- APPENDICES -

Managing Innovative Suppliers:

Exploring Company, Procurement

& Performance Variables

in New Zealand Construction Supply Chains.

Anne Anthonius Gerben Staal

A thesis submitted to
Auckland University of Technology
in fulfilment of the requirements for the degree of
Doctor of Philosophy

31 October 2018

Construction Management Programme
School of Engineering, Computer & Mathematical Sciences
AUCKLAND UNIVERSITY OF TECHNOLOGY
NEW ZEALAND

Table of Contents

References

Abbott, C., Dainty, A. (2009). Recognizing Innovation in Construction – introducing a new Task group. CIB Information Bulletin TG76.

Abbott, C., Jeong, K., Allem, S. (2006). The economic motivation for innovation in small construction companies, Construction Innovation vol. six N 3, (p. 187-196).

Adams, J. H. (2004). An empirical study on the state of the purchasing function within Small and Medium Sized Business Enterprises, PhD thesis, the George Washington University.

Adams, J. H., Khoja, F. M., Kauffman, R. (2012). An Empirical Study of Buyer–Supplier Relationships within Small Business Organisations. Journal of Small Business Management, 50(1), (p. 20-40).

Afuah, A.N. (2003). Innovation management: strategies, implementation and profits, Oxford University Press, NY.

Agndal, H. (2006). The purchasing market entry process--A study of 10 Swedish industrial small and medium-sized enterprises. Journal of Purchasing and Supply Management 12, (p. 182-196).

Ahn, J. M., Minshall, T., & Mortara, L. (2015). Open innovation: a new classification and its impact on firm performance in innovative SMEs. Journal of Innovation Management, 3(2), (p. 33-54).

Aken, J.E. van (2004). Management Research Based on the Paradigm of the Design Sciences: The Quest for Field-tested and Grounded Technological Rules. Journal of Management Studies, 41, 219-246.

Anderson, D. (2012). Prospectus for CUBE: The Centre for Urban Environment version 1.0. Internal publication of the Auckland University of Technology.

Andrews, D., Criscuolo, C., Gal, P., & Menon, C. (2015). Firm dynamics and public policy: evidence from OECD countries. In *RBA annual conference volume. Reserve Bank of Australia*.http://www.rba.gov.au/publications/confs/2015/andrews-criscuolo-gal-menon.html

Anting *et al.*, (2014). Education policy guidelines for sustainable built environments. UNEP, United Nations Environment Programme.

Antink, R., Garrigan, C., Bonetti, M., Westaway, R. (2014). Greening the Building Supply chain. UNEP Sustainable Buildings and Climate Initiative.

Aouad, G., Ozorhon, B., Abbott, C. (2010). Facilitating innovation in construction: Directions and implications for research and policy. Construction Innovation, 10(4), (p. 374-394).

Arend, R.J. (2006). SME-Supplier alliance activity in manufacturing: Contingent benefits and perceptions. Strategic Management Journal. 27(7), p. (741-763).

Arend, R.J., Wisner, J.D. (2005). Small Business and Supply Chain Management: is there a fit? Journal of Business Venturing, (p. 403-436).

Argyris, Ch., Schon, D.A. (1996). Organisational learning II – Theory, Method, Practice. Addison-Wesley Reading.

Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of marketing research*, 396-402.

Arnel, T. (2009). World Green Building Council (WGBC) - Six Continents. One Mission.

Arrigo, E. (2015). Open Innovation and Market Orientation: An Analysis of the Relationship. Journal of the Knowledge Economy, (p.1-12).

Ates, A. (2008). Strategy process in manufacturing Small Medium Enterprises. Doctoral dissertation, University of Strathclyde, UK.

AUT Ethic Guidelines (2015, 2018). https://www.aut.ac.nz/research/researchethics/guidelines-and-procedures#s. (Accessed 15 May 2015; accessed 5 August 2018).

AUT University Postgraduate Office. (2018). *Auckland University of Technology Postgraduate Handbook 2018*. AUT University.

Axelsson, B., Larsson, J. (2002). Developing purchasing and supply management skills in SMEs – An innovative concept for transfer and development of urgently needed knowledge. The 11th International Annual IPSERA Conference. Twente.

Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. Academy of management review, 14(4), (p. 496-515).

Bäckstrand, J., Jansson, D., Karlsson, J., & Löfving, M. (2016). Guidelines for designing a purchasing process for small businesses. In 25th International IPSERA Conference, Dortmund, March 20-23, 2016.

Baier, C. (2008). Alignment Performance Link in Purchasing and Supply Management. Springer.

Bals, L., Laine, J., & Mugurusi, G. (2018). Evolving Purchasing and Supply Organisations: A contingency model for structural alternatives. Journal of Purchasing and Supply Management 24, 41-58.

Bamford, C.E., Dean, T.J., Douglas, T.J. (2004): "The temporal nature of growth determinants in new bank foundings: implications for new venture research design", in: Journal of Business Venturing 19(6), (p. 899-919).

Barney, J. B. (2012). Purchasing, supply chain management and sustained competitive advantage: The relevance of resource-based theory. Journal of Supply Chain Management, 48(2), 3-6.

Barrett, P. & Sexton, M. (2006). Innovation in Small, Project-Based Construction Firms. British Journal of Management, 17(4), (p. 331-346).

Bartunek, J. M., Bobko, P. and Venkatraman, N. (1993). "Toward Innovation and Diversity in Management Research Methods," *The Academy of Management Journal* 36(6), 1362– 1373.

Basnet, C., Childerhouse, P., Ma, Y. (2010). Inhibitors to the adoption of supply chain management in New Zealand. International Journal of Logistics Systems and Management, 7(4), 472-489.

Bassioni, H. A., Price, A. D., & Hassan, T. M. (2005). Building a conceptual framework for measuring business performance in construction: an empirical evaluation. *Construction Management and Economics*, *23*(5), 495-507.

Batenburg, R., Versendaal, J. (2010). Maturity matters: performance determinants of the procurement business function. Utrecht, University of Utrecht, NL.

Bates, S.L., Bayne, K.M., Killerby, S.K. 2001. Room for a view: Three visions of the future built environment in Australasia. Forest Research Bulletin, 224.

Battisti, M., Deakins, D., Roxas, H. (2010). Explaining the levels of innovation and R&D in New Zealand's small and medium-sized enterprises: Too many small firms? Small enterprise research, 17(2), (p. 177-192).

Baumol, W. J. (2002). The free-market innovation machine: Analyzing the growth miracle of capitalism. Princeton university press.

Bemelmans, J. W. (2012). Buyer-supplier relationship management in the construction industry. University of Twente.

Benton, W.C., McHenry L.F. (2010). Construction Purchasing and Supply Chain Management, McGraw Hill, NY.

Berkhout, A. J., Hartmann, D., Van Der Duin, P., & Ortt, R. (2006). Innovating the innovation process. International journal of technology management, 34(3-4), (p. 390-404).

Berman, J., Smyth, R. (2013). Conceptual frameworks in the doctoral research process: a pedagogical model. Innovations in Education and Teaching International, http://dx.doi.org/10.1080/14703297.2013.809011, retrieved December 2013.

Bernstein, H. M., Kissinger, J. P., Kirksey, W. (1998). Moving innovation into practice. In Civil Engineering in the Asia Region@ Asian Infrastructure, Sustainable Development and Project Management (250-260). ASCE. (Not available via AUT library; cited in Gambatese & Hallowell, 2011a).

Bettis, R. A., & Hitt, M. A. (1995). The new competitive landscape. Strategic management journal, 16(S1), 7-19.

Bint, L., Pollard, A. (2015). Good for Business. Built 146, February / March Edition. BRANZ, Wellington.

Bint, L., Vale, R., & Isaacs, N. (2014). Water Efficiency in Office Buildings. *Water Efficiency in Buildings: Theory and Practice*, 241-251.

Bocken, N. M. P., Farracho, M., Bosworth, R., Kemp, R. (2014). The front-end of eco-innovation for eco-innovative small and medium sized companies. Journal of Engineering and Technology Management, 31, (p. 43-57).

Boodie, M. (2018). *Purchasing knowing-doing gaps and the influence of incentives from a buyer-internal customers relationship perspective*. Research University Groningen, PhD Thesis in Business & Economics. June 2018.

Bos, H. (2010). Sustainable Innovation Processes with small firms in construction and plastics industry. PhD Thesis University of Amsterdam.

Bossink, B. A. (2004). Managing drivers of innovation in construction networks. Journal of construction engineering and management, 130(3), (p. 337-345).

Bossink, B. Vrijhoef, R. (2009). Innovation management in the construction supply chain. Chapter 14 from the book Construction Supply Chain Management.

BRANZ (2013). On sustainable examples http://www.branz.co.nz/cms_display.php?sn=113&st=1&pg=9472, (Retrieved 8 December 2013).

BRANZ (2014). Building Research Levy Prospectus 2014/2015. Wellington, New Zealand.

Brem, A., & Tidd, J. (Eds.). (2012). Perspectives on supplier innovation: Theories, concepts and empirical insights on open innovation and the integration of suppliers (Vol. 18). World Scientific.

Brochner, J. (2013). Construction patents and university-industry research interaction. An analysis of Nordic region data. Construction Innovation. Vol. 13 No. 4, (p. 410-423).

Brown, F. A. (2004). Foreign sourcing behaviour of New Zealand retail SMEs (Thesis, Master of Commerce). Retrieved from http://hdl.handle.net/10523/1304

Brundtland, G.H. (1987). Address at 8th World Commission on Environment and Development. UN Report at the closing ceremony of the 8th and final meeting of the world commission on environment and development, Tokyo, two February 1987.

Brunswicker, S., & Vanhaverbeke, W. (2015). Open Innovation in Small and Medium-Sized Enterprises (SMEs): External Knowledge Sourcing Strategies and Internal Organizational Facilitators. Journal of Small Business Management, 53(4), (p. 1241-1263).

Brush, G. (2000) Supplier development strategies for small high technology firms. Innovation: Management, Policy & Practice, vol. 3, no. 3, pp. 3-10.

Buijs, J. A. (2012). The Delft innovation method: A design thinker's guide to innovation. 9th Norddesign conference 2012, Aalborg, Denmark, 22-24 August 2012.

Building a Better New Zealand (2013). A New Zealand industry-government partner. Research Strategy for the Building, Construction Industry. http://www.buildingabetternewzealand.co.nz/home. Retrieved May 2014.

Buildingvalue.nz (2014). Website on building and construction productivity partnership in New Zealand. Retrieved April 2014.

Burns, P. (2001). Entrepreneurship and Small Business, Chapter 1, 2nd ed. Palgrave London.

Bush (2014). Small cost to be green. New Zealand green Building Council. Build magazine, December 2013 / January 2014. BRANZ, New Zealand.

Bygballe, L., Jahre, M., Svard, A. (2010). Partnering relationships in construction - a literature review. Journal of Purchasing and Supply Management, 16.

Cagliano, R., Spina, G. (2002). „A comparison of practice-performance models between small manufacturers and subcontractors“, International Journal of Operations & Production Management, (22), 12, (p. 1367-1388).

Cambra-Fierro, J.J., Polo-Redondo, Y. (2008). Long-term Orientation of the Supply Function in the SME Context. International Small Business Journal 26, (p. 619-646).

Cameron, K. S., & Quinn, R. E. (2011). Diagnosing and changing organizational culture: Based on the competing values framework. John Wiley & Sons.

Canham, S., & T. Hamilton, R. (2013). SME internationalisation: offshoring,“backshoring”, or staying at home in New Zealand. *Strategic Outsourcing: An International Journal*, *6*(3), 277-291.

Carr, A. S., & Pearson, J. N. (1999). Strategically managed buyer–supplier relationships and performance outcomes. Journal of operations management, 17(5), 497-519.

Carr, A.S., Smeltzer, L.R. (1997). An empirically based operational definition of strategic purchasing, European Journal of Purchasing & Supply Management, three (4), pp. 199-207.

Chandler Jr, A. D. (1977). The visible hand: the managerial revolution in American Business.

Cheng, C. C., Huizingh, E. K. (2014). When is open innovation beneficial? The role of strategic orientation. Journal of Product Innovation Management, 31(6), (p. 1235-1253).

Chesbrough, H. W. (2003). Open innovation: the new imperative for creating and profiting from technology. Boston: Harvard Business School Press.

Chesbrough, H. W., & Crowther, A. K. (2006). Beyond high tech: early adopters of open innovation in other industries. R&D Management, 36(3), (p. 229–236).

Chesbrough, H., Vanhaverbeke,W., & West,J. (Eds.) (2006).Oxford University Press,

Chick, G., & Handfield, R. (2014). *The Procurement Value Proposition: The Rise of Supply Management*. Kogan Page Publishers.

Chicksand, D., Watson, G., Walker, H. Radnor, Z., Johnston, R. (2012). Theoretical perspectives in purchasing and supply chain management: an analysis of the literature. Supply Chain Management: An International Journal. 17/4 (p. 454–472).

Christiaans, H. H. C. M., Fraaij, A. L. A., De Graaff, E., Hendriks, Ch. F. (2004). Methodologie van technisch-wetenschappelijk onderzoek. Lemma-Boom Koninklijke Uitgevers.

Chung, J-E. (2012). When and How Does Supplier Opportunism Matter for Small Retailers -- Channel Relationships with the Suppliers? Journal of Small Business Management, vol. 50, no. 3, pp. 389-407.

Cohen, J. (1992). *Statistical power analysis for the behavioral sciences*. (Second Edition). Hillsdale, NJ: Erlbaum Associates.

Collier, D. A., & Evans, J. R. (2013). OM4 (Operations Management 4). South-Western Cengage Learning.

Colmar-Brunton (2013). www.colmarbrunton.co.nz. Better Business – Better World. Retrieved 23 February 2015.

Cooper, R. G. (2013). Where are all the breakthrough new products? Research Techn. MGMT, 56(5), (p. 25-33).

Cooper, R. G., Kleinschmidt, E. J. (1995). Benchmarking the firm's critical success variables in new product development. Journal of product innovation management, 12, (p. 374-391).

Cornelissen, J.P. (2017). Developments in theory building in business research. Rotterdam School of Management, powerpoint presentation at the WION (Werkgemeenschap Inkoop Onderzoek Nederland), Lunteren, 24 January 2017.

Cornell University, INSEAD, and WIPO (2015): The Global Innovation Index 2015: Effective Innovation Policies for Development, Fontainebleau, Ithaca, Geneva. https://www.globalinnovationindex.org/content/page/data-analysis/.

Cortinhas, C. & Black, K. (2012). Statistics for Bus iness and Economics. First European Edition. John Wiley & Sons Ltd.

Cousins, P. D. (2002). A conceptual model for managing long-term inter-organisational relationships. European Journal of Purchasing, Supply Management, 8(2), (p. 71-82).

Cox, A. (2015). Sourcing portfolio analysis and power positioning: towards a "paradigm shift" in category management and strategic sourcing. Supply Chain Management: An International Journal, 20(6), 717-736.

Cramer, D. (1998). *Fundamental statistics for social research: step-by-step calculations and computer techniques using SPSS for Windows*. Psychology Press.

Cramer, D., & Howitt, D. L. (2004). *The Sage dictionary of statistics: a practical resource for students in the social sciences*. Sage.

CRC (2009). Collaborative Research Centre for Construction Innovation. www.construction-innovation.info. Retrieved 29 February 2016.

Crespin-Mazet, F., Portier, P. (2010). The reluctance of construction purchasers towards project partnering. Journal of Purchasing and Supply Management, 16, (p. 230 – 238).

Creswell, J.W. (2003). Research design – qualitative, quantitative, and mixed-method approaches. Thousand Oaks, California: Sage Publications.

Cuerva, M. C., Triguero-Cano, Á., & Córcoles, D. (2014). Drivers of green and non-green innovation: empirical evidence in Low-Tech SMEs. Journal of Cleaner Production, 68, 104-113.

Cullen, S. (2012). The contract scorecard: successful outsourcing by design. Gower Publishing, Ltd.

Curtis, M. & Norman, D. (2014). Productivity trends and implications for our industry. BRANZ. Study report SR 326.

Cutler, A. (2015). "A decade of Green – where are we? New Zealand Market Update". NZGBC Green Property Summit 2015. NZGBC website, https://www.nzgbc.org.nz/Article?Action=View&Article_id=15retrieved 27 February 2016.

Dahlander, L., Gann, D. (2010) How open is innovation? Research Policy, v.39, (p. 699-709).

Dahlman, C. J., Westphal, L. E. (1981). The meaning of technological mastery in relation to transfer of technology. The Annals of the American Academy of Political and Social Science, 458(1), (p. 12-26).

Davidson, C. (2013). Innovation in construction - before the curtain goes up. Construction Innovation. Vol. 13 No. 4, (p. 344-351).

Davidsson, P. (2016). Researching Entrepreneurship – conceptualization and design. 2nd Ed. Springer. International Studies in Entrepreneurship.

Davidsson, P. Achtenhagen, L., Naldi, L. (2005). Research on Small Firm Growth – a Review. Queensland University of Technology.

Day, M., Lichtenstein, S. (2006). Strategic supply management: the relationship between supply management practices, strategic orientation and their impact on organisational performance. Journal of Purchasing and Supply Management, 12(6), 313-321.

De Clercq, D., Thongpapanl, N., & Voronov, M. (2015). Explaining SME engagement in local sourcing: The roles of location-specific resources and patriotism. International Small Business Journal, 33(8), 929-950.

De Jong, J. P. J. (2005). De bron van vernieuwing: rol van netwerken bij innovaties in het MKB. EIM, Onderzoek voor Bedrijf, Beleid. (The source of renewal – role of networks for innovations by SMEs. EIM Research Institute of Business, Policy).

De Jong, J. P., Vermeulen, P. A. (2006). Determinants of product innovation in small firms a comparison across industries. International small business journal, 24(6), (p. 587-609).

De Valence, G. (2010). Innovation, Procurement and Construction Industry Development. Australasian Journal of Construction Economics and Building, 10 (4), (p. 50-59).

De Valence, G. (no date; probably around 2002) Defining an industry – what is the size and scope of the Australian Building and Construction Industry? The Australian Journal of Construction Economics, Building, (p. 53-65).

De Villiers, R. (2013). *Management competence and incompetence training: theory and practice* (Doctoral dissertation, Auckland University of Technology).

De Waal, G.A. (2011). New Product Development – a study of the adoption, usage and impact of tools among small high technology firms. PhD thesis, University of Canterbury.

De Waal, G.A. (2013). Innovation tool adoption and adaptation in small technology-based firms. Int. Journal of Innovation Management, volume 17, (p. 19-25).

Deakins, D. (2013). The Role of Finance in the Development of Technology--based SMEs: Evidence from New Zealand. Massey University. ACERE conference Brisbane.

Dennis, W. J., Jr. (2003). Raising response rates in mail surveys of small business owners: Results of an experiment. Journal of Small Business Management, 41(3), (p. 278-295).

Dess, G. G., Lumpkin, G. T., & Covin, J. G. (1997). Entrepreneurial strategy making and firm performance: Tests of contingency and configurational models. Strategic management journal, 18(9), 677-695.

Díez-Vial, I. (2009). Firm Size Effects on Vertical Boundaries. Journal of Small Business Management, vol. 47, no. 2, pp. 137-53.

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). Mail and Internet Surveys: The Tailored Design Method, Third edition. New York: John Wiley and Sons

Dilts, J. C., & Prough, G. E. (1989). Strategic options for environmental management: A comparative study of small vs. large enterprises. Journal of Small Business Management, 27(3), 31.

Dollinger, M.J., Kolchin, M.G. (1985). Purchasing and the Small firm. US Journal of Small Business, 10, 3, (p. 33-45).

Drechsler, W., & Natter, M. (2012). Understanding a firm's openness decisions in innovation. Journal of Business Research, 65(3), (p. 438-445).

Drucker, P. F., Drucker, P. F. (2007). Innovation and entrepreneurship: Practice and principles. Routledge.

Dubois, A., Araujo, L. (2007). Case research in purchasing and supply management: opportunities and challenges. Journal of Purchasing and Supply Management, 13(3), (p. 170-181).

Dubois, A., Gadde, L.E. (2002). Systematic combining: an abductive approach to case research. Journal of Business Research 55 (7), 553–560.

Edmondson, A., McManus, St. (2007). Methodological Fit in Management Field Research. The Academy of Management Review, Vol. 32, No. 4 (Oct. 2007), pp. 1155-1179

Edwards, D. J., Holt, G. D. (2010). The case for “3D triangulation” when applied to construction management research. Construction Innovation: Information, Process, Management, 10(1), (p. 25-41).

Egan, J (1998). Rethinking Construction: The Report of the Construction Task Force to the Deputy Prime Minister. DTI. London.

EIPM (2005). The EIPM Purchasing Glossary. European Institute for Purchasing Management. http://www.eipm.org/1-Pages/AboutUs_Research.htm. Retrieved June 2014.

EIPRO (2006), by Tukker A. *et al.*, 2006. Environmental Impact of Products (EIPRO). Analysis of the life cycle environmental impacts related to the final consumption of the EU-25.

Eisenhardt, K. M. (1989). Building theories from case study research. Academy of Management Review, 14(4), (p. 532-550).

Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century business. Environmental Quality Management.

Ellegaard, C. (2006). Small company purchasing: A research agenda. Journal of Purchasing and Supply Management 12, (p. 272-283).

Ellegaard, C. (2008). Supply risk management in a small company perspective. Supply Chain Management: An International Journal 13, (p. 425-434).

Ellegaard, C. (2009). The purchasing orientation of small company owners. Journal of

Engeldorp Gastelaars, Ph. van (1998). Theorievorming en methoden van onderzoek binnen de sociale wetenschappen. (Theory building and research methodology within social sciences), 2nd ed. Service Post, NL.

Esbjerg, L., Knudsen, M. P., & Søndergaard, H. A. (2012). Diffusion of open innovation practices in Danish SMEs. *Ledelse & Erhvervsøkonomi*, *77*(2), 27-39.

Eshima, Y., & Anderson, B. S. (2017). Firm growth, adaptive capability, and entrepreneurial orientation. Strategic Management Journal, 38(3), 770-779.

European Commission (2006). Joint Research Centre - Technical Report EUR 22284 EN. http://ec.europa.eu/environment/ipp/pdf/eipro_report.pdf. Retrieved May 2014.

European Commission (2010). Bio intelligence Service - Service contract on management of construction and demolition waste. Draft Final Report Task 2. European Commission (DG ENV). http://ec.europa.eu/environment/waste/prevention/pdf/WPG_final_report.pdf. Retrieved September 2014.

European Commission (2015). http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm. (Website accessed 12 September 2015).

European Union (2003). Commission Recommendation 2003/361/EC, concerning the definition of micro, small and medium-sized enterprises.

Fairweather, J. (2010). Can building, construction sector innovation be improved? BRANZ, Lincoln University.

Fairweather, J., *et al.* (2009). Why do builders innovate? A review of the international literature on home-builder innovation, BRANZ report, Lincoln University.

Farshchi, (2004). Construction technology: an evaluation of patent data, 1969-1995. Unpublished report, The University of Reading, Reading. (Quoted in Farshchi, M. A., Brown, M., 2011).

Farshchi, M. A., Brown, M. (2011). Social networks and knowledge creation in the built environment: a case study. Structural Survey, 29(3), (p. 221-243).

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. International journal of qualitative methods, 5(1), 80-92.

Field, A. P. (2009). *Discovering statistics using SPSS.* London, England: SAGE.

Fisher, L. (1970). Industrial Marketing – an analytical approach to planning and execution, 2nd Ed. Princeton.

Foerstl, K. Hartman, E. Wynstra, F., Moser, R. (2013). Cross-functional integration and functional coordination in procurement and procurement management: Antecedents and effects on procurement and firm performance", International Journal of Operations, Production Management, vol. 33 Issue: 6, (p. 689-701).

Forsgren, R.A. (1989). Increasing mail survey response rates – methods for small business researchers. Journal of small business management.

Fouché, C., Light, G. (2011). An invitation to dialogue 'the world café' in social work research. Qualitative Social Work, 10(1), (p. 28-48).

Franz, B. (2018). Revisiting Entrepreneurial Orientation and its Contributions to Business Performance: An Industry Type Comparison employing Computer-Aided Text Analysis under Consideration of Configurational, Contingency, Environmental, and Temporal Aspects (Doctoral dissertation, Durham University).

Frederik, H., Monsen, E. (2011). New Zealand's perfect storm of entrepreneurship and economic development. Small Business Economics, 37, (p. 187-204).

Frost, J. (2017). Choosing between a Nonparametric test and a Parametric Test. http://blog.minitab.com/blog/adventures-in-statistics-2/choosing-between-a-nonparametric-test-and-a-parametric-test, accessed 20 July 2017.

Gadde, L-E, Hakansson, H. (2001) Supply Network Strategy, Wiley, Chichester 2nd Edition.

Gambatese, J., Hallowell, M. (2011b). Factors that influence the development and diffusion of technical innovations in the construction industry. Construction Management and Economics, 29, (p. 507-517).

Gambatese, J., Hallowell, M., (2011a). Enabling and measuring innovation in the construction industry. Construction Management and Economics, 29, (p. 553–567).

Garcia, R., Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. Journal of product innovation management, 19(2), (p. 110-132).

Gassmann, O., Enkel, E. (2004). Towards a theory of open innovation: three core process archetypes'. Proceedings of the R&D Management Conference. 6-9 July 2004. Lisbon, Portugal.

Giannakis, M. (2012). Choice of Research Methodology: choosing a methodology for your research and emerging topics in SCM for the next 10 years. Warwick Business School. Presentation for the IFPSM Summer School, Salzburg.

Gibbs, Gr. R. (2011, 24 October). Coding Part 1- 4, based on Bryman's four stages of qualitative analysis. Series of YouTube videos by Graham Gibbs and University of Huddersfield. https://www.youtube.com/watch?v=7X7VuQxPfpk. Accessed November 2015.

Gibbs, Gr.R (2014). The Chi-Square Statistic and Reporting Results. Part 2 of 2 on Crosstabulations and Chi-Square. YouTube video https://www.youtube.com/watch?v=JmaL62bDsf8. Published 11 March, 2014. Accessed 15 June 2018.

Glavinich, Th. (2008). The AGC contractors's guide to green building construction: management, project delivery, documentation and risk reduction. John Wiley, Sons, New Jersey, US.

Goethe, J.W. (1790). Maximen und Reflexionen. Aphorismen und Aufzeichnungen. Nach den Handschriften des Goethe- und Schiller-Archivs hg. von Max Hecker, Verlag der Goethe-Gesellschaft, Weimar 1907. Aus Kunst und Altertum, 5. Bandes 3. Heft, 1826. Einzelnes. Maximen und Reflectionen.

Gonzalez-Benito, J. (2007). A theory of purchasing's contribution to business performance. Journal of Operations Management 25. (p. 901–917).

Graetz, F., Rimmer, M., Lawrence, A., & Smith, A. (2006). Managing Organisational Change (2nd Australasian Edition ed.): John Wiley & Sons Australia, Ltd.

Grande, T. (2017). Introduction to the Chi-Square test. YouTube video https://www.youtube.com/watch?v=2SKXRB-bJKo. Published 8 July 2017. Accessed 15 June 2018.

Grant, D.B., Teller, Ch., & Teller, W. (2005). *Web-based Surveys in Logistics Research: An Empirical Application.* In Research Methodologies in Supply Chain management. (Kotzab *et al.* Eds, 2005).

Gray, C. (1998). Enterprise and Culture. Routledge, London.

Gronum, S., Verreynne, M. L. (2011). Open innovation in Australian small firms: When should we collaborate? In 8th AGSE International Entrepreneurship Research Exchange (1079-1091). Swinburne University of Technology.

Gronum, S., Verreynne, M. L., Kastelle, T. (2012). The Role of Networks in Small and Medium-Sized Enterprise Innovation and Firm Performance. Journal of Small Business Management, 50(2), (p. 257-282).

Grosfeld-Nir, A., Ronen, B., & Kozlovsky, N. (2007). The Pareto managerial principle: when does it apply? *International Journal of Production Research*, *45*(10), 2317-2325.

Grundström, C., Sjöström, R., & Rönnbäck, A. Ö. (2014). Effect of Inbound Open Innovation on Performance in Manufacturing SMEs. Proceedings from the International Society for Professional Innovation Management (ISPIM).

Gurau, C. (2011). Supply Chain Organization and Management in French SMEs: An Exploratory Study. perspective, 8, 9.

Hagelaar, G. Staal, A. Holman, R. Walhof, G. (2014). An integral framework for studying purchasing and supply management in SMEs. Competitive Paper presented at 24th IPSERA Conference, South Africa.

Hagelaar, G. Staal, A. Holman, R. Walhof, G. (2015a). The nature of embedded purchasing activities in SMEs – results from a Dutch multiple case study. 25th IPSERA Conference, Amsterdam.

Hagelaar, G. Staal, A. Holman, R. Walhof, G. (2015b). Tools for identifying critical control points in embedded purchasing activities in SMEs. 25th IPSERA Conference, Amsterdam.

Hanna, V., & Jackson, J. (2015). An examination of the strategic and operational impact of global sourcing on UK small firms. Production Planning & Control, 26(10), 786-798.

Hardie, M. (2011a). Factors influencing technical innovation in construction small firms - an Australian perspective. Engineering, Construction and Architectural Management, Vol 18, No 6, (p. 618-636).

Hardie, M. (2011b). Technical Innovation Delivery in Small and Medium Construction Enterprises (PhD Thesis, University of Western Sydney).

Hardie, M. *et al.* (2006). Innovation performance and its impact on profitability among groups in the Australian construction industry. Australian Journal of Construction Economics & Building. Vol6, No1.

Hardie, M., Allen, J., Newell, G. (2013). Environmentally driven technical innovation by Australian construction SMEs. Smart and green Built Environment, 2(2), (p. 179-191).

Hardie, M., Khan, S., Miller, G. (2006). Waste minimisation in office refurbishment projects: an Australian perspective.

Hartmann, A., & Caerteling, J. (2010). Subcontractor procurement in construction: the interplay of price and trust. Supply chain management: an international journal, 15(5), (p. 354-362).

Hartmann, E., Kerkfeld, D., Henke, M. (2012). Top and bottom line relevance of purchasing and supply management. Journal of Purchasing and Supply Management, 18(1), (p. 22-34).

Hattie, J. (1992). Measuring the effects of schooling. *Australian Journal of education*, *36*(1), 5-13.

Head, M. L., Holman, L., Lanfear, R., Kahn, A. T., & Jennions, M. D. (2015). The extent and consequences of p-hacking in science. PLoS biology, 13(3), e1002106.

Henderson, R. M., Clark, K. B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. Administrative science quarterly, (p. 9-30).

Hervas-Oliver, J. L., Baixauli, J. J., & Perez, B. (2012). Small Firms and Search Strategies to Access External Knowledge from Universities: An Empirical Approach in Low-Tech Firms. In Production Systems and Supply Chain Management in Emerging Countries: Best-practices (pp. 239-256). Springer Berlin Heidelberg.

Hinton, M. A. (2013). Convenient immorality: a substantive theory of competitive procurement in the New Zealand construction industry. (Link: http://ir.canterbury.ac.nz/handle/10092/8714).

Hochschild, J. L. (2009). Conducting intensive interviews and elite interviews. In Workshop on interdisciplinary standards for systematic qualitative research. National Science Foundation.

Hoffmann, P. (2011). Innovative Supply Risk Management. The Development of Comprehensive Innovations with Suppliers. PhD Thesis, Technical University of Twente. ISBN: 978-90-365-3278-5, the Netherlands.

Hölzl, W. (2009). Is the R&D behaviour of fast-growing SMEs different? Evidence from CIS III data for 16 countries. Small Business Economics, 33(1), 59-75.

Hopkins, W. G. (2002). A scale of magnitudes for effect statistics. A new view of statistics, 502. http://davidmlane.com/hyperstat/effect_size.html. Accessed September 2017

Huang, H. C., Lai, M. C., & Huang, W. W. (2015). Resource complementarity, transformative capacity, and inbound open innovation. Journal of Business & Industrial Marketing, 30(7), 842-854.

Hubbard, K. A. B., Adams, J. H., & Whitten, D. D. (2008). Purchasing And Supply Chain Management Practices In Greek Small And Medium Sized Business Enterprises (SMES). INTERNATIONAL BUSINESS AND ECONOMICS RESEARCH JOURNAL, 7(6), 39.

Huberman, A. M., Miles, M. B. (1994). Data management and analysis methods. Book.

Huberman, M., Miles, M. (1989). Some procedures for causal analysis of multiple-case data. Qualitative Studies in Education. VOL. 2, NO. 1, 55-68.

Huczynski, A., Buchanan, D. A. (2001). Organizational behaviour. Financial Times Prentice Hall.

Hughes & Weiss (2007). Kraft Food - Getting closer to key suppliers. CPO Agenda, Autumn: 19-23. Article and Figure cited in Johnsen Howard & Miemczyk (2014). Purchasing & Supply Chain Management – a sustainability perspective (p. 113-114). Textbook Routledge.

Hulbert, B., Gilmore, A., Carson, D. (2013). Sources of opportunities used by growth minded owner managers of small and medium sized enterprises. International Business Review, 22(1), (p. 293-303).

Hultink, E. J., & van den Hende, E. (2011). Report on collaborative innovation management practices. Report for the European Commission.

Huttinger, L. (2014). Preferential customer treatment by suppliers Identifying benefits and antecedents. PhD thesis TU Twente, The Netherlands.

Idrissia, M., Amaraa, N., & Landrya, R. (2012). SMEs' degree of openness: the case of manufacturing industries. Journal of technology management & innovation, 7(1), 186-210.

Inauen, M., & Schenker-Wicki, A. (2011). The impact of outside-in open innovation on innovation performance. European Journal of Innovation Management, 14(4), (p. 496-520).

Inauen, M., & Schenker-Wicki, A. (2012). Fostering radical innovations with open innovation. European Journal of Innovation Management, 15(2), (p. 212-231).

ISO 20400 (2017). Sustainable Procurement Guidance. Geneva, Switzerland.

James, P. Saad, M. Douglas, A., Philips, W. (2012). Key Characteristics of SME procurement – An Empirical Study. Conference paper IPSERA 2012, Naples.

James, P. Saad, M. Lamming, R., Douglas, A. Paverly, H., Trujillo, V. (2011). Key Characteristics of SME procurement – a literature review. Conference paper IPSERA 2011, Maastricht.

Jell, F. (2011). Patent Filing Strategies and Patent Management: An Empirical Study. Springer.

Jennings, P., & Beaver, G. (1997). The performance and competitive advantage of small firms: a management perspective. International Small Business Journal, 15(2), (p. 63-75).

Jensen, P., *et al.* (2012). Trust, Incomplete Contracts and the Market for Technology. University of Melbourne.

Johnsen, T., Calvi, R., Phillips, W. (2011). Purchasing and supplier involvement in discontinuous innovation: a literature review.

Johnsen, Th. E., Howard, M., Miemczyk , J. (2014). Purchasing and Supply Chain Management – a sustainability perspective. First Edition, Routledge, NY.

Johnson, G., Scholes, K., & Whittington, R. (2008). Exploring corporate strategy: Text and cases. Pearson Education.

Johnson, P. F., Leenders, M. (2007). A longitudinal study of supply organisational change. Journal of Purchasing, Supply Management 12, (p. 332–342).

Jones, R. (1996). Small-Firm Success and Supplier Relations in the Australian Boat-Building Industry: A Contrast of Two Regions. Journal of Small Business Management 34, (p. 71-78).

Ju, P. H., Chen, D. N., Yu, Y. C., & Wei, H. L. (2013). Relationships among open innovation processes, entrepreneurial orientation, and organizational performance of SMEs: the moderating role of technological turbulence. In International Conference on Business Informatics Research (pp. 140-160). Springer, Berlin, Heidelberg.

Julien, P. A. (1995). New technologies and technological information in small businesses. Journal of Business Venturing, 10(6), (p. 459-475).

Kaats, E., Opheij, W. (2013). Collaboration: A Fundamental Capability in Society and Organisations. Essential Conditions for Promising Collaboration.

Kashiwagi, D., Byfield, R. E. (2002). Selecting the best contractor to get performance: on time, on budget, meeting quality expectations. Journal of Facilities Management, 1(2), (p. 103-116).

Kasouf, C. J., Celuch, K. G., 1997. Interfirm Relationships in the Supply Chain: The Small

Kauppi, K. Brandon-Jones, A., Ronchi, S., Van Raaij, E. (2013). Tools without skills – exploring the moderating effect of absorptive capacity on the relationship between e-purchasing tools and category performance. International Journal of Operations, Production Management. Vol 33, no 7. (p. 828-857).

Keijzers, G., Bos-Brouwers, H. E. J., Rensman, M. (2007). Classificatie van het Nederlandse MKB: Uitdagen, helpen, coachen, eisen. Nijenrode University, the Netherlands.

Kenny, D. A. (1996). The design and analysis of social-interaction research. Annual Review of Psychology, 47, 59-86.

Kibbeling, M. I. (2010). Creating Value in Supply Chains: Supplier's Impact on Value for Customers, Society and Shareholders. PhD diss., Eindhoven University of Technology.

Kibert, Ch. & Grosskopf, J. (2005). Radical sustainable construction – envisioning next-generation green buildings. The 2005 World Sustainable Building Conference. Tokyo, 27-29 September, (p. 4154-4161).

Kjaergaard, T. (2016). *Chasing the Butterfly Effect Through Global Institutional and Organisational Architectures for Corporate Sustainability Reporting*. PhD Thesis submitted to School of Business and Social Sciences, Aarhus University.

Knoke, D., Bohrnstedt, G. W. & Mee, A.P. (2002). Statistics for social data analysis, 4th edition. Wadsworth Publishers.

Knott, P. (2008). Strategy tools: who really uses them? *Journal of Business Strategy*, *29*(5), 26-31.

Knudsen, M.P., Servais, P. (2007). Analyzing internationalisation configurations of SMEs: The purchaser's perspective. Journal of Purchasing and Supply Management. 13(2), (p. 137-151).

Koebel, C. T. (2008). Innovation in homebuilding and the future of housing. Journal of the American Planning Association, 74(1), (p. 45-58).

Koebel, C. T., Cavell, M. (2006). Characteristics of Innovative Production Home Builders (No. 39075). HUD USER, Economic Development.

Koen, P., Ajamian, G., Burkart, R., Clamen, A., Davidson, J., D'Amore, R., ..., Wagner, K. (2001). Providing Clarity and a Common Language to the. Research-Technology Management, 44(2), (p. 46-55).

Kraljic, P. (1983). Purchasing must become supply management. Harvard business review, Chicago 61(5), (p. 109-117).

Kreimeier, M. & Schuh, G. (2014) Designing technology purchasing for SMEs. IPT Fraunhofer, Aachen, Germany. IPSERA working paper 2016.

Kumar, N. (2012). *Capability, governance and collaboration: understanding the supplier perspective* (Doctoral dissertation, University of Bath).

Kumar, R. (2005). Research Methodology: A Step-by-Step Guide for Beginners. London: Sage.

Kumar, R. (2011). Similarities and Differences in the Strategic Orientation, Innovation Patterns and Performance of small firms and Large Companies. The Business Review, Cambridge16.2 (Dec 2010): (p. 50-56).

Landeta, J., Barrutia, J., Lertxundi, A. (2011). Hybrid Delphi: a methodology to facilitate contribution from experts in professional contexts. Technological Forecasting and Social Change, 78(9), (p. 1629-1641).

Langerak, F. (2014). How research domains develop over time: The case of cycle time research. Presentation at the Annual Dutch Conference on Procurement Research (WION).

Laraja, B.M., Lillo, F.G. (2004). SMEs and supplier alliances use: an empirical analysis. Supply Chain Management: An International Journal. 9(1), (p. 71-85).

Lasagni, A. (2012). How can external relationships enhance innovation in SMEs? New evidence for Europe. Journal of Small Business Management, 50(2), (p. 310-339).

Latham, M. (1994). Constructing the Team. London: HSMO.

Laursen, K., & Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. Strategic management journal, 27(2), 131-150.

Lavery, L. (2013). *Statistical Testing for Beginners*. Academic Consulting, Auckland, New Zealand.

Le , M. A., Calvi, R., & Cheriti, S. (2010). Developing an approach for design-or-buy-design decision-making. Journal of Purchasing and Supply Management, 16(2), 77-87.

Le Dain, M. A., Calvi, R., Cheriti, S. (2008). Development of a tool for self-assessing the project team's ability to co-design with suppliers in new product development. In 15th International Product Development Management Conference, Hamburg.

Le Dain, M. A., Calvi, R., Cheriti, S. (2011). Proposition of a tool to evaluate customer's performance in collaborative product development with suppliers. International Journal on Interactive Design and Manufacturing (IJIDeM), 5(2), (p. 73-83).

Lee, D. M., & Drake, P. R. (2010). A portfolio model for component purchasing strategy and the case study of two South Korean elevator manufacturers. International Journal of Production Research, 48(22), 6651-6682.

Lee, S., Park, G., Yoon, B., & Park, J. (2010). Open innovation in SMEs—An intermediated network model. *Research policy*, *39*(2), 290-300.

Lenderink, B., Voordijk, H., Halman, J., & Dorée, A. (2018). Public procurement and innovation: A conceptual framework for analysing project-based procurement strategies for innovation. IPSERA Proceedings.

Lewin, K. (1948). Action research and minority problems. In: Resolving social conflicts; Harper, Row; NY.

Lichtenthaler, U., & Ernst, H. (2009). Opening up the innovation process: the role of technology aggressiveness. R&d Management, 39(1), 38-54.

Lim, J.N., Ofori, G. (2007). Classification of innovation for strategic decision making in construction businesses. Construction Management, Economics, 25 (9), (p. 936-978).

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. Thousand Oaks, CA: Sage.

Linton, J. D. (2009). De-babelizing the language of innovation. *Technovation*, *29*(11), 729-737.

Lofgren, K. (2017). Normality test using SPSS: How to check whether data are normally distributed. Youtube video, accessed 17 July 2017. Umeä University Sweden.

London.

Lu, S., Sexton, M. G. (2004). Appropriate Research Design for Investigating Innovation in Small Knowledge-Intensive Professional Service Firms. Management, 2, (p. 733-739).

Lumpkin, G. T., Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. Academy of management Review, 21(1), (p. 135-172).

Maass, F., Führmann, B. (2012). Innovationstätigkeit im Mittelstand: Messung und Bewertung (No. 212). IfM-Materialien, Institut für Mittelstandsforschung (IfM) Bonn.

MacInnes, J. (2016). An Introduction to Secondary Data Analysis with IBM SPSS Statistics. SAGE.

Malhotra, N. K. & Birks, D. F. (2001). *Marketing research: an applied approach.* 3rd, European Edition, Prentice Hall.

Manley, K. (2008a). Against the odds: Small firms in Australia successfully introducing new technology on construction projects. Research Policy 37, (p. 1751-1764).

Manley, K. (2008b). Implementation of innovation by manufacturers subcontracting to construction projects. Journal of Engineering, Construction and Architectural Management (ECAM). Vol. 15 No 3.

Manley, K., Blayse, A. M., McFallan, S. (2005). Demonstrating the benefits of construction innovation.

Manley, K., Marceau, J., Parker, R. L., Matthews, J. H. (2008). The potential contribution of small firms to innovation in the built environment.

Manley, K., Rose, T. M. (2014b). Green urbanism and diffusion issues. In Proceedings of the World Sustainable Building Conference (SB14).

Manley, K., Rose, T., Lewis, J. (2014a). The distribution of absorptive capacity among construction supply chain participants.

Manyika, J., Chui, M., Bughin, J., Dobbs, R., Bisson, R., Marrs, A. (2013). Disruptive technologies: Advances that will transform life, business, and the global economy. McKinsey Report.

Marshall, D., McCarthy, L., McGrath, P., & Claudy, M. (2015). Going above and beyond: how sustainability culture and entrepreneurial orientation drive social sustainability supply chain practice adoption. Supply Chain Management: An International Journal, 20(4), 434-454.

Mason, K., Spring, M. (2011). The sites and practices of business models. Industrial Marketing Management, 40(6), (p. 1032-1041).

Masood, R., Lim, J., & Gonzalez, V. A. (2016). A Taxonomy of Construction Supply Chain for Affordable Housing in New Zealand. International Journal of Structural & Civil Engineering Research Vol.5, No. 1.

Matthyssens, P., & Vandenbempt, K. (2003). Cognition-in-context: reorienting research in business market strategy. *Journal of Business & Industrial Marketing*, *18*(6/7), 595-606.

Maylor, H. (2001). Assessing the relationship between practice changes and process improvement in new product development. *Omega*, *29*(1), 85-96.

Mazzarol, T. (2014). Small business diagnostic: what does it tell us about SMEs?

MBIE (2012). Website www.business.govt.nz/procurement. (Accessed 30 April 2015).

MBIE (2013a). New Zealand Sectors Report 2013 – Construction (4). http://www.mbie.govt.nz, retrieved 10 October 2015.

MBIE (2013b). Datasheet on small and medium sized enterprises. http://www.med.govt.nz/business/business-growth-internationalisation/pdf-docs-library/small-and-medium-sized-enterprises/Small-business-stats-factsheet.pdf. (Retrieved 5-DEC-2013).

MBIE (2014). The small business sector report. New Zealand Government.

Meijaard, J., Brand, M. J., Mosselman, M. (2005). Organizational structure and performance in Dutch small firms. Small Business Economics, 25(1), (p. 83-96).

Meredith, J. (1998). Building operations management theory through case and empirical research. Journal of operations management, 16(4), (p. 441-454).

Michelino, F., Cammarano, A., Lamberti, E., & Caputo, M. (2015). Business Models for Open Innovation: From Collaboration to Incorporation.

Miemczyk, J., Johnsen, T. E., Macquet, M. (2012). Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels. Supply Chain Management: An International Journal, 17(5), (p. 478-496).

Mikalef, P., Pateli, A., Batenburg, R. S., & Wetering, R. V. D. (2015). Purchasing alignment under multiple contingencies: a configuration theory approach. Industrial Management & Data Systems, 115(4), 625-645.

Miles, R. E., & Snow, C. C. (1994). *Organizational strategy, structure and process*. New York, Mc Graw–Hill.

Miller, G., Furneaux, C. W., Davis, P., Love, P., & O'Donnell, A. (2009). Built environment procurement practice: Impediments to innovation and opportunities for changes.

Mintzberg, H. (1990). Strategy formulation: Ten schools of thought. Perspectives on strategic Management. Cambridge, MA: Ballinger.

Mlecknik, E. (2013). Opportunities for supplier-led systemic innovation in highly energy-efficient housing. Journal of cleaner production, 56, (p. 103-111).

Mokhlesian, S., Holmen, H. (2012). Business model changes and green construction processes. Construction Management and Economics (September), 30 (p. 761–775)

Monczka, R., Scandell, T. (2011). Innovation sources - contributing to company competitiveness. http://www.CAPSresearch.org/publications/dpfs-public/monzcka2011innovEs/pdf. Retrieved, 5-DEC-2013.

Monczka, R., Trent, R., Handfield, R. (2005). Purchasing and Supply Chain Management. Thomson, US.

Morledge, R., Smith, A., Kashiwagi, D. (2006). Building procurement. BlackWell Publishing Ltd. UK.

Morrissey, B., Knight, L. (2011). Purchasing in Small Firms – past assumptions, current evidence and future research. Conference Paper IPSERA, 2011 Maastricht.

Morrissey, B., Pittaway, L. (2004). A study of procurement behaviour in small firms. Journal of Small Business and Enterprise Development 11, (p. 254-262).

Morrissey, W.J., Pittaway, L. (2006). Buyer-Supplier Relationships in Small Firms: The Use of Social Factors to Manage-relationships. International Small Business Journal 24, (p. 272-298).

Mosselman, M., & Kemp, R. (2005). Kritisch kopen in het MKB. Pantheia - EIM.

Moultrie, J., Clarkson, P. J., & Probert, D. (2007). Development of a design audit tool for SMEs. *Journal of Product Innovation Management*, *24*(4), 335-368.

Mudambi, R., Schrunder, C.P., Mongar, A. (2004). How Co-operative is Co-operative Purchasing in Small Firms? Long Range Planning, (p. 85-102).

Mullen, M. R., Budeva, D. G., & Doney, P. M. (2009). Research methods in the leading small business–entrepreneurship journals: A critical review with recommendations for future research. *Journal of Small Business Management*, *47*(3), 287-307.

Naismith, N. (2007). An empirical evaluation of strategic human resource management within construction sites (Doctoral dissertation. Loughborough University).

Nicholas, J., Ledwith, A., & Perks, H. (2011). New product development best-practice in SME and large organisations: theory versus practice. European Journal of Innovation Management, 14(2), 227-251.

Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. (2009). Why sustainability is now the key driver of innovation. Harvard business review, 87(9), 56-64.

Nitzsche, P., Wirtz, B. W., & Göttel, V. (2016). Innovation Success in the Context of Inbound Open Innovation. International Journal of Innovation Management, 20(02), 1650025.

Norman, G. (2010). Likert-scales, levels of measurement and the “laws” of statistics. Advances in health sciences education, 15(5), 625-632.

Nsimbila, P. M., & Jurriëns, J. A. (2012). Assessment of purchasing contribution to the development and growth of SMEs, evidence from Tanzania. International Journal of Entrepreneurship and Small Business, 17(1), 27-43.

Nunnally, J. C. (1994). Psychometric Theory (3rd ed.). New York: McGraw-Hill.

NZ Stats (2013). Innovation in New Zealand 2013 – tables. Accessed five September 2017.

NZBE (2010). The New Zealand Building Economist. Auckland, New Zealand.

NZCIC (2006). New Zealand Construction Industry Council. Principles of Best-practice in Construction Procurement in New Zealand.

NZGBC (2012). New Zealand Green Building Council. Sustainability Built Environment Research (SBER). Report.

NZGBC (2014). New Zealand Green Building Council. A New Zealand not-for-profit, industry organisation stimulating the development and adoption of market-based green building practices. https://www.nzgbc.org.nz/. 28 Feb2014.

NZGBC (2014). New Zealand Green Building Council. https://www.nzgbc.org.nz/. Retrieved 28 February 2014.

NZGBC (2016). New Zealand Green Building Council, Membership Directory. https://www.nzgbc.org.nz/DataFilter?Action=View&DataFilter_id=73#!/&DataFilter_Find=&DFF_127=[Any]&DFF_128=[Any]. Accessed 21 June 2018.

NZIER (2014). Bespoke residential housing demand and construction innovation.

O'Connor, G. C., McDermott, C. M. (2004). The human side of radical innovation. Journal of Engineering and Technology Management, 21(1), (p. 11-30).

OECD (2005). Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition. The Measurement of Scientific and Technological Activities, OECD Publishing. DOI: 10.1787/9789264013100-en

OECD (2010a). High-Growth Enterprises: What Governments Can Do to Make a Difference, OECD Studies on SMEs and Entrepreneurship, OECD Publishing. http://dx.doi.org/10.1787/9789264048782-en.

OECD (2010b). SMEs, Entrepreneurship and Innovation. OECD Studies on SMEs and Entrepreneurship, OECD Publishing ISBN 978-92-64-08035-5 (PDF)

OECD (2015). Economic Survey of New Zealand - Sustainable and Inclusive Growth. http://www.oecd.org/eco/surveys/economic-survey-new-zealand.htm. Accessed 31 October 2016.

Ofori-Amanfo, J. (2014). Supply management capabilities and operations performance of UK manufacturing small and medium sized enterprises (SMEs) (Doctoral dissertation, University of Leeds).

Ortiz-Urbina-Criado, M. (2011). What is the Degree of Inbound Open Innovation in Spanish Firms? Open Innovation in Firms and Public Administrations: Technologies for Value Creation: Technologies for Value Creation, 79.

Overby, J.W., Servais, P. (2005). Small and medium-sized firms' import behavior: The case of Danish industrial purchasers. Industrial Marketing Management 34, (p. 71-83).

Overweel, M., van der Zeijden, P. (2007). Inkoopgedrag in het MKB (Purchasing behaviour in Dutch SMEs). Zoetermeer, Panteia, Dutch Research Institute for SMEs.

Oxford Dictionaries (2016). http://www.oxforddictionaries.com/. Retrieved 20 March 2016.

Ozmen, E. S., Öner, M. A., Khosrowshahi, F., Underwood, J. (2014). SMEs' Purchasing Habits. SAGE Open, 4(2), 2158244014536405.

Ozmen, E.S. (2012). A Buying Behaviour Framework for SMEs in Turkey. PhD Thesis, University of Salford.

Ozorhon, B., Abbott, C., Aouad, G., Powell, J. (2010). Innovation in construction: A project life cycle approach. Salford Centre for Research and Innovation (SCRI).

Padilla-Meléndez, A., & Garrido-Moreno, A. (2012). Open innovation in universities: What motivates researchers to engage in knowledge transfer exchanges? International Journal of Entrepreneurial Behavior & Research, 18(4), 417-439.

Page, I. (2013). Construction industry data to assist in productivity research – Part Two. Study Report No. 283 Building Research Association of New Zealand (BRANZ).

Page, I. (2013b). New Zealand new housing characteristics and costs. In *S. Kajewski, K. Manley, & K. Hampson (Chair), Queensland University of Technology, Australia. Symposium conducted at the meeting of the 19th CIB World Building Congress: Construction and Society, Brisbane, Australia*.

Page, I. Curtis, M.D., (2013). Small firms' work types and resources. Study Report No. 284, 2013. Building Research Association of New Zealand (BRANZ).

Page, I., Norman, D. (2014). Measuring construction industry productivity and performance. Study Report No. 310. Building Research Association of New Zealand (BRANZ).

Paik, S. K. (2014). A Portfolio Approach to Purchasing Development in Small and Medium Sized Enterprises (SMEs). *Journal of Supply Chain and Operations Management*, *12*(1).

Paik, S. K., Wedel, T., Yao, C. C. (2009a). Prioritising purchasing development in small and medium sized enterprises. International Journal of Enterprise Network Management, 3(4), (p. 358-373).

Paik, S-K. (2011). Supply Management in Small and Medium-sized Enterprises: the role of small firm size. Supply chain Forum - An International Journal, vol. 12, No 3, (p. 10 – 21).

Paik, S-K., Bagchi, P., Skjot-Larsen, T. Adams, J., (2009c). Purchasing Development in SMEs, Supply Chain Forum – An International Journal, vol. 10, No 1, (p. 92-107).

Paik, S-K., Wedel, T., Yao, C-C (2009b). The relationship between the Level of Purchasing Development and the Performance of Small and Medium Sized Californian Enterprises, California Journal of Operations Management. Vol 7, No 1. (p. 11-20).

Pallant, J. (2001). SPSS Survival Manual: a step by step guide to data analysis using SPSS for windows. Allen & Unwin: NSW, Australia.

Parida, V., Westerberg, M., & Frishammar, J. (2012). Inbound open innovation activities in high-tech SMEs: the impact on innovation performance. Journal of Small Business Management, 50(2), (p. 283-309).

Park, D., Krishnan, H. A. (2001). Supplier selection practices among small firms in the United States: Testing three models. Journal of Small Business Management, 39(3), (p. 259-271).

Pearson, J.N., Ellram, L.M. (1995). Supplier Selection And Evaluation In Small Versus Large Electronics Firms. Journal of Small Business Management 33, (p. 53-65).

Peeters, M., & van der Steen, L. (2006). Succesvolle implementatie van Supply Chain Management in het MKB?

Perrow, C. B. C. B. (1970). Organizational analysis: A sociological view (No. 04; HM131, P3.).

Petrick, I., Maitland, C., & Pogrebnyakov, N. (2016). Unpacking Coordination Benefits in Supply Networks: Findings from Manufacturing SMEs. Journal of Small Business Management, 54(2), 582-597.

Pett, M. A. (2015). Nonparametric statistics for health care research: Statistics for small samples and unusual distributions. Sage Publications.

Pettigrew, A. M. (1985). Contextualist research and the study of organizational change processes. Research methods in information systems, 53-78.

Phillips, W., *et al.* (2004). Discontinuous Innovation and Supply Relationships: Strategic Dalliances.

Picaud, K. (2013). The role of Purchasing in Discontinuous Innovation, Research Proposal IFPSM 2013.

Porter, M., van der Linde, C. (1995). Toward a new conception of the environment competitiveness relationship. Journal of Economic Perspective 9 (4), (p. 97–118).

Pressey, A. D., Winklhofer, H. M., Tzokas, N. X. (2009). Purchasing practices in small-to medium-sized enterprises: An examination of strategic purchasing adoption, supplier evaluation and supplier capabilities. Journal of purchasing and supply management, 15(4), (p. 214-226).

Presutti, W.D. (1988). Purchasing management practices of small manufacturers. Journal of Purchasing and Materials Management. 24(4), (p. 26–31).

Pries, F., Dorée, A. (2005). A century of innovation in the Dutch construction industry. Construction Management and economics, 23(6), (p. 561-564).

Pries, F., Janszen, F. (1995). Innovation in the construction industry: the dominant role of the environment. Construction management and economics, 13(1), (p. 43-51).

Productivity Partnership (2012). Research Action Plan from the New Zealand Productivity Partnership. Retrieved from www.buildingvalue.co.nz on 24 May 2015.

Pryke, St. (2009). Construction Supply Chain Management – concepts and cases. Wiley-Blackwell.

Pullen, A. J. J. (2010). Successful new product development through external collaboration: the case of SMEs in the medical devices sector. University of Twente.

Pulles, N. J., Veldman, J., & Schiele, H. (2014). Identifying innovative suppliers in business networks: An empirical study. Industrial marketing management, 43(3), 409-418.

Pulles, N., Schiele, H., Veldman, J. (2012). Capturing Better Innovation Resources from a Supplier Network - Role of customer attractiveness, supplier satisfaction, and preferred customer status. TU Twente. (p. 1-21).

Punch, K. F., & Oancea, A. (2014). *Introduction to research methods in education*. Sage.

PWC, PricewaterhouseCoopers (2013). Breakthrough Innovation and Growth - annual web report. http://www.pwc.nl/nl/publicaties/breakthrough-innovation-and-growth.jhtml. Retrieved April 2014.

PWC, PricewaterhouseCoopers (2016). Valuing the role of Construction in the New Zealand economy: A report to the Construction Strategy Group.

Quayle, M. (2003). A study of supply chain management practices in UK industrial SMEs. Supply Chain Management: An International Journal 8, (p. 79 – 86).

Quayle, M., (2002). Purchasing in small firms, European Journal of Purchasing and Supply Management, 8, (p. 151-159).

Ramsay, J. (2008). Purchasing theory and practice: an agenda for change. European Business Review.

Reboud, S., Mazzarol, T, Clark, D. (2011, June). In Search of the 'SME Ordinaire'-Towards a Taxonomy. In 56th Annual ICSB World Conference (p. 15-18).

Reck, R.F., Long, B.G. (1988). Procurement: a competitive weapon. J. of Proc., Materials Management.

Rehm, M., Ade, R. (2013). Construction costs comparison between 'green' and conventional office buildings. Building Research, Information, 41(2), (p. 198-208).

Reichstein, T., Salter, A. J., Gann, D. M. (2008). Break on through: Sources and determinants of product and process innovation among UK construction firms. Industry and Innovation, 15(6), (p. 601-625).
Rigby, J. (2013). Expert Workshop on the Measurement of Public Procurement of Innovation. Manchester University. OECD Conference on Public Procurement. (Accessed 30 April 2015).
Rinne, T., Fairweather, J. (2011). Modelling cultural, national and innovation identities in order to understand New Zealand's modest innovation performance. Sites: a journal of social anthropology and cultural studies, 8(2), (p. 77-105).
Ritvanen, V. (2008). Procurement and Supply Management capabilities in Finnish SMEs.
Robbins, S. P. (2014). Decide and Conquer: The Ultimate Guide for Improving Your Decision Making. Pearson Education.
Robbins, S.P. (1990). Organization Theory. Prentice Hall. NJ.
Robinson, P. J., Faris, C. W. (1967). Industrial buying and creative marketing. Boston: Allyn, Bacon.
Rodriguez Ferradas, M. I. (2014). Relevant factors in the implementation of open innovation practices: Application to the case of SMEs in the automotive sector. PhD Thesis.
Rogers, E. (2003). Diffusion of Innovation. Free Press: New York.
Rose, T. M., Manley, K. (2012). Measurement constructs to explore innovation diffusion in construction. In Proceedings of the Construction, Building and Real Estate Conference (p. 354-362). Royal Institution of Chartered Surveyors and Arizona State University.
Rose, T. M., Manley, K. (2014). Revisiting the adoption of innovative products on Australian road infrastructure projects. Construction Management and Economics, 32(9), (p. 904-917).
Rosenwasser, D., Stephen, J. (2000). Writing analytically. Fort Worth, TX: Harcourt College Publishers.
Rowley, J. (2002). Using case studies in research. Management research news, 25(1), 16-27.
Rowley, J., Baregheh, A., Sambrook, S. (2011). Towards an innovation-type mapping tool. Management Decision, 49(1), (p. 73-86).
Rozemeijer, F. A. (2000). Creating corporate advantage in purchasing. Technische Universiteit Eindhoven.
Samarasinghe, D. A. S. (2014). Building materials supply chains: an evaluative study of the New Zealand residential construction (Doctoral dissertation, Auckland University of Technology).
Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. Academy of management Review, 26(2), 243-263.
Sarasvathy, S.D. (2004). "The questions we ask and the questions we care about: reformulating some problems in entrepreneurship research", in: Journal of Business Venturing 19(5), (p. 707-717).
Saunders, M., Lewis Ph. & Thornhill, A. (2009). Research methods for business students. Prentice Hall.
Savino, T., Messeni Petruzzelli, A., & Albino, V. (2017). Search and recombination process to innovate: a review of the empirical evidence and a research agenda. International Journal of Management Reviews, 19(1), 54-75.
SBENRC (2013). Sustainable Built Environment National Research Centre. (2013). Retrieved 1 February 2014, http://www.sbenrc.com.au/
Schiele, H. (2007). Supply-management maturity, cost savings and purchasing absorptive capacity: Testing the procurement–performance link. Journal of purchasing and supply management, 13(4), 274-293.
Schiele, H. (2010). Unveiling the importance of being a preferred customer in order to develop innovations with suppliers. Twente Technical University, the Netherlands.
Schiele, H. (2014). Innovative mixed-mode methodology for scientific research – word café and consortium benchmark. Presentation at the Annual Dutch Conference on Procurement Research (WION).
Schiele, H., Krummacher, S. (2011). Consortium Benchmarking: Collaborative academic-practitioner case study research. Journal of Business Research 64 (p. 1137-1145).
Schiele, H., Veldman, J., Hüttinger, L., Pulles, N. (2012). Towards a social exchange theory perspective on preferred customership —concept, practice. Supply management research (p. 133-151). Gabler Verlag.
Schillo, R. S. (2011). Entrepreneurial orientation and company performance: Can the academic literature guide managers? Technology Innovation Management Review, 1(2).
Schneider, L. & Wallenbur, C.M. (2013). 50 Years of research on organising the purchasing function: do we need any more? J. Purch.Supply Manag. 19(3), 144-164.
Schroll, A., Mild, A. (2012). A critical review of empirical research on open innovation adoption. Journal Betriebswirtschaft, 62, (p. 85-118).
Schueler, J., Schneider, S., Wales, W. J., & Baum, M. (2018). Testing Ontologies of Entrepreneurial Orientation. In Academy of Management Proceedings (Vol. 2018, No. 1, p. 11357). Briarcliff Manor, NY 10510: Academy of Management.

Schumpeter, J. A. (1942). Capitalism, socialism and democracy. Routledge.
Scully, J.I., Fawcett, S.E. (1994). International procurement strategies: challenges and opportunities for the small firm. Production and Inventory Management Journal 35, (p. 39-46).
Seuring, S. A. (2008). Assessing the rigor of case study research in supply chain management. Supply Chain Management: An International Journal, 13(2), (p. 128-137).
Sexton, M., Barret, P. (2004). The role of technology transfer in innovation within small construction firms. Engineering, Construction and Architectural Management, (p. 342-348).
Sexton, M., Barrett, P. (2003). Appropriate innovation in small construction firms. Construction management and economics, 21(6), (p. 623-633).
Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. Academy of management review, 25(1), 217-226.
Shane, S., Locke, E. A., & Collins, C. J. (2003). Entrepreneurial motivation. Human resource management review, 13(2), (p. 257-279).
Shankman, N.A. (1999). Reframing the debate between agency and stakeholder theories of the firm. Journal of Business Ethics, 19: 319-334. Kluwer Academic Publishers, the Netherlands
Sheffer, D. A., & Levitt, R. E. (2012). Fragmentation inhibits innovation: Overcoming professional and trade lock-in. *Collaboratory for Research on Global Projects Working Paper*.
Sheffer, D. A., Katila, R., Levitt, R. E., Taylor, J. E. (2013). Innovation of unique, complex products. In Proc., Academy of Management Conf., Academy of Management, Briarcliff Manor, NY.
Sheffer, D. A., Levitt, R. E. (2010a). How industry structure retards diffusion of innovations in construction: Challenges and opportunities. Collaboratory for Research on Global Projects Working Paper, 59.
Sheffer, D. A., Levitt, R. E. (2010b). The diffusion of energy saving technologies in the building industry: Structural barriers and possible solutions. Collaboratory for Research on Global Projects.
Siedlok, F. & Hibbert, P. (2014) The Organization of Interdisciplinary Research: Modes, Drivers and Barriers. International Journal of Management Reviews, 16:2 194-210.
Simmons, J., Nelson, L. D., & Simonsohn, U. (2013). Life After P-Hacking. ACR North American Advances.
Simonsohn, U., Nelson, L. D., & Simmons, J. P. (2014). p-curve and effect size: Correcting for publication bias using only significant results. Perspectives on Psychological Science, 9(6), 666-681.
Singh, S., Corner, P. D., & Pavlovich, K. (2015). Failed, not finished: A narrative approach to understanding venture failure stigmatization. *Journal of Business Venturing*, *30*(1), 150-166.
Skiffington, H., Akoorie, M. E., Sinha, P., & Jones, G. (2013). Production outsourcing offshore in the New Zealand printing, publishing and packaging industries. Strategic Outsourcing: An International Journal, 6(2), 116-137.
Slaughter, E. S. (2000). Implementation of construction innovations. Building Research, Information 28(1).
Slaughter, E.S. (1998). Models of construction innovation. Journal of Construction Eng., Management, 124 (3), (p. 226-231).
Slowinski, G., Sagal, M. W. (2010). Good practices in open innovation. Research-Technology Management, 53(5), (p. 38-45).
Som, S., Kirner, E., & Jäger, A. (2013). Absorptive capacity of Non-R&D-intensive firms in the German manufacturing industry. In 35th DRUID Celebration Conference (p. 17-19).
Songip, A. R., Lau, B. H., Jusoff, K., Hayati, N. R. (2013). Development of a Conceptual Model for the Diffusion of Construction Innovation. Australian Journal of Basic, Applied Sciences, 7(1).
Spina, G., Caniato, F., Luzzini, D., & Ronchi, S. (2015). Assessing the use of external grand theories in purchasing and supply management research. Journal of Purchasing and Supply Management. http://dx.doi.org/10.1016/j.pursup.2015.07.001i.
Spina, G., *et al.* (2013). Past, present and future trends of purchasing and supply management: An extensive literature review, Industrial Marketing Management.
Spithoven, A., Clarysse, B., & Knockaert, M. (2011). Building absorptive capacity to organise inbound open innovation in traditional industries.*Technovation*, *31*(1), (p. 10-21).
Spithoven, A., Vanhaverbeke, W., Roijakkers, N. (2012). Open innovation practices in small firms and large enterprises. Journal of Small Business Economics.
Staal, A., Hagelaar, G., Holman, R., & Walhof, G. (2016). Developing Risk-Based Procurement Management Tools for SMEs. Presented at ACERE Conference Brisbane.
Staal, A., Tookey, J. E., Seadon, J., Mobach, M., & Walhof, G. (2015). How entrepreneurial New Zealand firms procure environmental technical innovations for the construction industry. Understanding Small Enterprises – The Netherlands.
Stalenhoef, K. (2006). Global Sourcing in het MKB. Inkoop & Logistiek, NEVI.

Storey, D. (1994). Understanding the Small Business Sector. Routledge.
Sullivan, G. M., & Feinn, R. (2012). Using effect size—or why the P value is not enough. *Journal of graduate medical education*, *4*(3), 279-282.
Supplier's View. Industrial Marketing Management 26(6): 475–86.
Swanborn, P. (2013). Case study research: What, why and how? Sage.
Swieringa, J. & A. Wierdsma (1992). Becoming a Learning Organization: Beyond the Learning Curve, Addison-Wesley, Reading, MA.
Tan, S., Brown, J. (2005). The World Café in Singapore Creating a Learning Culture Through Dialogue. The Journal of Applied Behavioural Science, 41(1), (p. 83-90).
Tashakkori, A., & Creswell, J. W. (2007). Exploring the nature of research questions in mixed methods research. Journal of Mixed Methods Research. Editorial.
Taylor, J., Levitt, R. (2004). Understanding and managing systemic innovation in project-based industries. Innovations: Project management research, (p. 83-99).
Teddlie, C., & Tashakkori, A. (2012). Common "core" characteristics of mixed methods research: A review of critical issues and call for greater convergence. American Behavioral Scientist, 56(6), 774-788.
Teirlinck, P., & Spithoven, A. (2013). Formal R&D management and strategic decision making in small firms in knowledge-intensive business services. R&D Management, 43(1), 37-51.
Telgen, J. (1998). Revolution through electronic purchasing. BETA, Institute for Business Engineering and Technology Application.
Teller, C., Kotzab, H., Grant, D. B., & Holweg, C. (2016). The importance of key supplier relationship management in supply chains. International Journal of Retail & Distribution Management, 44(2), 109-123.
The Economist (2016). The problem with profits, big firms in the United States have never had it so good. Time for more competition. http://www.economist.com/news/leaders/21695392-big-firms-united-states-have-never-had-it-so-good-time-more-competition-problem?cid1=cust/ednew/n/bl/n/20160323n/owned/n/n/nwl/n/n/AP/n. Web-edition, retrieved 26 March 2016.
Tidd, J. (2014). Introduction: Why we need a tighter theory and more critical research on open innovation. In Open Innovation Research, Management and Practice (pp. 1-11).
Tidd, J., & Bodley, K. (2002). The influence of project novelty on the new product development process. R&D Management, 32(2), 127-138.
Tidd, J., Bessant, J. (2009). Managing Innovation – integrating Technological Market and Organisational Changes, 4th Ed. Wiley and Sons Ltd, Chichester, UK.
Tookey, J. E., Murray, M., Hardcastle, C., & Langford, D. (2001). Construction procurement routes: re-defining the contours of construction procurement. Engineering Construction and Architectural Management, 8(1), 20-30.
Torrès, O., Julien, P. A. (2005). Specificity and denaturing of small business. International Small Business Journal, 23(4), (p. 355-377).
Tran, T. (2013). Managing supplier relationship: case studies of small and medium asian grocery retailers in Melbourne.
Tran, V. (2010). Exploring construction productivity statistics in New Zealand. Auckland University of Technology.
Tranfield, D. *et al.* (2003). Towards a Methodology of Developing Evidence-Informed Management knowledge by Means of Systematic Review
Treacy, M., Wiersema, F. D. (1997). The discipline of market leaders: Choose your customers, narrow your focus, dominate your market. Basic Books.
Treaty of Waitangi (1840). https://nzhistory.govt.nz/politics/treaty/the-treaty-in-brief. (Accessed 23 November 2015).
Tsai, K. H. (2009). Collaborative networks and product innovation performance: Toward a contingency perspective. *Research policy*, *38*(5), 765-778.
Ubeda, R., Alsua, C., & Carrasco, N. (2015). Purchasing models and organizational performance: a study of key strategic tools. Journal of Business Research, 68(2), (p. 177-188).
Utterback, J.M. (1978, 1994). Mastering the dynamics of Innovation: How companies can seize opportunities in the face of technological change. Harvard Business School Press, Boston.
UvA stats (2017). Methodologie winkel voor statistische aspecten van wetenschappelijk onderzoek. Website: http://wiki.uva.nl/methodologiewinkel/index.php/Hoofdpagina, University of Amsterdam. accessed 17 July 2017.

Van de Vrande, V., De Jong, J. P., Vanhaverbeke, W., De Rochemont, M. (2009). Open innovation in SMEs: Trends, motives and management challenges. Technovation, 29(6), (p. 423-437).

Van Dijk, S., Tenpierik, M., van den Dobbelsteen, A. (2014). Continuing the building's cycles: A literature review and analysis of current systems theories in comparison with the theory of Cradle to Cradle. Resources, Conservation and Recycling, 82, (p. 21-34).

Van Echtelt, F. (2004). New product development: shifting suppliers into gear. PhD Thesis. Eindhoven.

Van Hemert, P., Nijkamp, P., & Masurel, E. (2013). From innovation to commercialization through networks and agglomerations: analysis of sources of innovation, innovation capabilities and performance of Dutch SMEs. The Annals of Regional Science, 50(2), 425-452.

Van Weele (1988, 2010). Purchasing & Supply Chain Management (p. 96-97). Text book Cengage Learning. 5th rev. Ed, London.

Van Weele, A. (2007). On the need for fostering academic community rather than academic methodology in purchasing and supply management. Journal of Purchasing, Supply Management.

Van Weele, A., Raaij, E. van (2014). The Future of Purchasing and Supply Management Research: about relevance and rigor. Journal of Supply Chain Management.

Van Weele, A., Van Berkel, J. & Walhof, G. (2017). Inkoop in strategisch perspectief. Shoppen voor Professionals, 7e geheel aangepaste druk. Vakmedianet.

VanVoorhis, C. W., & Morgan, B. L. (2007). Understanding power and rules of thumb for determining sample sizes. Tutorials in Quantitative Methods for Psychology, 3(2), 43-50.

Verreynne, M. L. (2006). Strategy-making process and firm performance in small firms. Journal of management & organization, 12(03), 209-222.

Verreynne, M. L., & Meyer, D. (2011). Differentiation strategies in mature small firms–the impact of uncertain environments. International Journal of Entrepreneurship and Small Business, 12(3), (p. 327-342).

Verreynne, M. L., Meyer, D. (2010). Small business strategy and the industry life cycle. Small Business Economics, 35(4), (p. 399-416).

Verschuren, P., Doorewaard, H., Mellion, M. J. (2010). Designing a research project. (English translation of the Dutch 4th Edition from 2007). Eleven International Publishing.

Vickers, G. (2010). Insights into appreciation and learning systems. In Social Learning Systems and Communities of Practice (p. 17-34). Springer London.

Vilasini, N., *et al.* (2012). A Framework for Subcontractor Integration in Alliance Contracts. International Journal of Construction Supply Chain Management. 2(1), (p. 17-33).

Von Thun, F. S., Langer, S., Tausch, R., & Höder, J. (1987). Sich verständlich ausdrücken. E. Reinhardt.

Vörösmarty, G. (2015). Green purchasing practices and their motivational background. WP41 FIN. Abstract for a working paper for IPSERA Conference, Amsterdam. Corvinus University of Budapest Institute of Business Economics. gyongyi.vorosmarty@uni-corvinus.hu.

Voss, C., Tsikriktsis, N., & Frohlich, M. (2002). Case research in operations management. International journal of operations & production management, 22(2), 195-219.

Vrijhoef, R. (Ed.). (2011). Supply chain integration in the building industry: The emergence of integrated and repetitive strategies in a fragmented and project-driven industry. IOS Press.

Wales, W. J., Gupta, V. K., & Mousa, F. T. (2013). Empirical research on entrepreneurial orientation: An assessment and suggestions for future research. International Small Business Journal, 31(4), 357-383.

Wallace, W. (2017). *The logic of science in sociology*. Routledge.

WasteMINZ. (2018). Website https://www.wasteminz.org.nz/resource-library/, a New Zealand public / private membership association on waste, resource recovery and contaminated land sectors, Accessed 12 June 2018.

Webster, F., Wind, Y. (1972). A General Model for Understanding Organizational Buying Behavior. Journal of Marketing, Vol. 36, No. 2, (p. 12-19).

Webster, F.E. (1992). The Changing Role of Marketing in the Corporation. Journal of Marketing, 56(4).

Weidman, J., Young-Corbett, D., Koebel, C. T., Fiori, C., Montague, E. N. (2011). Prevention through Design: Use of the Diffusion of Innovation Model to Predict Adoption. In International Council for Research and Innovation in Building and Construction Conference (CIB W099 Conference 2011), Washington, DC, USA.

Welter, F. & Lasch, F. (2008) Entrepreneurship research in Europe: taking stock and looking forward, *Entrepreneurship Theory and Practice*, Vol. 32, No. 2, pp. 241–248.

Welter, F., Baker, T., Audretsch, D. B., & Gartner, W. B. (2017). Everyday Entrepreneurship—A Call for Entrepreneurship Research to Embrace Entrepreneurial Diversity. *Entrepreneurship Theory and Practice*, *41*(3), 311-321.

Wheelwright, S. C., & Clark, K. B. (1992). Revolutionizing product development: quantum leaps in speed, efficiency, and quality. Simon and Schuster.

Wiklund, J., & Shepherd, D. (2005). Entrepreneurial orientation and small business performance: a configurational approach. Journal of business venturing, 20(1), 71-91.

Wiklund, J., & Shepherd, D. A. (2008). Portfolio entrepreneurship: Habitual and novice founders, new entry, and mode of organizing. Entrepreneurship theory and practice, 32(4), 701-725.

Williams, S.J. (2001). Defining supply chains networks to achieve best-practice amongst SMEs: A review of the pilot methodology. Manufacturing Information Systems. Proceedings of the Fourth SME International Conference, Aalborg University, Denmark, 14-16 May 2001.

Wilson, M. M., & Roy, R. N. (2009). Enabling lean procurement: a consolidation model for small-and medium-sized enterprises. Journal of Manufacturing Technology Management, 20(6), 817-833.

Winch, G. (1998). Zephyrs of creative destruction: understanding the management of innovation in construction. Building Research, Information, 26(5), p. 268-279.

Woodside, A. G. (2010). Bridging the chasm between survey and case study research: Research methods for achieving generalization, accuracy, and complexity. Industrial Mkrtg Management, 39(1), 64-75.

Wynarczyk, P., Piperopoulos, P., & McAdam, M. (2013). Open innovation in small and medium-sized enterprises: An overview. International Small Business Journal.

Wynstra, F. (1998). Purchasing Involvement in Product Development. Technical University Eindhoven.

Wynstra, F. (2010). What did we do, who did it and did it matter? A review of fifteen volumes of the (European) Journal of Purchasing and Supply Management. Journal of Purchasing and Supply Management, 16(4), 279-292.

Wynstra, F. (2016). Past, present and future trends of purchasing and supply management: an extensive literature review. A review and outlook. In *A Journey through Manufacturing and Supply Chain Strategy Research* (pp. 199-228). Springer International Publishing.

Wynstra, F., Axelsson, B., & Van Weele, A. (2000). Driving and enabling factors for purchasing involvement in product development. European Journal of Purchasing & Supply Management, 6(2), 129-141.

Wynstra, F., Pierick, E. T. (2000). Managing supplier involvement in new product development: a portfolio approach. European Journal of Purchasing, Supply Management, 6(1), (p. 49-57).

Wynstra, F., Pierick, E. van (2001). A Portfolio Approach for Supplier Involvement in Product Development. Differentiating Lean and Rich Interfaces. IPSERA, Vol. 20 No. 6, (p. 567-569).

Xue, X., Zhang, R., Yang, R. J., Dai, J. (2014). Innovation in Construction: A Critical Review and Future Research. International Journal of Innovation Science, 6(2), (p. 111-126).

Yin, R. K. (1994). "Discovering the future of the case study method in evaluation research." Evaluation practice 15, no. 3: 283-290.

Yin, R. K. (2013). Validity and generalization in future case study evaluations. Evaluation, 19(3), (p. 321-332).

Yin, R. K. (2017). *Case study research and applications: Design and methods*. Sage publications.

Zabala-Iturriagagoitia, J. M. (2012). New Product Development in Traditional Industries: Decision-Making Revised. *Journal of technology management & innovation*, *7*(1), 31-51.

Zazulina, M. (2010). Strategic approach to purchasing management in small and medium size enterprises: focus on supplier selection and supplier development functions.

Zheng, J. *et al.* (2004) Small firms and e-business: cautiousness, contingency, and cost–benefit. Journal of Purchasing and Supply Management 10(1): (p. 27–39).

Zortea-Johnston, E. Darroch, and J. Matear, S. (2012). Business orientations and innovation New Zealand in small and medium sized enterprises. International Entrepreneurial Management Journal. 8, (p. 145–164).

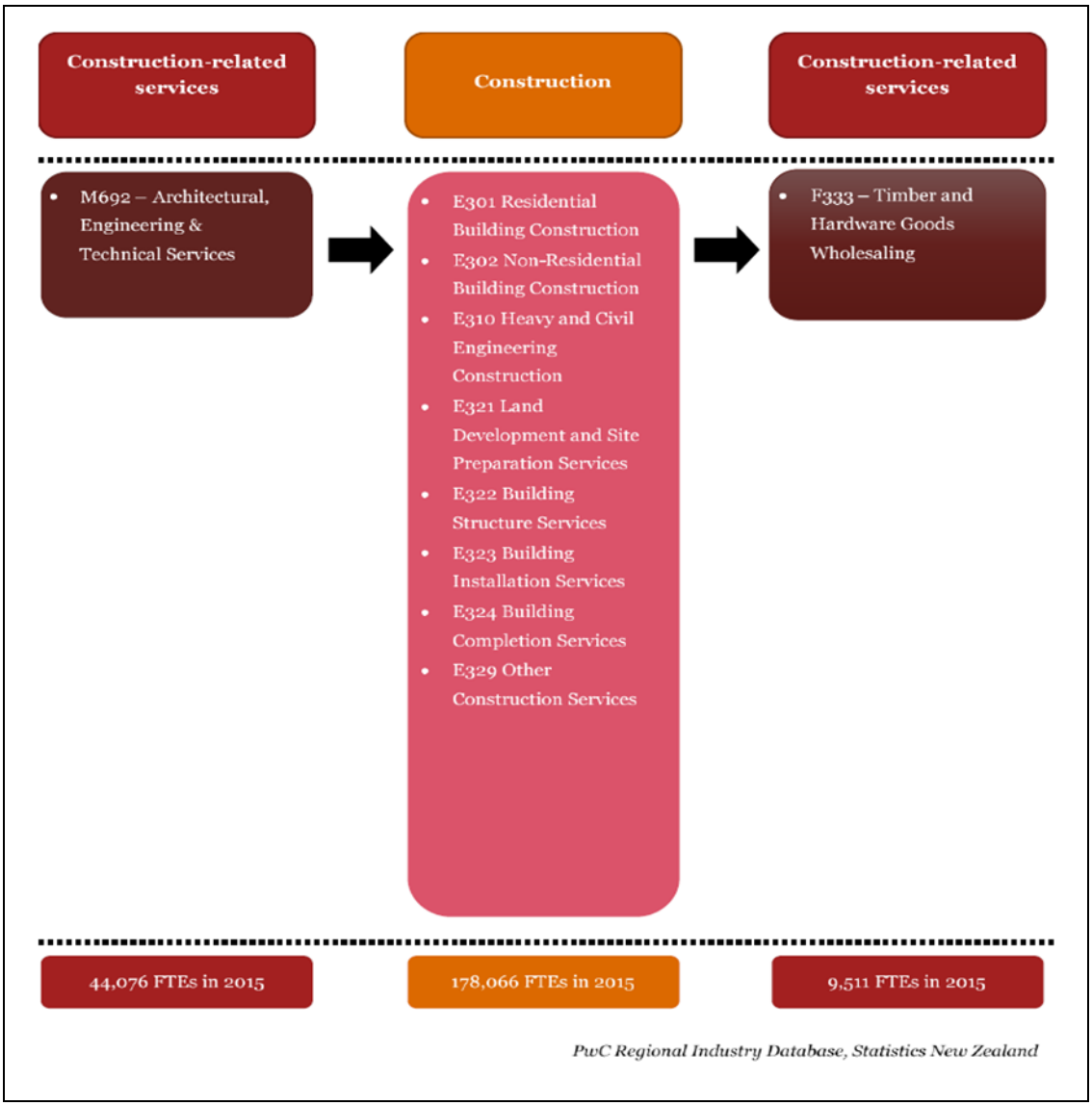
Zou, P. X., Sunindijo, R. Y., Dainty, A. R. (2014). A mixed methods research design for bridging the gap between research and practice in construction safety. Safety science, 70, (p. 316-326).

List of Tables in the Appendices

List of Figures in the Appendices

Chapter 2: Review of Literature

§2.1 : ANZSIC classification of the construction industry (PWC: 2016: 49)



§2.1 Classification of the New Zealand Construction Industry (ANZSIC)

1. Class E3011 House Construction: Companies mainly engaged in the construction of houses (except semi-detached houses) or in carrying out alterations, additions, or renovations to houses, or in organising or managing these activities.

2. Class E3019 Other Residential Building Construction: Companies mainly engaged in the construction of residential buildings (except freestanding houses) or in carrying out alterations, additions, or renovations to such buildings or in organising or managing these activities.

3. Class E3020 Non-Residential Building Construction: Companies mainly engaged in the construction of non-residential buildings such as hotels, motels, hostels, hospitals, prisons,

or other buildings, in carrying out alterations, additions or renovation to such buildings, or in organising or managing these activities.

4. Group E222 Structural Metal Product Manufacturing: off-site production of prefabricated buildings or building components.
5. Class 3020 Non-Residential Building Construction: the construction of hotels, hostels, hospitals and other public buildings.
6. Group 323 Building Installation Services: providing special trade repair services such as electrical or plumbing repairs.
7. Group M692 Architectural, Engineering and Technical Services: providing architectural or building consultancy services.
8. Group 322: Building structure services.
9. Group 324: Building completion services.
10. Group 329: Other construction services.
11. Group F333 Timber and hardware goods wholesaling

§2.1.2 The Construction Industry

A classification on commodity types

1. Product-related goods or services, also known as primary spend, or bill of material (BOM, Van Weele *et al.*, 2017: 36);
2. Non-product related (NPR) goods or services, also known as secondary spend, or minor items (Seuring, 2009), maintenance repairs and operating (MRO) materials or supplementary materials (Van Weele *et al.*, 2017: 36);
3. Suppliers of raw materials, semi-manufactured materials, components, or of finished products (Van Weele *et al.*, 2017: 36).
4. Suppliers of investment goods or capital equipment (Van Weele *et al.*, 2017: 36; Johnson, 2008: 349).
5. Suppliers that provided only knowledge or intellectual property, versus suppliers that combined this with an innovative service or an innovative product offering.

The (1st or 2nd tier) focal companies in this research could acquire or develop different types of innovative products or services with their (2nd or 3rd tier) innovative suppliers. See Table below.

Table 1: Typology for 2nd tier innovative suppliers (based on Winch, 1998; Van Weele, 2017)

	Type of company	**Description with examples**	**Source**
1	Builders and (trade) contractors	Companies supplying primary services (e.g. plumbers, carpenters) and possibly also related materials.	Winch
2	Component manufacturers	Companies supplying primary systems, e.g. window facades or other off-site manufactured structures which (as systems) would incorporate these with other systems in the end product. These components could either be customised or standard components.	Winch; Van Weele
3	Raw material suppliers or Material suppliers	Companies supplying primary commodities e.g. paint or cement, or bricks, nails, cladding material that were processed.	Winch; Van Weele

4a	MRO, NPR supplier	Companies supplying secondary goods that customers use use for their daily operation, e.g. maintenance materials, office furniture, or spare parts.	Van Weele
4b	Equipment suppliers	Companies supplying secondary goods that customers see as investments, such as cranes, vehicles, complex IT systems.	
5	Specialist consultant suppliers	Companies supplying a range of specialist services such as Health & Safety audits, providing temporary labour, architecture, engineering, design, quality.	Winch; Van Weele

Upstream in the supply chain, such 2nd tier companies could procure innovative goods or services, or technology-knowledge from 3rd tier suppliers. (See below).

Table 2: Typology for 3rd tier suppliers (based on Winch, 1998; Van Weele, 2017)

	Type of company	**Description with examples**	**Source**
1	Commercial companies	Companies supplying (distributing or trading) primary ready-to-sell tangible innovative products (e.g. machinery or materials) and associated know-how.	Benton
2	Technology providers	Companies (companies) supplying primary intangible products or services (technology or competencies/skills)	Winch
3	Component providers	Companies supplying primary tangible innovative (semi-manufactured) products or systems that must be transformed (processed or built) into a product offering and associated know-how.	Van Weele
4	Material or raw material providers	Companies supplying primary tangible innovative discrete products that must be transformed (processed or built) into a product offering and associated know-how.	Van Weele
5	Equipment providers	Companies supplying secondary tangible innovative discrete products that facilitate development or manufacture of product innovations within 2nd tier suppliers.	Van Weele

§2.2.3.2 Innovation terms as found in literature

Term	#	Sources	L/E
Administrative		Teece (1980), Zajac et al. (1991), Elenkov et al. (2005), Montes et al. (2005), Kim et al. (2006), and Santos-Vijande and Alvarez- Gonzalez (2007)	L
Architectural	X	Henderson and Clark (1990), Tidd (1995), Mikkola (2003), O'Sullivan (2003), Argyres and Silverman (2004), Pil and Cohen (2006), and Westerman et al. (2006); Slaughter (1998, 1999); Hardie (2010)	L
Breakthrough	X	Barnholt (1997), Brown (1998), Veryzer (1998), Mascitelli (2000), Hammer (2004), Zhou et al. (2005), and Phene et al. (2006)	L
Continuous		Robertson (1971), Lynn et al. (1996), Linton et al. (2002), Schwery and Raurich (2004), and Galende (2006)	L
Discontinuous	X	Mckee (1992), Lynn et al. (1996), Danneels and Kleinschmidt (2001), Kassicieh et al. (2002), Phillips et al. (2006), Vuola and Hameri (2006), and Birkinshaw et al. (2007)	L
Disruptive	X	Christensen et al. (2002), Gilbert and Bower (2002), Kassicieh et al. (2002), Linton et al. (2002), and Markides (2006); Koebel (2008)	L
Incremental		Ettlie et al. (1984), Bower and Keogh (1996), Chandy and Tellis (1998), Cardinal (2001), and Sheremata (2004)	L
Integral	X	Sheffer 2010, 2012, 2013)	E
Modular	X	Slaughter (1998, 1999); Sheffer (2010, 2012, 2013)	E
Process	X	Cohen and Klepper (1996), Gupta and Loulou (1998), Hatch and Mowery (1998), Linton (2000), Linton and Walsh (2004), and Furnsinn et al. (2007)	L
Product	X	Chandy and Tellis (1998), Freel (1999), Danneels and Kleinschmidt (2001), Verona and Ravasi (2003), Cormican and O'Sullivan (2004), and Lofsten and Lindelof (2005)	L
Radical	X	Ettlie et al. (1984), Lynn et al. (1996), Chandy and Tellis (1998), Cardinal (2001), Sheremata (2004), and Grover et al. (2007); Slaughter (1998, 1999), Hardie (2010)	L
Sustaining	X	Koebel (2008)	E
Swim lane	X	Sheffer (2010, 2012, 2013)	E
Systemic	X	Sometimes also called system innovation. Taylor & Levitt (2004); Sheffer (2010: 7; 2012, 2013). However Mlecnik (2013) distinguished between the 2 types.	E
Technical		Ibarra (1993), Chiesa et al. (1996), Livesay et al. (1996), Debackere et al. (1997), and Santos-Vijande and Alvarez-Gonzalez (2007)	L

Amended with extra authors and terms based on Linton (2009). The terms relevant for this research have been marked with an X in the Table. L means, as found in Linton, E means found elsewhere.

§2.3.3 Focus on Procurement within SMEs (literature review)

Table 3: Literature Review on Procurement within SMEs.

(See following pages).

	First author	SvQ, or X	main topic	context & variables	Main findings from research Procurement within SMEs	sample; respondents; firm type; industry	country	comp size	year
1.	Adams (PhD)	Q28 Q29	Procurement maturity		66% of respondents report to CEO (which would indicate a more strategic or important role of procurement, see van Weele ea 2017) (Adams, p 197). 60% of companies have 1 person responsible for procurement. See also p. 91, 101. procurement complexity increases with external (meso / macro) complexity (p. 26)	N=1560; 224 responses. (12%) Survey. Mostly less than 50 employees, in several manufacturing industries. P. 147	US	1-499, but 96% of case companies < 100 fte)	2004
2.	Agndal	Q11 Q12 Q7	International Sourcing	Driven by costs or product availability, or customer pr unsollicitated opportunities	More reactive (reluctant) than pro-active. Little evidence of long term planning on international sourcing. (p. 189)	N=10; various; Longitudinal multicase; SME sector; Manuf; Consumer/ Industrial	SE	46-164	2006
3.	Arend & Wisner	Q6 Q8 Q7	Supply Chain Management or Supplier relationship	Does not suit SMEs well.	SMEs doe not implement SCM correctly, could be used to supplement strategic focus.	N=5470; Senior Managers; (221 LE & 200 SME); (7%) Questionnaire; LE & SMEs; N/A; Manuf & Service	US	LE / SME	2005
4.	Arend & Wisner	Q6 Q8 Q17 Q18 Q19 Q20 Q30	Supply Chain Management and Supplier relationship		SME performance is negatively associated with SCM when controlled for self-selection (p. 427). (Arend 2006: is positively associated with SCM, when controlled for self selection: i.e. best performing companies chose to use SCM)	Manufacturing companies; (survey data from 1999) EU, MX, US. N = 5470; n = 556 (10.2 % response rate)	US	1 - 500	2005

5.	Axelsson & Larsson	Q29	Procurement Maturity	Upgrading of skills			SE		2002
6.	Backstrand	Q29 Q27 Q7 Q21	strategic procurement	size is important variable; also: resources, strategy; motivation, experience, (see Table 2, Backstrand)	SMEs have similar factors as LE's wrt procurement process. SMEs need to structure procurement in line with their business strategy. They need a more short-term perspective. Personalised management ie experience ability knowlegde and intution of owner. The article offers a 5-step tool	1 case study of a non-producing SME with 3 interviews	SE	20	2016
7.	Batenburg / Mikapef	Q26	strategic procurement		customer value proposition with suppliers (See also MacBryde)		NL	1-250	2015
8.	Hubbard Adams	Q8 Q29 Q30 Q12	Procurement Maturity supplier relations supply chain	Impact of technical complexity, spend, of influence over supplier	More impact within SMEs will lead to better developed procurement function. Suppliers have the majority of power in the relationships; percentage of purchased goods / services to total cost was medium - high, but no relation with experience of purchasing professionals	N=6; case study interviews.	GR	21-240	2008
9.	Brown	Q11	International Sourcing		SMEs exhibit similar sourcing behaviour as MNC		NZ	1-100?	2004
10.	Brush	Q7	Supply Chain Management and Supplier relationship	relations are based on trust	more with SMEs than with LE's		US	1-500?	2000

11.	Cagliano & Spina	Q29 Q26 Q27	Strategic Procurement	SMEs have Lower procurement decision skills	Decisions are made on the basis of intuition or misconceptions or personal experience, which can lead to bad performance. SMEs need best practices.	N=343 survey. Manuf and sub-contractor industries.	IT	1-99	2002
12.	Cambra-Fierro & Polo-Redondo	Q6 Q7 Q8 Q17 Q18 Q19 Q20	Supply Chain Management and Supplier relationship	Key factors: Satisfaction, commitment, communication, co-operation and trust.	SMEs tend to have long term relationships with their suppliers; but motivations differed with the size of the firm.	a) N=23 Managers; Interviews; SMEs; 0 to 99; Wineries (Spain) b) N=950 SC; Managers; Questionnaire; SMEs; 0 to 99; Industrial /Construction / Service	ES	0-99 0-99	2008
13.	Canham & Hamilton	Q11	international sourcing	NZ SMEs conduct offshoring for lower prices or availabilility	56% of SMEs did not offshore; 44% did (time period 2001 - 2011). Fear for loss of quality was a reason not to do offshoring. NZ companies that offshored were almost 2 as large as the non-offshore companies	N=676; response rate 22%; 44§ consumer goods; 56% intermediary industrial goods	NZ	mean = 60 fte; median = 17 fte	2013
14.	Carr & Pearson	Q23 Q29 Q7 Q8	Strategic Procurement	May be unfit for SMEs	SMEs lack flexibility to spend time / resources on strategic procurement initiatives		US		1999

15.	Chung	Q7 Q8 Q12	Supply Chain Management and Supplier relationship	dependance on supplier is higher; SMEs more tolerant to supplier opportunism	more with SMEs than with LE's		AU	1-50	2012
16.	De Clerq	Q11	International Sourcing	Preference for local sourcing (buy local!)	Emotions and personal values when procuring wine from local sources (access to location-specific human and social capital, and have strong ties with their country / region.	N=972; n=204; hospitality service (restaurants). Firm size in sq. ft.	CA	n.a. 1-99 (est.)	2014
17.	De Wilde, Slee	Q1	strategic procurement	early involvement	early involvement of procurement in a project-organisation can lead to better procurement performance		NL	1-250	2006
18.	Diez-Vial	Q8	Supply Chain Management and Supplier relationship		SMEs are more motivated to integrate supply chain as it would give more power and flexibility. (It would compensate for their limited resources)		ES	1-50?	2009
19.	Dilts & Prough	Q6 Q8 Q17 Q18 Q19 Q20	Supply Chain Management and Supplier relationship	Minimal resources, minimal negotiation (buying) power, lack of information	SMEs have only one or two key suppliers. Small firms consider close supplier relations, negotiating agreements or increase importance of firm for supplier as less effective than other strategies.	N=1473; response = 201. Travel service industry; SMEs and LEs.	US		1989

20.	Dollinger & Kolchin	Q8 Q11	Supply Chain Management and Supplier relationship		positive relationship with supplier intensity and performance; to attract and keer good suppliers needs a reputation of being fair	survey with 81 responses	US	< 100	1988
21.	Ellegaard	Q3 Q4 Q5 Q6 Q8	Procurement Maturity	Models focus too much on large organisations	Only 1st step in Purchasing maturity models is only in part suitable for SMEs (no formal strategy etc.(p. 298)	N=11; Small company owners. Interviews.	DK	1-12	2009
22.	Ellegaard	Q4 Q7 Q11 Q5 Q6 Q8	International Sourcing	Local sourcing, and mutual / reciprocal behaviours (fairness, loyalty, dependability)	Elimination of risk was preferred over opportunities from suppliers.	N=11; Small company owners; Interviews; Small Company; Manuf.	DK	1-12	2008
23.	Ellegaard	Q7 Q27 Q26 Q28 Q8	Strategic Procurement	Depends on Characteristics of owners; Decisions are taken quickly, without consultation	Small companies procure differently from micro or medium companies. Perform well in securing quality and service but want to spend little time with suppliers.	N=16; 15 owners; 1 employee; Interviews; Small Company; Industrial Manuf; Non High Tech	DK	2-14	2006
24.	Ellegaard	Q12 Q6 Q8 Q17 Q18 Q19 Q20	Supply Chain Management and Supplier relationship	Focused too much on large organisations	Small firm procurement will focus on continuity in production, and require quality, reliability, flexibility, responsiveness and service performance from suppliers. SMEs will be loyal to suppliers.	N=11; Small company owners. Interviews.	DK	1-12	2009

25.	Fagerstrom Jackson	Q3 Q8	Supply Chain Management and Supplier relationship	integration of sub suppliers (i.e. 3rd tier suppliers) for innovation project	If the sub-suppliers are to be integrated, it is not enough simply to have detailed knowledge of the subsystem; the sub-supplier must have contextual knowledge of how the complete system operates. Must be able to work with preliminary specifications and support the main supplier; common work procedure; short physical distance with suppliers	1 integrated case study with 1 main supplier and 9 sub suppliers in an industrial / hightech setting	SE	600	2002
26.	Gadde & Haekansson	Q17 Q18 Q19 Q20 Q8	Procurement Maturity	Procurement part of day-to-day operation.	SMEs can benefit from procurement to compensate for their own limited resources. Procurement is not a specific task but is integrated with the general operations of the company (i.e. often the owner).				2001
27.	GURĂU	Q27 Q26 Q7 Q28	Supply Chain Management and Supplier relationship	companies in growth stage need supply chains for flexible integration of all functions and actors	supply chain perspective starts with clients/customers	2 x 5 case studies with entrepreneur - managers, in distribution and in manufacting sector	FR	1 - 250	2011
28.	Hagelaar e.a.	Q7 Q30 Q8 Q24	Strategic Procurement	Customers drive procurement decisions for product related products or services		N=11 case studies N=74 Survey (25% response) Manufacturing and service companies in Northern region.	NL	5-200	2015

29.	Hanna & Jackson	Q1 Q8 Q11 Q12	International Sourcing Supply Chain management	small SMEs have difficulties in managaing offshore manufacturing suppliers.	constraints; financial risks, innovation constraints, information asymmetry and capability fit. Need more integrated supply chain thinking to realise cost-benefits of low-country sourcing	3 in-depth case studies in electronics manufacturing companies	UK	27 - 120 fte	2015
30.	Hartmann e.a.	Q4 Q13 Q17	Supplier selection strategic procurement	Price vs trust, quality and technical know-how.	Competitive prices are most important, then quality and cooperation, and then know-how. Only when price (quotes) are in reasonable range, subcontractors get repeat jobs and have a change to build up trust (confidence with contractors). Contractors seem to use their market position to obtain market-conform prices.	N=922; n=202. (22%) Avg size 55 fte. (source EIC) contractor firms.	NL	20-100	2010
31.	Hayden Skiffington e.a.	Q4 Q5 Q6 Q8 Q11 Q26 Q30	international sourcing	outsourcing management model for SMEs	Case study SMEs preferred short-term formal contracts, but also preferred longer relations with suppliers for future business opportunities. Detailed specifications (p127 from customer towards suppliers. Foreign supplier selection was done based on internet search, references and intermediaries (p 130); ethical considerations. 45% of SMEs experienced growth through offshoring. Impact of customer satisfaction and responsiveness for customers was highly important during the outsourcing project. (cf Voss e.a., 1998): SMEs managed a 3-way relationship.	22 case studies on SMEs in printing and publishing	NZ	1-99	2013

32.	Jones	Q6 Q8 Q17 Q18 Q19 Q20	Supply Chain Management or Supplier relationship	Investigated SMEs in both declining and expanding markets.	SMEs in declining markets were seen as insular and conservative, with a widespread lack of trust with their suppliers, process and products had become dated. SMEs in expanding markets tried niche-markets and their offerings emphasised design and product innovation. SMEs in expanding markets differentiated between those suppliers capable of enhancing the SMEs offering whether by product and service and those less likely to do so. In this case relationships were progressive and interactive.	a) N/A; N/A; AUS; Questionnaire; SMEs; 3+ (8.9 / 13.9); Boat Building; Sydney / Queensland. b) N=19; Owners; Interviews	AU	n/a	1996
33.	Jorgensen & Koch	Q12 Q8 Q17 Q27	International Sourcing	emergent strategies to tackle complexity	Case study SMEs have offshored large part of their activities. They will reshore when it proves difficult to create managerial direction and organisational routines; innovations and knowlegde are less transferable and increase the need for reshoring or re-integration. They managed large suppliers with varying success.	3 longitudinal case studies clothing industry	DK	30 - 100	2012
34.	Kasouf & Celuch	Q6 Q8 Q17 Q18 Q19 Q20	Supply Chain Management and Supplier relationship	Perception of SMEs on industry Technology change	SMEs optimistic about industry growth think alliances are more important. Rapid technological change also stimulates alliances.	N=154; 62 responses. (40%) CEO / Divisional Head; Questionnaire; SMEs and LEs; Powder Metallurgy -Automotive	US / CA	3-2200	1997

35.	Knudsen & Servais	Q11 Q12	International sourcing	Previous import experience stimulate international sourcing. As does willingness to negotiate.	When focussing on import, building strong ties and building trust are important. Cultural differences and risks were considered less important for importing from other EU countries.	N=1229; of which 108 were surveyed; 94 responded. Survey to persons responsible for procurement.	DK	10-499	2007
36.	Laraja & Lillo	Q6 Q8 Q7	Supply Chain Management or Supplier relationship	SMEs can benefit from SCM					2004
37.	Lee & Drake	Q8 Q7 Q26 Q12	strategic procurement		supplier portfolio (Kraljics; Bensaou) are useful tools for SMEs but need to be algined with strategic SME strategies. Working with small vs large suppliers	2 case study interviews in SMEs	KR		2009
38.	Marchesnay & Julien??	Q13 Q5 Q6 Q8 Q17 Q18 Q19 Q20 Q21	Supply Chain Management and Supplier relationship	Minimal resources, minimal knowledge, minimal negotiation (buying) power	SMEs do not have the power (resources) to switch. Only change suppliers when absolutely necessary.		DK		2007
39.	Meeks	Q4	supplier selection		SME do collaborative procurement		NL		2010

40.	Morrissey & Knight	Q3 Q4 Q5 Q6 Q7	Procurement Practise Procurement Performance Sourcing Supplier Relationship	Entrepreneur Income/lifestyle Survivor	Wide variety of SMEs; a preference for quantitative SME procurement research. Contrasting procurement in small and large firms increases understanding. Pragmatic approach on supplier management. (See p. 1151 on entrepreneurial etc. procurement).	N=16; semi-structured interviews	UK	4-33	2011
41.	Morrissey & Pittaway	Q6 Q8 Q17 Q18 Q19 Q20 Q7	Supply Chain Management and Supplier relationship	Social Factors to build trust. Actively managed as integral part of daily activities. (Where in Kraljics??)	SMEs are sceptical of collaborative relationships because of 'adversarial practices' of large firm dominance. Practices and theory for large organisations may not be applicable to most SMEs.	a) N=6; owners; Interviews; Small Firm; Manuf; Plastic Moulding b) N=4000; N/A; Questionnaire; SME; Sector All c) N=122; owners; Questionnaire; SMESector; Manuf; Stainless Steel	UK	17-80 0-250 0-250	2006
42.	Morrissey & Pittaway	Q6 Q7 Q8 Q17 Q18 Q19 Q20	Supply Chain Management and Supplier relationship	Non-financial (lifestyle) motives in the owner-managers decision process. Uncertainty of collaborative relationships	Criticized applicability of large firms procurement models on their lack of complexity when applied to SMEs. Cooperation between small firms is problematic, although it could increase power and reduce dependence on larger firms	a) N=1229. Various; Telephone Survey; SMEs; b) N=190; Purchasing; Postal questionnaire; SMEs; Manuf	UK	1-250	2004

43.	Mosselman & Kemp	Q4 Q5 Q6 Q8 Q13	Supplier Selection		lower frequencies of switching suppliers; flexibility and service from suppliers more important than discounts		NL	1-250	2005
44.	Mudambi e.a.	Q29 Q23	Procurement Maturity	Deliberate type (mostly ME) Emergent type (mostly SE)	Deliberate type (mostly medium size) had adequate formal procurement plans & systems. Emergent type (mostly small firms) had inadequate systems with close & adversarial supplier relations. More complex organisations will need formal procurement strategy; emergent types can do without.	a) N=621; 25% response. N/A; Questionnaire; SMEs; Manuf; Engineering b) N=24; various; Interviews; SMEs; 14 Mech. / 10 Elec. Engineering.	UK	0-250	2004
45.	Lee Drake / Myung	Q26 Q27 Q7 Q11 Q12 Q13	Strategic Procurement	Lack of data about suppliers or supplier market		N=5; Case study.	KR		2009
46.	Nsimbila & Jurriens	Q8 Q30	Supply Chain Management and Supplier relationship	performance	good supplier relationships (win-win) statistically give the company benefits (p 35) which lead to better customer service ; poor supplier relationships (lose-win) statistically limits company growth	manufacturing, distribution; survey N = 240; response rate 70%	TAN	60 - 100	2012

47.	Ofori-Amanfo (PhD)	Q8 Q29 Q28 Q17 Q18(?); Q6	Supply Chain Management and Supplier relationship		the function of a dedicated supply chain professional increases the SC capabilities of SMEs; also open communication between partners, alignment of supply strategy and company strategy, and highly skilled and empowered procurement staff has a positive impact on performance	15 case study interviews; n=132 responses in a survey; manufacturing SMEs	UK	1-250?	2015
48.	Overby & Servais	Q11 Q12	International Sourcing	Drivers are improvements on cost and quality; not on availability	SMEs in a small nation (such as Denmark) are highly import intensive. (Contrary to Agndal & Axelsson (2004) who mentioned necessity as major driver).	a) N=1229. Various; Telephone Survey; SMEs; b) N=190; Purchasing; Postal Questionnaire; SMEs; Manuf	DK	10-499	2005
49.	Overweel & vd Zeijden	Q23 Q28 Q29	supplier selection strategic procurement		selection based on quality, only then price and service; only 15% has procurement department; owner in 81% of cases responsible for procurement; most respondents find procurement important; 65% has less than 2 suppliers for new services or products.	survey	NL	1-250	2007
50.	Ozmen (PhD)	Q7 Q28	strategic procurement	Personal and emotional motives (non-rational)	Play a role in the decision making of Turkish SMEs with non-critical commodities such as laptops.				2012

51.	Paik	Q20 Q21 Q12 Q29	Procurement maturity	Use of portfolio model is related to performance and maturity	The purchasing development has a positive relationship with business performance. There is a positive relationship between profit impact and supply risk, and purchasing development.	N=1170, n=230. To ISM industry association; various industries	US	1-500	2014
52.	Paik	Q29	Strategic Procurement maturity		Supply Chain Management		US		2011
53.	Paik et al.	Q29	Procurement maturity				DK/US		2009
54.	Park & Krishnan	Q4 Q5 Q29 Q27	Supplier Selection	Owners used objective criteria. Owner variables (age, education, experience) impact SCM		N=200; Executives; (14% response) Questionnaire; Small; All sectors; Midwestern US	US	0-500	2001
55.	Pearson & Ellram	Q4	Supplier Selection	Investigated both small and large firms.	Large firms conduct supplier selection more formally than smaller firms. However the criteria were reported similar. The lack of formalisation did not imply bad performance, in fact smaller firms developed relations with their suppliers via personal networks. The authors saw this as equally effective as formal selection methods.	N=600; Members of Procurement Industry association NAPM; Questionnaire; Small / Large; Electronics.	US	0 – 250 250+	1985

56.	Peeters	Q7	Supply Chain Management and Supplier relationship		SMEs can benefit from SCM: benefit from good trust. IT and processes must be good	case studies	NL		2006
57.	Petrick Maitland	Q17 Q18 Q19 Q20 Q8 Q30	Supply Chain Management and Supplier relationship	performance	companies that participate in networks are more likely to survive and will increase the ability to innovate (p2) due to better and cheaper access to sources.	survey N = 596, with 11.7 % response rate; 58 interviews; plactices manufacturers	US	1 - over 500, but 87% less than 250 staff	2015
58.	Pressey e.a.	Q27 Q26 Q7 Q28	Strategic procurement Supplier evaluation Supplier capabilities	Three types of manager personalities (holistic , …., traditional)	Practices varied with manager type Evaluation was less formalized, but yielded results. Limited evidence of strategic procurement. Importance of suppliers was recognised via owner-manager.	N=750; n = 97. (13%) N/A; Questionnaire; SME Sector; Manuf; 5 Sectors	UK	0-250	2009
59.	Presutti	Q29 Q23	Procurement Maturity	80% centralised procurement; 49% separate department; 31 assigned authority to staff member	Used 'large firm' context in the procurement assessment, which led to wrong interpretation of findings.	N=165; survey. small companies.	US	0-499	1988
60.	Quayle	Q23 Q29 Q7 Q8	Strategic Procurement Supplier selection Supplier relationship	Procurement often has a low priority, because of lack of procurement power	SMEs were reluctant to disclose information for establishing a collaborative procurement service. Select on quality, [price, and reliability]. Adversarial buyer-seller relationships. 46% mentioned they have supplier development program. Customers vs suppliers (p 158).	N=400; 232 responses. UK. Chief Executives; Questionnaire; SMEs; All sectors; Suffolk	UK	0-200	2002

61.	Quayle	Q6 Q8 Q17 Q18 Q19 Q20 Q24	Supply Chain Management or Supplier relationship	Useful with innovation, R&D and value engineering		N=480; 288 responses. Chief Executives (or equiv); Questionnaire; SMEs; All sectors; Wales	UK	0-200	2003
62.	Ram Wilson	Q4 Q8 Q11 Q26	supplier selection	lean procurement with suppliers	sole (single) sourcing can bring advantages in lean supply chains, however also brings risks of supply disruption and high pricing; however sole sourcing brings better MOQ and less coordination costs; international sourcing (which is often necessary in an NZ context) creates barriers for lean procurement.	conceptual model	NZ	1-99?	2009
63.	Ramsey	Q5 Q29	strategic procurement		lack of time and experience of SME owners prevents them from obtaining competitive advantage; concpetual paper	conceptual paper	UK	1-250	2007
64.	Ritvanen (PhD)	Q4 Q29 Q8	Procurement maturity Supplier selection Supplier relationship		60% had procurement staff, to be decreased in future. 10% of SMEs have spend of 50+ %, rest considerably lower (p. 97). Large firm procurement theory seems to work for SMEs (p. 146)	N=546; n=94; (17.5%) manuf, trade, services.	FI	1-250	2007

65.	Schuh Kreimeier	Q11 Q13	supplier selection strategic procurement	need new suppliers for innovations	based on their flexibility and limited resources, technology SMEs need to structure procurement function to remain competitive (Fraunhofer)	conceptual paper; German technology companies	DE	1-500	2015
66.	Sculley & Fawcett	Q11 Q12	International Sourcing		Small firms successfully conduct international sourcing, although to a lesser degree than large firms.	N=500; 72 responses (14.4%) 44% SMEs. Senior Purchasing Execs; Questionnaire; SMEs and LEs; Trans; Elec; Metals & Non Elec Ym/c.	US	0 – 500+	1994
67.	Stalenhoef	Q11; Q17 Q9	International Sourcing	cost reductions, compare local suppliers to int. Suppliers; acquisition of technology / knowlegde, and for branding		4 case studies	NL	1-250	2007
68.	Thi Viet Hoa Tran PhD	Q6 Q8 Q17 Q18 Q19 Q20	Supply Chain Management and Supplier relationship		small (AUS) retailers' negotation strategies are assessed with Kraljics. They use a mix of supplier relation strategies, and also bolster their bargaining power	8 case studies in Melbourne	AU	1-50	2013

69.	Vorosmarty	Q7 Q17 Q18 Q19 Q20	strategic procurement	Sustainable (green) procurement as a strategy. Drivers: Regulation, cost saving, customer demands.	Three clusters: avoidance of neg. effects, compliance to owner / customer demands, positively want to achieve green benefits. The positive may be hindered by lack of info. The avoidance focus on cost & legislation.	Survey; Various industries. Low rate of response (109)	Hu	20-249	2015
70.	Williams	Q6 Q8 Q17 Q18 Q19 Q20 Q7	Supply Chain Management or Supplier relationship	Supplier development although limited resources	Transfer of knowledge; improved communication with key suppliers. Developed SCM framework	N=1; Case study with three strategic suppliers.	UK	120	2001
71.	Zazulina	Q4	supplier selection; strategic procurement		as resources are limited, procurement activities are done by sme owner, which enables strategic procurement (i.e. top mgmt involvement, cooperation within SME, long term relation with few number of key suppliers. (hence contrary to other findings; see p. 32).	5 case study interviews	SE FI	1-50	2010
72.	Zheng	Q26 Q27 Q7	Strategic Procurement	Small ordering quantities for cash flow management.	This results in fragmented and non-strategic behaviour. (lower financial risks)			1-20	2004

§2.3.4 Overview of relevant terms related to procurement in construction

Table 4: Definitions and relevant terms on procurement in construction

The act of buying materials, equipment, and services that conform to the correct quality, in the correct quantity, at the market price, and are delivered in accordance with the promised delivery date.	Purchasing in construction (Benton &McHenry 2010)
The activity related to the acquisition of articles, land, property, or services by the means of purchasing.	Procurement in construction (Benton & McHenry 2010)
The process of researching and determining qualified sources of materials and equipment.	Sourcing in construction (Benton & McHenry 2010)
the process of acquiring or obtaining material, property or services. This begins with the determination of a need for a property or service and ends with the completion and close-out of a contract.	Construction procurement Palaneeswaran et al. (2003)
The framework within which construction is brought about, acquired or obtained.	Construction procurement Counseil International du Bâtiment (CIB), WP 82.
The overall approach to procurement [of construction] including the procurement strategy and procurement system.	Procurement methodology in construction (Miller et al., 2009: 10)
A procurement strategy outlines the key means by which the objectives of the project are to be achieved. It will include contracting arrangements for design, construction, maintenance or operation activities and subcontract arrangements.	Procurement strategy (Miller et al., 2009: 10)
An organisational system that assigns specific responsibilities and authorities to people and organisations, and defines the various elements in the construction of a project.	Procurement system (also known as delivery system (Love et al. 1998: 222).

§2.3.6 Focus on Inbound Open Innovations in SMEs (literature review)

(See the following pages).

Table 5: Literature review on SME inbound open innovations.

	Source	Main research focus	Context & Variables	Findings from the extant Research on Open (Supplier) Innovations	Sample; respondents; method; firm type; sector	Country	Firm Size	Year
1.	Ahn e.a.	Collaboration	Broad & intensive OI adoption -> positive relation with performance	Broad engagement; Tech. and market-oriented OI with low level of change; non-competing partners (customers, consultants, universities). The capabilities of innovative SMEs are in technology and less in management skills (Narula, 2004; Oakey 2013). This would explain that SMEs do not favour higher level change (like M&A, new bumo) but prefer lower level changes. Collaboration with many partners did not do harm.	N=3000; n=306; survey to innovative SMEs	KR		2015
2.	Arrigo	strategy	Conceptual paper	Drives value creation				2015
3.	Brunswicker & Vanhaverbeke	Sourcing (external) (non pecuniary)	5 Clusters: Minimal Supply chain Tech oriented Appl. Oriented Full scope sourcing	Each cluster has a strategy, reflecting nature of external interactions; and four internal practices & routines (p. 1243) as positive mediating variables. Full scope sourcing seems most successful; Next best is appl. Sourcing.	N=3000 benchmarking; n=1411 site visit. Median 23 fte, 14 yrs.	Eu	23 med.	2015
4.	Cheng & Huizingh	Strategy	Entrepreneurial; market; resources	Entrepreneurial orientation seems to create the best basis for OI. Market orientation (focusing on current customers) middle; resource o. least.	n=223 service firms (finance, IT, retail & log)	Asia	SMEs LEs	2014

5.	Chesbrough & Crowther	experience	Risks of OI for SMEs	SMEs are reluctant to take risks (also due to lack or resources, skills)				2006
6.	Cuerva e.a.	Low-tech SMEs	Green innovations vs non-green innovations	QMS stimulates adoption of green innovations; Techn. capabilities (R&D, skills) stimulate non-green innovations.	N=2493 SMEs, with 85% < 10 ftes. n=301. Low-tech food & beverage industry	ES	1-okt	2014
7.	Dahlander & Gann	Pecuniary	Complex transactions like acquisitions & licensing-in	These are resource intensive and require control over supplier network				2010
8.	Drechsler ea	experience	Lack of knowledge prevents SMEs from doing OI.	When firms lack knowledge on markets and technology, they are not open in innovation. Lack of skills; strategic IP protection (secrecy, lead-time, complexity) can help more than patent IP. Large firms more open, service less open, high competition, less open.	N=4509, n=2422 firms; industry & services	DE	>10	2012

9.	Esbjerg e.a.	networking	Narrow OI adoption. Most DK innovative SMEs use closed innovation. (0-6 practices: 49%); 10+ OI practices 14%.	(p. 35): Internet search for trends or technologies, trade organisations, participate in innovation fairs, shows, purchased R&D, outsourced R&D, purchased patents, licences, know how, work with lead users. Breath = no of practices applied. Thinks OI with supplier/customers is 'easier' (sic) (meant more freq?) than with Unis (and competitors).	7 Case studies over industries and size. survey N=3540, n = 355. Manuf firms	DK	5-499	2012
10.	Frishammer & Horte	Scouting	Can bring too many ideas	SMEs then struggle with resources to manage and prioritize				2005
11.	Gronum e.a.	Networking	Strong heterogeneous ties improve innovation	Structural and relational dimensions of social capital in networks help (give advantage of larger siez); But innovation breadth (OECD) is mediating factor; and should lead to improvements in innovations & and a bit in performance. Other unknown factors play a role.	N= 2732; n=1435; sec data. several industries	AUS	1-199	2012
12.	Grundstrom	Low-tech SMEs	OI factors and firm performance	Majority of SMEs apply technology at lower end of techn. complexity scale (Gagliardi, 2013). Breadth = no of partners or sources, depth = degree or the use of those sources, intensity & duration of collaboration. (Laursen & Salter, 2006).	n=152 SMEs manuf.	SE		2014

13.	Heger e.a.	Networking	Superficial or fundamental	Most SMEs use networking for data collecting, few use it for strategy & decision making. Networking can be beneficial for identifying opportunities.				2014
14.	Hemert et al.	Collaboration		Collaboration more important in commercialisation than early stages of innovation				2013
15.	Hervas e.a.	Sourcing (strategies)	Ability to scan, value and access knowledge from Unis;	Low-tech[2] is defined as low levels of R&D, using informal levels of R&D, and learning by doing and by using, or acquisition of tacit knowledge.	n=442 Low-tech firms; survey. industries n.a.	ES	n.a.	2012
16.	Holzl	Performance	Country differences	SMEs are shaped by their techn intensities of countries in which they are based. (E.g technology-following country vs leading)				2009
17.	Huang ea	scouting	complementary technologies, capacities and knowledge	Then transform and develop these through transformative capacity, create core competences and then value	n=200; survey via researcher network	CN		2015
18.	Idrissia	Performance	OI factors and SME firm	4 types of open innovation - depends on age, breadth and depth	manufacturing; N = 1268	Chili		2011

19.	Inauen Schenker	performance	OI versus closed innovation; low-tech vs high tech	Higher openness to unis and customers increase product innovation; Higher openness to suppliers (SCM; early supplier integration), and competitors (possibly decreases path dependency) increases process innovations. Cross industry collaboration = negative, due to cognitive distance and low ACAP[1]. High-tech firms more innovative than low-tech firms.	N=783 stock-listed firms, R&D mgrs. n=141. Manuf, service	DE, CH, AUT	SMEs LEs	2011
20.	Inauen Schenker	performance	OI versus closed innovation; high-tech vs low-tech; outbound	Inbound open innovation is more likely to create radical innovations & sell more new products. Closed innovation firms more likely to have incremental product innov. LEs more incremental than SMEs. High-tech firms more innovative than low-tech firms	N=783 stock-listed firms, R&D mgrs. n=141. Manuf, service	De, CH, AT	SMEs LEs	2012
21.	jong vermeulen	practices		major differences on use of innovative practices between SMEs and LE's, and relation to introduction of new product innovations ("during kast 2 years, as opposed to OECD 3 yr); age classification, p. 595	n=1250 firms in 7 industries: construction, retail services, hotel etc	NL	< 100 fte	2006

22.	Lasagni	Collaboration	Performance drivers	Strengthening relations with customers, suppliers, users; better NPD when improve relation with laboratories and Research institutes. Customers – for defining product definitions; suppliers for accelerating & reducing costs, and generating ideas in design but probably less so in development. Unis for breakthrough, but difficult to manage, and limited role in success?	N=500 SMEs in 6 countries. Used survey via national agencies. Practices from lit & experts.	AT DE IT HU PO SL	1-9 10-19 20-49 40-99 100-249	2012
23.	Laursen & Salter.	Sourcing (external) (strategy & channels)	Over-searching can have negative effects	SMEs should be careful with concept of openness and consider cost of searching				2006
24.	Lee ea	exploration	Strategic and multi-actor alliances important drivers. Suppliers of BOM and NPR placed 2nd. (p 295)	SMEs use OI less than LEs (p. 294). OI with SMEs often limited to strategic alliances with LEs and outsourcing. More active SMEs more conscious of OI problems (p. 296). SMEs can benefit from intermediate organisations supporting SMEs in searching for partners & building trust	n=2414 SMEs and 329 LEs. And a case study.	KR	n.a.	2010
25.	Lichtenthaler	sourcing (inbound transactions)	Six groups of SMEs	Closed, closed 2, absorbers, desorbers, balanced, open	manuf	DE, CH, AUT		2008

26.	Lichtenthaler et al.	Scouting	Analysing the SMEs techn. environment to gather information & ideas	role of technology aggressuveness				2009
27.	Michelino	Collaboration	5 business models: collaboration, outsourcing, licencing, trading, incorporation (M&A)	Used financial data to analyse the 5 models.	N=813; n=271 firms; several high-tech industries	world	n.a.	2015
28.	miller e.a.	Collaboration	low level of collaborative arrangments	90% of contractors do not have collaborative arrangements; p. 62. Those that have, do this with clients/customers or buyers (90%), and much less with suppliers (27%) or competitors (41%). Page 71	national sensus	AUS	1-100?	2009
29.	Nicolas & Ledwith Perks	practices	best NPD practices	strategy most important, metrics and performance evaluation STATISTICALLY least important with both SMEs and LE's Definition EXPERT: > 3 YRS EXPERIENCE selected uniquely by SMES or LE's on a more detailed level (table iv, p. 237)	N=70 SMEs, and N=74 larges companies; response rate (convien sample) 39%	UK IR		2011

30.	Nitzsche				N=5048;n=496. Survey; no size	DE	n.a.	2016
31.	Padilla e.a.	Networking	Formal and informal relations needed					2013
32.	Parida ea	scouting (scanning) Sourcing	Importance: Scouting (§) -> incr. Sourcing (n§) -> rad.	Vertical techn. collaboration -> rad. Horizontal techn. collaboration -> incr. Both used to overcome liability of size. Both important, though scouting more for incr. sourcing more for rad.	N=1500; n=252 hightech SMEs (IT, service techn) turnover 150kUSD / fte.	SE	7-249	2012
33.	Pei-Hung Ju e.a.	strategy	Inbound higher occurrence than outbound or coupled (also with high dynamics)	Higher EO -> higher score on innovation processes. But firms with higher EO and higher dynamics do not adopt coupling approach more often.	Avg <200 ftes. Survey MBA students, N=112 manuf; n=49 service	TW	1-499	2013
34.	Pullen	Networking	Closed, focused and consistency is driver for high innovation performance	Successful network profile is complementary goals & resources, trust and low strength in network position	Case studies			2012

35.	Rodriguez	practices	practices					2014
36.	Santoro	Sourcing (External vs internal sources)	More closed than open.	Highest external: B2B customers, then competitors, partners, suppliers, & (least) universities.	N=441 SMEs, n=91; high-tech (43%) and lowtech (32%) man; services	IT	1-249	2016
37.	Savino	networking	Lit review; suppliers	The literature has also focused on suppliers as a source of knowledge (Chen et al. 2011; Cousins et al. 2011; Kang and Kang 2014; Kohler et al. 2012; Li and Vanhaverbeke 2009; Ray and Ray 2011). Innovating firms may seek suppliers in very different industries in order to uncover new and complementary technological elements and recombine them into pioneering innovations (Li and Vanhaverbeke 2009; Padula 2008; Troilo et al. 2014). A significant result may be obtained when firms search among old knowledge from outside industry suppliers (Katila 2002). Mature and well-understood knowledge elements are useful bricks when combined in different technological domains, since they offer greater reliability and may be revitalized by the exploitation of emergent technological solutions (Ahuja and Lampert 2001; Nerkar 2003). Suppliers' knowledge may play an important role in lowering costs associated with developing an architectural innovation, especially when they are involved in	Lit review (p. 10)	IT		2015

				the early design phase (Argyres and Bigelow 2010; Ray and Ray2011).				
38.	Sia-Ljungstrom	Low-tech SMEs	traditional			SE		2014
39.	Som & Kirner	networking	supplier-dominated	For low and medium tech companies (LMT), suppliers are more important as source and for collaborative relationship than Unis (p. 23); LMT need ACAP (p. 27). LMT have stable market position due to high investment barriers and long term relations with suppliers & customers (p. 86 Som, 2010).	Aggregated and lit review. Manuf industry	DE		
40.	Spithoven ea	Sourcing (search) Scouting (acquiring / collaboration / access / use)	Nine information and collaboration sources for search & scout (p.10, 11). OI turnover in SMEs driven by IP protection; in LE by source (search)	SMEs more effective in using different OI practices. Need OI more (lack or resources) and can benefit more from OI than LEs. SMEs can benefit from IP protection and techn. intermediaries, but too many do not take systematic IP approach SMEs in continuous or fundamental processes use IO least. science-based and knowledge-intensive most. Collaboration includes value chain partnerships	N=1427; n= 792 SMEs, 175 > SMEs. Several industries, incl manuf, services.	BE	1-249 > 250	2013
41.	Spithoven et al.		Low-tech					2011

42.	Teirlink ea	Collaboration	Co-developing innovators Outsourcing innovators	Smaller SMEs have lower degrees of collaboration				2008 2013
43.	Tsai	networking	Suppliers are a source for ideas. Network partners	Suppliers; For techn. solutions or process innovations; partners long term for joint value creation				2009
44.	Tunzelmann & Acha		Non R&D based innovations					2005
45.	Ortiz Urbina-Criado	Strategy	Degree of open innovation depends on size and sector. Three equally large clusters	Small–medium Manuf -> low–medium OI Large service -> highest OI: buy more R&D, are cooperative, more innovative. (Do not always use IP protection).	n=8467 firms 63% manuf;37% services	ES	1-250 250-499; >500	2012
46.	Van der Vrande e.a.	Exploitation exploration	Motives: market or customer related. challenges: organisational & cultural. Difficult to benefit /use ext. relations	Exploration: customers, external networking and participation, outsourcing R&D, licencing-in of IP. SMEs use OI to compensate for lack or resources (liability of smallness) Grp 1= open, mostly manuf; Grp 2: Grp 3: customer only but no IP transactions. No differences between services & manuf	N=605 SMEs. manuf and services	NL	1-249	2009

47.	Vanhaverbeke ea							2006
48.	Wynarczyk	Collaboration	SMEs with OI collaborate for product innovations	SMEs with closed innovations collaborate for incr. changes on existing products				2013
49.	Zabala	practices	Low-tech SMEs largely have same NPD decision processes as medium-high LEs	Based on model krishnan 2001; and NPD process Mathesob 1998. Defines traditional industry as supplier dominated, techn. adopters (instead of own R&D),in part old firms, low tech, competiveness on customers' preferences & fashion (p. 32) . SMEs rank priority in practices/decisions differently. also varies per industry.	N=1200; n= 136. survey of SMEs in traditional (low tech) industries	ES	1- 9 10-50 51-249	2012

§2.10.3 Overview of steps in innovation processes as found in literature

Table 6: Overview of innovation process steps as found in literature

#	Steps	Steps in innovation processes	Source
1	3	Idea generation Opportunity Diffusion	Gambatese & Hallowell, 2011a: 553. (empirical research)
2	3	Idea generation (in house, cross-pollination, external) Idea development (selection, development) Diffusion (spread)	Ozorhon et al. (2010) process model on construction innovation (used in NZIER, 2014). The model originated from a generic 3 step model of Hansen & Birkinshaw (2007)
3	3	Conceptualisation Development Implementation	Park (2004) as cited in Gambatese & Hallowell (2011a)
4	3	Identification Evaluation implementation	Toole et al. (2013: 47) on innovation in construction
5	4	Generalising & conceptualising a new idea Developing new technology Transferring knowledge Applying new methods to solve follow-up troubles	Bernstein et al. (1998) on innovation in construction
6	5	Idea formulation (ideation) Concept formulation Development of product First use in market / test marketing Commercial (full / international) use in market.	Cooper (2001) as used in Tidd and Bessant, (2009: 314). (See also p. 328-330).
7	5	Problem identification Analytical investigation Development of a solution Establishing validity of full-scale prototype Commercial realization	Halim & Haas (2004) on innovation in construction (In Xue, 2014: 116)
8	5	Diagnosis Action Plan Taking Action Evaluation Specific learning	Sexton & Barrett (2003: 630). Construction innovation is a nonlinear cycle of divergent & convergent activities.
9	5	Inclinations and changes of recognition Development of requisite abilities Supply of modern technologies into the industry Experimentation and refinement implementation	Tatum (1987) on innovation in construction (In Xue, 2014: 116)
10	6	Research & Development Beginning of Commercialisation Diffusion Adoption by Innovation Accepting Organisation Implementation Consequences	Rogers (1970, 1995, 2003) as cited in Gambatese & Hallowell (2001: 508) and others.
11	6	Identification Evaluation Commitment Detailed preparation Actual use Post-use evaluation	Slaughter (2000: 4) on innovation in construction (based on Meyer & Goes, Goodman & Griffith, Von Hippel & Tyre)

§2.11.1 Different terminology for procurement best-practices

Cullen (2012) used a typology for contract management (see below) with 4 steps (control, interact, adapt and plan). Each step explained 2–4 key processes, which she called "best-practices". (See Figure below).

Control	Interact	Adapt	Plan
1. **Ensure performance** - set, review, and monitor KPIs 2. **Watch over the finances** - budgets, billing and payment, total cost of contract, and trends. 3. **Record keep and report** - real-time audit trails and reporting 4. **Audit compliance** - of both parties to contractual documents	5. **Invest in the relationship** - strong SRM at all levels 6. **Orchestrate the CM network** - of your people to act within the contractual frame-work as a cross-functional team 7. **Handle disagreements and disputes** - prevent and treat internally and not through third parties	8. **Gauge issues and risks** - ongoing identification, prioritisation, tracking, and resolution 9. **Manage variations** -written, verbal, and behaviour-based (estoppel) variations	10. **Forecast demand and supply** - business needs and changes, provider capabilities, etc. 11. **Maintain market intelligence** - over your providers and the market as a whole (e.g. prices, technology, market conditions, standards) 12. **Drive continuous improvement** - within both parties and their interfaces

Figure 1: Terminology on best-practices with managing contracts (Cullen, 2012)

In contrast, Ubeda et al. (2015: 182) found in a survey of 287 Chilean SMEs and large companies that those companies used a wide collection of simple and more complex cost-saving procurement "levers". (See Figure below). These levers seem to be on a similar level as Cullen's best-practices.

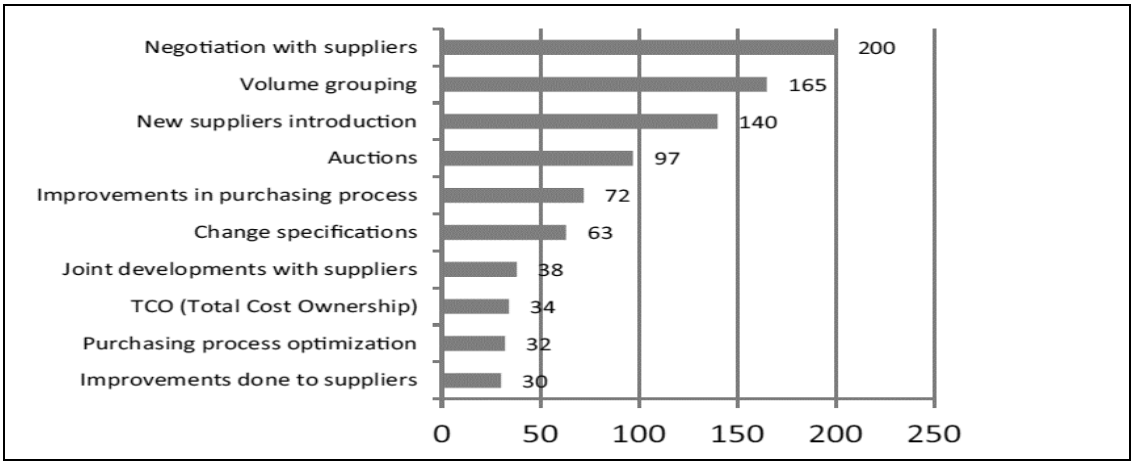


Figure 2: Terminology on cost-saving procurement levers (Ubeda *et al.,* 2015: 182)

The 3 bar charts below from Ritvanen (2007: 123) shows survey results on procurement of logistic services in 92 Finnish SMEs. The survey used prompted awareness to respondents (2007: 197, 203). From the first bar chart, Ritvanen concluded that most of these Finnish SMEs used several *procurement tools* for evaluating their procurement performance. The second and third bar chart in the Figure show *procurement performance criteria* and *supplier selection criteria*. Depending on the context of the company, such criteria could also be considered best-practices.

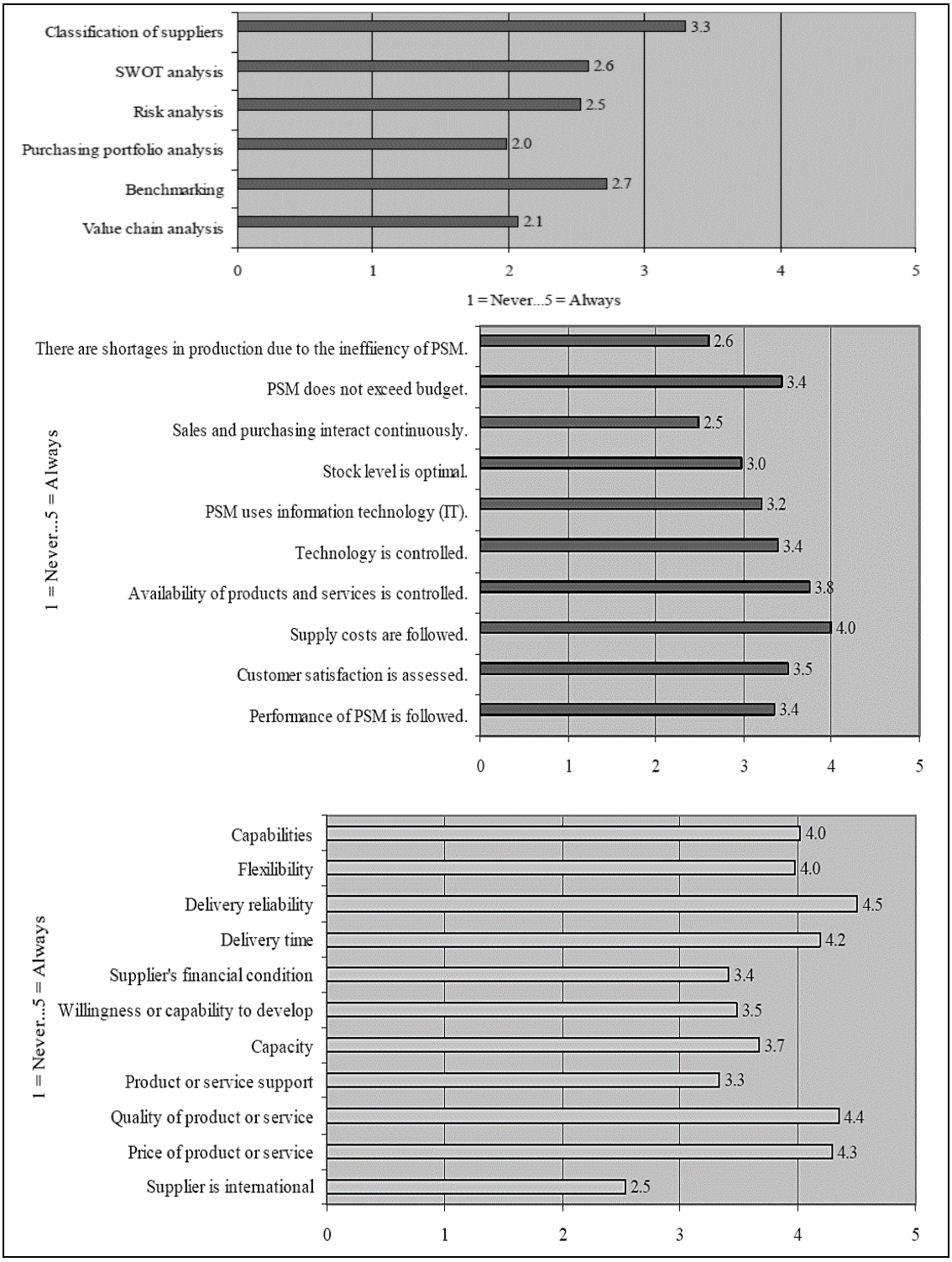


Figure 3: Terminology on tools, performance criteria, & selection criteria in SMEs (Ritvanen, 2007)

Chapter 3: Methodology of this Research

§3.6.1 Search strategies for the literature review

The review applied 3 search strategies separately or in combination:

1. Conducting searches with combinations of key words;
1. Conducting reference and citation searches;
2. Conducting searches with author's names or journal names.

Ad 1: Using predominantly search terms (key words) as procurement or purchasing (buying, supply, sourcing, supplier) combined with small business, small company(s), small company or small companies, small organisation(s) or SME(s), with innovation or innovative or innovate, or construction innovation or building innovation revealed a potentially-relevant body of research in Web of Science and in Google Scholar. (See Appendix for complete overview of search terms used),

Ad 2: In (subsequent) reference and citation searches via Google Scholar the main focus was on literature from 1995 or 2000 onwards. Research on procurement and on innovation management has developed quickly over the past decades and new technology and increased competition has changed procurement and innovation processes. As the construction industry has remained fairly stable over the last decades, the literature could also include older articles.

Ad 2: For example, Ellegaard (2006: 278) found limited cross-referencing between domains of small company journals and purchasing literature and found limited cross-publishing. Nevertheless (forward and backward) citation searches for older or newer articles proved beneficial when the research analysed (1) older (backward) references from extant literature reviews and from PhD theses, or (2) newer (forward) citations from highly-cited and relevant publications.

Ad 3: Several authors (e.g. Hardie, 2011, Hochrein & Glock, 2012: 233) recommend using established (peer-reviewed) research journals as a source of reference. Initially these journals (see Table below) were used as a source for potential literature. However, it revealed that relevant authors often used several journals to discuss their related research, and exclusively searching for papers via academic journals yielded limited extra results. This was confirmed in Spina et al. (2013: 5) who found 20 peer-reviewed journals related to procurement research, and Ellegaard (2006) who found 58 peer-reviewed articles spread out over 17 journals related to small company purchasing. (See Appendix for more details).

Ad 3: Nevertheless, the review status was a first quality criterion. The focus was on peer-reviewed papers from academic journals. Additionally, the literature review covered peer-reviewed conference papers that were mainly accessible via proceedings of ACERE (Australian Centre for Entrepreneurship Research Exchange) and IPSERA (International Purchasing and Supply Education and Research Association). Papers published via these conferences often describe work-in-progress or new research avenues that in future may appear in one of the journals mentioned above. (See Appendix).

Ad 3: The review furthermore identified non-academic documents (accessed via Google) from consultancy companies, industry associations, commercial companies, and (semi-) governmental companies. (See Appendix).

§3.6.1 Search strings with synonyms and related terms

Several search strings used in the iterative literature search. (Status 4th of June 2015).

When Google Scholar could not combine long search strings, Web of Science was used.

Long search string on SMEs or entrepreneurial firms. [Allintitle: 28,600 (anywhere in article 431,000) hits in Google Scholar] In WoS this is 19533 articles (60668 topics) including deliberate typos (SME OR SMEs OR "small firm" OR "small firms" OR "small business" OR "small businesses" OR "small company" OR "small companies" OR "small and medium sized firm" OR "small and medium firm" OR "small and medium sized firms" "small and medium firms" OR "small and medium sized business" OR "small and medium business" OR "small and medium sized businesses" OR "small and medium businesses" OR "small and medium sized entreprise" OR "small and medium enterprises" OR "small and medium sized enterprise" OR "small and medium enterprises" OR venture OR ventures OR entrepreneurial OR entrepreneur OR entrepreneurs OR enterpreneur OR enterpreneurs OR gazelle OR gazelles)

Short search string on SMEs. [Allintitle: 76,500 (anywhere in article 1.34 million) hits in Google Scholar.: (SME OR SMEs OR "small firm" OR "small firms" OR "small business" OR "small businesses" OR "small company" OR "small companies" OR "small and medium sized firm" OR "small and medium firm" OR "small and medium sized firms")

Short Search string on entrepreneurial firms [including the typo]. (venture OR ventures OR entrepreneurial OR entrepreneur OR entrepreneurs OR enterpreneur OR enterpreneurs OR gazelle OR gazelles)

Long search string on procurement. [Allintitle: 112,000 (anywhere in article 3.5 million) hits in Google Scholar] In **Web of Science this results in 58,000 HITS IN TITLE from 2000.** (Purchasing OR procurement OR supplier OR supply OR buyer OR buyers OR supplier OR suppliers OR buying OR "supply chain" OR "supply management" OR "supply base" OR "supplier base" OR "supplier-based" OR "supply chain management" OR "supply chain integration" or "Supplier-buyer" OR "supplier-customer" OR "seller-buyer" OR "seller-customer" OR "buyer-supplier" OR "customer-supplier" OR "buyer-seller" OR "customer-seller" OR "Supplier-buyers" OR "supplier-customers" OR "seller-buyers" OR "seller-customers" OR "buyer-suppliers" OR "customer-suppliers" OR "buyer-sellers" OR "customer-sellers" OR "Suppliers-buyers" OR "suppliers-customers" OR "sellers-buyers" OR "sellers-customers" OR "buyers-suppliers" OR "customers-suppliers" OR "buyers-sellers" OR "customers-sellers" OR "Supplier buyer" OR "supplier customer" OR "seller buyer" OR "seller customer" OR "buyer supplier" OR "customer supplier" OR "buyer seller" OR "customer seller"OR "Supplier buyers" OR "supplier customers" OR "seller buyers" OR "seller customers" OR "buyer suppliers" OR "customer suppliers" OR "buyer sellers" OR "customer sellers" OR "Suppliers buyers" OR "suppliers customers" OR "sellers buyers" OR "sellers customers" OR "buyers suppliers" OR "customers suppliers" OR "buyers sellers" OR "customers sellers")

Short search string] on procurement. (supply OR supplier OR procurement OR purchasing OR buyer OR buying)

Short search string on procurement process model: "Weele model" OR "purchasing process model" OR procurement process model" OR "procurement model" OR "purchasing model")

Search string on Sustainability: (Green OR environmental OR sustainable OR sustainability OR "carbon footprint" OR "circular economy" OR waste OR "waste-reduction" OR "waste-reducing" OR CSR OR "corporate social responsibility")

Long and very generic search string on collaboration: [Allintitle 1,1 million (anywhere in article 5 million) hits in Google Scholar]. (Clustering OR cluster OR clusters OR collaborative OR collaborating OR collaboration OR network OR networks OR networking OR integrate OR integration OR integrating OR alliance OR alliancing OR alliances OR dyad OR dyads OR dyadic) *HENCE NOT: astronomics, neural, medicine, medical, mathematics, algorithm,* ***etc.***

Long search string on buyer-seller. [Allintitle 13,900 (anywhere in article 17.300) hits in Google Scholar] ("Supplier-buyer" OR "supplier-customer" OR "seller-buyer" OR "seller-customer" OR

"buyer-supplier" OR "customer-supplier" OR "buyer-seller" OR "customer-seller" OR "Supplier-buyers" OR "supplier-customers" OR "seller-buyers" OR "seller-customers" OR "buyer-suppliers" OR "customer-suppliers" OR "buyer-sellers" OR "customer-sellers" OR "Suppliers-buyers" OR "suppliers-customers" OR "sellers-buyers" OR "sellers-customers" OR "buyers-suppliers" OR "customers-suppliers" OR "buyers-sellers" OR "customers-sellers" OR "Supplier buyer" OR "supplier customer" OR "seller buyer" OR "seller customer" OR "buyer supplier" OR "customer supplier" OR "buyer seller" OR "customer seller" OR "Supplier buyers" OR "supplier customers" OR "seller buyers" OR "seller customers" OR "buyer suppliers" OR "customer suppliers" OR "buyer sellers" OR "customer sellers" OR "Suppliers buyers" OR "suppliers customers" OR "sellers buyers" OR "sellers customers" OR "buyers suppliers" OR "customers suppliers" OR "buyers sellers" OR "customers sellers")

Search string on industry relations: ("industrial-relation" OR "business-to-business" OR "business-relation" OR "business relation" OR "commercial relation" OR "industry relation" OR industry-relation" OR "industry-relationship" "industrial-relations" OR "business-to-business" OR "business-relations" OR "business relations" OR "commercial relations" OR "industry relations" OR industry-relations" OR "industry-relationships")

Search string on non-incremental innovation: (radical OR disruptive OR discontinuous OR architectural OR system OR integral OR systemic OR modular OR systems)

Search string on construction industry: (Construction OR building OR housing) AND (industry OR sector OR "supply chain")

Search string on open Innovation: ("open innovation" OR "user innovation" OR "customer innovation" OR "distributed innovation" OR "supplier innovation")

Search string on innovation: ("new product development" OR NPD OR innovat*)

Search string on technology innovation: ("Technology innovation" OR "product innovation" OR "technological innovation")

§3.6.1: Examples of academic journals possibly relevant to this research

Table 7: Journal names possibly relevant to this research

Journal name	Academic Domain
Building Research and Information (BRI)	Construction industry and innovation
Construction Innovation (CI)	Construction industry and innovation
Construction Management and Economics (CME)	Construction industry and innovation
Engineering Construction and Architectural Management (CME)	Construction industry and innovation
Journal of Construction Engineering and Management (JCEM)	Construction industry and innovation
Journal of Purchasing & Supply Management (JPSM)	Procurement
Supply Chain Management: An International Journal (SCMIJ)	Procurement
Journal of Supply Chain Management (JSCM)	Procurement
Industrial Marketing Management	Business / Entrepreneurship
Journal of Small Business Management (JSBM)	Small Business / Entrepreneurship
International Small Business Journal (ISBJ)	Small Business / Entrepreneurship
Journal of Business Venturing	Small business / Entrepreneurship
Small Business Economics (SBE)	Small Business / Entrepreneurship
Technovation (JV)	Innovation management
Journal of Product Innovation Management (JPIM)	Innovation management

Based on the ERA list. (For the ERA Journal list, see Anonymous, 2009. The Excellence in Research for Australia (ERA) Initiative. Australian Research Council, http://www.arc.gov.au/era [6 April 2010].

§3.6.1 Conference papers and non-academic sources used for the review

Table 8: Overview of academic sources used in Chapter 2

Academic conference proceedings	Details
IPSERA proceedings (2008 – 2016)	Procurement & supply management research ***http://www.ipsera.com/***
ACERE proceedings (2013, 2015, 2016)	Small Business / entrepreneurship research ***http://acereconference.com/***
CIB proceedings (UK / NL)	Construction innovations research ***http://www.cibworld.nl/site/databases/publications.html***
CRC and BRITE proceedings (AUS) Sustainable Built Environment national research centre (SBEnrc; AUS)	Construction innovations research CRC and BRITE: (***http://www.construction-innovation.info/indexd708.html?id=3***) SBENRC: ***http://sbenrc.com.au/***

Table 9: Overview of non-academic sources used in Chapter 2

Non-academic source	Details
Industry (research) associations	Built Research Association NZ (BRANZ)
Consultancy companies	Price Waterhouse Coopers McKinsey
(semi) governmental companies	NZ Statistics
Industry associations	Prefabrication New Zealand (PrefabNZ) Facilities Management Association NZ (FMANZ) Buildingvalue.nz (NZ) Building a Better New Zealand (NZ) Bouwend Nederland (NL) New Zealand Green Building Council (NZGBC)

§3.6.2.1 Detailed discussion of 8 process steps for case study research

The aspects discussed below have been taken from table based on Eisenhardt (1989)

Ad 2: The s*election of cases* will be done carefully to fit research objectives. Both according to Dubois & Araujo (2007) and Swanborn (2013) this is important for the validity. It is also necessary to get access to cases with sufficient richness of data and a potential comparison with other cases.

Ad 2: The *number of cases* required for this research also depends on the non-positivistic perspective of this research. For example, Dubois & Gadde (2002) favoured single *case studies* which would produce rich material and new theoretical relationships. Both Yin (1984) and Eisenhardt (1989) preferred *multiple-case studies* over single case studies as they would develop more elaborate theory which would be more robust and generalizable. Eisenhardt (1989) as cited in Manley (2008) saw poor generalisation with fewer than 4 case studies while more than 10 case studies would limit possibilities for effective cross-comparison. Meredith (1998) suggested a relationship between the number of case studies and the possibility to apply statistical methods for correlating and comparing data. According to Meredith (1998) such possibilities would increase from 6 multiple cases upwards. However, innovations processes by definition are *non-standard improvements* (see for example Tidd & Bessant, 2009) and this research expected a large variety of practises which made a statistical analysis with more case studies less useful or at least not efficient.

Ad 2: Considering the research domains in more detail. In her *construction innovation* research Hardie (2011) applied 7 case studies. Bemelmans on describing best practices in *construction procurement* used 2 case studies to design a procurement maturity model and then tested the model in another 2 case studies. In their seminal work on *procurement maturity models* Reck & Long (1998) as cited in Baier (2008) used 15 case studies. Ates (2008) applied 4 case studies with each 3 interviews per case study on her research on *strategy making in SMEs*. Wynstra (1998) in a 4 -year research project on supplier involvement in NPD used 9 case studies, 9 interviews and an additional 3 in-depth case studies. Hagelaar *et al.* (2015) on procurement practices within SMEs used 9 case study interviews combined with one focus-group discussion, and a Delphi study with new participants. Ellegaard (2006, 2009), and Morrissey & Knight (2011) both used between 10 – 15 interviews as a single mode of research. De Waal (2011) combined a quantitative survey with 5 case studies.

Ad 2: The number of cases also depends on whether they are used *exploratory, descriptive* or *explanatory*. The current research focused on the question *how* focal companies manage innovative suppliers with the object of explaining *why* they conduct certain practices. This research hence commences with an exploratory perspective (in the interviews) and then with a descriptive and explanatory perspective (in the surveys). According to Yin (2013) this would need either one single, or multiple case studies.

Ad 2: There are some practical considerations to be made as well. (Swanborn, 2013: 79). Preparing an extra interview may not take much extra time, but transcribing and analysing approx. one hour of speech would take considerable time. Moreover, for time constraints the case companies had to be situated in Auckland. This latter point may not be a large issue on the validity, as the Auckland region represents approx. 50% of all construction

activity in New Zealand and therefore the region may have hundreds of potentially-relevant focal companies.

Ad 2: In conclusion. This research commences with a working understanding from literature. The interviews should help to convert this understanding (assumptions) into survey questions. Too many (superficial) case studies will not give a better understanding whereas one single (in-depth) case study would give too many details but no comparison (replication) with other case studies. The researcher also has to consider the time available in this research project. Considering the above, this research uses material from 5 New Zealand case study interviews to explore this research.

Ad 5: In *conducting the data analysis* this research focuses on data from open-structured interviews with one key informant from 5 companies. The interviews are recorded and summarized in writing. The interviewees receive a draft copy within one week and are invited to give their comments. This enables the interviewees to give feedback and also enables the researcher to pose additional questions.

Ad 5-7: The steps of *analysing data (5) and building theory (6)* both needs rigor and creativity and form an iterative process which take some time. It is here that an additional *review of literature* (7) had an added-value to design survey I.

As discussed above the case study interviews had open-ended structures. The researcher used 3 power-point slides to guide the interview. As a fallback-scenario the researcher prepared a set of semi-structured interview questions in case a more structured approach proved more appropriate. However, in all 5 instances the interviewees needed little prompting and openly discussed several units-of-analysis within the context of the current research.

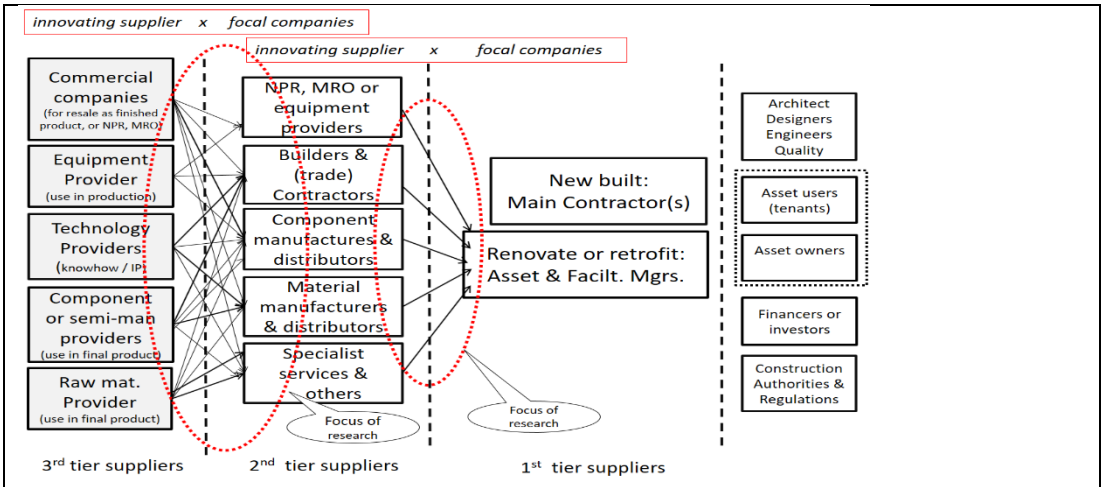
§3.6.2.2 Profile of Company & Research Participant of Focal Companies

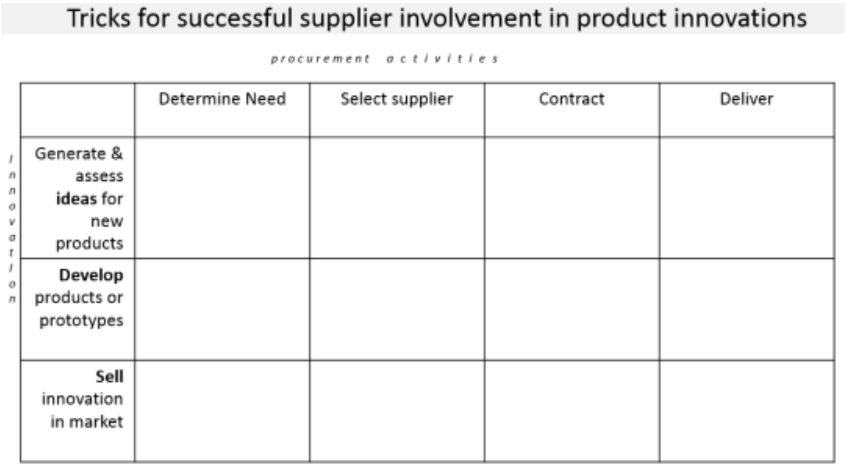
(See also Chapter 4)

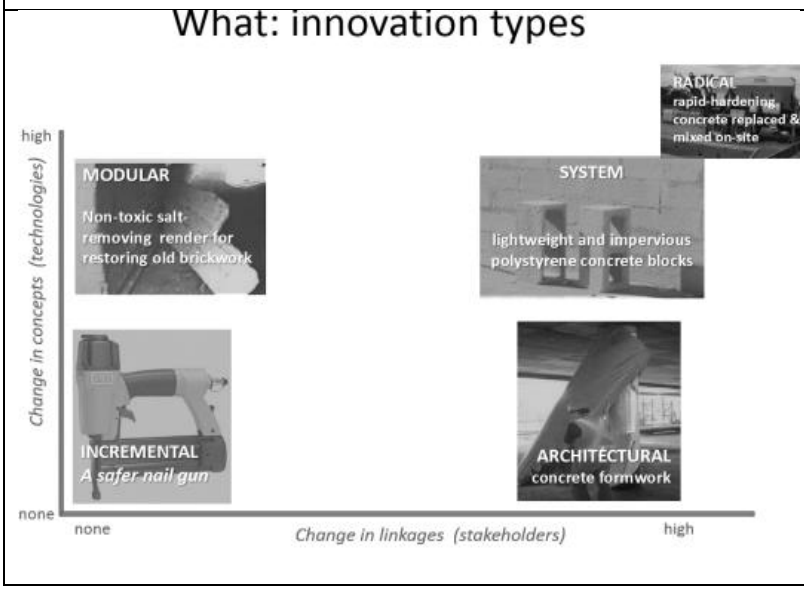
Table 10: Profile of research participants explorative interviews

	Code name	Profile Company	Inter-viewee	Comp. Size	Age & experience	Comp age	Date interview
1	Design & Build	Collective of architect, engineers, contractors and product manufacturers. Designs, constructs and manages the complete build of innovative prefab emergency shelters (residential and non-residential) and residential baches.	Director FT	1 – 10	40 – 50 Experienced, master level	< 5 yr	13 JAN2016
2	Survey & Consult	Architect. Chartered Building Surveyor and Engineer; offering specialist construction services	Director KW	1-2	40 – 50 Experienced PhD	15+ yr	10 DEC2015
3	Innovative building Services	Start-up company specializing in providing building maintenance services with procured innovative equipment	Partner KC	5-10	40 Experienced, MBA	< 1 yr	11 DEC2015
4	Insulator	Master-franchise company. Distributor of overseas innovative insulation material, manufacturer of organic insulation material. Also provides installation services in new built (residential / non residential)	Director NH	10-50 51-100	40 Experienced Degree in Commerce.	15+ yr	15 DEC2015
5	Concrete Panel	Large-scale prefab manufacturer of innovative concrete panels for residential and non-residential buildings. Subsidiary of an established NZ company operating in the same industry.	Marketing director PA	100+	40 (12+ yrs) Experienced in general management, marketing & procurement	15+ yr	11 DEC2015

§3.6.2.2 Powerpoint slides used during the Interviews







§3.6.2.2 Interviews: Coding, Intelligent Transcription and Reformat in Paragraphs

The interviews were recorded. Audio files were transformed into interview text files via intelligent transcription[1] with the software programme NVIVO[2]. This means that the interview texts (see Appendix §4.2) were transcribed without interjections, prompts or meaningless expressions (such as ums, eh, you know, right), and without repetitions, laughter, or breaks. Parts of the discussions not relating to the research topic (e.g. disturbances, small talk, taking the phone, introduction or closing of the interview) were eliminated or summarised. Grammatical editing was performed to obtain more correct sentences. This improved readability and reduced ambiguity. In several instances sentences were summarised. Time stamps and line numbering were added.

An individual letter indicates each participant. The AUT-researcher was indicated with an A. In some instances, post-hoc remarks or clarifications were added between square brackets: [ ]. Breaks in the conversation were indicated by: […]. Incomprehensible wording from the audio files were indicated with: [*]. (See §4.1 for details).

The interview texts were re-formatted into paragraphs after each prompt or after each question by the researcher. Where it was clear that participants started a new (sub) topic, the interview texts also continued with a new paragraph for better readability. Names of employees, suppliers, industry professionals, competitors, or client companies were deleted or anonymised. In the texts such names were indicated within square brackets, for example: [company name] or [expert name].

Conducting intelligent transcriptions could potentially impact the reliability of the transcripts as the final documents need to adequately reflect the opinions and ideas of the participants. The purpose of the transcripts was to obtain expert insights on the meso and micro level of the industry. The PhD researcher was a trained and certified translator with industry experience in translating and editing source texts into object texts (target texts). Hence it was assumed that the transition from the source texts into more readable transcripts was conducted conscientiously and without loss of quality. Had the purpose of the interviews been on a narrative or discourse level, intelligent transcriptions would *not* have been an adequate method as input for data analysis.

Quotes from the interviews or reference to the interview in this PhD thesis were cross-referenced by the line number of the transcribed interview text.

[1] https://www.globalme.net/blog/verbatim-vs-intelligent-vs-edited-transcription.
http://www.transcriptioncity.co.uk/verbatim-transcription/.
(Both websites accessed 5 December 2015).

[2] The programme was provided by the University and works user-friendly. (For a discussion on software packages, see Samarasinghe, 2014: 135 – 141).

§3.6.3 Comparison of group-type Research based on Schiele and Landeta

A traditional *focus-group* approach (group interview) consists of several experts and researcher(s). Experts will be asked questions and can also respond on each other's answers. This will help participants and the researcher in obtaining generating knowledge about complex subject matters (Verschuren & Doorewaard, 2010: 232). A disadvantage of this method is the possibility of group-think and bias, and the relatively weak position of the researcher (Engeldorp Gastelaars, 1998: 308). Such disadvantages could be avoided in a Delphi study.

A traditional *Delphi-study* has 2 or more rounds with written questions to experts, and analysing their written opinions which should lead to increased knowledge and a convergence of opinions (Verschuren & Doorewaard, 2010: 233). An advantage is that participants can develop their knowledge. The researcher takes the lead in developing research questions and hypotheses. The absence of face-to-face discussions makes interactions among participants limited and knowledge generation time-consuming. It also requires a steady base of participants. Other disadvantages are the difficulty to verify the precision of the method (that is manipulation by participants or by the researcher) and the lack of interaction which for example is needed to clarify questions posed by the researcher (Landeta, 2011: 1630).

The *nominal-group-technique* consists of a small number of experts who follow a strict process in producing ideas (proposals or answers) on items that a researcher poses to them. Experts first put down their ideas in writing, and only then explain these to other experts in a discussion. Then experts individually and anonymously prioritize ideas which are summarised by the researcher. Although the interaction produces good results, according to Landeta (2011) these are still less reliable than Delphi due to group-effects.

Finally, the *world-café approach* consists of several structured focus-group discussions. It was developed by Tan & Brown (2005) and found wide application both in New Zealand (see for example Fouché, 2011) and abroad. The related *research world café* approach was developed by Schiele (2012) and was successfully applied in 3 procurement-related PhD studies. It compensates for weaknesses found in both the Delphi (i.e. time-consuming for participants) and the traditional focus-group setting (i.e. risk of group-think, Hoffmann, 2011).

The roundtable discussion of this research was conducted consistent with the *research world-café approach* as it (1) was less dependent on a steady base of participants, (2) was less time-consuming for participants, (3) yielded results which were less subjected to interviewer-bias or group-think and (4) had multiple discussion rounds which increases internal and external validity. Moreover, (5) participants generally appreciated the discussions and learnings (Schiele, 2014). Finally, (6) the researcher had experience with participating in and organising world-café research, which increased the likelihood of a good outcome. Hoffmann (2011) suggested that this approach could replace case-studies.

§3.6.4 Strategies to get Access to the Survey-Population

Table 11: Potential respondents identified from several public online sources

Public source	Email address	First names
Building Guide members	25	4
Companies selected with 'green' or innovative' and 'construction' etc.	109	63
EWPA Elevating Work Platform members	17	9
FMANZ contacts (in part referrals)	62	62
Heavy Equipment Supplier Association	27	22
Master Joiners members selected with 'green' or 'innovative'	11	6
MRM Roofer members	60	31
New Zealand Concrete society	27	18
New Zealand Contractors members	222	152
New Zealand Timber Industry Federation	46	25
NZGBC members	179	113
Patentees & Inventors of Construction Innovations (*N*=166; *n*=29)	29	9
Placemaker supplier contacts	12	12
PrefabNZ members	337	261
Ready Mix Concrete Association	8	6
REFERRALS: AUT Built Asset MGMT alumni	38	38
REFERRALS: AUT contacts (partly via LinkedIn)	21	21
REFERRALS: CIPS New Zealand contacts and MBA alumni	27	27
REFERRALS: Value New Zealand / Construction Industry Group	28	17
Research relations (LinkedIn, business cards contacts, email addresses), in part referrals	23	21
SBN network contacts and website, includes referrals	63	54
Strata Laminated Timber Association	7	3
Waterproofing Membrane members	34	34
WPMA – Associate members	36	28
WPMA Wood Processors & Manufacturing Association	43	21
Gross totals	1,491	1057

Strategy of promotion and self-selection to obtain survey response

The research used email newsletters from several associations and postings in several LinkedIn groups to stimulate response. The Table below shows the total reach to theoretically 15,282 members. It is clear from marketing research (for example Verhage, 2009, p. 453) that (1) a relatively small portion of these members was within the target range of managing innovative suppliers, that (2) a smaller portion had actually read at least one the postings, and that (3) an even smaller proportion had also completed the survey. This is assumed to be particular true for the 2 LinkedIn postings on SME business New Zealand and on Infrastructure and construction. Additionally, the researcher attended 3 industry conferences and several networking sessions to promote the survey. Finally, the researcher promoted and published some research results on a weblog. Based on some feedback and on SurveyMonkey meta-data, this promotion and self-selection strategy only led to a small number of self-selected survey respondents. However, it is assumed that promotion increased the response from the survey-invites as discussed below.

Table 12: Data on industry associations & LinkedIn groups for promotion or self-selection strategy

Promotion	Readers/members
Mentioned in FMANZ email newsletter, with a focus on SMEs and FM 30 May 2016; Attended 2-day conference May 2016; one network session in April 2016	800
Mentioned in PrefabNZ email newsletter; focus on prefabrication; 29 May 2016; Attended 2-day conference April 2016	600
Mentioned in NZGBC email newsletter; focus on green-tech & sustainability; 10 May 2016; Attended 1-day conference June 2016	700
Posting in LinkedIn FMANZ group with a focus on FM and SMEs; (13, 24 May 2016)	631

Posting in LinkedIn New ZealandGBC group; focus on green-tech and sustainability (13, 24 May 2016)	257
Posting in LinkedIn group CIPSNZ for referrals or experts; with focus on procurement (11, 13 May 2016); Networking nights in April, May, June 2016	263
Posting in LinkedIn group SME business New Zealand (24 May 2016)	8,800
Posting in LinkedIn group infrastructure & construction (24 May 2016)	3,231
Gross total of members of these industry associations and LinkedIn groups	3263,031

(2) Strategy survey-invites to industry representatives to obtain survey response

The second strategy was to send survey-invites to the target-population. The Table below alphabetically summarizes the gross survey population (N=1491) related to several industry associations as collected on the Internet between April and June 2016. The Table also includes results from a search into New Zealand construction patents. Email addresses, company & contact names, and the name of the industry association were collected and stored in an Excel database and used in line with AUT Ethics Approval 15/237. Not all industry associations had member email addresses publicly available or easily downloadable. In several instances, associations provided email addresses of roughly 10% to 30% of their members. This increased a representation bias with members of such associations. In part, the below numbers consisted of *referral* email addresses. The researcher asked such individuals to forward the survey-invite to relevant industry professionals, which also created a representation bias.

§3.6.4.1 Cleaning the Survey Data in Five Steps

Preparing and cleaning the dataset, and selecting appropriate statistical tests was done in 5 steps as explained below.

Step 1: Data conversion from SurveyMonkey for SPSS

Raw data on the SurveyMonkey results (N=121) were downloaded in Excel with condensed columns and with numerical value (1-n) cells. The survey data in this Excel file was modified. Hence 33 text heading questions and 90 subheading questions were replaced by 115 variable names and 12 text-label names. The modified data in the Excel file then was imported in an SPSS software package, version 23. (See SPSS Codebook). Considering the sample size and with the purpose of increasing the internal validity and statistical power, several ordinal variables with initially 5-point or 7-point Likert-type scales were recoded into 2-point or 3-point Likert-type scales. (See SPSS Codebook).

Step 2: Outliers in SPSS and the nett sample size

From the gross total **N=121** respondents, 6 respondents only answered the mandatory survey questions (Q1-Q6) and were removed from the dataset. Respondents' completion times varied considerably but no outliers were identified. One late respondent (1 August 2016) was known to the researcher. The data suggested a conscientious survey completion and the case was accepted. An analysis on company size versus the number of number of staff involved with innovations revealed 1 outlier. Similarly, 2 self-selected respondents were identified via their foreign private email addresses were removed from the dataset as they were not working in the New Zealand construction industry. Hence in total 9 cases were removed from the dataset. Another 8 cases had partially missing data but were not removed as the data provided by those respondents on Q1 – Q21 contained no outliers and were considered useful[3]. Further analysis in SPSS found no further "anomalies" (SPSS terminology) in the dataset. The cleaned dataset had a sample size of N=112.

Step 3: Analysing the Nett Sample Response Rates on Question Level

[3] Cases 48, 52, 53, 56, 74, 64, 68, 110, and 111 were removed. Cases 9, 11, 12, 13, 14, 21, 27, 45 had partial missing data and were not removed. An independent-samples Mann-Whitney U test showed no significance with $p = .497$. (Analysed 21 April 2017).

As mentioned above, the broad industry scope increased the external validity necessary for generalising findings to the target group. A common test to determine external validity is using an independent-samples t-test over a first batch and last batch of respondents (Armstrong & Overton, 1977). However, the process of submitting 3 invite-waves to the target population and adding invitees with different backgrounds made it impossible to test the available data on late or non-response bias as adding new email addresses in subsequent waves could create significant differences. Additionally, for example Mullen *et al.* (2009, p. 302) questioned the obvious assumption that late respondents behave similarly to non-respondents. This assumption can neither be proven nor disproven.

However, a non-response analysis was conducted on the question level to analyse reliability of the individual respondents. SurveyMonkey contained 32 questions, totalling 115 variables[4]. On the question level SurveyMonkey indicated how many respondents "answered" or "skipped" (SurveyMonkey terminology) an individual question. Analysis from the SurveyMonkey raw data (Table below) revealed that several questions yielded a non-response i.e. were "skipped" by one or more respondents.

Table 13: Overview of Questions 1 to 32 (N=112) and frequency and percentage of missing data

Question	Name of Variable	N non-respondents	% non-response	Mandatory	Variable Type	Label of Variable
Q1	IDEA	0	0.0%	No	O	Ranking or procurement activities in idea phase
Q2	DEVELOP	0	0.0%	No	O	Ranking of procurement activities in develop phase
Q3	SpecifyFunct	0	0.0%	Yes	N	Specify functionality for innovative suppliers
Q4	Select&Find	0	0.0%	Yes	N	Find & select innovative suppliers
Q5	Nego&Contr	0	0.0%	Yes	N	Negotiate & contract with innovative suppliers
Q6	Manage Rel	0	0.0%	Yes	N	Manage relations with innovative suppliers
Q7[#]	EntOrient	4	3.8%	No	O	Entrepreneurial orientation
Q8	IntsSuppR	0	0.0%	Yes	O	Intensity of relations with types of suppliers
Q9	ProdProc	0	0.0%	Yes	O	The company develops process or product innovations with
Q10	RadIncr	0	0.0%	Yes	O	The company develops radical or innovations with …
Q11	ForDom	0	0.0%	Yes	O	We prefer foreign or domestic suppliers for (somewhat) …

[4] Hence a survey question in SurveyMonkey could generate more than one variable in SPSS.

Q12	NewCur	0	0.0%	Yes	O	We prefer small or large suppliers for (somewhat) …
Q13	SmalLrg	0	0.0%	Yes	O	We prefer new or current suppliers for (somewhat) …
Q14#	NmInno	30	26.8%	No	S	Estimated number of innovations developed with all suppliers last 3 years
Q15#	TurnInno	38	33.9%	No	S	Estimated % of turnover from of innovations developed with all suppliers last 3 years
Q16	AddRemarks	90	80.3%	No	T	Optional remarks on Q14 and Q15
Q17	InnWSbC	0	0.0%	Yes	O	Innovations with supplier interaction are beneficial for our company
Q18	InnWSbE	0	0.0%	Yes	O	Innovations with supplier interaction are beneficial for the natural environment
Q19	InnNSbC	0	0.0%	Yes	O	Innovations without supplier interaction are beneficial for our company
Q20	InnNSbE	0	0.0%	Yes	O	Innovations without supplier interaction are beneficial for the natural environment
Q21	Comsize	10	2.7%	Yes	O	Company size in classes
Q22#	StffInnoS	20	11.6%	No	S	Number of staff involved in innovations with suppliers
Q23#	StffInnoP	21	12.5%	No	S	Number of staff involved in procurement of innovations with suppliers
Q24#	ComAge	23	14.3%	No	S	Company age (in years)
Q25#	Turnover	19	14.0%	No	O	Ranking of estimated company turnover from products, services or distribution
Q26#	CStrategy	19	14.7%	No	O	Ranking of customer strategy (Treacy & Wiersma)
Q27#	Bstrategy	30	15.2%	No	O	Ranking of business strategy; entrepreneurial; stable; survival mode

Q28	ComPos	14	12%	No	N	My position in the company
Q29	LevelEx	10	8%	Yes	O	My level of experience in the following areas
Q30	Satisfy	5	7.3%	No	O	Ranking of satisfaction on innovation activities
Q31#	InfoRTD	16	14.3%	No	N	Please send me information on the focus group
Q32#	Informed	15	13.4%	No	N	Please keep me informed about this research

*Questions with # are explained below. Variable types were N (nominal), O (ordinal) or S (scale).

The SurveyMonkey syntax was that Q3 – Q7 were mandatory and hence respondents were forced via the survey structure ("Please complete this question") to submit data on these questions. From Q7 onwards several questions were non-compulsory and respondents could choose *not* to answer a specific question.

In line with the Ethics Approval, data on the survey was by default anonymous. Respondents could choose to submit names and email addresses (Q31, Q 32) or to remain anonymous. An analysis revealed no relationship of non-responses on the question level with anonymous responses (Q32).

The non-compulsory questions that related to the estimated number of innovations developed with all suppliers over the past 3 years and related to the estimated turnover from such innovations (Q14, Q15) yielded relatively high non-response rates (26.8% and 33.9%). Possible reasons for non-responses on these quantitative questions could be that respondents did not have specific data directly available. Contrary to expectations (see for example Hardie, 2011b) 3 commercial and strategy questions yielded lower non-response rates (Q25 = 14%; Q26 = 14.7% and Q27 = 15.2%). It could be that non-respondents did not want to disclose this information. To some governmental respondents, these questions could also appear less relevant[5]. The preceding question on company age (Q24) yielded a similar non-response rate of 14.3%. Hence there was no special reason to suggest that the non-respondents on the 3 commercial and strategy questions behaved differently.

The research was unable to verify reasons for non-responses with the respondents although the stable response rates on content at the end of the questionnaire (Q28, Q29, Q30) did not suggest a 'survey fatigue' with respondents. (Compare Saunders e.a., 2009: 374). As shown in the above Table, most respondents were willing to submit data on their own company position (Q28; non-response 12%) and on their individual experience (Q29; non-response 8%). The response rates on process questions (Q31, Q32) for respondents' interest in planned focus group discussions and their interest in the research results did not suggest such a fatigue. Finally, respondents could add free-text suggestions or remarks to several questions. Excluding the free-text question 16, on average each question yielded 8 remarks. The distribution in the Table below did not suggest a survey fatigue, with the last question having 10 remarks.

Table 14: Number of remarks per question that respondents submitted with the free-text options

Question	Q3	Q4	Q5	Q6	Q7	Q10	Q11	Q12	Q13	Q16	Q32
Remarks (n)	17	9	10	10	6	5	6	1	8	22	10

[5] In line with e.g. MBIE (2013a, p. 6), in this research the term "company" was used generically and included relevant organisations in education, government or health sectors. Respondents would be procurement management or facilities management professionals from such large organisations.

Step 4: Analysis of Normal Distribution for appropriate Testing

Checks on normality of data were important to determine the adequate choice of parametric versus non-parametric tests. Basically, parametric tests basically are for continuous variables with normally distributed data (with a bell-curve distribution); non-parametric tests are for categorical variables with non-normally distributed data (e.g. a skewed or kurtosis distribution). The research hence had to check (1) normality, (2) data type, and often (3) other assumptions.

(1) NORMALITY. Before conducting a specific test in the following Sections, this research checked normality of the combination of independent variables with dependent variables by analysing Q-Q-plots, boxplots, and histograms (Löfgren, 2017). Only with test subsample sizes[6] of n < 30, a Shapiro-Wilk analysis was additionally conducted and the kurtosis and skewness were analysed. (These cases have been indicated with a footnote). Several (partly conflicting) guidelines exist on critical kurtosis and skewness values; this research followed Cramer (1998) who suggested that both values need to be close to zero and preferably between -1 < x < + 1. Another rule of the thumb is that skewness or kurtosis are each less than 2x their standard errors (S.E.). With test subsample sizes of n > 30 (or preferably n > 50) normality was assumed although a Shapiro-Wilk test or kurtosis or skewness values could suggest otherwise (Cramer & Howitt, 2004; UvA stats, 2017).

(2) DATA-TYPE. Based on the Table in Step 3, some categorical variables were nominal but most variables were ordinal and based on Likert-type scales. These variable types had non-normal distributions. The 5 continuous (scale type) variables in the survey had non-normal (positive skewness) distributions, and hence non-parametric tests should be used. Most researchers prefer parametric tests (e.g. Pallant, 2001). These non-normal distributions posed limitations on the application of parametric tests. Non-parametric tests should be used when the data type is categorical, the sample size is small (n < 30) and in case of non-normality (e.g. Malhotra & Birks, 2000, p. 474; Lavery, 2013, p. 4 to 12). However, with larger samples sizes (n > 30, or n > 50) the central limit theorem was valid and categorical data can be considered normally distributed. (Cramer & Howitt, 2004).

(3) ADDITIONAL ASSUMPTIONS. Tests may have the assumption that data consist of random samples, i.e. that the data is representative for the target population Depending on the types of relationship in the tests, groups are either independent or paired (See also Step 5). These and other assumptions have been discussed with the relevant T-tests.

Parametric tests (Table below) have a higher validity and often more statistical power. They help to detect a significant effect in instances when such an effect truly exists. The research used a significance level of α= .05 which put the Type I error at 5%. Non-parametric tests however have less assumptions but also have less power and are more prone to Type II errors[7].

Basic guidelines for choosing between parametric and non-parametric test from several sources (Cohen, 1998; Lavery, 2013; Cramer & Howitt, 2004; Malhotra & Birks, 2000; Cortinhas & Black, 2012, p. 715) are summarized in the Table below.

Table 15: Differences en guidelines for applying parametric versus non-parametric test

Parametric when …	Non-parametric when …
determining differences in means	determining differences in ranks
sample size N > 20 (or > 30)	sample size N < 30
Characteristics …	Characteristics …
normal distribution of sample (bell curve)	non-normal distribution of sample (other curves)

[6] Subsample sizes (n) are the sample sizes found for specific groups during statistical tests. (Lavery, 2013).

[7] Type I error: Ho was incorrectly rejected; the probability of this controlled by determining the level of significance α. Type II error: Ho hypothesis was not rejected when false but should have been rejected. (Malhotra & Birks, 2000, p. 459).

less flexible – more assumptions	more flexible – less assumptions
more robust: less sensitive to minor violations of underlying assumption(s)	less robust more sensitive to minor violations of underlying assumption(s)
higher requirements on data-type	less requirements on data type
more statistical power – better in rejecting a false Ho hypothesis	less statistical power – worse in rejecting a false Ho hypothesis
	more prone to Type II errors (beta errors), hence less likely to detect statistical differences
preferable for interval or scale (continuous)	preferable for nominal or ordinal (categorical)
can be used with nominal or ordinal with n > 30	should be used with nominal or ordinal with n < 30
often preferred	less preferred

The research applied parametric tests whenever possible and non-parametric tests when necessary, or vice versa. It must be noted that determining normality is not always straightforward and some levels of skewness or kurtosis will not give significant deviations from normality. When necessary *both* parametric and non-parametric tests were used, especially with subsamples sizes of non-normal data n > 20 and each group > 15 (for more details see e.g. Frost, 2017).

Step 5: Determine adequate statistical tests

Step 4 discussed the choice of parametric versus non-parametric tests. This Step 5 was to determine whether the independent variable(s) in a test were *independent* (not-related) or *independent* (paired, related) versus a dependent variable. One example: when procurement practices of small or large companies were compared, the research saw these 2 types of companies as 2 independent groups. However, when the research compared entrepreneurial orientation towards customers versus suppliers, these should be considered as 2 related (paired) groups[8].

The descriptive tests in this research basically determined means, frequencies, and standard deviations. The inferential tests determined significance (with p values < .05) and Pearson or Spearman correlations where possible. The research is aware that the extent of correlations can be classified in several ways, also depending on the research purpose (Hattie, 1992; Cohen, 1998; Knoke, Bohrnstedt & Mee, 2002, p. 150). Several types or correlation or effect sizes exist (Cramer & Howitt, 2004; Field, 2009). A sophisticated scheme (as e.g. proposed by Hopkins, 2002) would fit large sample sizes and could pretend a too large validity or reliability. Hence this research used the original Cohen's benchmark (1988) as shown in the Table below.

Table 16: Effect sizes of Cohen's benchmark (Hopkins, 2002; Field, 2009: 57; Cramer & Howitt: 39)

	Small effect size	Medium or moderate effect size	Large or major effect size
Association: Cohen's r	r between 0.1 and 0.3	r between 0.3 and 0.5	r more than 0.5
Difference in means: Cohen's d	d = .02 or smaller	d = .05	d = .08 or larger

Requirements for the specific statistical test may differ with circumstances. The tests as used for this research mainly followed the guidelines of SPSS (version 24), Malhotra & Birks (2000, p.474, 480), and Field (2009). Table below mention tests used in this Chapter.

[8] Dependent (paired, or related) samples = two or more samples selected so that these are dependent or related: each person or item in one sample has a corresponding or matched item in the other sample. For example, respondents from small companies may rate the importance of product versus process innovations. independent-samples = two or more samples in which the selected items are only related by chance. For example, respondents from small versus large companies: measuring one sample has no effect on the values of the other sample. (Based on Malhotra & Birks, 2000, p. 476, 479; Cortinhas & Black, 2012, p. 821, 822).

Table 17: Statistical tests used for this research

Parametric tests (means)		Nonparametric tests (medians)	
1-sample T-test		1-sample Sign, 1-sample Wilcoxon	
2-sample T-test		Mann-Whitney test	
One-Way ANOVA		two-independent-samples test	

§3.6.4.2 Survey I Structure, related Questions, and Question Types

Variables on Ranking of Procurement Steps; on Ranking of Procurement Practices

Questions 1-2 (see below) were based on the innovation phases and procurement process steps (§2.4, §2.10.3). These questions aimed to reveal a priority of the four procurement process steps during innovation processes.

In each of the Questions 3–6, respondents could submit their TOP 3 ranking out of nine procurement practices via prompted awareness. Additionally, respondents could suggest other practices via unaided awareness. Literature had revealed a wide array of possible practices. The 4x9=36 proposed practices in these four questions were selected from the literature (§2.11). Within the context of this research, it was not feasible to analyse all possibly-relevant practices, and four questions with 9 practices were already considered long. Hence the research used a simple list-type question.

It must be noted that within the scope of the research, these 36 practices were believed to be most commonly used, although each Survey question could also include practises that the researcher à priori considered somewhat less-appropriate or less-commonly used. The Survey prompts for other "important procurement practices" however enabled respondents to also mention practices were the researcher's assumptions seemed incorrect.

Table 18: Procurement practices – interacting with innovative suppliers

Question	Label	(sub) Questions	Type of Questions	Suggestions
1-2	Priorities in the Idea and the Develop phase	4	Ranking	No
3-6	Ranking of procurement practices	9	List TOP 3	Yes

The structure of the Survey I dataset did not allow to calculate within groups and between groups significance. The dependent data levels (TOP 3 practices) were *nominal* so that statistical significance could not be calculated (Grande, 2017; Huizingh, 2010: 337-338). A series of Chi2 tests in SPSS on the three variables with high versus low entrepreneurial orientation towards expected values would not meet Chi2 test assumptions. Hence the analysis of procurement practices could only generate descriptive statistics. A descriptive analysis in SPSS via a manual operation in the function custom tables proved too cumbersome and was likely to cause mistakes.

The analysis was conducted with stacked bar charts. These were manually produced in SurveyMonkey and shown in Sections §6.1.2, §6.2.2, §6.3.2, and §6.4.2. Any relative differences with cut-off points ≥10% were assumed to be *possibly* statistically-significant, and were indicated with "possibly-relevant difference". These percentages were assessed manually from the SurveyMonkey data.

Without further calculations, this assumption of a cut-off point of 10% was considered cautious, though slightly arbitrary considering the absence of advanced statistics. Hence this research uses the phrase "possibly-relevant difference". (For margin of error; see §10.4.2).

Variables related to Entrepreneurial Orientation

Question Q7 contrasted the respondents' entrepreneurial behaviour to customers with their behaviour to suppliers[9]. To support respondents, the items in the contrasting pairs were underlined in the online Survey. The respondents had the opportunity to add their comments after this paired-variable question. The Survey used the four paired-variables based on entrepreneurial orientation (§2.7) and added 1 trust paired-variable. (See §2.9.5).

[9] In hindsight, the aggressiveness pair correlated negatively with the other pairs. Perhaps this should have been phrased differently.

Table 19: Entrepreneurial practices – with innovative suppliers or customers (Q7)

Question	Label	(sub) Questions	Type of Questions	Suggestions
7	Innovative activities with innovative customers	0	5-Likert-scales (matrix)	yes
7	Innovative activities with innovative suppliers	0	5-Likert-scales (matrix)	yes
7	Risk-taking towards innovative customers	0	5-Likert-scales (matrix)	yes
7	Risk-taking towards innovative suppliers	0	5-Likert-scales (matrix)	yes
7	Opportunities with innovative customers	0	5-Likert-scales (matrix)	yes
7	Opportunities with innovative suppliers	0	5-Likert-scales (matrix)	yes
7	Being aggressive to competition in customer markets	0	5-Likert-scales (matrix)	yes
7	Being aggressive to competition in supplier markets	0	5-Likert-scales (matrix)	yes
7	Trust with innovative customers	0	5-Likert-scales (matrix)	yes
7	Trust with innovative suppliers	0	5-Likert-scales (matrix)	yes

Variables related to Innovation and Supplier types

This part on innovation type practices included supplier type variables. The supplier intensity variable (Q8) was based on the Oslo Manual (OECD, 2005: 76, 79, 82) and focused on supplier relations. Wynstra (1998), and Le Dain (2010) suggested a relation between the intensity of the relation, and the amount of development risk granted to innovative suppliers. Van Weele (2010) and construction literature in particular suggested a difference related to the supplier type. (See §2.9.4).

The product versus process innovation variable (Q9) was based on the Oslo Manual (OECD, 2005), and more in particular to the company type, i.e. whether it focused on providing services or products. It was amended with trading companies (See §2.10.2).

The radical versus incremental innovation variable (Q10) was based on several sources. (§2.10.). In case of stable market situations, incumbent companies could focus on incremental innovations; with more volatile situations, especially newcomers could focus on more radical innovations.

The foreign vs domestic suppliers (Q11) for (somewhat) radical vs incremental innovations (c.f. Q10) was based on the premises that focal companies were inclined to contact local suppliers for incremental innovations, and foreign suppliers for more radical innovations. (See §2.9, §2.10).

The new vs current suppliers (Q12) for (somewhat) incremental vs radical innovations (c.f. Q10) was based on similar premises with Q11, that focal companies were inclined to contact current suppliers for incremental innovations, and new suppliers for more radical innovations. (See §2.9, §2.10).

The small vs large suppliers (Q13) for (somewhat) incremental vs radical innovations (c.f. Q10) was based on the premises that focal companies either preferred large (and hence stable) suppliers for incremental or contrary for radical innovations, or preferred small (and hence more flexible or committed) suppliers for radical versus incremental innovations. (See §2.9, §2.10).

Table 20: Innovation and supplier practices – with innovative suppliers

Question	Label	(sub) Questions	Type of Questions	Suggestions
8	Rank intensity relations (with services, manufacturing and wholesale suppliers)	3	4-Likert-scale (matrix)	yes
9	Process vs product Innovations for innovative customers vs suppliers	2	5-Likert-scale (matrix)	yes

10	Radical vs incremental innovations (explained) for innovative customers vs suppliers	2	5-Likert-scale (matrix)	yes
11	Foreign vs domestic suppliers for (somewhat) radical vs incremental innovations	2	5-Likert-scale (matrix)	yes
12	New vs current suppliers for (somewhat) incremental vs radical innovations	2	5-Likert-scale (matrix)	yes
13	Small vs large suppliers for (somewhat) incremental vs radical innovations	2	5-Likert-scale (matrix)	yes

Variables related to Company and Respondent

This part mainly provided questions (Q21-Q27) on the context of the company. The number of staff and the estimated % of turnover related to the company's investments in resources. When used as a ratio with company size, these numbers e.g. could be compared to benefits or financials rewards i.e. to the estimated % of turnover. (See also below). The variables were based on the Oslo Manual (OECD, 2005: 61, 73, 99, 109; cf. §2.12.4).

The customer strategy variables (Q26) were based on Treacy & Wiersema (1995; §2.8). The company strategy (Q27; growth, lifestyle, or survival) were based on extant research by Morrissey & Knight (2011), Reboud *et al.* (2011), Lumpkin & Dess (1996). (See §2.8).

The position and experience of respondents (Q28, 29) were used to check whether the respondents matched the requirements for the Survey (§31.3) and was used to establish a profile of the respondents.

Table 21: Profile of company and respondent

Question	Label	(sub) Questions	Type of Questions	Suggestions
21	Company size	0	Continuous (qty)	No
22	Staff involved with supplier innovations	0	Continuous (qty)	No
23	Staff involved with supplier innovations	0	Continuous (qty)	No
24	Company age	0	Continuous (qty)	No
25	Est. % turnover from services, products, wholesale, or else	4	Ranking	No
26	Customer strategy (T&W)	3	Ranking	No
27	Company strategy	3	Ranking	No
28	Respondent position	4	Nominal (list)	No
29	Respondent experience	5	3-Likert-scale (matrix)	No

Variables related to Benefits and Satisfaction

The performance questions (see below) related to innovation results (number of innovations and turnover), innovation-benefits and innovation-satisfaction[10] were split up over three sections for a more logical flow of the Survey for the respondents (cf. Saunders *et al.,* 2009: 387).

Questions Q14 and Q15 were again based on the Oslo Manual (OECD, 2005). (§2.12) Questions Q17 to Q20 sought to determine the added value of supplier interactions in innovation processes, both for the natural environment and for the focal company. These four questions tested extant findings that innovations with suppliers (whether from a procurement perspective, or an open innovation

[10] Note that Survey I used the word "activities" instead of "practices".

perspective) were beneficial for innovating companies. These questions also tested findings that such innovations with supplier interactions were more beneficial for the natural environment. (§2.12).

Finally, matrix Question Q30 investigated satisfaction rates with the companies' functional processes on innovation with innovative customers versus innovative suppliers. Extant small business or entrepreneurial research tends to focus on customer aspects, whereas extant procurement research tends to focus on supplier aspects. This question aimed to investigate relations/correlations. (Also §2.12)

Table 22: Innovation-benefits and satisfaction rates

Questions	Label	(sub) Questions	Type of Questions	Suggestions
14	Est. innovations developed with all suppliers over last three yrs.	1	Continuous (qty)	Yes
15	Est. % turnover from these innovations over last three yrs.	1	Continuous (qty)	Yes
17	Innovation-benefits with supplier interaction for company	1	5-Likert-scale	No
18	Innovation-benefits without supplier interactions for company	1	5-Likert-scale	No
19	Innovation-benefits with supplier interactions for environment	1	5-Likert-scale	No
20	Innovation-benefits without supplier interactions for environment	1	5-Likert-scale	No
30	Satisfaction with procurement activities with innovative suppliers	1	5-Likert-scale (matrix)	No
30	Satisfaction with innovation activities with innovative suppliers	1	5-Likert-scale (matrix)	No
30	Satisfaction with marketing-sales activities with innovative customers	1	5-Likert-scale (matrix)	No
30	Satisfaction with innovation activities with innovative customers	1	5-Likert-scale (matrix)	No
30	Satisfaction with internal innovation activities	1	5-Likert-scale (matrix)	No

3.6.4.3 Survey II Structure, related Questions, and Question Types

The following two Tables show the Survey structure, the related questions, and the question types. The Table below gives the four key procurement process steps and related practices questions.

Table 23: Procurement process steps with practices for managing innovative suppliers

Question	Label	(sub) Questions	Type of Questions	Suggestions
1	Specifying-Needs from innovative suppliers	9	Matrix	No
2	Finding-Selecting Innovative Suppliers	9	Matrix	No
3	Negotiate-contract Innovative Suppliers	9	Matrix	No
4	Manage-relations with Innovative Suppliers	9	Matrix	No

These four matrix questions each suggested 9 situations (i.e. independent variables), and asked respondents which of the three procurement best-practices they preferred in such situation for each of the four procurement process steps. (See §2.11). The eight key-variables are shown as independent variables in the above conceptual model III. For each step, respondents could select one procurement practice, or else indicate the option "*do not know or we use other practices*". For brevity reasons, respondents could not add comments or suggestions.

Table 24: Company and respondent profile

Question	Label	(sub) Questions	Type of Questions	Suggestions
5	Company type or profession	9	List	Yes
6	Company size	7	Category	No
7	Source of main turnover	4	Category	Yes
8	Main customer strategy	3	Category	Yes

The company profile questions acted as moderating variables. These questions were based on §2.12., §2.6.1, §2.8.1, and §2.8.3.

§3.7.2 Rigour Quantitative Research - Testing internal validity & reliability Survey I & II

Testing for internal validity, and reliability was done on the survey and question level:

SURVEY I

1. A review of draft survey versions by four knowledgeable academics: two were engaged in SME procurement research, and two were familiar with the specifics of the New Zealand construction industry. Feedback was per email and in face-to-face discussions.
2. A review of draft versions by three mature master students. One individual had industry experience in Brazilian supplier innovation projects; one was engaged with research in Dutch construction innovations, and one was engaged with green procurement research in Chinese construction companies. Feedback was either face-to-face or via Skype.
3. Feedback from two industry professionals working in the New Zealand facilities management industry. Further feedback from the two New Zealand academics mentioned in #1.
4. A check with a trial-run of the survey with 16 respondents within the target-population.

Based these test results, in one last modification was carried out and results of the 16 respondents were admitted into the survey population. Likewise, Survey II was tested on the survey and question level:

SURVEY II

1. A review of draft survey versions by two knowledgeable academics. One was engaged in SME procurement research, and the other was familiar with the particulars of the New Zealand construction industry. Feedback was in face-to-face and Skype discussions.
2. Feedback from 1 industry professional from the New Zealand facilities management industry. Feedback from the two academics as mentioned in #1.
3. A check with a trial-run of the survey with two New Zealand informed industry professionals within the target-population

Based on these test results, no changes were deemed necessary. However, a question was added for profiling focal companies. This question was based on the company types of §2.1.2.

§3.8 Application of Treaty of Waitangi Principles on this Research

Summarised from the official Ethics Application document of this research.

(1) PRINCIPLE OF PARTNERSHIP: How does the design and practice of this research implement the Principle of Partnership in the interaction between the researcher and other participants?

During the exploratory interviews, I build trust and expect a professional attitude from the participants. This will be mentioned in the Information Sheet and Consent Form, and repeated at the beginning of each interview.

Before the start of the focus-group discussion, I emphasize aspects of trust, confidentiality, and professional behaviour. This is mentioned in the Information Sheet and Consent Form that focus-group participants will have received & signed beforehand. The Moderator Protocol and the setting ensures a hospitable environment in which participants are encouraged to contribute to discussions (cf. Brown & Isaacs, 2002).

The cover letter for the surveys emphasizes aspects or confidentiality. The introduction part in the surveys again emphasise the voluntary and confidential nature. The survey ends with thanking respondents, gives a weblink for updates on the research and gives respondents to submit their email address if they want to remain informed on the research.

The objective of the research is to determine how New Zealand companies manage innovative suppliers in construction supply chains. An increased insight is potentially beneficial to participants, although the researcher is aware that benefits to individual participants could be limited. At every stage participants have the right to be informed and have the right not to participate in or to withdraw from the research.

The contribution of participants is acknowledged vocally where possible and in writing. Without their contribution this research is not possible, and their efforts & time are highly valued.

(2) PRINCIPLE OF PARTICIPATION: How does the design and practice of this research implement the Principle of Participation in the interaction between the researcher and other participants?

The research design of the exploratory interviews and the focus-group discussion is such that participants are not merely researched objects but are invited to actively engage in the research. Participants and researcher jointly develop and share information. (Delnooz, 2008; p. 68; Schiele, 2014; Chen *et al*., 2013).

Participants do not have a formal role as stakeholder and are no formal beneficiaries of this research. If they want to, participants can review and amend summaries from interviews or from the focus-group discussion.

(3) PRINCIPLE OF PROTECTION: How does the design and practice of this research implement the principle of Protection in the interaction between the researcher and other participants?

The researcher is aware that information from participants may be commercially or otherwise sensitive. However, the research is designed in such a manner that it does not harm participants' personal wellbeing or integrity, their privacy, their cultural, personal or their company's intellectual property or the intellectual property or their business partners.

For the exploratory interviews and the focus-group discussion: As the researcher knows all participants, he cannot ensure anonymity. In the research results the names of participants and companies will be indicated via pseudonyms to ensure confidentiality of their identity. Additionally, all focus-group participants will be made aware that: (1) they should never disclose other participants' identity or information to third parties, and (2) they should never disclose any information to other participants or to third parties that could harm their own company, their position or the position of others. (Mentioned in the Consent forms).

For the surveys: Participants have been selected based on public information from the Internet. The Cover letter and introduction of the surveys emphasize confidentiality. The identity of respondents will remain confidential and not be shared with other research participants or shared with third parties.

The essence is building trust between the participants and the researcher, and also among participants. The researcher has industry experience in dealing with such situations, including conducting patenting activities, negotiating tri-party agreements, drafting, and managing non-disclosure agreements, and protecting university students or staff members from unfair treatment.

§3.8 Confirmation of Candidature – AUT 18 JUNE 2015

AUT UNIVERSITY POSTGRADUATE

University Postgraduate Centre
Private Bag 92006
Auckland 1142
Ph +64 9 921 9378

Ref: 1316767

18 Jun 2015

Anne Anthonius Gerben Staal
10 Ajax Street
Narrow Neck
Auckland
NEW ZEALAND

Dear Anne Anthonius Gerben,

Re: Confirmation of Candidature

Congratulations!

I am pleased to inform you your PGR9 was approved by the Faculty of Design & Creative Technologies and was noted at the University Postgraduate Board at their meeting held on 16 Jun 2015. You have now completed all conditions placed on your provisional admission to your programme, and the Board will now confirm your candidature in the Doctor of Philosophy.

The completion of this milestone marks a significant point in the career of every doctoral student, and represents the successful passage from provisional to confirmed candidature. It demonstrates your maturity as a doctoral researcher capable of contributing an original contribution to your field of enquiry. It also demonstrates that your project is of a suitable scope and standard for your degree, and that you have the capacity, resources, and potential to complete your research at the required level.

Data Collection

If your research does not require ethics approval, you may now begin data collection. If your research does require ethics approval, you may begin data collection once you have ethics approval.

Business Cards

As a recognition of this milestone, the University would like to provide you with your own AUT business cards for you to use when attending conferences and networking with other researchers. We have attached the 'AUT Business Card Order Form' for you to complete and return by email (no hard copies required) to Scott Pilkington (scott.pilkington@aut.ac.nz).

The University will cover this initial printing expense, however, reprints will be at the candidate's expense. Please contact the University Postgraduate Centre when a reprint is required.

Faculty Contacts

Your primary supervisor is John Tookey

Your secondary supervisor is Jeff Seadon

The Associate Dean (Postgraduate) is Rosser Johnson, ext 7818

Your faculty doctoral contact person is Angela Anderson, ext. 6761, doffice@aut.ac.nz

University Postgraduate Centre Contact

Your enrolment contact at the University Postgraduate Centre is Jessica Yamamoto, ext. 8220, jessica.yamamoto@aut.ac.nz

Congratulations Again

On behalf of all staff involved in the programme we would like to acknowledge the challenge of undertaking research at this level as well as the commitment and application which are required to pass this significant milestone in your research career.

If you have any questions, please feel free to contact me.

Yours sincerely

Martin Wilson
Manager, University Postgraduate Centre
martin.wilson@aut.ac.nz
+64-9-921-9999 ext 8812

cc: John Tookey, Jeff Seadon, Angela Anderson DE, Jessica Yamamoto

§3.8 Estimated time requirements for the research participants

Research method	Time requirement and objectives
Exploratory interviews Participants will discuss her/his experience on the current research area and is invited to comment on the current research design and expected outcomes.	DEC 2015 – JAN 2016 5 unstructured interviews each lasting 60 – 90 minutes. The aim is to increase the researcher's understanding procurement & innovation activities and to validate the conceptual model for Survey I and II.
Industry observations During networking sessions (FMANZ, NZGBC, CIPSA)	FEB 2014 – JUL 2016 The aim is to increase the researcher's understanding procurement & innovation activities, and to conduct promotion for the survey.
Workshop with roundtable discussions Participants will have several rounds of discussions focussing on several research topics.	MAY 2016 Workshop with 10 – 15 participants. Duration 3 hours, with coffee and networking function. The aim is to validate results from Survey I.
Survey I N = 1097	MAY 2016 – JUL 2016 Duration 10 - 20 minutes. (N = 121).
Survey II N = 1097 (Same survey population)	JUL 2016 – SEP 2016 Duration 5 - 10 minutes. (N = 39).

§3.8 Examples Participant Information Sheets; Protocols etc

§3.8 Example of Flyer used at a Networking Event to Attract Respondents
(paper version)

5 – 10 MINUTE SURVEY
MANAGING INNOVATIVE SUPPLIERS

AUT

How do firms procure innovations in the FM industry?

Innovations are often risky. More knowledge on procurement of such innovations will increase chances of success.

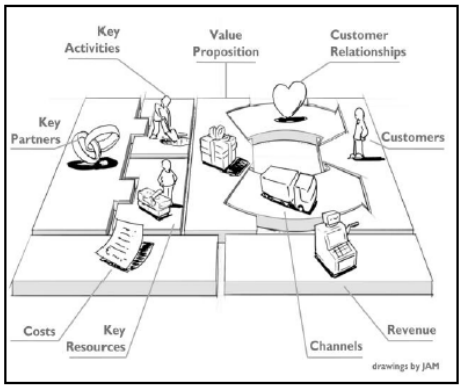
That is why I invite you to this 5 – 10 min survey. Your participation is voluntarily and anonymous. Five lucky respondents get the business model handbook. (Copies available at the Registration Desk).

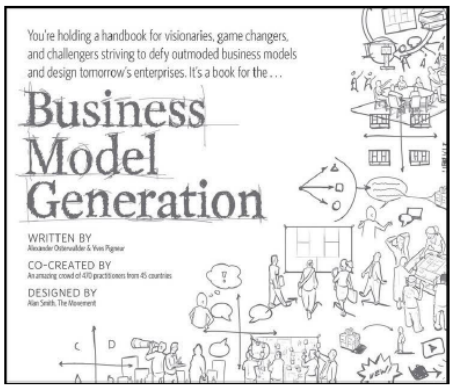
AUT will organise a round-table discussion on this topic **24 June**. If you are interested, please write name & email on the last page. Five participants again get a copy of the handbook.

Feel free to contact me in case you have any questions.
I thank you for your participation!

Best regards,

(Mr) Anne Staal
PhD researcher & lecturer
Built Environment Engineering
Phone: 22 389 44 62
Email: astaal@aut.ac.nz





This innovation research is approved by AUT Ethics Committee (15/237).
Please contact itookey@aut.ac.nz or astaal@aut.ac.nz for questions or remarks.

§3.8 Example Moderator Protocol [03] for Roundtable Discussions

Approved by the Auckland University of Technology Ethics Committee; ref number 15/237, October 2015
Please contact professor John Tookey (jtookey@aut.ac.nz or 09 921 9512) for your questions or remarks.

AUT UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

[03] MODERATOR PROTOCOL FOR THREE ROUND-TABLE DISCUSSIONS

(PhD research on procurement and innovation activities)
Anne A.G. Staal - PhD researcher & lecturer
How New Zealand companies in the built environment procure innovations for the construction industry.

This document give *background information* (additional to the Information Sheet and Consent Form) and the *protocol* that participants will use during four round-table discussions for PhD research on procurement activities and innovation activities for the New Zealand construction industry. For a general introduction on the roundtable discussion, see the PDF with four power point slides. This document is for moderators and for participants wanting to have more detailed information on the round table discussions. The document is structured as follows.

1. Purpose & background of this research

This research wants to know *how New Zealand companies procure innovations for the construction industry*. In the New Zealand context these companies will often be called innovative or *entrepreneurial*, and can often be relatively *small*.
The answer to this question is relevant to the industry and also to the society, both in New Zealand and abroad. After all the construction industry uses a lot of raw material and lags in sustainability. And together we consume a lot of energy as our buildings are not energy-efficient.
Over the past decades academic research has helped *large* organisations to improve their procurement activities. However there is not much knowledge on how *smaller* companies procure their goods & services. Hence it is difficult to help such small organisations to improve their procurement performance. Furthermore, we know that innovative companies may also depend on innovations from their suppliers. We tend to call this "open innovations" or "supplier innovation". Moreover, when we focus at *smaller* innovative companies in the construction industry (or built environment), there is some knowledge on how these companies successfully sell innovations to market. But then (again) it is not known how such companies procure innovations. Hence there is a knowledge gap in this area.
There is a business and environmental need to know more on this topic. In trying to find answers, this PhD research uses series of interviews, an online survey and two round-table discussions.

Approved by the Auckland University of Technology Ethics Committee; ref number 15/237, October 2015
Please contact professor John Tookey (jtookey@aut.ac.nz or 09 921 9512) for your questions or remarks.

2. Purpose of the two round-table discussions?

For each round-table discussion we want more insight in best practices in four types of procurement activities (Van Weele, 1988). (See the table below).

	Procurement activities (Van Weele, 1988)			
Some examples of variables	1. Specify need	2. Select supplier(s)	3. contract Negotiation	4. Manage relation(s)
Idea or development phase				
Radical or incremental innovations				
Green or non-green innovations				
Overseas or domestic suppliers				
New or current suppliers				
Small or large suppliers				
Product or Process innovations				

We are aware that the *actual application* of best practices will depend on several *variables* related to the innovation type, to the industry & the macro environment, and to the characteristics of the company and the owner. We also realize that different procurement practices will have different effects on the company results. Hence each table will discuss one particular procurement activity (with best practices) and relate that to a set of given variables. Participants can suggest new variables/practices.

3. Background information on the round-table discussions

The round-table discussions we use in this research are flexible and time-efficient discussions based on the world café. This method was developed by Brown & Isaacs (2005). It wants to stimulate conversations and share knowledge in an informal setting.

We will have four parallel round-tables with a total of 15 – 20 participants. Each table has a moderator and 4-5 people discussing a particular question (topic). After 20 – 30 minutes participants will move to another parallel table to discuss another question. People will use flip-charts, whiteboard and large sheets of paper to collect their ideas and remarks in pictures and text. In this way other participants can see results of earlier discussions rounds. It is very much a social process because people mingle and over-time contribute to the discussions of all four tables.

The moderators will be the 'owners' of specific questions. They will the guide discussions: introduce questions in the first round(s) and help participants to come to a conclusion in the last round(s). For each of the round-table discussions we will try to answer the following question:

When do we use these (8 – 9) particular procurement best practices?

TABLE 1: SPECIFYING WHAT THE COMPANY NEEDS FROM INNOVATIVE SUPPLIERS (**Rogerio**)
TABLE 2: FINDING OR SELECTING INNOVATIVE SUPPLIERS (**René**)
TABLE 3: NEGOTIATING & CONTRACTING WITH KEY INNOVATIVE SUPPLIERS (**Michael or Jeff**)
TABLE 4: MANAGE RELATIONS WITH KEY INNOVATIVE SUPPLIERS (**Jeff or Michael**)

We will use an A1 sheet of paper with a matrix. In the columns the variables, in the row 9 best practices for each of the 4 procurement activities. Every table has markers in several colours, and a paper summary of survey results.

Approved by the Auckland University of Technology Ethics Committee; ref number 15/237, October 2015
Please contact professor John Tookey (jtookey@aut.ac.nz or 09 921 9512) for your questions or remarks.

4. Who are the participants

Participants for these round-table discussions can have backgrounds from industry, consultancy or research.

They industry participants are company owners of innovative companies or professionals who hold senior positions within such companies. The industry participants can either come from participating case study companies or from other companies. Part of the participants could work as academics or consultants or experts in industry associations or consultancy or research organisations.

It is expected that most participants will have a university degree. All participants will preferably have at least three years of (industry or academic) relevant experience in *three out of the four* areas:

- construction industry in a New Zealand or comparable context;
- partnering management or procurement management, marketing / sales management;
- innovation management;
- green technical innovations.

This mix of experience will enable the participants to reflect (compare and contrast) their own experience with research findings and with opinions of other participants.

5. Role of the moderator; collection of data

The moderator is assigned to a discussion at a particular table. He or she is important for the quality of that discussion. On the one hand the moderator must facilitate the discussion process with the various groups of participants. Hence (s)he will share the thoughts and ideas from prior conversations of the previous group(s). This helps a new group of participants to build on these thoughts and ideas. On the other hand the moderator must take care *not* to dominate the content of the discussion. In fact the moderator ensures safe and creative thinking and ensures the following guidelines for every participant:

- Understands the purpose and content of the table topic;
- Explores questions and issues that matter;
- Listens and speaks with respect;
- Encouraged to participate;
- Writes down or sketches ideas and thoughts;
- Connects and exchanges perspectives.

In early rounds the moderator helps the groups to *explore* questions; in the later rounds the moderator will help the groups to organize and visually record key insights (conclusions, recommendations, and questions). The moderator will be able to initiate and finalize discussions.

6. The role of the PhD researcher; managing the process

The PhD researcher will organise and host the round-table discussions. He will:

- select and invite potential participants;
- explain the questions (topics);
- explain the round-table process (logistics and guidelines);
- encourage participation;
- encourage a friendly & creative atmosphere.

In general he stimulates powerful open-ended questions: they should be clear, simple and thought provoking. They should generate energy and focus on inquiry, and could open new possibilities.

7. The round-table discussion: logistics from beginning to end

The table below shows the planning for each of the three round-table discussions. To minimize the time effort for participants, the discussions will preferably be organised parallel to conferences or e.g. as workshops or breakfast meetings within industry associations.

Arrival with coffee & tea	*8:35 am*
Introduction	9:00 am
Discussion Round 1 - procurement practices	9:15 am
Discussion Round 2 - procurement practices	9:45 am
Morning tea & coffee break	*10:15 am*
Discussion Round 3 - procurement practices	10:30 am
Discussion Round 4 - procurement practices	11:15 am
Presentations from Discussion Round 4	11:30 am
Closing	11:55 am

What are next steps? After the round-table discussions the PhD researcher will summarize and synthesize results. He will contrast the findings with literature and personal reflections. He will then send the participants a draft document and invites them to submit their comment and amendments. The PhD researcher will then write the final document which will be used as input for the next phase of the research.

8. How new is this type of round-table discussion?

Round-table discussions are perhaps as old as Arthur's Knights of the Round-table. Governments, marketing and health professionals have used focus-group discussions since the middle of the last century.

The world café method is a special type of focus-group discussion and is quite new. In New Zealand Fouché and Light (2011) used this approach in their social work research, but it has also been used to facilitate Maori iwi on land and reparation payments (World Café, Margulies).

The world café can be used by groups to come up with ideas or solve common problems. This PhD research uses a special type of world café method that is relevant to the industry participants and also ensures the academic quality. This method has e.g. been used in Dutch PhD research (Schiele, 2014; Hoffmann, 2011; Hüttinger, 2014). In the US Latham (2008) used this method to define a research agenda on quality management topics.

For more information on the world café, please see:

http://en.wikipedia.org/wiki/World_Caf%C3%A9 (Conversational process)
http://www.theworldcafe.com/method.html (Explaining the general method)
For more information on the world café as used in this research, please see:
http://doc.utwente.nl/78385/1/thesis_P_Hoffmann.pdf (2011)

§3.8 Example Participant Information Sheet [06] for RT Discussions

Participant Information Sheet

AUT UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

[06] *For round-table discussions in Auckland*

Managing Innovative (Green) Suppliers
How do Companies procure Innovations for the Construction Industry in New Zealand?

Dear Madam or Sir,

This document provides background information for your participation in one round-table discussion. The discussion with other industry participants focuses on best practices of smaller and innovative companies operating in the built environment when they manage innovative (green) suppliers.

Although I highly value your potential contribution, please do not feel obliged to participate in this research. You may withdraw at any time.

But then, I again like to stress that I'd very much want you to participate.

The round-table discussions are scheduled at AUT on Friday morning 24 June, and at NZGBC at 7 July. I look forward to meeting you.

Please contact me in case you have any suggestions or remarks.

AUT roundtable discussion	NZGBC roundtable discussion
Friday 24 June, between 9 – 12 am	Thursday 7 July, between 9 – 11 am
15 – 20 participants	10 – 15 participants
City Campus (WG 608) 55 Wellesley Street East, Auckland 1010	Tower 1 (Level 2) 205 Queen Street, Auckland 1010

(Mr) Anne Staal
PhD researcher and lecturer
Phone: 22 389 44 62
Email: astaal@aut.ac.nz

What is the purpose of this research?

In this research we investigate current practices with experts and companies via interviews, surveys and round-table discussions. This document relates to the round-table discussions.

If you want to, you will receive summaries of my intermediate research findings. In a later phase I first want to present (anonymised) results at a conference or in a journal and then want to publish my thesis. You can receive PDF copies of my publications, or follow my website.

How were you identified and why are you being invited to participate in this research?

I have selected you as I understand that you have experience in procurement and innovation activities for commercializing innovations in the built environment. I acquired your contact details via sources on the Internet, via industry associations or via a referral.

I am particular interested in your participation when you have (more than 3 years of) experience in relevant partnering or procurement activities or innovation activities. Hence I expect that we can have a good discussion on how managing innovative suppliers can contribute to company and environmental results.

What will happen in this research?

During the round-table discussion we will discuss topics related to procurement best practices while managing innovative suppliers. The survey serves as input for such industry practices.

We will start with an introduction and then split up into four subgroups who will discuss one topic per table. Experienced moderators each "own" such topic and will help us with the discussion. After 15-20 minutes the subgroups change composition and tables, and continue with another topic. We then have a tea break.

During the last table discussion, the moderators will help the subgroups with finalizing the discussions and presenting results. This world café process is easy & will be explained in more detail during the day.

What are the discomforts and risks?

There are no discomforts or risks. You **will not disclose any information** that may harm your company or your position. Your fellow-participants will know about your involvement in this research, but your specific contribution will remain confidential in my research findings. All participants will sign a Consent Form (please find attached) that states that information must be kept confidential.

How will your privacy be protected?

The Consent Form (please find attached) describes how your confidentiality will be protected. All information (relations, data, trends, insights) which is not known to others and which is commercially or technical sensitive is considered confidential. The AUT is to keep all information and identities of all participants confidential and will only be used for academic purposes. You may withdraw yourself or any information / documentation that you have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.

What are the benefits?

FOR YOU: You may get deeper and broader insights in procurement & innovation activities that may help companies to be more successful.

FOR ME: Your participation helps me to develop knowledge and insights for my PhD thesis.

FOR OTHERS: Improved know-how on such procurement and innovation activities can be beneficial for companies operating in the built environment, for owners and tenants of buildings and for the wider community.

What are your costs of participating in this research?

There are no costs involved. However the planning is that the round-table discussion will take **180 minutes**. Preparing feedback may take another **5 - 30 minutes**. Over a period of 2 – 3 weeks your total participation time is max **3.5 hours**.

However great value your participation to such a case study may bring, this is not compulsory.

What opportunity do you have to consider this invitation?

Assuming you will have to organise the meeting and perhaps some documentation: I would like to hear from you within a week. Please allow me to contact you within 14 days in case I have not received a response.

How do you agree to participate in this research?

When you have decided to participate in this research, please sign the Consent Form and send one PDF copy to astaal@aut.ac.nz. (Alternatively, we could exchange the signed forms during our interview).

Will you receive feedback on the results of this research?

I would like to stay into contact and hear your opinion on my reseach findings. Please indicate on the Consent Form in case you want no feedback on the results of this research. You will receive summarized interview or discussion findings in writing. Your subsequent written or oral amendments or corrections are very much welcome.

What do you do if you have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, John Tookey, email jtookey@aut.ac.nz, phone +64 921 9999 ext. 9512.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Kate O'Connor, ethics@aut.ac.nz, phone +64 921 9999 ext. 6038.

In case you have any questions please do not hesitate to contact us.

Researcher Contact Details

Mr Anne Staal
astaal@aut.ac.nz; 0 22 389 4462
PhD researcher and lecturer
Centre for the Built Environment
AUT / School of Engineering

Project Supervisor Contact Details
Dr John Tookey
jtookey@aut.ac.nz; 0 921 9512
Professor in Construction Management
Head of Built Environment Engineering
Director Centre for the Built Environment
AUT / School of Engineering

§3.8 Example Consent Form [09] for RoundTable Discussion

JUNE 2016 Page 1of 1

Consent Form

[09] for round-table discussions

AUT UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

Project title: ***Managing Innovative (Green) Suppliers***
Researcher: ***Mr Anne Staal (AUT; astaal@aut.ac.nz)***
Project Supervisor: ***Professor John Tookey (AUT; jtookey@aut.ac.nz)***

1. I understand that I must not disclose any information that may harm my company, my position or that of others. I will contribute to trust, confidentiality and professional behaviour of participants and myself.
2. All company information (industry-relations, data, trends, insights) not known to others or commercially or technical sensitive is considered confidential. I understand that the AUT and the researcher will keep such information and identities confidential and only use for academic purposes.
3. I understand that the identity of my fellow participants and all their company information (see also 2) of our round-table discussions is to remain confidential to third parties and I agree to keep this information confidential.
4. I have read and understood the information provided about this research project in the Information Sheet dated 1st of July 2015.I have had an opportunity to ask questions and to have them answered.
5. I understand that the researcher may ask for additional documentation to be analysed for the academic purposes of this project. However, I am not obliged to provide any such documentation.
6. I understand that the discussions will be audio-taped and that notes, visualisations (e.g. on whyteboards or flip charts) and photographs will be taken during the discussions, and that the discussions will be worked-out into summarizing documents.
7. I understand that material as referred to in point 6 will be used for academic purposes only and will not be published outside of this project without my written permission.
8. I understand that although the researcher or other participants may have suggestions that can be beneficial for my company, implementing such suggestions is my own commercial responsibility.
9. I understand that the researcher may ask to be referred to additional participants within or outside my organisation. I have the right to contact such additional participants and ask whether they would be interested in such participation. If so, they will contact the researcher.
10. I understand that I may withdraw myself, my image, or any information / documents that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
11. If I withdraw, I understand that while it may not be possible to destroy all records of the round-table discussions in which I participated, the relevant information about myself including photographs, notes and summaries, or parts thereof, will not be used.
12. I agree to take part in this research.
13. I wish to receive a copy of the published report from the research **Yes** ○ **No** ○

Participant's signature .....

Participant's name .....

Participant's email address .....

Participant's position .....

Participants organisation .....

Date & place .....

The Participant will retain a copy of this form.

Approved by the Auckland University of Technology Ethics Committee (AUTEC) on 20 OCT 2015; Reference number 15 / 257

§3.8 Example of Consent Form [07] for Interviews

Consent Form

[07] for explorative interviews

AUT UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

Project title: ***Procuring Radical Green-Tech Construction Innovations***
Researcher: ***Mr Anne Staal (AUT)***
Project Supervisor: ***Professor John Tookey (AUT)***

1. I understand that I must not disclose any information that may harm my company, my position or others. I will contribute to trust, confidentiality and professional behaviour of participants and myself.
2. All company information (industry-relations, data, trends, insights) which is not known to others and which is commercially or technical sensitive is considered confidential. I understand that the AUT and the researcher will keep such information and identities confidential and only use for academic purposes.
3. I have read and understood the information provided about this research project in the Information Sheet dated 1st of July 2015. I have had an opportunity to ask questions and to have them answered.
4. I understand that the researcher may ask to be referred to additional participants within or outside my company. I have the right to contact such additional participants and ask whether they would be interested in such participation. If so, they will contact the researcher.
5. I understand that the interview will be audio-taped and that notes will be taken during the interviews and worked-out into summarizing documents.
6. I understand that the researcher may ask for additional documentation to be analysed for the academic purposes of this project. However, I am not obliged to provide any such documentation.
7. I understand that although the researcher or other participants may have suggestions that can be beneficial for my company, implementing such suggestions is my own commercial responsibility
8. I understand that I may withdraw myself or any information / documentation that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
9. If I withdraw, I understand that all relevant information including contact details, notes and summaries, or parts thereof, will be destroyed.
10. I agree to take part in this research.
11. I wish to receive a summary of the research I will be involved in **Yes** O **No** O
12. I wish to receive a copy of the published report from the research **Yes** O **No** O

Participant's signature:
.....

Participant's name:
.....

Participant's email address:
.....

Participant's position:
.....

Participants organisation :
.....

Date & place:
.....

The Participant will retain a copy of this form.

Einde van document

§3.8 Confirmation of Ethics Approval

AUTEC Secretariat

Auckland University of Technology
D-88, WU406 Level 4 WU Building City Campus
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

20 October 2015

John Tookey
Faculty of Design and Creative Technologies

Dear John

Re Ethics Application: **15/257 Procuring radical green-tech construction innovations.**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 20 October 2018.

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through http://www.aut.ac.nz/researchethics. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 20 October 2018;
- A brief report on the status of the project using form EA3, which is available online through http://www.aut.ac.nz/researchethics. This report is to be submitted either when the approval expires on 20 October 2018 or on completion of the project.

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this. If your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply there.

To enable us to provide you with efficient service, please use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at ethics@aut.ac.nz.

All the very best with your research,

Kate O'Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: Anne Anthonious Gerben Staal astaal@aut.ac.nz, Jeff Seadon

Chapter 4: Exploring Interviews on Industry Practice

§4.1 Protocol & Topics (Indicative Questions) for Exploring Interviews

[01] Protocol & Topics for Exploring Interviews

Participants and the researcher use this format as a guideline and for taking notes.

[PhD research on procurement of green-tech innovation]
How innovative New Zealand firms procure green technical innovations for the construction industry.
Researcher Anne Staal

This documents refers to the following documents:

1. **Consent Form – Case Studies**
2. **Participant Information Sheet – Case Studies**

This document is structured as follows:

Date interview	
Company name	
Name & contact details of participant	
Company pseudonym	
Pseudonym of participant	

Introduction

Good morning, I hope we will have a *discussion* around my PhD topic where I want to know more about procurement activities within innovation activities of your company. We have a list of questions, but I prefer a dialogue.

Please be aware not to give any information that may harm your position, your company, or others.

[Refer to Participant Information Sheet and Consent Form].

Perhaps you remember this model from the Participant Information Sheet. [Explain model].

	Specify Need	*Find & Select supplier*	*Negotiate & Contract*	*Manage supplier relations*
Generate & assess ideas for new products				
Develop products or prototypes				
Business: Sell innovation to customers				

Our discussion takes your main innovation activities as a guideline.

When conducting these innovation activities, I assume that your company will conduct several procurement activities.

My PhD research is interested in your descriptions of such procurement activities.

The nature of your innovation and procurement activities can be influenced by a number of factors [variables]. These can be related to the market or other external factors, to the innovation, or to your company. Later-on in the interview, I'd also like to have your opinion on such factors.

Please contact professor John Tookey [jtookey@aut.ac.nz or 09 921 9512] for your questions or remarks.
Approved by the Auckland University of Technology Ethics Committee, ref number 15/ 257, on 20 OCT 2015.

Q1 Can you please give me information on your company profile.

Note: combine this with information available on the Internet.

Q2: What would your company describe as an "innovation"?

Note: This research focusses on a specific type of innovation for a specific type of industry. It focusses on [1] *environmental (green) innovations* and on [2] *construction innovations*. They all have [3] a *technical* nature. In short, I call them "green-tech innovations for the construction industry". Definitions can vary.

Note: We will discuss "success" and the "innovation steps" later-on.

Filling the Grid of Procurement Activities & Innovation Activities

Q3 How can you relate the grid of innovation and procurement activities?

Discuss only as a prompt: Can you give a GT innovation example [e.g. the process of a product or service innovation; supplier issue or activity?] and relate that to the grid?

Q4: What are your company's key procurement activities in the *ideation step*?

Q5: What are your company's key procurement activities in the *develop step*?

Q6: What are your company's key procurement activities in the *business* step?

Q9: Would you have any additional remarks or suggestions on the procurement activities?

Discussing your Procurement Success

Q10: What are your company's key procurement results for the *ideation* step?

Q12: What are your company's key procurement results at the *develop* step?

Q13: What are your company's key procurement results in the business step?

Please contact professor John Tookey [jtookey@aut.ac.nz or 09 921 9512] for your questions or remarks.
Approved by the Auckland University of Technology Ethics Committee, ref number 15/ 257, on 20 OCT 2015.

Q16: Would you have any additional remarks or suggestions on procurement results?

Factors affecting the Company's Procurement Activities

Q17: What are most & least important factors that can determine your procurement activities?

Note: this can be classified according to the above model.

The End of this Interview

We have now come to the end of our discussion. Thank you so far! I have two remaining questions.

Q23: Do you have any remarks or suggestions? Did we miss something?

Q24: Do you know experts in your organisation or network that I could talk to?

Note: I am looking for similar or contrasting insights on procurement of green-tech innovations. This will help to increase the quality of this research. I therefore need participants for case studies and for round-table discussion. If so, I will send you a brief email explaining the purpose of my interview so that you can forward that to these persons. *If they then wish, they can contact me.*

I will also send you the transcript of this interview, and very much appreciate your feedback.

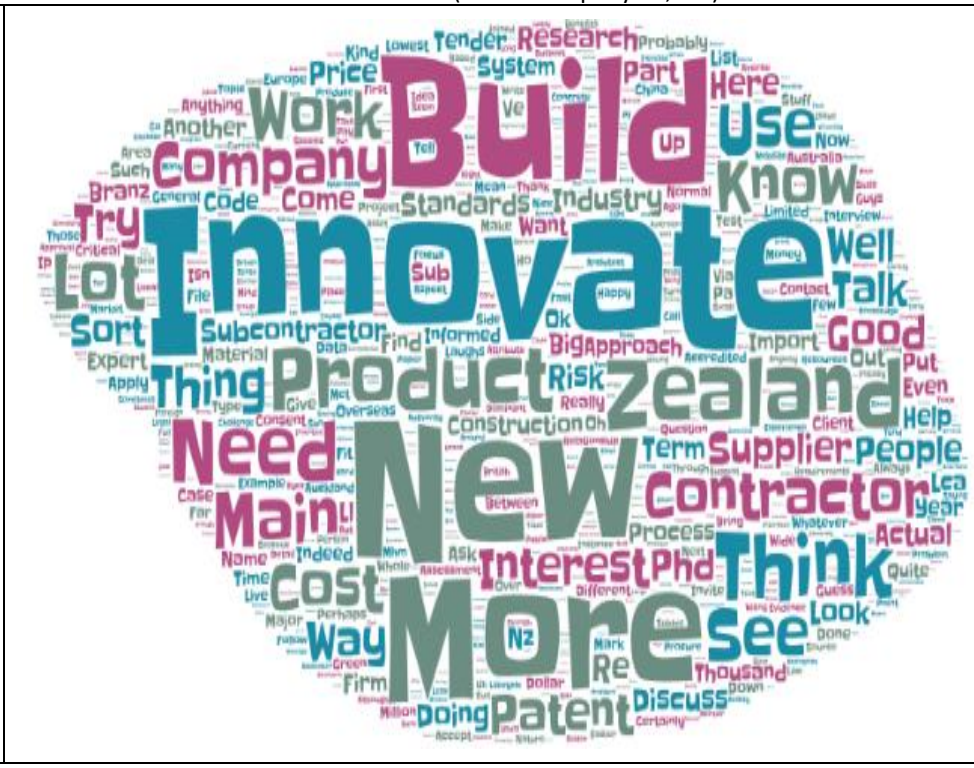
Thank you again!

Please contact professor John Tookey [jtookey@aut.ac.nz or 09 921 9512] for your questions or remarks.
Approved by the Auckland University of Technology Ethics Committee, ref number 15/ 257, on 20 OCT 2015.

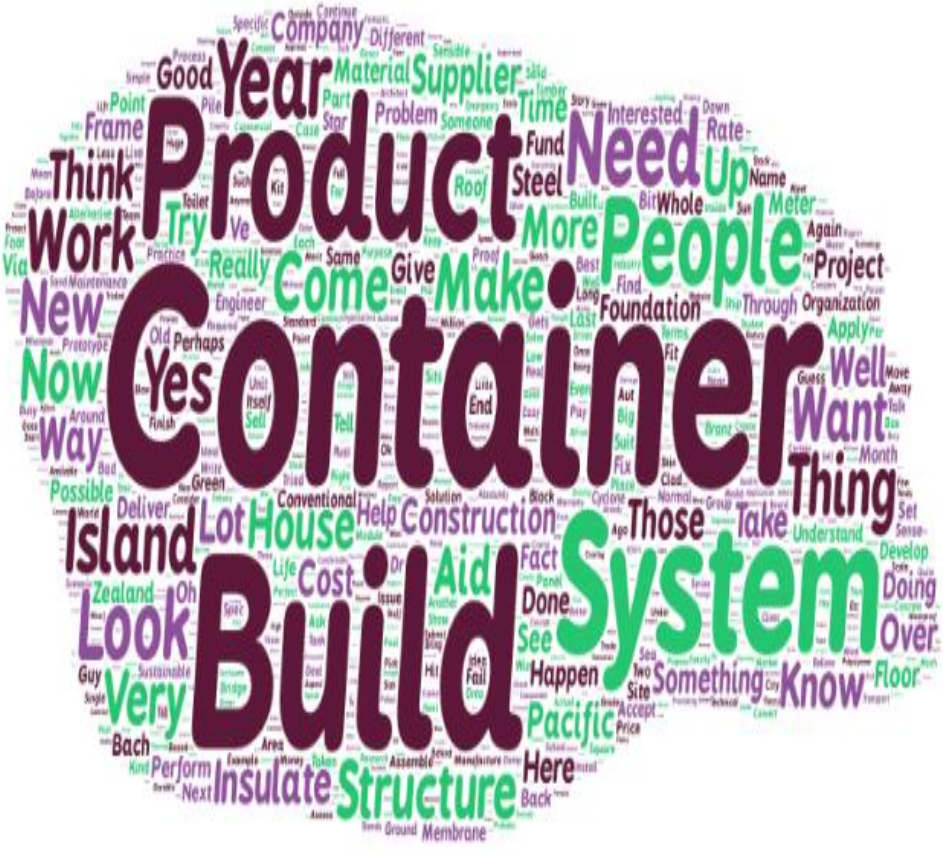
§4.2 Preparing the Analysis of the Explorative Interviews

The word-clouds hence visualize dominant concepts as mentioned in the interviews. Manually, common words such as “one”, “yes”, “go”, “a”, “the”, “does”, “have” or “first” were removed.

Figure 4: Word clouds of the five interview texts (C#1 is Company #1, etc).

C #1	

C #2	
C #3	

C #4	
C #5	

§4.2 New Zealand Interview Transcripts

Interview # 1
Director/owner building consultancy firm
Auckland ART Café, 10 December 2015

A: Thank you for this interview. Now we just continue this conversation like this recorder is not here [laughs].
K: Yes. I know a woman [expert name] that is perhaps interesting for you.
A: Ok so what's her background then?
K: She is an architect and has taught at Unitec and Auckland university. She knows a lot about prefab construction and is a very innovative architect. When it comes down to procurement aspects and certainly to the contract side she could be helpful because she had a long background in the architectural industry and in the building industry as an whole.
A: Oh that's interesting.
K: If necessary I can contact her for you.
A: Thank you, I'll give you my card.
A: Talking about the industry, and especially the SMEs. Research tells us a large number of New Zealand companies in the construction industry do not innovate. But then you have the front runners who do have green-tech innovations and ho could be quite successful? For instance, I will have a discussion with a representative of a company who manufacture light-weight concrete precast slabs.
A: They're a member of PrefabNZ. That is how I have selected my case companies: they are either members of PrefabNZ or of the NZ Green Building Counsel. I retrieved the company data from their respective websites.
K: I think there are limitations on the strength of that concrete?
A: yes could be
K: cause that will be because of the other benefits
A: yes benefits and limitations of course
K: yes of course their products using lightweight products would suit the engineering requirements or the compressive strength needed, it might be limited to approximately of 20 or 25 pa.
A: mhm
K: less than actual concrete because that has around 40 or 50 pa.
A: That's not my area of expertise [laughs]. There seems to be a market place for these sorts of products.
K: Yes.
A: I am not sure but think such panels have been applied at an AUT building as vertical sun shades.
K: Oh yes so it's not structural...
A: That would not be not structural.
K: that's ideal
A: yes...
K: So what is the difference between this majority of companies that do not innovate and the small minority of companies that do? How do you identify them?
A: the identification is
K: what is the difference between those companies in nature the fast majority of the fast majority that don't innovate. It is that the construction industry...?
A: mhm
K: is by nature is conservative
A: it has to be conservative
K: lacking innovation. So what's the difference between the companies who do innovate?
A: That's one of the things I want to find out via interviews. But literature says that a lot of these New Zealand companies are lifestyle companies or survivor companies. They are not interested in innovations. In contrast to companies that are more entrepreneurial or more innovative. Such companies have skills or resources to innovate. It is a worldwide thing in construction- not a typical Kiwi thing - you can find it in The Nederland's or in the UK or whatever
K: Interesting. If you focus on subcontractors or supplier for innovation [...] I think there is an important issue in New Zealand. I think subcontractors are quite bad to their main contractors and they're bound primarily by price they have to in most cases slavishly follow the contractors of what the contractor says
A: Yes, that type of hostile relationship is not helping in the process or product innovation...
A: that sort of tension
K: To be able to provide more innovation in the industry you need more normal relationship between a subcontractor and contractor
A: Yes indeed. There was a scholar in Canterbury who did his PhD research on the relationship between subcontractors and main contractors. It is one of deep distrust and trying to get the lowest prices and trying to do the minimal effort. And that behaviour is not a very positive environment for innovation of course...
K: No, it's certainly not at all I would think

A: I will have interview with representatives from larger organisations and one of my questions could be: how would you stimulate innovation by these guys or how would you develop your supplier to be more innovative, how do you do that? They got these big words and nice websites but how do they do that in reality...
K: I think you need to overcome the prime attribute that the main contractor is always looking for having lowest cost. If the industry I suppose hiring requirements are lowest cost since clients want lowest cost and main contractors are tendered often on the basis of lowest cost. And then they will screw the price down as much as possible, all the individual costs of the sub contractors. However, if we could overcome that dominant cost attribute it would help, but an interesting question how do you do it?
A: I have not seen many successful examples. You need at least an informed client and you need lifecycle thinking.
K: I think that you need a prospect example from a local government or so. From popular works from the local authority sector but also the government sector. In tendering processes they traditionally have a list about produce cost is only one you have 10 [*]
A: You have quality and logistics
K: Yes resources I can't remember the rest which they are actively thinking about. They are thinking about a wide range of attributes other than cost inherent in that process. Arguably you could bring in a promotion...
A: Yes indeed that would stimulate
K: That would help. The culture it is almost if it needs to be an educational approach to the public and to the building owners as a whole.
A: Yes you could be right. I have now been teaching Built Asset Management for two years now in New Zealand. I do not see a lot of asset management thinking or lifecycle thinking in the industry or not even in the councils or with major clients. It is all about short term and monetary costs
K: You are probably aware of some of the BRANZ initiatives on this. Have you met [expert name] him?
A: I have not met him
K: In terms of lifecycle costing [LCA] he would be a good person to ask.
K: He's a scientist with BRANZ in Wellington and I know he approached me just recently because he's applying for an research grant that he is currently seeking. He ran up his coming research in the coming year specifically what he's doing in this project is that he is supplying LCA to building subject to disaster so in the seismic damage area with traditional LCA has considered buildings over their intended live but not on building lives who's live have been shortened by disaster by like earthquakes. He is going to do research on integrating LCA modelling with seismic damage and other seismic stuff. It is quite mind-boggling...
A: I can imagine indeed, so that's his topic?
K: That is his current initiative. In the past years his topic has been LCA in a general sense, outcome of such LCA research could be probably a good driver for innovation
A: It could be a good driver for innovation. But then my focus is innovations and barriers of innovations: I am looking at the 10 or 5% firms and I will do some case studies [interviews] what does the supplier market say or what do your customers say? You say your company is innovative and in part you procure from Europe or from China, and in part you develop innovations yourself. So how actually do you do that? Do you go search new suppliers, do you work with suppliers you know very well, or do you look for foreign suppliers? Do you indeed do the more radical or incremental stuff with domestic suppliers?
K: Seem all good questions. I think the challenge here in New Zealand is that most suppliers are almost monopoly suppliers. And therefore they would not really or practically be interested in innovations. They are making a lot of money anyway. Those people that do deviate and try and use new suppliers normally need to search overseas. Sometimes they get caught up in unforeseen situations such as procuring materials with toxic substances like pesticides. For example some years ago an insulation product came from China. It was installed and they put in trains but after a while they realised it actually contained toxic fibres which obviously had been banned in the 1980s. The problem was it is not banned in China and Russia they produce it so much that it came through easily. This is one of the challenges of being innovative this small isolated country Zealand is that you go overseas but then...
A: you have more risks
K: You run far more risks. And the other part of using overseas suppliers are potential obstacles in our Building Code. You have to have some sort of recognition or appraisal or recognition or some sort of code mark as you bring in a new product from overseas.
A: Of course, you need approval.
K: The building consent authority will look at it and say well that does not and you might say it does: it has this accreditation. But the source is important [...] it could be from a so-called 'accredited laboratory or company' somewhere overseas which is not recognised in New Zealand. Or we don't know if its actually recognised because we don't have a system in our building consent system to know if the accreditation is good or not. The inspectors who are doing the check have a risk averse approach which is the dominant approach since the leaky building syndrome. So in terms of the assessment and processing of building consent is an entirely risk-averse approach which by nature tends to bend down any likely hood of innovation
A: That would not help I guess
K: That is another barrier for achieving innovation

A: And that's all OK. I mean you cannot accept all kinds of materials that haven't gone in one way or another through your accreditation process.

K: And that same risk-averse approach I suggest applies particularly to builders, sub- contractors and contractors. They don't want to put their heads on the cutting table and not use a product they know nothing about. They need to use a product that has been used for years here in New Zealand. And then they can point to that if it goes through customs later they can say look I have used this product I couldn't have done anymore than that but when it comes to litigation and they use some imported products it is far more risk full.

A: Yes and would that also apply to material from Australian, or is that easier?

K: Well I can't answer that with particular knowledge but I suspect that it would be easier with the joined New Zealand and Australia standards. Most standards are joined New Zealand and Australian standards so that would make it much easier and also some of those products will be accredited in Australia. So in terms of code mark, in New Zealand there is only the one company that does accredited code mark assessments. [post hoc: For an example see: http://lockwood.co.nz/Aboutus/CodeMark.aspx]. However there are 2 or 3 companies in Australia who tend to be doing the majority of code mark assessment. That is the highest form there is so much more assessment in turns of the BRANZ appraisal approach. BRANZ have originally have done appraisals that is sort of a lower tier type of assessment but other companies have done that as well and possibly some Australia products would have had that sort of part of assessment. Because we have a closer relationship we are more similar to Australia than say China where many products come from or European nations. I suspect is that we feel safer with Australian products, but then having said that we know that New Zealand is much more damp and marine environment

A: So the leaky buildings syndrome?

K: So we have to be really careful there because what might have been tested in Australia, in very dry Perth or whatever, might not be adequate for New Zealand

A: And the same for German DIN norms or British Standards norms?

K: Probably in my experience at least not as much although we do recognise some British standards. When you say go to NZ Standards website, you will see British standards and some of them are appropriate. I am not particularly conversant [familiar] with them [...] the dominant area were we apply standards where we have joined AES [Australasian Evaluation Society] and Australia standards and because that became a formal system 10 or 12 years ago.

A: and you would need the money and the resources and the time to import non-NZ innovative triple glazing or whatever...

[21:36]

K: Talking about standards the other important thing to look at is compliance with Building Code. We all know that under each Building Code there is a list of compliance requirements that may be used as it didn't comply with the Building Code. Really that is the starting point of using standards to see if it is listed there or not. If it's not, you have to be much more careful and that is definitely going to be an alternative solution to a building consent application. That's where you got to justify the use of a product in a building on its merits, and that is often a higher cost things and it is normally reluctantly to pay in my experience and that approach is going to cost more and that there is no usual guarantee that it's going to be accepted. Even if it is accepted by the authority and the building consent it always leaves it more open to a higher risk to legislation.

A: And so BRANZ or the NZGBC [New Zealand green building council] are not proactively trying to get foreign materials or products imported and approved?

K: No it is not a proactive approach on their part. It will depend on the demand in the market a buyer a test done who has to pay for it they're talking about a lot (10s of thousands) of money to have things tested. Often there are very few people that are equipped to do the testing. BRANZ would have the most well-equipped building laboratory. I think in that way they have a sort of monopoly but at least BRANZ approved products are usually favoured because of the reputation and also because of the fact that part of the BRANZ is operated by a levy instead of Building Consent.

A: you see that in more countries I guess? If it does not meet specs it is a harder game. It even becomes more difficult when it has to fit in a sub-system or interface with another system. Unless it's just a standalone thing but of course you integrate new things into excising systems also you got that interactive problem.

K: Yes that is another obstacle really like you say that very few of these products or systems that we may be considering in an innovative way do have to fit in and become part of the building. That interface issue is really big one and an interesting one because often the question is who has the skills and the ability especially to apply the new materials to its surrounding interface.

A: That would be interesting to know how these guys tackle that problem

K: You know most sub-contractors believe in New Zealand

A: they don't have

K: they don't have the resources

A: not willing or able to take the risks

K: But because the design for the next project [*] they are tendering for the next project. In that way, they spent a lot of time and money on a tendering process where they may not even get the work which is inherent in the main tendering anyway. They often have production lost in the tendering process and even with that system

sub-contractors can put in a tender price to a main contractor who they may do the work for. And then the main contractor will turn around and tell the subcontractor "well you've got the work you tendered for a million dollars, but we will only accept you if you bring it down to 800 thousand dollars".
A: Yes that idea, yes.
K: And really that idea of when the main contractor says that to a subcontractor often the subbie has no choice to say OK, because they need the work.
A: Because already they have invested the time
K: And also they don't want to fall out of favour with the main contractor because they do work for the main contractor all the time. Maybe he is their main source of work so in a way a lot of subcontracting are held ransom to main contractors and it is very hard for them to increase their prices or to have any approval at all to innovate and to think about better or more efficient ways of doing things
A: Interesting. That's a kind of vicious circle I guess? So this is where all the productivity and affordability thinking stops? We don't see an increase in affordability and productivity in the construction industry? Or do we see that? Or do we only see that in some pilot projects?
[28:56]
K: I suspect any benefits of productivity which means cost saving to main contractors have always been focused on reducing their cost via their one million dollar subbie to the 800 thousand dollar subbie.
A: They can report that as a saving (laughs)
K: Then they increase their profit by 200 thousand.
A: Yes. But is that not a ritual dance? What if the subcontractor initially can do the work for 800 thousand? But instead he thinks: let's try and ask one million? So he can always go back?
K: Well there might be that tendency but of course ...
A: Or is the price competition that fierce? That they will submit a reasonable price anyway.
K: I can be specific based on actual real knowledge in terms of my general knowledge of it I believe that the relationships are so close and earnest that first instance the subcontractor is more inclined to submit they lowest price he can. Because if he puts in a million when he can do the work for 800 thousand, it's like trying to pull the wool over the main contractor's eyes who you know well. And the main contractor is likely to know straight off that you haven't been honest: you know you can do it for 800 thousand why don't you just say 800 thousand in the first place? That is my fairly good answer without examples or evidence.
K: Now, have you also talked to the association of sub contractors?
A: there is an association of subcontractors? I did not know that... That could be interesting although my current expectations are that material suppliers will have most incentives to come up with new materials products or systems, and not the subcontractors.
K: Yes certainly the suppliers are probably the leaders amongst that group
A: And if you look at existing research papers on construction innovation, you will see that main contractors have relatively often been a topic for research, more than subcontractors or suppliers.
A: And quite another thing. Strangely enough you see that all kinds of foreign firms have patented construction inventions here in New Zealand and ...
K: Did they...
A: Yes so. Apparently they hope or they have succeeded in getting a compliance. I have not studied this in detail but you see quite a lot of Americans or European patents with equivalents here in New Zealand.
K: In terms of patents [...] another angle could be, have you contacted the legal companies that deal with these patents? Like...
A: there are some legal companies [patent attorneys] here ...
Have you contacted any of them?
A: I have them on the shortlist. I used to work for a patent firm early in my career, they are most probably not willing to share their client information.
K: I'm thinking, if it was more by the sort of request you have made to a lot people as an PhD student doing research you can normally get information I would've thought that doesn't divulge any first known information you know mostly people in our own field can talk about that sort of stuff without identifying or disclosing any important information/identification.
A: yes indeed
K: it is probably worth a try.
A: Yes, everything will be anonymised. For instance you will be an expert in my PhD not be mentioned with our name
K: Even in a discussion you would have with them. You would not need to know anything about them their address or anything they could just talk about a certain case...
A: so how do they hide their IP from these guys?
K: I guess your focus is New Zealand isn't it in this way...
A: yes although I got some parallel research going on in the Nederlands.
K: I asked that question because my brother-in-law is based in London and he's a patent attorney. He just retired and has worked for a couple of big companies in Europe and the US. He hasn't worked in New Zealand but he has ...

A: a well perhaps he has clients…
K: That might be getting far removed from what your doing if you need stuff there I could always put you in contact with them
A: that's good. TXS. I've retrieved public data from about 100 New Zealand patent owners who also filed patent applications in Europe or the US. Likewise there about 100 overseas [mainly from the US or Europe] patents that are also valid in New Zealand. That is quite a limited list you see the big New Zealand names but also smaller entities.
[39:20-39:30]
[Data about a reference deleted].
A: that is a really nice suggestion, it could indeed be that the experts (such as you) are more willing to share information than the particular firms dealing with patents.
K: Yes, but what we're talking about: I'm not divulging anything to you in terms of clients or anything and discuss my experience in a general way.
[40;40-42:00]
Text deleted that discussed the PhD project in more general terms.
A: So you suggest that architects or quantity surveyors could have interesting information for my research.
K: They could be a good source and for example [name] would be a good starting point amongst that group because he is an building expert with a wide knowledge. I know that early in his career he worked for one of the big construction companies here in Auckland.
A: yes
K: so he has done a lot of side work on big projects and so on. Now actually another person that comes to mind with the trouble of being in the industry for a few years you get to know a lot of people too much [laughs]. An old boss of mine is based in Christchurch and has wide experience in all aspects of building, civil engineering, industry construction, you name it. You will probably find such people on Google and if not give me a call.
A: I got a lot of contacts from you this one is also a great idea to contact IP firms /law firms
K: yes
A: They could give me some good information on how they license out or what/ how these firms acquire technology, I mean filing a patent in New Zealand that would cost over the life of that patent 10 thousand dollars or something, so you will not do it unless you see a chance of a good return.
K: Yes and that's only I guess when you say that is only part of it isn't it they would be included in that technical assessment and whatever and that could be a whole lot more than that
A: Yes indeed
K: Perhaps you need the confidence to take it to that stage. Although I think with some patents you can get it with not too much evidence.
A: yes, you could get an patent with not to much evidence or whatever or technical evidence that it actually works. The only requirements are that it must be new [novel], it must have an inventive step, and it must be related to technology. So that's it - you can file for all types of patent applications for weird things or gene modification of flying fruits or whatever.. . Software is limited though.
K: yes because
A: It actually doesn't need to work you just need to build your argument which is new and inventive
K: and which can follow the detail justification confined
A: and the next step would be that it would be going through the certification process [and some policy or whatever?] this is interesting what can I do for you? I mean I will come up with report and papers say in July or earlier and perhaps also I will also discuss my paper on a congress here in Auckland. I could invite you if you want to. And of course you will receive a copy of the transcript of this interview.
K: Ah yes. You don't need to do anything for me I am just happy to help. I have an interest in what you are doing and I like to help and anything that is appropriate and there is an audience I would be very happy to be invited certainly. But I don't expect anything other than you would normally be doing if you weren't talking to me so but yes I'm very interested.
A: Likewise, we have an interesting discussion. So if I asked the FMANZ people for giving a presentation on my research results, I will invite you to that one if you want?
K: yes I would be very happy to receive an invitation.
A: And I will post regular updates on my PhD blog, but not to detailed of course not to specific.
A: I understand you examine PhD work at Massey and Auckland University. Of course you cannot examine my PhD because we talked about it and we had this discussion.
However, I will do a round-table discussion in March or May 2016 with industry experts. We will then discuss the findings from the interviews. I will try to make some sense out of the material and try to find out if I have found anything sensible. So if you would be interested in that...
K: I would be. And if you want me to do any more, I would be happy to. I'm very good at doing critical reviews on what people say & write and sometimes you need quite a strong critical approach of course. Certainly on this PhD level you need someone who's going to be strongly critical and challenge the things you say because if you can justify what our saying or it you are hard to follow, or at least rewording what you are saying is probably important. That's what I find with all the people I criticise if I don't understand you...

A: Than another expert won't understand me either
K: It then needs a rewrite or some alterations
A: if I write an article on this one I'll send you my draft. If you got the time or are interested...
K: I could comment in that way yes. I think one of the problems is that too often people in our position do not have enough people that can correctly criticise you.
A: That is very limited
K: Yes and until we too easy produce something we think is great but in reality, isn't another person looking at it and saying... Just slightly different eyes make a difference
A: You're often blind of our own mistakes
K: Why do you say that or in that way?
A: That's a very good thing to do a very important aspect and sometimes when you write something and put it on the shelve for a couple of weeks only then you see the more critical mistakes that you have made in your thinking or in the text.
K: And even so you're right there to some extend you can't be fully critical on your own work. It needs someone else to see the wood from the trees.
A: It was a kind of unstructured interview, but very useful. Thank you and we will be in touch.
K: Likewise.
End of interview.
[51:20]

INTERVIEW #2
Partner in new start-up company that imports machine equipment & provides operational services
AUT Café Auckland, 11 December 2015.

A: [Introduces the topic discussing innovations and supplier interaction from the perspective of the industry experience of M.
M: What is interesting is: we do have main contractors here, private industries and private businesses and they get their innovations often from sub-contractors or suppliers. The thing then is, where do those sub-contractors or suppliers get their innovation from? I think it often it has been through government initiatives. For instance the government wants [improved] airport equipment and hence need innovations. In that role they have to ask for certain technologies, so the question is: how do they find new technologies where nothing relevant exists. How do the original technologies come to New Zealand?
A parallel to medieval times would be the cathedral builders back in the old days: you had some master builders and specialists who moved from town to town all over Europe: they had the knowledge and skills but also worked with a lot of the workers from the local environment with limited skills.
A: Ah, you probably read the Ken Follett novel on building cathedrals. [Irrelevant text deleted].
M: A more modern-day example I relates to former East-Germany. The East Germans always had computer chip technology so there was already an educated workforce. But after the collapse of the former DDR and the Berlin Wall there was no interest in these chips. So somebody smart used the workforce which was already there. Because you could either you use a workforce that had the knowledge, or you come up with something radically new and you build up the workforce. And that also happens in developing countries: a company moves in and they train people and bring them up to a higher level and in exchange they get a cheap workforce but also the transfer of technology and new knowledge. Relating this to New Zealand: how would a knowledge transfer happen in New Zealand if you do not have a company that has already been working on these materials or innovations or that can adopt certain environmental standards? How do you get those guys to share...?
A: Yes that is an interesting question. Well I guess that standards or regulation can be an important driver for innovations. You can have high requirements on sustainability, but that is not exactly the case here in New Zealand. For every new building material or system that you want to import here for application in the building system, you will have to get consent with regards to the Building Code.
M: It must be tested and approved by those guys.
A: Yes it must be tested. Often there is an industry associations such as BRANZ that does that, but you have to pay for it so if you want to use new technology. If it hasn't been approved previously, you must pay for that or you need to find a client that is willing to pay.
M: Indeed. Some university lecturer was looking into building things. He came from the United States and stated that in America you have prefab and you can build a lot cheaper. But he thought that dominant players like Fletcher's construction were reluctant because they are very big. So basically, anything that is not Fletcher compatible is being ignored unless that company is doing it by themselves.
A: but Fletcher's do some innovations themselves... They have some patented technology and for example Fletcher window systems...
M: Or get these innovations imported. Fletchers is also one of the few companies that is also successful overseas as they operate in other major overseas markets as well.
A: Yes indeed.
M: That could be another thing to look into because the New Zealand market is very limited. This market has two problems: a, the nearest neighbour is Australia which for a European is very strange. When you have a have got a plumbing business in Germany near the French border you can expect to have French customers if you want to?
A: I think so, but you still have to comply with the French building code etc. And it could be easier for products than for services, although we have some European-scale construction or installation service companies.
M: In New Zealand this is very difficult because you have 2000 kilometres between New Zealand and Australia. And shipping is very expensive for New Zealand. I would guess it would cost as much to ship from New Zealand to Australia as from New Zealand to Europe so you for your company to grow
A: are you sure about that pricing between New Zealand and Australia is the same between Europe and New Zealand?
M: no I am not absolutely sure about, but I think that it is quite expensive even more expensive imp not sure it might be because it is an monopoly it is probably worth looking into that is where a lot of shipping is, everything that needs to be imported to New Zealand needs to be shipped. It would be a large price component.
A: yes indeed.
M: yes there for the company sometimes. You know if New Zealand wants to get more revenues and taxes it will be good to have companies that operate overseas even though some tax would be lost to overseas but…
A: As a country, you can make money in two ways: either you get people in like tourists or students to buy stuff here, I mean that is a business model for New Zealand: overseas students or tourists. Or indeed you try to export your dairy, your wine or anything you have. Those two things can make a country richer.

M: Yes, especially export.
A: So the construction industry although there is a lot of money involved in New Zealand there is about 4 billion dollars or something, it all remains here so it does not actually add much to New Zealand economy. (Though it contributes to employment and keeps a lot of people busy).
M: No, it has no change to grow which also means that they are limited in the technology they can offer because there is a very small market right?
A: I do not know, I only guess so? There only a few major cities of course.
M: yes.
A: so in general indeed you see that they are not very innovative the construction industry. That is in part the regulation but also because it is a thin supply line and a focus on cost. And these guys are perhaps too small to be innovative and they prefer a lifestyle approach. They have got the BBQ the Bach and the Boat, that kind of stuff.
M: The threshold for an investment to grow overseas is also quite large. They then have a new competition base, so you can see that a lot of those companies will be disappointed. They are just happy that they have a certain market share in New Zealand. They know if they want to push it in New Zealand is difficult and to push overseas is extremely expensive.
A: Say exporting...
M: Then one of the procurement things is: in Berlin we had the American forces, right? We also had the French and the English as part of the allies. The interesting thing was wherever the Americans went in terms of their military they took companies like UPS with them for their postal mail system, and for example McDonalds on aircraft carriers. Of course then UPS and McDonald obtained a big market in Germany.
A: Yes, they had a foothold
M: Having a foothold in a country not part of theirs
A: Oh, that was their model?
M: Yes. And that is interesting because the thing is what do you have if a big company goes overseas? Let's say you would have a big New Zealand company like Mainfreight and what would you have if Fletchers challenges overseas and they have some timber mills with them and they are Kiwi timber mills? Would they preferably do business with them or would they preferably do business with an American company? Because you have a trust base already, let's say a German car manufacturer like Mercedes opens up a factory in Turkey would they rather have a Turkish company as main suppliers for windscreen wipers or would you they take a German company as their main suppliers that can also makes good screen wipers in Turkey?
A: yes, they would opt for the German company.
M: So that is the things if you have companies, if you have clusters of companies like primary companies and their suppliers and they would have Kiwi suppliers with companies which are Kiwi owned and operated already that the trust base already exists, UPS they have already guaranteed business so when they go overseas because they know they will have business with that air force base there and they have that much mail coming to them, so it makes it stable for them. A lot of businesses started over there like that, they merge right? DHL goes overseas they merge with a local company that has already a base there like a Kiwi merge with them and call it DHL. Or as a big company you already go overseas, such as a Facility Management company of Deutsche Bank right it might be a facility management company, but they go with Deutsche Bank to Britain they go there, they work out all their things and Deutsche Bank can be sure that they get the same quality so you get that as well.
A: I am not so much interested in export. From my research I am more interested in the import. Of course unless you`re very much interested in the export that's OK.
M: I would be interested in both because I think that are both needed. If you do the export you would have a small competitive advantage right? It could be that in New Zealand the competitive advantage would be quite small, because you would only have a small time-window in the market because if those guys first test the Kiwi instructions on how to install it, then the competitive information for you as a company is gone because then anyone can figure it out by themselves right?
A: Yes, I've also found this in my desk research [Koebel]. That indeed is an issue but companies that do benefit from the product innovations file their patents and design rights and trademarks. And really it is much more difficult to protect process innovations, so I guess I could find some interesting suppliers on products or components of for example triple glazing systems, energy-efficient HVAC systems, or some low maintenance product.
M: triple glazing systems are a really a thing they have already in Scandinavia for decades.
A: Yes, it is a relative thing. I see an innovation as being new to the New Zealand industry or customers. It can have been in use for ages in Australia China or America etc. So it's no new world wide novelty as you would see in patenting.
M: Innovation would be that it is the latest standard of technology whilst in Europe you still have got the old standards which might still be still be in place and not changed over the last 20 years. It might be triple glazing or a special gas between the window panes that might be giving you better isolation value. Those companies [can benefit from first movers] and adapt the latest technologies, while in Europe they might still be behind because a lot of the windows might still be in use or something...

A: Yes but there is the question: have you got a stimulus from the asset owner to have a lifecycle assessment, that is a long-term view, or do you want initial low prices. Will you apply simple glazing or even compare simple or more advanced double glazing systems and also consider long terms benefits of coatings and gasses? For example, this is a new university building and it does not have double glazing.
M: Yes even in cold Dunedin it would not have double glazing. They have very nice buildings, but they are really cold in winter.
A: So you have lived down there?
M: Yes, I used to live in Dunedin. Now the city council has all fireplaces removed although they are essential for keeping the houses warm instead of electrical heating. Council wants them to be replaced but some houses can only be kept warm with fireplaces because you will have to pay for power that you do not even use which you lose in the heat exchange. They are not as economical as burning wood.
A: So you used woodstoves or open fire places?
M: Preferably if you can yes.
A: because it's cheaper?
M: Yes and you also get more heat from it from the fire, anyway what is a renewable resource I mean I know that it has an carbon emission, the problem is that we went to deposits that have been shed away for hundreds of millions of years that is where the excess comes in if you burn a tree you have the same amount of carbon basically.
A: To switch subjects, I understand you have a busy job?
M: Yes, I start working with my flatmate's company in January. At the moment it is a small company, but it has a lot of potential and is quite good in sales. It already has some quite big companies. He could have contracted a very big client but that it was too big a job with a low margin. He still has contacts with this lost client. The thing in New Zealand is that although people look for the cheapest deal a lot of things still work on relationships, officially there is no ...
A: there is no formal tendering process
M: but it happens, and it is very big.
A: But indeed, relationships are important here.
M: Extremely, but I mean of course that you can't really put in a research project but that changes the balance a little bit which contractor is chosen right? Of course if you as a sub-contractor would introduce more sustainable ways and pass it on to a main contractor or as the main contractor you can use it and offer it to the client...
A: or if it increases your productivity: that would be good then you can have a better margin on the work you do. It need not always be product-related so that the end-user or the main contractor sees it could be. It can also be process-related. I have an example here: this can be an improved nail gun that helps you work quicker or safer or helps in delivering a more standard quality.
M: Yes, my partner did something similar. He got himself a very strong electrical scrubber from abroad, and found that it could do things in half the time than scrubbers already on the market in New Zealand. So yes, technology like that seems to not be obvious new technology like a new sort of solar panel but it can have a considerate change in the market, for customers and competitors.
A: If you are competitors do not sell this product, it is an innovation?
M: Yes. And it is environmentally friendly, it cuts the time down and it also saves electricity because you can do your job a lot quicker.
A: I think that's an example of an innovation that does not involve many stakeholders and that does do not bring a major change of technology. I am also looking at innovation types that do involve new stakeholders and innovation types that also involve changes in technology. There recently was an Australian scholar that did her PhD on 5 types of innovations which was based on the Slaughter model (from 1999 / 2000). I have the model here: if you buy this type you will probably have different procurement behaviour than if you would buy that type or that one, if you buy new technology then you have to go through consent of does it actually work and that kind of stuff? If you have to involve a lot of stakeholders like your customers cannot do your spot buy to have a different procurement process. What would be your opinion?
M: I recognize this. But I think my partner works in a smoother field than that so it would be like offering non-toxic substances or house washes and things like that because there is quite a lot of toxicity and he also does moss removal and moss treatment so there is a very strong environmental impact but there is also something strange because for example he uses water pressure so he used to have a machine that had 3000 psi.
A: that's high I guess that is 300 bars or something. I do not know.
M: Yes, but now he has got a machine that has 5000 psi. It is very noisy, but it has got a very strong water jet. The thing was even though he could buy it here in New Zealand, not a lot of companies had bought it here. He is one of the few New Zealand companies that have it. These machines are versatile, for example you can put an attachment on it and have it work as a sand blaster with water which means that he cuts down on the dust. Or for example he does it at car parks: he strips of the paint of the cars to be repainted he can do that without creating any dust because the dust goes into the water. It is an innovation yes, but it has been on the market for decades. So why is everybody so slow in adopting such innovations? Even if we forget the sustainability aspect: it is just pure business calculation.

A: There is some research from Lincoln University that says you have got the lifestyle companies and you have got the survivors and you have got the more entrepreneurial or innovative guys. Apparently, your partner is more entrepreneurial, so he is scanning markets for opportunities, probably does a kind of risk assessment and then thinks let's try this one...

M: Exactly, and if the things pay themselves off, it's good.

A: And other companies have perhaps for decades been working with conventional tools and perhaps their employees do not want to use new technology because they think it's dangerous or they do not know how to handle it. And probably your partner's or his clients' employees are willing to try something new. My guess is that only a small part (perhaps less than 5 % of all firms) is entrepreneurial / innovative and is pro-actively looking for something new. That is why such companies would be member of the New Zealand Green Building Council or that you see them winning innovation prices, or you perhaps do not see them or you hear these types of stories.

A: That is why it would be interesting to see how they how actually do their stuff, I have got that very simple procurement process in 4 process steps [the Van Weele procurement process model] and I have got a very simple innovation process in 4 or 5 steps. Of course I would be interested to know [shows the model] when you are here, how would you evaluate this sand or water blaster before the bought it. What are key activities here, did he go to trade fares or did he watch demonstrations, or else ...

M: No he did not; he just saw a need for it. He saw what he could do with the equipment and he thought that it would make his work faster and it would give him more opportunities as well because he can, and he has more options of what he can do...

A: So he cuts in time and in waste that's good.

M: Yes, but he also got some of his own ideas he has got in terms of engineering. He has practical ideas and little things that he could do even with water guards in the pipes on your roof. He knows many things are and know how much people pay, but he also knows technology that might be relevant for New Zealand but not available. So then he found a contact in the United States for a dirt guard for the gutters and he was thinking of importing it but then a major DYI chain started importing it. So he found out that this DYI chain was already on the ball, but he seems to be open for things like that...

A: that`s interesting. Does he search or scan the Internet? How does he do that: does he have a problem and then tries to find a solution? Or does he see some technology and then tries to find an application?

M: For some reason he has a very keen mind where the problem really is. For example with the dirty guards in the roof he found that the leave size matters because sometime when he needs to clean the gutters he noticed that some gutters work for certain trees because of the leaves and not for other leaves. And then he says there is a product and that works for leaves of those trees. Another strange thing is that nobody else had those thoughts in New Zealand and that everyone goes like the companies have everybody does what the next person does like Mr Green there is no innovations in lawn mowers or anything it is just so ...

A: But he does not actively scan the overseas market for finding products if he can find an application for it here...

M: I assume he does search the Internet on a simple way of putting a product and then see what other companies might have on offer to look for cheaper alternatives to cut the price right but also effective, but if he gets something that is cheap and more effective he goes for that.

A: Any idea what you would do as part of this research?

[29:25]

M: Personally I would find it very interesting to see how New Zealand companies succeed overseas right? Procurement, for example like how did the logistics company Mainfreight go overseas? They started with one office and one home truck and 20 year later they are overseas. Another case would be Fletcher's: how did they manage to get out New Zealand. We used to have a lot of potential with the furniture companies like IKEA, right? They just grew I mean [*] they were in Germany already like 30yrs ago with the concept and everything; they are in Australia as well. The only reason why they didn't come into New Zealand is because the local Kiwi businesses complained that IKEA would smash the price of the products but when you look at the IKEA furniture they do its overprized. So there say protectionism in the New Zealand industry which stops [*].

A: They say that it is an open economy, but I have heard this story before. Are you sure that this is the way how it went?

M: I have not read anything about it, but it might be interesting topic. Of course, you are more interested in how businesses attract or import innovations into the country... [Non relevant part of the discussion deleted].

A: So what is the size of your partner's company? New Zealand is stacked with small SMEs...

M: Currently he has 2 employees and he partners with a contractor. Our expectation is that next year [2016] we can attract a lot of work, so he has to find good contractors with good staff who have a certain amount of loyalty and who do the job on time and with a good quality. Good staff is very difficult to come by, the current contractor works very slowly. He does some good work but that cuts the profits even for him if you have something that should take a day and choose to take a lunch and he works for 2 days and then the profit will be split over two days that reduces the amount of money he makes. That means at the end of the day he only goes home with about a 100§ which is stupid because he if he comes on time and works efficiently, every day he could go home with a 1000§ or 500§ relatively easily. Making 3000§ dollars a day is a lot of money in

construction. More than in Europe. As a contractor or construction worker in Europe you do not get a lot of money. It is like a brick layer – you would not earn that much money as you would earn more in a European office job.
A: As a subbie [sub-contractor], you can make more money here?
M: Yes, a lot of more money. I have heard of a university lecturer, who stopped working and he got a plumbing license and became a plumber because he could make more money that way. It is sad...
A: I do not know if it is sad it is just a fact of life.
M: It just depends what you want... As a plumber it is not as exciting as doing research ....
A: Some academics do not like research at all.
[Non relevant part of discussion deleted].
M: But when you look at companies who buy these high-tech patented innovations ...
A: They would probably not use the word procurement. They would be talking about technology transfer or licensing and that kind of words. It is a different vocabulary and it is a different type of profession I guess.
M: But for example if I would have a chair that would have a different hydraulic mechanism and it is patented? You know like the office chairs that go up and down. Then if a different company buys such a chair in a retail store they would buy the innovation as, well wouldn't they?
A: Yes but you buy the innovative product and that is already tangible.
M: Indeed, you would not buy the patent itself, so the interesting thing that would be of those companies who would buy only the patent or the know-how.
A: You would buy or licence [get access to] a bundle of intangible assets: the production capacity or know how from that firm, the brand and all of that kind of stuff...
[53:24]
M: When I start in my friends company I will have a wage big enough because I will get part of the profit because the company is so small. Is a good time to go in if it has potential.
A: That is where your MBA thinking helps I guess.
M: yes just to make sure to get further in the business so it goes to different stages.
A: so when do you want to start then with the business.

[Non relevant part deleted]

[1:08:40]

M: It would be interesting to see what your research brings. It also could be interesting to compare New Zealand with other countries such as Brazil. I know that Brazil has lot of bribery, so it could be a very dissimilar situation to New Zealand, although in both countries a few large companies absolutely dominate the construction market. Or perhaps you have a similar structure as here, which is just for speculation. It might be possible to compare with different countries of the same size, for example Croatia, Finland and Denmark. But the thing is that Croatia is completely updated with German and Austria's industry. Finland has stood their own ground they have had Nokia but they are still very close to the European market. So exporting and interaction with bigger markets is really easy.

A: Europe is one big market of course, not with a currency difference etc.

M: It must be a country like New Zealand that is quite isolated.

A: But that depends on the data or literature available. It needs to have relevance for New M: but how does this fit in the picture here.

M: Back to that patented chair? What does fall under procurement of IP?

[1:10:50]

A: if they develop their own IP and they could try to sell that to their own company or to their own suppliers and they do not have the manufacturing capabilities to manufacture that chair.

M: I mean licensing in a way: I mean if you pay royalties that would also be procurement in a way on a wider scale?

A: Yes, could be. But I define procurement as an invoice being paid to another supplying company. That is a very simple definition. Otherwise you would call it partnering or joined ventures or something which I have excluded. It would become too difficult and even inter-Fletcher procurement I do not see as procurement. But if you look the inter-Fletcher definition on procurement or what the Johnson book gives on procurement, they do not

include that financial aspect of an invoice. I have borrowed this notion from a Dutch professor Jan Telgen. He stated there has to be an invoice and that is my boundary. So if they receive license fees for only intangible assets to me that is not procurement.

M: but when you pay it, that is procurement...

A: Yes but only if you pay for the patented chair to sit on, to me that is procurement. Or you pay for the man cleaning the floor, with a visible result on a tangible asset. Or you pay for a consultancy report on an innovation strategy... Somewhere there could be a thin line of course.

[Some text deleted]

A: I will stop this interview because the battery is almost empty. Thank you very much for this interview and all the other interesting stuff.

M: Was nice to have this discussion. Hope it helps you in your research.

INTERVIEW # 3
With a marketing manager of a precast concrete manufacturer, Auckland.
Date 11DEC2015, interview held at the factory premises, Auckland

A: Thank you for allowing me this interview.
P: You're welcome.
A: My research is actually procurement research and I am involved in research in The Netherlands on how SMEs procure their goods and services. One can read lots of stuff on how large companies conduct their procurement activities but there is nothing on how SMEs do this. They only thing that we know is that procurement is done differently and you do not have the power to do your supplier negotiations and have all the fancy stuff that large companies such as for example Philips or Fletchers' have. So you have to manage your supplier base differently.
P: I used to work for a large New Zealand plasterboard company somewhere around the corner and we preferred to run with one small supplier long term, not necessarily the best prices, but as long as the quality was there.
A: That pays out in the end.
P: Definitely. Because smaller suppliers look after you more. They've got all your business. [...] Not talking about e.g. resin suppliers or paper suppliers that have big volume - that sort of industry.
A: Indeed, for your commodities you go for your lowest prices of course. But if it's really important for your business...
P: But even the commodities we were using on the crap paper of the board wasn't the cheapest price. It was the best quality of a reasonable price, delivered on-time.
A: You use that in your product, that's different I guess.
P: Yes.
A: But then you do not use pens and pencils in your product.
P: No. That's the difference.
[3:00]
A: And do you use a lot of suppliers for this light concrete product of yours?
P: No.
P: What happens here is that we sub-contract the concrete manufacturing to another company on our site. We rent some space out to a concrete batching company. And before the company moved on to the site we used to do everything. Make the concrete etc. But it is easier to concentrate on one thing that you're good at, rather than have to worry about all those other aspects. Getting the cement and mixing and probably having more staff doing that, running trucks and that sort of stuff. So, we are buying our concrete with a 10-minute delivery out of the factory to our site. And they supply other people, builders: for floor slabs but not to other pre-cast companies. That's the deal. They've also got another plant in East Tamaki (Auckland) and they are putting another plant into New Lynn (Auckland). So, they are an independent company whereas the major concrete batching companies [company name A] and [company name B] control and screw. Whereas this company we deal with, they've recently started a company to make their own cement which is a fingers' up to the big companies A and B duopoly.
A: And as they are on your site and you cooperate quite closely I guess.
P: It is virtually one organisation.
A: Totally integrated.
P: That's great.
A: Both with their own payrolls?
P: It is a separate company based in Hastings.
A: You do not see that often in the construction industry I guess
P: No. And not for the length of time either.
A: So who came up with the idea then? Was it them, or is it something. .
P: I think it just happened.
A: It just grew gradually?
P: Yes.
A: You see that in e.g. the automotive industry where you want to have your suppliers on-site, your key suppliers.
P: The problem is that the automotive tends to close it down occasionally. And the guys that are sitting there have their heads cut off.
A: Have no other customers. But at least your supplier can sell to other companies. So that is financially more robust I guess
P: Yes.
A: That is a clever thing to do. When I worked for a small Philips plant we did this with a Norwegian raw material supplier. We were very integrated, and had better supply lines that with the US dominant monopolist. But then of course we still had the physical distance. That was quite unique for this type of Philips plants to do this. We helped him twice with a bankruptcy

P: Cool.
A: You need trust and long term...
P: Yes. You need give and take.
A: So the reason they are now in the position to make their own Portland-like cement you say...
P: Yes they are bringing in new clinker material from Malaysia. You know, clinker is the semi-processed raw material before it is ground. It is ground to make the fine cement. Clinker is silica sand that has been blast-furnaced and it comes out in lumps. And then they grind it very finely to make the cement.
A: And why do not they grind it over there in Malaysia
P: Because it is cheaper to bring it in as a raw material (for tax reasons), and it is better for the quality of the material to grind it here. Moisture has less impact.
A: Yes that sounds good. Is your organisation in any way involved in this?
P: No. They've got another couple of shareholders.
A: But at least you know.
P: The quality of the cement is as good as Portland cement. It's a standard. It complies with the requirements.
A: So you will not do any testing on the new material.
P: We've used it for the last 18 months. Before that it was tested.
A: But not via you via BRANZ or something.
P: No BRANZ wouldn't be involved in this sort of thing. They brought in an independent chemist to develop it. And then we do trials and that's good.
A: So how do you do your trials then? Have you got knowledge and equipment?
P: Yes we have got some of the right people here. And one in our key supplier behind us – they've got a chemical engineer or something. So they really know what to do.
A: So in part that is again trust. That's great. [POST-HOC REMARK: inaccurate reply to I!]
A: So that is an example where a supplier of you innovates by bringing in a new raw material.
P: Yes, as I've said the duopoly in the market company name A and B. They just keep pulling their prices up. And officially they might not talk to each other.
A: But in duopolies you always do.
P: And what's happened with [company name A] there is that they are importing. They used to have a plant in Greymouth on the west coast. And recently they've decided to get away from that. And they are now importing from one of their plants in Asia. Because they are one of the biggest in the world. They are based in Europe somewhere and have decided to stop manufacturing in New Zealand. And now bring it in in bulk or bags. I am not sure how they do that. So they are putting their tin [factory] somewhere in Auckland (North Island) and another one somewhere on the South Island. And [company name] now is the only New Zealand manufacturer. This company is vertically integrated. But recently they've got a computer-operated batching plant in the City (Auckland) and they put out a month's worth of concrete in a lot of the infrastructure projects. They discovered that the hardened concrete only had a third of the strength it should have had.
A: Wow. That's a lot of production.
P: Now they are ripping out parts of buildings, retaining walls here and there, and all sorts of things. They are keeping it pretty quiet, but this is costing a lot of money. Heaps.
A: Yes you can automate what you want but you need the common sense as well I guess.
A: Can you tell me more about this product here where you clip it on. And if you do not want to tell me that is OK of course.
P: We cast these steel wall plates on the back of concrete panel. It is a typical pre-cast method for panels. I will show you an international example of fixing from the book. Nothing innovative.
A: Did you need any special construction to hold the panel as the concrete has less strength?
I: No, it has less weight to hold it upon the building even though it has less strength. So that compensates each other. This is only one of a wide range of plate type things. Some of them have a long bar attached and going up to the panel.
A: You source these from Asia or something?
P: No there is a company up the road who makes all these sizes. An engineering company.
A: Is it that you prefer to source locally if possible?
P: the problem with sourcing internationally is that you do not know what sort of quality you get; you know there is reinforcing steel coming in from China which is supposed to be documented in terms of the quality to an international standard. And all the material we get locally has a tag on it, stating it is made to a certain standard. The stuff coming out of China - you do not know what you are buying. So we tend to buy from reputable steel suppliers locally. It is not all made locally, some if it is imported but they import from a quality manufacturer offshore.
A: Yes and they give you the guarantees that it is OK
P: Because liability is enormous.
A: Yes you have your direct and indirect damage and they will want to try to sue you for the indirect damage as well.
P: Yes.
A: It can be a tough game.

A: So you source this product locally (here in New Zealand). But at the same time your company allow its key suppliers to switch supplier and source clinker material in Malaysia…
P: But they source from a reputable company.
A: OK. That is the difference. You know they are reputable.
P: It is a large cement manufacturer based in I think in Malaysia.
A: OK. How then do you determine whether it is a reputable company, whether you can trust that company? Is that just industry knowledge?
P: Oh yes, definitely.
A: That is past experience from a competitor etc.
P: It is not a very big industry.
A: Everyone knows each other I guess.
P: Yes.
A: Are there other companies or regions where they use this volcanic pumice?
P: No, no one else in New Zealand. The technology is available, but we are the only people that have taken the time to invest a lot of money and develop systems and testing and all that sort of stuff.
A: That can take years I guess.
P: Oh probably 2 or 3 years, basic testing [*].
A: This is how you started, with the conventional concrete?
P: Yes. The company [name] has been going for 52 years. And we started developing the lightweight system about 11 years ago.
A: Are you still developing or...
P: Yes it is an ongoing process. We are looking at trying to cut down the width of the panel and look at other options as well.
A: OK and why is that then, so that you can be flexible in...
P: Yes because the further south you go the more insulated the panel has to be. The volcanic plateau of the North Island has a colder climate zone (class 3; the same as the South Island). And to supply into that market - our panels are 3.30 thick. We do not get any business there because the current panels are too big and they cost a lot of money to ship. So we are now looking at an option of putting polystyrene in the panel. They do that in normal concrete but we get thermal bridging around the edges. We try something different…
[specific company information on this development deleted].
P: Yes. We are currently undergoing a program - with a government grant to help us along the way.
A: Polystyrene is being used in conventional concrete.
P: Yes we make conventional polystyrene panels. That's bigger in Europe, for commercial and domestic applications but...
A: But you do not want to add any cladding from the inside with an insulating material?
P: With the residential markets the 2.80 thick panels. Once they are finished all you have to do is to finish (paint) them. Whereas with standard precast you have to strap and line them and put timber battens on for framing and insulation and then plasterboard. But in doing that you are mitigating the benefits of thermal mass. Its ability to store energy and dissipate it through the wall into the house. Because the insulation is doing its job of keeping the energy inside the house. Whereas proper thermal insulation it is able to change in cooler and hotter times.
A: OK. Coming back to the supplier on your site - have you got a detailed contract. As larger organisations would do that … or have you got a kind of gentlemen's understanding?
P: We are currently buying it from a product company [name]; they are one of the bigger concrete additive suppliers in the world. You name it. We just have a trading account with them. We just purchase it.
A: So you are the marketing manager but also the procurement manager here.
P: No I do not do the procurement. Does that affect your research...?
A: Then you can speak more freely about the quality [laughs]
A: OK. I've heard of that one and try to understand this technically. And so you have a government grant...
P: It's from Callaghan Innovation part of the MBIE ministry.
A: Indeed. And do you use partners to develop this new material?
P: We use partners to test it. University of Auckland, OPUS in Wellington and that sort of organisations. And an engineer working for me for the past 14 years, and he is an expert in concrete and cement. He's a big advantage for us to look into other options. Whereas a lot of the precast companies just make precast and ship it. We look for developments and things.
A: Yes indeed. That is one of the reasons you are a member of the NZGBC / Prefabnz.
A: Coming back to the polystyrene. Is it an ordinary quality?
P: There are a couple of options with high or low density of the product.
A: But you do not work with a partner on this one, it is just...
P: No we just buy it. We're also looking at this other product, expanded phenolic resin from a large European company [name].
P: The advantage of this other product is that it takes even less moisture than polystyrene. And this aspect does not impact the strength. Just initially it dries out eventually. But in terms of working with a product this is a

better option than polystyrene, so we are testing both. This [Company name] in insulated panels is big in Europe.
A: So you are looking to (past) developments in Europe or materials that you see they are using in Europe?
P: Yes although the only reason we are using it is because the company that imports it, and we would not have gone over there to get this.
A: No No. But you would have known via the Internet of trade fairs?
P: When I was working at [company name A] we made some - we used it for treating craft paper. And our lab people trialed some and pressed it. I did not know what they were talking about at the time.
A: But now you know.
A: OK. Or whether it is this or that material your [company name] will have a normal contract with these suppliers once you are up and running?
P: Yes when we decide which one we are going to use. There is only one supplier of that material, but they've really shaved [*] the pencil when we were discussing things. Because it's being used in precast in Ireland, funny enough, as an insulation product. But they've never had anyone in New Zealand interested into looking into the option. So I think they are probably keen that we get involved.
A: I guess so.
P: The other advantage of that one is that we can use a narrower panel to get the same insulation value as a thicker panel. The R insulation value is better.
A: Either you decrease the width or say it has better insulation properties.
P: We haven't yet decided on what material to use.
A: And any fibrous material?
P: We use polypropylene fiber. I will show you an example. You can see it here sticking out of the concrete product around the edges. Like here. [Indicates amount per m3]. The fibers help reduce shrinkage (and surface cracking) and help with finishing cement with trailing and stuff. And they provide small conducts in the material in case of a fire. Any moisture in the panel can then escape in case of fire as the fibers melt and leave the conducts in the panel. Whereas normal concrete tends to explode in a fire, because there is always moisture in concrete. No matter how old it is. And also if you are welding near the panel, moisture can escape. In normal concrete pieces will break out with welding. We also applied this in the Victoria Tunnel. This use of fibers came from overseas, not made in New Zealand. Four distributor companies supply this in New Zealand. We've changed the supplier a couple of times but it is basically the same product.
A: [pauses] Where is that supplier on your site? Have you got a detailed contract like large organisations would do that or do you have that kind of gentleman understanding?
[27:08]
We're currently buying it from
A: Coming back to different roles. So you're the marketing manager and also the procurement manager yes?
P: No I don't do the procurement
A: you don't do the procurement
P: does that affect you, [laughs]
A: you can talk more freely about the quality of procurement I guess? Not mentioning the name of the guy who does it, do you see differences in how you approach your customers compared to how your organisation approaches supplier?
P: yes
A: So, where is the difference then?
P: Well I'm a marketing person and for me a customer is always right.
A: and the procurement guy says I'm always right and the customer is not always right
P: Yes, that could be right: they are more numbers-orientated than customers-orientated.
A: Yes, but then I guess what targets you still need and how you define success in your organisations, if you say I want cost savings of 5% this next year and the year afterwards, you will get a different guy.
P: Yes but you can still communicate with people in the right way, it doesn't need to be like this.
A: But I guess that is the same of how your customers react to you I guess?
P: I was just about to go and say that, but if I put myself in someone else's position and look how I would react and that how I've basically worked with my business over the years. It is that you treat people how you want to be treated, and often that doesn't happen.
A: these are two different world the procurement guys and sale guys.
P: it is not just procurement either it is most production-orientated people
A: yes, I guess so
P: and accountants even
A: or guys in logistics
P: a lot of the problems that a lot of accountants run businesses and they're more concerned with numbers than with customers in my opinion. However, the customers keep them in business, and some people don't see that. If you haven't got a customer you do not have income.
A: you can't have a very nice department or company etc. I discussed that with an engineer the other day. He said he liked a factory without people.

P: That sounds wrong, that's another thing I mentioned: in the housing market every panel is a different size. Where our factory people want all panels of the same size.
A: But that is a normal conflict with marketing sales and operations I guess. You will try something new with your customers and operations will say we can't make that, we don't have the skills or we don't have the machinery or we don't have the time …
P: Correct. [Shows a model]. This is a 3D printing of some panels of a job were doing for a local council. These panels are 8 meters by 1.5 meters. We've got some pictures on our website.
A: so that will change business enormously, 3D printing [posthoc: modeling] I guess?
P: the client will have a good idea of what he is going to get and it gives the supplier who makes the mold down the road a good idea of what he is going to do.
A: So, this is a model? How do you use that vertically?
P: these are replicating 8m panels going on the building showing surface textures, and with this sort of thing is different to our normal flat panels in the factory
A: so you will say this is going to be complex
P: yes there are ways around it you put pieces of little rubber made to that design on the mold and the concrete comes away, so this product has got us into more integrated parts of the market but also forcing people to change the way they do things, rather than just flat panels, anyone can make flat panels
A: one day they will start imitating your product and you need to be ahead of that product
P: Yes. Of course and if we wouldn't have had this product we wouldn't have gotten this job which is worth around half a million dollars
A: yes that is a lot of money
P: so it's ok for people in the factory to say it is too difficult. But this product is extending our business into markets that we didn't have before …
A: but profile panels… When you drive in downtown Auckland you see these profile panels on the viaducts and what have you done esthetically is nice. How does that work? Was the resistance internally…?
P: But once you do it, operations people say it wasn't so bad after all [laughs]
A: because we people are afraid of change, I guess. So Ok, so what makes him/her a successful procurement guy in your opinion, what should this man/woman have if he tries to help with innovative stuff to do with your customers?
P: It's on time and on the right price
A: so it's on time and price that is numbers …
P: Yes
A: and does he do any scouting on technology, or does he try to find and evaluate new suppliers…
P: yes, although as I have said before we don't change a lot. Like the guy making our engineering requirements: welding plates and other connections. They put like an other precast company like this. They will bend over backwards to do something quickly and if we have a problem they will give us first call, which is really good…
A: I read that one, when an American automotive company has a problem with a supplier he sends out his lawyers. On the other hand, when Toyota has problems with one of their suppliers they sent out a bunch of engineers to help the suppliers analyses and fix the problems. My guess is that your company uses more of the Toyota approach
P: I guess I think it all comes down to people. The New Zealanders are a bit different than the Americans, aren't they?
A: Yes, but we tend to have negative relationships in the New Zealand construction industry …
P: Of course, but not as bad as the Americans, I think one of the main things here is the Accident Compensation system (ACC) here in New Zealand.
A: For the coverage of cost in case of accidents?
P: We do not have all the legal suing. For example, if you fall over in a shop you can sue a company for millions of dollars
A: Or the microwave that didn't state on the front door: don't dry your dog inside. So, it is a long-term relationship and give and take and the persons in the factories talking to each other: the logistics guys or operations guys.
P: the whole thing
A: it is virtually one company
P: and other supplying companies come along and say can you buy some of these, we get Chinese people all the time supplying all sorts of connections things, which I don't worry about.
A: unless the gap in price becomes too big?
P: No. It is more reliability. Just like company [name B]. These guys have a whole range of lifting material to lift the panels out of the molds and clutches for putting it on the truck. Whereas the engineer guys make these kinds of things because they're all different sizes etc… All this lifting gear is all standardized, so we deal with one company for that. They used to be a small company, but they got taken over by an Australian company. Since that happened the stock control has changed a bit: they don't carry as much stock as they used to. Because the Australians are more keen on the money in the stock plus they have got a recession over there, which means that their stock there is low which means they think they need to do that in New Zealand too, which is not the

case. So we work very close with them, but not as close as with the concrete supplier and with the engineer. But we have dealt with this company for years since that company was a one man band, and now that they have been taken over we still deal with them because they are probably the best deal because we are probably their main customer in New Zealand.

A: there is also reliability?

P: yes, and everything is tested to international standards

A: they pay for that?

M; yes, they pay for that, they probably get stuff made in China but they oversee the manufacturer, so its quality in the material

A: so, the risk is with the supplier here and you trust the supplier. There is a level of risk

P: We did a lot of work in Eden Park when it was redeveloping, and some of the lifting iron was rusting. And they traced it back to whatever it did, and they just had to replace it.

A: so there and manufacturer and also a distributor?

P: yes, you may have heard of a Company [name C]. They sell these electronic nail guns to shoot nails into concrete. They use it on building sites, they have a little 22. caliber gun and they use that to shoot things into concrete; well this company also owns the Company's [name C] brand.

A: I guess you would not shoot it as easily into this one as into that one because this concrete would be harder [looks at a sample on the table]?

P: the requirements for this product are different than the requirements for this product: different type of nails

A: so, it's not a chemical type of bonding is it? Just physical nails?

P: yes, but sometimes we do use chemical products. Have you heard of true bolts, like expanding bolts in concrete which you can then tighten up? We would recommend chemical anchors, so you drill a hole, put some adhesive in put the threaded rod inlet it dry and then toil it up, because there is less strength in this it has an different […] than that one.

A: you don't have extensive contracts, because in Philips I had these types of contracts with20, 30 or sometimes 50 pages. But with that Norwegian supplier we just had a set of emails and that was it.

P: that is probably what we do, from these guys we get a letter saying this is what we do, this is your discount for all these products for such and such, same with the guys which we buy the reinforcing steal from they're the one we deal with most tends to be a small company who is growing and gives us the service lot you wouldn't believe.

A: did these two companies grow with your growth and your success?

P: I am not sure. It could be yes, because we tend to start with smaller businesses, you see large Company D has a reinforced steal supplier. They visit us once a year; we give them a bit of business and it falls apart, bloody hopeless. It could be that they look after their own building companies first because building sites use a lot reinforced steal in concrete as well as precast.

A: I guess that if you do precast your reinforcing steel company will have to deliver different batches than if you do full things, so will they help you? How does he do that? Does he already deliver you the steel mess or steel bars and whatever?

P: we get the bars and they're bent to whatever we need them for and our guys make them.

[43:35]

A: and you have got a sort of gunner [*] or something?

P: Our guys do that in the factory because they're all different sizes etc. for every job, different thickness for every rebar 12-32…

A: so, they cut it and bend it.

M; also ship it for every project.

A: and then your guys do the clipping and use the clipping gun or the traditional wiring? Why do you use a clipping gun?

P: because it is around 10x faster, because it is only to hold it in place it is not a structural tie

A: only to cast it? And keep it in place?

P: yes

A: and these clipping guns are they available on the New Zealand market or were they imported from oversees

P: they are imported from oversees

A: but they were available here

P: yes

A: so that's bending in length is also integration of your planning I guess

P: yes

A: so how do you do that? If you don't have expensive software packets of something like that?

[45:50]

P: We get architectural drawings from architects and engineers, and we convert them to shop drawings. Once they are shop drawings we know all the steel that is required for each panel and for the whole job. And often for a big job we will give the drawings to a supplier and they will give us a quotation for the whole job. His guys will work it out. But as for smaller jobs we tend to estimate and swing them around about, we have justgot a job recently for an maximum security prison and there is 1576 panels in it very intricate y shaped panels. that stand

up in a y shape and the floor goes on it comes out as a big honey comb so for that sort of thing we will need to have an quotation that is very accurate down to the last centimeter because of the size of the project, for the smaller ones we tend to use the rates and for the bigger ones we will get the company to quota it for us.
A: would that make a difference if it is tendered by commercial owner instead of the government?
P: no, we do the same job
A: And these guys will not require you to do BIM [Building Information Modeling] or something.
P: It is coming, but it's a long way of even in the UK it is there but not good enough that the whole industry is infected by it.
A: it will take a decade or something.
P: if that gets established we won't have to change the engineering drawing to fit the credit flow [*] for our manufacturer
A: perhaps you don't want that because those drawings is the value, and knowledge gone
P: it's Is also a hassle because shop drawings take long than the panels to make with some jobs, another problem to is that we have our own drafting guys for the shop drawings and there is a pool in the market for independent guys when things are busy you have to use the independent guys as well but when it is not-so-busy there might be enough to do for all the guys out there as well. So there is an trade-offs of how many to use for full employment and how many to use for overflow as well using independent people as well, now it's so busy that we wait 3 or 4 weeks to get hold of an independent guy, that is the one stumbling block in the precast industry: enough shop drawing people, I have just got an order for a job on the north shore for the district a health court it is an administrations building. What is unusual is that the health court has given me a letter of intent, so we can get the shop drawings on the way before the main contract is started. Because it is going to save them 8 weeks or so.
A: so, what if you don't get the main contract?
P: we will get the main contract because we are the only guys that make it. But even though we are the only guys that make it, it is still the same process as there is for the standard products which is to get the shop drawings finished on time, because we can't do anything without the shop drawings. And the customer has to sign them off as well, so what we do to have a set of drawings showing every panel with all the dimensions with all the holes required for surfaces etc., and then the customer has to sign them all of after that is done and we have made the panels he owns them, even if we might have made a mistake.
A: ok so you transfer the risk with signing off?
P: yes, we try to encourage in some of the residential jobs we deal with, to give us an order even with drawings before they go to building consent because it is going to save them 3 or 4 weeks maybe.
A: yes, but then there is the risk that the drawings will not be accepted…
P: Then we can make some changes which a problem is not but normally the Building Consent accepts it: councils like precast concrete because there is not liability on them, like leaky homes and all sorts of liabilities, precast concrete is no liability on the council they like it.
A: Why is it no liability on the council?
P: Because there is nothing to rot… [laughs]
A: and it meets the fire and the other building codes
P: and if you do get a leak in a residential precast you get the water off the floor and replace the seal if it's gone. Instead with leaky homes of timber, you have to take the whole house down
A: do you do the construction work yourself?
P: No, we make the panels and deliver them to site
A: You are the main contractor and another guy does the assembly, so if he would be liable if he needs to mop the water away like that…
P: we are partly liable for problems with the panels or inside the panel. We use a set of partners for the assembly.
A: I have learned a lot so far.
P: we had a bad batch of pumice from a supplier. We have changed supplier now, and that caused us a lot of work to the amount of 140,000 dollars
A: why was the pumice quality bad then?
P: Wrong grain size. Because they did not carry out quality controls we got too much of the fine stuff in the pumice, and the panel started shrinking and big 4 mm cracks came in the panel.
A: and that impacts the strength and the esthetical aspects of the panel?
[53:50]
P: yes [company name] is the biggest company with all the quality control etc.
A: we all make mistakes I guess…
P: but they denied it, we got the information and the material from the material and all the other things I guess.
A: so, you take test samples
P: yes, we make test panels of random piles we got some money of them in the end, but not enough to get even it back
A: not even your direct material cost?

P: We got a bit more than that: but the cost for literally rebuilding one house was a big cost. And what we do is first fix it then argue about it
A: I suppose it was bad for your company's name? And you got an email and pricelist from the supplier no major contracts?
P: No. formal contracts.
A: Because it was a commodity?
P: We started to deal with them years ago another small company, but they grew like everyone else. That was part of their attack on us with their legal attack because we did not have anything written down. But they took our money all the time when they shipped us something.
A: at least under Dutch law you would have got a contract.
P: I was a contract: the moment you buy something and pay for it that is a contract. They didn't see it that way afterwards, but they did whilst they were shipping it. That's just corporate lawyers and Company [name] that is what they do throw money at it and it will go away, it was small, and it got bigger all the time and in the end we cut our losses and switch suppliers. They have closed that mine down now.
[57:00]
A: so, you are experienced in this kind of legal hassle
P: we don't need all of this legal stuff.
A: sometimes you do
P: yes, but at the end of the day everybody loses and the lawyer is making the money. Anyway
A: So far, this has been a great interview.
P: our next major supplier is our trucking company, and it is the same scenario. The guy running the trucking business has coffee in here for over twice a week or something, and it's like that. And they supply the service to other people as well, but they tend to look after us.
A: is that a large trucking company.
P: Yes, it's called [company e]. They are the only trucking company which can handle our volumes. But that is not the only reason that we deal with them another reason is that we have got a long-term relationship with them, and their company has been taken over by different companies, but we still deal with the same people, the company is now owned by a company [name]. They do international freight forwarding and all sorts of things, there not an international company but they do international freight forwarding things etc.
A: That is the best thing; the truckers share the coffee with your people and discuss problems I guess as well
P: they still make a profit out of it, but they have got a long-term deal as a part of our volume is dedicated to them
A: again, you're the major customer.
P: In precast concrete yes, but they also ship big machinery. For example, when a company is shifting their manufacturing plant to a new building? They do that as well. We get people coming in regularly from other trucking companies, but we are quite happy with these guys.
[1:00:50]
A: That is again on the quality and relationship. Great I have got no further questions.
So, what I will do I will make a summary of the interview. I will give you the summary of this one and if you're interested I'd like to invite you for a round table discussion with all the people I have interviewed and some other industry guys. That will be at the university, somewhere after March 2016. It can't be totally confidential although people will sign a confidentiality agreement. Participants are should not discuss any confidential information with each other. Everything that I write down in the interview summary will refer to as a major or national supplier or whatever, I will not use that, otherwise that would not be good.
P: because we have signed an agreement to not divulge anything
A: For instance, here I have said here a large company.
M; they're the biggest actually the biggest in New Zealand
A: So, if you would be interested …
P: it is actually good to look at this to talk about this and see how much it depends on personalities and such
A: I think so. My guess is that your company is an exception on how you manage your suppliers. But I don't know that you put much more trust in your long-term relationships, in Philips we had this time schedule trying to regularly switch or renew contracts with suppliers except for the very special suppliers
P: I think in Europe they are like that aren't they? Most of our raw material comes out of Europe, they would fly in and try and sign a contract for 3 years
A: When I was in sales I did 5 to 15-year contracts. Why do you think you should be in business for 10 years I'm not a hunter I'm more of a farmer I guess? Good I didn't have to use this one I didn't have to use all my questioners
P: so, you're getting all types of different parts of the industry to talk to?
A: yes, mainly manufacture based
P: our industry is quite small in the scheme of things not a lot of businesses
[1:04:00]

A: I am mostly focused on innovations that have an impact on the environment like this one it is a green tech innovation is how I would describe it, I pick guys from the Prefab New Zealand website and the guys from New Zealand Green Building Council. I try to approach them for an interview.

P: how many will you end up with …

A: 2 before Christmas 2 or 3 next year and then a round of table discussions and then maybe another round of interviews or a survey. The survey is could be quicker …

P: do you find you get responses from surveys always fill them in. My wife can`t be bothered: I always tell her nothing is going to change if you don't give them your opinion.

A: yes you're right but then if you try to do a PhD you have high requirements on the quality of your survey Of course it is different than doing an survey in the herald, so that will be a struggle to get enough people responding, then an interview is easier you either get refused or you know you get good data like this one or bad data, but the quality check of this is easier this is an hour it is perhaps 10 pages of text

P: My wife does transcribe for the police I tell her to give it away.

A: I couldn't do that but then say you have 100 pages of text then you try to find what you actually find.

P: she was saying that an hour of material takes 80 hours to transcribe because there are people visual and people talking. .. There are people saying things etc., and then you can't hear it and have to rewind and listen again, and they all have nicknames and all sort of things. It is crazy.

A: That will take me some time to sort that out. I wish you all the best with your company. Thanks again.

P: Thank you, it was nice talking to each other.

INTERVIEW #4
With franchise owner/director of an insulation material supplier and service provider.
15 December 2015, at the premises of the case company, Auckland, New Zealand.

N: Is it recording?
A: Yes, it is recording. Thank you for allowing me this interview.
N: For any information you need, perhaps it is best to discuss the different ways we market our products. Maybe I will talk, and we will run through the different channels. And as I said to you earlier on a lot of what is happening now is largely dictated by history.
A: yes
N: And so, it is how we change perceptions based on history. Whether it is accurate or not to create opportunities for growth. So, if we think about the purpose of what we do with our company: the purpose of what we do is to grow a sustainable presence of ourselves which means it is a business which provides products in a repeatable manner which is profitable, and we can keep growth on our share of the market.
A: yes
N: Let's try to explain our business. So that is our broader view on business sustainability. So why are we involved in insulation? If you look at building products, there are two things happening in insulation which are driving demand: one is the increase in consumer awareness of the importance of energy efficiency and comfort in everyone's homes for existing houses. So that is something which has changed in last 5 years in particular in New Zealand. It has been a dramatic change in consumer awareness and that is because there has been the subsidizing insulation program. So now they have rocks in their heads or else they are death dumb or blind not to know that insulation is important in your house. Not only for energy efficiency but also for the health benefits. Of all the countries in the world, New Zealand is probably the biggest in drive with the health benefits of having a warm dry house.
A: if you see the amount of New Zealand kids having asthma, et cetera.
N: Correct we have got a very high level of asthma compared to the rest of the Western world. And that is because we live in cold houses. So taking your house as an example, you might not have insulation in the walls.
A: Correct.
N: and might not have something underneath.
A:My landlord installed some last year, but probably only five centimetres polystyrene thick.
N: yes
A:but it is enough to keep some of the cold out of the house.
N: So you can see that there is a vast stock of existing houses in New Zealand that need to be upgraded. So that is one driver which is driven by legislation for homeowner and tenancies of rental properties. Now that is coming through by minimal requirements on insulation declaration for residential tenancies and also just a general awareness in people understanding" I could warm dry and healthier. So those are if you look at Maslow's hierarchy of needs: it is the basic requirements of human life to have a warm dry house is not it?
A: Yes, I would say so.
N: And that has become more important. Then you have got the new construction work, and there is 2 levels of residential construction of human habitation I guess perspective. You have got the levy requirement zo it needs to meet the building code and that is the minimum. And then you have got designers/ architects/ homeowners who want to have a house that performs well. So by building the house by the building code does not literally mean that the house is going to perform well. So the house built by the building code are just reaching minimum standards and those standards are for the world are quite low. That is a driver for demand-based on compliance or based on better-than compliance.
A: And you said that has started five years ago?
N: No. The retrofit started about five years ago. The requirement in the building code for insulation of some levels first appeared in 1978. It has just slowly come and still relatively low for world terms.
A: yes
N: And I guess the other thing to think about is that insulation does not stand alone in that design consideration. It is related to windows and glazing and all those different things
[5:00]
A: and it is a major part.
N: It is, but what we see is that we consumer knowledge is improving. And those people who understand that our building code is not good enough want to have a much better performing house. So that was the macro level demand. But it is a commodity because we are selling something that once installed remains there forever. Unless you have a retrofit in your house you do not see the insulation in the ceiling of your house unless you poke your head out.
A: You just do not see it
N: It is not like a car.
A: Yes, it is not like an electrical car or an energy-efficient car.
N: Correct. So then it becomes quite hard, because it is a commodity, to drive those perceived benefits

A: Yes. I heard that also in if you compare investments in HVAC compared to LED lighting, organisations are more willing to invest into LED lighting because they can show that. Although an investment in HVAC seems more energy efficient, but you do not see it.
N: Correct. And therefore the supply side becomes really important, because we need to have motivated manufacturers who are driving those differences in a commodified market.
A: So you need big brands for that one?
N: Well and that is why I partnered with this [company name] international insulation supplier. So they are my main supplier, probably 80% of my turnover comes from their products. We operate nation-wide, so we got franchises from the rest of the country.
[7:30]
A: You have got a franchise organisation.
N: Yes. Auckland is either operated by me and the rest of the market is franchise. We are probably the 4th or 5th largest insulation installer in the country. Not huge, not small either, but good enough for my insulation provider.
A: Yes.
N: OKAY. 5 to 6 years ago there was when the insulation subsidies were in place in NZ. The demand was very high, and supply could not meet the demand. So I went looking for supply outside the country because the local market was made out of [competitor A] which is very much commodified traditional glass wool insulation. Some yellow product and polyester product which is [competitor B]. They have done a really good job of greening their offer compared to [competitor A].Based on all the things you talked about before it is not itchy and not dusty. So these perceived benefits. They call their product green stuff because they put a green dye in to it or a green fibre to make it look green. And it is a hundred percent polyester which is an oil-based product has some recycled content, but we do not know how much. Nevertheless they did a very good job for the perception of green. So as a manufacturer they have done a really good job creating green as a differentiator compared to pink & itchy [competitor A]. But they have twice the price. So as a manufacturer they have done a really good job of motivating their market, to have architects and homeowners specify their products over the traditional glass wool based on this perceive difference. Now there is nothing particularly green about.
A: green dye [laughs]
N: or polyester oil-based product. It is non-renewable and maybe recyclable at the end. But once it has changed its form into a polyester long chain it is a polyester and that is what is.
A: You mean to say that you cannot upgrade it more?
N: Well I mean it has gone from the state of oil into a plastic.
N: And it is to break down over time. Yes it could be reconstituted in life and put back. It is not very green because it is a hundred percent polyester. I know this as I make the products so make them myself, so I am not having a go at [competitor B]…
A: I know, it is just a description about that type of material…
N: However it has an end of life and it is recyclable.
A: are there already recycling programmes already in place?
N: Only a couple of small ones.
N: So but this gives you an example of a manufacturer doing exactly what you are talking about which is creating a point of difference via perceived green outcomes
A: Yes
N: Other real outcomes?
A: Depends on what standard you have
N: Correct so I actively partner with [international insulation supplier] because I have read a lot and done some research and I can see.
A: [interrupts] so what is your background then?
N: I am a salesman with a bachelor's degree in commerce (Otago).
A: You are a salesman.
N: but I did find that from a sustainability point of view if we start looking at the straight cradle-to- grave cost of manufacturing, distribution, [*] energy imports: fibre glass installation is way more sustainable than the embodied energy contained in polyester installation and in sheep's wool installation.
[13 min]
A: I can follow the polyester, but not the sheep wool.
N: Let's just take you through the sheep's wool cycle. If we would just take sheep's wool of the back of the sheep and plant it with polyester and put it in our systems, there would be the impurities of the organic nature of being on a farm. Be it oils that are sitting in the resin of the wool that performs as a moisture barrier. And also the fibre quite expensive. So the cost, it kept coming back, the cost of manufacturing the insulation which is about (1) getting the fibre into form and (2) transport. Those two are the main two costs manufacturing and insulation. And so we now talk about sheep's wool insulation, or sheep's wool fibre. But before we can do anything before can turn into socks and jerseys we got to scour it. Scouring is a high-energy process to strip all the purities the oils everything away just to get that is stranded fibre in a workable form just so that you can do

something with it. To dye it or for instance put it into yarn, you need a whole heap of energy so that the farm gate cost of sheep's wool is approximately §2.60 a kilo.
A: yes
N: and then if you start scouring, it is like §4?
A: yes okay
N: that cost is cost of energy with the chemicals to treat it and work it and there is a lot of recycling from the scouring industry and anything like that its side products that come out scouring. So if we were there to take raw fibre. This costs §4.
N: If we would have put that clean fibre in our insulation then it would make our insulation the insulation 4 times expensive than normal because we add in the polyester fibre which is §2.60 per kilo and then we got the manufacturing cost and then the packaging and then the distribution and so just to make sheep's wool for insulation out of freshly scarred sheep's wool is a nonsense.
A: That is not sustainable in commercial terms.
N: Indeed not sustainable in commercial terms. It could be called sustainable because it is a solution with natural fibres, but it is not economically sustainable. So how did we overcome that? That product that you saw over there, the sheep's wool product is a by-product from the carpet manufacturing industry. We are getting their waste product for little or no cost.
A: Yes, some transport cost or something like that.
N: Then we got some manufacturing cost on the fibre to open it up again, and then bleed up the polyester to bring the cost price down per kilo considerably.
A: you still got domestic carpet manufacturing here in NZ?
N: yes but it is going down
A: what would you do when the last company closes its doors?
N: Interestingly, there is a world-wide commodity / supply of waste sheep's wool.
A: Okay.
N: You can buy it from India you can buy them from… It might be New Zealand wool that' gone over there as yarn, has been processed and then the waste from the manufacturing process …
A: [helps with sentence] comes back
N: it is crazy. It is crazy I try not to look too hard at that to be honest. But it is not something I am looking forward to.
A: Then it is economically sustainable to use?
N: Only if we can get here as waste. If we are going to get it as a by-product from the carpet industry and we are using that completely with polyester. So we are the manufacturer and in that case, we are promoting our product as being New Zealand made, made with organic materials
A: made with recyclable materials, whatever.
N: sheep's wool insulation 60% sheep's wool 40% polyester. Not a hundred % sheep's wool. It has got a nice feel and smell and it is soft. It smells nice so those are perceiving benefits but on from an R 3.6 value: sheep's wool, polyester wool, glass wool are still doing the same thing from a compliance perspective from the need of the consumer which is a warm and dry house, good comfort its doing the same thing.
A: It is doing the same thing, but you will need more material compared to the [international insulation supplier] material, so that has more transportation cost.
N: More cost as sheep's wool does not compress that much so you need bigger bags. You can see the bags are more rounded and fluffy in square metres of that product. [International insulation supplier] would be probably 10% of bag size for the same square metres. So keep on going with the sheep's wool. As the manufacturer I promote it as being a nice sustainable product on this basis.
A: Well indeed that stuff is made in Asia or whatever …
N: now I will tell about [international insulation supplier] which is the different proposition, particularly around innovation. And I think that is one of the key reasons I partner with them because they have taken a commodified product…
A: yes
N: Yellow and pink glass wool insulation it has been around since 1950s.Since I am in my 50s the technology is been around for a long time.
A: yes quite long
N: It takes silica which is one of the most bountiful commodities you can mine. Then mix it with sand and a few other small things like lime and a few other things. Essentially, it's the same recipe as making glass. And they melt it, then they spin it. Out of a candyfloss spinner, and then drop those fibres on to a conveyor belt at various densities, as they are dropping they will spray a binder on it which is holding the fibre together. They will cook that binder they will cook the product through, and the density or the thickness they are trying to achieve. And the binder holds the fibres together. And then they package it. The traditional binder is formaldehyde, is a petroleum-based derivate.
A: it is not too popular anymore?
N: And its very unpopular material, and it's carcinogenic. So if it is cured properly if it has gone in the ovens so it has properly cooked...

A: It becomes neutralized.
N: However I have opened plenty of products
A: you smell it.
N: it smells like cat-piss and your eyes will water because I walked in some warehouses around the world and went out again, because I noticed it is dangerous.
A: yes, it is.
N: What [international insulation supplier]we are the first to do not the only ones to do it but the first to do it, is to cross over the 'holy grail' and find an alternative binder that was economic.
A: yes
N: Their binder is a proprietary name called 'eco-technology' it is a plant-based binder. Essentially it is a starch.
A: It is a starch?
N: It is a starch binder and that is why it turns brown, as it cooks as it goes through the oven it turns brown. They do not put a dye on it.
A: Yes, caramelisation or what not?
N: Caramelisation is exactly what is happening, slightly different but I do know the chemical process that sits behind it.
A: I forgot that one [laughs]it is the sugar components in the starch?
N: Sure bit, and a little bit of protein in there as well so it is called the milliard reaction. They were the first to do it also in doing so they identified a better way of creating a fibre.
A: Yes
N: Which meant longer and finer fibre, and with the longer finer fibre they end up combining it the two things combined meant you can compress it more and it recovers. The more you can compress it the further you can transport it because the cost of transportation is quite low when you are talking about a container on a ship. What they were able to do is change the whole manufacturing dynamics from small local manufactures because it had to be close to market because of the cost of transportation to very efficient large high-volume and they could ship around the world and still be competitive to local manufactures and that is a game changer. So now the product out there some of that is made in Wales some of that is made in the USA some it is made in Turkey, some of it is made in Africa. So they got these mega manufacturing plants around the world with their economies of scale. And because making glass wool is melting glass into glass wool, so the more energy efficient they are with making the glass wool, the more they save energy because most energy is used in making the glass wool. And the more efficient they are at doing this, their cost base comes down.
A: Yes.
N: They plant themselves down near hydro power stations so they got that sustainable energy source. And use up to 80% recycled glass that is certified post-consumer glass. So you can see that their proposition to the market is all about sustainability value for money, recycling, taking away the nasties from the process. From my perspective as a distributor and installer of the product I know we have taken away one risk out of our chain.
A: Yes
N: Removing formaldehyde is less dusty and hence less irritating. The guys like to install it as you just felt.
A: Yes.
N: it is not make-believe, it is real. Not as itchy as traditional glass wools. So their supplier roles, from my perspective as a distributor and installer, is to promote that point of difference through specifies home-owners builders, those people who are the decision-makers around the selection of that commodity and to encourage them to choose earth wool over glass wool and [international insulation supplier]'s innovative product range over traditional glass wool.
A: Over the traditional stuff.
N: yes
A: Can you find that type of glass wool at [a major NZ distributor] as well?
N: Absolutely.
A: They have got their different channels
N: They got their different channels. Yes, in New Zealand they have got [major NZ distributor] and us and some other small partners, and that is about it.
A: How is your relationship then with [international insulation supplier]?
N: It is a collaboration and that is another reason why I partner with them. Because as a manufacturer, other manufacturers in New Zealand own the channels to market in different ways through common ownership [competitor A] or they own their own reseller or vertical integration. Whereas the [international insulation supplier] says "no we are a specialist manufacturer were going to bring new innovative technology to market we are going to create demand for that and we want to partner with people who want to support us in creating a demand". So that is where our collaboration comes in. So I will regularly go and do join calls with [international insulation supplier] on architect builders opportunities so we go in together: they talk about the product attributes and the benefits of the product, and we talk about the service attributes and all what's to it. And so looking at your table, there's a lot of... I mean, I do not know quite...
A: It is this one, and in this case how you corporate

N: So we look after all the transaction in the marketplace and we buy in bulk from [international insulation supplier]. But we sit hand in hand and we go talk to people. They will not talk about price in the market, they create the demand. As far as I am concerned my supplier in this situation is just as important as my customers: they are equally important to us.
A: Yes. I can imagine because you have a kind of dual commercial role. You are the wholesaler for the New Zealand market and also do the installation and also service? After sale-service?
N: Once it is installed it is inert, it does not do much.
A: So the service is helping them to decide what they need and how much they need.
[28 minutes]
N: Correct. And jointly we work to improve the building we are working in. So if we go back to history if we look at the history while the building code has got a certain requirement which is the minimum requirement. That is set relatively low because in 2009 I did a market survey of the world insulation market of glass wool. And New Zealand had the highest price glass insulation in the world because we had a dominant single manufacturer [competitor A] so they kept the price high and…
A: we would do the same.
N: Absolutely. You want to maintain margin on return of investments for your shareholders and everything, so yeah no there is no criticism with them. Itis just nature and that is why polyester was able to come into New Zealand because the price differential was relatively close compared to the rest of the world where it was like this. Because the glass wool price was relatively high. With [international insulation supplier] coming in the marketplace there is real competition and the price of glass wool has come down.
A: But then the demand increases.
N: Yes. That is the other thing because the New Zealand Building Code was set when the price was high there is this perception, especially in builders architect, oh if I increase the R value it is going to cost an arm or leg. But it actually does not and if we take a standard house and if we go from the building code improve its performance by 20% - 25% based on the R-value alone, the difference of prices are maybe §500 which is on one house. That is nothing, and the performance of that house is dramatically improved on the comfort for the users and the health for the users…
A: How do you communicate that the house is not damp anymore…
N: It should not be damp because of other reasons. But it is interesting: you need to be in a warmer house to understand it. So you come from Holland, the Netherlands, where your house is built at Level which is probably 2 or 3 times the minimum requirement in New Zealand. So when you go in the house you take your jacket off you take your jersey off and you walk around the house as you are right now because its winter its normal, well most of the time its normal.
A: People wear t-shirts most of the time.
N: That is right because the environment you are living in is warm. Whereas in New Zealand, when you walk in you put your jersey on because it is colder inside than outside. That is because our old houses are poorly built. And the new houses we are building, I call them tents. The current Building Code is still building tents, not houses.
A: I like the comparison.
N: Well it is true I will show you.
A: I believe you I walked past these new builds well indeed these looks flimsy compared to European styles, but then you think the climate is better because of the palm trees but then in the winter its…
N: Still cold, still wet and cold. And that is because the cost of building in New Zealand is relatively high and so and that is because businesses like [competitor A] have been able to keep it high and make superior margins out of it. This means that innovation in building design does not come in because it is deemed to be expensive. I will give you an example but I does not have the cost analysis here but one of the things that make a fundamental difference to a house and design is… and performance. You do understand about how structures are put together..
A: Yes more or less I did mechanical engineering when I was young.
N: You know more than enough so you take a standard detail of the house. [Draws a structure]. In New Zealand 90 mm framing is what we use. So we do that is a wall with 90 mm framing. We will insulate there between the walls, then we got thermal bridging on the timbers and also the way that designers design building: there is a stud at the end. And because of the strength of the building there will be a packer and usually a gap with packer in between. And the second stud here so then well insulate through there, but there is no insulation and of course there's reduced thermal performance because of the timbers. So what you will find when you go into new houses: sub-contractors have put in insulation that has all been done, but residents have still mould and fungi on the walls because warm air keeps warm moisture and so it condenses on the cold bridge at the bottom and the building is an tent.
A: Because it only got two sheets the interior one and the exterior.
N: It got 10mm plasterboard it is got a flimsy material in a packer and it have got airflow in the packer and it has got a cladding system on the outside. So it really is a tent. You know it could have really nice double glazing in here but there still got...
A: that kind of bridging stuff

N: and an internal wall where….
A: In the Netherlands on the colder side of the house I got triple glazing. It did not cost much. It was just retrofit because the previous ones had not been placed correctly so they started leaking. Although my wife said its only condensation inside. But you have got your cold bridge now. So why not replace it with triple glazing. It was a cold room because it was on the north side and we live on the country side, so we have the winds howling for five kilometres especially winter of course and it made a huge difference. It almost got the same insulation capacity now as the wall.
N: that is great so your whole system is working
A: Yes.
N: so...
A: She was happy as well because she did not have the condensation on the windows in the winter.
N: which is basically it is a cold point in the house its warm moisture condensing. So what some people do, what some designers do, is increase the R value in here. So the building code 2.2 to 2.6 or 2.8 but it does not improve much of the building.
A: Not much I guess.
N: And the cost goes on dramatically because is constrained to 90 mm. So the R- value goes up disproportional to the density.
A: You should do something about these bridges
N: We should do something about these bridges
A: Do you have a solution for these bridges?
N: Yes, simple and it all meets the building code. This is where we come into education to the market and this is something [international insulation supplier]and we do collectively depending on who the audience is. If we talk to group home builders with this they say go away. They do lowest cost complied with the building code we do not give a shit about us it is not important as long as the gardens good it has been painted right. They do not care. It meets the building code and it has got council approval, but they are building absolutely shit houses.
A: But the first owner is not interested even if they do know they will move out in 3-4-5 years and make their profit on.
N: Correct and the damage may not be that obvious because moisture causes damage through continuous condensation down there, it will cause damage.
[38 min]
N: It not only causes health damage but also water damage into the structure. One way to do that is this. Here you see a example of what we have just discussed: 90mm so the alternative is this detail here instead of having two alternatives one alternative that we do a lot of and recommend is: we step out the wall. They are still going for 90mm but instead of having … you have got me going you know that.
A: [laughs] we can skip this one.
N: No.
A: you know Russell Bailey.
N: I know Russell Bailey.
A: He's a colleague of mine. He did a presentation some weeks back.
N: This is his house, we insulated his house.
A: it is a small world.
N: it is New Zealand.
A: And that is indeed New Zealand. A small bubble and everyone within the bubble knows each other.
N: Largely.
A: Now he's got one of these Tesla batteries from his electricity distribution company.
N: He does yes. This is the traditional structure of a wall: you got the vertical stud and you got these horizontal nogs (battens) and those nogs are not for structural reason but to either to fix internal or external lines. Instead of using nogs if you looked down at this detail here, you have your 90 frame you would run a batten across the face of this that is stepping out. You now have a deeper cavity and your finished cavity is say 140 mm thickness instead of 90 mm. Because now you have got 90+45 = 140 mm so you have a deeper wall and with insulation.
A: You have got only your points acting as a cold bridge.
N: That is the only cold point there correct but also with 90 mm you are constrained. If we go density and they are after the cost of fibre and R value in a constrained cavity, let's say 90mm. The R value is 2.2 which is code has got a density of about 12 kilograms per cubic meter. Which is the cost of insulation of the fibre, An R value of 2.6 let's say that is 12 kilograms and going up to 20 kilograms. And R value of 2.8 goes up to 28 kilograms, so you have got a curve disproportional to the R value. The R value goes up like this but the cost is going up like that. What Russell did: you can see he has got a deeper cavity and his batten is going across so he has got insulation going in and then across. That was a combined R value 2.6 and 4.2 I think we put in 2 different products in: low density, cost effective and a far better performing wall. That is an easy solution, and that meets the building code. He did not do anything special to go through council.
A: And that is a good one as well so the use of that batten is that quite novel?
N: Unusual but we are promoting it as a system approach. Because we are putting in low density product not high density product, which keeps the cost low but the R value is high. And that is part of the educational part

process of a supplier like [international insulation supplier] going to the marketplace. It is bringing innovative ideas to the table and supporting that sort of thing. So you know this is Russell's house as well the finished insulation. In 2 layers. That is the electrical box and there is insulation right behind the electrical box, and then the second layer which is this one here so again there is very limited bridging or gaps.

A: So how do you solve this other problem?

N: In Russell's situation is very simple. [N draws a corner position]. You use a mix of 140 mm studs, so instead of having voids we have a slightly bigger timber in the corner and so the 90mm insulation goes all the way through here. You can see up there -that is looking into here, and so if the structure has done that and then he has got a batten on the face of it.

A: You have again reduced your cold bridge.

N: it is a continuous insulation loop. Because it also has an insulation layer through there between the battens. [45 min]

A: that is innovative.

N: It is just smart thinking, and it does not cost much more because you have still got.

A: You have got to train the boys to do it differently.

N: Yes, and we took training this job and sometimes they've got a rock somewhere. But what is the cost of the wall system? The cost is the timber, you have roughly got the same amount of timber because instead of having full thickness nogs you have a batten going across the front of it, so the timber is about the same.

A: It is a bit cheaper in labour because that one you have to cut off.

N: Yes slightly it is easier to install but slightly deeper reveal on the windows and you got deep windows.

A: Women like that because they can put their flowers on that.

N: Yes so this kind of stuff that [international insulation supplier] insulation: what they are talking to the marketplace and what we are doing with them, they are doing expert tours and doing education of architect and best practice and world best practice you know because New Zealand is being dumped down and being the basic rubbish standard. Itis all about getting that knowledge up and driving that demand.

A: So you share that knowledge with those decision makers or stakeholders in the market and you do not try to keep it proprietary.

N: Indeed. And that is why we pull a long face. As an example it is just the easiest one to show you.

A: If you look at the logistics in the [international insulation supplier] contracts - it is a standard stuff the moment that you buy it ex-works, and then you have to pay it or do have to pay it before you ship it to your customers?

N: I own the stock which I receive in bulk. Different ways of purchasing and stored locally. So they bring in the product into the country, they warehouse and distribute. I can bring 4 containers direct when I want and I do that from time to time just to look what the product is, and yes so.

A: They have got local warehouses here ... and also experts or staff?

N: Here and there. I think 2 or 3 staff not very many. Their job is to create demand. They are not running warehouses.

A: No, no. That is third party warehousing.

N: And that is why I like [international insulation supplier] because they are focused on pushing and creating demand on the marketplace. And also, if you look at their perspective they make money out of tonnage they are interested in tonnage.

A: They want volume.

N: They want volume so that is tonnage. By educating the market that the cost of increasing thermal performance and the comfort by increasing the R value means more tonnage for them.

A: That is a good business.

N:It is a very motivated to increase tonnage. We are seeing a change in the marketplace where builders become more aware that by increasing the R value they have produce something better for their customer depending on who they are, and architects as well.

A: When you started in 2009, did you go to Europe to do your scouting and your assessment on that supplier? Or did they come to you?

N: I did not find them in 2009.They were already into Australia but they had not come into New Zealand so there was a bit of a process to motivate them to come to New Zealand. But when we talked about the price of insulation in New Zealand they could see that there was a good margin that they did not need to drop the price they could just chip in.

A: And then they were interested.

N: They were interested.

A: So for your franchise organization elsewhere in New Zealand do they organize transport or do you do it.

N: So I arranged a supply contracts that they just buy direct from [international insulation supplier] and it just get dropped straight in their warehouse, so it is not coming in here.

A: No that would not be efficient.

[50 min]

N: And if you come back to the whole eco story, you know I stand straight in my comfort that using the term 'eco' is correct because all the products are saving energy or helping manage your energy use. So that is critical.

I'm not using the term 'eco' in the green washing way. We are not saying it is all organic fibres and all that we do talk about that just from our sheep's wool products, but it is more for saving energy and proof of comfort and using recycled materials. Those are our core 'eco' credentials.
A: Yes, I can understand that from what you say. I cannot do my own auditing or certification.
N: I just say we are putting product in there, for example plasterboard I probably would step away from the 'eco' term. Because the core product itself is not really doing anything else apart from providing a lining, whereas insulation is providing energy-saving solutions.
A: Well, but if it were recycled plasterboard or whatever …
N: Even that, but I think the mere fact or the products' primary purpose, regardless what fibres or brand, itis about energy saving.
A: That is why you use insulation in your name I guess.
N: Correct.
A: you could come with a different brand for whatever product you would then have to use or also.
N: and also existing brand.
A: I understand that [international insulation supplier] is 80% of your procurement spend. Do you have any other critical or important partner or suppliers?
N: No [international insulation supplier] is most important. We do a little bit of heating systems as well. Not much but that is more out of convenience for the consumer or the homeowner. Did you know that New Zealand the only country in the world that calls an 'air conditioner 'a 'heat pump'?
A: The word *heat pump* looks like green washing.
N: do you know why that is.
A: I do not know but I find it very clever.
N: I will tell you why, EECA you know them? The Energy Efficiency Conservation Association here in New Zealand. You have got to meet him or …
A: I did not get to know them directly.
N: Back in 2009, when the subsidies insulation programme was set for homeowners there were subsidies for insulation and heating. So, you know the clean heat devices that were included were energy-efficient heating systems called heat pumps and very efficient gas fluid devices and fires. So those were the 3 heating devices that were mentioned. Because heat pumps were also called air conditioners, EECA did not want the market to know that those devices are also for cooling as well, because they wanted to keep houses warm not cool. It was a contra argument by not saying that you could cool your house in summer too because New Zealand does not get hot in summer. But that is why the name heat pump was applied to those devices, even though they are air conditioners. It just happens they can heat and cool. That is why they are called heat pumps because they are a subsided and the government could not be seen to be subsidizing cooling in summer because that is not a major energy use in New Zealand and also health benefits of keeping warm and dry in winter.
A: I did not know that, but it is interesting.
N: So stupid, sorry I have got an opinion on this.
A: So, what would you do for the next 5 years would you scale up your franchise organization?
N: No, the New Zealand economy it is not that big. It is a small country, so I procured the brand eco insulation two years ago.
A: You are new to the job.
N: Well I have been in the sector for some time I'm not going to go into the history. I knew Eco Insulation pretty well I knew their distribution system pretty well I stepped away. It changed ownership and then the new owners, it tipped over and I was in a stage with my development and some other insulation areas that I wanted to install networks so I have known it for a long time so the franchises are in core market where there is enough scale. I mean we got one along the road, but he is just not going to survive because there is not enough market for him to be worthwhile.
A: So, you need a city with a 100.000 inhabitants.
N: And easy. Yes, so Auckland, Hamilton, Tauranga, Wellington and Christchurch and the one you are in is to go to Queenstown. There are high value houses with high value insulation because it is cold.
A: So, you would have a vacancy over there, and in Dunedin or Otago?
N: Otago? No, very small economy and its cold but the amount of building in Dunedin is very low, next it is a shrinking population. There is a lot of activity near Queenstown with a lot of development there and that will keep going.
A: And also, retirement homes in Queenstown. I saw that.
N: Canterbury will decrease. Wellington is only just viable. Tauranga and Hamilton have lots of activity.
A: This has been a nice interview. I really enjoyed it. You told your experience on how you worked with your [international insulation supplier] and for me that is even better than coming to discuss theoretical concepts or discuss how large organisations would procure their innovations.
[57:27]
End of interview.

INTERVIEW #5
Owner of architectural, material supplier and construction services, 13 January 2016, in a Devonport café Auckland.

F: My company [company name] is really a spinoff of my architecture practice, and it happened even before the Christchurch earthquake rebuild project.
F: In fact it was specifically around the cyclones which continually hit the Pacific island. I have a church organization that I work for that has lost 2 schools. So they were looking for an alternative to replacing the old building by a similar new building, which is the normal delivery for new structures in the Pacific islands.
So when a cyclone hit one of the islands, the aid organization tends to fund a new building. That new building could come out of any country really. Typically it comes out as a timber frame or a steel frame structure, via the clinic, via the house, or via the toilet block. And the component parts are put in a container and they get delivered to the island. And then those components get pulled out, but it is beyond the capability of the islanders to put them together. Then they wait for a little bit more funding, or an aid organization to send out 10 volunteers to assemble the building. Which to me is a daft solution, yet it continually happens a lot here, that is the model. And then 3 cyclones later, the building that has been delivered has been blown away, but the container that it has been delivered in, is sitting next to the site as it always was. So, out of a particular request from a funding organization I developed a model, for the container solution, and that continues, I continued to do projects around that, so…
A: So that's why you got school buildings on your website?
F: Yes. I got school residents because there are toilet blocks, emergency buildings. And so the whole rationale for of what I am proposing is a series of modules that can be used for anything, any purpose, and all the components that are required are in the container. The container is finished to a sufficient standard, and the construction assembly is so simple, that the islanders can, under perhaps, with 1 or 2 supervisors coming with the container, can show them how to help themselves. And that to me seems the most sensible way to deal with it, and then the recycling of those, those are emergency structures they come in to help for a period of time, if they want to keep sending kit-set timber buildings that blow over let them do so, those are the permanent building and these structures can be taken back to the wharf, and not bring back to New Zealand, just stored on the wharf, for the next cyclone which is going to happen on the island next door, and then a ship comes and picks them up, and that to me is a sensible way to use an aid fund, you got a pool of buildings that continually move around the Pacific Islands.
A: That sounds like a really sensible thing to do.
F: Far too sensible, and beyond the capabilities of key people to understand in New Zealand believe it or not it drives me to this crazy.
A: Because they are project-minded? They think about this project, and then it stops or something?
F: It is almost like they do not care. It is an allocation of funds and there is a process in place: you engage certain consultants, they will go and do a huge evaluation, and they will come back and submit a report. It for example takes about 9 months before the toilet that was needed straight after the event gets delivered, to the site as an emergency structure. It is hugely inefficient, and 2 million dollars are been spent to go through that whole process and find a contractor who is going to deliver something.
[5:00]
A: Have you got contact with Suzanne Wilkinson from Auckland University?
F: No I have not. What I have tried to do is that I tried to go to the Ministry of Foreign Affairs & Trade, and I have gone direct to them. And I said to them "look, to me this makes a lot of sense". It is easy to do this, it is not complicated, the structure is transportable I have given them the merits, which they understand. But there is a process in place, and I said to them how do I get into the process, how big is your organization? Well what difference does that make? It is the idea of the concept it does not matter that I have not got 50 staff and I am alone. It is the idea, it is the concept and it is the delivery of it, I am not making these and delivering them but I can take a container and I can put 10 portable toilets in it, I can put a tank underneath it, and there is a processing unit that would suit the Pacific islands.
A: you have got your [suppliers] contractors and…
F: And that would take 3 months to assemble, and within 2 months you could have something up the site without going through the protocols and the system. And I tried to get on to the advisory group who generally are specialist consultants, and again, clearly, you need to have a 1000 people in a whole-wide organization to come up with smart ideas. If you are an individual architect clearly you must be an idiot, it is desperately sad, but I cannot make any headway with anyone to make these recommendations and they do not only exist in the Pacific islands we have got homeless people that I can put in a container tomorrow. It would take me 4 weeks to put people who are sleeping on the ground in a container with a portable toilet and it would take nothing at all and minimal costs, bizarre are it not? I just despair that you can't help people help themselves.
When it comes down to your PhD inquiries and green technology. What I am looking at is, applying the products that I utilize on the containers to be the most durable, most resilient, most maintenance free products that I can find. So those are the practical issues of what I am specifically looking for, because there is no hardware shop in the Pacific islands. So when you apply a membrane that has to protect a container it has to last for 50 years. So it might not be the best green technology all sustainable.
A: Well, if look at it from a life-cycle approach and social impact.
F: And that is the angle that I am coming from is that, it has to last an incredibly long time.
A: It has to be simple, it has to last.

F: It has to be simple and it has to last and. So I have brought an example of a product. This is a relatively new to the New Zealand market, and it just got all the BRANZ approval. [Shows the material].
A: Is it an insulation material or something.
F: No it is not, it is a waterproof membrane. It is a rubber-based product, and...
A: But the polystyrene, what is that doing then?
F: It can be applied onto anything, and so what I do with… There is so much literature available, but a lot of the technical composition in these materials (also this particular case), are not made available. So what I am interested to know is, how does your organization or someone who is evaluating this in terms of its suitability or rating for green sustainable products, how do they evaluate this product?
A: You have got zillions of ways to do that depending on what you think is important.
[10:00]
F: So how does this get a rating? If it is a scale from 1 to 10: how does this get a 7 as a rating, which person does that analysis? The reason I ask this question is because I am sceptical of …
A: Green stars and LEED ratings and all of that...
F: All of that, I have not seen any products withdrawn when this came to be, amazingly, now all the products I use are still available and now they got a green tick next to them. So presumably, someone must have failed somewhere or have they all converted [speaking through each other, cannot understand] to write a specific report that makes it acceptable. So I am an older architect, sceptical of the whole system and you get these buildings that are rated we have used. So you go through all the substrate materials and then you go to the finishing materials, and then it gets a tick and then in the end it is a 10 star building. And it is the best that we can build, but I am sceptical because it has the same paint system that is on my 4 star one, it has got the same flooring as my 3 star one, it has got the same concrete frame structure or it is a steel frame structure, so...
A: We either measure it when the building is empty so we do not take users kind or whatever, we do not take bad maintenance intervals into account.
F: Yes absolutely, maintenance is probably the single biggest issue that I have a problem with. Because for instance we do the silliest things in this part of the world. Like we would take a perfectly corrugated sheet and, we would drill holes through it to fix it, through the roof. Because this has been done for years and years, and I understand that. But we have done is e created a potential for leak and for rust, every fixing point for corrosion and I can absolutely guarantee you that it will rust in those positions and it will not be washed down every three months. Yet we insist on perpetuating this because it is the Kiwi way we do things. Whereas in Europe we go for concealed fixing systems the fixing are not visible, they are hidden so there is limited potential for rusting, why are we not converting to something like that, and how does…
A: [interrupts] that is the problem of your client is it not? But your client is not interested.
F: He is not interested because he does not want to pay the money but in terms of green star rating that product, all the maintenance associated with that every 3 months should really be faceted into that product, so when you come to rate it is not such a great product. And the people who manufacture this product should know that it is not such a great product.
A: yes they sell the ideal picture.
F: So are we…
A: But the system is broken, I mean you got market failures but this is a system failure and that is because the guy that owns this building is not interested in the guy using the building, he is not interested in us sitting here, and that is, that just does not work, it is not a family.
F: Yes, but really I do not want to carry on this. What I want to say is that this is specifically where I am looking for, I am looking for products that will endure, that matches my philosophy, of things that go into construction should last as long as possible, they should be as maintenance-free as possible.
A: But that is bad for business.
F: I know it is bad for business but and the cost.
A: There is an anti-marketing theory, I do not know if that is a complot theory or not, but after the war in the US in the 60s the marketing guys said to the technology guys “hey I want you to reduce the technical life of these products because we have to sell more”.
F: We see it all the time but are that a good thing or a bad thing.
A: I do not know if it is true but yes well that is our paradigm. That is what we live in I guess, but it is not very good, it is not sustainable, however you define that.
[15:00]
F: I think the most sustainable thing is that you will again we are talking housing, we are talking about these structures where I am interested in, and I want them to last as long as possible.
A: Like these old brick buildings at the other side of the street: I think that for New Zealand they are quite iconic buildings.
F: There is no one to service them, there is no one to maintain them and they have to survive in harsh climates and durable for a long time.
A: These buildings need a lot of maintenance I guess.
F: Well these old buildings reflect their time; a century ago they were not concerned with these things. That was about 100 years ago, when they built them.

A: Well they were more concerned with that then say in the 60s or in the 80s
F: Yes.
A: There was more of lifetime thinking.
F: Yes. But then if you see the brick buildings in Napier – they were destroyed during that earthquake. The European immigrants build with the knowledge at that time.
A: And coming back to your frustration on trying to get into the system, Suzanne Wilkinson has a team of researchers and she does research on disaster recovery. And she tries to find out how that proceeds. So, she not only focuses on Christchurch but also on Australia and even on typhoons-struck islands and perhaps you can use her as an endorser for your system container.
F: I am building more and more so I am very comfortable with the way they are performing. So I built some buildings that have been out for over 3 years now, and yes believe it or not they are what they are, they are not perfect as a structure, but they are.
A: They fit their purpose I guess.
F: Absolutely, they are definitely fit for that purpose, for moving structures and remote areas
A: But your problem is for instance, I have had an MBA student working here in Auckland buying shipping containers for her work. How to assess the quality of a good container, if you can see the rough life it has here in the Pacific. So how do you determine the quality of a good container?
F: I only use single-use containers, so they are transported with products from outside the country and they get delivered here. Because, I do not know the history of those containers they could have been carrying concrete bags, cement bags around the world. And if they have heavy weights in them, they will get damaged. They do not refurbish them as frequently as they should. So there have been cases of aid organizations that were looking for reusing containers. They got a really good deal, say §1,500 for 40-foot. And when they wanted to use the container for aid purposes, the floor fell out. So there are people that assess container all the time for container companies: they come in and they get graded. For construction I would never use anything else than a premium grade. And they are affordable: a 20-foot container is §4,000 and a 40-foot container is §7,000.
A: And that is a new container?
F: Yes. Single use. So, that to me is the starting point for any type of construction. So for terms of earthquakes, the container has about 50,000 bracing units, when a conventional house would have 2,000-3,000 maybe 4,000 bracing units depending on the complexity…
[20:00]
F: So in terms of its resistance to suit the events that occur around us in use, it could not find a better product. It has very few foundations; I have to put down 4 foundations, one of each of the casting blocks. It is a very simple system, concrete-less system, that is now available. But in the Pacific islands where they do not have concrete, and where they have to use sea sand which is going to corrode steel work. It is just an impractical thing to consider conventional construction - you are going to have to find the alternative systems.
A: Where do you get that alternative foundation system from?
F: Because I look for it. On the internet I look for it. Two years ago I saw what I thought I was a perfect system. And it has now developed to a point that we can use it now, and then in fact I got, I am going to use it on the next 2 to 3 months. And that is the way I had to work. I talk to these suppliers who are developing the product and I say this is my scenario I am at the sea, in the Pacific islands and I need a solution. Will your product suit the application for that scenario? And then they say yes, we can get it right. And so there is a little bit of development on their part, and good faith. Because anyone who is doing any development wants to know if it is going to translate into sales and profits. And I am in an area where we are trying to keep the costs as low as possible and I must rely on product suppliers, helping me, because I personally have not got the resources to develop these things.
A: Of course not. So you bring in your specs or your requirements and they try to…
F: Yes. And they try to satisfy those requirements. And so they have got a system, this foundation system, I said "how would it perform in a marine environment?" They said "oh it will be fine; it is already used in the Pacific islands". So then I ask them: "What coating do you have on the steel plates so that you can bury them in the sand? "And so they said: "Oh you know the corrosion rate?", and they show you some graphs, this is what you are expecting. So then I think can you apply this onto your product? And this product would also allow me to protect the container and extend its life, because the walls are really thin.
A: And normally it would have a life of 20 years I guess.
F: You want to extend the life as far as possible.
A: Can you easily scratch or damage this material?
F: Not easily, so what I do is, I go to my laboratory. Which is the back of my garden, which is my barbeque, and they tell me this is a self-extinguishing product, and if I can see a report this thick, telling me it. But how do I know definitely that it works, I have got it on the barbeque, and I torch it, and I satisfy myself that the claims on the paper actually work. And then they tell me it is waterproof, so I make a polystyrene box out of really thin polystyrene and I apply it inside and I put water in, and I put boiling water over it. And these are the only ways that I can satisfy myself that these products will work, so this is what I do with all the products on these projects. I kind of do assessments which is not commonly done, and people think that I am absolutely eccentric and a complete idiot, but if I got to send a container.
A: [A not important comment deleted].

F: But how else could I. If I got someone who would fund this project and would give me between §100,000 and §200,000. Then I could conduct all the tests. But I have looked over my shoulder and there is no benefactor who is interested in doing this. I think it has a lot of merit but you need to persuade someone: this makes sense, this is going to help us all because we are spending 2 million to 3 million a year on aid. Or we can now spend 1 million once, and have a pool of buildings that will last 50 years, and we do not have to spend 2 or 3 million a year.
[25:00]
A: That is too big for the aid industry; people will be out of their jobs so you are too disruptive.
F: So, again I built this product because this [coating material] comes in a bucket with a paintbrush. On the islands, it will get scratched on a chip on a container.
A: You apply this as a coating, not as a foil?
F: It is sprayed on as a coating. But for any repair that needs to be done at any stage: it comes in a bucket and any unskilled person can repair it. So that is the level of technology that I am looking at.
A: Should you not get it to a different target group, like people wanting to live off the grid, or green-earth people or whatever enthusiastic people?
F: Doing that for a bunch of guys right now out in a forestry area. They want to have the whole sustainable living thing and I have got an example of one of them and it's a container.
A: Now you have got your pilot project.
F: Yes.
A: So if I compare this to, say a sustainable bach (a private holiday home or beach-house) or something: how would that price-wise be?
F: At the moment in New Zealand it is working well, about 1,800§ per square meter that is the whole thing, that is everything, not just the bach, it is the foundations, it is the sewage system, it is the water tanks, and it is all of those.
A: You mentioned it in square meters.
F: We did it in square meters.
A: I think in the Netherlands we do it in cubic meters, I think 800 Euros per cubic meter or something like that.
F: And so I am trying to bring the cost as low as I can. So I end up negotiating with these suppliers. And they are reluctant to do it. Again, because this is being sold at the same price for a square meter as that the industry, the competitor's product itself. Why would suppliers sell it for less than that 90 dollars a square meter to apply this on the containers and also give you 20 year warranty. And this to me is the most sensible to my application and I am trying to these suppliers to give it to me for §50. But hey say: "Why must they give it to you?"
A: But you do not have the volume?
F: Exactly. That is what they say. And I say no, but you are doing a good thing. We are doing something good. No one is making a pile of money out of this but we are helping people in difficult situations. They understand that and say – come and meet and perhaps we can make a deal out of this. So that is the reality I am in that is the reality, and I think that people would probably understand that, because they come from the mind-set you have. Which is that what have got to pay [*]. But if you try to house people in difficult situations or if have to create sort of emergency structures, you have got to get down to the lowest possible cost and there is no other way around this. Because if it is going to cost 2000§ per square meters you are never going to sell these, you are not going to sell them and you are never going to be able to manufacture these with the volume. You have got come with a price advantage.
A: do you need scale?
F: You do need scale. Because the container companies who are doing the engineering here aren't really geared out for mass-manufacturing. Their primary operation here in New Zealand is leasing containers. They have got a few kit sets, kitchens, and some basic accommodation. But it is not suited to the application that we have overseas. They do not do mass manufacturing here, so they are not geared up for it. So I am working with them trying to say, look you could get involved I this work because there is the potential because they are projects, very real projects like the one I have set in the Pacific islands. Very real projects in Christchurch, in remote areas in New Zealand where construction would be prohibited [*] experienced. Very real projects in housing people who sleep in the carton box, through the winter. These are structures that can be brought in and taken away. The fact that they are transportable is the biggest point of difference from conventional construction. That cannot be dropped and taken away. There is an example of some very fancy steel modules that were built for a promotional event for Samsung. Near the waterfront, and they were a sensible model for the activity that was going to occur in. I think it was like 6 meters by 3 meters, and they built 3 of them and Samsung did some promotional. And those modules cost 100,000§ each. And a similar 12 by 2.5 meter container would cost 7. 000§. And they moved them recently - they are not easy to move, because you need a transport permit, a vehicle in front, a vehicle behind, and it is not standard. So it makes no sense to me that you are trying to re-create something that is a module that is universal. I would say I come from Africa and have been in Europe: containers have reached every corner of the world. And they will continue to build them because they are the most sensible module, and we should just accept that fact and work around, and come up with innovative solutions, neutralizing.
[30:00]
A: So but there are also other companies like you also trying to build containers for housing.
F: It is more baches: there is a big push at the moment for accommodation in the city. But nothing has really taken off, because the cost differential between conventional construction and these structures is not big. It is not a massive thing, and also the planners in the councils are quite a strong. They are determined in what is acceptable

and what is not acceptable. So when you start building in city areas, there is a real resistance to something other than the weatherboard, they do not want…
A: But you can do weatherboard cladding…
F: You can. I have a bach already which is built as a prototype. You would not know that it was a series of containers that were put together. And so I have taken it to the point that I have super-insulated it. I have put all the finishes on it and it is twice as warm as my old house here in Devonport. It hardly needs any heating at all through the worst of the winter months.
A: That is almost zero energy.
[35:00]
F: Exactly. So 1 kilowatt of heat is required through the month that is the coldest. Based on the calculation that we have done with my mechanical engineer and turned out to be the case. Admittedly it is on the Coromandel Coast where it does not get particularly cold. But I have moved from an 100 year old house in Devonport where I shiver and race from one room to the other, and I go to the bach and I orientate the windows to the sun, and it comes in and it is captured in the room, the usual thing architects should think about but do not, and certainly the housing companies do not.
A: You could use a rotating foundation, would that be possible.
F: Of course it would. It would be not too expensive there are turntables for parking garages, they'll be a bit of cost but it will be easy enough to do. Not complicated. So your question about what they are being used for now, the other companies are generally issuing fancy baches for people who want something with from a point of difference. Which I could do, but I am not interested. I am interested in aid projects; I am interested in the emergency projects. I am an older architect now and I used to do this work in Africa out of conventional construction. And I like to finish my career and doing that in the Pacific islands. I think it has the most merit and I just need to get the suppliers of these products on board, and ideally get others in the industry. So I thought you need, what I should be doing: I should be going to the industry and also do the government agencies and trying to champion this. Say look "this makes sense what does it going to take, who can fund it, how can we get this happen".
A: Have you discussed this with BRANZ, for getting a grant or something.
F: BRANZ, I have been talking on one of their senior economists about emergency housing for the Salvation Army. I have a fantastic solution for that. And they know it, I have given them a costing and it will just…. Nothing happens quickly in this part of the world you have to progress things slowly and you have to develop a momentum of support across the board. And it is very difficult as a single practitioner, I do not have the resources and the time because I have to follow my practice and generate an income.
A: So how long have you been working on this concept?
F: I have been working on this concept for 3 to 4 years now. So we have done pretty well, we have built a commercial facility in East Tamaki for [*] which has really worked very well for them. They are very pleased with it. I am taking a group of engineers (I am working with a bigger engineering company now) and I am taking another group tomorrow to look at the project I have done there. In fact I have just done a project at the AUT which is an emergency structure. No in fact it is a utility structure that we dropped in just before Christmas. It has 5 containers, it happened easily, it is very practical it is very sensible, and it will be pulled away and can be reconfigured in some other arrangement for another. It was on the AUT City Campus.
A: Cool, I did not know that. So, you've got 2 problems with suppliers: pricing issues and what exactly is the spec [specification] or the usability [fitness for use].
F: It is. I want to get the price as low as possible. And so I think, the only way for me to do that is to make the assembly so simple that people could do it themselves because then the labour aspect comes out of it completely.
[40:00]
A: Yes but to do that, your materials will be more expensive I guess
F: No it is the same materials that are being applied by builders with simplicity in the design. And in the prototype that I have built I have trialled different systems. I went for the cheapest possible insulation. To give you an example: I have got polystyrene but I was concerned about it in terms of flammability as we insulate on the inside. Because from the transporting over-seas point of view you cannot have anything on the outside of the container. So what we did is we layer out some fibre board which were horrendously expensive, but I know that they will perform fantastically well in terms of fire. And unskilled people bonded the product panels onto the polystyrene. It was adhesive and it was a very, but I just used them to do that. And it did not take them long to figure it out but for something that is sent over-seas you would need to hovered those panels laminated to one another before. Prefab and then stack them in the containers. And for the floor assemblies we used an insulated roof panel as a floor. And the company that manufactured said we cannot use it for that. So I said well we can if I keep the stands. Because I do not always use the containers together, I install them apart so I have got a space between. So I use the insulated roof panel as a roof panel over the whole thing and I use it as a floor that corrugation and the depth of the insulation with the metal skin on the underside, give it a certain structural performance. This is sufficient for domestic purposes 1 kpa loading is possible but you got to keep the stands down. The suppliers were hesitant because I was using their product in a way that it is not normally used. But engineers did the calculations and they were comfortable with but, how would you solve this problem ….
A: Perhaps they have another product for flooring and they make a better profit with that. So perhaps it is for a commercial reason and not for a liability reason?

F: Their concern was liability. So what I have done is that I have used it like that. We could convince the supplier that the product would perform. We had to encapsulate the steel from the durability point of view. I put a waterproofing membrane on it. Not this product but another product which I painted on. Then I put on another a sheet, a damp-proof membrane underneath. So now I have got 3 systems that had to fail for the floor to fail. So I am very comfortable with the product that we would get performance frame the damp-proof membrane which sits below this product. That in itself would give you 40 years normally it is under a slab her it is under a floor there is no UV exposure. So I am comfortable with that and then we got a damp proof membrane in which is on the metal skin and then the metal skin itself got 50 years. So we got a 50 we got a 20 and we got 15 on the product. So I had to do that to convince BRANZ because the prototype had to go through the normal building consent process. And in fact what I have got is more like 80 years performance.

[45:00]

A: Did they accept that.

F: They did accept.

A: The materials will deteriorate over time I guess,…

F: Yes, but

A: The 10 year product will be gone in 10 - 15 years.

F: No, because the 10-year product will not fail because it is above the waterproof membrane. It is not exposed as there is no exposure to the panel. The waterproof memory is also protected and if the damp-proof membrane may have failed off the 50 years and for your building consent when you apply for building consent for structures in New Zealand, the minimum requirements for your structure component he is 50 years. So, this is a flaw because I need to meet that.

A: Ok there is no deterioration in there even without exposure. That is what you are assuming.

F: Correct. That is what I believe. I've also used it in my own bach and I am very confident that that will happen. I am sure my grandchildren will use it and thanking me for putting these low maintenance products on this spec. But I have a multi proof. For most companies that come into New Zealand will take 1. 5 – 2 years to uptake [*]. And that multi proof is like a New Zealand building consent. Pre-approved once, so that you can build it wherever you want. The documentation has been assessed by BRANZ, MBIE, and they have said: "This has got a certification number; you submit the full package of documentation to the council. …

A: Why would you need BRANZ approval for something you use abroad, that is in the Pacific?

F: Well, you have to achieve a standard. So, my thinking all along was, I could need a European standard or an American standard. But to give confidence from someone like the Ministry of Foreign Affairs & Trade and anyone who wants funding would expect you to meet a certain standard. So, I deliberately went for multi-proof. So, for that multi-proof I had to find solutions, had to be resourceful, I had to accelerate the process for it to work. So, I managed to get it all to happen in 6 months which is quite phenomenal. And I can still remember the engineering queries that came back. Because it is unusual: obviously they had not had many applications for container modifications. But they wanted to know what the specifications of an ISO container were. So, we had to get my engineer to provide that information, to provide the manufacturing specifications, and then they had to certify the modifications to suit the installation as we have. Which was the double stories. And BRANZ / MBIE engineers came back with a wave of queries. Their engineers were unsure despite the fact that containers have 30,000 reinforcement bracing units. They were concerned about the structural performance of the containers. But at that time at the Coromandel Coast there was a ship wrecked and heeling over by 30 degrees. The containers were stacked 6 high and none of them fell off. Then I said to the official: "Have you watched the TV lately. Are you really that concerned of the structure of the container?" And he agreed. Honestly, I think people in certain organisations are not practical; there is not a lot of common sense. They do not really understand the technical aspects of what we propose.

[50:00]

A: Perhaps that is because you are too early. You are a front runner.

F: I am not. Containers have been around for 50 years.

A: But perhaps this is a different use?

F: Anyways. Yeah. So, the products I've been looking at are for prolonging the life of the container. Which is a higher-grade steel anyway. They get an industrial paint once every five year when it is considered necessary including the underside of the container. But it is a non-insulated box. You have got to ensure that it will perform and meet it's over to the server requirements for insulation and ventilation very important practices in the way that people in till to make a frame at steel frames and conventional installation problems and what happens is…

A: You got your cold bridges and cavities.

F: Absolutely. They do not eliminate the thermal bridges at all. It is a repeat of all the problems we had in the industry all over again. And what I do not want to happen is you convert to something like a container construction. And then there is a whole lot of buffoons who are going to make the same mistakes and then it spoil it for those people who understand the board of sconce. So, it is. That is why I put it on my website it is intelligent container construction. That is what my company name [company name] means; that is what the acronym means. It is not like doing whatever you want and create a problem.

A: Before we had this conversation, I thought that containers were just stupid things. But it is not the container itself that is intelligent: it is the way of looking at it, how you design it for a certain purpose.

F: It is the opportunity which is there, for a series of building blocks that can be assembled in different configurations, including vertically. We have already prototyped a 40-foot container standing vertically. It could function as a lift shaft or as a stair. If you are going to deliver a 2-story structure in the Pacific islands, you have to deliver everything in the container. You cannot build a steel stair on site and deliver it separately. No, the container is the stair (or the container is the lift) that leads you to the upper stories and there is the system. It must be so simple that it stacks, and they do on the container ship. You cannot put a roof over the container which you have to dismantle when you want to go to 2 stories. So, it is thinking through the wall insulation, the roof insulation, the weather-tightness aspects, the floor insulation …

A: And also, the stability. If you put a container up right, then it is not as stable as it will normally be.

F: But you can connect it to the rest of the structure. It is the way you arrange it.

A: But can you use the same foundation?

F: No, we have not trialed the new foundation system. What we've done is, we have put a slab online and deliver 400 deep and slightly bigger than the footprint of the container on end. It has been standing there for three years very happily. But I think there is a better way of doing it using the alternative foundation system that we now have. [55:00]

A: So how do you get a commercial commitment or a contract with these suppliers on the delivery itself?

F: I have not needed to. The suppliers have accepted in the end, that the application that I am using is considered suitable. I just spoke to the directors of the suppliers and I said this is what I am proposing to do, and this is how I am going to use the product, will you warranty it? And the suppliers agreed that they will warrant it in the installation that [company name] has recommended. Otherwise I would not have gone through with it. Because the paperwork is important, and someone has to warrant it. For me it is the products supplier who manufactures it, needs to accept the warranty for it. Otherwise I will not use their product and I will go to an alternative…

A: How can you guarantee, that it is just not the material or product itself but also the installation during the construction phase?

F: I use a construction company as a supplier which assembles it and puts it on the site. So, the foundations get a certification. Most of it has been concrete or timber pile so it's conventional construction up and till now. And we use the screw pile system as well. So rather than one supplier company who is offering a warranty for the whole thing, it is separate suppliers who are giving the assurance what that they have done complies. For instance, the supplier [company name] on the bach: I have looked at their entire system and just attached it to the container. So, it was as if I was attaching it to a steel frame or concrete frame. It did not matter. It was their system and it fully complied. The same with the waterproofing membrane that I have applied. It is a [supplier name] system and the supplier gives a 20-year warranty. And so, I have got a roof, I've got cladding, I have got insulation, I have got a floor system. Probably the floor system is the only one I were I have used something different from conventional construction. But what I have got is a fully insulated structure, no thermal bridging or absolutely minimal thermal bridging, because you have if you imagine… I will sketch you.

A: [Discussing the sketch]. Those are your two containers and that is the gap in the middle. Is that an exclamation mark or something?

F: that is a human…

A: Oh, that is a human.

F: So, there is the insulation in several places. That is the ground there and this is the pile, and in this case, we actually have got a roof which goes over the whole thing like that. And so, the only bridging is there, in there.

A: In the foundations.

F: Yes, and some tracking across there. But there is not a lot you can do but if you compare it to conventional construction which is either a timber or a steel frame [continues to sketch]. This is the outside and this is the inside, oh no the average is ok.

A: You know Russell Bailley?

F: I have heard his name.

A: You can look him up on Facebook. He is building a sustainable house, [sketches] what he does he has got these ones, and then he's got another one here and he insulated this one. This is his actual cladding, his inside cladding. So, he got only these crosses as a bridge, which is an improvement.

F: That is pretty much the standard [*] what the Germans would do [sketches]. They have got a dual wall and the insulation that bridges there, and you have got insulation on the inside (not the outside) and you have got a cavity. And that is why their system works so well. But we are not going to pay for the extra wood because would you imagine what are cost will be to build like that. And the housing that we are building right now greatening speed, is there any improvement on the systems that we have got a problem with? No. It is exactly the same methodology that we used before. It drives me insane, and there is this desperate need to build houses badly yet again. And somehow the belief that the people building it will be more responsible and you have got them tied them up in some legal contract to perform. This is really not making one iota of difference. I can just foresee more problems with the housing that we are currently building. What should have been happening here is that the New Zealand government should be going to 4 or 5 contractors. And have them develop a prototype that would cost them 200,000§ each, whatever it is. And then we all get to criticize them, and we all get to praise them and we all get to say - because there are enough people who know what the problems are. And then when they have performed, and

you pick 2 and you say, this is the way we are going to build 20,000 houses in New Zealand. Not just getting us the best price, who has the biggest company, and who can finance the disaster when it is going to happen.
A: What you also can do is what they do in the Netherlands is to look at the 5 prototypes and combine the best practices from each prototype and say that is a new spec.
F: Absolutely.
A: And then everyone can submit a tender based on this spec.
F: And there is no alternative solution. Once you selected the way to build, then you train everyone to build it exactly like that. Then we will not have any problems, we do not learn.
A: But you can see in history as well that we are very slow in learning. [Non-relevant part skipped]. I can make some sense out of this. And I can understand your motivation to do this.
F: My children do not have the hope of finding a house in Auckland that they can afford.
A: So, you say that this type of manufacturing is cheaper?
T 1:05:00].
F: Indeed. For example, the foundation system I have got is fantastic, and you see it kind of is maximizing the use of containers. [Shows an example]. So, this is a bach in the middle of a forest, with a slightly sloped ground. This is the lower floor plan – where it falls away. And normally you would have to put in huge wooden piles. But all we have to do is putting in a little bit of earthwork for a 40-foot container. And in this container, I have got water tanks and a sewage system. This means I do not have to excavate that into the ground. I use two containers of 4000§ and 7000§.
A: How does that compare with conventional construction?
F: That would be more expensive: 10,000§ and the foundation 15,000§.
A: Would it be more expensive when you partly bury the containers into the ground?
F: You will be de-stabilizing the soil as well. The excavation would be about 5,000§. Hence you are saving about 5,000§ for not putting that into the ground and it is accessible all the time. And the fact that I got this up the ground is a saving on the sewage system which normally costs 19,000§ but now is costing 11,000§. That is because they do not have to dig it into the ground. From the maintenance point of view the sewage systems works on tiger worms so they just consume everything, and you just need an effluent field. This is our first prototype for the sewage system. It is perfect for the Pacific islanders because at the moment they are digging latrines which will contaminate the soil or the beach at some places. In March I will travel to Tonga where they had a massive cyclone about 2. 5 years ago. They have build about 10 or 15 houses of the probably 150 houses that were destroyed. But they are building timber kitset houses.
[1:10:00]
A: So who then is driving the aid organizations?
F: In fairness to these aid organisations, it gets complicated. Some of the Pacific islands want to direct the funds. So what happens is that they get the money and they decide who gets what. Which is not an ideal scenario because some of the money does not go where it should, which is the story in Africa and in a lot of other places. But if you would ask: "what do you need" they could say: "we need 2 toilet blocks we need 3 wards for the hospital and we need this that and the other", you give them those structures. The money cannot be directed to anyone else.
A: Do you conduct promotional activities with other organisations such as schools?
F: It could be good for promotions. Again you would have to convince organisations that operate in that space. I tended to communicate with the [name] aid organization. But they only do the initial first aid response – they come in with the tents and an organization like the Red Cross does the food parts. But you need the aid organisations that come in just behind them. What happens is that part of the assessment of the cyclone damage is done by the country itself and a group of consultants that are accepted.
A: You need to marry into those groups?
F: Yes. And then persuade them that we can convert containers – that are for example being used for transporting food or clothes – into something for the islanders. It is kind of winning organisations over. We can stack one container full of material. And we could convert the containers that are already in the Pacific island a as a group project. That is a possibility – there are lots of different opportunities. There really are.
A: Are you doing it on your own? Or have you got a small team of people?
F: I am doing it on my own, with CAD-guys and engineers, a core of people from [*] etc.
A: But that is not people who can influence politics, not business people or political savvy people?
F: Indeed. You would need someone who would be fulltime promoting this. I have got the housing ministers to come and have a look, and they can never quite make it. They are too busy. To be honest, you need the technical people who make the decision: "We will be putting this structure in on that site". These people are one step down; they are the hands-on people, because they will understand the system immediately. They are not the economist who is writing the check out. You actually have to speak to the people who do the work and say: "This is the dumbest construction ever – no clean water, no clean sand for the concrete for the foundation". You will have to go to those people who are trying to do the best job they can. But when they are aware of alternative systems, they will then say: "Oh hang on. This is a good system. Why didn't someone tell me about it"? You will have to get to those people who will then convince the people who write the check. Or the organization managers. "Look, this is a good system, we will consider doing it. Or we should build one here and see how it goes, and we work out what the costs end up".

[1:15:00]
F: I am trying to solve all the technical issues. Based on my history of aid work in Africa, I am anticipating the skill level – I know what you can find. There are lots of decisions you can make. You do not put glass in the windows, you use polycarbonate. Or perhaps it is so hot that you need shutters instead of windows. There is a whole lot of stuff that I believe I have solved. I will not have solved everything. However, I believe I've got enough resolution for a prototype to be built.
A: Would you benefit from master students from our [Construction Engineering] Department at AUT? If they could do some research for you or write some documents?
F: That would be fantastic. If students can tell me that the system that I have developed is higher than a 10 Green star [Gold star] sustainable building. It will be interesting to know, how this rates as system a [*] structure. It has a steel foundation; it is either a polystyrene or other PIR insulation. . . I have got no capacity to determine where it rates; I have not got time to follow the changes in the technology development of products.
A: But you need modern materials, state of the art materials I guess. Not NASA stuff, but proven technology?
F: I have the preference to use … I have trialed high-density polyethylene (from recycled bottles) on my commercial building as facades. The sun the wind and the rain. It is a perfect product in theory, but it walked & twisted like [*] and was totally impractical as a finish. So we ended up having to go back to fiber cement. And I have trialed it deliberately to see how it would perform. That is, again, me on my own without a technical team or laboratory behind me. Just me making the decision to do this. And then the client says: "do I pay for it".
A: But that is in a more commercial setting. I guess you have different markets here. These people on the islands…
F: The perfect island scenario is: the container structure is waterproof; it is black. But the supplier can put a white application and the supplier claims that this will reduce the impact of the sun by 80%. The other advantage of it is that it is potable. I more or less checked on this whether this product from an American supplier it is potable. It has been approved in South African as a potable membrane. But I do not know the quality of that report. Perhaps someone at the AUT can tell me more about it. Perhaps it is toxic. I do not know. May be, they get out of the building safely in case of a fire, I do not know. I want the best performing product that I can.
F: The cheapest thing is not to clad the Pacific Island containers. But I have tested it on my bach and it works well: what we can do is putting up a series of timber framing and the Islanders can apply a layer of coconut fibers on it. It will provide the container with an individual look. The next cyclone may blow away the fibers, but the framing will survive the next cyclone. You do not need a roof, although it could help in reducing the temperature.
[1:20:00]
F: The timber could be sourced locally, or could be delivered with the container. It could be assembled and the women can then do the lacing. That looks very attractive as a finish. That would also help in the adoption, and it screens the wall so that the heating effect is eliminated. And the breeze goes through it so you get good ventilation and no moisture trapped behind it. It is like common sense stuff again. You could even grow plants for gardening etc.
F: For me I am happy to collaborate with whoever I can to win them over. I cannot do it on my own. It would take me 20 years to get there. But if you get likeminded people and product manufacturing suppliers who will say: "All right, we will try". I have to win them over. There are some people who genuinely just want to help and do feel that is a good thing to do.
A: I will do two things. Investigate possibilities via AUT for contract research (via Dr. Andrew Hilton). And to a paper coordinator or academic (via Dr. James Rotimi or Dr. Ali Ghaffarian Hoseini) for assignments to master in construction students. To see whether some of the students could do an assignment, of course you would have give them a specific assignment and supervise that.
A: I will make this into a nice transcript (10 – 15 pages). It was all interesting but not all was relevant to my PhD. I will send you a summary and am glad you are interested in the round table discussion. Also: your website is good. Thank you very much for this interview.
[1:25:00]
[Rest of interview not related to research].
[: 1:30:00. End of interview].

Chapters 5: Survey I: Getting a Feel for the Data

§5.1 Questionnaire of online Survey I

Thank you for participating in this survey

How do we manage innovative suppliers?

This survey focuses on innovations in the *built environment* (architects, designers, project managers, construction firms, subcontractors, building product suppliers, facilities management). Such innovations are often risky and can be developed with suppliers.

However we do not know how innovative suppliers are managed when these innovations are procured or (co-)developed.

That is why I invite you to this 10 min survey. Your participation is anonymous and voluntary.
Five lucky respondents will get an hands-on handbook on improving business models.

We will organize a round-table discussion on this topic at**AUT** on **24 June** and at **NZGBC** on **7 July.** You are cordially invited.
Five lucky participants again get a copy of the book.

Please contact me for questions or remarks.

Kind regards,
(Mr) Anne Staal
Auckland University of Technology
astaal@aut.ac.nz
022 389 44 62

1

Participant Information

Please note the following:

- Survey results are confidential and cannot be related to your answers or your company.
- Survey results will only be used for academic purposes.
- You must not disclose information that may harm your company, your position or others.
- You have been selected as we assume from information on the Internet that your company has experience in working with innovative suppliers.
- Your participation is voluntarily.
- You may withdraw from the survey at any time.
- Survey results can be beneficial to your company & others as it may give insights in procurement & innovation practices with suppliers.
- Survey results can be beneficial for the PhD researcher as it helps in developing his insights for a PhD project.
- The researcher has extensive industry experience and is involved in Dutch research on procurement in SMEs.
- The research is supervised by Professor John Tookey and Dr. Jeff Seadon of AUT.
- The research is approved by AUT Ethics Committee 15/237.
- Please contact in the first instance the Project Supervisor Professor John Tookey, jtookey@aut.ac.nz, phone 09 21 9999 (ext. 9512) for any concerns regarding the nature of this research.
- Please contact the Executive Secretary of AUTEC, Kate O'Connor, ethics@aut.ac.nz, phone 09 21 9999 (ext. 6038) for any concerns regarding the conduct of this research.
- You can receive survey results, and indicate your interest in the round-table discussion.
- Allow us to send you one or two follow-up emails.
- Please forward the survey link to other interested persons.

You can now start with the survey!

PROCUREMENT PRACTICES - interacting with innovative suppliers

Realizing construction innovations often have an IDEA phase and a DEVELOPMENT phase.

1. In the IDEA phase innovative suppliers can contribute *in generating or assessing innovative ideas*. Please rank the importance of four procurement activities during this phase.

TOP 1 (most important) to TOP 4 (least important)

- ☐ Specify functionality wanted from innovative suppliers
- ☐ Find or select innovative suppliers
- ☐ Negotiate or draft contracts with innovative suppliers
- ☐ Manage relations with innovative suppliers

2. In the DEVELOP phase innovative suppliers can contribute *in the design or building prototypes*. Please rank the importance of four procurement activities during this phase.

TOP 1 (most important) to TOP 4 (least important)

- ☐ Specify functionality wanted from innovative suppliers
- ☐ Find or select innovative suppliers
- ☐ Negotiate or draft contracts with innovative suppliers
- ☐ Manage relations with innovative suppliers

The following questions discuss procurement practices in more detail.

3. Practices to specify functionality on innovations that our company needs from suppliers.

Please rank your TOP 3 of most important procurement practices.

	TOP 3
We focus on the technology that innovative suppliers provide	☐

3

	TOP 3
We focus on the economic value that innovative suppliers provide for our customers	☐
Our customers mainly determine key functional specifications for innovations	☐
Our company mainly determines key functional specifications for innovations	☐
Innovative suppliers contribute to functional specifications for innovations	☐
Innovative suppliers only contribute to technical specification for innovations	☐
Regulations or standards mainly determine key functional specifications for innovations	☐
We demand major contributions from innovative suppliers	☐
We use quite a formal process to determine the functionality we need	☐

Add other important procurement practices to specify functionality on innovations. (Please explain).

4

4. Practices to find or to select our innovative suppliers.

Please rank your TOP 3 of most important procurement practices.

	TOP 3
We have a good knowledge of innovative supplier markets	☐
We use price and availability criteria to select our innovative suppliers	☐
We use a wide range of criteria to select our innovative suppliers	☐
We know the resources and capabilities of our innovative suppliers	☐
Our innovative suppliers must be large or stable	☐
Our innovative suppliers must be flexible and cooperative	☐
Our innovative suppliers need to know our customers' profiles and demands	☐
We concentrate on selecting 1 – 2 key innovative suppliers	☐
We pro-actively scan overseas supplier markets for innovative suppliers	☐

Add other important procurement practices to search or select innovative suppliers. (Please explain).

5

5. Negotiate or contract practices with innovative suppliers.

Please rank your TOP 3 of most important procurement practices.

	TOP 3
We do compensate for our limited financial positions & low negotiating power	☐
We focus on formal written contracts	☐
We are satisfied with a set of emails and verbal agreements	☐
We make arrangements with innovative suppliers on use of patents, trademarks or trade secrets	☐
Our negotiations with innovative suppliers focus on managing risks	☐
Our negotiations with innovative suppliers focus on opportunities	☐
Our negotiations with innovative suppliers focus on total costs	☐
We reward innovative suppliers for successful innovations	☐
We prefer tri-party agreements for risky innovations	☐

Add other important procurement practices when negotiating with or contracting innovative suppliers.(Please explain).

6. Practices to manage relations with innovative suppliers.

Please rank your TOP 3 of most important procurement practices.

6

	TOP 3
Our experience & skills are important for managing innovative suppliers	☐
We mainly use contracts to manage innovative suppliers	☐
We mainly use social relations to manage innovative suppliers	☐
Our relations are adversarial and innovative suppliers are managed rigorously	☐
Our relations with innovative suppliers are based on mutual goals	☐
Our relations with innovative suppliers focus on delivery of a specific innovative product	☐
Our relations with innovative suppliers focus on mutual learning for future opportunities	☐
Innovative suppliers are always involved early in innovation processes	☐
We build trust and strong ties with innovative suppliers	☐

Add other important procurement practices to manage relationships with innovative suppliers. (Please explain).

7

ENTREPRENEURIAL PRACTICES - with innovative suppliers or customers

7. Please rank these practices with innovative suppliers or innovative customers

	very important	important	moderately important	not important	not at all important
Innovating activities with innovative customers are …	○	○	○	○	○
Innovating activities with innovative suppliers are …	○	○	○	○	○
Risk taking towards our innovative customers is …	○	○	○	○	○
Risk taking towards our innovative suppliers is …	○	○	○	○	○
Opportunities with innovative customers are …	○	○	○	○	○
Opportunities with innovative suppliers are …	○	○	○	○	○
Being aggressive to competition in customer markets is …	○	○	○	○	○
Being aggressive to competition in supplier markets is ...	○	○	○	○	○
Trust with innovative customers is …	○	○	○	○	○
Trust with innovative suppliers is …	○	○	○	○	○

Add comments on your company's orientation towards innovative suppliers or customers.

8

INNOVATION PRACTICES - with innovative suppliers

8. Please give the INTENSITY of the relationships with these types of innovative suppliers

	never used	low intensity	medium intensity	high intensity
... suppliers providing services	○	○	○	○
... suppliers manufacturing products	○	○	○	○
... suppliers in wholesale or distribution	○	○	○	○

Add comments on the intensity of your company's relations with innovative suppliers.

9. The innovations our company develops for or with ...

	only *process* innovations	mainly process innovations	both process & product innovations	mainly product innovations	only *product* innovations
... for innovative customers are ...	○	○	○	○	○
... with innovative suppliers are ...	○	○	○	○	○

Add your comments on process or product innovations.

Radical: a drastic improvement or change for either suppliers, company or customers.
Incremental: a gradual improvement for either suppliers, company or customers.

9

10. The innovations our company develops for or with ...

	only *radical*	mainly radical	neutral	mainly incremental	only *incremental*
... for innovative customers are ...	○	○	○	○	○
... with innovative suppliers are ...	○	○	○	○	○

Add comments on radical or incremental innovations.

11. Preferring foreign or domestic suppliers.

	only *domestic* suppliers	mainly domestic suppliers	both domestic & overseas suppliers	mainly overseas suppliers	only *overseas* suppliers
For (somewhat) incremental innovations we prefer ...	○	○	○	○	○
For (somewhat) radical innovations we prefer ...	○	○	○	○	○

Add your comments on overseas or domestic suppliers.

10

12. Preferring new or current suppliers

	only *new* suppliers	mainly new suppliers	both new & current suppliers	mainly current suppliers	only *current* suppliers
For (somewhat) incremental innovations we prefer ...	○	○	○	○	○
For (somewhat) radical innovations we prefer ...	○	○	○	○	○

Add your comments on new or current suppliers.

13. Preferring small or large suppliers

	only *small* suppliers	mainly small suppliers	both small & large suppliers	mainly large suppliers	only *large* suppliers
For (somewhat) incremental innovations we prefer ...	○	○	○	○	○
For (somewhat) radical innovations we prefer ...	○	○	○	○	○

Add your comments on large or small suppliers.

14. Estimated innovations developed with all our suppliers over the last 3 years.

(Please use whole number)

15. Estimated % of turnover from these innovations with all our suppliers over the last 3 years.

(Please use whole number)

11

16. Add any remarks on Question 14 or Question 15.

17. Our innovations with supplier interactions are beneficial for our company

- always
- frequently
- sometimes
- occassionally
- never

18. Our innovations with supplier interactions are beneficial to the natural environment

- Always
- Frequently
- Sometimes
- Occasionally
- Never

19. Our innovations without supplier interactions are beneficial for our company

- Always
- Frequently
- Sometimes
- Occasionally
- Never

20. Our innovations without supplier interactions are beneficial for the natural environment

- Always
- Frequently
- Sometimes
- Occasionally
- Never

12

COMPANY PROFILE

21. The size of our company

(Please indicate number of staff)

22. Number of staff involved in innovations with suppliers

(Please give estimated number of employees)

23. Number of staff involved in procurement of innovations with suppliers

(Please give estimated number of employees)

24. Age of your company

(In years)

25. Our estimated annual turnover (in percentages) comes from ...

Rank from TOP 1 (most important) to TOP 4 (least important).

- Turnover from providing services
- Turnover from manufacturing products
- Turnover from wholesale or distribution
- Not relevant, or turnover from other activities

26. Our strategy towards our customers is ...

Rank from TOP 1 (most important) to TOP 3 (least important).

- Delivering the best-possible innovative product or service (product leadership)
- Fulfil customers' needs by exactly following their demands (customer intimacy)
- Deliver a reasonable product against a (reasonably) low price (operational excellence)

13

27. Our strategy towards our customers or suppliers is ...

Rank from TOP 1 (most important) to TOP 3 (least important).

☐	Based on an entrepreneurial approach - we want growth and increased profits
☐	Based on a stable company income or non-financial benefits
☐	Based on trying to remain in business for the following year

28. My position in our company is ...

(please tick one or more boxes)

- ☐ Director or owner
- ☐ Responsible for innovation
- ☐ Responsible for marketing, sales or business development
- ☐ Responsible for operations
- ☐ Responsible for procurement or supply chain

29. My level of experience in the following areas is ...

(please tick one or more boxes)

	high	medium	low
Procurement or supply chain	☐	☐	☐
Marketing, sales or business development	☐	☐	☐
Innovation or new product development	☐	☐	☐
Management and strategy	☐	☐	☐
Overseas experience	☐	☐	☐

14

TOWARDS THE END OF THE SURVEY

30. Overall, rank how satisfied are you about ...

	very unsatisfied	unsatisfied	neutral	satisfied	very satisfied
procurement activities with our innovative suppliers	○	○	○	○	○
innovation activities with our innovative suppliers	○	○	○	○	○
marketing & sales activities with our innovative customers	○	○	○	○	○
innovation activities with our innovative customers	○	○	○	○	○
our internal innovation activities	○	○	○	○	○

We thank you for the time you have invested in this research and for the information you share.

Please indicate below if you want more information. Note that all results are anonymous. Your identify or company data will not be tied to the published survey results. You can check http://procurementgreeninnovationsphd.blogspot.co.nz/ for results of the survey.

Best regards,

John Tookey & Anne Staal
Built Engineering Management
Auckland University of Technology
astaal@aut.ac.nz; phone: 022 389 4462
jtookey@aut.ac.nz; phone: 021 137 2088

31. Please send me information on the round-table discussion at AUT (24 June) or at NZGBC (7 July)

○ yes

○ no

15

32. Please keep me updated on this AUT innovation research

- ◯ yes
- ◯ no

Add your comments on this survey.

33. Your contact details

(if you are interested in the round-table discussion or want to be updated on this research)

Name

Email Address

Phone Number

16

§5.1 Codebook SPSS on Survey I

Name	Label	Value	Measure
RespID	Respondent ID	None	Scl.
IdeaSp	Ranking in Idea phase Specify	{1, most important}...	Ord.
IdeaFS	Ranking in Idea phase Find or Select	{1, most important}...	Ord.
IdeaNC	Ranking in Idea phase Negotiate or Contract	{1, most important}...	Ord.
IdeaMR	Ranking in Idea phase Manage Relations	{1, most important}...	Ord.
DevlSp	Ranking in Develop phase Specify	{1, most important}...	Ord.
DevlFS	Ranking in Develop phase Find or Select	{1, most important}...	Ord.
DevlNC	Ranking in Develop phase Negotiate or Contract	{1, most important}...	Ord.
DevlMR	Ranking in Develop phase Manage Relations	{1, most important}...	Ord.
Sp1	Our company focuses on the technology the supplier provides	{5, TOP 3}...	Nom.
Sp2	Our company focuses on the economic value the supplier provides for our customers	{5, TOP 3}...	Nom.
Sp3	Our customers mainly determine key functional specifications for innovations	{5, TOP 3}...	Nom.
Sp4	Our company mainly determines key functional specifications for innovations	{5, TOP 3}...	Nom.
Sp5	Our suppliers contribute to key functional specifications for innovations	{5, TOP 3}...	Nom.
Sp6	Innovative suppliers only contribute to technical specifications for innovations	{5, TOP 3}...	Nom.
Sp7	Regulations or standards mainly determine key functional specifications for innovations	{5, TOP 3}...	Nom.
Sp8	We demand major contributions from key innovative suppliers	{5, TOP 3}...	Nom.
Sp9	We use quite a formal process to determine the functionality we need	{5, TOP 3}...	Nom.
FS1	We have a good knowledge of innovative supplier markets	{5, TOP 3}...	Nom.
FS2	We use prices and availability criteria to select innovative suppliers	{5, TOP 3}...	Nom.
FS3	We use a wide range of criteria to select innovative suppliers	{5, TOP 3}...	Nom.
FS4	We know the resources and capabilities of our innovative suppliers	{5, TOP 3}...	Nom.

Name	Label	Value	Measure
FS5	Our innovative suppliers must be large or stable	{5, TOP 3}...	Nom.
FS6	Our innovative suppliers must be flexible and cooperative	{5, TOP 3}...	Nom.
FS7	Our innovative suppliers need to know our customer's profiles and demands	{5, TOP 3}...	Nom.
FS8	We concentrate on selecting 1 – 2 innovative suppliers	{5, TOP 3}...	Nom.
FS9	We pro-actively scan overseas supplier markets for innovative suppliers	{5, TOP 3}...	Nom.
NC1	We do compensate for our limited financial positions & low negotiating power	{5, TOP 3}...	Nom.
NC2	We focus on formal written contracts	{5, TOP 3}...	Nom.
NC3	We are satisfied with a set of emails and verbal agreements	{5, TOP 3}...	Nom.
NC4	We make arrangements with innovative suppliers on use of patents, trademarks or trade secrets	{5, TOP 3}...	Nom.
NC5	Our supplier negotiations focus on managing risks	{5, TOP 3}...	Nom.
NC6	Our supplier negotiations focus on opportunities	{5, TOP 3}...	Nom.
NC7	Our supplier negotiations focus on total costs	{5, TOP 3}...	Nom.
NC8	We reward innovative suppliers for successful innovations	{5, TOP 3}...	Nom.
NC9	We prefer tri-party agreements for risky innovations	{5, TOP 3}...	Nom.
MR1	Our experience & skills are important for managing innovative suppliers	{5, TOP 3}...	Nom.
MR2	We mainly uses contracts to manage innovative suppliers	{5, TOP 3}...	Nom.
MR3	We mainly uses social relations to manage innovative suppliers	{5, TOP 3}...	Nom.
MR4	Relations are adversarial and innovative suppliers are managed rigorously	{5, TOP 3}...	Nom.
MR5	Relations with innovative suppliers are based on trust and mutual goals	{5, TOP 3}...	Nom.
MR6	Relations with innovative suppliers focus on delivery of a specific innovative product	{5, TOP 3}...	Nom.
MR7	Relations with innovative suppliers focus on mutual learning for future opportunities	{5, TOP 3}...	Nom.
MR8	Innovative suppliers are always involved early in innovation processes	{5, TOP 3}...	Nom.
MR9	We build trust and strong ties with innovative suppliers	{5, TOP 3}...	Nom.

Name	Label	Value	Measure
InnwICus	Innovating activities with Innovative Customers	{1, very important}...	Ord.
InnowISup	Innovating activities with Innovative Suppliers	{1, very important}...	Ord.
RiskICus	Risk taking towards Innovative Customers	{1, very important}...	Ord.
RiskISup	Risk taking towards Innovative Suppliers	{1, very important}...	Ord.
OppICus	Opportunities with Innovative Suppliers	{1, very important}...	Ord.
OppiSup	Opportunities with Innovative Customers	{1, very important}...	Ord.
AggCusM	Aggressiveness in Customer Markets	{1, very important}...	Ord.
AggSupM	Aggressiveness in Supplier Markets	{1, very important}...	Ord.
TrstICus	Trust with innovative Customers	{1, very important}...	Ord.
TrstISup	Trust with innovative Suppliers	{1, very important}...	Ord.
INTSERVS	Intensity of relationships with suppliers providing services	{1, never used}...	Ord.
INTMANUS	Intensity of relationships with suppliers manufacturing products	{1, never used}...	Ord.
INTWHOLS	Intensity of relationships with suppliers in wholesale or distribution	{1, never used}...	Ord.
PrdPrc4ICus	We develop product or process innovations /with our innovative customers	{1, only process innovations}...	Ord.
PrdPrc4ISup	We develop product or process innovations with our innovative suppliers	{1, only process innovations}...	Ord.
wInCus	We develop radical or incremental innovations for/with our innovative customers	{1, only radical}...	Ord.
wInSup	We develop radical or incremental innovations with our innovative suppliers	{1, only radical}...	Ord.
IncrInnFD	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	{1, only domestic suppliers}...	Ord.
RdInnFD	We prefer foreign or domestic suppliers for (somewhat) radical innovations	{1, only domestic suppliers}...	Ord.
IncrInnNwCur	We prefer new or current suppliers for (somewhat) incremental innovations	{1, only new suppliers}...	Ord.
RadInnNwCur	We prefer new or current suppliers for (somewhat) radical innovations	{1, only new suppliers}...	Ord.
IncrInnSL	We prefer small or large suppliers for (somewhat) incremental innovations	{1, only small suppliers}...	Ord.
RadInnSL	We prefer small or large suppliers for (somewhat) radical innovations	{1, only small suppliers}...	Ord.
NbrInno	Estimated number of innovations developed with all suppliers last 3 yrs	None	Scl.

Name	Label	Value	Measure
TurnInno	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	None	Scl.
InnWSupbC	Innovations with supplier interaction are beneficial for our company	{1, always}...	Ord.
InnWSupbE	Innovations with supplier interaction are beneficial for the natural environment	{1, always}...	Ord.
InnNSupbC	Innovations without supplier interaction are beneficial for our company	{1, always}...	Ord.
InnNSupbE	Innovations without supplier interaction are beneficial for the natural environment	{1, always}...	Ord.
ComSize	Company size in classes	{1, employees: 0 - 4}...	Nom.
StffInnoSup	Number of staff involved in innovations with suppliers	None	Scl.
StffInnoP	Number of staff involved in procurement of innovations with suppliers	None	Scl.
ComAge	Company age (in years)	None	Scl.
TurnServ	Company turnover from providing services	{1, most important}...	Ord.
TurnMan	Company turnover from manufacturing products	{1, most important}...	Ord.
TurnWhol	Company turnover from wholesale or distribution	{1, most important}...	Ord.
TurnOth	Company turnover from other activities or non relevant	{1, most important}...	Ord.
ProdLd	Customer strategy is product leadership	{1, most important}...	Ord.
CusInt	Customer strategy is customer intimacy	{1, most important}...	Ord.
OpEx	Customer strategy is operational excellence	{1, most important}...	Ord.
Entrepr	Company strategy towards customers or supplier is entrepreneurial	{1, most important}...	Ord.
Stable	Company strategy towards customers or supplier is lifestyle	{1, most important}...	Ord.
Survive	Company strategy towards customers or supplier is survival mode	{1, most important}...	Ord.
DirOwn	director or owner	{1, director or owner}...	Nom.
ResInno	responsible for innovation	{2, responsible for innovation}...	Nom.
ResMSBD	responsible for marketing, sales or business development	{3, responsible for marketing, sales or business development}...	Nom.

Name	Label	Value	Measure
ResOps	responsible for operations	{4, responsible for operations}...	Nom.
ResProcS	responsible for procurement or supply chain	{5, responsible for procurement or supply chain}...	Nom.
SatProcInSup	Satisfaction with procurement with innovative suppliers	{1, very unsatisfied}...	Ord.
SatInnInSup	Satisfaction with innovation with innovative suppliers	{1, very unsatisfied}...	Ord.
SatMSInCus	Satisfaction with marketing&sales with innovative customers	{1, very unsatisfied}...	Ord.
SatInnwInnCus	Satisfaction with innovation with innovative customers	{1, very unsatisfied}...	Ord.
SatIntInnAct	Satisfaction with internal innovation activities	{1, very unsatisfied}...	Ord.
InfoRTD	Want to be informed on the roundtable discusion	{1, yes}...	Nom.
Informed	Want to be informed about the research	{1, yes}...	Nom.
StaffInvolved inInnoSup_Bin	Number of staff involved in innovations with suppliers (Binned)	{1, < 2}...	Ord.
NbrInno_ binned	Estimated number of innovations developed with all suppliers last 3 yrs (Binned)	{1, 0 - 25 innovations last 3 yrs}...	Ord.
StffInnoProc_ binned	Number of staff involved in procurement of innovations with suppliers (Binned)	{1, 1 - 72 staff}...	Ord.
ExpProcurement	Experienced in Procurement or Supply Chain	{0, no data}...	Ord.
ExpSalesMrktgBD	Experienced in Sales Marketing or BD	{0, no data}...	Ord.
ExpNPDInno	Experienced in NPD or Innovation	{0, no data}...	Ord.
ExpMgmtStrat	Experienced in Mgmt or Strategy	{0, no data}...	Ord.
ExpOverseas	Experience in Oversea	{0, no data}...	Ord.
Completed_ W_o_Rank	Blank Cells - Completed Without Rank - for testing if 10 cases (ID 9-14,21,27,36,45) without the missing ranking Q (1,2, 25-28) are differerent from RoP	{0, incomplete}...	Nom.
CompletedYN _and_CompS_5	Indicating the 10 cases with partially missing data (ID 9-14, 21, 27, 36, 45) and compsize 5 (4,20,58,83,87,101,103,106,117,119)	{0, missing data}...	Nom.
ComSizeS_L	ComSize Small vs Large	{1.00, less than 99 fte}...	Nom.

§5.2 Respondents Rankings and Remarks with Survey Questions

§5.2.2 Procurement Practices (Q3 – Q6)

Table 25: Ranking "most important procurement practices" in procurement steps (*N*=112)[11]

Procurement Practice	n	n/Tot %	Cum n/Tot %	Pr Step Rk
Our supplier negotiations focus on opportunities	71	5,4%	5,4%	NC 1
Our company focuses on the economic value the supplier provides for our customers	66	5,0%	10,3%	SP 1
Our suppliers contribute to key functional specifications for innovations	65	4,9%	15,2%	SP 2
Our supplier negotiations focus on total costs	64	4,8%	20,1%	NC 2
Our innovative suppliers must be flexible and cooperative	64	4,8%	24,9%	FS 1
We build trust and strong ties with innovative suppliers	63	4,8%	29,6%	MR 1
Our supplier negotiations focus on managing risks	55	4,1%	33,8%	NC 3
Our company focuses on the technology the supplier provides	52	3,9%	37,7%	SP 3
Innovative suppliers are always involved early in innovation processes	51	3,8%	41,6%	MR 2
Relations with innovative suppliers are based on trust and mutual goals	47	3,5%	45,1%	MR 3
We focus on formal written contracts	47	3,5%	48,6%	NC 4
We use a wide range of criteria to select innovative suppliers	46	3,5%	52,1%	FS 2
Relations with innovative suppliers focus on mutual learning for future opportunities	46	3,5%	55,6%	MR 4
We use prices and availability criteria to select innovative suppliers	45	3,4%	59,0%	FS 3
We know the resources and capabilities of our innovative suppliers	42	3,2%	62,1%	FS 4
Our innovative suppliers need to know our customer's profiles and demands	41	3,1%	65,2%	FS 5
Our company mainly determines key functional specifications for innovations	38	2,9%	68,1%	SP 4
Relations with innovative suppliers focus on delivery of a specific innovative product	38	2,9%	71,0%	MR 5
Regulations or standards mainly determine key functional specifications for innovations	37	2,8%	73,8%	SP 5
Our experience & skills are important for managing innovative suppliers	36	2,7%	76,5%	MR 6
We reward innovative suppliers for successful innovations	34	2,6%	79,0%	NC 5
Our customers mainly determine key functional specifications for innovations	33	2,5%	81,5%	SP 6
We mainly uses contracts to manage innovative suppliers	31	2,3%	83,9%	MR 7
We concentrate on selecting 1 – 2 innovative suppliers	27	2,0%	85,9%	FS 6
We demand major contributions from key innovative suppliers	26	2,0%	87,9%	SP 6
We have a good knowledge of innovative supplier markets	26	2,0%	89,8%	FS 7
We pro-actively scan overseas supplier markets for innovative suppliers	22	1,7%	91,5%	FS 8
We are satisfied with a set of emails and verbal agreements	22	1,7%	93,1%	NC 6
Our innovative suppliers must be large or stable	20	1,5%	94,6%	FS 9
We make arrangements with innovative suppliers on patents, trademarks or trade secret	18	1,4%	96,0%	NC 7
We mainly uses social relations to manage innovative suppliers	17	1,3%	97,3%	MR 8
We use quite a formal process to determine the functionality we need	13	1,0%	98,3%	SP 8
We prefer tri-party agreements for risky innovations	8	0,6%	98,9%	NC 8
Innovative suppliers only contribute to technical specifications for innovations	7	0,5%	99,4%	SP 9
We do compensate for our limited financial positions & low negotiating power	5	0,4%	99,8%	NC 9
Relations are adversarial and innovative suppliers are managed rigorously	3	0,2%	100,0%	MR 9
	1326	**100%**		

[11] For reach practice, the table gives frequencies (n, and Tot), the frequency ratio (n/Tot%), a cumulative ratio (Cum n/Tot%), frequencies n versus population N. The most-right column ranks (1 to 9) each procurement step.

Remarks from respondents with each of the four procurement steps.

Table 26: Four Tables with remarks from Respondents on Procurement Practices

	Q3 Specify Innovation Needs
1	Its difficult to balance innovation against our clients economic values in the short term. When engaging professional services its important to manage that relationship to ensure key functional specifications for innovation are included or considered.
2	Length of time in market; long term reliability
3	We certainly demand a lot form our suppliers
4	Building practice in New Zealand is profit focused over functional and quality benefits. Innovative domestic suppliers are rare
5	best performance in relation to ROI
6	suppliers that have a hands on approach that work with us to develop the most efficient cost effective systems. Design engineers often don't look at cost effectiveness durability and local industry that can produce these products .
7	Establish a relationship that explore creative opportunities together by challenging existing boundaries. Ask why not! Set commercial outcomes in the first instance but seek secondary benefits such as ongoing management benefits .
8	Innovations have to be well supported and not locked in by one vendor
9	Life cycle of a business solution is a key factor when evaluating the feasibility of green-tech innovations.
10	Having the relationship with the supplier so that the doors are open, the supplier understands the needs of the enterprise and can contribute.
11	evidenced track record of delivery and development of green technology.
12	Suppliers Demonstrate compliance with building code through alternative solutions. Suppliers provide recommended fixing details and technical soecifications Suppliers assist with project telated technical problem solving
13	Innovative products and suppliers for me are products that do less harm to the environment than other similar products.
14	Total cost of ownership issues. i.e. the ongoing implications of innovation, runningcosts, repairs and maintenance, decommissioning, environmental issues etc.
15	Must not be innovation for innovation sake. Must be thought through. No gimmick.
16	Innovative suppliers must deliver input for specs or hand in ideas where we as a buying company don't even know that the solution was already on the market, that also indicates that we want to be the first on the market and of course share the mutual benefits.
17	sustainability community involvement

	Q4 Find & Select Innovative Suppliers
1	Innovation is a term widely used by suppliers but difficult to ascertain what practices these actually are. Sometimes we see innovation that suppliers consider normal practice or vice versa.
2	Ensure the relationship is mutually beneficial in terms of scale and benefits for both parties. Seek partners that add value with quality reporting and an ongoing commitment to the service.
3	Track record and word of mouth are still very important means of assessing performance
4	Identification of key personnel and their capabilities.
5	small suppliers

6	We develop knowledge and experience of working with suppliers over a number of projects and try to develop a good working relationship with them.
7	I judge innovative products against the criteria in the Living Building Challenge standard and can assess their suitability in a straightforward manner.
8	The answere given to question 4 could vary significantly depending on a number of factors: What is being procured (product or service, what suppliers are in the market and the prevailing market conditions. The risks need to be carefully considered
9	Innovative suppliers are not by definition large stable companies, so it is difficult to find and select the right suppliers. We use a wide range of criteria, however a clear model/tool to select innovative suppliers is not available yet.

	Q5 Negotiate or Contract with innovative suppliers
1	Risk is our number one consideration when contracting innovative suppliers this is predominately around cost, time and solution. Risks however can by its very nature stifle innovative practices and does limit potential solutions.
2	n/a
3	More on opportunities than on managing risks.
4	innovation is restricted due to profit focus
5	Establish a common understanding what success looks like.
6	intellectual property pass through arrangements or Partnering are key.
7	Negotiations vary depending on scale , perceived risk and degree of innovation required.
8	Typically, we partner up with innovative product suppliers and the payback they get is on media coverage around the green projects.
9	clarifications of this top 3: If a supplier is able to have an impact on our EBITDA results of the company it is important to reward this certain supplier, however upfront we always have a formal contract in place (also with reward schemes) but more important to have a non-disclosure agreement and IP-rights/trademarks etc covered in the contract.
10	1. availability 2. price 3. locality (using local products etc)

	Q6 Manage Relations with Innovative Suppliers
1	We default to a written contact as our number one consideration with our suppliers even if we have trusted relationship status or strong ties with our suppliers. We use contacts to limit our risk exposure and follow prudent management practices.
2	mutual learning for future opportunities
3	Effective communication is critical to success so to achieve develop trust in the relationship. Build commitment
4	Innovation is usually the result of positive collaboration between the buying organisation and the supplier
5	involvement is more on a case by case basis
6	we involve suppliers when needed
7	our innovative suppliers are involved on a need-to basis
8	Early involvement and early cost estimation are important as innovation is usually aimed at better value - more performance without too much extra cost and risk.
9	We also tend to build a strong relationship with the innovative supplier, though this is not often necessary.

10	There should always be a mutual benefit for as well the buying company as the innovative supplier. In managing such a relationship it is important to cover that at each level of the organization. (I don't see that in the questions, however in my opinion it is important create alignment with the top management, middle management and lower management of both companies)

§5.2.3 Supplier Types (Q11 – Q13)

Table 27: Respondents' Remarks on Supplier Types

	Q11 We prefer foreign versus domestic suppliers for either radical or incremental innovations (2 questions)
1	Overseas suppliers are frequently in front of New Zealand suppliers on innovation in process and technical ability
2	Will depend on skill set needed & client tolerance for OSeas involvement
3	Incremental is easier closer to home, radical innovations need to be proven overseas.
4	NZ is a limited manufacturing nation and when innovative ideas, materials or methodologies are considered, the reliance of subsidury or interation with other materials or assemblers (labour market) may be reliant of overseas assistance. Inovation for NZ is not just about developing a product or service to fit into existing practices but development the whole life cycle of an innovation (materials used, labour used, supporting materials needed for the innovation to function .....)
5	We have to comply with NZ standards and codes and regulations. Demonstrating compliance is time consuming, costly and sometimes risky.
6	has more to do with the possibility to organize face to face sessions
	Q12 We prefer new versus current suppliers for either radical or incremental innovations (2 questions)
1	Many industries do not have a "lessons learnt" mentality and as such, the wheel is continuingly being re-invented but never for the betterment of the wheel or the rider using that wheel.
	Q13 We prefer small versus large suppliers for either radical or incremental innovations (2 questions)
1	Supplier size does not control innovation. Smaller supplier are frequently more open to new ideas
2	Reliability is more important than size
3	Its more important to ask how agile is the supplier rather than how large or small is the organisation.
4	The size of the supplier is not at question but the ability to preform as the end user requires, is important.
5	Size is not most important. Many small suppliers in NZ represent large overseas companies.
6	Large suppliers can be innovative as well as smaller suppliers.
7	We tend to use small suppliers to trial innovations but then use large suppliers to ensure security in the supply chain.

§5.2.4 Intensity of Supplier Relations (Q8)

Table 28: Respondents' Remarks on Intensity of Supplier Relations

Q8 The intensity of relations with types of innovative suppliers
As a company we don't value innovative suppliers over non innovative supplies.
The intensity of the supply arrangement is often based on the business outcomes.
we work more with component suppliers
depends on type of service providers (innovative AED)
we work more with designers/consultants/architects than with contractors.
Also intense relationships with researchz
Answered in the context of a government organisation

§5.2.5 Innovation Types (Q9 – Q10)

Table 29: Respondents' Remarks on Innovation Types

	Q9 The innovations we develop with our suppliers - Product or Process innovations
1	Typically we seek design solutions that use proven and known technologies/ products and solutions.
2	Our focus is on delivering quality environments for our customers so that can only be achieved by knowing your business and your customers. Always seek to enhance the customer experience.
3	There is a new focus in our company on product innovation to increase top line profitability.
4	Innovation is required where materials products and systems from different suppliers come together, as suppliers usually restrict themselves to performance of just their own product or process.
5	Answered in the context of a government organisation
6	you need both to be really sucesful

	Q9 The innovations we develop with our suppliers - Radical or Incremental innovations
1	Typically we seek design solutions that use proven and known technologies/ solutions thereby through default we have mainly incremental developments.
2	The Radical or incremental approach is highly dependant on the status/knowledge/skills, the supplier/customer has or brings to the table in reference to the innovative product or service being proposed. Meaning, there are different approaches for different suppliers and there are different approaches for different customers.
3	We generally have incremental processes but sometime radical products.

4	We are a research-based organization, so we develop radical solutions for our clients. But the services provided to achieve that need to be reliable, because we are subject to compliance regulations and so on.
5	Answered in the context of a government organisation

§5.2.6 Entrepreneurial Orientation (Q7)

Q7 Entrepreneurial Orientation towards Innovative Customers or innovative Suppliers
focus towards supply side innovation is in its infancy in this organisation but is becoming increasingly important and formalised
Risk management is key in the Construction Sector low risk high yeild opportunities are focal points
Our responsibility is primarily to our customers. We have to manage cost- benefit and risk for them. Innovative suppliers create opportunities for us and help us manage the risks and technical challenges.
Our organisation does not have direct customers and there is no N/A option, as such not at all important has been selected for each customer related one.
Note. We are a public organisation rather than private industry
Innovative customers are important as they enhance projects and usually lead to an exciting combination of consultants. Innovative customers are hard to find however. Innovative suppliers have to be carefully judged against standards and long term economic benefit rather than short term gain.

§5.2.6 Correlations with Entrepreneurial Orientations Customers vs Suppliers (Q7)

Table 30 Spearman correlations for the 5 customer variables indicate that aggressiveness is not related. Rest moderate to weak correlations.

Correlations

			Innovating activities with Innovative Customers	Risk taking towards Innovative Customers	Opportunities with Innovative Customers	Aggressiveness in Customer Markets	Trust with innovative Customers
Spearman's rho	Innovating activities with Innovative Customers	Correlation Coefficient	1,000	,319**	,647**	-,040	,376**
		Sig. (2-tailed)	.	,001	,000	,681	,000
		N	110	107	107	108	108
	Risk taking towards Innovative Customers	Correlation Coefficient	,319**	1,000	,085	,216*	,062
		Sig. (2-tailed)	,001	.	,386	,026	,523
		N	107	107	106	106	107
	Opportunities with Innovative Customers	Correlation Coefficient	,647**	,085	1,000	-,103	,520**
		Sig. (2-tailed)	,000	,386	.	,290	,000
		N	107	106	107	107	107
	Aggressiveness in Customer Markets	Correlation Coefficient	-,040	,216*	-,103	1,000	,032
		Sig. (2-tailed)	,681	,026	,290	.	,744
		N	108	106	107	108	107
	Trust with innovative Customers	Correlation Coefficient	,376**	,062	,520**	,032	1,000
		Sig. (2-tailed)	,000	,523	,000	,744	.
		N	108	107	107	107	108

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 31: Spearman correlations for the 5 supplier variables indicate that aggressiveness is not related. Rest moderate to weak correlations.

Correlations

			Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Spearman's rho	Innovating activities with Innovative Suppliers	Correlation Coefficient	1,000	,210*	,584**	-,072	,397**
		Sig. (2-tailed)	.	,031	,000	,461	,000
		N	108	106	107	108	108
	Risk taking towards Innovative Suppliers	Correlation Coefficient	,210*	1,000	,283**	,136	,208*
		Sig. (2-tailed)	,031	.	,003	,164	,033
		N	106	106	106	106	106
	Opportunities with Innovative Suppliers	Correlation Coefficient	,584**	,283**	1,000	,057	,441**
		Sig. (2-tailed)	,000	,003	.	,556	,000
		N	107	106	107	107	107
	Aggressiveness in Supplier Markets	Correlation Coefficient	-,072	,136	,057	1,000	-,057
		Sig. (2-tailed)	,461	,164	,556	.	,559
		N	108	106	107	108	108
	Trust with innovative Suppliers	Correlation Coefficient	,397**	,208*	,441**	-,057	1,000
		Sig. (2-tailed)	,000	,033	,000	,559	.
		N	108	106	107	108	109

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 32: Spearman correlations on Entrepreneurial Orientation (yellow: significant relations on EO with suppliers).

Correlations

			Innovating activities with Innovative Customers	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Customers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Customers	Opportunities with Innovative Suppliers	Aggressiveness in Customer Markets	Aggressiveness in Supplier Markets	Trust with innovative Customers	Trust with innovative Suppliers
Spearman's rho	Innovating activities with Innovative Customers	Correlation Coefficient	1,000	,486**	,319**	,076	,647**	,301**	-,040	-,236*	,376**	,223*
		Sig. (2-tailed)	.	,000	,001	,440	,000	,002	,681	,014	,000	,020
		N	110	108	107	106	107	107	108	108	108	109
	Innovating activities with Innovative Suppliers	Correlation Coefficient	,486**	1,000	,096	,210*	,431**	,584**	,008	-,072	,341**	,397**
		Sig. (2-tailed)	,000	.	,327	,031	,000	,000	,938	,461	,000	,000
		N	108	108	106	106	107	107	108	108	107	108
	Risk taking towards Innovative Customers	Correlation Coefficient	,319**	,096	1,000	,607**	,085	,085	,055	,055	,062	,053
		Sig. (2-tailed)	,001	,327	.	,000	,386	,384	,026	,573	,523	,587
		N	107	106	107	105	106	106	106	106	107	107
	Risk taking towards Innovative Suppliers	Correlation Coefficient	,076	,210*	,607**	1,000	,039	,283**	,270**	,136	,052	,208*
		Sig. (2-tailed)	,440	,031	,000	.	,690	,003	,005	,164	,596	,033
		N	106	106	105	106	106	106	106	106	106	106
	Opportunities with Innovative Customers	Correlation Coefficient	,647**	,431**	,085	,039	1,000	,450**	-,103	-,195*	,520**	,284**
		Sig. (2-tailed)	,000	,000	,386	,690	.	,000	,290	,044	,000	,003
		N	107	107	106	106	107	107	107	107	107	107
	Opportunities with Innovative Suppliers	Correlation Coefficient	,301**	,584**	,085	,283**	,450**	1,000	,050	,057	,326**	,441**
		Sig. (2-tailed)	,002	,000	,384	,003	,000	.	,606	,556	,001	,000
		N	107	107	106	106	107	107	107	107	107	107
	Aggressiveness in Customer Markets	Correlation Coefficient	-,040	,008	,216*	,270**	-,103	,050	1,000	,716**	,032	-,017
		Sig. (2-tailed)	,681	,938	,026	,005	,290	,606	.	,000	,744	,863
		N	108	108	106	106	107	107	108	108	107	108
	Aggressiveness in Supplier Markets	Correlation Coefficient	-,236*	-,072	,055	,136	-,195*	,057	,716**	1,000	-,099	-,057
		Sig. (2-tailed)	,014	,461	,573	,164	,044	,556	,000	.	,312	,559
		N	108	108	106	106	107	107	108	108	107	108
	Trust with innovative Customers	Correlation Coefficient	,376**	,341**	,062	,052	,520**	,326**	,032	-,099	1,000	,655**
		Sig. (2-tailed)	,000	,000	,523	,596	,000	,001	,744	,312	.	,000
		N	108	107	107	106	107	107	107	107	108	108
	Trust with innovative Suppliers	Correlation Coefficient	,223*	,397**	,053	,208*	,284**	,441**	-,017	-,057	,655**	1,000
		Sig. (2-tailed)	,020	,000	,587	,033	,003	,000	,863	,559	,000	.
		N	109	108	107	106	107	107	108	108	108	109

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

§5.3 Respondents' Remarks Nbr of Innovations & % Turnover (Q14,15)

	Q14 Q15 Remarks with the estimated number of innovations and estimated turnover of innovations
1	Very difficult for me to ascertain as we don't actively track innovation with our suppliers or clients either in our financial process or our project profiles.
2	It takes time.
3	I would like to think our whole service offering is innovative, but the marginal increase due to specific collaborations is estimated as above
4	Start-up company with a 2-3 year incubation, currently launched.
5	speculative without proper analysis
6	Long gestation sometimes
7	not sure
8	Innovation plays a small part in the overall spend.
9	have 1 innovation with a key supplier
10	Not sure what is meant by these questions. I suppose that a §§ figure is required for Q14 and converted to a % for Q15. I am unable to answer these.
11	estimated innovations from key suppliers: 4
12	Lots of small changes suggested in discussions with suppliers which are not project related
13	Rather hard to define.
14	Large organisation so unable to know total number of innovations across organisation. Do not have turn over as government organisation.
15	The form did not let me put comments in boxes 14 and 15, therefore I entered 0.Not sure what you will be able to take from the answeres to these questions if they are not defined measured in the same way by each of the respondents
16	n.a
17	we don't track innovations
18	Cloud based service software for operations
19	difficult to determine one number
20	Q 15-- some innovation still in early stages of launching to market, growth will be rapid
21	Don't know the answer to 15 & 15
22	nil
23	We do not know the answer to Q14 Q15

Chapter 6: Survey I: Comp. Variables on Procurmnt MGMT

§6.2.1 Entrepren. Orientation & Procur. Priorities Idea & Develop (Q7,Q1-2)

Table 33: Procurement steps idea phase controlled for innovating w innovative suppliers (*N*=112)

Group Statistics

	Innovating with innovating Suppliers - recoded	N	Mean	Std. Deviation	Std. Error Mean
Ranking in Idea phase Specify	very important	41	2,02	,987	,154
	moderately to not at all important	21	1,95	1,024	,223
Ranking in Idea phase Find or Select	very important	41	1,71	,955	,149
	moderately to not at all important	22	2,68	1,086	,232
Ranking in Idea phase Negotiate or Contract	very important	41	3,27	,672	,105
	moderately to not at all important	22	3,05	1,090	,232
Ranking in Idea phase Manage Relations	very important	42	3,02	1,024	,158
	moderately to not at all important	23	2,22	,998	,208

Test Statistics[a,b]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations
Chi-Square	,114	11,975	,134	8,687
df	1	1	1	1
Asymp. Sig.	,735	,001	,714	,003

a. Kruskal Wallis Test

b. Grouping Variable: Innovating with innovating Suppliers - recoded

Table 34: Procurement steps idea phase controlled for opportunities w innovative suppliers (*N*=112)

Group Statistics

	Opportunities with innovative Suppliers - recoded	N	Mean	Std. Deviation	Std. Error Mean
Ranking in Idea phase Specify	very important	29	1,97	,865	,161
	moderately to not at all important	25	1,80	,866	,173
Ranking in Idea phase Find or Select	very important	29	1,76	1,091	,203
	moderately to not at all important	26	2,31	1,011	,198
Ranking in Idea phase Negotiate or Contract	very important	29	3,17	,711	,132
	moderately to not at all important	25	3,20	1,000	,200
Ranking in Idea phase Manage Relations	very important	30	3,13	1,008	,184
	moderately to not at all important	26	2,62	1,169	,229

Test Statistics[a,b]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations
Chi-Square	,582	5,033	,457	2,847
df	1	1	1	1
Asymp. Sig.	,445	,025	,499	,092

a. Kruskal Wallis Test

b. Grouping Variable: Opportunities with innovative Suppliers - recoded

Table 35: Procurement steps develop phase controlled for trust w innovative suppliers

Ranks

	Trust with innovative Suppliers - recoded	N	Mean Rank
Ranking in Develop phase Specify	very important	72	37,42
	moderately to not at all important	2	40,25
	Total	74	
Ranking in Develop phase Find or Select	very important	73	37,22
	moderately to not at all important	2	66,50
	Total	75	
Ranking in Develop phase Negotiate or Contract	very important	72	38,36
	moderately to not at all important	2	6,50
	Total	74	
Ranking in Develop phase Manage Relations	very important	72	37,56
	moderately to not at all important	2	35,50
	Total	74	

Test Statistics[a,b]

	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Chi-Square	,039	3,752	4,941	,019
df	1	1	1	1
Asymp. Sig.	,844	,053	,026	,890

a. Kruskal Wallis Test

b. Grouping Variable: Trust with innovative Suppliers - recoded

§6.2.2 Entrepreneurial Orientation & Procurement Practices (Q7, Q3-6)

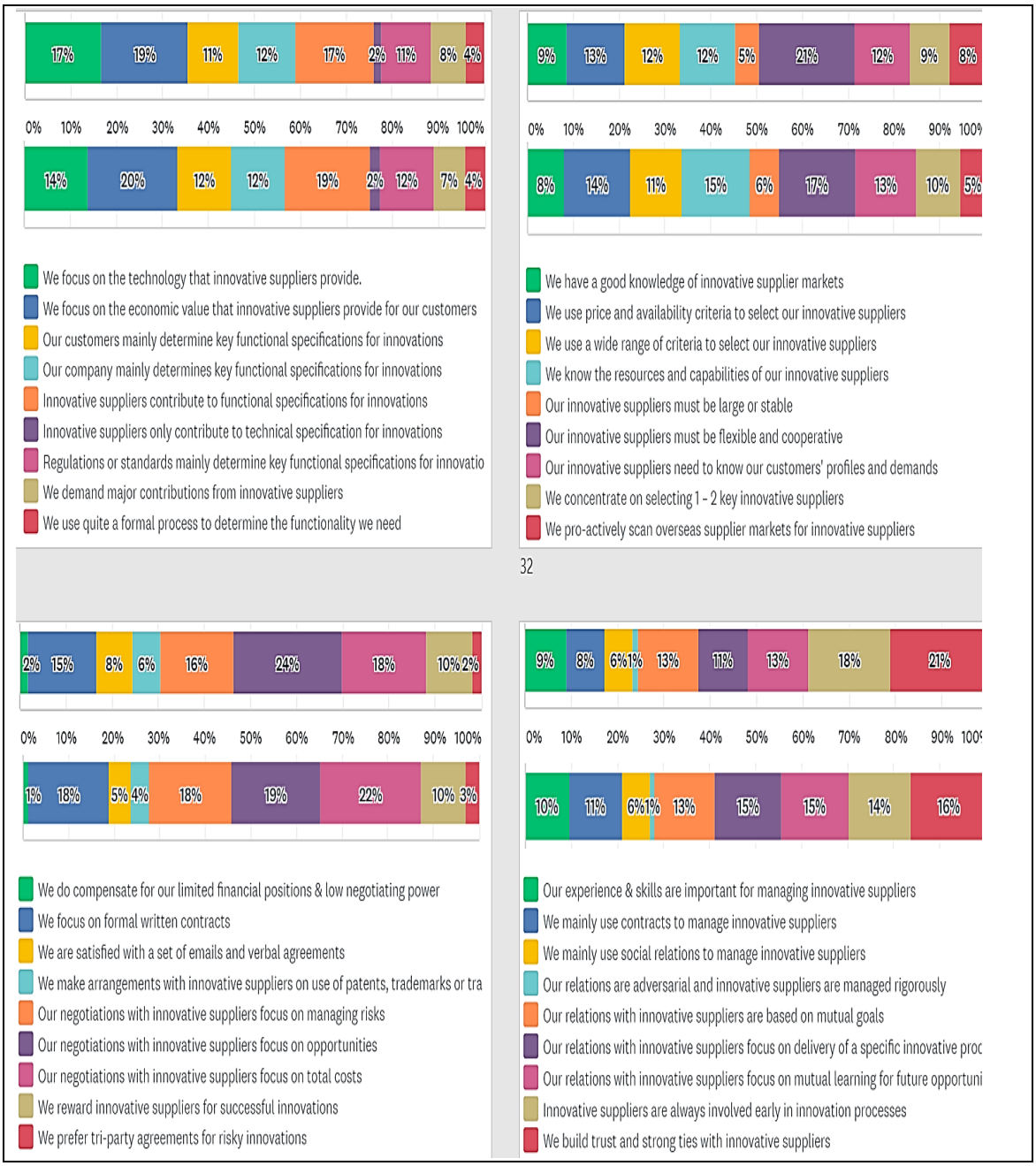


Figure 5: Practices controlled for the four entrepren. orientation variables combined w. innovative suppliers (N_{high}=78; N_{low}=61)[12]

[12] For this Figure and the next 5 Figures: Top left=specify-needs step; top right=find-select supplier step; bottom left=negotiate-contract step; bottom right manage-relations step. For each step, the top stacked bar chart relates to high (N_{high}, or N_{very}) levels, the below bar chart relates to low levels (N_{low}) of the specific entrepreneurial orientation variable. (Samples size N=111; high & low is listwise).

§6.2.3 Entrepreneurial Orientation, Innovation & Supplier Types (Q7, Q11-13)

Table 36: Three suppliers types controlled for entrepreneurial orientation to suppliers[13]

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	,530	,113	,612	,639	6,840	,587
df	1	1	1	1	1	1
Asymp. Sig.	,466	,736	,434	,424	,009	,444

a. Kruskal Wallis Test

b. Grouping Variable: Innovating with innovating Suppliers - recoded

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	,009	,092	,076	,496	,177	2,001
df	1	1	1	1	1	1
Asymp. Sig.	,925	,761	,782	,481	,674	,157

a. Kruskal Wallis Test

b. Grouping Variable: Risk taking with innovative Suppliers - recoded

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	,383	,557	1,949	,321	,005	,928
df	1	1	1	1	1	1
Asymp. Sig.	,536	,455	,163	,571	,941	,335

a. Kruskal Wallis Test

b. Grouping Variable: Opportunities with innovative Suppliers - recoded

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	,890	,001	,051	,103	1,676	1,240
df	1	1	1	1	1	1
Asymp. Sig.	,345	,980	,821	,748	,195	,265

a. Kruskal Wallis Test

b. Grouping Variable: Aggressive in Supplier Markets - recoded

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	1,706	3,325	2,636	,182	1,783	,004
df	1	1	1	1	1	1
Asymp. Sig.	,192	,068	,104	,670	,182	,948

a. Kruskal Wallis Test

b. Grouping Variable: Trust with innovative Suppliers - recoded

[13] Shapiro-Wilk tests, Q-Q-plots and especially box plots (exclude cases pairwise) found significant non-normality for the recoded supplier entrepreneurial orientation variables as IV and the supplier types as DV. Applied a 5-point Likert-scale: 1 only domestic, 2 mainly domestic, 3 both domestic and overseas, 4 mainly overseas, 5 only overseas suppliers. And: 1 only new, 2 mainly new, 3 both new & current, 4 mainly current,

§6.2.4 Entrepreneurial Orientation & Intensity of Supplier Relations (Q7, Q8)

Table 37: Intensity of relations controlled for entrepreneurial orientation towards suppliers

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	3,374	3,314	1,028
df	1	1	1
Asymp. Sig.	,066	,069	,311

a. Kruskal Wallis Test

b. Grouping Variable: Innovating with innovating Suppliers - recoded

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	,000	1,898	2,890
df	1	1	1
Asymp. Sig.	,993	,168	,089

a. Kruskal Wallis Test

b. Grouping Variable: Risk taking with innovative Suppliers - recoded

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	1,011	8,149	2,074
df	1	1	1
Asymp. Sig.	,315	,004	,150

a. Kruskal Wallis Test

b. Grouping Variable: Opportunities with innovative Suppliers - recoded

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	4,986	4,720	,101
df	1	1	1
Asymp. Sig.	,026	,030	,750

a. Kruskal Wallis Test

b. Grouping Variable: Aggressive in Supplier Markets - recoded

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	,369	4,574	,635
df	1	1	1
Asymp. Sig.	,544	,032	,425

a. Kruskal Wallis Test

b. Grouping Variable: Trust with innovative Suppliers - recoded

5 only current suppliers. And: 1 only small, 2 mainly small, 3 both large and small, 4 mainly large 5 only large suppliers.

§6.3.1 Experience Levels & Procur. Priorities Idea & Develop Phase (Q29,Q1-2)

Table 38: Procurement step priorities idea & develop phase controlled for experience levels (N_{avg}=54)

Test Statistics[a,b]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Chi-Square	,093	1,457	,055	,623	2,767	,078	2,586	,285
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,760	,227	,815	,430	,096	,780	,108	,593

a. Kruskal Wallis Test

b. Grouping Variable: procurement experience recoded into high and low

Test Statistics[a,b]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Chi-Square	,225	,470	2,793	1,954	2,311	3,955	,271	2,017
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,635	,493	,095	,162	,128	,047	,603	,156

a. Kruskal Wallis Test

b. Grouping Variable: Mgmt experience recoded into high and low

Test Statistics[a,b]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Chi-Square	6,598	4,457	,043	,048	,002	,086	,567	,002
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,010	,035	,835	,827	,966	,770	,451	,968

a. Kruskal Wallis Test

b. Grouping Variable: NPD or Innovation experience recoded into high and low

Test Statistics[a,b]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Chi-Square	,474	,000	,470	,003	,115	1,275	1,394	,249
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,491	,993	,493	,960	,735	,259	,238	,617

a. Kruskal Wallis Test

b. Grouping Variable: Experience in sales mrktg BD recoded into high and low levels

Test Statistics[a,b]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Chi-Square	4,341	,274	1,603	,455	3,674	4,938	2,047	,462
df	1	1	1	1	1	1	1	1
Asymp. Sig.	,037	,601	,205	,500	,055	,026	,153	,497

a. Kruskal Wallis Test

b. Grouping Variable: Experience overseas recoded high - low

§6.3.2 Experience Levels & Procurement Practices (Q29, Q3-6)

Figure 6: Practices procurement steps, high vs. low procurement experience (N_{high}=34; N_{low}=24)

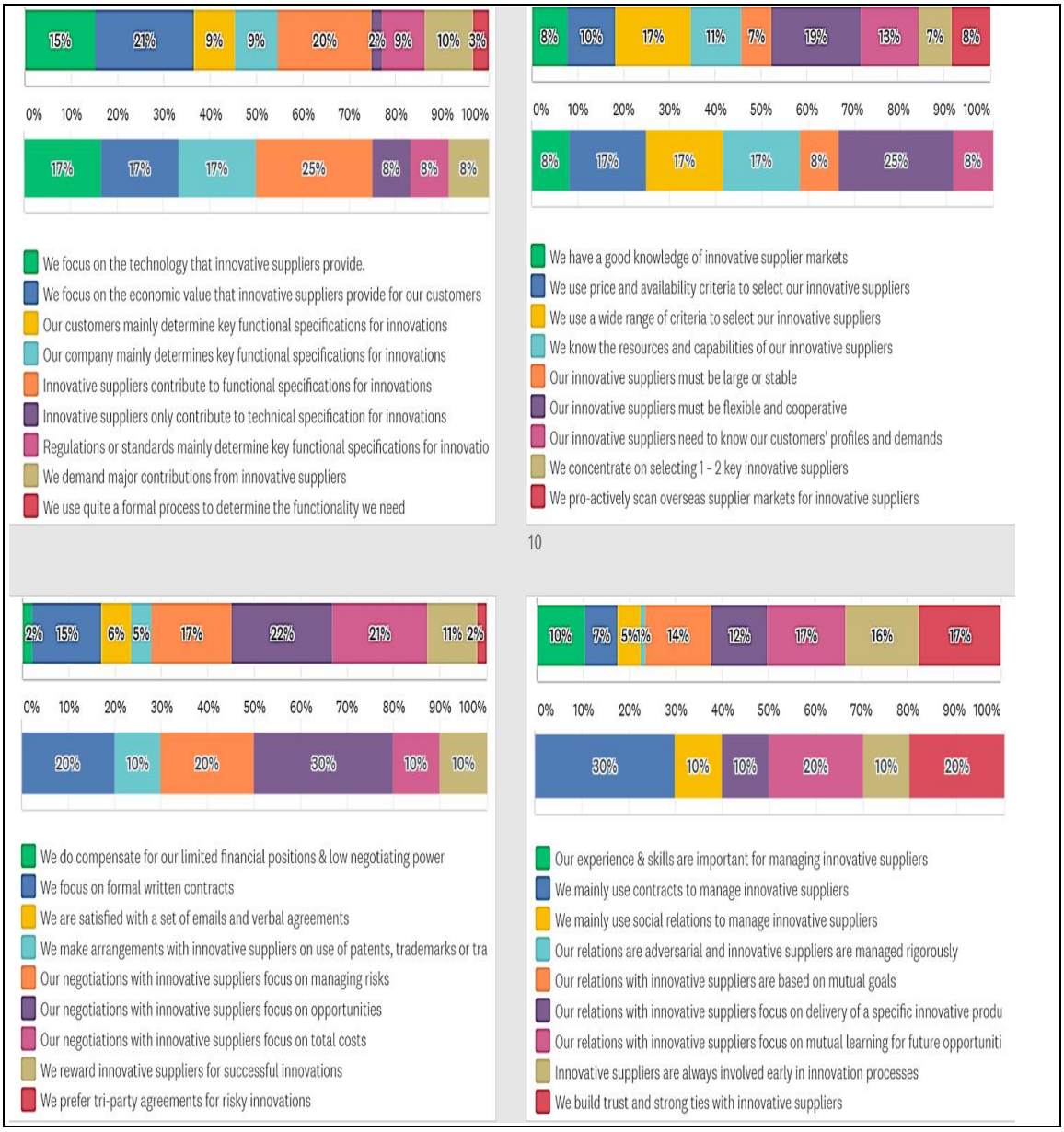


Figure 7: Practices procurement steps, high vs low mgmt & strat experience (N_{high}=61; N_{low}=4)

§6.3.3 Experience Levels & Supplier Types (Q29, Q11-13)

Table 39: Three supplier types controlled for recoded experience levels

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	,498	,064	,245	,177	,590	,048
df	1	1	1	1	1	1
Asymp. Sig.	,480	,801	,621	,674	,443	,827

a. Kruskal Wallis Test

b. Grouping Variable: procurement experience recoded into high and low

Test Statistics[a]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Mann-Whitney U	1.241,500	1.333,000	1.238,000	1.266,000	1.352,500	1.011,500
Wilcoxon W	2.369,500	3.044,000	2.949,000	2.977,000	2.480,500	2.722,500
Z	-,858	-,211	-,951	-,713	-,097	-2,958
Asymp. Sig. (2-tailed)	,391	,833	,341	,476	,923	,003

a. Grouping Variable: Management experience recoded high versus medium + low

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	1,065	,084	1,287	,113	1,444	10,605
df	1	1	1	1	1	1
Asymp. Sig.	,302	,772	,257	,737	,230	,001

a. Kruskal Wallis Test

b. Grouping Variable: NPD or Innovation experience recoded into high and low

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	,081	,158	,552	1,197	,006	3,651
df	1	1	1	1	1	1
Asymp. Sig.	,776	,691	,458	,274	,940	,056

a. Kruskal Wallis Test

b. Grouping Variable: Experience in sales mrktg BD recoded into high and low levels

Test Statistics[a,b]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Chi-Square	,158	,417	,584	,301	,055	,234
df	1	1	1	1	1	1
Asymp. Sig.	,691	,518	,445	,583	,815	,628

a. Kruskal Wallis Test

b. Grouping Variable: Experience overseas recoded high - low

§6.3.4 Experience Levels & Intensity of Supplier Relations (Q29, Q8)

Table 40: Intensity of supplier relations controlled for recoded experience levels

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	1,567	1,455	,145
df	1	1	1
Asymp. Sig.	,211	,228	,704

a. Kruskal Wallis Test

b. Grouping Variable: procurement experience recoded into high and low

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	,761	,725	2,038
df	1	1	1
Asymp. Sig.	,383	,395	,153

a. Kruskal Wallis Test

b. Grouping Variable: Management experience recoded high versus medium + low

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	,234	2,483	,009
df	1	1	1
Asymp. Sig.	,629	,115	,924

a. Kruskal Wallis Test

b. Grouping Variable: NPD or Innovation experience recoded into high and low

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	1,602	,117	2,576
df	1	1	1
Asymp. Sig.	,206	,733	,108

a. Kruskal Wallis Test

b. Grouping Variable: Experience in sales mrktg BD recoded into high and low levels

Test Statistics[a,b]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Chi-Square	,173	,198	,633
df	1	1	1
Asymp. Sig.	,678	,656	,426

a. Kruskal Wallis Test

b. Grouping Variable: Experience overseas recoded high - low

§6.3.6 Experience Levels & Entrepreneurial Orientation to Suppliers (Q29, Q7)

Table 41: Experience levels controlled for entrepreneurial orientation to suppliers

Test Statistics[a,b]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Chi-Square	1,767	,448	3,046	,510	,000
df	1	1	1	1	1
Asymp. Sig.	,184	,503	,081	,475	,984

a. Kruskal Wallis Test

b. Grouping Variable: procurement experience recoded into high and low

Test Statistics[a,b]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Chi-Square	1,902	,166	,986	1,131	,039
df	1	1	1	1	1
Asymp. Sig.	,168	,684	,321	,288	,843

a. Kruskal Wallis Test

b. Grouping Variable: Management experience recoded high versus medium + low

Test Statistics[a,b]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Chi-Square	6,574	,595	6,736	1,535	,573
df	1	1	1	1	1
Asymp. Sig.	,010	,441	,009	,215	,449

a. Kruskal Wallis Test

b. Grouping Variable: NPD or Innovation experience recoded into high and low

Test Statistics[a,b]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Chi-Square	,024	,100	,387	,687	,099
df	1	1	1	1	1
Asymp. Sig.	,876	,752	,534	,407	,753

a. Kruskal Wallis Test

b. Grouping Variable: Experience in sales mrktg BD recoded into high and low levels

Test Statistics[a,b]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Chi-Square	,600	,390	5,549	6,823	,928
df	1	1	1	1	1
Asymp. Sig.	,438	,532	,018	,009	,335

a. Kruskal Wallis Test

b. Grouping Variable: Experience overseas recoded high - low

§6.4.1 Strategy Types & Procurement Priorities Idea & Develop Phase (Q26, Q1-2)

Table 42: Procurement step priorities steps controlled for customer strategy variables

Test Statistics[a]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Mann-Whitney U	332,500	327,500	416,500	432,000	369,500	409,000	381,000	386,500
Wilcoxon W	1.367,500	517,500	606,500	1.560,000	1.359,500	599,000	571,000	1.376,500
Z	-1,488	-1,580	-,324	-,216	-,801	-,282	-,593	-,487
Asymp. Sig. (2-tailed)	,137	,114	,746	,829	,423	,778	,553	,626

a. Grouping Variable: Customer strategy is product leadership

Test Statistics[a]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Mann-Whitney U	272,500	341,500	324,500	384,000	387,500	366,000	345,000	314,500
Wilcoxon W	503,500	936,500	919,500	1.014,000	663,500	996,000	975,000	590,500
Z	-1,394	-,289	-1,181	-,307	-,253	-,600	-,958	-1,447
Asymp. Sig. (2-tailed)	,163	,773	,237	,759	,800	,549	,338	,148

a. Grouping Variable: Customer strategy is customer intimacy

Test Statistics[a]

	Ranking in Idea phase Specify	Ranking in Idea phase Find or Select	Ranking in Idea phase Negotiate or Contract	Ranking in Idea phase Manage Relations	Ranking in Develop phase Specify	Ranking in Develop phase Find or Select	Ranking in Develop phase Negotiate or Contract	Ranking in Develop phase Manage Relations
Mann-Whitney U	368,500	346,500	365,000	383,000	368,000	354,500	374,000	347,500
Wilcoxon W	1.449,500	499,500	518,000	1.464,000	521,000	507,500	1.364,000	1.337,500
Z	-,372	-,738	-,306	-,130	-,108	-,458	,000	-,442
Asymp. Sig. (2-tailed)	,710	,460	,760	,897	,914	,647	1,000	,658

a. Grouping Variable: Customer strategy is operational excellence

§6.4.2 Strategy Types & Procurement Practices (Q26, Q3-6)

Figure 8: Procurement practices controlled for levels of product leadership on (N_{high}=47;N_{low}=21)

Figure 9: Procurement practices controlled for levels of customer intimacy (N_{high}=35;N_{low}=23)

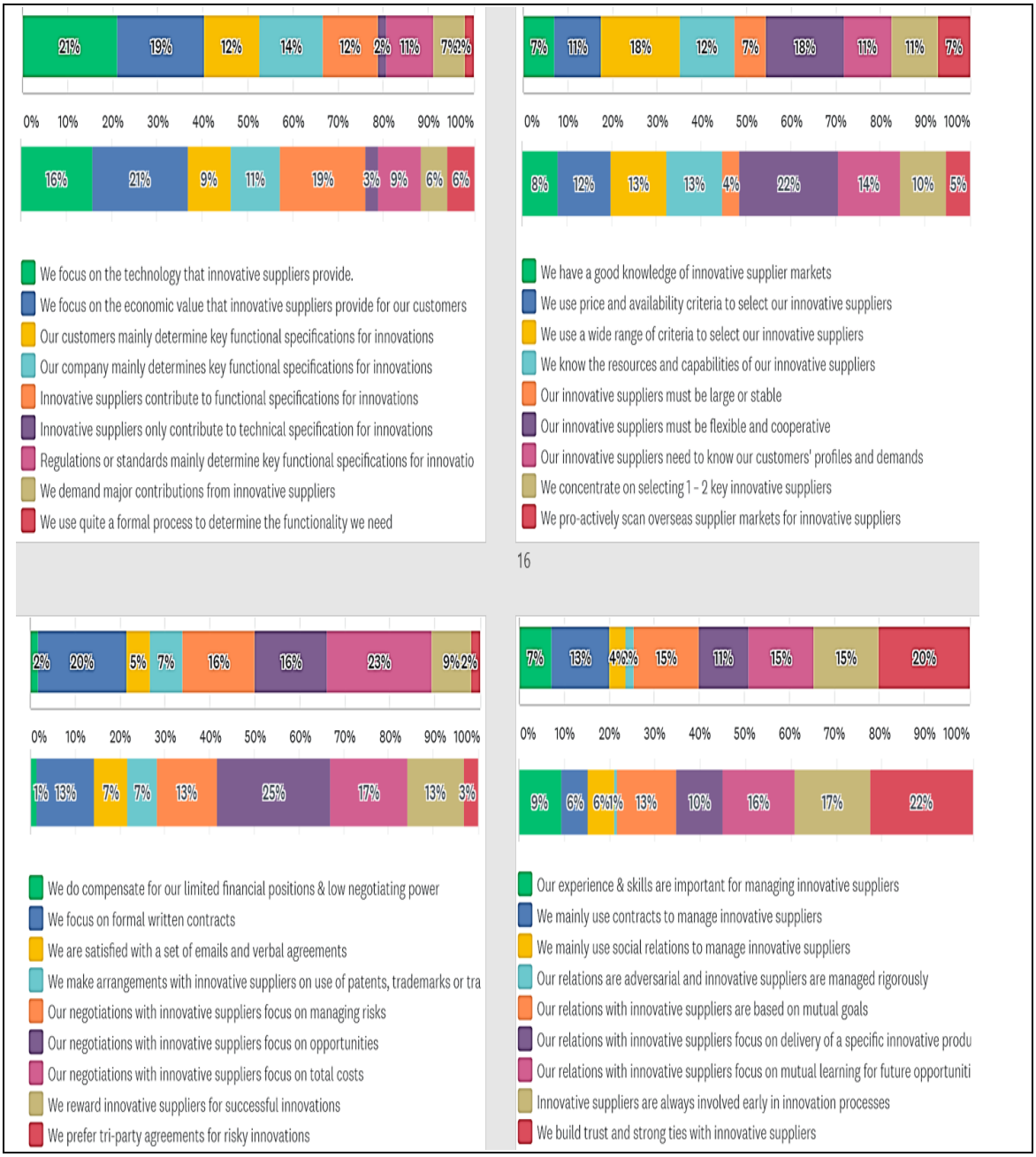


Figure 10: Procurement practices controlled for operational excellence levels (N_{high}=19;N_{low}=46)

§6.4.3 Strategy Types & Supplier Types (Q26, Q11-13)

Table 43: Significance levels of supplier types controlled for customer strategies

Test Statistics[a]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Mann-Whitney U	280,000	403,500	438,500	410,000	381,000	304,500
Wilcoxon W	470,000	593,500	1.566,500	1.538,000	1.509,000	1.432,500
Z	-2,571	-,654	-,132	-,586	-1,267	-2,485
Asymp. Sig. (2-tailed)	,010	,513	,895	,558	,205	,013

a. Grouping Variable: Customer strategy is product leadership

Test Statistics[a]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Mann-Whitney U	343,000	386,000	369,000	335,000	363,500	329,000
Wilcoxon W	973,000	662,000	645,000	611,000	993,500	605,000
Z	-1,033	-,299	-,628	-1,295	-,944	-1,606
Asymp. Sig. (2-tailed)	,302	,765	,530	,195	,345	,108

a. Grouping Variable: Customer strategy is customer intimacy

Test Statistics[a]

	We prefer foreign or domestic suppliers for (somewhat) incremental innovations	We prefer foreign or domestic suppliers for (somewhat) radical innovations	We prefer new or current suppliers for (somewhat) incremental innovations	We prefer new or current suppliers for (somewhat) radical innovations	We prefer small or large suppliers for (somewhat) incremental innovations	We prefer small or large suppliers for (somewhat) radical innovations
Mann-Whitney U	322,000	366,500	390,000	350,500	306,000	375,500
Wilcoxon W	475,000	519,500	1.471,000	1.431,500	1.387,000	1.456,500
Z	-1,184	-,412	-,018	-,693	-1,814	-,292
Asymp. Sig. (2-tailed)	,236	,680	,986	,488	,070	,771

a. Grouping Variable: Customer strategy is operational excellence

§6.4.4 Strategy Types & Intensity of Supplier Relations (Q26, Q8)

Table 44: Intensity of supplier relations controlled for customer strategies[14]

Test Statistics[a]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Mann-Whitney U	350,500	355,500	349,000
Wilcoxon W	1.478,500	545,500	539,000
Z	-1,486	-1,363	-1,446
Asymp. Sig. (2-tailed)	,137	,173	,148

a. Grouping Variable: Customer strategy is product leadership

[14] Intensity of relations used a 4-Likert-scale: 1 never used; 2 low intensity; 3 medium intensity; 4 high intensity.

Test Statistics[a]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Mann-Whitney U	326,000	239,500	362,000
Wilcoxon W	956,000	869,500	992,000
Z	-1,321	-2,750	-,680
Asymp. Sig. (2-tailed)	,186	,006	,497

a. Grouping Variable: Customer strategy is customer intimacy

Test Statistics[a]

	Intensity of relationships with suppliers providing services	Intensity of relationships with suppliers manufacturing products	Intensity of relationships with suppliers in wholesale or distribution
Mann-Whitney U	340,000	332,000	284,000
Wilcoxon W	1.421,000	1.413,000	437,000
Z	-,867	-,962	-1,729
Asymp. Sig. (2-tailed)	,386	,336	,084

a. Grouping Variable: Customer strategy is operational excellence

§6.4.5 Strategy Types & Innovation Types (Q26, Q9-10)

Table 45: Innovation types controlled for customer strategy product leadership

Ranks

	Customer strategy is product leadership	N	Mean Rank	Sum of Ranks
We develop product or process innovations with our innovative suppliers	most important	47	36,73	1.726,50
	least important	19	25,50	484,50
	Total	66		
We develop radical or incremental innovations with our innovative suppliers	most important	47	31,89	1.499,00
	least important	19	37,47	712,00
	Total	66		

Test Statistics[a]

	We develop product or process innovations with our innovative suppliers	We develop radical or incremental innovations with our innovative suppliers
Mann-Whitney U	294,500	371,000
Wilcoxon W	484,500	1.499,000
Z	-2,660	-1,134
Asymp. Sig. (2-tailed)	,008	,257

a. Grouping Variable: Customer strategy is product leadership

When controlled for operational excellence, respondents who scored high on operational would have more often (mainly) process innovations instead of product innovations with innovative suppliers. (Table below). This is understandable from the focus of process improvements in this customer strategy. This difference was statistically significant.

Table 46: Innovation types controlled for customer strategy operational excellence

Ranks

	Customer strategy is operational excellence	N	Mean Rank	Sum of Ranks
We develop product or process innovations with our innovative suppliers	most important	17	25,21	428,50
	least important	46	34,51	1.587,50
	Total	63		
We develop radical or incremental innovations with our innovative suppliers	most important	17	32,91	559,50
	least important	46	31,66	1.456,50
	Total	63		

Test Statistics[a]

	We develop product or process innovations with our innovative suppliers	We develop radical or incremental innovations with our innovative suppliers
Mann-Whitney U	275,500	375,500
Wilcoxon W	428,500	1.456,500
Z	-2,101	-,258
Asymp. Sig. (2-tailed)	,036	,797

a. Grouping Variable: Customer strategy is operational excellence

When controlled for the three company strategies, respondents who scored high on entrepreneurial strategy would more often develop radical innovations with suppliers. This difference was statistically significant. (Table below).

Table 47: Innovation types controlled for the company strategy entrepreneurial

Ranks

	Company strategy towards customers or supplier is entrepreneurial	N	Mean Rank	Sum of Ranks
We develop product or process innovations with our innovative suppliers	most important	43	30,13	1.295,50
	least important	15	27,70	415,50
	Total	58		
We develop radical or incremental innovations with our innovative suppliers	most important	43	27,03	1.162,50
	least important	15	36,57	548,50
	Total	58		

Test Statistics[a]

	We develop product or process innovations with our innovative suppliers	We develop radical or incremental innovations with our innovative suppliers
Mann-Whitney U	295,500	216,500
Wilcoxon W	415,500	1.162,500
Z	-,563	-1,999
Asymp. Sig. (2-tailed)	,574	,046

a. Grouping Variable: Company strategy towards customers or supplier is entrepreneurial

Likewise, when controlled for company strategies, respondents who scored high on lifestyle strategy would less often develop radical innovations with innovative suppliers. This difference was statistically significant. (Table below).

Table 48: Innovation types controlled for the company strategy lifestyle

Ranks

	Company strategy towards customers or supplier is lifestyle	N	Mean Rank	Sum of Ranks
We develop product or process innovations with our innovative suppliers	most important	35	25,07	877,50
	least important	14	24,82	347,50
	Total	49		
We develop radical or incremental innovations with our innovative suppliers	most important	35	28,56	999,50
	least important	14	16,11	225,50
	Total	49		

Test Statistics[a]

	We develop product or process innovations with our innovative suppliers	We develop radical or incremental innovations with our innovative suppliers
Mann-Whitney U	242,500	120,500
Wilcoxon W	347,500	225,500
Z	-,074	-3,019
Asymp. Sig. (2-tailed)	,941	,003

a. Grouping Variable: Company strategy towards customers or supplier is lifestyle

§6.4.6 Strategy Types & Entrepreneurial Orientation to Suppliers (Q26, Q7)

Table 49: Entrepreneurial orientation variables controlled for product leadership

Ranks

	Customer strategy is product leadership	N	Mean Rank	Sum of Ranks
Innovating activities with Innovative Suppliers	most important	47	33,09	1.555,00
	least important	19	34,53	656,00
	Total	66		
Risk taking towards Innovative Suppliers	most important	46	33,85	1.557,00
	least important	19	30,95	588,00
	Total	65		
Opportunities with Innovative Suppliers	most important	47	32,72	1.538,00
	least important	19	35,42	673,00
	Total	66		
Aggressiveness in Supplier Markets	most important	47	35,24	1.656,50
	least important	19	29,18	554,50
	Total	66		
Trust with innovative Suppliers	most important	47	34,07	1.601,50
	least important	19	32,08	609,50
	Total	66		

Test Statistics[a]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Mann-Whitney U	427,000	398,000	410,000	364,500	419,500
Wilcoxon W	1.555,000	588,000	1.538,000	554,500	609,500
Z	-,299	-,589	-,556	-1,201	-,465
Asymp. Sig. (2-tailed)	,765	,556	,578	,230	,642

a. Grouping Variable: Customer strategy is product leadership

Table 50: Entrepreneurial orientation variables when controlled for customer intimacy

Ranks

	Customer strategy is customer intimacy	N	Mean Rank	Sum of Ranks
Innovating activities with Innovative Suppliers	most important	35	29,86	1.045,00
	least important	23	28,96	666,00
	Total	58		
Risk taking towards Innovative Suppliers	most important	35	30,67	1.073,50
	least important	23	27,72	637,50
	Total	58		
Opportunities with Innovative Suppliers	most important	35	31,20	1.092,00
	least important	23	26,91	619,00
	Total	58		
Aggressiveness in Supplier Markets	most important	35	29,27	1.024,50
	least important	23	29,85	686,50
	Total	58		
Trust with innovative Suppliers	most important	35	30,04	1.051,50
	least important	23	28,67	659,50
	Total	58		

Test Statistics[a]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Mann-Whitney U	390,000	361,500	343,000	394,500	383,500
Wilcoxon W	666,000	637,500	619,000	1.024,500	659,500
Z	-,213	-,695	-1,018	-,131	-,370
Asymp. Sig. (2-tailed)	,831	,487	,309	,895	,711

a. Grouping Variable: Customer strategy is customer intimacy

Table 51: Entrepreneurial orientation variables controlled for operational excellence

Ranks

	Customer strategy is operational excellence	N	Mean Rank	Sum of Ranks
Innovating activities with Innovative Suppliers	most important	17	35,82	609,00
	least important	46	30,59	1.407,00
	Total	63		
Risk taking towards Innovative Suppliers	most important	16	32,19	515,00
	least important	45	30,58	1.376,00
	Total	61		
Opportunities with Innovative Suppliers	most important	16	33,03	528,50
	least important	46	30,97	1.424,50
	Total	62		
Aggressiveness in Supplier Markets	most important	17	27,26	463,50
	least important	46	33,75	1.552,50
	Total	63		
Trust with innovative Suppliers	most important	17	29,94	509,00
	least important	46	32,76	1.507,00
	Total	63		

Test Statistics[a]

	Innovating activities with Innovative Suppliers	Risk taking towards Innovative Suppliers	Opportunities with Innovative Suppliers	Aggressiveness in Supplier Markets	Trust with innovative Suppliers
Mann-Whitney U	326,000	341,000	343,500	310,500	356,000
Wilcoxon W	1.407,000	1.376,000	1.424,500	463,500	509,000
Z	-1,093	-,331	-,425	-1,296	-,717
Asymp. Sig. (2-tailed)	,275	,741	,671	,195	,473

a. Grouping Variable: Customer strategy is operational excellence

Chapter 7: Survey I: Comp. & Proc. Variables on Performce.

§7.1 Performance variables

Table 52 Bivariate correlations on output & process performance variables – uncoded & recoded

Correlations

			Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Spearman's rho	Estimated number of innovations developed with all suppliers last 3 yrs	Correlation Coefficient	1,000	,175
		Sig. (2-tailed)	.	,135
		N	82	74
	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Correlation Coefficient	,175	1,000
		Sig. (2-tailed)	,135	.
		N	74	74
	Innovations with supplier interaction are beneficial for our company	Correlation Coefficient	-,166	-,166
		Sig. (2-tailed)	,135	,157
		N	82	74
	Innovations with supplier interaction are beneficial for the natural environment	Correlation Coefficient	-,080	-,025
		Sig. (2-tailed)	,472	,831
		N	82	74
	Innovations without supplier interaction are beneficial for our company	Correlation Coefficient	-,161	-,071
		Sig. (2-tailed)	,147	,548
		N	82	74
	Innovations without supplier interaction are beneficial for the natural environment	Correlation Coefficient	-,058	-,005
		Sig. (2-tailed)	,606	,968
		N	82	74
	Innovations with suppliers are beneficial for our company recoded	Correlation Coefficient	-,114	-,256
		Sig. (2-tailed)	,406	,072
		N	55	50
	Innovations with suppliers are beneficial for the natural environment recoded	Correlation Coefficient	-,061	-,047
		Sig. (2-tailed)	,710	,787
		N	40	36
	Innovations without suppliers are beneficial for our company recoded	Correlation Coefficient	-,174	-,162
		Sig. (2-tailed)	,265	,317
		N	43	40
	Innovations without suppliers are beneficial for the natural environment recoded	Correlation Coefficient	-,026	-,046
		Sig. (2-tailed)	,871	,783
		N	42	38
	Satisfaction with procurement with innovative suppliers	Correlation Coefficient	,258*	,041
		Sig. (2-tailed)	,021	,730
		N	80	72
	Satisfaction with innovation with innovative suppliers	Correlation Coefficient	,332**	,083
		Sig. (2-tailed)	,003	,489
		N	79	71
	Satisfaction with marketing&sales with innovative customers	Correlation Coefficient	,191	,230
		Sig. (2-tailed)	,092	,054
		N	79	71
	Satisfaction with innovation with innovative customers	Correlation Coefficient	,162	,124
		Sig. (2-tailed)	,155	,303
		N	79	71
	Satisfaction with internal innovation activities	Correlation Coefficient	,275*	,105
		Sig. (2-tailed)	,014	,382
		N	80	72
	Satisfaction innovation procurement recoded	Correlation Coefficient	,449**	,115
		Sig. (2-tailed)	,001	,440
		N	52	47
	Satisfaction innovative suppliers recoded	Correlation Coefficient	,420**	,108
		Sig. (2-tailed)	,002	,469
		N	52	47
	Satisfaction MS w customers recoded	Correlation Coefficient	,211	,394*
		Sig. (2-tailed)	,216	,031
		N	36	30
	Satisfaction innovation w customers recoded	Correlation Coefficient	,103	,020
		Sig. (2-tailed)	,465	,893
		N	53	49
	Satisfaction internal innovation activities recoded	Correlation Coefficient	,386**	-,048
		Sig. (2-tailed)	,005	,757
		N	51	45

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Note: significant relations are indicated in yellow.

Table 53 Non-parametric bivariate correlations on performance variables; uncoded & recoded

Correlations																										
		Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company recoded	Innovations without supplier interaction are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Spearman's rho	Estimated number of innovations developed with all suppliers last 3 yrs	Correlation Coefficient	1,000	,175	-,166	-,080	-,161	-,058	-,114	-,061	-,174	-,026	,258*	,332**	,191	,162	,275*	,449**	,420**	,211	,103	,386**
		Sig. (2-tailed)	.	,135	,135	,472	,147	,606	,406	,710	,265	,871	,021	,003	,092	,155	,014	,001	,002	,216	,465	,005
		N	82	74	82	82	82	82	55	40	43	42	80	79	79	79	80	52	52	36	53	51
	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Correlation Coefficient	,175	1,000	-,166	-,025	-,071	-,005	-,256	-,047	-,162	-,046	,041	,083	,230	,124	,105	,115	,108	,394*	,020	-,048
		Sig. (2-tailed)	,135	.	,157	,831	,548	,968	,072	,787	,317	,783	,730	,459	,054	,303	,382	,440	,469	,031	,893	,757
		N	74	74	74	74	74	74	50	36	40	38	72	71	71	71	72	47	47	30	49	45
	Innovations with supplier interaction are beneficial for our company	Correlation Coefficient	-,166	-,166	1,000	,620**	,196*	,272**	,510**	,630**	,209	,369**	-,287**	-,320**	-,209*	-,180	-,127	,269*	-,182	-,277	-,139	-,116
		Sig. (2-tailed)	,157	.	.	,000	,038	,004	,000	,000	,127	,004	,003	,001	,023	,068	,198	,028	,141	,051	,243	,341
		N	82	74	112	112	112	112	71	52	55	56	104	103	104	103	105	67	67	50	72	69
	Innovations with supplier interaction are beneficial for the natural environment	Correlation Coefficient	-,080	-,025	,620**	1,000	,197*	,532**	,304**	,781**	,213	,617**	-,151	-,331**	-,223*	-,335**	-,186	-,180	-,366**	-,245	-,358**	-,265**
		Sig. (2-tailed)	,472	,831	,000	.	,037	,000	,010	,000	,119	,000	,127	,001	,023	,001	,058	,145	,002	,086	,002	,028
		N	82	74	112	112	112	112	71	52	55	56	104	103	104	103	105	67	67	50	72	69
	Innovations without supplier interaction are beneficial for our company	Correlation Coefficient	-,161	-,071	,196*	,197*	1,000	,668**	,137	,263	,920**	,740**	,215*	-,240*	-,209*	-,080	-,042	-,155	-,117	-,144	-,108	-,040
		Sig. (2-tailed)	,147	,548	,038	,037	.	,000	,253	,059	,000	,000	,029	,015	,033	,423	,673	,209	,347	,320	,368	,743
		N	82	74	112	112	112	112	71	52	55	56	104	103	104	103	105	67	67	50	72	69
	Innovations without supplier interaction are beneficial for the natural environment	Correlation Coefficient	-,058	-,005	,272**	,532**	,668**	1,000	,078	,579**	,740**	,906**	,233*	-,388**	-,274**	-,274**	-,095	-,173	-,387**	-,261	-,333**	-,149
		Sig. (2-tailed)	,606	,968	,004	,000	,000	.	,516	,000	,000	,000	,017	,000	,005	,005	,334	,161	,001	,067	,004	,221
		N	82	74	112	112	112	112	71	52	55	56	104	103	104	103	105	67	67	50	72	69
	Innovations without suppliers are beneficial for our company recoded	Correlation Coefficient	-,114	-,256	,510**	,304*	,137	,078	1,000	,632**	,196	,139	,064	-,112	,014	,000	,040	,098	-,110	,092	,116	,098
		Sig. (2-tailed)	,406	,072	,000	,010	,253	,516	.	,000	,213	,047	,639	,261	,911	,998	,743	,497	,423	,584	,419	,509
		N	55	50	71	71	71	71	71	42	42	44	69	69	69	69	70	50	55	38	51	48
	Innovations without suppliers are beneficial for the natural environment recoded	Correlation Coefficient	-,061	-,047	,630**	,781**	,263	,579**	,632**	1,000	,365*	,701**	,899**	,740**	-,159	-,409**	-,204	-,392**	-,158	-,525**	-,095	-,407**	-,357*
		Sig. (2-tailed)	,710	,787	,000	,000	,059	,000	,000	.	,047	,000	,269	,004	,160	,000	,274	,002	,194	,000	,666	,013	,035
		N	40	36	52	52	52	52	42	52	30	38	50	49	49	50	50	33	31	23	37	35
	Innovations without suppliers are beneficial for our company recoded	Correlation Coefficient	-,174	-,162	,208	,213	,920**	,740**	,196	,365*	1,000	,897**	,325**	,965**	,328**	,365**	,016	-,153	-,133	-,187	-,136	,000
		Sig. (2-tailed)	,265	,317	,127	,119	,000	,000	,213	,047	.	,000	,019	,008	,028	,455	,910	,403	,468	,370	,424	1,000
		N	43	40	55	55	55	55	42	30	55	39	52	51	52	52	53	32	32	25	37	35
	Innovations without suppliers are beneficial for the natural environment recoded	Correlation Coefficient	-,026	-,046	,383**	,617**	,740**	,906**	,139	,701**	,897**	1,000	,390**	,605**	-,413**	-,392**	-,092	-,276	-,600**	-,397*	-,484**	-,190
		Sig. (2-tailed)	,871	,783	,004	,000	,000	,000	,368	,000	,000	.	,003	,000	,002	,003	,504	,114	,000	,045	,002	,254
		N	42	38	56	56	56	56	44	38	39	56	55	54	54	55	54	34	34	26	40	38
	Satisfaction with innovative suppliers recoded	Correlation Coefficient	,258*	,041	-,287**	-,151	-,215*	-,233*	,064	-,159	-,325**	-,390**	1,000	,645**	,249*	,492**	,285**	,890**	,524**	,368**	,499**	,315**
		Sig. (2-tailed)	,021	,730	,003	,127	,029	,017	,601	,269	,019	,003	.	,000	,011	,000	,003	,000	,000	,009	,000	,009
		N	80	72	104	104	104	104	69	50	52	55	104	103	103	103	104	67	67	49	72	68
	Satisfaction with innovation with innovative suppliers	Correlation Coefficient	,332**	,093	-,320**	-,331**	-,240*	-,388**	-,112	-,409**	-,365**	-,605**	,645**	1,000	,381**	,450**	,310**	,644**	,877**	,458**	,482**	,389**
		Sig. (2-tailed)	,003	,488	,001	,001	,015	,000	,361	,004	,008	,000	,000	.	,000	,000	,001	,000	,000	,001	,000	,001
		N	79	71	103	103	103	103	68	49	51	64	103	103	103	102	103	66	67	49	71	67
	Satisfaction with marketing&sales with innovative customers	Correlation Coefficient	,191	,230	-,209*	-,223*	-,209*	-,274**	,014	-,204	-,306**	-,413**	,249*	,381**	1,000	,322**	,261**	,287**	,377**	,871**	,380**	,345**
		Sig. (2-tailed)	,092	,054	,033	,023	,033	,005	,911	,160	,028	,002	,011	,000	.	,001	,008	,020	,002	,000	,001	,004
		N	79	71	104	104	104	104	69	49	52	54	103	103	104	102	104	66	67	50	71	68
	Satisfaction with innovative customers	Correlation Coefficient	,162	,124	-,180	-,335**	-,080	-,274**	,000	-,382**	-,106	-,392**	,482**	,450**	,322**	1,000	,298**	,378**	,484**	,184	,880**	,386**
		Sig. (2-tailed)	,155	,303	,068	,001	,423	,005	1,000	,006	,455	,003	,000	,000	,001	.	,002	,000	,000	,207	,000	,001
		N	79	71	103	103	103	103	69	50	52	55	103	102	102	103	103	67	67	49	72	68
	Satisfaction with internal innovation activities	Correlation Coefficient	,275*	,105	-,127	-,186	-,042	-,095	,040	-,158	-,016	-,092	,285**	,310**	,261**	,298**	1,000	,334**	,289*	,512**	,209	,787**
		Sig. (2-tailed)	,014	,382	,198	,058	,673	,334	,743	,274	,910	,504	,003	,001	,008	,002	.	,006	,018	,000	,078	,000
		N	80	72	105	105	105	105	70	50	53	55	104	103	104	103	105	67	67	50	72	69
	Satisfaction innovation procurement recoded	Correlation Coefficient	,449**	,115	-,266*	-,160	-,155	-,173	,098	-,194	-,153	-,276	,890**	,644**	,287*	,376**	,334**	1,000	,741**	,581**	,566**	,499**
		Sig. (2-tailed)	,001	,440	,028	,145	,209	,161	,497	,279	,403	,114	,000	,000	,020	,002	,006	.	,000	,000	,000	,000
		N	52	47	67	67	67	67	50	33	32	34	67	66	66	67	67	67	55	36	54	47
	Satisfaction innovative suppliers recoded	Correlation Coefficient	,420**	,108	-,182	-,366**	-,117	-,387**	-,110	-,525**	-,133	-,600**	,524**	,877**	,377**	,484**	,289*	,741**	1,000	,539**	,649**	,536**
		Sig. (2-tailed)	,002	,469	,141	,002	,347	,001	,423	,002	,468	,000	,000	,000	,002	,000	,018	,000	.	,000	,000	,000
		N	52	47	67	67	67	67	55	31	32	34	67	67	67	67	67	55	67	38	51	49
	Satisfaction MS w customers recoded	Correlation Coefficient	,211	,394*	-,277	-,245	-,144	-,261	,092	,095	-,187	-,397*	,368**	,458**	,871**	,184	,512**	,581**	,539**	1,000	,503**	,677**
		Sig. (2-tailed)	,216	,031	,051	,066	,320	,067	,594	,666	,370	,045	,009	,001	,000	,207	,000	,000	,000	.	,001	,000
		N	36	30	50	50	50	50	38	23	25	26	49	49	50	49	50	36	50	43	33	
	Satisfaction innovation w customers recoded	Correlation Coefficient	,103	,020	-,139	-,356**	-,108	-,333**	,116	-,407*	-,136	-,484**	,499**	,482**	,389**	,880**	,209	,566**	,649**	,503**	1,000	,437**
		Sig. (2-tailed)	,465	,893	,243	,002	,368	,004	,419	,013	,424	,002	,000	,000	,000	,000	,078	,000	,000	,001	.	,001
		N	53	49	72	72	72	72	51	37	37	40	72	71	71	72	72	54	51	43	72	53
	Satisfaction internal innovation activities recoded	Correlation Coefficient	,386**	-,048	-,116	-,265*	-,040	-,149	,098	-,357*	,000	-,190	,315**	,389**	,345**	,386**	,787**	,499**	,536**	,677**	,437**	1,000
		Sig. (2-tailed)	,005	,757	,341	,028	,743	,221	,509	,035	1,000	,254	,009	,001	,004	,001	,000	,000	,000	,001	,001	.
		N	51	45	69	69	69	69	48	35	35	38	68	67	68	68	69	47	49	33	53	69

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Coloured cells indicate analysed correlations.

§7.1 Effects of procurement performance variables

Combined Tables with mean ranks and significance of # of innovations and % of turnover controlled for four benefits and five satisfaction variables

Table 54 Mean ranks & significances controlled for innovations with supplier interaction are beneficial for our company

Ranks

	Innovations with supplier interaction are beneficial for our company	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	always	17	42,18
	frequently	33	47,58
	sometimes	27	34,74
	occassionally	4	40,38
	never	1	16,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	always	17	37,94
	frequently	28	42,79
	sometimes	24	34,15
	occassionally	4	20,88
	never	1	29,00
	Total	74	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	5,521	4,904
df	4	4
Asymp. Sig.	,238	,297

a. Kruskal Wallis Test

b. Grouping Variable: Innovations with supplier interaction are beneficial for our company

Ranks

	Innovations with suppliers are beneficial for our company recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Always or frequently	50	28,57
	Occassionally or never	5	22,30
	Total	55	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Always or frequently	45	26,72
	Occassionally or never	5	14,50
	Total	50	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	,706	3,220
df	1	1
Asymp. Sig.	,401	,073

a. Kruskal Wallis Test

b. Grouping Variable: Innovations with suppliers are beneficial for our company recoded

Table 55: Mean ranks & significances controlled for innovations with supplier interaction are beneficial for the natural environment

Ranks

	Innovations with supplier interaction are beneficial for the natural environment	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	always	13	43,65
	frequently	17	45,79
	sometimes	42	39,08
	occassionally	10	41,55
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	always	13	38,23
	frequently	14	37,25
	sometimes	38	37,89
	occassionally	9	35,17
	Total	74	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	1,106	,138
df	3	3
Asymp. Sig.	,776	,987

a. Kruskal Wallis Test

b. Grouping Variable: Innovations with supplier interaction are beneficial for the natural environment

Ranks

	Innovations with suppliers are beneficial for the natural environment recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Always or frequently	30	20,90
	Occassionally or never	10	19,30
	Total	40	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Always or frequently	27	18,78
	Occassionally or never	9	17,67
	Total	36	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	,143	,076
df	1	1
Asymp. Sig.	,705	,783

a. Kruskal Wallis Test

b. Grouping Variable: Innovations with suppliers are beneficial for the natural environment recoded

Table 56: Mean ranks & significances controlled for innovations without supplier interaction are beneficial for our company

Ranks

	Innovations without supplier interaction are beneficial for our company	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	always	5	47,80
	frequently	21	48,21
	sometimes	39	38,08
	occassionally	12	41,21
	never	5	34,40
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	always	5	30,80
	frequently	20	41,85
	sometimes	34	37,79
	occassionally	10	28,55
	never	5	42,70
	Total	74	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	3,315	3,386
df	4	4
Asymp. Sig.	,507	,495

a. Kruskal Wallis Test

b. Grouping Variable: Innovations without supplier interaction are beneficial for our company

Ranks

	Innovations without suppliers are beneficial for our company recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Always or frequently	26	23,73
	Occassionally or never	17	19,35
	Total	43	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Always or frequently	25	21,94
	Occassionally or never	15	18,10
	Total	40	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	1,269	1,027
df	1	1
Asymp. Sig.	,260	,311

a. Kruskal Wallis Test

b. Grouping Variable: Innovations without suppliers are beneficial for our company recoded

Table 57: Mean ranks & significances controlled for innovations without supplier interaction are beneficial for the natural environment

Ranks

	Innovations without supplier interaction are beneficial for the natural environment	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	always	6	57,92
	frequently	16	33,44
	sometimes	40	43,79
	occassionally	12	41,79
	never	8	33,44
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	always	6	35,75
	frequently	14	39,57
	sometimes	36	37,47
	occassionally	10	28,95
	never	8	46,00
	Total	74	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	6,053	3,047
df	4	4
Asymp. Sig.	,195	,550

a. Kruskal Wallis Test

b. Grouping Variable: Innovations without supplier interaction are beneficial for the natural environment

Ranks

	Innovations without suppliers are beneficial for the natural environment recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Always or frequently	22	21,80
	Occassionally or never	20	21,18
	Total	42	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Always or frequently	20	19,98
	Occassionally or never	18	18,97
	Total	38	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	,027	,079
df	1	1
Asymp. Sig.	,869	,779

a. Kruskal Wallis Test

b. Grouping Variable: Innovations without suppliers are beneficial for the natural environment recoded

Table 58: Mean ranks & significances controlled for satisfied with procurement with innovations innovative suppliers

Ranks

	Satisfaction with procurement with innovative suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very unsatisfied	1	16,50
	unsatisfied	8	19,81
	neutral	28	38,45
	satisfied	39	48,95
	very satisfied	4	19,88
	Total	80	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	unsatisfied	7	31,43
	neutral	25	36,86
	satisfied	36	37,53
	very satisfied	4	33,88
	Total	72	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	16,155	,578
df	4	3
Asymp. Sig.	,003	,902

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction with procurement with innovative suppliers

Ranks

	Satisfaction innovation procurement recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	low satisfaction	9	11,89
	high satisfaction	43	29,56
	Total	52	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	low satisfaction	7	20,29
	high satisfaction	40	24,65
	Total	47	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	10,266	,613
df	1	1
Asymp. Sig.	,001	,434

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction innovation procurement recoded

Table 59: Mean ranks & significances controlled for satisfied with innovation with innovative suppliers

Ranks

	Satisfaction with innovation with innovative suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	unsatisfied	11	23,05
	neutral	27	36,72
	satisfied	36	47,14
	very satisfied	5	43,60
	Total	79	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	unsatisfied	10	31,90
	neutral	24	35,38
	satisfied	33	37,71
	very satisfied	4	35,88
	Total	71	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	10,309	,655
df	3	3
Asymp. Sig.	,016	,884

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction with innovation with innovative suppliers

Ranks

	Satisfaction innovative suppliers recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	low satisfaction	11	14,41
	high satisfaction	41	29,74
	Total	52	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	low satisfaction	10	21,20
	high satisfaction	37	24,76
	Total	47	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	9,008	,538
df	1	1
Asymp. Sig.	,003	,463

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction innovative suppliers recoded

Table 60: Mean ranks & significances controlled for satisfied with marketing & sales with innovative customers

Ranks

	Satisfaction with marketing&sales with innovative customers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very unsatisfied	2	47,00
	unsatisfied	6	24,75
	neutral	43	38,91
	satisfied	26	42,46
	very satisfied	2	70,25
	Total	79	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very unsatisfied	2	22,00
	unsatisfied	4	21,75
	neutral	41	35,13
	satisfied	23	40,80
	very satisfied	1	46,00
	Total	71	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	6,805	4,455
df	4	4
Asymp. Sig.	,147	,348

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction with marketing&sales with innovative customers

Ranks

	Satisfaction MS w customers recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	low satisfaction	8	14,44
	high satisfaction	28	19,66
	Total	36	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	low satisfaction	6	8,75
	high satisfaction	24	17,19
	Total	30	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	1,564	4,512
df	1	1
Asymp. Sig.	,211	,034

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction MS w customers recoded

Table 61: Mean ranks & significances controlled for satisfied innovation with innovative customers

Ranks

	Satisfaction with innovation with innovative customers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very unsatisfied	2	47,00
	unsatisfied	7	35,50
	neutral	26	33,75
	satisfied	39	44,64
	very satisfied	5	39,80
	Total	79	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very unsatisfied	2	21,75
	unsatisfied	6	41,75
	neutral	22	31,61
	satisfied	36	37,56
	very satisfied	5	42,90
	Total	71	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	4,032	3,227
df	4	4
Asymp. Sig.	,402	,521

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction with innovation with innovative customers

Ranks

	Satisfaction innovation w customers recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	low satisfaction	9	23,56
	high satisfaction	44	27,70
	Total	53	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	low satisfaction	8	24,38
	high satisfaction	41	25,12
	Total	49	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	,547	,019
df	1	1
Asymp. Sig.	,460	,892

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction innovation w customers recoded

Table 62: Mean ranks & significances controlled for satisfaction with internal innovation activities

Ranks

	Satisfaction with internal innovation activities	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very unsatisfied	1	8,50
	unsatisfied	8	25,56
	neutral	29	38,62
	satisfied	35	44,60
	very satisfied	7	49,43
	Total	80	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very unsatisfied	1	51,50
	unsatisfied	6	41,25
	neutral	27	30,70
	satisfied	31	39,31
	very satisfied	7	40,21
	Total	72	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	7,620	3,733
df	4	4
Asymp. Sig.	,107	,443

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction with internal innovation activities

Ranks

	Satisfaction internal innovation activities recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	low satisfaction	9	13,83
	high satisfaction	42	28,61
	Total	51	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	low satisfaction	7	24,43
	high satisfaction	38	22,74
	Total	45	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs
Chi-Square	7,453	,099
df	1	1
Asymp. Sig.	,006	,753

a. Kruskal Wallis Test

b. Grouping Variable: Satisfaction internal innovation activities recoded

§7.2.1 Effects of Company size

Table 63: Performance variables controlled for company size small vs large -recoded 2 classes

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,388	1,001	,136	1,946	,002	,716	1,134	4,321	,000	1,120	1,767	,017	,113	1,955	,011	2,382	,059	,321	2,385	,514
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,129	,317	,712	,163	,965	,397	,287	,038	1,000	,290	,184	,896	,737	,162	,918	,123	,808	,571	,122	,473

a. Kruskal Wallis Test

b. Grouping Variable: ComSize Small (< 99) vs Large (> 249)

Ranks

	ComSize Small (< 99) vs Large (> 249)	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	less than 99 fte	49	33,95
	more than 249 fte	23	41,93
	Total	72	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	less than 99 fte	47	34,99
	more than 249 fte	19	29,82
	Total	66	
Company turnover from providing services	less than 99 fte	53	35,20
	more than 249 fte	26	49,79
	Total	79	
Company turnover from manufacturing products	less than 99 fte	46	37,72
	more than 249 fte	22	27,77
	Total	68	
Company turnover from wholesale or distribution	less than 99 fte	41	30,68
	more than 249 fte	21	33,10
	Total	62	
Company turnover from other activities or non relevant	less than 99 fte	47	40,63
	more than 249 fte	25	28,74
	Total	72	
Innovations with supplier interaction are beneficial for our company	less than 99 fte	64	49,26
	more than 249 fte	35	51,36
	Total	99	
Innovations with supplier interaction are beneficial for the natural environment	less than 99 fte	64	47,28
	more than 249 fte	35	54,97
	Total	99	
Innovations without supplier interaction are beneficial for our company	less than 99 fte	64	49,91
	more than 249 fte	35	50,16
	Total	99	
Innovations without supplier interaction are beneficial for the natural environment	less than 99 fte	64	48,31
	more than 249 fte	35	53,09
	Total	99	
Satisfaction with procurement with innovative suppliers	less than 99 fte	60	50,12
	more than 249 fte	34	42,88
	Total	94	
Satisfaction with innovation with innovative suppliers	less than 99 fte	60	46,75
	more than 249 fte	33	47,45
	Total	93	
Satisfaction with marketing&sales with innovative customers	less than 99 fte	60	48,14
	more than 249 fte	34	46,37
	Total	94	
Satisfaction with innovation with innovative customers	less than 99 fte	60	50,23
	more than 249 fte	34	42,68
	Total	94	
Satisfaction with internal innovation activities	less than 99 fte	60	48,21
	more than 249 fte	35	47,64
	Total	95	

Table 64 Performance variables controlled for company size in the uncoded 7 classes

Ranks

	Company size in classes	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	employees: 0 - 4	15	32,17
	employees: 5 - 9	10	35,10
	employees: 10 - 19	8	31,31
	employees: 20 - 99	16	45,53
	employees: 100-249	8	46,44
	employees: 250-499	6	45,25
	employees: above 499	17	46,15
	Total	80	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	employees: 0 - 4	15	34,60
	employees: 5 - 9	9	47,94
	employees: 10 - 19	8	34,13
	employees: 20 - 99	15	40,23
	employees: 100-249	6	28,67
	employees: 250-499	6	28,08
	employees: above 499	13	35,42
	Total	72	
Innovations with supplier interaction are beneficial for our company	employees: 0 - 4	18	50,78
	employees: 5 - 9	12	44,46
	employees: 10 - 19	10	67,95
	employees: 20 - 99	24	60,23
	employees: 100-249	10	38,80
	employees: 250-499	10	49,85
	employees: above 499	25	61,44
	Total	109	
Innovations with supplier interaction are beneficial for the natural environment	employees: 0 - 4	18	52,72
	employees: 5 - 9	12	43,88
	employees: 10 - 19	10	60,90
	employees: 20 - 99	24	53,48
	employees: 100-249	10	48,90
	employees: 250-499	10	63,45
	employees: above 499	25	60,14
	Total	109	
Innovations without supplier interaction are beneficial for our company	employees: 0 - 4	18	53,83
	employees: 5 - 9	12	66,88
	employees: 10 - 19	10	54,95
	employees: 20 - 99	24	49,38
	employees: 100-249	10	56,10
	employees: 250-499	10	56,30
	employees: above 499	25	54,60
	Total	109	
Innovations without supplier interaction are beneficial for the natural environment	employees: 0 - 4	18	52,50
	employees: 5 - 9	12	54,96
	employees: 10 - 19	10	54,55
	employees: 20 - 99	24	51,88
	employees: 100-249	10	55,95
	employees: 250-499	10	56,80
	employees: above 499	25	58,90
	Total	109	
Innovations with suppliers are beneficial for our company recoded	employees: 0 - 4	12	33,00
	employees: 5 - 9	8	33,00
	employees: 10 - 19	5	40,00
	employees: 20 - 99	13	35,69
	employees: 100-249	9	33,00
	employees: 250-499	7	38,00
	employees: above 499	16	37,38
	Total	70	
Innovations with suppliers are beneficial for the natural environment recoded	employees: 0 - 4	10	25,00
	employees: 5 - 9	6	20,00
	employees: 10 - 19	2	20,00
	employees: 20 - 99	11	24,55
	employees: 100-249	4	20,00
	employees: 250-499	6	32,50
	employees: above 499	11	29,09
	Total	50	
Innovations without suppliers are beneficial for our company recoded	employees: 0 - 4	9	27,28
	employees: 5 - 9	6	33,17
	employees: 10 - 19	5	26,10
	employees: 20 - 99	12	24,33
	employees: 100-249	5	26,10
	employees: 250-499	4	28,75
	employees: above 499	12	26,54
	Total	53	
Innovations without suppliers are beneficial for the natural environment recoded	employees: 0 - 4	7	25,79
	employees: 5 - 9	9	26,22
	employees: 10 - 19	4	27,75
	employees: 20 - 99	13	26,69
	employees: 100-249	4	27,75
	employees: 250-499	7	29,71
	employees: above 499	11	31,50
	Total	55	
Satisfaction with procurement with innovative suppliers	employees: 0 - 4	18	60,67
	employees: 5 - 9	11	56,18
	employees: 10 - 19	8	42,81
	employees: 20 - 99	23	53,04
	employees: 100-249	10	60,30
	employees: 250-499	10	42,85
	employees: above 499	24	48,17
	Total	104	
Satisfaction with innovation with innovative suppliers	employees: 0 - 4	18	46,86
	employees: 5 - 9	11	49,09
	employees: 10 - 19	8	44,94
	employees: 20 - 99	23	55,59
	employees: 100-249	10	64,35
	employees: 250-499	9	45,56
	employees: above 499	24	53,38
	Total	103	
Satisfaction with marketing&sales with innovative customers	employees: 0 - 4	18	43,03
	employees: 5 - 9	11	62,50
	employees: 10 - 19	8	56,63
	employees: 20 - 99	23	52,98
	employees: 100-249	10	61,20
	employees: 250-499	9	52,61
	employees: above 499	25	49,66
	Total	104	
Satisfaction with innovation with innovative customers	employees: 0 - 4	18	53,47
	employees: 5 - 9	11	59,50
	employees: 10 - 19	8	65,31
	employees: 20 - 99	23	51,37
	employees: 100-249	9	48,17
	employees: 250-499	10	49,15
	employees: above 499	24	46,25
	Total	103	
Satisfaction with internal innovation activities	employees: 0 - 4	18	55,78
	employees: 5 - 9	11	63,36
	employees: 10 - 19	8	48,06
	employees: 20 - 99	23	49,85
	employees: 100-249	10	47,40
	employees: 250-499	10	68,25
	employees: above 499	25	47,06
	Total	105	
Satisfaction innovation procurement recoded	employees: 0 - 4	13	35,85
	employees: 5 - 9	6	41,00
	employees: 10 - 19	5	27,60
	employees: 20 - 99	14	36,21
	employees: 100-249	8	36,81
	employees: 250-499	8	24,25
	employees: above 499	13	33,27
	Total	67	
Satisfaction innovative suppliers recoded	employees: 0 - 4	12	29,83
	employees: 5 - 9	6	35,42
	employees: 10 - 19	4	32,63
	employees: 20 - 99	16	36,81
	employees: 100-249	8	36,81
	employees: 250-499	7	26,64
	employees: above 499	14	36,21
	Total	67	
Satisfaction MS w customers recoded	employees: 0 - 4	7	20,29
	employees: 5 - 9	6	31,00
	employees: 10 - 19	5	26,00
	employees: 20 - 99	11	26,45
	employees: 100-249	7	27,43
	employees: 250-499	2	31,00
	employees: above 499	12	22,67
	Total	50	
Satisfaction innovation w customers recoded	employees: 0 - 4	10	40,40
	employees: 5 - 9	10	36,80
	employees: 10 - 19	6	44,00
	employees: 20 - 99	16	37,25
	employees: 100-249	7	33,71
	employees: 250-499	9	32,00
	employees: above 499	14	33,71
	Total	72	
Satisfaction internal innovation activities recoded	employees: 0 - 4	13	35,69
	employees: 5 - 9	9	37,17
	employees: 10 - 19	5	34,10
	employees: 20 - 99	14	36,07
	employees: 100-249	5	34,10
	employees: 250-499	8	36,69
	employees: above 499	15	31,80
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	6,334	5,328	8,924	4,505	2,956	,890	4,646	7,414	1,917	1,251	5,266	4,180	5,080	4,076	6,500	7,660	4,595	5,172	3,897	1,435
df	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Asymp. Sig.	,387	,503	,178	,609	,814	,989	,590	,284	,927	,974	,510	,652	,534	,666	,370	,264	,597	,522	,691	,964

a. Kruskal Wallis Test

b. Grouping Variable: Company size in classes

7.2.2 Levels of experience

Table 65: procurement or supply chain management - uncoded

Ranks

	Experienced in Procurement or Supply Chain	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	24	34,06
	medium	39	43,45
	low	16	40,50
	Total	79	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	21	33,93
	medium	36	38,24
	low	14	33,36
	Total	71	
Innovations with supplier interaction are beneficial for our company	high	32	54,92
	medium	47	48,79
	low	25	56,38
	Total	104	
Innovations with supplier interaction are beneficial for the natural environment	high	32	55,23
	medium	47	48,02
	low	25	57,42
	Total	104	
Innovations without supplier interaction are beneficial for our company	high	32	53,38
	medium	47	51,12
	low	25	53,98
	Total	104	
Innovations without supplier interaction are beneficial for the natural environment	high	32	56,42
	medium	47	49,16
	low	25	53,76
	Total	104	
Innovations with suppliers are beneficial for our company recoded	high	20	35,95
	medium	34	34,53
	low	15	34,80
	Total	69	
Innovations with suppliers are beneficial for the natural environment recoded	high	13	25,77
	medium	27	24,63
	low	10	27,50
	Total	50	
Innovations without suppliers are beneficial for our company recoded	high	15	27,87
	medium	23	25,87
	low	15	27,87
	Total	53	
Innovations without suppliers are beneficial for the natural environment recoded	high	17	29,88
	medium	26	25,42
	low	11	28,73
	Total	54	
Satisfaction with procurement with innovative suppliers	high	32	52,13
	medium	46	55,74
	low	25	44,96
	Total	103	
Satisfaction with innovation with innovative suppliers	high	32	50,38
	medium	46	56,33
	low	24	43,75
	Total	102	
Satisfaction with marketing&sales with innovative customers	high	32	48,72
	medium	47	56,02
	low	24	48,50
	Total	103	
Satisfaction with innovation with innovative customers	high	32	53,05
	medium	45	55,51
	low	25	42,30
	Total	102	
Satisfaction with internal innovation activities	high	32	45,03
	medium	47	60,88
	low	25	46,30
	Total	104	
Satisfaction innovation procurement recoded	high	23	31,89
	medium	27	38,06
	low	16	28,13
	Total	66	
Satisfaction innovative suppliers recoded	high	22	33,00
	medium	30	36,10
	low	14	28,71
	Total	66	
Satisfaction MS w customers recoded	high	16	23,19
	medium	22	28,73
	low	12	22,67
	Total	50	
Satisfaction innovation w customers recoded	high	23	35,78
	medium	33	38,12
	low	15	31,67
	Total	71	
Satisfaction internal innovation activities recoded	high	22	29,68
	medium	32	39,44
	low	14	30,79
	Total	68	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,531	,877	1,497	2,324	,215	1,324	,323	,561	,295	1,213	2,461	3,385	1,894	3,908	7,595	5,856	2,862	3,756	2,025	8,703
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,282	,645	,473	,313	,898	,516	,851	,755	,863	,545	,292	,184	,388	,142	,022	,054	,239	,153	,363	,013

a. Kruskal Wallis Test

b. Grouping Variable: Experienced in Procurement or Supply Chain

Table 66: procurement or supply chain management - recoded

Ranks

	procurement experience recoded into high and low	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	24	19,27
	low	16	22,34
	Total	40	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	21	17,88
	low	14	18,18
	Total	35	
Innovations with supplier interaction are beneficial for our company	high	32	28,70
	low	25	29,38
	Total	57	
Innovations with supplier interaction are beneficial for the natural environment	high	32	28,44
	low	25	29,72
	Total	57	
Innovations without supplier interaction are beneficial for our company	high	32	28,84
	low	25	29,20
	Total	57	
Innovations without supplier interaction are beneficial for the natural environment	high	32	29,72
	low	25	28,08
	Total	57	
Innovations with suppliers are beneficial for our company recoded	high	20	18,25
	low	15	17,67
	Total	35	
Innovations with suppliers are beneficial for the natural environment recoded	high	13	11,65
	low	10	12,45
	Total	23	
Innovations without suppliers are beneficial for our company recoded	high	15	15,50
	low	15	15,50
	Total	30	
Innovations without suppliers are beneficial for the natural environment recoded	high	17	14,74
	low	11	14,14
	Total	28	
Satisfaction with procurement with innovative suppliers	high	32	30,59
	low	25	26,96
	Total	57	
Satisfaction with innovation with innovative suppliers	high	32	30,11
	low	24	26,35
	Total	56	
Satisfaction with marketing&sales with innovative customers	high	32	28,63
	low	24	28,33
	Total	56	
Satisfaction with innovation with innovative customers	high	32	31,58
	low	25	25,70
	Total	57	
Satisfaction with internal innovation activities	high	32	28,67
	low	25	29,42
	Total	57	
Satisfaction innovation procurement recoded	high	23	20,91
	low	16	18,69
	Total	39	
Satisfaction innovative suppliers recoded	high	22	19,41
	low	14	17,07
	Total	36	
Satisfaction MS w customers recoded	high	16	14,63
	low	12	14,33
	Total	28	
Satisfaction innovation w customers recoded	high	23	20,37
	low	15	18,17
	Total	38	
Satisfaction internal innovation activities recoded	high	22	18,27
	low	14	18,86
	Total	36	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,682	,007	,026	,107	,007	,160	,118	,134	,000	,048	,759	,845	,005	2,010	,032	,562	,699	,013	,613	,041
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,409	,932	,871	,743	,931	,689	,731	,714	1,000	,826	,384	,358	,943	,156	,858	,453	,403	,909	,434	,839

a. Kruskal Wallis Test

b. Grouping Variable: procurement experience recoded into high and low

Table 67: Marketing or sales or business development - uncoded

Ranks

	Experienced in Sales Marketing or BD	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	30	44,40
	medium	30	32,65
	low	18	42,75
	Total	78	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	28	37,84
	medium	25	33,10
	low	17	35,18
	Total	70	
Innovations with supplier interaction are beneficial for our company	high	32	52,55
	medium	45	52,03
	low	25	49,20
	Total	102	
Innovations with supplier interaction are beneficial for the natural environment	high	32	50,28
	medium	45	50,61
	low	25	54,66
	Total	102	
Innovations without supplier interaction are beneficial for our company	high	32	46,78
	medium	45	54,54
	low	25	52,06
	Total	102	
Innovations without supplier interaction are beneficial for the natural environment	high	32	44,64
	medium	45	52,60
	low	25	58,30
	Total	102	
Innovations with suppliers are beneficial for our company recoded	high	22	33,55
	medium	28	34,43
	low	18	35,78
	Total	68	
Innovations with suppliers are beneficial for the natural environment recoded	high	14	22,93
	medium	22	23,86
	low	12	27,50
	Total	48	
Innovations without suppliers are beneficial for our company recoded	high	18	23,33
	medium	20	27,50
	low	12	25,42
	Total	50	
Innovations without suppliers are beneficial for the natural environment recoded	high	20	23,28
	medium	21	27,88
	low	12	31,67
	Total	53	
Satisfaction with procurement with innovative suppliers	high	32	60,11
	medium	44	46,93
	low	25	46,50
	Total	101	
Satisfaction with innovation with innovative suppliers	high	31	56,73
	medium	44	47,36
	low	25	48,30
	Total	100	
Satisfaction with marketing&sales with innovative customers	high	31	60,06
	medium	45	44,13
	low	25	52,12
	Total	101	
Satisfaction with innovation with innovative customers	high	32	59,22
	medium	43	47,72
	low	25	44,12
	Total	100	
Satisfaction with internal innovation activities	high	32	57,39
	medium	45	46,97
	low	25	52,12
	Total	102	
Satisfaction innovation procurement recoded	high	24	38,63
	medium	28	29,39
	low	14	32,93
	Total	66	
Satisfaction innovative suppliers recoded	high	21	38,43
	medium	29	30,90
	low	16	31,75
	Total	66	
Satisfaction MS w customers recoded	high	19	27,92
	medium	20	20,70
	low	10	28,05
	Total	49	
Satisfaction innovation w customers recoded	high	24	40,06
	medium	34	30,34
	low	11	38,36
	Total	69	
Satisfaction internal innovation activities recoded	high	22	38,48
	medium	28	30,43
	low	17	34,09
	Total	67	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	4,579	,734	,232	,454	1,525	3,540	,620	1,561	1,059	3,104	5,332	2,441	6,613	5,324	2,697	6,331	4,321	5,858	8,006	4,766
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,101	,693	,891	,797	,466	,170	,733	,458	,589	,212	,070	,295	,037	,070	,260	,042	,115	,053	,018	,092

a. Kruskal Wallis Test

b. Grouping Variable: Experienced in Sales Marketing or BD

Table 68: Marketing or sales or business development - recoded

Ranks

	Experience in sales mrktg BD recoded into high and low levels	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	30	24,97
	low	18	23,72
	Total	48	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	28	23,59
	low	17	22,03
	Total	45	
Innovations with supplier interaction are beneficial for our company	high	32	29,89
	low	25	27,86
	Total	57	
Innovations with supplier interaction are beneficial for the natural environment	high	32	27,91
	low	25	30,40
	Total	57	
Innovations without supplier interaction are beneficial for our company	high	32	27,69
	low	25	30,68
	Total	57	
Innovations without supplier interaction are beneficial for the natural environment	high	32	25,72
	low	25	33,20
	Total	57	
Innovations with suppliers are beneficial for our company recoded	high	22	19,91
	low	18	21,22
	Total	40	
Innovations with suppliers are beneficial for the natural environment recoded	high	14	12,36
	low	12	14,83
	Total	26	
Innovations without suppliers are beneficial for our company recoded	high	18	15,00
	low	12	16,25
	Total	30	
Innovations without suppliers are beneficial for the natural environment recoded	high	20	14,60
	low	12	19,67
	Total	32	
Satisfaction with procurement with innovative suppliers	high	32	32,69
	low	25	24,28
	Total	57	
Satisfaction with innovation with innovative suppliers	high	31	30,61
	low	25	25,88
	Total	56	
Satisfaction with marketing&sales with innovative customers	high	31	30,61
	low	25	25,88
	Total	56	
Satisfaction with innovation with innovative customers	high	32	33,22
	low	25	23,60
	Total	57	
Satisfaction with internal innovation activities	high	32	30,28
	low	25	27,36
	Total	57	
Satisfaction innovation procurement recoded	high	24	20,71
	low	14	17,43
	Total	38	
Satisfaction innovative suppliers recoded	high	21	20,62
	low	16	16,88
	Total	37	
Satisfaction MS w customers recoded	high	19	14,97
	low	10	15,05
	Total	29	
Satisfaction innovation w customers recoded	high	24	18,27
	low	11	17,41
	Total	35	
Satisfaction internal innovation activities recoded	high	22	21,11
	low	17	18,56
	Total	39	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,090	,152	,241	,383	,523	3,169	,600	1,270	,208	2,926	4,797	1,419	1,424	6,029	,538	2,724	3,096	,002	,330	1,743
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,764	,697	,623	,536	,470	,075	,439	,260	,648	,087	,029	,234	,233	,014	,463	,099	,078	,965	,566	,187

a. Kruskal Wallis Test

b. Grouping Variable: Experience in sales mrktg BD recoded into high and low levels

Table 69: Innovation or new product development - uncoded

Ranks

	Experienced in NPD or Innovation	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	26	47,96
	medium	33	42,18
	low	20	26,05
	Total	79	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	25	36,52
	medium	30	37,25
	low	16	32,84
	Total	71	
Innovations with supplier interaction are beneficial for our company	high	33	48,71
	medium	46	55,00
	low	26	54,90
	Total	105	
Innovations with supplier interaction are beneficial for the natural environment	high	33	51,70
	medium	46	49,33
	low	26	61,15
	Total	105	
Innovations without supplier interaction are beneficial for our company	high	33	56,85
	medium	46	48,24
	low	26	56,54
	Total	105	
Innovations without supplier interaction are beneficial for the natural environment	high	33	56,74
	medium	46	45,93
	low	26	60,75
	Total	105	
Innovations with suppliers are beneficial for our company recoded	high	23	34,00
	medium	30	35,95
	low	16	34,66
	Total	69	
Innovations with suppliers are beneficial for the natural environment recoded	high	17	25,88
	medium	25	24,00
	low	8	29,38
	Total	50	
Innovations without suppliers are beneficial for our company recoded	high	17	28,76
	medium	22	23,27
	low	13	29,00
	Total	52	
Innovations without suppliers are beneficial for the natural environment recoded	high	20	30,50
	medium	24	23,17
	low	11	34,00
	Total	55	
Satisfaction with procurement with innovative suppliers	high	32	57,03
	medium	46	52,52
	low	25	44,60
	Total	103	
Satisfaction with innovation with innovative suppliers	high	31	58,40
	medium	46	51,80
	low	25	42,38
	Total	102	
Satisfaction with marketing&sales with innovative customers	high	31	60,08
	medium	46	49,82
	low	26	46,23
	Total	103	
Satisfaction with innovation with innovative customers	high	32	56,72
	medium	45	52,92
	low	25	42,26
	Total	102	
Satisfaction with internal innovation activities	high	32	58,30
	medium	46	57,76
	low	26	36,06
	Total	104	
Satisfaction innovation procurement recoded	high	22	37,95
	medium	29	34,07
	low	16	28,44
	Total	67	
Satisfaction innovative suppliers recoded	high	22	37,00
	medium	26	36,19
	low	18	25,33
	Total	66	
Satisfaction MS w customers recoded	high	17	29,53
	medium	22	24,18
	low	11	21,91
	Total	50	
Satisfaction innovation w customers recoded	high	24	38,56
	medium	34	35,69
	low	13	32,08
	Total	71	
Satisfaction internal innovation activities recoded	high	23	36,07
	medium	31	38,31
	low	14	23,50
	Total	68	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	10,974	,509	1,072	3,081	2,338	5,298	,640	1,634	2,338	5,619	2,873	4,751	4,211	4,184	11,845	4,457	9,482	4,167	1,784	12,900
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,004	,775	,585	,214	,311	,071	,726	,442	,311	,060	,238	,093	,122	,123	,003	,108	,009	,124	,410	,002

a. Kruskal Wallis Test

b. Grouping Variable: Experienced in NPD or Innovation

Table 70: Innovation or new product development - recoded

Ranks

	NPD or Innovation experience recoded into high and low	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	26	28,46
	low	20	17,05
	Total	46	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	25	21,86
	low	16	19,66
	Total	41	
Innovations with supplier interaction are beneficial for our company	high	33	28,45
	low	26	31,96
	Total	59	
Innovations with supplier interaction are beneficial for the natural environment	high	33	27,80
	low	26	32,79
	Total	59	
Innovations without supplier interaction are beneficial for our company	high	33	30,15
	low	26	29,81
	Total	59	
Innovations without supplier interaction are beneficial for the natural environment	high	33	29,26
	low	26	30,94
	Total	59	
Innovations with suppliers are beneficial for our company recoded	high	23	19,85
	low	16	20,22
	Total	39	
Innovations with suppliers are beneficial for the natural environment recoded	high	17	12,44
	low	8	14,19
	Total	25	
Innovations without suppliers are beneficial for our company recoded	high	17	15,44
	low	13	15,58
	Total	30	
Innovations without suppliers are beneficial for the natural environment recoded	high	20	15,30
	low	11	17,27
	Total	31	
Satisfaction with procurement with innovative suppliers	high	32	32,06
	low	25	25,08
	Total	57	
Satisfaction with innovation with innovative suppliers	high	31	32,18
	low	25	23,94
	Total	56	
Satisfaction with marketing&sales with innovative customers	high	31	32,48
	low	26	24,85
	Total	57	
Satisfaction with innovation with innovative customers	high	32	32,64
	low	25	24,34
	Total	57	
Satisfaction with internal innovation activities	high	32	34,83
	low	26	22,94
	Total	58	
Satisfaction innovation procurement recoded	high	22	21,77
	low	16	16,38
	Total	38	
Satisfaction innovative suppliers recoded	high	22	23,68
	low	18	16,61
	Total	40	
Satisfaction MS w customers recoded	high	17	16,18
	low	11	11,91
	Total	28	
Satisfaction innovation w customers recoded	high	24	20,19
	low	13	16,81
	Total	37	
Satisfaction internal innovation activities recoded	high	23	21,59
	low	14	14,75
	Total	37	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	8,295	,336	,682	1,532	,007	,159	,068	,506	,002	,486	2,994	4,054	3,630	4,132	7,892	4,380	6,434	4,079	1,785	5,864
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,004	,562	,409	,216	,935	,690	,794	,477	,961	,486	,084	,044	,057	,042	,005	,036	,011	,043	,182	,015

a. Kruskal Wallis Test

b. Grouping Variable: NPD or Innovation experience recoded into high and low

Table 71: Management and strategy experience - uncoded

Ranks

	Experienced in Mgmt or Strategy	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	46	42,24
	medium	29	35,05
	low	3	40,50
	Total	78	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	42	37,64
	medium	25	34,20
	low	3	16,33
	Total	70	
Innovations with supplier interaction are beneficial for our company	high	58	52,91
	medium	41	55,07
	low	6	39,75
	Total	105	
Innovations with supplier interaction are beneficial for the natural environment	high	58	52,86
	medium	41	54,88
	low	6	41,50
	Total	105	
Innovations without supplier interaction are beneficial for our company	high	58	53,71
	medium	41	51,74
	low	6	54,75
	Total	105	
Innovations without supplier interaction are beneficial for the natural environment	high	58	53,20
	medium	41	52,38
	low	6	55,33
	Total	105	
Innovations with suppliers are beneficial for our company recoded	high	40	35,09
	medium	24	35,38
	low	5	32,50
	Total	69	
Innovations with suppliers are beneficial for the natural environment recoded	high	27	24,54
	medium	19	26,45
	low	3	20,00
	Total	49	
Innovations without suppliers are beneficial for our company recoded	high	31	27,47
	medium	18	25,81
	low	4	28,75
	Total	53	
Innovations without suppliers are beneficial for the natural environment recoded	high	30	27,25
	medium	19	26,55
	low	4	27,25
	Total	53	
Satisfaction with procurement with innovative suppliers	high	55	54,82
	medium	40	44,50
	low	6	59,33
	Total	101	
Satisfaction with innovation with innovative suppliers	high	54	51,91
	medium	40	46,80
	low	6	62,50
	Total	100	
Satisfaction with marketing&sales with innovative customers	high	54	47,81
	medium	41	56,27
	low	6	43,67
	Total	101	
Satisfaction with innovation with innovative customers	high	55	54,03
	medium	39	44,65
	low	6	56,17
	Total	100	
Satisfaction with internal innovation activities	high	55	53,16
	medium	41	47,00
	low	6	67,00
	Total	102	
Satisfaction innovation procurement recoded	high	41	34,06
	medium	21	31,07
	low	4	40,50
	Total	66	
Satisfaction innovative suppliers recoded	high	40	33,08
	medium	22	33,00
	low	4	40,50
	Total	66	
Satisfaction MS w customers recoded	high	27	22,74
	medium	21	27,67
	low	1	30,00
	Total	49	
Satisfaction innovation w customers recoded	high	45	34,72
	medium	21	35,83
	low	4	42,50
	Total	70	
Satisfaction internal innovation activities recoded	high	38	33,33
	medium	24	33,92
	low	5	39,50
	Total	67	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,822	3,278	1,491	1,214	,140	,063	,430	1,212	,254	,033	3,958	2,097	2,836	3,102	3,176	1,801	1,129	3,136	1,134	1,078
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,402	,194	,475	,545	,932	,969	,806	,546	,881	,984	,138	,351	,242	,212	,204	,406	,569	,208	,567	,583

a. Kruskal Wallis Test

b. Grouping Variable: Experienced in Mgmt or Strategy

Table 72: Management and strategy experience - recoded

Ranks

	Mgmt experience recoded into high and low	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	46	25,13
	low	3	23,00
	Total	49	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	42	23,93
	low	3	10,00
	Total	45	
Innovations with supplier interaction are beneficial for our company	high	58	33,28
	low	6	25,00
	Total	64	
Innovations with supplier interaction are beneficial for the natural environment	high	58	33,16
	low	6	26,08
	Total	64	
Innovations without supplier interaction are beneficial for our company	high	58	32,44
	low	6	33,08
	Total	64	
Innovations without supplier interaction are beneficial for the natural environment	high	58	32,37
	low	6	33,75
	Total	64	
Innovations with suppliers are beneficial for our company recoded	high	40	23,19
	low	5	21,50
	Total	45	
Innovations with suppliers are beneficial for the natural environment recoded	high	27	15,78
	low	3	13,00
	Total	30	
Innovations without suppliers are beneficial for our company recoded	high	31	17,90
	low	4	18,75
	Total	35	
Innovations without suppliers are beneficial for the natural environment recoded	high	30	17,50
	low	4	17,50
	Total	34	
Satisfaction with procurement with innovative suppliers	high	55	30,80
	low	6	32,83
	Total	61	
Satisfaction with innovation with innovative suppliers	high	54	29,88
	low	6	36,08
	Total	60	
Satisfaction with marketing&sales with innovative customers	high	54	30,70
	low	6	28,67
	Total	60	
Satisfaction with innovation with innovative customers	high	55	30,95
	low	6	31,50
	Total	61	
Satisfaction with internal innovation activities	high	55	30,25
	low	6	37,83
	Total	61	
Satisfaction innovation procurement recoded	high	41	22,61
	low	4	27,00
	Total	45	
Satisfaction innovative suppliers recoded	high	40	22,05
	low	4	27,00
	Total	44	
Satisfaction MS w customers recoded	high	27	14,35
	low	1	18,50
	Total	28	
Satisfaction innovation w customers recoded	high	45	24,56
	low	4	30,00
	Total	49	
Satisfaction internal innovation activities recoded	high	38	21,54
	low	5	25,50
	Total	43	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,064	3,195	1,231	,944	,007	,034	,393	,644	,032	,000	,086	,811	,090	,006	1,106	,928	1,106	,400	1,094	1,075
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,800	,074	,267	,331	,932	,854	,531	,422	,857	1,000	,769	,368	,765	,936	,293	,335	,293	,527	,296	,300

a. Kruskal Wallis Test

b. Grouping Variable: Mgmt experience recoded into high and low

Table 73: Overseas experience - uncoded

Ranks

	Experience in Oversea	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	26	41,10
	medium	27	44,02
	low	27	36,41
	Total	80	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	24	37,31
	medium	26	37,13
	low	22	34,86
	Total	72	
Innovations with supplier interaction are beneficial for our company	high	37	51,50
	medium	36	53,97
	low	32	53,64
	Total	105	
Innovations with supplier interaction are beneficial for the natural environment	high	37	51,80
	medium	36	57,43
	low	32	49,41
	Total	105	
Innovations without supplier interaction are beneficial for our company	high	37	51,35
	medium	36	49,10
	low	32	59,30
	Total	105	
Innovations without supplier interaction are beneficial for the natural environment	high	37	55,72
	medium	36	52,93
	low	32	49,94
	Total	105	
Innovations with suppliers are beneficial for our company recoded	high	24	35,92
	medium	26	35,69
	low	20	34,75
	Total	70	
Innovations with suppliers are beneficial for the natural environment recoded	high	19	25,26
	medium	13	25,77
	low	18	25,56
	Total	50	
Innovations without suppliers are beneficial for our company recoded	high	20	26,10
	medium	24	25,44
	low	9	33,17
	Total	53	
Innovations without suppliers are beneficial for the natural environment recoded	high	21	29,71
	medium	16	27,75
	low	18	26,22
	Total	55	
Satisfaction with procurement with innovative suppliers	high	37	50,53
	medium	35	57,46
	low	32	49,36
	Total	104	
Satisfaction with innovation with innovative suppliers	high	36	50,10
	medium	35	52,69
	low	32	53,39
	Total	103	
Satisfaction with marketing&sales with innovative customers	high	36	55,10
	medium	36	50,11
	low	32	52,27
	Total	104	
Satisfaction with innovation with innovative customers	high	36	52,11
	medium	35	55,36
	low	32	48,20
	Total	103	
Satisfaction with internal innovation activities	high	37	60,11
	medium	36	47,71
	low	32	50,73
	Total	105	
Satisfaction innovation procurement recoded	high	26	31,98
	medium	23	36,63
	low	18	33,56
	Total	67	
Satisfaction innovative suppliers recoded	high	22	33,39
	medium	26	33,27
	low	19	35,71
	Total	67	
Satisfaction MS w customers recoded	high	20	26,00
	medium	17	23,65
	low	13	27,15
	Total	50	
Satisfaction innovation w customers recoded	high	28	35,00
	medium	26	37,08
	low	18	38,00
	Total	72	
Satisfaction internal innovation activities recoded	high	25	38,24
	medium	24	32,38
	low	20	34,10
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,494	,198	,158	1,503	2,398	,703	,199	,019	2,372	,621	1,696	,272	,600	1,129	3,755	1,427	,413	,904	,517	2,559
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,474	,906	,924	,472	,301	,704	,905	,991	,305	,733	,428	,873	,741	,569	,153	,490	,813	,636	,772	,278

a. Kruskal Wallis Test

b. Grouping Variable: Experience in Oversea

Table 74: Overseas experience - recoded

Ranks

	Experience overseas recoded high - low	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high	26	28,69
	low	27	25,37
	Total	53	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high	24	24,29
	low	22	22,64
	Total	46	
Innovations with supplier interaction are beneficial for our company	high	37	34,39
	low	32	35,70
	Total	69	
Innovations with supplier interaction are beneficial for the natural environment	high	37	35,78
	low	32	34,09
	Total	69	
Innovations without supplier interaction are beneficial for our company	high	37	32,59
	low	32	37,78
	Total	69	
Innovations without supplier interaction are beneficial for the natural environment	high	37	36,76
	low	32	32,97
	Total	69	
Innovations with suppliers are beneficial for our company recoded	high	24	22,83
	low	20	22,10
	Total	44	
Innovations with suppliers are beneficial for the natural environment recoded	high	19	18,89
	low	18	19,11
	Total	37	
Innovations without suppliers are beneficial for our company recoded	high	20	13,80
	low	9	17,67
	Total	29	
Innovations without suppliers are beneficial for the natural environment recoded	high	21	21,14
	low	18	18,67
	Total	39	
Satisfaction with procurement with innovative suppliers	high	37	35,31
	low	32	34,64
	Total	69	
Satisfaction with innovation with innovative suppliers	high	36	33,47
	low	32	35,66
	Total	68	
Satisfaction with marketing&sales with innovative customers	high	36	35,43
	low	32	33,45
	Total	68	
Satisfaction with innovation with innovative customers	high	36	35,68
	low	32	33,17
	Total	68	
Satisfaction with internal innovation activities	high	37	37,85
	low	32	31,70
	Total	69	
Satisfaction innovation procurement recoded	high	26	22,08
	low	18	23,11
	Total	44	
Satisfaction innovative suppliers recoded	high	22	20,34
	low	19	21,76
	Total	41	
Satisfaction MS w customers recoded	high	20	16,70
	low	13	17,46
	Total	33	
Satisfaction innovation w customers recoded	high	28	22,75
	low	18	24,67
	Total	46	
Satisfaction internal innovation activities recoded	high	25	24,20
	low	20	21,50
	Total	45	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,622	,178	,062	,138	1,437	,681	,186	,007	1,707	,610	,022	,239	,208	,325	1,831	,123	,305	,109	,438	1,354
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,430	,673	,775	,710	,231	,409	,666	,932	,191	,435	,881	,625	,648	,569	,176	,726	,581	,741	,508	,245

a. Kruskal Wallis Test

b. Grouping Variable: Experience overseas recoded high - low

§7.2.3 Customer or Company Strategies

Product leadership recoded into most important – least important

Ranks

	Product Leadership recoded into high (1) and low (3)	N	Mean Rank	Sum of Ranks
Estimated number of innovations developed with all suppliers last 3 yrs	most important	41	29,27	1200,00
	least important	15	26,40	396,00
	Total	56		
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	36	27,75	999,00
	least important	13	17,38	226,00
	Total	49		
Innovations with supplier interaction are beneficial for our company	most important	47	32,14	1510,50
	least important	19	36,87	700,50
	Total	66		
Innovations with supplier interaction are beneficial for the natural environment	most important	47	31,83	1496,00
	least important	19	37,63	715,00
	Total	66		
Innovations without supplier interaction are beneficial for our company	most important	47	34,47	1620,00
	least important	19	31,11	591,00
	Total	66		
Innovations without supplier interaction are beneficial for the natural environment	most important	47	34,37	1615,50
	least important	19	31,34	595,50
	Total	66		
Innovations with suppliers are beneficial for our company recoded	most important	33	22,70	749,00
	least important	13	25,54	332,00
	Total	46		
Innovations with suppliers are beneficial for the natural environment recoded	most important	24	14,52	348,50
	least important	5	17,30	86,50
	Total	29		
Innovations without suppliers are beneficial for our company recoded	most important	27	19,72	532,50
	least important	10	17,05	170,50
	Total	37		
Innovations without suppliers are beneficial for the natural environment recoded	most important	26	18,42	479,00
	least important	9	16,78	151,00
	Total	35		
Satisfaction with procurement with innovative suppliers	most important	47	34,85	1638,00
	least important	19	30,16	573,00
	Total	66		
Satisfaction with innovation with innovative suppliers	most important	47	33,53	1576,00
	least important	19	33,42	635,00
	Total	66		
Satisfaction with marketing&sales with innovative customers	most important	47	34,28	1611,00
	least important	19	31,58	600,00
	Total	66		
Satisfaction with innovation with innovative customers	most important	47	34,68	1630,00
	least important	18	28,61	515,00
	Total	65		
Satisfaction with internal innovation activities	most important	47	37,05	1741,50
	least important	19	24,71	469,50
	Total	66		
Satisfaction innovation procurement recoded	most important	29	23,52	682,00
	least important	14	18,86	264,00
	Total	43		
Satisfaction innovative suppliers recoded	most important	30	23,75	712,50
	least important	15	21,50	322,50
	Total	45		
Satisfaction MS w customers recoded	most important	21	16,07	337,50
	least important	9	14,17	127,50
	Total	30		
Satisfaction innovation w customers recoded	most important	33	21,68	715,50
	least important	9	20,83	187,50
	Total	42		
Satisfaction internal innovation activities recoded	most important	36	24,50	882,00
	least important	9	17,00	153,00
	Total	45		

Test Statistics[a]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Recoded Nbr of innovations w suppliers last 3 years
Mann-Whitney U	276,000	135,000	382,500	366,000	401,000	405,500	188,000	48,500	115,500	100,000	383,000	445,000	410,000	344,000	279,500	159,000	202,500	82,500	142,500	108,000	268,500
Wilcoxon W	396,000	226,000	1510,500	1496,000	591,000	595,500	749,000	348,500	170,500	151,000	573,000	635,000	600,000	515,000	469,500	264,000	322,500	127,500	187,500	153,000	1129,500
Z	-,587	-2,260	-,971	-1,233	-,682	-,617	-1,511	-,895	-,784	-,479	-1,000	-,023	-,584	-1,259	-2,533	-1,900	-,782	-,922	-,270	-2,313	-1,347
Asymp. Sig. (2-tailed)	,557	,024	,331	,217	,495	,537	,131	,371	,433	,632	,317	,982	,559	,208	,011	,057	,434	,357	,787	,021	,178
Exact Sig. [2*(1-tailed Sig.)]								,518[b]	,511[b]	,697[b]								,594[b]	,857[b]	,131[b]	

a. Grouping Variable: Product Leadership recoded into high (1) and low (3)

b. Not corrected for ties.

Customer intimacy recoded into most important – least important

Ranks

	Customer Intimacy recoded high (1) and low (3)	N	Mean Rank	Sum of Ranks
Estimated number of innovations developed with all suppliers last 3 yrs	most important	25	21,64	541,00
	least important	21	25,71	540,00
	Total	46		
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	24	19,77	474,50
	least important	18	23,81	428,50
	Total	42		
Innovations with supplier interaction are beneficial for our company	most important	35	29,06	1017,00
	least important	23	30,17	694,00
	Total	58		
Innovations with supplier interaction are beneficial for the natural environment	most important	35	29,17	1021,00
	least important	23	30,00	690,00
	Total	58		
Innovations without supplier interaction are beneficial for our company	most important	35	30,99	1084,50
	least important	23	27,24	626,50
	Total	58		
Innovations without supplier interaction are beneficial for the natural environment	most important	35	29,51	1033,00
	least important	23	29,48	678,00
	Total	58		
Innovations with suppliers are beneficial for our company recoded	most important	24	21,50	516,00
	least important	16	19,00	304,00
	Total	40		
Innovations with suppliers are beneficial for the natural environment recoded	most important	16	14,03	224,50
	least important	11	13,95	153,50
	Total	27		
Innovations without suppliers are beneficial for our company recoded	most important	17	16,79	285,50
	least important	14	15,04	210,50
	Total	31		
Innovations without suppliers are beneficial for the natural environment recoded	most important	16	15,50	248,00
	least important	14	15,50	217,00
	Total	30		
Satisfaction with procurement with innovative suppliers	most important	35	27,29	955,00
	least important	23	32,87	756,00
	Total	58		
Satisfaction with innovation with innovative suppliers	most important	34	27,79	945,00
	least important	23	30,78	708,00
	Total	57		
Satisfaction with marketing&sales with innovative customers	most important	34	27,47	934,00
	least important	23	31,26	719,00
	Total	57		
Satisfaction with innovation with innovative customers	most important	35	26,71	935,00
	least important	23	33,74	776,00
	Total	58		
Satisfaction with internal innovation activities	most important	35	27,64	967,50
	least important	23	32,33	743,50
	Total	58		
Satisfaction innovation procurement recoded	most important	25	18,40	460,00
	least important	15	24,00	360,00
	Total	40		
Satisfaction innovative suppliers recoded	most important	24	18,81	451,50
	least important	15	21,90	328,50
	Total	39		
Satisfaction MS w customers recoded	most important	15	11,50	172,50
	least important	9	14,17	127,50
	Total	24		
Satisfaction innovation w customers recoded	most important	23	18,78	432,00
	least important	17	22,82	388,00
	Total	40		
Satisfaction internal innovation activities recoded	most important	21	17,60	369,50
	least important	16	20,84	333,50
	Total	37		

Test Statistics[a]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Mann-Whitney U	216,000	174,500	397,000	391,000	350,500	402,000	168,000	87,500	105,500	112,000	325,000	350,000	339,000	305,000	337,500	135,000	151,500	52,500	156,000	138,500
Wilcoxon W	541,000	474,500	1017,000	1021,000	626,500	678,000	304,000	153,500	210,500	217,000	955,000	945,000	934,000	935,000	967,500	460,000	451,500	172,500	432,000	369,500
Z	-1,032	-1,065	-,260	-,200	-,865	-,009	-1,452	-,037	-,627	,000	-1,352	-,711	-,958	-1,715	-1,102	-2,228	-1,127	-1,192	-1,642	-1,416
Asymp. Sig. (2-tailed)	,302	,287	,795	,841	,376	,993	,147	,971	,531	1,000	,177	,477	,338	,086	,271	,026	,260	,233	,101	,157
Exact Sig. [2*(1-tailed Sig.)]							,521[b]	,981[b]	,597[b]	1,000[b]						,148[b]	,415[b]	,379[b]	,298[b]	,370[b]

a. Grouping Variable: Customer Intimacy recoded high (1) and low (3)

b. Not corrected for ties.

Operational excellence recoded into most and least important

Ranks

	Operational Excellence recoded into high (1) and low (3)	N	Mean Rank	Sum of Ranks
Estimated number of innovations developed with all suppliers last 3 yrs	most important	13	26,88	349,50
	least important	38	25,70	976,50
	Total	51		
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	12	17,75	213,00
	least important	35	26,14	915,00
	Total	47		
Innovations with supplier interaction are beneficial for our company	most important	17	40,56	689,50
	least important	46	28,84	1326,50
	Total	63		
Innovations with supplier interaction are beneficial for the natural environment	most important	17	36,44	619,50
	least important	46	30,36	1396,50
	Total	63		
Innovations without supplier interaction are beneficial for our company	most important	17	29,00	493,00
	least important	46	33,11	1523,00
	Total	63		
Innovations without supplier interaction are beneficial for the natural environment	most important	17	30,41	517,00
	least important	46	32,59	1499,00
	Total	63		
Innovations with suppliers are beneficial for our company recoded	most important	8	22,06	176,50
	least important	33	20,74	684,50
	Total	41		
Innovations with suppliers are beneficial for the natural environment recoded	most important	8	21,25	170,00
	least important	28	17,71	496,00
	Total	36		
Innovations without suppliers are beneficial for our company recoded	most important	7	13,29	93,00
	least important	23	16,17	372,00
	Total	30		
Innovations without suppliers are beneficial for the natural environment recoded	most important	11	18,18	200,00
	least important	25	18,64	466,00
	Total	36		
Satisfaction with procurement with innovative suppliers	most important	17	27,88	474,00
	least important	46	33,52	1542,00
	Total	63		
Satisfaction with innovation with innovative suppliers	most important	17	32,18	547,00
	least important	46	31,93	1469,00
	Total	63		
Satisfaction with marketing&sales with innovative customers	most important	17	30,15	512,50
	least important	46	32,68	1503,50
	Total	63		
Satisfaction with innovation with innovative customers	most important	16	33,38	534,00
	least important	46	30,85	1419,00
	Total	62		
Satisfaction with internal innovation activities	most important	17	27,26	463,50
	least important	46	33,75	1552,50
	Total	63		
Satisfaction innovation procurement recoded	most important	8	15,75	126,00
	least important	26	18,04	469,00
	Total	34		
Satisfaction innovative suppliers recoded	most important	10	21,50	215,00
	least important	30	20,17	605,00
	Total	40		
Satisfaction MS w customers recoded	most important	9	13,83	124,50
	least important	22	16,89	371,50
	Total	31		
Satisfaction innovation w customers recoded	most important	12	23,33	280,00
	least important	32	22,19	710,00
	Total	44		
Satisfaction internal innovation activities recoded	most important	9	20,72	186,50
	least important	34	22,34	759,50
	Total	43		

Test Statistics[a]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Mann-Whitney U	235,500	135,000	245,500	315,500	340,000	364,000	123,500	90,000	65,000	134,000	321,000	388,000	359,500	338,000	310,500	90,000	140,000	79,500	182,000	141,500
Wilcoxon W	976,500	213,000	1326,500	1396,500	493,000	517,000	684,500	496,000	93,000	200,000	474,000	1469,000	512,500	1419,000	463,500	126,000	605,000	124,500	710,000	186,500
Z	-,251	-1,848	-2,393	-1,234	-,860	-,440	-,620	-1,162	-,885	-,139	-1,194	-,051	-,537	-,528	-1,346	-,926	-,505	-1,240	-,377	-,537
Asymp. Sig. (2-tailed)	,802	,065	,017	,217	,390	,660	,535	,245	,376	,889	,232	,960	,592	,598	,178	,354	,614	,215	,706	,591
Exact Sig. [2*(1-tailed Sig.)]							,784[b]	,421[b]	,471[b]	,918[b]						,591[b]	,770[b]	,403[b]	,805[b]	,736[b]

a. Grouping Variable: Operational Excellence recoded into high (1) and low (3)

b. Not corrected for ties.

Ranks

	Company strategy towards customers or supplier is lifestyle	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	28	36,29
	important	30	34,57
	least important	12	36,00
	Total	70	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	25	28,48
	important	26	31,94
	least important	11	37,32
	Total	62	
Innovations with supplier interaction are beneficial for our company	most important	35	48,76
	important	39	42,81
	least important	14	38,57
	Total	88	
Innovations with supplier interaction are beneficial for the natural environment	most important	35	49,14
	important	39	43,33
	least important	14	36,14
	Total	88	
Innovations without supplier interaction are beneficial for our company	most important	35	46,10
	important	39	44,40
	least important	14	40,79
	Total	88	
Innovations without supplier interaction are beneficial for the natural environment	most important	35	48,83
	important	39	41,09
	least important	14	43,18
	Total	88	
Innovations with suppliers are beneficial for our company recoded	most important	20	30,95
	important	28	30,11
	least important	11	28,00
	Total	59	
Innovations with suppliers are beneficial for the natural environment recoded	most important	17	25,09
	important	19	20,89
	least important	7	17,50
	Total	43	
Innovations without suppliers are beneficial for our company recoded	most important	17	23,76
	important	19	22,79
	least important	9	22,00
	Total	45	
Innovations without suppliers are beneficial for the natural environment recoded	most important	17	26,24
	important	19	20,11
	least important	9	23,00
	Total	45	
Satisfaction with procurement with innovative suppliers	most important	35	39,76
	important	39	51,38
	least important	14	37,18
	Total	88	
Satisfaction with innovation with innovative suppliers	most important	35	43,47
	important	39	46,47
	least important	14	41,57
	Total	88	
Satisfaction with marketing&sales with innovative customers	most important	35	39,57
	important	39	48,42
	least important	14	45,89
	Total	88	
Satisfaction with innovation with innovative customers	most important	34	38,49
	important	39	48,58
	least important	14	44,64
	Total	87	
Satisfaction with internal innovation activities	most important	35	38,26
	important	39	48,54
	least important	14	48,86
	Total	88	
Satisfaction innovation procurement recoded	most important	18	26,78
	important	29	31,07
	least important	9	23,67
	Total	56	
Satisfaction innovative suppliers recoded	most important	24	29,25
	important	27	32,17
	least important	9	28,83
	Total	60	
Satisfaction MS w customers recoded	most important	15	18,17
	important	18	23,86
	least important	8	19,88
	Total	41	
Satisfaction innovation w customers recoded	most important	19	26,50
	important	29	31,05
	least important	9	27,67
	Total	57	
Satisfaction internal innovation activities recoded	most important	21	24,45
	important	29	31,50
	least important	8	35,50
	Total	58	

Ranks

	Company strategy towards customers or supplier is survival mode	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	8	30,38
	important	15	40,20
	least important	45	33,33
	Total	68	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	8	23,44
	important	13	37,73
	least important	40	30,33
	Total	61	
Innovations with supplier interaction are beneficial for our company	most important	10	51,95
	important	18	39,19
	least important	54	40,33
	Total	82	
Innovations with supplier interaction are beneficial for the natural environment	most important	10	42,15
	important	18	35,08
	least important	54	43,52
	Total	82	
Innovations without supplier interaction are beneficial for our company	most important	10	35,35
	important	18	42,47
	least important	54	42,31
	Total	82	
Innovations without supplier interaction are beneficial for the natural environment	most important	10	35,75
	important	18	43,11
	least important	54	42,03
	Total	82	
Innovations with suppliers are beneficial for our company recoded	most important	6	31,17
	important	13	28,65
	least important	37	28,01
	Total	56	
Innovations with suppliers are beneficial for the natural environment recoded	most important	4	22,25
	important	9	17,00
	least important	29	22,79
	Total	42	
Innovations without suppliers are beneficial for our company recoded	most important	3	13,50
	important	13	23,65
	least important	28	22,93
	Total	44	
Innovations without suppliers are beneficial for the natural environment recoded	most important	6	20,00
	important	11	24,77
	least important	28	22,95
	Total	45	
Satisfaction with procurement with innovative suppliers	most important	10	41,65
	important	18	36,89
	least important	54	43,01
	Total	82	
Satisfaction with innovation with innovative suppliers	most important	10	43,00
	important	18	36,47
	least important	54	42,90
	Total	82	
Satisfaction with marketing&sales with innovative customers	most important	10	52,55
	important	18	34,75
	least important	54	41,70
	Total	82	
Satisfaction with innovation with innovative customers	most important	10	43,40
	important	18	42,83
	least important	53	39,92
	Total	81	
Satisfaction with internal innovation activities	most important	10	45,10
	important	18	38,28
	least important	54	41,91
	Total	82	
Satisfaction innovation procurement recoded	most important	7	25,79
	important	10	24,30
	least important	35	27,27
	Total	52	
Satisfaction innovative suppliers recoded	most important	7	28,07
	important	10	26,50
	least important	38	28,38
	Total	55	
Satisfaction MS w customers recoded	most important	6	21,00
	important	8	14,25
	least important	22	19,36
	Total	36	
Satisfaction innovation w customers recoded	most important	7	26,71
	important	11	28,09
	least important	35	26,71
	Total	53	
Satisfaction internal innovation activities recoded	most important	6	32,50
	important	10	27,00
	least important	39	27,56
	Total	55	

Ranks

	Company strategy towards customers or supplier is entrepreneurial	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	35	36,30
	important	22	31,80
	least important	12	37,08
	Total	69	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	31	34,98
	important	20	26,60
	least important	10	27,45
	Total	61	
Innovations with supplier interaction are beneficial for our company	most important	43	37,45
	important	25	44,54
	least important	15	50,80
	Total	83	
Innovations with supplier interaction are beneficial for the natural environment	most important	43	38,52
	important	25	47,76
	least important	15	42,37
	Total	83	
Innovations without supplier interaction are beneficial for our company	most important	43	42,14
	important	25	41,20
	least important	15	42,93
	Total	83	
Innovations without supplier interaction are beneficial for the natural environment	most important	43	40,30
	important	25	45,08
	least important	15	41,73
	Total	83	
Innovations with suppliers are beneficial for our company recoded	most important	32	27,89
	important	16	28,78
	least important	9	33,33
	Total	57	
Innovations with suppliers are beneficial for the natural environment recoded	most important	22	18,91
	important	14	26,00
	least important	6	20,50
	Total	42	
Innovations without suppliers are beneficial for our company recoded	most important	27	23,50
	important	11	21,68
	least important	7	23,14
	Total	45	
Innovations without suppliers are beneficial for the natural environment recoded	most important	24	22,08
	important	14	25,64
	least important	8	24,00
	Total	46	
Satisfaction with procurement with innovative suppliers	most important	43	45,07
	important	25	36,28
	least important	15	42,73
	Total	83	
Satisfaction with innovation with innovative suppliers	most important	43	43,05
	important	25	42,34
	least important	15	38,43
	Total	83	
Satisfaction with marketing&sales with innovative customers	most important	43	42,09
	important	25	41,82
	least important	15	42,03
	Total	83	
Satisfaction with innovation with innovative customers	most important	43	44,27
	important	24	34,27
	least important	15	45,13
	Total	82	
Satisfaction with internal innovation activities	most important	43	45,19
	important	25	39,72
	least important	15	36,67
	Total	83	
Satisfaction innovation procurement recoded	most important	30	27,40
	important	13	24,00
	least important	9	27,11
	Total	52	
Satisfaction innovative suppliers recoded	most important	28	29,55
	important	18	26,39
	least important	9	26,39
	Total	55	
Satisfaction MS w customers recoded	most important	20	18,73
	important	10	19,65
	least important	7	18,86
	Total	37	
Satisfaction innovation w customers recoded	most important	32	27,19
	important	12	23,88
	least important	9	30,50
	Total	53	
Satisfaction internal innovation activities recoded	most important	31	30,79
	important	16	26,50
	least important	9	24,17
	Total	56	

Ranks

	Customer strategy is product leadership	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	41	41,59
	important	21	34,55
	least important	15	38,17
	Total	77	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	36	40,57
	important	20	30,43
	least important	13	26,62
	Total	69	
Innovations with supplier interaction are beneficial for our company	most important	47	45,81
	important	27	45,30
	least important	19	52,37
	Total	93	
Innovations with supplier interaction are beneficial for the natural environment	most important	47	47,19
	important	27	41,13
	least important	19	54,87
	Total	93	
Innovations without supplier interaction are beneficial for our company	most important	47	47,96
	important	27	48,11
	least important	19	43,05
	Total	93	
Innovations without supplier interaction are beneficial for the natural environment	most important	47	49,57
	important	27	43,70
	least important	19	45,32
	Total	93	
Innovations with suppliers are beneficial for our company recoded	most important	33	31,47
	important	18	32,28
	least important	13	35,42
	Total	64	
Innovations with suppliers are beneficial for the natural environment recoded	most important	24	23,29
	important	17	22,56
	least important	5	27,70
	Total	46	
Innovations without suppliers are beneficial for our company recoded	most important	27	25,89
	important	12	25,21
	least important	10	22,35
	Total	49	
Innovations without suppliers are beneficial for the natural environment recoded	most important	26	26,96
	important	15	23,50
	least important	9	24,61
	Total	50	
Satisfaction with procurement with innovative suppliers	most important	47	49,65
	important	27	45,28
	least important	19	42,89
	Total	93	
Satisfaction with innovation with innovative suppliers	most important	47	46,72
	important	27	47,83
	least important	19	46,50
	Total	93	
Satisfaction with marketing&sales with innovative customers	most important	47	49,46
	important	27	43,69
	least important	19	45,63
	Total	93	
Satisfaction with innovation with innovative customers	most important	47	47,47
	important	27	49,94
	least important	18	38,81
	Total	92	
Satisfaction with internal innovation activities	most important	47	51,81
	important	27	47,69
	least important	19	34,13
	Total	93	
Satisfaction innovation procurement recoded	most important	29	32,47
	important	16	28,97
	least important	14	26,07
	Total	59	
Satisfaction innovative suppliers recoded	most important	30	32,33
	important	17	32,03
	least important	15	29,23
	Total	62	
Satisfaction MS w customers recoded	most important	21	23,95
	important	13	19,38
	least important	9	21,22
	Total	43	
Satisfaction innovation w customers recoded	most important	33	31,36
	important	20	32,35
	least important	9	30,11
	Total	62	
Satisfaction internal innovation activities recoded	most important	36	33,06
	important	17	32,85
	least important	9	22,72
	Total	62	

Ranks

	Customer strategy is customer intimacy	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	25	36,34
	important	33	40,67
	least important	21	43,31
	Total	79	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	24	32,33
	important	29	37,29
	least important	18	38,81
	Total	71	
Innovations with supplier interaction are beneficial for our company	most important	35	46,87
	important	38	49,99
	least important	23	48,52
	Total	96	
Innovations with supplier interaction are beneficial for the natural environment	most important	35	47,51
	important	38	49,13
	least important	23	48,96
	Total	96	
Innovations without supplier interaction are beneficial for our company	most important	35	50,24
	important	38	49,51
	least important	23	44,17
	Total	96	
Innovations without supplier interaction are beneficial for the natural environment	most important	35	47,64
	important	38	49,92
	least important	23	47,46
	Total	96	
Innovations with suppliers are beneficial for our company recoded	most important	24	35,13
	important	26	33,54
	least important	16	31,00
	Total	66	
Innovations with suppliers are beneficial for the natural environment recoded	most important	16	23,50
	important	21	25,86
	least important	11	23,36
	Total	48	
Innovations without suppliers are beneficial for our company recoded	most important	17	27,00
	important	20	26,48
	least important	14	24,11
	Total	51	
Innovations without suppliers are beneficial for the natural environment recoded	most important	16	26,75
	important	23	27,33
	least important	14	26,75
	Total	53	
Satisfaction with procurement with innovative suppliers	most important	35	46,00
	important	38	46,36
	least important	23	55,85
	Total	96	
Satisfaction with innovation with innovative suppliers	most important	34	46,32
	important	38	47,43
	least important	23	51,41
	Total	95	
Satisfaction with marketing&sales with innovative customers	most important	34	42,62
	important	38	52,34
	least important	23	48,78
	Total	95	
Satisfaction with innovation with innovative customers	most important	35	44,49
	important	37	46,43
	least important	23	55,87
	Total	95	
Satisfaction with internal innovation activities	most important	35	44,84
	important	38	49,54
	least important	23	52,35
	Total	96	
Satisfaction innovation procurement recoded	most important	25	27,46
	important	21	31,64
	least important	15	36,00
	Total	61	
Satisfaction innovative suppliers recoded	most important	24	30,17
	important	25	33,10
	least important	15	35,23
	Total	64	
Satisfaction MS w customers recoded	most important	15	18,83
	important	19	23,74
	least important	9	23,61
	Total	43	
Satisfaction innovation w customers recoded	most important	23	31,02
	important	25	31,70
	least important	17	37,59
	Total	65	
Satisfaction internal innovation activities recoded	most important	21	30,76
	important	28	32,70
	least important	16	36,47
	Total	65	

Ranks

	Customer strategy is operational excellence	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	13	38,35
	important	24	39,54
	least important	38	36,91
	Total	75	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	12	24,13
	important	21	37,33
	least important	35	36,36
	Total	68	
Innovations with supplier interaction are beneficial for our company	most important	17	59,47
	important	28	43,98
	least important	46	42,25
	Total	91	
Innovations with supplier interaction are beneficial for the natural environment	most important	17	51,32
	important	28	49,63
	least important	46	41,83
	Total	91	
Innovations without supplier interaction are beneficial for our company	most important	17	42,88
	important	28	43,29
	least important	46	48,80
	Total	91	
Innovations without supplier interaction are beneficial for the natural environment	most important	17	43,50
	important	28	46,75
	least important	46	46,47
	Total	91	
Innovations with suppliers are beneficial for our company recoded	most important	8	32,81
	important	20	30,53
	least important	33	30,85
	Total	61	
Innovations with suppliers are beneficial for the natural environment recoded	most important	8	26,94
	important	9	21,00
	least important	28	22,52
	Total	45	
Innovations without suppliers are beneficial for our company recoded	most important	7	21,36
	important	18	23,83
	least important	23	25,98
	Total	48	
Innovations without suppliers are beneficial for the natural environment recoded	most important	11	24,14
	important	13	26,19
	least important	25	24,76
	Total	49	
Satisfaction with procurement with innovative suppliers	most important	17	37,65
	important	28	51,61
	least important	46	45,67
	Total	91	
Satisfaction with innovation with innovative suppliers	most important	17	46,12
	important	28	46,29
	least important	46	45,78
	Total	91	
Satisfaction with marketing&sales with innovative customers	most important	17	43,74
	important	28	44,54
	least important	46	47,73
	Total	91	
Satisfaction with innovation with innovative customers	most important	16	48,59
	important	28	45,00
	least important	46	44,73
	Total	90	
Satisfaction with internal innovation activities	most important	17	39,94
	important	28	44,36
	least important	46	49,24
	Total	91	
Satisfaction innovation procurement recoded	most important	8	25,50
	important	22	28,68
	least important	26	29,27
	Total	56	
Satisfaction innovative suppliers recoded	most important	10	32,50
	important	20	29,50
	least important	30	30,50
	Total	60	
Satisfaction MS w customers recoded	most important	9	17,67
	important	10	22,45
	least important	22	21,70
	Total	41	
Satisfaction innovation w customers recoded	most important	12	31,42
	important	17	32,91
	least important	32	29,83
	Total	61	
Satisfaction internal innovation activities recoded	most important	9	28,83
	important	17	30,21
	least important	34	31,09
	Total	60	

Table 75: Customer Strategies - uncoded

Product Leadership

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,421	6,194	1,075	3,386	,585	1,020	2,412	1,134	,622	,770	1,208	,044	1,057	2,390	6,708	3,577	,673	2,434	,227	6,143
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,491	,045	,584	,184	,747	,601	,299	,567	,733	,680	,547	,978	,589	,303	,035	,167	,714	,296	,892	,046

a. Kruskal Wallis Test

b. Grouping Variable: Customer strategy is product leadership

Operational Excellence

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,222	4,113	6,247	2,774	1,203	,214	,544	2,010	,891	,184	3,613	,008	,514	,334	1,954	,901	,472	2,163	,774	,301
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,895	,128	,044	,250	,548	,899	,762	,366	,640	,912	,164	,996	,774	,846	,376	,637	,790	,339	,679	,860

a. Kruskal Wallis Test

b. Grouping Variable: Customer strategy is operational excellence

Customer Intimacy

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,116	1,224	,256	,081	,846	,184	2,111	,663	,441	,024	2,529	,573	2,843	3,058	1,253	5,377	1,416	3,225	2,856	1,991
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,572	,542	,880	,960	,655	,912	,348	,718	,802	,988	,282	,751	,241	,217	,534	,068	,493	,199	,240	,370

a. Kruskal Wallis Test

b. Grouping Variable: Customer strategy is customer intimacy

Table 76: Customer strategies - recoded

Product Leadership

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,345	5,110	,943	1,521	,465	,381	2,284	,802	,615	,230	1,001	,001	,341	1,585	6,417	3,609	,611	,850	,073	5,351
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,557	,024	,331	,217	,495	,537	,131	,371	,433	,632	,317	,982	,559	,208	,011	,057	,434	,357	,787	,021

a. Kruskal Wallis Test

b. Grouping Variable: Customer Strategy is productleadership recoded High versus Low

Operational Excellence

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,063	3,414	5,727	1,523	,740	,194	,384	1,350	,783	,019	1,427	,003	,288	,278	1,811	,858	,355	1,536	,142	,288
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,802	,065	,017	,217	,390	,660	,535	,245	,376	,889	,232	,960	,592	,598	,178	,354	,614	,215	,706	,591

a. Kruskal Wallis Test

b. Grouping Variable: Customer Strategy is operational excellence recoded High versus Low

Customer Intimacy

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,066	1,134	,068	,040	,783	,000	2,108	,001	,393	,000	1,827	,506	,918	2,942	1,214	4,964	1,270	1,420	2,695	2,005
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,302	,287	,795	,841	,376	,993	,147	,971	,531	1,000	,177	,477	,338	,086	,271	,026	,260	,233	,101	,157

a. Kruskal Wallis Test

b. Grouping Variable: Customer Strategy is customer intimacy recoded High versus Low

Table 77: Company Strategies - uncoded

Entrepreneurial

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,850	3,241	4,306	2,700	,058	,697	3,877	5,748	,206	,848	2,591	,489	,003	3,872	1,987	1,356	1,306	,143	2,786	3,379
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,654	,198	,116	,259	,971	,706	,144	,056	,902	,654	,274	,783	,999	,144	,370	,508	,521	,931	,248	,185

a. Kruskal Wallis Test

b. Grouping Variable: Company strategy towards customers or supplier is entrepreneurial

Lifestyle

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,114	1,893	2,142	3,217	,502	1,997	1,115	4,176	,163	2,837	6,280	,563	2,803	3,511	3,986	4,226	1,082	4,108	2,147	6,687
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,945	,388	,343	,200	,778	,368	,573	,124	,922	,267	,043	,755	,246	,173	,136	,121	,582	,128	,342	,035

a. Kruskal Wallis Test

b. Grouping Variable: Company strategy towards customers or supplier is lifestyle

Survival mode

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,779	3,437	2,509	1,967	,865	,776	,977	3,063	2,217	,688	1,106	1,227	4,624	,401	,671	1,035	,293	4,978	,201	1,318
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,411	,179	,285	,374	,649	,678	,614	,216	,330	,709	,575	,542	,099	,818	,715	,596	,864	,083	,904	,517

a. Kruskal Wallis Test

b. Grouping Variable: Company strategy towards customers or supplier is survival mode

Table 78: Company Strategies - recoded

Entrepreneurial

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,010	1,392	3,650	,373	,011	,043	3,665	,273	,006	,164	,131	,536	,000	,010	1,678	,009	,751	,002	1,216	2,985
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,922	,238	,056	,541	,918	,836	,055	,602	,941	,685	,718	,464	,992	,919	,195	,924	,386	,964	,270	,084

a. Kruskal Wallis Test

b. Grouping Variable: Company strategy is entrepreneurial recoded high versus low

Lifestyle

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,004	1,730	1,864	2,893	,469	,434	1,138	3,157	,147	,471	,155	,056	,646	,530	2,214	,371	,007	,164	,053	4,063
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,953	,188	,172	,089	,494	,510	,286	,076	,701	,493	,693	,813	,422	,466	,137	,542	,932	,686	,819	,044

a. Kruskal Wallis Test

b. Grouping Variable: Company strategy is lifestyle recoded high versus low

Survival mode

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,181	1,011	2,300	,028	,873	,701	,985	,011	2,030	,334	,035	,000	2,368	,237	,164	,216	,006	,566	,000	1,247
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,670	,315	,129	,866	,350	,402	,321	,915	,154	,564	,851	,984	,124	,627	,686	,642	,936	,452	1,000	,264

a. Kruskal Wallis Test

b. Grouping Variable: Company strategy is survival recoded high versus low

§7.2.4 Effects of Company Turnover Type

Table 79: Effects of providing services - uncoded

Ranks

	Company turnover from providing services	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	47	35,04
	important	13	33,85
	not so important	3	50,83
	least important	8	39,56
	Total	71	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	42	31,27
	important	13	36,23
	not so important	2	25,50
	least important	6	30,08
	Total	63	
Innovations with supplier interaction are beneficial for our company	most important	58	43,06
	important	17	51,97
	not so important	4	47,13
	least important	9	38,50
	Total	88	
Innovations with supplier interaction are beneficial for the natural environment	most important	58	41,26
	important	17	59,47
	not so important	4	48,13
	least important	9	35,50
	Total	88	
Innovations without supplier interaction are beneficial for our company	most important	58	45,08
	important	17	42,71
	not so important	4	38,88
	least important	9	46,67
	Total	88	
Innovations without supplier interaction are beneficial for the natural environment	most important	58	42,93
	important	17	52,53
	not so important	4	38,00
	least important	9	42,33
	Total	88	
Satisfaction with procurement with innovative suppliers	most important	58	42,41
	important	17	51,38
	not so important	4	53,00
	least important	9	41,17
	Total	88	
Satisfaction with innovation with innovative suppliers	most important	58	44,86
	important	17	39,56
	not so important	4	39,75
	least important	9	53,61
	Total	88	
Satisfaction with marketing&sales with innovative customers	most important	58	43,43
	important	17	47,65
	not so important	4	45,75
	least important	9	44,89
	Total	88	
Satisfaction with innovation with innovative customers	most important	57	46,15
	important	17	36,71
	not so important	4	42,25
	least important	9	44,94
	Total	87	
Satisfaction with internal innovation activities	most important	58	43,63
	important	17	45,88
	not so important	4	48,50
	least important	9	45,72
	Total	88	
Satisfaction innovation procurement recoded	most important	36	28,94
	important	13	33,23
	not so important	3	35,50
	least important	7	27,07
	Total	59	
Satisfaction innovative suppliers recoded	most important	38	30,16
	important	10	26,80
	not so important	3	25,83
	least important	7	31,36
	Total	58	
Satisfaction MS w customers recoded	most important	29	21,31
	important	7	26,50
	not so important	1	26,50
	least important	6	19,33
	Total	43	
Satisfaction innovation w customers recoded	most important	42	30,08
	important	9	28,44
	not so important	2	35,00
	least important	6	30,08
	Total	59	
Satisfaction internal innovation activities recoded	most important	36	28,56
	important	11	28,91
	not so important	4	27,00
	least important	5	28,40
	Total	56	
Innovations with suppliers are beneficial for our company recoded	most important	39	29,51
	important	10	33,90
	not so important	2	28,00
	least important	8	28,00
	Total	59	
Innovations with suppliers are beneficial for the natural environment recoded	most important	30	20,20
	important	7	33,71
	not so important	3	25,33
	least important	4	18,00
	Total	44	
Innovations without suppliers are beneficial for our company recoded	most important	29	22,86
	important	6	20,33
	not so important	3	20,33
	least important	6	24,00
	Total	44	
Innovations without suppliers are beneficial for the natural environment recoded	most important	29	22,02
	important	10	28,60
	not so important	1	12,50
	least important	6	24,00
	Total	46	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	2,060	1,094	2,447	9,295	,434	2,533	2,619	2,235	,452	2,204	,271	2,432	1,095	2,789	,579	,087	3,599	14,198	,490	3,308
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,560	,779	,485	,026	,933	,469	,454	,525	,929	,531	,965	,488	,778	,425	,901	,993	,308	,003	,921	,347

a. Kruskal Wallis Test

b. Grouping Variable: Company turnover from providing services

Table 80: Effects of providing services - recoded

Ranks

	Turnover from Services - recoded Most Important vs Least Important	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high importance	47	27,57
	least important	8	30,50
	Total	55	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high importance	42	24,56
	least important	6	24,08
	Total	48	
Innovations with supplier interaction are beneficial for our company	high importance	58	34,43
	least important	9	31,22
	Total	67	
Innovations with supplier interaction are beneficial for the natural environment	high importance	58	34,66
	least important	9	29,78
	Total	67	
Innovations without supplier interaction are beneficial for our company	high importance	58	33,84
	least important	9	35,00
	Total	67	
Innovations without supplier interaction are beneficial for the natural environment	high importance	58	34,09
	least important	9	33,44
	Total	67	
Satisfaction with procurement with innovative suppliers	high importance	58	34,16
	least important	9	33,00
	Total	67	
Satisfaction with innovation with innovative suppliers	high importance	58	33,08
	least important	9	39,94
	Total	67	
Satisfaction with marketing&sales with innovative customers	high importance	58	33,85
	least important	9	34,94
	Total	67	
Satisfaction with innovation with innovative customers	high importance	57	33,61
	least important	9	32,78
	Total	66	
Satisfaction with internal innovation activities	high importance	58	33,80
	least important	9	35,28
	Total	67	
Satisfaction innovation procurement recoded	high importance	36	22,22
	least important	7	20,86
	Total	43	
Satisfaction innovative suppliers recoded	high importance	38	22,86
	least important	7	23,79
	Total	45	
Satisfaction MS w customers recoded	high importance	29	18,28
	least important	6	16,67
	Total	35	
Satisfaction innovation w customers recoded	high importance	42	24,50
	least important	6	24,50
	Total	48	
Satisfaction internal innovation activities recoded	high importance	36	21,01
	least important	5	20,90
	Total	41	
Innovations with suppliers are beneficial for our company recoded	high importance	39	24,21
	least important	8	23,00
	Total	47	
Innovations with suppliers are beneficial for the natural environment recoded	high importance	30	17,70
	least important	4	16,00
	Total	34	
Innovations without suppliers are beneficial for our company recoded	high importance	29	17,84
	least important	6	18,75
	Total	35	
Innovations without suppliers are beneficial for the natural environment recoded	high importance	29	17,74
	least important	6	19,25
	Total	35	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	,232	,006	,240	,572	,031	,010	,031	1,133	,029	,018	,052	,129	,068	,214	,000	,001	,419	,426	,052	,147
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,630	,937	,624	,450	,859	,922	,859	,287	,865	,895	,820	,719	,795	,644	1,000	,977	,517	,514	,820	,702

a. Kruskal Wallis Test

b. Grouping Variable: Turnover from Services - recoded Most Important vs Least Important

Table 81: Effects of manufacturing products - uncoded

Ranks

	Company turnover from manufacturing products	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	13	38,35
	important	18	33,14
	not so important	16	28,06
	least important	16	29,50
	Total	63	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	12	31,75
	important	16	24,84
	not so important	16	31,63
	least important	14	30,46
	Total	58	
Innovations with supplier interaction are beneficial for our company	most important	19	41,76
	important	20	36,78
	not so important	19	31,37
	least important	19	46,21
	Total	77	
Innovations with supplier interaction are beneficial for the natural environment	most important	19	35,16
	important	20	39,08
	not so important	19	38,68
	least important	19	43,08
	Total	77	
Innovations without supplier interaction are beneficial for our company	most important	19	34,58
	important	20	38,70
	not so important	19	38,53
	least important	19	44,21
	Total	77	
Innovations without supplier interaction are beneficial for the natural environment	most important	19	34,95
	important	20	36,95
	not so important	19	41,18
	least important	19	43,03
	Total	77	
Satisfaction with procurement with innovative suppliers	most important	19	39,76
	important	20	42,13
	not so important	19	39,39
	least important	19	34,55
	Total	77	
Satisfaction with innovation with innovative suppliers	most important	18	42,25
	important	20	44,20
	not so important	19	31,53
	least important	19	35,92
	Total	76	
Satisfaction with marketing&sales with innovative customers	most important	18	43,00
	important	20	38,55
	not so important	19	31,11
	least important	19	41,58
	Total	76	
Satisfaction with innovation with innovative customers	most important	19	41,82
	important	20	43,23
	not so important	19	28,82
	least important	18	39,97
	Total	76	
Satisfaction with internal innovation activities	most important	19	43,79
	important	20	41,80
	not so important	19	30,89
	least important	19	39,37
	Total	77	
Satisfaction innovation procurement recoded	most important	14	27,21
	important	14	29,11
	not so important	14	25,32
	least important	11	26,18
	Total	53	
Satisfaction innovative suppliers recoded	most important	12	26,96
	important	13	29,00
	not so important	13	19,58
	least important	11	24,55
	Total	49	
Satisfaction MS w customers recoded	most important	10	18,25
	important	11	16,82
	not so important	5	16,50
	least important	9	20,00
	Total	35	
Satisfaction innovation w customers recoded	most important	14	27,79
	important	14	29,64
	not so important	11	19,68
	least important	13	27,50
	Total	52	
Satisfaction internal innovation activities recoded	most important	15	27,90
	important	13	31,50
	not so important	13	21,12
	least important	13	29,42
	Total	54	
Innovations with suppliers are beneficial for our company recoded	most important	12	29,50
	important	15	26,80
	not so important	16	26,69
	least important	11	27,45
	Total	54	
Innovations with suppliers are beneficial for the natural environment recoded	most important	12	20,63
	important	8	18,06
	not so important	10	21,65
	least important	11	22,95
	Total	41	
Innovations without suppliers are beneficial for our company recoded	most important	12	18,67
	important	10	20,00
	not so important	10	20,00
	least important	8	24,50
	Total	40	
Innovations without suppliers are beneficial for the natural environment recoded	most important	12	21,38
	important	8	20,44
	not so important	11	24,27
	least important	14	24,86
	Total	45	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	2,709	1,752	5,219	1,359	2,051	1,749	1,449	4,679	4,124	6,101	4,282	1,195	7,629	1,982	6,406	8,411	1,057	1,383	1,729	1,162
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,439	,625	,156	,715	,562	,626	,694	,197	,248	,107	,233	,754	,054	,576	,093	,038	,788	,709	,631	,762

a. Kruskal Wallis Test

b. Grouping Variable: Company turnover from manufacturing products

Table 82: Effects of manufacturing products - recoded

Ranks

	Turnover from manufacturing - recoded Most Important vs Least Important	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high importance	13	17,04
	least important	16	13,34
	Total	29	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high importance	12	13,88
	least important	14	13,18
	Total	26	
Innovations with supplier interaction are beneficial for our company	high importance	19	18,68
	least important	19	20,32
	Total	38	
Innovations with supplier interaction are beneficial for the natural environment	high importance	19	17,53
	least important	19	21,47
	Total	38	
Innovations without supplier interaction are beneficial for our company	high importance	19	17,18
	least important	19	21,82
	Total	38	
Innovations without supplier interaction are beneficial for the natural environment	high importance	19	17,50
	least important	19	21,50
	Total	38	
Satisfaction with procurement with innovative suppliers	high importance	19	20,84
	least important	19	18,16
	Total	38	
Satisfaction with innovation with innovative suppliers	high importance	18	20,61
	least important	19	17,47
	Total	37	
Satisfaction with marketing&sales with innovative customers	high importance	18	19,47
	least important	19	18,55
	Total	37	
Satisfaction with innovation with innovative customers	high importance	19	19,47
	least important	18	18,50
	Total	37	
Satisfaction with internal innovation activities	high importance	19	20,71
	least important	19	18,29
	Total	38	
Satisfaction innovation procurement recoded	high importance	14	13,21
	least important	11	12,73
	Total	25	
Satisfaction innovative suppliers recoded	high importance	12	12,54
	least important	11	11,41
	Total	23	
Satisfaction MS w customers recoded	high importance	10	9,55
	least important	9	10,50
	Total	19	
Satisfaction innovation w customers recoded	high importance	14	14,07
	least important	13	13,92
	Total	27	
Satisfaction internal innovation activities recoded	high importance	15	14,13
	least important	13	14,92
	Total	28	
Innovations with suppliers are beneficial for our company recoded	high importance	12	12,42
	least important	11	11,55
	Total	23	
Innovations with suppliers are beneficial for the natural environment recoded	high importance	12	11,38
	least important	11	12,68
	Total	23	
Innovations without suppliers are beneficial for our company recoded	high importance	12	9,33
	least important	8	12,25
	Total	20	
Innovations without suppliers are beneficial for the natural environment recoded	high importance	12	12,42
	least important	14	14,43
	Total	26	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	1,374	,054	,231	1,312	1,886	1,315	,701	,915	,083	,097	,541	,067	,469	,900	,006	,223	,278	,335	1,567	,595
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,241	,815	,630	,252	,170	,252	,402	,339	,773	,755	,462	,796	,493	,343	,937	,636	,598	,563	,211	,440

a. Kruskal Wallis Test

b. Grouping Variable: Turnover from manufacturing - recoded Most Important vs Least Important

Table 83: Effects of wholesale or distribution company type - uncoded

Ranks

	Company turnover from wholesale or distribution	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	8	9,75
	important	10	9,30
	Total	18	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	7	8,86
	important	8	7,25
	Total	15	
Innovations with supplier interaction are beneficial for our company	most important	9	14,33
	important	14	10,50
	Total	23	
Innovations with supplier interaction are beneficial for the natural environment	most important	9	16,17
	important	14	9,32
	Total	23	
Innovations without supplier interaction are beneficial for our company	most important	9	13,28
	important	14	11,18
	Total	23	
Innovations without supplier interaction are beneficial for the natural environment	most important	9	14,94
	important	14	10,11
	Total	23	
Satisfaction with procurement with innovative suppliers	most important	9	13,22
	important	14	11,21
	Total	23	
Satisfaction with innovation with innovative suppliers	most important	9	11,11
	important	14	12,57
	Total	23	
Satisfaction with marketing&sales with innovative customers	most important	9	11,33
	important	14	12,43
	Total	23	
Satisfaction with innovation with innovative customers	most important	9	12,06
	important	14	11,96
	Total	23	
Satisfaction with internal innovation activities	most important	9	11,89
	important	14	12,07
	Total	23	
Satisfaction innovation procurement recoded	most important	8	9,88
	important	10	9,20
	Total	18	
Satisfaction innovative suppliers recoded	most important	5	8,00
	important	10	8,00
	Total	15	
Satisfaction MS w customers recoded	most important	5	6,70
	important	8	7,19
	Total	13	
Satisfaction innovation w customers recoded	most important	6	9,17
	important	11	8,91
	Total	17	
Satisfaction internal innovation activities recoded	most important	6	8,67
	important	10	8,40
	Total	16	
Innovations with suppliers are beneficial for our company recoded	most important	6	9,50
	important	12	9,50
	Total	18	
Innovations with suppliers are beneficial for the natural environment recoded	most important	2	10,00
	important	9	5,11
	Total	11	
Innovations without suppliers are beneficial for our company recoded	most important	4	8,75
	important	11	7,73
	Total	15	
Innovations without suppliers are beneficial for the natural environment recoded	most important	5	10,00
	important	9	6,11
	Total	14	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	,032	,504	2,460	6,605	,587	3,070	,673	,300	,171	,001	,004	,170	,000	,123	,015	,026	,000	5,926	,212	4,012
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,857	,478	,117	,010	,444	,080	,412	,584	,680	,973	,947	,680	1,000	,726	,904	,873	1,000	,015	,645	,045

a. Kruskal Wallis Test

b. Grouping Variable: Company turnover from wholesale or distribution

Table 84: Effects of wholesale or distribution company type - recoded

Ranks

	Turnover from wholesale/distribution - recoded Most Important vs Least Important	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high importance	8	13,69
	least important	14	10,25
	Total	22	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high importance	7	11,79
	least important	14	10,61
	Total	21	
Innovations with supplier interaction are beneficial for our company	high importance	9	13,67
	least important	17	13,41
	Total	26	
Innovations with supplier interaction are beneficial for the natural environment	high importance	9	15,44
	least important	17	12,47
	Total	26	
Innovations without supplier interaction are beneficial for our company	high importance	9	14,17
	least important	17	13,15
	Total	26	
Innovations without supplier interaction are beneficial for the natural environment	high importance	9	17,50
	least important	17	11,38
	Total	26	
Satisfaction with procurement with innovative suppliers	high importance	9	14,56
	least important	17	12,94
	Total	26	
Satisfaction with innovation with innovative suppliers	high importance	9	13,83
	least important	17	13,32
	Total	26	
Satisfaction with marketing&sales with innovative customers	high importance	9	14,56
	least important	17	12,94
	Total	26	
Satisfaction with innovation with innovative customers	high importance	9	12,83
	least important	17	13,85
	Total	26	
Satisfaction with internal innovation activities	high importance	9	13,83
	least important	17	13,32
	Total	26	
Satisfaction innovation procurement recoded	high importance	8	10,31
	least important	11	9,77
	Total	19	
Satisfaction innovative suppliers recoded	high importance	5	8,50
	least important	10	7,75
	Total	15	
Satisfaction MS w customers recoded	high importance	5	4,60
	least important	4	5,50
	Total	9	
Satisfaction innovation w customers recoded	high importance	6	6,67
	least important	8	8,13
	Total	14	
Satisfaction internal innovation activities recoded	high importance	6	10,42
	least important	13	9,81
	Total	19	
Innovations with suppliers are beneficial for our company recoded	high importance	6	7,50
	least important	9	8,33
	Total	15	
Innovations with suppliers are beneficial for the natural environment recoded	high importance	2	7,00
	least important	7	4,43
	Total	9	
Innovations without suppliers are beneficial for our company recoded	high importance	4	6,25
	least important	7	5,86
	Total	11	
Innovations without suppliers are beneficial for the natural environment recoded	high importance	5	8,50
	least important	7	5,07
	Total	12	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	1,458	,172	,007	1,248	,131	4,532	,318	,030	,379	,124	,031	,107	,159	,800	,821	,096	,667	1,829	,048	3,929
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,227	,678	,931	,264	,717	,033	,573	,862	,538	,725	,861	,744	,690	,371	,365	,756	,414	,176	,827	,047

a. Kruskal Wallis Test

b. Grouping Variable: Turnover from wholesale/distribution - recoded Most Important vs Least Important

Table 85: Not relevant or turnover from other activities - uncoded

Ranks

	Company turnover from other activities or non relevant	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	most important	9	30,28
	important	20	31,65
	not so important	12	34,46
	least important	22	31,68
	Total	63	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	most important	9	19,44
	important	20	30,73
	not so important	10	38,25
	least important	21	31,33
	Total	60	
Innovations with supplier interaction are beneficial for our company	most important	11	47,77
	important	27	42,98
	not so important	14	41,61
	least important	29	36,29
	Total	81	
Innovations with supplier interaction are beneficial for the natural environment	most important	11	52,45
	important	27	35,35
	not so important	14	46,75
	least important	29	39,14
	Total	81	
Innovations without supplier interaction are beneficial for our company	most important	11	47,32
	important	27	42,67
	not so important	14	38,46
	least important	29	38,28
	Total	81	
Innovations without supplier interaction are beneficial for the natural environment	most important	11	50,09
	important	27	37,22
	not so important	14	42,93
	least important	29	40,14
	Total	81	
Satisfaction with procurement with innovative suppliers	most important	11	34,77
	important	27	37,26
	not so important	14	45,18
	least important	29	44,83
	Total	81	
Satisfaction with innovation with innovative suppliers	most important	11	32,45
	important	27	41,76
	not so important	14	46,00
	least important	29	41,12
	Total	81	
Satisfaction with marketing&sales with innovative customers	most important	11	25,14
	important	27	39,89
	not so important	14	51,36
	least important	29	43,05
	Total	81	
Satisfaction with innovation with innovative customers	most important	11	30,68
	important	26	45,67
	not so important	14	44,18
	least important	29	37,81
	Total	80	
Satisfaction with internal innovation activities	most important	11	42,23
	important	27	38,52
	not so important	14	49,54
	least important	29	38,72
	Total	81	
Satisfaction innovation procurement recoded	most important	5	26,10
	important	18	24,00
	not so important	11	29,05
	least important	20	30,15
	Total	54	
Satisfaction innovative suppliers recoded	most important	7	21,21
	important	20	27,50
	not so important	9	33,00
	least important	19	28,66
	Total	55	
Satisfaction MS w customers recoded	most important	2	4,00
	important	10	18,40
	not so important	10	20,20
	least important	14	19,43
	Total	36	
Satisfaction innovation w customers recoded	most important	7	21,43
	important	18	30,00
	not so important	10	30,30
	least important	19	25,89
	Total	54	
Satisfaction internal innovation activities recoded	most important	7	25,50
	important	15	24,10
	not so important	10	29,00
	least important	17	23,24
	Total	49	
Innovations with suppliers are beneficial for our company recoded	most important	6	30,58
	important	16	27,72
	not so important	10	26,00
	least important	23	28,39
	Total	55	
Innovations with suppliers are beneficial for the natural environment recoded	most important	5	27,70
	important	16	18,44
	not so important	4	20,88
	least important	14	18,79
	Total	39	
Innovations without suppliers are beneficial for our company recoded	most important	5	25,30
	important	13	22,46
	not so important	7	18,86
	least important	16	19,41
	Total	41	
Innovations without suppliers are beneficial for the natural environment recoded	most important	7	26,50
	important	14	19,00
	not so important	7	23,50
	least important	14	20,50
	Total	42	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	,314	5,717	2,559	6,135	1,727	2,833	3,235	2,476	10,103	4,703	2,832	4,236	4,892	8,842	4,133	2,710	1,633	5,645	1,883	2,702
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,957	,126	,465	,105	,631	,418	,357	,480	,018	,195	,418	,237	,180	,031	,248	,439	,652	,130	,597	,440

a. Kruskal Wallis Test

b. Grouping Variable: Company turnover from other activities or non relevant

Table 86: Not relevant or turnover from other activities - recoded

Ranks

	Not relevant or turnover from other activities - recoded Most Important vs Least Important	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	high importance	9	15,89
	least important	22	16,05
	Total	31	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	high importance	9	11,28
	least important	21	17,31
	Total	30	
Innovations with supplier interaction are beneficial for our company	high importance	11	24,32
	least important	29	19,05
	Total	40	
Innovations with supplier interaction are beneficial for the natural environment	high importance	11	25,27
	least important	29	18,69
	Total	40	
Innovations without supplier interaction are beneficial for our company	high importance	11	23,68
	least important	29	19,29
	Total	40	
Innovations without supplier interaction are beneficial for the natural environment	high importance	11	23,95
	least important	29	19,19
	Total	40	
Satisfaction with procurement with innovative suppliers	high importance	11	16,77
	least important	29	21,91
	Total	40	
Satisfaction with innovation with innovative suppliers	high importance	11	17,32
	least important	29	21,71
	Total	40	
Satisfaction with marketing&sales with innovative customers	high importance	11	13,95
	least important	29	22,98
	Total	40	
Satisfaction with innovation with innovative customers	high importance	11	17,82
	least important	29	21,52
	Total	40	
Satisfaction with internal innovation activities	high importance	11	21,68
	least important	29	20,05
	Total	40	
Satisfaction innovation procurement recoded	high importance	5	11,50
	least important	20	13,38
	Total	25	
Satisfaction innovative suppliers recoded	high importance	7	10,93
	least important	19	14,45
	Total	26	
Satisfaction MS w customers recoded	high importance	2	2,50
	least important	14	9,36
	Total	16	
Satisfaction innovation w customers recoded	high importance	7	11,93
	least important	19	14,08
	Total	26	
Satisfaction internal innovation activities recoded	high importance	7	13,29
	least important	17	12,18
	Total	24	
Innovations with suppliers are beneficial for our company recoded	high importance	6	15,92
	least important	23	14,76
	Total	29	
Innovations with suppliers are beneficial for the natural environment recoded	high importance	5	13,20
	least important	14	8,86
	Total	19	
Innovations without suppliers are beneficial for our company recoded	high importance	5	13,30
	least important	16	10,28
	Total	21	
Innovations without suppliers are beneficial for the natural environment recoded	high importance	7	13,00
	least important	14	10,00
	Total	21	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded
Chi-Square	,002	3,077	1,786	3,002	1,293	1,507	1,921	1,281	6,281	,909	,176	1,174	2,030	6,429	,632	,246	,315	3,762	1,272	1,455
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,965	,079	,181	,083	,255	,220	,166	,258	,012	,340	,675	,279	,154	,011	,427	,620	,575	,052	,259	,228

a. Kruskal Wallis Test

b. Grouping Variable: Not relevant or turnover from other activities - recoded Most Important vs Least Important

§7.3 Procurement Priorities in the idea and develop phase

Table 87: Procurement performance variables controlled for specify needs priorities: un- & recoded

Specify idea

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	5,858	1,762	6,762	5,007	,397	,686	3,145	2,442	,474	,515	1,532	1,743	,214	1,935	4,349	2,061	1,343	1,359	2,240	3,009
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,119	,623	,080	,171	,941	,877	,370	,486	,925	,916	,675	,627	,975	,586	,226	,560	,719	,715	,524	,390

a. Kruskal Wallis Test

b. Grouping Variable: Ranking in Idea phase Specify

Specify Idea recoded H L

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,064	1,326	2,600	3,828	,026	,418	,938	1,015	,138	,332	,354	,035	,088	,983	,154	1,202	,180	,975	,021	,088
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,800	,250	,107	,050	,872	,518	,333	,314	,710	,564	,552	,851	,767	,321	,695	,273	,671	,323	,886	,767

a. Kruskal Wallis Test

b. Grouping Variable: Idea Specification Most versus Least important

Specify Develop

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,112	,852	4,769	,992	4,761	2,614	1,900	2,276	4,696	4,252	4,707	5,860	,866	7,755	1,577	2,621	2,814	1,513	5,536	,223
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,550	,837	,190	,803	,190	,455	,593	,517	,195	,235	,195	,119	,834	,051	,665	,454	,421	,679	,137	,974

a. Kruskal Wallis Test

b. Grouping Variable: Ranking in Develop phase Specify

Specify Develop Recoded H L

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,993	,132	,042	,049	3,700	2,787	,385	,078	3,703	3,908	1,212	,909	,058	,841	,010	,118	,588	,034	,007	,008
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,319	,717	,838	,825	,054	,095	,535	,780	,054	,048	,271	,340	,809	,359	,922	,731	,443	,854	,933	,930

a. Kruskal Wallis Test

b. Grouping Variable: Develop Specification Most vs Least important

Table 88: Procurement performance variables controlled for find&select priorities: un- & recoded

Find & Select IDEA

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,855	4,641	8,489	4,401	3,860	2,832	2,983	3,272	5,340	4,133	3,745	6,403	,189	,182	6,441	6,386	5,879	,048	1,680	2,241
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,603	,200	,037	,221	,277	,418	,397	,351	,149	,247	,290	,094	,979	,980	,092	,094	,118	,997	,641	,524

a. Kruskal Wallis Test

b. Grouping Variable: Ranking in Idea phase Find or Select

Find & Select IDEA recoded H v L

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,054	1,408	1,992	1,729	1,570	1,673	1,214	1,653	2,050	2,901	2,434	3,437	,026	,135	4,768	4,228	5,739	,017	1,179	,454
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,816	,235	,158	,189	,210	,196	,271	,199	,152	,089	,119	,064	,872	,713	,029	,040	,017	,897	,278	,500

a. Kruskal Wallis Test

b. Grouping Variable: Idea Find & Select Most vs Least important

Find & Select Develop

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,068	2,640	,597	2,217	1,667	1,078	,853	2,123	1,716	1,081	1,969	1,070	,730	1,563	4,784	2,102	,685	3,203	3,398	6,072
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,785	,450	,897	,529	,644	,782	,837	,547	,633	,782	,579	,784	,866	,668	,188	,551	,877	,361	,334	,108

a. Kruskal Wallis Test

b. Grouping Variable: Ranking in Develop phase Find or Select

Find&Select Develop recoded H v L

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,176	2,243	,260	1,407	,002	,099	,131	1,414	,049	,473	,392	,922	,324	,085	,389	,020	,003	3,231	,230	,180
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,675	,134	,610	,236	,965	,753	,717	,234	,825	,492	,531	,337	,569	,770	,533	,888	,958	,072	,631	,671

a. Kruskal Wallis Test

b. Grouping Variable: Develop Find & Select Most vs Least important

§7.4 Supplier Types and Procurement Performance

Table 89 Foreign vs domestic suppliers for developing (somewhat) incremental innovations

Ranks

	We prefer domestic (1) or foreign (5) suppliers for (somewhat) incremental innovations	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	only domestic suppliers	10	31,85
	mainly domestic suppliers	27	43,46
	both domestic and foreign suppliers	40	41,11
	mainly foreign suppliers	4	55,50
	only foreign suppliers	1	44,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	only domestic suppliers	10	30,65
	mainly domestic suppliers	21	30,00
	both domestic and foreign suppliers	38	40,83
	mainly foreign suppliers	4	64,50
	only foreign suppliers	1	29,00
	Total	74	
Innovations with supplier interaction are beneficial for our company	only domestic suppliers	11	44,82
	mainly domestic suppliers	37	57,53
	both domestic and foreign suppliers	59	58,26
	mainly foreign suppliers	4	45,50
	only foreign suppliers	1	87,00
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	only domestic suppliers	11	50,14
	mainly domestic suppliers	37	58,88
	both domestic and foreign suppliers	59	53,81
	mainly foreign suppliers	4	88,25
	only foreign suppliers	1	70,50
	Total	112	
Innovations without supplier interaction are beneficial for our company	only domestic suppliers	11	70,91
	mainly domestic suppliers	37	57,47
	both domestic and foreign suppliers	59	54,23
	mainly foreign suppliers	4	40,25
	only foreign suppliers	1	61,00
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	only domestic suppliers	11	61,64
	mainly domestic suppliers	37	53,76
	both domestic and foreign suppliers	59	56,47
	mainly foreign suppliers	4	68,50
	only foreign suppliers	1	55,50
	Total	112	
Innovations with suppliers are beneficial for our company recoded	only domestic suppliers	8	33,50
	mainly domestic suppliers	23	36,59
	both domestic and foreign suppliers	36	36,46
	mainly foreign suppliers	4	33,50
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	only domestic suppliers	4	20,50
	mainly domestic suppliers	16	27,00
	both domestic and foreign suppliers	30	25,70
	mainly foreign suppliers	2	46,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	only domestic suppliers	7	36,14
	mainly domestic suppliers	16	28,53
	both domestic and foreign suppliers	30	26,58
	mainly foreign suppliers	2	16,50
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	only domestic suppliers	7	30,00
	mainly domestic suppliers	19	27,26
	both domestic and foreign suppliers	29	28,48
	mainly foreign suppliers	1	42,00
	Total	56	
Satisfaction with procurement with innovative suppliers	only domestic suppliers	11	58,14
	mainly domestic suppliers	36	48,99
	both domestic and foreign suppliers	52	52,35
	mainly foreign suppliers	4	64,88
	only foreign suppliers	1	75,50
	Total	104	
Satisfaction with innovation with innovative suppliers	only domestic suppliers	11	45,45
	mainly domestic suppliers	35	48,89
	both domestic and foreign suppliers	52	54,16
	mainly foreign suppliers	4	63,63
	only foreign suppliers	1	74,00
	Total	103	
Satisfaction with marketing&sales with innovative customers	only domestic suppliers	11	51,64
	mainly domestic suppliers	35	52,19
	both domestic and foreign suppliers	53	52,55
	mainly foreign suppliers	4	60,50
	only foreign suppliers	1	38,50
	Total	104	
Satisfaction with innovation with innovative customers	only domestic suppliers	11	52,18
	mainly domestic suppliers	35	47,07
	both domestic and foreign suppliers	52	56,13
	mainly foreign suppliers	4	46,13
	only foreign suppliers	1	31,00
	Total	103	
Satisfaction with internal innovation activities	only domestic suppliers	11	57,95
	mainly domestic suppliers	36	52,39
	both domestic and foreign suppliers	53	54,95
	mainly foreign suppliers	4	24,63
	only foreign suppliers	1	30,50
	Total	105	
Satisfaction innovation procurement recoded	only domestic suppliers	7	36,21
	mainly domestic suppliers	23	32,26
	both domestic and foreign suppliers	33	33,89
	mainly foreign suppliers	3	41,00
	only foreign suppliers	1	41,00
	Total	67	
Satisfaction innovative suppliers recoded	only domestic suppliers	6	29,83
	mainly domestic suppliers	26	30,69
	both domestic and foreign suppliers	31	36,68
	mainly foreign suppliers	3	41,00
	only foreign suppliers	1	41,00
	Total	67	
Satisfaction MS w customers recoded	only domestic suppliers	5	26,00
	mainly domestic suppliers	14	27,43
	both domestic and foreign suppliers	29	24,10
	mainly foreign suppliers	2	31,00
	Total	50	
Satisfaction innovation w customers recoded	only domestic suppliers	6	38,00
	mainly domestic suppliers	20	36,80
	both domestic and foreign suppliers	43	36,47
	mainly foreign suppliers	3	32,00
	Total	72	
Satisfaction internal innovation activities recoded	only domestic suppliers	7	36,07
	mainly domestic suppliers	25	34,10
	both domestic and foreign suppliers	36	36,21
	mainly foreign suppliers	1	6,50
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	3,278	11,111	3,349	6,041	4,118	1,257	1,081	7,905	4,233	1,139	2,489	2,709	,618	3,057	5,200	1,594	4,285	1,557	,351	5,147
df	4	4	4	4	4	4	3	3	3	3	4	4	4	4	4	4	4	3	3	3
Asymp. Sig.	,512	,025	,501	,196	,390	,869	,782	,048	,237	,768	,647	,608	,961	,548	,267	,810	,369	,669	,950	,161

a. Kruskal Wallis Test

b. Grouping Variable: We prefer domestic (1) or foreign (5) suppliers for (somewhat) incremental innovations

Table 90: Foreign vs domestic suppliers 4 develop. (somewhat) incremental innovations- recoded

Ranks

	We prefer domestic (1) or foreign (5) suppliers for (somewhat) incremental innovations - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly domestic suppliers	37	20,73
	Only or mainly foreign suppliers	5	27,20
	Total	42	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly domestic suppliers	31	16,65
	Only or mainly foreign suppliers	5	30,00
	Total	36	
Innovations with supplier interaction are beneficial for our company	Only or mainly domestic suppliers	48	27,01
	Only or mainly foreign suppliers	5	26,90
	Total	53	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly domestic suppliers	48	25,71
	Only or mainly foreign suppliers	5	39,40
	Total	53	
Innovations without supplier interaction are beneficial for our company	Only or mainly domestic suppliers	48	27,76
	Only or mainly foreign suppliers	5	19,70
	Total	53	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly domestic suppliers	48	26,53
	Only or mainly foreign suppliers	5	31,50
	Total	53	
Innovations with suppliers are beneficial for our company recoded	Only or mainly domestic suppliers	31	18,13
	Only or mainly foreign suppliers	4	17,00
	Total	35	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly domestic suppliers	20	10,70
	Only or mainly foreign suppliers	2	19,50
	Total	22	
Innovations without suppliers are beneficial for our company recoded	Only or mainly domestic suppliers	23	13,52
	Only or mainly foreign suppliers	2	7,00
	Total	25	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly domestic suppliers	26	13,75
	Only or mainly foreign suppliers	1	20,50
	Total	27	
Satisfaction with procurement with innovative suppliers	Only or mainly domestic suppliers	47	25,73
	Only or mainly foreign suppliers	5	33,70
	Total	52	
Satisfaction with innovation with innovative suppliers	Only or mainly domestic suppliers	46	25,17
	Only or mainly foreign suppliers	5	33,60
	Total	51	
Satisfaction with marketing&sales with innovative customers	Only or mainly domestic suppliers	46	25,79
	Only or mainly foreign suppliers	5	27,90
	Total	51	
Satisfaction with innovation with innovative customers	Only or mainly domestic suppliers	46	26,27
	Only or mainly foreign suppliers	5	23,50
	Total	51	
Satisfaction with internal innovation activities	Only or mainly domestic suppliers	47	27,78
	Only or mainly foreign suppliers	5	14,50
	Total	52	
Satisfaction innovation procurement recoded	Only or mainly domestic suppliers	30	17,03
	Only or mainly foreign suppliers	4	21,00
	Total	34	
Satisfaction innovative suppliers recoded	Only or mainly domestic suppliers	32	17,88
	Only or mainly foreign suppliers	4	23,50
	Total	36	
Satisfaction MS w customers recoded	Only or mainly domestic suppliers	19	10,84
	Only or mainly foreign suppliers	2	12,50
	Total	21	
Satisfaction innovation w customers recoded	Only or mainly domestic suppliers	26	15,21
	Only or mainly foreign suppliers	3	13,17
	Total	29	
Satisfaction internal innovation activities recoded	Only or mainly domestic suppliers	32	17,41
	Only or mainly foreign suppliers	1	4,00
	Total	33	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,239	7,101	,000	4,497	1,474	,540	,266	5,600	1,926	,929	1,476	1,679	,119	,185	3,890	1,141	1,683	,351	,315	3,714
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,266	,008	,987	,034	,225	,462	,606	,018	,165	,335	,224	,195	,730	,668	,049	,285	,195	,554	,575	,054

a. Kruskal Wallis Test

b. Grouping Variable: We prefer domestic (1) or foreign (5) suppliers for (somewhat) incremental innovations - recoded

Table 91: Foreign vs domestic suppliers for developing (somewhat) radical innovations

Ranks

	We prefer domestic (1) or foreign (5) suppliers for (somewhat) radical innovations	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	only domestic suppliers	9	26,33
	mainly domestic suppliers	28	38,72
	both domestic and foreign suppliers	43	46,23
	mainly foreign suppliers	4	41,38
	only foreign suppliers	1	44,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	only domestic suppliers	9	31,94
	mainly domestic suppliers	20	30,25
	both domestic and foreign suppliers	40	40,69
	mainly foreign suppliers	4	56,50
	only foreign suppliers	1	29,00
	Total	74	
Innovations with supplier interaction are beneficial for our company	only domestic suppliers	11	55,36
	mainly domestic suppliers	30	59,13
	both domestic and foreign suppliers	61	57,34
	mainly foreign suppliers	8	43,50
	only foreign suppliers	2	49,75
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	only domestic suppliers	11	47,82
	mainly domestic suppliers	30	51,58
	both domestic and foreign suppliers	61	60,70
	mainly foreign suppliers	8	59,00
	only foreign suppliers	2	40,00
	Total	112	
Innovations without supplier interaction are beneficial for our company	only domestic suppliers	11	75,09
	mainly domestic suppliers	30	61,42
	both domestic and foreign suppliers	61	52,63
	mainly foreign suppliers	8	48,06
	only foreign suppliers	2	32,25
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	only domestic suppliers	11	63,73
	mainly domestic suppliers	30	51,02
	both domestic and foreign suppliers	61	59,95
	mainly foreign suppliers	8	47,44
	only foreign suppliers	2	30,00
	Total	112	
Innovations with suppliers are beneficial for our company recoded	only domestic suppliers	6	33,50
	mainly domestic suppliers	20	38,83
	both domestic and foreign suppliers	38	35,37
	mainly foreign suppliers	6	33,50
	only foreign suppliers	1	33,50
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	only domestic suppliers	6	24,83
	mainly domestic suppliers	17	25,09
	both domestic and foreign suppliers	23	27,28
	mainly foreign suppliers	5	30,90
	only foreign suppliers	1	20,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	only domestic suppliers	6	39,42
	mainly domestic suppliers	15	31,17
	both domestic and foreign suppliers	29	25,03
	mainly foreign suppliers	4	23,38
	only foreign suppliers	1	16,50
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	only domestic suppliers	8	31,50
	mainly domestic suppliers	20	25,20
	both domestic and foreign suppliers	24	31,50
	mainly foreign suppliers	3	23,33
	only foreign suppliers	1	14,00
	Total	56	
Satisfaction with procurement with innovative suppliers	only domestic suppliers	10	50,20
	mainly domestic suppliers	30	52,62
	both domestic and foreign suppliers	54	53,41
	mainly foreign suppliers	8	43,06
	only foreign suppliers	2	75,50
	Total	104	
Satisfaction with innovation with innovative suppliers	only domestic suppliers	10	49,40
	mainly domestic suppliers	29	52,86
	both domestic and foreign suppliers	54	52,71
	mainly foreign suppliers	8	41,81
	only foreign suppliers	2	74,00
	Total	103	
Satisfaction with marketing&sales with innovative customers	only domestic suppliers	10	56,10
	mainly domestic suppliers	29	58,66
	both domestic and foreign suppliers	55	48,96
	mainly foreign suppliers	8	48,00
	only foreign suppliers	2	60,50
	Total	104	
Satisfaction with innovation with innovative customers	only domestic suppliers	10	47,40
	mainly domestic suppliers	29	51,40
	both domestic and foreign suppliers	54	53,14
	mainly foreign suppliers	8	52,38
	only foreign suppliers	2	51,50
	Total	103	
Satisfaction with internal innovation activities	only domestic suppliers	10	62,45
	mainly domestic suppliers	30	54,23
	both domestic and foreign suppliers	55	53,23
	mainly foreign suppliers	8	35,50
	only foreign suppliers	2	51,00
	Total	105	
Satisfaction innovation procurement recoded	only domestic suppliers	5	34,30
	mainly domestic suppliers	17	37,06
	both domestic and foreign suppliers	37	33,76
	mainly foreign suppliers	6	24,25
	only foreign suppliers	2	41,00
	Total	67	
Satisfaction innovative suppliers recoded	only domestic suppliers	6	29,83
	mainly domestic suppliers	20	34,30
	both domestic and foreign suppliers	34	35,09
	mainly foreign suppliers	5	27,60
	only foreign suppliers	2	41,00
	Total	67	
Satisfaction MS w customers recoded	only domestic suppliers	4	31,00
	mainly domestic suppliers	15	29,33
	both domestic and foreign suppliers	27	22,67
	mainly foreign suppliers	3	22,67
	only foreign suppliers	1	31,00
	Total	50	
Satisfaction innovation w customers recoded	only domestic suppliers	4	44,00
	mainly domestic suppliers	19	38,32
	both domestic and foreign suppliers	43	34,79
	mainly foreign suppliers	5	36,80
	only foreign suppliers	1	44,00
	Total	72	
Satisfaction internal innovation activities recoded	only domestic suppliers	9	33,33
	mainly domestic suppliers	20	35,83
	both domestic and foreign suppliers	34	36,94
	mainly foreign suppliers	5	20,30
	only foreign suppliers	1	41,00
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	5,782	7,141	1,823	3,666	7,997	4,679	3,060	1,614	7,499	3,994	2,401	2,495	2,941	,387	4,197	4,408	2,385	5,597	2,168	7,395
df	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Asymp. Sig.	,216	,129	,768	,453	,092	,322	,548	,806	,112	,407	,662	,645	,568	,983	,380	,354	,665	,231	,705	,116

a. Kruskal Wallis Test

b. Grouping Variable: We prefer domestic (1) or foreign (5) suppliers for (somewhat) radical innovations

Table 92: Foreign vs domestic suppliers for develop. (somewhat) radical innovations - recoded

Ranks

	We prefer domestic (1) or foreign (5) suppliers for (somewhat) radical innovations - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly domestic suppliers	34	19,51
	Only or mainly foreign suppliers	5	23,30
	Total	39	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly domestic suppliers	29	16,02
	Only or mainly foreign suppliers	5	26,10
	Total	34	
Innovations with supplier interaction are beneficial for our company	Only or mainly domestic suppliers	41	27,16
	Only or mainly foreign suppliers	10	21,25
	Total	51	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly domestic suppliers	41	25,70
	Only or mainly foreign suppliers	10	27,25
	Total	51	
Innovations without supplier interaction are beneficial for our company	Only or mainly domestic suppliers	41	27,76
	Only or mainly foreign suppliers	10	18,80
	Total	51	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly domestic suppliers	41	26,99
	Only or mainly foreign suppliers	10	21,95
	Total	51	
Innovations with suppliers are beneficial for our company recoded	Only or mainly domestic suppliers	26	17,40
	Only or mainly foreign suppliers	7	15,50
	Total	33	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly domestic suppliers	23	14,52
	Only or mainly foreign suppliers	6	16,83
	Total	29	
Innovations without suppliers are beneficial for our company recoded	Only or mainly domestic suppliers	21	14,55
	Only or mainly foreign suppliers	5	9,10
	Total	26	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly domestic suppliers	28	16,93
	Only or mainly foreign suppliers	4	13,50
	Total	32	
Satisfaction with procurement with innovative suppliers	Only or mainly domestic suppliers	40	25,80
	Only or mainly foreign suppliers	10	24,30
	Total	50	
Satisfaction with innovation with innovative suppliers	Only or mainly domestic suppliers	39	25,36
	Only or mainly foreign suppliers	10	23,60
	Total	49	
Satisfaction with marketing&sales with innovative customers	Only or mainly domestic suppliers	39	25,76
	Only or mainly foreign suppliers	10	22,05
	Total	49	
Satisfaction with innovation with innovative customers	Only or mainly domestic suppliers	39	24,86
	Only or mainly foreign suppliers	10	25,55
	Total	49	
Satisfaction with internal innovation activities	Only or mainly domestic suppliers	40	27,05
	Only or mainly foreign suppliers	10	19,30
	Total	50	
Satisfaction innovation procurement recoded	Only or mainly domestic suppliers	22	16,45
	Only or mainly foreign suppliers	8	12,88
	Total	30	
Satisfaction innovative suppliers recoded	Only or mainly domestic suppliers	26	17,19
	Only or mainly foreign suppliers	7	16,29
	Total	33	
Satisfaction MS w customers recoded	Only or mainly domestic suppliers	19	12,39
	Only or mainly foreign suppliers	4	10,13
	Total	23	
Satisfaction innovation w customers recoded	Only or mainly domestic suppliers	23	15,11
	Only or mainly foreign suppliers	6	14,58
	Total	29	
Satisfaction internal innovation activities recoded	Only or mainly domestic suppliers	29	18,98
	Only or mainly foreign suppliers	6	13,25
	Total	35	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,489	4,499	1,407	,098	3,367	1,000	,862	,712	2,744	,633	,100	,139	,684	,023	2,502	2,018	,088	1,551	,051	2,939
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,484	,034	,236	,754	,067	,317	,353	,399	,098	,426	,752	,710	,408	,880	,114	,155	,767	,213	,822	,086

a. Kruskal Wallis Test

b. Grouping Variable: We prefer domestic (1) or foreign (5) suppliers for (somewhat) radical innovations - recoded

Table 93: New vs current suppliers for developing (somewhat) incremental innovations

Ranks

	We prefer new (1) or current (5) suppliers for (somewhat) incremental innovations	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	mainly new suppliers	4	43,25
	both new and current suppliers	51	38,63
	mainly current suppliers	24	46,31
	only current suppliers	3	49,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	mainly new suppliers	4	31,75
	both new and current suppliers	46	36,73
	mainly current suppliers	21	37,26
	only current suppliers	3	58,67
	Total	74	
Innovations with supplier interaction are beneficial for our company	mainly new suppliers	4	29,00
	both new and current suppliers	71	57,98
	mainly current suppliers	32	59,14
	only current suppliers	5	40,60
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	mainly new suppliers	4	55,25
	both new and current suppliers	71	53,81
	mainly current suppliers	32	64,42
	only current suppliers	5	45,00
	Total	112	
Innovations without supplier interaction are beneficial for our company	mainly new suppliers	4	62,75
	both new and current suppliers	71	55,42
	mainly current suppliers	32	56,27
	only current suppliers	5	68,40
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	mainly new suppliers	4	77,88
	both new and current suppliers	71	54,72
	mainly current suppliers	32	57,94
	only current suppliers	5	55,50
	Total	112	
Innovations with suppliers are beneficial for our company recoded	mainly new suppliers	4	33,50
	both new and current suppliers	44	35,92
	mainly current suppliers	19	37,24
	only current suppliers	4	33,50
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	mainly new suppliers	1	20,50
	both new and current suppliers	31	23,85
	mainly current suppliers	16	31,88
	only current suppliers	4	27,00
	Total	52	
Innovations without suppliers are beneficial for our company recoded	mainly new suppliers	2	30,25
	both new and current suppliers	39	27,78
	mainly current suppliers	13	27,08
	only current suppliers	1	44,00
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	mainly new suppliers	2	42,00
	both new and current suppliers	34	27,18
	mainly current suppliers	18	29,56
	only current suppliers	2	28,00
	Total	56	
Satisfaction with procurement with innovative suppliers	mainly new suppliers	4	71,50
	both new and current suppliers	64	52,24
	mainly current suppliers	31	51,77
	only current suppliers	5	45,10
	Total	104	
Satisfaction with innovation with innovative suppliers	mainly new suppliers	4	36,63
	both new and current suppliers	64	53,65
	mainly current suppliers	30	48,25
	only current suppliers	5	65,70
	Total	103	
Satisfaction with marketing&sales with innovative customers	mainly new suppliers	4	41,63
	both new and current suppliers	65	51,41
	mainly current suppliers	30	52,13
	only current suppliers	5	77,60
	Total	104	
Satisfaction with innovation with innovative customers	mainly new suppliers	4	68,88
	both new and current suppliers	63	51,82
	mainly current suppliers	31	48,29
	only current suppliers	5	63,80
	Total	103	
Satisfaction with internal innovation activities	mainly new suppliers	4	40,75
	both new and current suppliers	65	53,02
	mainly current suppliers	31	54,95
	only current suppliers	5	50,40
	Total	105	
Satisfaction innovation procurement recoded	mainly new suppliers	3	41,00
	both new and current suppliers	41	33,65
	mainly current suppliers	20	34,30
	only current suppliers	3	29,83
	Total	67	
Satisfaction innovative suppliers recoded	mainly new suppliers	2	24,25
	both new and current suppliers	40	35,14
	mainly current suppliers	21	31,43
	only current suppliers	4	41,00
	Total	67	
Satisfaction MS w customers recoded	mainly new suppliers	2	18,50
	both new and current suppliers	30	25,17
	mainly current suppliers	14	25,64
	only current suppliers	4	31,00
	Total	50	
Satisfaction innovation w customers recoded	mainly new suppliers	3	44,00
	both new and current suppliers	45	36,00
	mainly current suppliers	20	35,00
	only current suppliers	4	44,00
	Total	72	
Satisfaction internal innovation activities recoded	mainly new suppliers	1	41,00
	both new and current suppliers	42	35,25
	mainly current suppliers	22	34,73
	only current suppliers	4	32,38
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,110	3,305	4,962	3,629	1,057	2,330	,948	5,853	1,489	2,231	2,234	3,231	4,938	2,985	,929	1,094	3,063	2,034	2,076	,391
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,550	,347	,173	,305	,788	,507	,814	,119	,685	,526	,525	,357	,176	,394	,819	,779	,382	,565	,557	,942

a. Kruskal Wallis Test

b. Grouping Variable: We prefer new (1) or current (5) suppliers for (somewhat) incremental innovations

Table 94: New vs current suppliers for developing (somewhat) incremental innovations - recoded

Ranks

	We prefer new (1) or current (5) suppliers for (somewhat) incremental innovations - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly new suppliers	4	16,00
	Only or mainly current suppliers	27	16,00
	Total	31	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly new suppliers	4	12,25
	Only or mainly current suppliers	24	14,88
	Total	28	
Innovations with supplier interaction are beneficial for our company	Only or mainly new suppliers	4	12,25
	Only or mainly current suppliers	37	21,95
	Total	41	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly new suppliers	4	18,63
	Only or mainly current suppliers	37	21,26
	Total	41	
Innovations without supplier interaction are beneficial for our company	Only or mainly new suppliers	4	22,50
	Only or mainly current suppliers	37	20,84
	Total	41	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly new suppliers	4	27,63
	Only or mainly current suppliers	37	20,28
	Total	41	
Innovations with suppliers are beneficial for our company recoded	Only or mainly new suppliers	4	13,00
	Only or mainly current suppliers	23	14,17
	Total	27	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly new suppliers	1	7,00
	Only or mainly current suppliers	20	11,20
	Total	21	
Innovations without suppliers are beneficial for our company recoded	Only or mainly new suppliers	2	9,00
	Only or mainly current suppliers	14	8,43
	Total	16	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly new suppliers	2	16,00
	Only or mainly current suppliers	20	11,05
	Total	22	
Satisfaction with procurement with innovative suppliers	Only or mainly new suppliers	4	27,88
	Only or mainly current suppliers	36	19,68
	Total	40	
Satisfaction with innovation with innovative suppliers	Only or mainly new suppliers	4	15,13
	Only or mainly current suppliers	35	20,56
	Total	39	
Satisfaction with marketing&sales with innovative customers	Only or mainly new suppliers	4	15,25
	Only or mainly current suppliers	35	20,54
	Total	39	
Satisfaction with innovation with innovative customers	Only or mainly new suppliers	4	27,13
	Only or mainly current suppliers	36	19,76
	Total	40	
Satisfaction with internal innovation activities	Only or mainly new suppliers	4	15,88
	Only or mainly current suppliers	36	21,01
	Total	40	
Satisfaction innovation procurement recoded	Only or mainly new suppliers	3	16,00
	Only or mainly current suppliers	23	13,17
	Total	26	
Satisfaction innovative suppliers recoded	Only or mainly new suppliers	2	10,75
	Only or mainly current suppliers	25	14,26
	Total	27	
Satisfaction MS w customers recoded	Only or mainly new suppliers	2	7,50
	Only or mainly current suppliers	18	10,83
	Total	20	
Satisfaction innovation w customers recoded	Only or mainly new suppliers	3	16,50
	Only or mainly current suppliers	24	13,69
	Total	27	
Satisfaction internal innovation activities recoded	Only or mainly new suppliers	1	16,50
	Only or mainly current suppliers	26	13,90
	Total	27	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,000	,368	2,623	,200	,091	1,530	,362	,615	,034	1,454	2,129	,981	,924	1,701	,798	,776	,628	1,188	,739	,227
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	1,000	,550	,105	,655	,763	,216	,548	,433	,854	,228	,145	,322	,336	,192	,372	,378	,428	,276	,390	,634

a. Kruskal Wallis Test

b. Grouping Variable: We prefer new (1) or current (5) suppliers for (somewhat) incremental innovations - recoded

Table 95: New vs current suppliers for developing (somewhat) radical innovations

Ranks

	We prefer new (1) or current (5) suppliers for (somewhat) radical innovations	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	only new suppliers	1	16,50
	mainly new suppliers	8	47,75
	both new and current suppliers	52	41,09
	mainly current suppliers	17	42,12
	only current suppliers	4	38,00
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	only new suppliers	1	29,00
	mainly new suppliers	8	50,00
	both new and current suppliers	45	37,54
	mainly current suppliers	16	29,59
	only current suppliers	4	45,75
	Total	74	
Innovations with supplier interaction are beneficial for our company	only new suppliers	1	12,50
	mainly new suppliers	11	63,64
	both new and current suppliers	68	56,46
	mainly current suppliers	27	61,04
	only current suppliers	5	25,70
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	only new suppliers	1	9,50
	mainly new suppliers	11	61,64
	both new and current suppliers	68	57,49
	mainly current suppliers	27	55,78
	only current suppliers	5	45,00
	Total	112	
Innovations without supplier interaction are beneficial for our company	only new suppliers	1	109,50
	mainly new suppliers	11	49,27
	both new and current suppliers	68	56,56
	mainly current suppliers	27	55,13
	only current suppliers	5	68,40
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	only new suppliers	1	107,50
	mainly new suppliers	11	46,32
	both new and current suppliers	68	56,18
	mainly current suppliers	27	59,74
	only current suppliers	5	55,50
	Total	112	
Innovations with suppliers are beneficial for our company recoded	only new suppliers	1	33,50
	mainly new suppliers	7	38,57
	both new and current suppliers	42	35,19
	mainly current suppliers	16	37,94
	only current suppliers	5	33,50
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	only new suppliers	1	20,50
	mainly new suppliers	7	31,64
	both new and current suppliers	27	25,31
	mainly current suppliers	13	26,50
	only current suppliers	4	27,00
	Total	52	
Innovations without suppliers are beneficial for our company recoded	only new suppliers	1	44,00
	mainly new suppliers	5	22,00
	both new and current suppliers	37	28,39
	mainly current suppliers	11	26,50
	only current suppliers	1	44,00
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	only new suppliers	1	42,00
	mainly new suppliers	6	23,33
	both new and current suppliers	32	28,00
	mainly current suppliers	15	30,80
	only current suppliers	2	28,00
	Total	56	
Satisfaction with procurement with innovative suppliers	only new suppliers	1	33,00
	mainly new suppliers	11	54,14
	both new and current suppliers	62	53,41
	mainly current suppliers	25	48,04
	only current suppliers	5	63,80
	Total	104	
Satisfaction with innovation with innovative suppliers	only new suppliers	1	32,50
	mainly new suppliers	11	46,95
	both new and current suppliers	62	53,48
	mainly current suppliers	24	51,23
	only current suppliers	5	52,40
	Total	103	
Satisfaction with marketing&sales with innovative customers	only new suppliers	1	82,50
	mainly new suppliers	11	55,18
	both new and current suppliers	63	52,40
	mainly current suppliers	24	49,02
	only current suppliers	5	58,60
	Total	104	
Satisfaction with innovation with innovative customers	only new suppliers	1	72,00
	mainly new suppliers	11	58,36
	both new and current suppliers	61	50,84
	mainly current suppliers	25	47,72
	only current suppliers	5	69,50
	Total	103	
Satisfaction with internal innovation activities	only new suppliers	1	30,50
	mainly new suppliers	11	47,45
	both new and current suppliers	63	53,29
	mainly current suppliers	25	56,14
	only current suppliers	5	50,40
	Total	105	
Satisfaction innovation procurement recoded	mainly new suppliers	8	32,63
	both new and current suppliers	44	33,39
	mainly current suppliers	12	35,42
	only current suppliers	3	41,00
	Total	67	
Satisfaction innovative suppliers recoded	mainly new suppliers	8	28,44
	both new and current suppliers	40	35,14
	mainly current suppliers	15	34,30
	only current suppliers	4	32,63
	Total	67	
Satisfaction MS w customers recoded	only new suppliers	1	31,00
	mainly new suppliers	5	26,00
	both new and current suppliers	26	27,15
	mainly current suppliers	14	22,07
	only current suppliers	4	24,75
	Total	50	
Satisfaction innovation w customers recoded	only new suppliers	1	44,00
	mainly new suppliers	9	36,00
	both new and current suppliers	40	36,80
	mainly current suppliers	18	34,00
	only current suppliers	4	44,00
	Total	72	
Satisfaction internal innovation activities recoded	mainly new suppliers	7	31,14
	both new and current suppliers	42	35,25
	mainly current suppliers	16	36,69
	only current suppliers	4	32,38
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,790	5,698	8,320	3,687	4,610	4,429	2,048	2,126	3,855	2,159	2,052	1,056	1,941	3,845	1,395	1,077	1,637	2,462	1,844	1,037
df	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	3
Asymp. Sig.	,774	,223	,081	,450	,330	,351	,727	,713	,426	,707	,726	,901	,747	,427	,845	,783	,651	,651	,765	,792

a. Kruskal Wallis Test

b. Grouping Variable: We prefer new (1) or current (5) suppliers for (somewhat) radical innovations

Table 96: New vs current suppliers for developing (somewhat) radical innovations- recoded

Ranks

	We prefer new (1) or current (5) suppliers for (somewhat) radical innovations - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly new suppliers	9	16,28
	Only or mainly current suppliers	21	15,17
	Total	30	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly new suppliers	9	18,83
	Only or mainly current suppliers	20	13,28
	Total	29	
Innovations with supplier interaction are beneficial for our company	Only or mainly new suppliers	12	23,63
	Only or mainly current suppliers	32	22,08
	Total	44	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly new suppliers	12	23,25
	Only or mainly current suppliers	32	22,22
	Total	44	
Innovations without supplier interaction are beneficial for our company	Only or mainly new suppliers	12	21,46
	Only or mainly current suppliers	32	22,89
	Total	44	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly new suppliers	12	20,50
	Only or mainly current suppliers	32	23,25
	Total	44	
Innovations with suppliers are beneficial for our company recoded	Only or mainly new suppliers	8	15,31
	Only or mainly current suppliers	21	14,88
	Total	29	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly new suppliers	8	14,19
	Only or mainly current suppliers	17	12,44
	Total	25	
Innovations without suppliers are beneficial for our company recoded	Only or mainly new suppliers	6	9,00
	Only or mainly current suppliers	12	9,75
	Total	18	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly new suppliers	7	11,14
	Only or mainly current suppliers	17	13,06
	Total	24	
Satisfaction with procurement with innovative suppliers	Only or mainly new suppliers	12	21,88
	Only or mainly current suppliers	30	21,35
	Total	42	
Satisfaction with innovation with innovative suppliers	Only or mainly new suppliers	12	19,38
	Only or mainly current suppliers	29	21,67
	Total	41	
Satisfaction with marketing&sales with innovative customers	Only or mainly new suppliers	12	22,92
	Only or mainly current suppliers	29	20,21
	Total	41	
Satisfaction with innovation with innovative customers	Only or mainly new suppliers	12	23,92
	Only or mainly current suppliers	30	20,53
	Total	42	
Satisfaction with internal innovation activities	Only or mainly new suppliers	12	18,92
	Only or mainly current suppliers	30	22,53
	Total	42	
Satisfaction innovation procurement recoded	Only or mainly new suppliers	8	11,13
	Only or mainly current suppliers	15	12,47
	Total	23	
Satisfaction innovative suppliers recoded	Only or mainly new suppliers	8	12,44
	Only or mainly current suppliers	19	14,66
	Total	27	
Satisfaction MS w customers recoded	Only or mainly new suppliers	6	14,00
	Only or mainly current suppliers	18	12,00
	Total	24	
Satisfaction innovation w customers recoded	Only or mainly new suppliers	10	16,80
	Only or mainly current suppliers	22	16,36
	Total	32	
Satisfaction internal innovation activities recoded	Only or mainly new suppliers	7	12,64
	Only or mainly current suppliers	20	14,48
	Total	27	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,101	2,697	,140	,063	,139	,448	,053	,506	,110	,488	,019	,368	,490	,776	,842	,473	,764	,580	,029	,609
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,750	,101	,708	,803	,709	,503	,817	,477	,740	,485	,891	,549	,484	,378	,359	,492	,382	,446	,865	,435

a. Kruskal Wallis Test

b. Grouping Variable: We prefer new (1) or current (5) suppliers for (somewhat) radical innovations - recoded

Table 97: Small vs large suppliers for developing (somewhat) incremental innovations

Ranks

	We prefer small (1) or large (5) suppliers for (somewhat) incremental innovations	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	only small suppliers	2	40,50
	mainly small suppliers	4	39,38
	both small and large suppliers	66	41,85
	mainly large suppliers	10	40,25
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	only small suppliers	2	23,50
	mainly small suppliers	4	55,38
	both small and large suppliers	59	35,64
	mainly large suppliers	9	44,89
	Total	74	
Innovations with supplier interaction are beneficial for our company	only small suppliers	2	66,25
	mainly small suppliers	5	40,60
	both small and large suppliers	91	57,51
	mainly large suppliers	13	51,73
	Total	112	
	only large suppliers	1	87,00
Innovations with supplier interaction are beneficial for the natural environment	only small suppliers	2	50,00
	mainly small suppliers	5	50,10
	both small and large suppliers	91	56,97
	mainly large suppliers	13	55,58
	Total	112	
	only large suppliers	1	70,50
Innovations without supplier interaction are beneficial for our company	only small suppliers	2	79,50
	mainly small suppliers	5	36,10
	both small and large suppliers	91	58,88
	mainly large suppliers	13	43,81
	Total	112	
	only large suppliers	1	61,00
Innovations without supplier interaction are beneficial for the natural environment	only small suppliers	2	74,25
	mainly small suppliers	5	33,00
	both small and large suppliers	91	58,78
	mainly large suppliers	13	46,92
	Total	112	
	only large suppliers	1	55,50
Innovations with suppliers are beneficial for our company recoded	only small suppliers	1	33,50
	mainly small suppliers	4	33,50
	both small and large suppliers	55	36,08
	mainly large suppliers	11	36,73
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	only small suppliers	1	20,50
	mainly small suppliers	2	20,50
	both small and large suppliers	42	26,69
	mainly large suppliers	7	27,93
	Total	52	
Innovations without suppliers are beneficial for our company recoded	only small suppliers	1	44,00
	mainly small suppliers	3	16,50
	both small and large suppliers	46	29,65
	mainly large suppliers	5	16,50
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	only small suppliers	1	42,00
	mainly small suppliers	3	14,00
	both small and large suppliers	43	30,28
	mainly large suppliers	9	23,33
	Total	56	
Satisfaction with procurement with innovative suppliers	only small suppliers	2	67,50
	mainly small suppliers	5	58,50
	both small and large suppliers	83	51,94
	mainly large suppliers	13	55,38
	Total	104	
	only large suppliers	1	1,50
Satisfaction with innovation with innovative suppliers	only small suppliers	2	66,50
	mainly small suppliers	5	60,70
	both small and large suppliers	82	49,67
	mainly large suppliers	13	62,62
	Total	103	
	only large suppliers	1	32,50
Satisfaction with marketing&sales with innovative customers	only small suppliers	2	60,50
	mainly small suppliers	5	56,10
	both small and large suppliers	83	49,45
	mainly large suppliers	13	70,46
	Total	104	
	only large suppliers	1	38,50
Satisfaction with innovation with innovative customers	only small suppliers	2	51,50
	mainly small suppliers	5	47,40
	both small and large suppliers	82	52,65
	mainly large suppliers	13	53,62
	Total	103	
	only large suppliers	1	2,00
Satisfaction with internal innovation activities	only small suppliers	2	85,75
	mainly small suppliers	5	42,20
	both small and large suppliers	84	54,24
	mainly large suppliers	13	45,81
	Total	105	
	only large suppliers	1	30,50
Satisfaction innovation procurement recoded	only small suppliers	1	41,00
	mainly small suppliers	3	41,00
	both small and large suppliers	52	33,91
	mainly large suppliers	10	34,30
	Total	67	
	only large suppliers	1	7,50
Satisfaction innovative suppliers recoded	only small suppliers	1	41,00
	mainly small suppliers	5	34,30
	both small and large suppliers	49	33,48
	mainly large suppliers	12	35,42
	Total	67	
Satisfaction MS w customers recoded	only small suppliers	1	31,00
	mainly small suppliers	2	31,00
	both small and large suppliers	38	23,76
	mainly large suppliers	9	31,00
	Total	50	
Satisfaction innovation w customers recoded	only small suppliers	1	44,00
	mainly small suppliers	2	44,00
	both small and large suppliers	60	36,20
	mainly large suppliers	8	39,50
	Total	72	
	only large suppliers	1	8,00
Satisfaction internal innovation activities recoded	only small suppliers	2	41,00
	mainly small suppliers	3	29,50
	both small and large suppliers	56	35,46
	mainly large suppliers	8	32,38
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,078	5,197	2,959	,588	6,420	5,549	,447	1,012	7,681	5,967	4,325	4,025	7,141	3,526	4,984	4,777	,461	4,364	4,883	1,323
df	3	3	4	4	4	4	3	3	3	3	4	4	4	4	4	4	3	3	4	3
Asymp. Sig.	,994	,158	,565	,964	,170	,235	,930	,798	,053	,113	,364	,403	,129	,474	,289	,311	,927	,225	,300	,724

a. Kruskal Wallis Test

b. Grouping Variable: We prefer small (1) or large (5) suppliers for (somewhat) incremental innovations

Table 98: Small vs large suppliers for developing (somewhat) incremental innovations - recoded

Ranks

	We prefer small (1) or large (5) suppliers for (somewhat) incremental innovations - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly small suppliers	6	8,33
	Only or mainly large suppliers	10	8,60
	Total	16	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly small suppliers	6	8,25
	Only or mainly large suppliers	9	7,83
	Total	15	
Innovations with supplier interaction are beneficial for our company	Only or mainly small suppliers	7	10,14
	Only or mainly large suppliers	14	11,43
	Total	21	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly small suppliers	7	10,21
	Only or mainly large suppliers	14	11,39
	Total	21	
Innovations without supplier interaction are beneficial for our company	Only or mainly small suppliers	7	11,36
	Only or mainly large suppliers	14	10,82
	Total	21	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly small suppliers	7	10,86
	Only or mainly large suppliers	14	11,07
	Total	21	
Innovations with suppliers are beneficial for our company recoded	Only or mainly small suppliers	5	8,00
	Only or mainly large suppliers	11	8,73
	Total	16	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly small suppliers	3	4,50
	Only or mainly large suppliers	7	5,93
	Total	10	
Innovations without suppliers are beneficial for our company recoded	Only or mainly small suppliers	4	5,63
	Only or mainly large suppliers	5	4,50
	Total	9	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly small suppliers	4	6,63
	Only or mainly large suppliers	9	7,17
	Total	13	
Satisfaction with procurement with innovative suppliers	Only or mainly small suppliers	7	12,21
	Only or mainly large suppliers	14	10,39
	Total	21	
Satisfaction with innovation with innovative suppliers	Only or mainly small suppliers	7	11,36
	Only or mainly large suppliers	14	10,82
	Total	21	
Satisfaction with marketing&sales with innovative customers	Only or mainly small suppliers	7	9,29
	Only or mainly large suppliers	14	11,86
	Total	21	
Satisfaction with innovation with innovative customers	Only or mainly small suppliers	7	10,86
	Only or mainly large suppliers	14	11,07
	Total	21	
Satisfaction with internal innovation activities	Only or mainly small suppliers	7	12,29
	Only or mainly large suppliers	14	10,36
	Total	21	
Satisfaction innovation procurement recoded	Only or mainly small suppliers	4	9,50
	Only or mainly large suppliers	11	7,45
	Total	15	
Satisfaction innovative suppliers recoded	Only or mainly small suppliers	6	9,50
	Only or mainly large suppliers	12	9,50
	Total	18	
Satisfaction MS w customers recoded	Only or mainly small suppliers	3	6,50
	Only or mainly large suppliers	9	6,50
	Total	12	
Satisfaction innovation w customers recoded	Only or mainly small suppliers	3	7,50
	Only or mainly large suppliers	9	6,17
	Total	12	
Satisfaction internal innovation activities recoded	Only or mainly small suppliers	5	7,20
	Only or mainly large suppliers	8	6,88
	Total	13	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,012	,032	,239	,200	,045	,006	,455	,964	1,250	,083	,482	,046	1,029	,007	,521	1,273	,000	,000	,733	,040
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,912	,858	,625	,655	,833	,937	,500	,326	,264	,773	,487	,830	,310	,935	,470	,259	1,000	1,000	,392	,841

a. Kruskal Wallis Test

b. Grouping Variable: We prefer small (1) or large (5) suppliers for (somewhat) incremental innovations - recoded

Table 99: Small vs large suppliers for developing (somewhat) radical innovations

Ranks

	We prefer small (1) or large (5) suppliers for (somewhat) radical innovations	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	only small suppliers	3	32,50
	mainly small suppliers	6	46,58
	both small and large suppliers	60	41,58
	mainly large suppliers	12	42,88
	only large suppliers	1	16,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	only small suppliers	3	40,33
	mainly small suppliers	6	44,00
	both small and large suppliers	53	36,79
	mainly large suppliers	11	37,36
	only large suppliers	1	29,00
	Total	74	
Innovations with supplier interaction are beneficial for our company	only small suppliers	3	48,33
	mainly small suppliers	7	52,64
	both small and large suppliers	85	57,01
	mainly large suppliers	16	53,69
	only large suppliers	1	109,50
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	only small suppliers	3	36,50
	mainly small suppliers	7	55,14
	both small and large suppliers	85	56,08
	mainly large suppliers	16	64,75
	only large suppliers	1	29,50
	Total	112	
Innovations without supplier interaction are beneficial for our company	only small suppliers	3	73,33
	mainly small suppliers	7	42,57
	both small and large suppliers	85	59,19
	mainly large suppliers	16	44,88
	only large suppliers	1	61,00
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	only small suppliers	3	55,50
	mainly small suppliers	7	37,50
	both small and large suppliers	85	57,79
	mainly large suppliers	16	60,56
	only large suppliers	1	18,00
	Total	112	
Innovations with suppliers are beneficial for our company recoded	only small suppliers	2	33,50
	mainly small suppliers	5	33,50
	both small and large suppliers	51	35,59
	mainly large suppliers	12	36,46
	only large suppliers	1	69,00
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	only small suppliers	2	20,50
	mainly small suppliers	4	27,00
	both small and large suppliers	40	26,35
	mainly large suppliers	5	30,90
	only large suppliers	1	20,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	only small suppliers	1	44,00
	mainly small suppliers	5	22,00
	both small and large suppliers	41	29,91
	mainly large suppliers	8	19,94
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	only small suppliers	2	28,00
	mainly small suppliers	5	19,60
	both small and large suppliers	41	29,71
	mainly large suppliers	7	30,00
	only large suppliers	1	14,00
	Total	56	
Satisfaction with procurement with innovative suppliers	only small suppliers	3	56,00
	mainly small suppliers	7	65,93
	both small and large suppliers	77	51,99
	mainly large suppliers	16	47,00
	only large suppliers	1	75,50
	Total	104	
Satisfaction with innovation with innovative suppliers	only small suppliers	3	69,00
	mainly small suppliers	7	62,36
	both small and large suppliers	76	50,59
	mainly large suppliers	16	49,59
	only large suppliers	1	74,00
	Total	103	
Satisfaction with marketing&sales with innovative customers	only small suppliers	3	53,17
	mainly small suppliers	7	66,43
	both small and large suppliers	77	51,26
	mainly large suppliers	16	50,38
	only large suppliers	1	82,50
	Total	104	
Satisfaction with innovation with innovative customers	only small suppliers	3	44,67
	mainly small suppliers	7	64,36
	both small and large suppliers	76	54,48
	mainly large suppliers	16	34,94
	only large suppliers	1	72,00
	Total	103	
Satisfaction with internal innovation activities	only small suppliers	3	81,00
	mainly small suppliers	7	54,64
	both small and large suppliers	78	53,90
	mainly large suppliers	16	41,47
	only large suppliers	1	71,50
	Total	105	
Satisfaction innovation procurement recoded	only small suppliers	1	41,00
	mainly small suppliers	7	36,21
	both small and large suppliers	48	34,02
	mainly large suppliers	10	30,95
	only large suppliers	1	41,00
	Total	67	
Satisfaction innovative suppliers recoded	only small suppliers	2	41,00
	mainly small suppliers	6	35,42
	both small and large suppliers	45	34,30
	mainly large suppliers	13	30,69
	only large suppliers	1	41,00
	Total	67	
Satisfaction MS w customers recoded	only small suppliers	1	31,00
	mainly small suppliers	4	31,00
	both small and large suppliers	36	24,75
	mainly large suppliers	8	24,75
	only large suppliers	1	31,00
	Total	50	
Satisfaction innovation w customers recoded	only small suppliers	1	44,00
	mainly small suppliers	5	44,00
	both small and large suppliers	57	37,05
	mainly large suppliers	8	26,00
	only large suppliers	1	44,00
	Total	72	
Satisfaction internal innovation activities recoded	only small suppliers	3	41,00
	mainly small suppliers	5	34,10
	both small and large suppliers	51	35,59
	mainly large suppliers	9	29,50
	only large suppliers	1	41,00
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,869	,827	3,482	3,464	5,570	4,846	13,670	1,689	5,903	3,423	2,997	3,056	3,266	8,908	6,054	1,197	1,621	1,885	5,966	2,524
df	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4
Asymp. Sig.	,760	,935	,481	,483	,234	,303	,008	,793	,116	,490	,558	,548	,514	,063	,195	,879	,805	,757	,202	,640

a. Kruskal Wallis Test

b. Grouping Variable: We prefer small (1) or large (5) suppliers for (somewhat) radical innovations

Table 100: Small vs large suppliers for developing (somewhat) radical innovations - recoded

Ranks

	We prefer small (1) or large (5) suppliers for (somewhat) radical innovations	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly small suppliers	9	11,44
	Only or mainly large suppliers	13	11,54
	Total	22	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly small suppliers	9	12,22
	Only or mainly large suppliers	12	10,08
	Total	21	
Innovations with supplier interaction are beneficial for our company	Only or mainly small suppliers	10	13,20
	Only or mainly large suppliers	17	14,47
	Total	27	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly small suppliers	10	12,00
	Only or mainly large suppliers	17	15,18
	Total	27	
Innovations without supplier interaction are beneficial for our company	Only or mainly small suppliers	10	14,90
	Only or mainly large suppliers	17	13,47
	Total	27	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly small suppliers	10	11,55
	Only or mainly large suppliers	17	15,44
	Total	27	
Innovations with suppliers are beneficial for our company recoded	Only or mainly small suppliers	7	9,50
	Only or mainly large suppliers	13	11,04
	Total	20	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly small suppliers	6	6,00
	Only or mainly large suppliers	6	7,00
	Total	12	
Innovations without suppliers are beneficial for our company recoded	Only or mainly small suppliers	6	8,33
	Only or mainly large suppliers	8	6,88
	Total	14	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly small suppliers	7	7,14
	Only or mainly large suppliers	8	8,75
	Total	15	
Satisfaction with procurement with innovative suppliers	Only or mainly small suppliers	10	16,35
	Only or mainly large suppliers	17	12,62
	Total	27	
Satisfaction with innovation with innovative suppliers	Only or mainly small suppliers	10	16,20
	Only or mainly large suppliers	17	12,71
	Total	27	
Satisfaction with marketing&sales with innovative customers	Only or mainly small suppliers	10	15,60
	Only or mainly large suppliers	17	13,06
	Total	27	
Satisfaction with innovation with innovative customers	Only or mainly small suppliers	10	17,65
	Only or mainly large suppliers	17	11,85
	Total	27	
Satisfaction with internal innovation activities	Only or mainly small suppliers	10	17,10
	Only or mainly large suppliers	17	12,18
	Total	27	
Satisfaction innovation procurement recoded	Only or mainly small suppliers	8	10,81
	Only or mainly large suppliers	11	9,41
	Total	19	
Satisfaction innovative suppliers recoded	Only or mainly small suppliers	8	12,63
	Only or mainly large suppliers	14	10,86
	Total	22	
Satisfaction MS w customers recoded	Only or mainly small suppliers	5	8,50
	Only or mainly large suppliers	9	6,94
	Total	14	
Satisfaction innovation w customers recoded	Only or mainly small suppliers	6	10,00
	Only or mainly large suppliers	9	6,67
	Total	15	
Satisfaction internal innovation activities recoded	Only or mainly small suppliers	8	10,38
	Only or mainly large suppliers	10	8,80
	Total	18	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,001	,627	,186	,244	1,711	1,137	,407	,821	,667	1,673	1,494	,786	3,898	2,776	,576	,715	1,204	3,394	,744
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,973	,428	,666	,622	,191	,286	,523	,365	,414	,196	,222	,375	,048	,096	,448	,398	,273	,065	,388

a. Kruskal Wallis Test

b. Grouping Variable: We prefer small (1) or large (5) suppliers for (somewhat) radical innovations

§7.5 Effects of Intensity in Supplier Relations

Table 101: Mean ranks of performance variables controlled for relations with service suppliers

Ranks

	Intensity of relationships with suppliers providing services	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used	1	16,50
	low intensity	11	33,64
	medium intensity	38	40,58
	high intensity	32	46,08
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used	1	40,00
	low intensity	9	37,33
	medium intensity	34	37,74
	high intensity	30	37,20
	Total	74	
Company turnover from providing services	never used	1	67,00
	low intensity	10	49,95
	medium intensity	43	42,51
	high intensity	34	44,75
	Total	88	
Company turnover from manufacturing products	never used	2	58,50
	low intensity	10	31,40
	medium intensity	38	40,13
	high intensity	27	38,78
	Total	77	
Company turnover from wholesale or distribution	never used	2	34,00
	low intensity	10	30,35
	medium intensity	33	34,77
	high intensity	26	39,88
	Total	71	
Company turnover from other activities or non relevant	never used	1	6,00
	low intensity	11	40,55
	medium intensity	37	46,08
	high intensity	32	36,38
	Total	81	
Innovations with suppliers are beneficial for our company recoded	low intensity	6	39,42
	medium intensity	33	36,73
	high intensity	32	34,61
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	low intensity	5	30,90
	medium intensity	26	27,50
	high intensity	21	24,21
	Total	52	
Innovations without suppliers are beneficial for our company recoded	never used	1	44,00
	low intensity	6	30,25
	medium intensity	26	27,08
	high intensity	22	27,75
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	never used	1	42,00
	low intensity	6	28,00
	medium intensity	30	28,93
	high intensity	19	27,26
	Total	56	
Satisfaction with procurement with innovative suppliers	never used	2	17,25
	low intensity	16	44,03
	medium intensity	48	52,63
	high intensity	38	57,76
	Total	104	
Satisfaction with innovation with innovative suppliers	never used	2	32,50
	low intensity	16	50,75
	medium intensity	47	48,62
	high intensity	38	57,74
	Total	103	
Satisfaction with marketing&sales with innovative customers	never used	2	60,50
	low intensity	16	38,88
	medium intensity	48	54,15
	high intensity	38	55,74
	Total	104	
Satisfaction with innovation with innovative customers	never used	2	37,00
	low intensity	16	34,53
	medium intensity	47	51,87
	high intensity	38	60,30
	Total	103	
Satisfaction with internal innovation activities	never used	2	51,00
	low intensity	16	39,53
	medium intensity	49	57,31
	high intensity	38	53,22
	Total	105	

Ranks

	Intensity of relationships with suppliers providing services recoded L H	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used to low intensity	12	17,33
	high intensity	32	24,44
	Total	44	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used to low intensity	10	20,65
	high intensity	30	20,45
	Total	40	
Company turnover from providing services	never used to low intensity	11	25,45
	high intensity	34	22,21
	Total	45	
Company turnover from manufacturing products	never used to low intensity	12	19,00
	high intensity	27	20,44
	Total	39	
Company turnover from wholesale or distribution	never used to low intensity	12	16,46
	high intensity	26	20,90
	Total	38	
Company turnover from other activities or non relevant	never used to low intensity	12	22,83
	high intensity	32	22,38
	Total	44	
Innovations with suppliers are beneficial for our company recoded	never used to low intensity	6	21,67
	high intensity	32	19,09
	Total	38	
Innovations with suppliers are beneficial for the natural environment recoded	never used to low intensity	5	16,20
	high intensity	21	12,86
	Total	26	
Innovations without suppliers are beneficial for our company recoded	never used to low intensity	7	16,79
	high intensity	22	14,43
	Total	29	
Innovations without suppliers are beneficial for the natural environment recoded	never used to low intensity	7	14,43
	high intensity	19	13,16
	Total	26	
Satisfaction with procurement with innovative suppliers	never used to low intensity	18	22,56
	high intensity	38	31,32
	Total	56	
Satisfaction with innovation with innovative suppliers	never used to low intensity	18	24,94
	high intensity	38	30,18
	Total	56	
Satisfaction with marketing&sales with innovative customers	never used to low intensity	18	23,06
	high intensity	38	31,08
	Total	56	
Satisfaction with innovation with innovative customers	never used to low intensity	18	19,00
	high intensity	38	33,00
	Total	56	
Satisfaction with internal innovation activities	never used to low intensity	18	23,78
	high intensity	38	30,74
	Total	56	

Table 102: Significance levels of performance variables controlled for relations with services suppliers

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Company turnover from providing services	Company turnover from manufacturing products	Company turnover from wholesale or distribution	Company turnover from other activities or non relevant	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&Sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities
Chi-Square	3,588	,024	2,119	2,958	2,021	5,695	1,785	1,900	1,654	1,096	6,022	3,354	4,834	10,486	4,717
df	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3
Asymp. Sig.	,309	,999	,548	,398	,568	,127	,410	,387	,647	,778	,111	,340	,184	,015	,194

a. Kruskal Wallis Test

b. Grouping Variable: Intensity of relationships with suppliers providing services

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Company turnover from providing services	Company turnover from manufacturing products	Company turnover from wholesale or distribution	Company turnover from other activities or non relevant	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&Sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities
Chi-Square	2,703	,002	,679	,142	1,430	,012	1,809	1,653	,546	,188	4,030	1,503	3,664	10,951	2,499
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,100	,962	,410	,706	,232	,912	,179	,199	,460	,665	,045	,220	,056	,001	,114

a. Kruskal Wallis Test

b. Grouping Variable: Intensity of relationships with suppliers providing services recoded! L H

Table 103: Performance controlled for intensity with service providers (uncoded)

Ranks

	Intensity of relationships with suppliers providing services	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used	1	16,50
	low intensity	11	33,64
	medium intensity	38	40,58
	high intensity	32	46,08
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used	1	40,00
	low intensity	9	37,33
	medium intensity	34	37,74
	high intensity	30	37,20
	Total	74	
Innovations with supplier interaction are beneficial for our company	never used	2	87,00
	low intensity	16	73,38
	medium intensity	55	60,24
	high intensity	39	42,74
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	never used	2	70,50
	low intensity	16	67,25
	medium intensity	55	58,05
	high intensity	39	49,18
	Total	112	
Innovations without supplier interaction are beneficial for our company	never used	2	85,25
	low intensity	16	60,88
	medium intensity	55	55,20
	high intensity	39	55,06
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	never used	2	81,50
	low intensity	16	56,41
	medium intensity	55	56,95
	high intensity	39	54,62
	Total	112	
Innovations with suppliers are beneficial for our company recoded	low intensity	6	39,42
	medium intensity	33	36,73
	high intensity	32	34,61
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	low intensity	5	30,90
	medium intensity	26	27,50
	high intensity	21	24,21
	Total	52	
Innovations without suppliers are beneficial for our company recoded	never used	1	44,00
	low intensity	6	30,25
	medium intensity	26	27,08
	high intensity	22	27,75
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	never used	1	42,00
	low intensity	6	28,00
	medium intensity	30	28,93
	high intensity	19	27,26
	Total	56	
Satisfaction with procurement with innovative suppliers	never used	2	17,25
	low intensity	16	44,03
	medium intensity	48	52,63
	high intensity	38	57,76
	Total	104	
Satisfaction with innovation with innovative suppliers	never used	2	32,50
	low intensity	16	50,75
	medium intensity	47	48,62
	high intensity	38	57,74
	Total	103	
Satisfaction with marketing&sales with innovative customers	never used	2	60,50
	low intensity	16	38,88
	medium intensity	48	54,15
	high intensity	38	55,74
	Total	104	
Satisfaction with innovation with innovative customers	never used	2	37,00
	low intensity	16	34,53
	medium intensity	47	51,87
	high intensity	38	60,30
	Total	103	
Satisfaction with internal innovation activities	never used	2	51,00
	low intensity	16	39,53
	medium intensity	49	57,31
	high intensity	38	53,22
	Total	105	
Satisfaction innovation procurement recoded	never used	1	7,50
	low intensity	10	27,60
	medium intensity	31	34,52
	high intensity	25	36,98
	Total	67	
Satisfaction innovative suppliers recoded	low intensity	8	36,81
	medium intensity	33	30,85
	high intensity	26	37,13
	Total	67	
Satisfaction MS w customers recoded	never used	1	31,00
	low intensity	7	16,71
	medium intensity	24	25,79
	high intensity	18	28,22
	Total	50	
Satisfaction innovation w customers recoded	never used	2	26,00
	low intensity	9	24,00
	medium intensity	32	36,13
	high intensity	29	41,52
	Total	72	
Satisfaction internal innovation activities recoded	never used	1	41,00
	low intensity	10	23,75
	medium intensity	35	37,06
	high intensity	23	36,50
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	3,588	,024	15,545	5,077	2,374	1,536	1,785	1,900	1,654	1,096	6,022	3,354	4,834	10,486	4,717	7,127	3,433	6,451	10,893	8,653
df	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3	2	3	3	3
Asymp. Sig.	,309	,999	,001	,166	,499	,674	,410	,387	,647	,778	,111	,340	,184	,015	,194	,068	,180	,092	,012	,034

a. Kruskal Wallis Test

b. Grouping Variable: Intensity of relationships with suppliers providing services

Table 104: Performance controlled for intensity with service providers (recoded into never used & low intensity vs high intensity)

Ranks

	Intensity of relationships with suppliers providing services recoded L H	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used to low intensity	12	17,33
	high intensity	32	24,44
	Total	44	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used to low intensity	10	20,65
	high intensity	30	20,45
	Total	40	
Innovations with supplier interaction are beneficial for our company	never used to low intensity	18	40,03
	high intensity	39	23,91
	Total	57	
Innovations with supplier interaction are beneficial for the natural environment	never used to low intensity	18	35,50
	high intensity	39	26,00
	Total	57	
Innovations without supplier interaction are beneficial for our company	never used to low intensity	18	31,92
	high intensity	39	27,65
	Total	57	
Innovations without supplier interaction are beneficial for the natural environment	never used to low intensity	18	30,64
	high intensity	39	28,24
	Total	57	
Innovations with suppliers are beneficial for our company recoded	never used to low intensity	6	21,67
	high intensity	32	19,09
	Total	38	
Innovations with suppliers are beneficial for the natural environment recoded	never used to low intensity	5	16,20
	high intensity	21	12,86
	Total	26	
Innovations without suppliers are beneficial for our company recoded	never used to low intensity	7	16,79
	high intensity	22	14,43
	Total	29	
Innovations without suppliers are beneficial for the natural environment recoded	never used to low intensity	7	14,43
	high intensity	19	13,16
	Total	26	
Satisfaction with procurement with innovative suppliers	never used to low intensity	18	22,56
	high intensity	38	31,32
	Total	56	
Satisfaction with innovation with innovative suppliers	never used to low intensity	18	24,94
	high intensity	38	30,18
	Total	56	
Satisfaction with marketing&sales with innovative customers	never used to low intensity	18	23,06
	high intensity	38	31,08
	Total	56	
Satisfaction with innovation with innovative customers	never used to low intensity	18	19,00
	high intensity	38	33,00
	Total	56	
Satisfaction with internal innovation activities	never used to low intensity	18	23,78
	high intensity	38	30,74
	Total	56	
Satisfaction innovation procurement recoded	never used to low intensity	11	14,32
	high intensity	25	20,34
	Total	36	
Satisfaction innovative suppliers recoded	never used to low intensity	8	17,38
	high intensity	26	17,54
	Total	34	
Satisfaction MS w customers recoded	never used to low intensity	8	10,00
	high intensity	18	15,06
	Total	26	
Satisfaction innovation w customers recoded	never used to low intensity	11	13,59
	high intensity	29	23,12
	Total	40	
Satisfaction internal innovation activities recoded	never used to low intensity	11	13,77
	high intensity	23	19,28
	Total	34	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,703	,002	12,976	4,864	,939	,309	1,809	1,653	,546	,188	4,030	1,503	3,664	10,951	2,499	4,809	,005	4,537	11,034	4,217
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,100	,962	,000	,027	,333	,578	,179	,199	,460	,665	,045	,220	,056	,001	,114	,028	,942	,033	,001	,040

a. Kruskal Wallis Test

b. Grouping Variable: Intensity of relationships with suppliers providing services recoded L H

Table 105 Performance variables controlled for relationships w manufacturing suppliers uncoded

Ranks

	Intensity of relationships with suppliers manufacturing products	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used	5	35,00
	low intensity	24	31,04
	medium intensity	33	31,30
	Total	62	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used	5	28,20
	low intensity	22	23,84
	medium intensity	29	32,09
	Total	56	
Innovations with supplier interaction are beneficial for our company	never used	7	50,50
	low intensity	27	47,52
	medium intensity	50	38,67
	Total	84	
Innovations with supplier interaction are beneficial for the natural environment	never used	7	55,71
	low intensity	27	45,02
	medium intensity	50	39,29
	Total	84	
Innovations without supplier interaction are beneficial for our company	never used	7	48,79
	low intensity	27	44,67
	medium intensity	50	40,45
	Total	84	
Innovations without supplier interaction are beneficial for the natural environment	never used	7	60,64
	low intensity	27	40,39
	medium intensity	50	41,10
	Total	84	
Innovations with suppliers are beneficial for our company recoded	never used	3	24,00
	low intensity	16	30,38
	medium intensity	32	24,00
	Total	51	
Innovations with suppliers are beneficial for the natural environment recoded	never used	5	26,40
	low intensity	12	21,33
	medium intensity	21	16,81
	Total	38	
Innovations without suppliers are beneficial for our company recoded	never used	3	26,50
	low intensity	14	23,00
	medium intensity	25	20,06
	Total	42	
Innovations without suppliers are beneficial for the natural environment recoded	never used	4	28,00
	low intensity	14	18,50
	medium intensity	20	18,50
	Total	38	
Satisfaction with procurement with innovative suppliers	never used	6	35,33
	low intensity	26	37,44
	medium intensity	44	39,56
	Total	76	
Satisfaction with innovation with innovative suppliers	never used	6	24,17
	low intensity	25	36,98
	medium intensity	44	40,47
	Total	75	
Satisfaction with marketing&sales with innovative customers	never used	6	32,83
	low intensity	25	37,66
	medium intensity	45	39,72
	Total	76	
Satisfaction with innovation with innovative customers	never used	6	37,50
	low intensity	25	33,56
	medium intensity	44	40,59
	Total	75	
Satisfaction with internal innovation activities	never used	6	34,58
	low intensity	26	40,65
	medium intensity	45	38,63
	Total	77	
Satisfaction innovation procurement recoded	never used	2	31,50
	low intensity	19	23,61
	medium intensity	29	26,33
	Total	50	
Satisfaction innovative suppliers recoded	never used	1	7,50
	low intensity	19	22,97
	medium intensity	29	26,93
	Total	49	
Satisfaction MS w customers recoded	never used	1	23,50
	low intensity	11	20,05
	medium intensity	26	19,12
	Total	38	
Satisfaction innovation w customers recoded	never used	3	30,00
	low intensity	18	21,67
	medium intensity	29	27,41
	Total	50	
Satisfaction internal innovation activities recoded	never used	4	25,13
	low intensity	22	24,55
	medium intensity	25	27,42
	Total	51	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,211	3,244	3,533	3,894	1,208	5,127	9,309	6,423	1,431	3,524	,324	3,444	,682	1,975	,432	1,376	3,938	,375	4,584	,891
df	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	,900	,198	,171	,143	,547	,077	,010	,040	,489	,172	,850	,179	,711	,372	,806	,503	,140	,829	,101	,640

a. Kruskal Wallis Test

b. Grouping Variable: intensity of relationships with suppliers manufacturing products

Table 106: Performance variables controlled for relationships w manufacturing suppliers recoded never used to low intensity vs high intensity

Ranks

	Intensity of relationships with suppliers manufacturing products recoded L - H	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used to low intensity	29	22,98
	high intensity	20	27,93
	Total	49	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used to low intensity	27	21,43
	high intensity	18	25,36
	Total	45	
Innovations with supplier interaction are beneficial for our company	never used to low intensity	34	34,96
	high intensity	28	27,30
	Total	62	
Innovations with supplier interaction are beneficial for the natural environment	never used to low intensity	34	33,85
	high intensity	28	28,64
	Total	62	
Innovations without supplier interaction are beneficial for our company	never used to low intensity	34	33,35
	high intensity	28	29,25
	Total	62	
Innovations without supplier interaction are beneficial for the natural environment	never used to low intensity	34	33,34
	high intensity	28	29,27
	Total	62	
Innovations with suppliers are beneficial for our company recoded	never used to low intensity	19	21,61
	high intensity	20	18,48
	Total	39	
Innovations with suppliers are beneficial for the natural environment recoded	never used to low intensity	17	17,38
	high intensity	14	14,32
	Total	31	
Innovations without suppliers are beneficial for our company recoded	never used to low intensity	17	16,44
	high intensity	13	14,27
	Total	30	
Innovations without suppliers are beneficial for the natural environment recoded	never used to low intensity	18	20,00
	high intensity	18	17,00
	Total	36	
Satisfaction with procurement with innovative suppliers	never used to low intensity	32	29,44
	high intensity	28	31,71
	Total	60	
Satisfaction with innovation with innovative suppliers	never used to low intensity	31	25,32
	high intensity	28	35,18
	Total	59	
Satisfaction with marketing&sales with innovative customers	never used to low intensity	31	30,39
	high intensity	28	29,57
	Total	59	
Satisfaction with innovation with innovative customers	never used to low intensity	31	29,03
	high intensity	28	31,07
	Total	59	
Satisfaction with internal innovation activities	never used to low intensity	32	30,06
	high intensity	28	31,00
	Total	60	
Satisfaction innovation procurement recoded	never used to low intensity	21	18,07
	high intensity	17	21,26
	Total	38	
Satisfaction innovative suppliers recoded	never used to low intensity	20	15,90
	high intensity	18	23,50
	Total	38	
Satisfaction MS w customers recoded	never used to low intensity	12	13,00
	high intensity	12	12,00
	Total	24	
Satisfaction innovation w customers recoded	never used to low intensity	21	21,86
	high intensity	22	22,14
	Total	43	
Satisfaction internal innovation activities recoded	never used to low intensity	26	20,58
	high intensity	18	25,28
	Total	44	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,436	,990	3,066	1,485	,937	,859	2,189	1,326	,600	,975	,299	5,589	,043	,238	,051	1,555	8,880	,242	,009	3,190
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,231	,320	,080	,223	,333	,354	,139	,250	,439	,323	,584	,018	,835	,625	,821	,212	,003	,623	,925	,074

a. Kruskal Wallis Test

b. Grouping Variable: Intensity of relationships with suppliers manufacturing products recoded L - H

Table 107: Performance variables controlled for relationships w wholesale or distribution suppliers uncoded

Ranks

	Intensity of relationships with suppliers in wholesale or distribution	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used	18	34,78
	low intensity	30	43,27
	medium intensity	24	42,21
	high intensity	10	46,60
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used	17	32,18
	low intensity	27	41,02
	medium intensity	22	38,11
	high intensity	8	35,25
	Total	74	
Innovations with supplier interaction are beneficial for our company	never used	22	74,93
	low intensity	42	58,36
	medium intensity	36	48,10
	high intensity	12	41,42
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	never used	22	69,77
	low intensity	42	60,02
	medium intensity	36	47,13
	high intensity	12	47,96
	Total	112	
Innovations without supplier interaction are beneficial for our company	never used	22	64,07
	low intensity	42	55,70
	medium intensity	36	52,25
	high intensity	12	58,17
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	never used	22	65,39
	low intensity	42	55,23
	medium intensity	36	51,79
	high intensity	12	58,79
	Total	112	
Innovations with suppliers are beneficial for our company recoded	never used	8	37,94
	low intensity	28	38,57
	medium intensity	25	33,50
	high intensity	10	33,50
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	never used	8	33,50
	low intensity	19	28,71
	medium intensity	18	21,94
	high intensity	7	24,21
	Total	52	
Innovations without suppliers are beneficial for our company recoded	never used	10	33,00
	low intensity	20	27,50
	medium intensity	19	25,18
	high intensity	6	30,25
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	never used	9	35,78
	low intensity	22	28,00
	medium intensity	18	24,89
	high intensity	7	30,00
	Total	56	
Satisfaction with procurement with innovative suppliers	never used	21	44,29
	low intensity	39	54,60
	medium intensity	32	52,02
	high intensity	12	61,33
	Total	104	
Satisfaction with innovation with innovative suppliers	never used	21	45,21
	low intensity	38	47,63
	medium intensity	32	54,33
	high intensity	12	71,50
	Total	103	
Satisfaction with marketing&sales with innovative customers	never used	21	42,71
	low intensity	39	51,58
	medium intensity	32	55,06
	high intensity	12	65,79
	Total	104	
Satisfaction with innovation with innovative customers	never used	20	45,83
	low intensity	39	52,14
	medium intensity	32	53,98
	high intensity	12	56,54
	Total	103	
Satisfaction with internal innovation activities	never used	21	44,90
	low intensity	40	52,93
	medium intensity	32	52,25
	high intensity	12	69,42
	Total	105	
Satisfaction innovation procurement recoded	never used	13	28,12
	low intensity	26	34,56
	medium intensity	20	34,30
	high intensity	8	41,00
	Total	67	
Satisfaction innovative suppliers recoded	never used	9	33,56
	low intensity	27	29,83
	medium intensity	21	36,21
	high intensity	10	41,00
	Total	67	
Satisfaction MS w customers recoded	never used	9	19,89
	low intensity	21	23,86
	medium intensity	13	29,08
	high intensity	7	31,00
	Total	50	
Satisfaction innovation w customers recoded	never used	13	32,92
	low intensity	28	35,00
	medium intensity	22	39,09
	high intensity	9	40,00
	Total	72	
Satisfaction internal innovation activities recoded	never used	14	28,68
	low intensity	24	35,25
	medium intensity	21	36,07
	high intensity	10	41,00
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,107	1,899	13,758	9,596	2,193	2,926	5,166	7,315	2,327	3,676	3,256	8,377	5,831	1,499	5,714	4,525	5,648	6,562	2,248	5,447
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,550	,594	,003	,022	,533	,403	,159	,063	,507	,299	,354	,039	,120	,682	,126	,210	,130	,087	,523	,142

a. Kruskal Wallis Test

b. Grouping Variable: Intensity of relationships with suppliers in wholesale or distribution

Table 108: Performance variables controlled for relationships w wholesale or distribution suppliers recoded never used to low intensity vs high intensity

Ranks

	Intensity of relationships with suppliers in wholesale or distribution recoded L H	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	never used to low intensity	48	28,73
	high intensity	10	33,20
	Total	58	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	never used to low intensity	44	26,73
	high intensity	8	25,25
	Total	52	
Innovations with supplier interaction are beneficial for our company	never used to low intensity	64	40,94
	high intensity	12	25,50
	Total	76	
Innovations with supplier interaction are beneficial for the natural environment	never used to low intensity	64	40,13
	high intensity	12	29,79
	Total	76	
Innovations without supplier interaction are beneficial for our company	never used to low intensity	64	38,50
	high intensity	12	38,50
	Total	76	
Innovations without supplier interaction are beneficial for the natural environment	never used to low intensity	64	38,44
	high intensity	12	38,83
	Total	76	
Innovations with suppliers are beneficial for our company recoded	never used to low intensity	36	24,19
	high intensity	10	21,00
	Total	46	
Innovations with suppliers are beneficial for the natural environment recoded	never used to low intensity	27	18,30
	high intensity	7	14,43
	Total	34	
Innovations without suppliers are beneficial for our company recoded	never used to low intensity	30	18,40
	high intensity	6	19,00
	Total	36	
Innovations without suppliers are beneficial for the natural environment recoded	never used to low intensity	31	19,53
	high intensity	7	19,36
	Total	38	
Satisfaction with procurement with innovative suppliers	never used to low intensity	60	35,33
	high intensity	12	42,33
	Total	72	
Satisfaction with innovation with innovative suppliers	never used to low intensity	59	33,19
	high intensity	12	49,83
	Total	71	
Satisfaction with marketing&sales with innovative customers	never used to low intensity	60	34,53
	high intensity	12	46,33
	Total	72	
Satisfaction with innovation with innovative customers	never used to low intensity	59	35,25
	high intensity	12	39,71
	Total	71	
Satisfaction with internal innovation activities	never used to low intensity	61	34,89
	high intensity	12	47,75
	Total	73	
Satisfaction innovation procurement recoded	never used to low intensity	39	22,97
	high intensity	8	29,00
	Total	47	
Satisfaction innovative suppliers recoded	never used to low intensity	36	21,97
	high intensity	10	29,00
	Total	46	
Satisfaction MS w customers recoded	never used to low intensity	30	17,83
	high intensity	7	24,00
	Total	37	
Satisfaction innovation w customers recoded	never used to low intensity	41	24,79
	high intensity	9	28,72
	Total	50	
Satisfaction internal innovation activities recoded	never used to low intensity	38	23,32
	high intensity	10	29,00
	Total	48	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,587	,066	5,590	2,699	,000	,004	1,524	1,276	,022	,002	1,300	7,396	3,757	,535	4,126	2,550	3,929	3,111	,980	2,864
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,443	,798	,018	,100	1,000	,951	,217	,259	,883	,965	,254	,007	,053	,464	,042	,110	,047	,078	,322	,091

a. Kruskal Wallis Test

b. Grouping Variable: Intensity of relationships with suppliers in wholesale or distribution recoded L H

§7.6 Innovation Types

More or less than 5 supplier innovations over last 3 years

Ranks

	Recoded Nbr of innovations w suppliers last 3 years	N	Mean Rank	Sum of Ranks
Estimated number of innovations developed with all suppliers last 3 yrs	0 to 5 innovations	51	26,00	1326,00
	6 to 100 innovations	31	67,00	2077,00
	Total	82		
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	0 to 5 innovations	45	34,29	1543,00
	6 to 100 innovations	29	42,48	1232,00
	Total	74		
Innovations with supplier interaction are beneficial for our company	0 to 5 innovations	51	44,09	2248,50
	6 to 100 innovations	31	37,24	1154,50
	Total	82		
Innovations with supplier interaction are beneficial for the natural environment	0 to 5 innovations	51	41,28	2105,50
	6 to 100 innovations	31	41,85	1297,50
	Total	82		
Innovations without supplier interaction are beneficial for our company	0 to 5 innovations	51	44,75	2282,50
	6 to 100 innovations	31	36,15	1120,50
	Total	82		
Innovations without supplier interaction are beneficial for the natural environment	0 to 5 innovations	51	42,70	2177,50
	6 to 100 innovations	31	39,53	1225,50
	Total	82		
Innovations with suppliers are beneficial for our company recoded	0 to 5 innovations	30	29,17	875,00
	6 to 100 innovations	25	26,60	665,00
	Total	55		
Innovations with suppliers are beneficial for the natural environment recoded	0 to 5 innovations	23	19,85	456,50
	6 to 100 innovations	17	21,38	363,50
	Total	40		
Innovations without suppliers are beneficial for our company recoded	0 to 5 innovations	26	24,25	630,50
	6 to 100 innovations	17	18,56	315,50
	Total	43		
Innovations without suppliers are beneficial for the natural environment recoded	0 to 5 innovations	28	22,00	616,00
	6 to 100 innovations	14	20,50	287,00
	Total	42		
Satisfaction with procurement with innovative suppliers	0 to 5 innovations	51	37,03	1888,50
	6 to 100 innovations	29	46,60	1351,50
	Total	80		
Satisfaction with innovation with innovative suppliers	0 to 5 innovations	51	35,45	1808,00
	6 to 100 innovations	28	48,29	1352,00
	Total	79		
Satisfaction with marketing&sales with innovative customers	0 to 5 innovations	51	36,03	1837,50
	6 to 100 innovations	28	47,23	1322,50
	Total	79		
Satisfaction with innovation with innovative customers	0 to 5 innovations	50	38,00	1900,00
	6 to 100 innovations	29	43,45	1260,00
	Total	79		
Satisfaction with internal innovation activities	0 to 5 innovations	51	36,68	1870,50
	6 to 100 innovations	29	47,22	1369,50
	Total	80		
Satisfaction innovation procurement recoded	0 to 5 innovations	32	23,69	758,00
	6 to 100 innovations	20	31,00	620,00
	Total	52		
Satisfaction innovative suppliers recoded	0 to 5 innovations	31	23,61	732,00
	6 to 100 innovations	21	30,76	646,00
	Total	52		
Satisfaction MS w customers recoded	0 to 5 innovations	21	16,50	346,50
	6 to 100 innovations	15	21,30	319,50
	Total	36		
Satisfaction innovation w customers recoded	0 to 5 innovations	31	26,37	817,50
	6 to 100 innovations	22	27,89	613,50
	Total	53		
Satisfaction internal innovation activities recoded	0 to 5 innovations	31	23,92	741,50
	6 to 100 innovations	20	29,23	584,50
	Total	51		

Test Statistics[a]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Mann-Whitney U	,000	508,000	659,500	779,500	624,500	729,500	340,000	190,500	163,500	182,000	562,500	492,000	511,500	625,000	544,500	230,000	236,000	115,500	321,500	245,500
Wilcoxon W	1326,000	1543,000	1154,500	2105,500	1120,500	1225,500	665,000	456,500	315,500	287,000	1888,500	1808,000	1837,500	1900,000	1870,500	758,000	732,000	346,500	817,500	741,500
Z	-7,610	-1,612	-1,338	-,114	-1,700	-,625	-1,188	-,547	-1,715	-,432	-1,933	-2,560	-2,316	-1,108	-2,096	-2,583	-2,359	-1,871	-,541	-1,864
Asymp. Sig. (2-tailed)	,000	,107	,181	,909	,089	,532	,235	,584	,086	,666	,053	,010	,021	,268	,036	,010	,018	,061	,588	,060
Exact Sig. [2*(1-tailed Sig.)]								,685[b]		,722[b]								,180[b]		

a. Grouping Variable: Recoded Nbr of innovations w suppliers last 3 years

b. Not corrected for ties.

Table 109: Performance controlled for radical versus incremental with innovative suppliers - uncoded

Ranks

	We develop radical or incremental innovations with our innovative suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	mainly radical	25	44,46
	neutral (both radical and incremental)	21	42,57
	mainly incremental	33	39,39
	only incremental	3	32,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	mainly radical	24	39,73
	neutral (both radical and incremental)	20	40,83
	mainly incremental	27	34,41
	only incremental	3	25,33
	Total	74	
Innovations with supplier interaction are beneficial for our company	mainly radical	28	51,39
	neutral (both radical and incremental)	37	56,03
	mainly incremental	42	57,14
	only incremental	5	83,20
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	mainly radical	28	53,52
	neutral (both radical and incremental)	37	51,09
	mainly incremental	42	61,85
	only incremental	5	68,30
	Total	112	
Innovations without supplier interaction are beneficial for our company	mainly radical	28	51,57
	neutral (both radical and incremental)	37	51,55
	mainly incremental	42	61,85
	only incremental	5	75,80
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	mainly radical	28	53,41
	neutral (both radical and incremental)	37	53,19
	mainly incremental	42	59,81
	only incremental	5	70,50
	Total	112	
Innovations with suppliers are beneficial for our company recoded	mainly radical	20	35,28
	neutral (both radical and incremental)	22	35,11
	mainly incremental	27	36,13
	only incremental	2	51,25
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	mainly radical	12	22,67
	neutral (both radical and incremental)	17	23,56
	mainly incremental	19	30,08
	only incremental	4	33,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	mainly radical	19	26,63
	neutral (both radical and incremental)	17	24,59
	mainly incremental	17	31,06
	only incremental	2	44,00
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	mainly radical	12	25,67
	neutral (both radical and incremental)	16	26,25
	mainly incremental	24	30,33
	only incremental	4	35,00
	Total	56	
Satisfaction with procurement with innovative suppliers	mainly radical	27	67,19
	neutral (both radical and incremental)	30	52,45
	mainly incremental	42	45,57
	only incremental	5	31,70
	Total	104	
Satisfaction with innovation with innovative suppliers	mainly radical	26	64,02
	neutral (both radical and incremental)	30	46,65
	mainly incremental	42	50,31
	only incremental	5	35,80
	Total	103	
Satisfaction with marketing&sales with innovative customers	mainly radical	26	52,81
	neutral (both radical and incremental)	31	58,21
	mainly incremental	42	48,42
	only incremental	5	49,80
	Total	104	
Satisfaction with innovation with innovative customers	mainly radical	27	64,00
	neutral (both radical and incremental)	29	48,29
	mainly incremental	42	48,42
	only incremental	5	38,80
	Total	103	
Satisfaction with internal innovation activities	mainly radical	27	65,06
	neutral (both radical and incremental)	31	53,31
	mainly incremental	42	44,65
	only incremental	5	56,10
	Total	105	
Satisfaction innovation procurement recoded	mainly radical	23	38,09
	neutral (both radical and incremental)	18	35,42
	mainly incremental	23	30,80
	only incremental	3	18,67
	Total	67	
Satisfaction innovative suppliers recoded	mainly radical	22	36,43
	neutral (both radical and incremental)	16	32,63
	mainly incremental	27	33,56
	only incremental	2	24,25
	Total	67	
Satisfaction MS w customers recoded	mainly radical	11	26,45
	neutral (both radical and incremental)	17	28,06
	mainly incremental	19	23,11
	only incremental	3	22,67
	Total	50	
Satisfaction innovation w customers recoded	mainly radical	22	40,73
	neutral (both radical and incremental)	18	36,00
	mainly incremental	28	35,00
	only incremental	4	26,00
	Total	72	
Satisfaction internal innovation activities recoded	mainly radical	21	39,36
	neutral (both radical and incremental)	19	37,37
	mainly incremental	25	29,96
	only incremental	4	32,38
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,130	2,290	4,611	3,670	5,173	2,318	5,896	6,234	4,826	2,142	12,854	7,880	2,332	7,512	8,518	7,226	1,889	2,324	4,160	6,731
df	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,770	,514	,203	,299	,160	,509	,117	,101	,185	,543	,005	,049	,506	,057	,036	,065	,596	,508	,245	,081

a. Kruskal Wallis Test

b. Grouping Variable: We develop radical or incremental innovations with our innovative suppliers

Table 110: Performance controlled for radical versus incremental with innovative suppliers - recoded

Ranks

	We develop only or mainly radical or incremental for/with Inno Customers - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly radical innovation(s)	20	34,13
	Only or mainly incremental innovation(s)	41	29,48
	Total	61	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly radical innovation(s)	19	33,97
	Only or mainly incremental innovation(s)	35	23,99
	Total	54	
Innovations with supplier interaction are beneficial for our company	Only or mainly radical innovation(s)	22	27,61
	Only or mainly incremental innovation(s)	52	41,68
	Total	74	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly radical innovation(s)	22	32,43
	Only or mainly incremental innovation(s)	52	39,64
	Total	74	
Innovations without supplier interaction are beneficial for our company	Only or mainly radical innovation(s)	22	34,84
	Only or mainly incremental innovation(s)	52	38,63
	Total	74	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly radical innovation(s)	22	37,00
	Only or mainly incremental innovation(s)	52	37,71
	Total	74	
Innovations with suppliers are beneficial for our company recoded	Only or mainly radical innovation(s)	19	23,00
	Only or mainly incremental innovation(s)	31	27,03
	Total	50	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly radical innovation(s)	11	14,64
	Only or mainly incremental innovation(s)	25	20,20
	Total	36	
Innovations without suppliers are beneficial for our company recoded	Only or mainly radical innovation(s)	11	16,36
	Only or mainly incremental innovation(s)	24	18,75
	Total	35	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly radical innovation(s)	13	20,19
	Only or mainly incremental innovation(s)	29	22,09
	Total	42	
Satisfaction with procurement with innovative suppliers	Only or mainly radical innovation(s)	22	51,84
	Only or mainly incremental innovation(s)	52	31,43
	Total	74	
Satisfaction with innovation with innovative suppliers	Only or mainly radical innovation(s)	22	48,39
	Only or mainly incremental innovation(s)	51	32,09
	Total	73	
Satisfaction with marketing&sales with innovative customers	Only or mainly radical innovation(s)	22	38,55
	Only or mainly incremental innovation(s)	51	36,33
	Total	73	
Satisfaction with innovation with innovative customers	Only or mainly radical innovation(s)	22	47,23
	Only or mainly incremental innovation(s)	52	33,38
	Total	74	
Satisfaction with internal innovation activities	Only or mainly radical innovation(s)	22	42,11
	Only or mainly incremental innovation(s)	52	35,55
	Total	74	
Satisfaction innovation procurement recoded	Only or mainly radical innovation(s)	20	30,73
	Only or mainly incremental innovation(s)	31	22,95
	Total	51	
Satisfaction innovative suppliers recoded	Only or mainly radical innovation(s)	21	29,52
	Only or mainly incremental innovation(s)	31	24,45
	Total	52	
Satisfaction MS w customers recoded	Only or mainly radical innovation(s)	11	18,82
	Only or mainly incremental innovation(s)	24	17,63
	Total	35	
Satisfaction innovation w customers recoded	Only or mainly radical innovation(s)	19	29,26
	Only or mainly incremental innovation(s)	33	24,91
	Total	52	
Satisfaction internal innovation activities recoded	Only or mainly radical innovation(s)	15	27,73
	Only or mainly incremental innovation(s)	34	23,79
	Total	49	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,936	5,060	7,471	2,044	,571	,019	3,337	3,344	,549	,286	16,156	10,764	,202	7,477	1,597	6,155	2,802	,193	1,988	1,425
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,333	,024	,006	,153	,450	,891	,068	,067	,459	,593	,000	,001	,653	,006	,206	,013	,094	,660	,159	,233

a. Kruskal Wallis Test

b. Grouping Variable: We develop only or mainly radical or incremental for/with Inno Customers - recoded

Table 111: Performance controlled for process versus product with innovative suppliers - uncoded

Ranks

	We develop product or process innovations with our innovative suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	only process innovations	1	44,50
	mainly process innovations	5	49,30
	both process and product innovations	57	41,88
	mainly product innovations	17	39,06
	only product innovations	2	30,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	only process innovations	1	7,00
	mainly process innovations	5	42,90
	both process and product innovations	52	35,19
	mainly product innovations	15	45,57
	only product innovations	1	40,00
	Total	74	
Innovations with supplier interaction are beneficial for our company	only process innovations	1	87,00
	mainly process innovations	8	76,63
	both process and product innovations	80	51,72
	mainly product innovations	20	65,63
	only product innovations	3	59,33
	Total	112	
Innovations with supplier interaction are beneficial for the natural environment	only process innovations	1	70,50
	mainly process innovations	8	68,06
	both process and product innovations	80	53,53
	mainly product innovations	20	65,08
	only product innovations	3	43,17
	Total	112	
Innovations without supplier interaction are beneficial for our company	only process innovations	1	61,00
	mainly process innovations	8	57,31
	both process and product innovations	80	54,60
	mainly product innovations	20	64,95
	only product innovations	3	47,17
	Total	112	
Innovations without supplier interaction are beneficial for the natural environment	only process innovations	1	55,50
	mainly process innovations	8	55,63
	both process and product innovations	80	55,12
	mainly product innovations	20	62,58
	only product innovations	3	55,50
	Total	112	
Innovations with suppliers are beneficial for our company recoded	mainly process innovations	2	33,50
	both process and product innovations	56	35,40
	mainly product innovations	11	39,95
	only product innovations	2	33,50
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	mainly process innovations	2	33,50
	both process and product innovations	37	24,72
	mainly product innovations	11	32,32
	only product innovations	2	20,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	mainly process innovations	6	30,25
	both process and product innovations	38	26,63
	mainly product innovations	10	33,00
	only product innovations	1	16,50
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	mainly process innovations	4	28,00
	both process and product innovations	39	27,64
	mainly product innovations	13	31,23
	Total	56	
Satisfaction with procurement with innovative suppliers	only process innovations	1	33,00
	mainly process innovations	7	58,86
	both process and product innovations	73	52,21
	mainly product innovations	20	54,35
	only product innovations	3	39,00
	Total	104	
Satisfaction with innovation with innovative suppliers	only process innovations	1	32,50
	mainly process innovations	7	56,21
	both process and product innovations	72	51,85
	mainly product innovations	20	52,83
	only product innovations	3	46,83
	Total	103	
Satisfaction with marketing&sales with innovative customers	only process innovations	1	38,50
	mainly process innovations	7	51,07
	both process and product innovations	73	53,71
	mainly product innovations	20	50,75
	only product innovations	3	42,67
	Total	104	
Satisfaction with innovation with innovative customers	mainly process innovations	7	62,00
	both process and product innovations	73	50,75
	mainly product innovations	20	55,23
	only product innovations	3	37,50
	Total	103	
Satisfaction with internal innovation activities	only process innovations	1	30,50
	mainly process innovations	7	63,86
	both process and product innovations	74	51,07
	mainly product innovations	20	57,90
	only product innovations	3	50,00
	Total	105	
Satisfaction innovation procurement recoded	mainly process innovations	6	35,42
	both process and product innovations	48	33,32
	mainly product innovations	11	37,95
	only product innovations	2	24,25
	Total	67	
Satisfaction innovative suppliers recoded	mainly process innovations	4	41,00
	both process and product innovations	48	33,32
	mainly product innovations	13	35,85
	only product innovations	2	24,25
	Total	67	
Satisfaction MS w customers recoded	mainly process innovations	2	31,00
	both process and product innovations	37	26,59
	mainly product innovations	9	25,44
	only product innovations	2	18,50
	Total	50	
Satisfaction innovation w customers recoded	mainly process innovations	7	38,86
	both process and product innovations	48	36,50
	mainly product innovations	15	36,80
	only product innovations	2	26,00
	Total	72	
Satisfaction internal innovation activities recoded	mainly process innovations	6	41,00
	both process and product innovations	45	34,87
	mainly product innovations	16	34,53
	only product innovations	3	29,50
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,188	5,128	8,206	4,524	2,230	,988	2,594	5,395	2,581	,636	1,651	,782	,892	2,178	2,608	2,104	2,403	1,452	1,203	1,585
df	4	4	4	4	4	4	3	3	3	2	4	4	4	3	4	3	3	3	3	3
Asymp. Sig.	,880	,274	,084	,340	,694	,912	,459	,145	,461	,728	,800	,941	,926	,536	,625	,551	,493	,693	,752	,663

a. Kruskal Wallis Test

b. Grouping Variable: We develop product or process innovations with our innovative suppliers

Table 112: Performance controlled for process versus product with innovative suppliers - recoded

Ranks

	We develop mainly or only process or product with inno suppliers - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	Only or mainly process innovation(s)	6	15,83
	Only or mainly product innovation(s)	19	12,11
	Total	25	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Only or mainly process innovation(s)	6	9,83
	Only or mainly product innovation(s)	16	12,13
	Total	22	
Innovations with supplier interaction are beneficial for our company	Only or mainly process innovation(s)	9	19,00
	Only or mainly product innovation(s)	23	15,52
	Total	32	
Innovations with supplier interaction are beneficial for the natural environment	Only or mainly process innovation(s)	9	17,78
	Only or mainly product innovation(s)	23	16,00
	Total	32	
Innovations without supplier interaction are beneficial for our company	Only or mainly process innovation(s)	9	15,56
	Only or mainly product innovation(s)	23	16,87
	Total	32	
Innovations without supplier interaction are beneficial for the natural environment	Only or mainly process innovation(s)	9	15,28
	Only or mainly product innovation(s)	23	16,98
	Total	32	
Innovations with suppliers are beneficial for our company recoded	Only or mainly process innovation(s)	2	7,00
	Only or mainly product innovation(s)	13	8,15
	Total	15	
Innovations with suppliers are beneficial for the natural environment recoded	Only or mainly process innovation(s)	2	8,75
	Only or mainly product innovation(s)	13	7,88
	Total	15	
Innovations without suppliers are beneficial for our company recoded	Only or mainly process innovation(s)	6	8,75
	Only or mainly product innovation(s)	11	9,14
	Total	17	
Innovations without suppliers are beneficial for the natural environment recoded	Only or mainly process innovation(s)	4	8,25
	Only or mainly product innovation(s)	13	9,23
	Total	17	
Satisfaction with procurement with innovative suppliers	Only or mainly process innovation(s)	8	16,88
	Only or mainly product innovation(s)	23	15,70
	Total	31	
Satisfaction with innovation with innovative suppliers	Only or mainly process innovation(s)	8	16,25
	Only or mainly product innovation(s)	23	15,91
	Total	31	
Satisfaction with marketing&sales with innovative customers	Only or mainly process innovation(s)	8	16,00
	Only or mainly product innovation(s)	23	16,00
	Total	31	
Satisfaction with innovation with innovative customers	Only or mainly process innovation(s)	7	17,29
	Only or mainly product innovation(s)	23	14,96
	Total	30	
Satisfaction with internal innovation activities	Only or mainly process innovation(s)	8	16,44
	Only or mainly product innovation(s)	23	15,85
	Total	31	
Satisfaction innovation procurement recoded	Only or mainly process innovation(s)	6	9,92
	Only or mainly product innovation(s)	13	10,04
	Total	19	
Satisfaction innovative suppliers recoded	Only or mainly process innovation(s)	4	11,50
	Only or mainly product innovation(s)	15	9,60
	Total	19	
Satisfaction MS w customers recoded	Only or mainly process innovation(s)	2	8,50
	Only or mainly product innovation(s)	11	6,73
	Total	13	
Satisfaction innovation w customers recoded	Only or mainly process innovation(s)	7	13,29
	Only or mainly product innovation(s)	17	12,18
	Total	24	
Satisfaction internal innovation activities recoded	Only or mainly process innovation(s)	5	14,50
	Only or mainly product innovation(s)	19	11,97
	Total	24	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,226	,551	1,085	,277	,145	,242	,331	,090	,030	,158	,120	,010	,000	,465	,029	,005	,900	,655	,246	1,211
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,268	,458	,297	,599	,704	,623	,565	,765	,862	,691	,729	,921	1,000	,495	,864	,945	,343	,418	,620	,271

a. Kruskal Wallis Test

b. Grouping Variable: We develop mainly or only process or product with inno suppliers - recoded

§7.7 Effects of entrepreneurial orientation with suppliers

Table 113: Innovating - uncoded

Ranks

	Innovating activities with Innovative Suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	32	35,88
	important	32	45,97
	moderately important	17	44,47
	not important	1	28,00
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	30	37,70
	important	27	37,26
	moderately important	16	36,81
	not important	1	49,00
	Total	74	
Innovations with supplier interaction are beneficial for our company	very important	42	46,85
	important	43	53,49
	moderately important	22	69,73
	not important	1	84,50
	Total	108	
Innovations with supplier interaction are beneficial for the natural environment	very important	42	46,61
	important	43	57,33
	moderately important	22	65,18
	not important	1	29,50
	Total	108	
Innovations without supplier interaction are beneficial for our company	very important	42	56,88
	important	43	52,15
	moderately important	22	54,36
	not important	1	58,50
	Total	108	
Innovations without supplier interaction are beneficial for the natural environment	very important	42	51,43
	important	43	55,53
	moderately important	22	58,39
	not important	1	53,50
	Total	108	
Innovations with suppliers are beneficial for our company recoded	very important	30	35,33
	important	28	33,00
	moderately important	12	41,75
	Total	70	
Innovations with suppliers are beneficial for the natural environment recoded	very important	23	23,89
	important	16	25,38
	moderately important	12	33,50
	not important	1	20,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	very important	24	29,50
	important	22	25,82
	moderately important	8	26,13
	Total	54	
Innovations without suppliers are beneficial for the natural environment recoded	very important	25	26,32
	important	20	29,40
	moderately important	11	31,82
	Total	56	
Satisfaction with procurement with innovative suppliers	very important	41	58,45
	important	41	57,21
	moderately important	21	33,79
	not important	1	8,50
	Total	104	
Satisfaction with innovation with innovative suppliers	very important	41	57,11
	important	41	54,46
	moderately important	20	37,45
	not important	1	32,50
	Total	103	
Satisfaction with marketing&sales with innovative customers	very important	41	51,99
	important	41	50,65
	moderately important	20	55,48
	not important	1	38,50
	Total	103	
Satisfaction with innovation with innovative customers	very important	41	54,29
	important	40	52,39
	moderately important	21	45,83
	not important	1	72,00
	Total	103	
Satisfaction with internal innovation activities	very important	41	55,63
	important	41	50,96
	moderately important	21	48,50
	not important	1	71,00
	Total	104	
Satisfaction innovation procurement recoded	very important	26	38,42
	important	27	37,28
	moderately important	13	20,38
	not important	1	7,50
	Total	67	
Satisfaction innovative suppliers recoded	very important	24	39,60
	important	31	33,44
	moderately important	12	24,25
	Total	67	
Satisfaction MS w customers recoded	very important	16	27,44
	important	21	23,50
	moderately important	12	24,38
	Total	49	
Satisfaction innovation w customers recoded	very important	28	38,86
	important	30	35,60
	moderately important	13	32,92
	not important	1	44,00
	Total	72	
Satisfaction internal innovation activities recoded	very important	29	35,81
	important	26	33,96
	moderately important	12	32,00
	not important	1	40,50
	Total	68	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	3,545	,313	9,734	7,340	,584	,902	7,820	6,545	,955	1,285	14,974	7,732	,682	1,872	1,479	20,768	10,113	1,378	1,857	,987
df	3	3	3	3	3	3	2	3	2	2	3	3	3	3	3	3	2	2	3	3
Asymp. Sig.	,315	,958	,021	,062	,900	,825	,020	,088	,620	,526	,002	,052	,877	,599	,687	,000	,006	,502	,603	,804

a. Kruskal Wallis Test

b. Grouping Variable: Innovating activities with Innovative Suppliers

Table 114: innovating recoded

Ranks

	Innovating with innovating Suppliers - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	32	23,92
	moderately to not at all important	18	28,31
	Total	50	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	30	24,05
	moderately to not at all important	17	23,91
	Total	47	
Innovations with supplier interaction are beneficial for our company	very important	42	28,32
	moderately to not at all important	23	41,54
	Total	65	
Innovations with supplier interaction are beneficial for the natural environment	very important	42	29,50
	moderately to not at all important	23	39,39
	Total	65	
Innovations without supplier interaction are beneficial for our company	very important	42	33,60
	moderately to not at all important	23	31,91
	Total	65	
Innovations without supplier interaction are beneficial for the natural environment	very important	42	31,62
	moderately to not at all important	23	35,52
	Total	65	
Innovations with suppliers are beneficial for our company recoded	very important	30	20,40
	moderately to not at all important	12	24,25
	Total	42	
Innovations with suppliers are beneficial for the natural environment recoded	very important	23	16,35
	moderately to not at all important	13	22,31
	Total	36	
Innovations without suppliers are beneficial for our company recoded	very important	24	17,00
	moderately to not at all important	8	15,00
	Total	32	
Innovations without suppliers are beneficial for the natural environment recoded	very important	25	17,42
	moderately to not at all important	11	20,95
	Total	36	
Satisfaction with procurement with innovative suppliers	very important	41	37,46
	moderately to not at all important	22	21,82
	Total	63	
Satisfaction with innovation with innovative suppliers	very important	41	35,74
	moderately to not at all important	21	23,21
	Total	62	
Satisfaction with marketing&sales with innovative customers	very important	41	30,94
	moderately to not at all important	21	32,60
	Total	62	
Satisfaction with innovation with innovative customers	very important	41	33,63
	moderately to not at all important	22	28,95
	Total	63	
Satisfaction with internal innovation activities	very important	41	33,28
	moderately to not at all important	22	29,61
	Total	63	
Satisfaction innovation procurement recoded	very important	26	24,46
	moderately to not at all important	14	13,14
	Total	40	
Satisfaction innovative suppliers recoded	very important	24	21,25
	moderately to not at all important	12	13,00
	Total	36	
Satisfaction MS w customers recoded	very important	16	15,25
	moderately to not at all important	12	13,50
	Total	28	
Satisfaction innovation w customers recoded	very important	28	22,50
	moderately to not at all important	14	19,50
	Total	42	
Satisfaction internal innovation activities recoded	very important	29	22,10
	moderately to not at all important	13	20,15
	Total	42	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,063	,001	7,998	4,566	,137	,705	2,682	4,721	,365	1,145	11,891	7,869	,147	1,108	,657	14,253	10,431	,704	1,206	,544
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,303	,973	,005	,033	,711	,401	,102	,030	,546	,285	,001	,005	,701	,292	,418	,000	,001	,401	,272	,461

a. Kruskal Wallis Test

b. Grouping Variable: Innovating with innovating Suppliers - recoded

Table 115: risk taking uncoded

Ranks

	Risk taking towards Innovative Suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	14	41,89
	important	35	45,79
	moderately important	25	39,50
	not important	7	30,00
	not at all important	1	16,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	10	36,30
	important	33	36,77
	moderately important	23	39,89
	not important	7	36,00
	not at all important	1	29,00
	Total	74	
Innovations with supplier interaction are beneficial for our company	very important	18	47,72
	important	45	55,28
	moderately important	31	48,69
	not important	11	73,00
	not at all important	1	12,00
	Total	106	
Innovations with supplier interaction are beneficial for the natural environment	very important	18	48,47
	important	45	56,53
	moderately important	31	47,52
	not important	11	70,23
	not at all important	1	9,00
	Total	106	
Innovations without supplier interaction are beneficial for our company	very important	18	51,17
	important	45	54,56
	moderately important	31	51,08
	not important	11	55,27
	not at all important	1	103,50
	Total	106	
Innovations without supplier interaction are beneficial for the natural environment	very important	18	52,89
	important	45	55,33
	moderately important	31	46,74
	not important	11	61,68
	not at all important	1	101,50
	Total	106	
Innovations with suppliers are beneficial for our company recoded	very important	13	32,50
	important	30	35,95
	moderately important	23	35,50
	not important	2	32,50
	not at all important	1	32,50
	Total	69	
Innovations with suppliers are beneficial for the natural environment recoded	very important	9	22,83
	important	21	27,29
	moderately important	14	21,82
	not important	6	37,00
	not at all important	1	20,00
	Total	51	
Innovations without suppliers are beneficial for our company recoded	very important	12	26,54
	important	22	27,55
	moderately important	16	25,44
	not important	2	28,75
	not at all important	1	42,00
	Total	53	
Innovations without suppliers are beneficial for the natural environment recoded	very important	12	27,25
	important	19	29,42
	moderately important	18	24,19
	not important	5	35,50
	not at all important	1	41,00
	Total	55	
Satisfaction with procurement with innovative suppliers	very important	18	53,64
	important	42	60,33
	moderately important	31	48,31
	not important	10	22,40
	not at all important	1	32,00
	Total	102	
Satisfaction with innovation with innovative suppliers	very important	18	60,94
	important	41	54,05
	moderately important	31	48,06
	not important	10	31,55
	not at all important	1	32,50
	Total	101	
Satisfaction with marketing&sales with innovative customers	very important	18	49,83
	important	41	51,80
	moderately important	31	51,85
	not important	10	44,05
	not at all important	1	82,00
	Total	101	
Satisfaction with innovation with innovative customers	very important	18	51,33
	important	41	54,79
	moderately important	31	53,08
	not important	10	26,40
	not at all important	1	71,00
	Total	101	
Satisfaction with internal innovation activities	very important	18	58,11
	important	42	53,00
	moderately important	31	47,48
	not important	10	47,90
	not at all important	1	30,00
	Total	102	
Satisfaction innovation procurement recoded	very important	11	36,55
	important	29	37,26
	moderately important	21	30,21
	not important	4	7,00
	Total	65	
Satisfaction innovative suppliers recoded	very important	13	37,50
	important	29	33,28
	moderately important	20	31,88
	not important	3	18,33
	Total	65	
Satisfaction MS w customers recoded	very important	6	25,58
	important	21	23,90
	moderately important	16	23,63
	not important	3	21,67
	not at all important	1	29,50
	Total	47	
Satisfaction innovation w customers recoded	very important	10	39,50
	important	35	35,00
	moderately important	19	39,32
	not important	5	15,00
	not at all important	1	43,00
	Total	70	
Satisfaction internal innovation activities recoded	very important	13	37,42
	important	28	35,21
	moderately important	19	31,18
	not important	7	30,43
	Total	67	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	4,102	,552	8,760	8,799	3,534	5,573	1,636	9,481	1,588	3,936	16,768	8,941	2,178	9,778	2,570	20,573	5,164	,633	12,440	2,588
df	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	3
Asymp. Sig.	,392	,968	,067	,066	,473	,233	,802	,050	,811	,414	,002	,065	,703	,044	,632	,000	,160	,959	,014	,460

a. Kruskal Wallis Test

b. Grouping Variable: Risk taking towards Innovative Suppliers

Table 116: risk taking recoded

Ranks

	Risk taking with innovative Suppliers - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	14	25,96
	moderately to not at all important	33	23,17
	Total	47	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	10	20,00
	moderately to not at all important	31	21,32
	Total	41	
Innovations with supplier interaction are beneficial for our company	very important	18	28,50
	moderately to not at all important	43	32,05
	Total	61	
Innovations with supplier interaction are beneficial for the natural environment	very important	18	29,47
	moderately to not at all important	43	31,64
	Total	61	
Innovations without supplier interaction are beneficial for our company	very important	18	30,08
	moderately to not at all important	43	31,38
	Total	61	
Innovations without supplier interaction are beneficial for the natural environment	very important	18	31,50
	moderately to not at all important	43	30,79
	Total	61	
Innovations with suppliers are beneficial for our company recoded	very important	13	19,00
	moderately to not at all important	26	20,50
	Total	39	
Innovations with suppliers are beneficial for the natural environment recoded	very important	9	14,17
	moderately to not at all important	21	16,07
	Total	30	
Innovations without suppliers are beneficial for our company recoded	very important	12	15,96
	moderately to not at all important	19	16,03
	Total	31	
Innovations without suppliers are beneficial for the natural environment recoded	very important	12	18,50
	moderately to not at all important	24	18,50
	Total	36	
Satisfaction with procurement with innovative suppliers	very important	18	35,61
	moderately to not at all important	42	28,31
	Total	60	
Satisfaction with innovation with innovative suppliers	very important	18	37,83
	moderately to not at all important	42	27,36
	Total	60	
Satisfaction with marketing&sales with innovative customers	very important	18	30,17
	moderately to not at all important	42	30,64
	Total	60	
Satisfaction with innovation with innovative customers	very important	18	32,42
	moderately to not at all important	42	29,68
	Total	60	
Satisfaction with internal innovation activities	very important	18	34,94
	moderately to not at all important	42	28,60
	Total	60	
Satisfaction innovation procurement recoded	very important	11	22,36
	moderately to not at all important	25	16,80
	Total	36	
Satisfaction innovative suppliers recoded	very important	13	21,12
	moderately to not at all important	23	17,02
	Total	36	
Satisfaction MS w customers recoded	very important	6	14,33
	moderately to not at all important	20	13,25
	Total	26	
Satisfaction innovation w customers recoded	very important	10	19,75
	moderately to not at all important	25	17,30
	Total	35	
Satisfaction internal innovation activities recoded	very important	13	22,50
	moderately to not at all important	26	18,75
	Total	39	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,416	,094	,568	,222	,079	,022	1,027	,614	,001	,000	2,535	5,319	,012	,362	1,871	3,344	2,416	,174	,850	1,915
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,519	,759	,451	,638	,779	,882	,311	,433	,981	1,000	,111	,021	,913	,547	,171	,067	,120	,677	,357	,166

a. Kruskal Wallis Test

b. Grouping Variable: Risk taking with innovative Suppliers - recoded

Table 117: Opportunities uncoded

Ranks

	Opportunities with Innovative Suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	26	41,44
	important	37	41,93
	moderately important	16	38,72
	not important	3	51,50
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	25	39,00
	important	30	38,15
	moderately important	16	33,50
	not important	3	39,83
	Total	74	
Innovations with supplier interaction are beneficial for our company	very important	30	36,92
	important	51	57,51
	moderately important	23	66,28
	not important	3	71,00
	Total	107	
Innovations with supplier interaction are beneficial for the natural environment	very important	30	39,77
	important	51	57,71
	moderately important	23	59,65
	not important	3	90,00
	Total	107	
Innovations without supplier interaction are beneficial for our company	very important	30	46,67
	important	51	58,04
	moderately important	23	54,09
	not important	3	58,00
	Total	107	
Innovations without supplier interaction are beneficial for the natural environment	very important	30	44,07
	important	51	56,62
	moderately important	23	57,61
	not important	3	81,17
	Total	107	
Innovations with suppliers are beneficial for our company recoded	very important	26	35,69
	important	32	34,09
	moderately important	11	39,36
	not important	1	33,00
	Total	70	
Innovations with suppliers are beneficial for the natural environment recoded	very important	20	23,10
	important	21	26,69
	moderately important	9	29,17
	not important	2	46,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	very important	19	24,53
	important	27	30,00
	moderately important	8	26,13
	Total	54	
Innovations without suppliers are beneficial for the natural environment recoded	very important	21	23,33
	important	26	30,15
	moderately important	7	34,00
	not important	2	42,00
	Total	56	
Satisfaction with procurement with innovative suppliers	very important	30	61,70
	important	49	53,70
	moderately important	21	38,17
	not important	3	24,00
	Total	103	
Satisfaction with innovation with innovative suppliers	very important	30	62,97
	important	49	51,09
	moderately important	20	37,35
	not important	3	37,83
	Total	102	
Satisfaction with marketing&sales with innovative customers	very important	30	54,20
	important	49	52,87
	moderately important	20	43,85
	not important	3	53,17
	Total	102	
Satisfaction with innovation with innovative customers	very important	29	61,09
	important	49	48,55
	moderately important	21	49,10
	not important	3	23,83
	Total	102	
Satisfaction with internal innovation activities	very important	30	54,33
	important	49	50,92
	moderately important	21	55,43
	not important	3	22,33
	Total	103	
Satisfaction innovation procurement recoded	very important	23	37,13
	important	28	36,46
	moderately important	14	23,50
	not important	1	7,00
	Total	66	
Satisfaction innovative suppliers recoded	very important	22	39,00
	important	29	34,81
	moderately important	13	22,73
	not important	2	24,00
	Total	66	
Satisfaction MS w customers recoded	very important	12	28,00
	important	26	24,46
	moderately important	9	19,33
	not important	1	30,00
	Total	48	
Satisfaction innovation w customers recoded	very important	21	41,81
	important	34	34,10
	moderately important	15	34,03
	not important	1	8,00
	Total	71	
Satisfaction internal innovation activities recoded	very important	20	37,10
	important	30	34,83
	moderately important	17	32,50
	not important	1	6,50
	Total	68	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,770	,749	15,988	13,933	3,006	6,876	2,847	8,957	1,938	6,061	12,287	11,291	2,090	7,382	3,979	15,160	13,006	4,018	7,855	5,809
df	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
Asymp. Sig.	,857	,862	,001	,003	,391	,076	,416	,030	,380	,109	,006	,010	,554	,061	,264	,002	,005	,260	,049	,121

a. Kruskal Wallis Test

b. Grouping Variable: Opportunities with Innovative Suppliers

Table 118: opportunities - recoded

Ranks

	Opportunities with innovative Suppliers - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	26	23,19
	moderately to not at all important	19	22,74
	Total	45	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	25	23,84
	moderately to not at all important	19	20,74
	Total	44	
Innovations with supplier interaction are beneficial for our company	very important	30	22,00
	moderately to not at all important	26	36,00
	Total	56	
Innovations with supplier interaction are beneficial for the natural environment	very important	30	23,17
	moderately to not at all important	26	34,65
	Total	56	
Innovations without supplier interaction are beneficial for our company	very important	30	26,35
	moderately to not at all important	26	30,98
	Total	56	
Innovations without supplier interaction are beneficial for the natural environment	very important	30	24,63
	moderately to not at all important	26	32,96
	Total	56	
Innovations with suppliers are beneficial for our company recoded	very important	26	18,96
	moderately to not at all important	12	20,67
	Total	38	
Innovations with suppliers are beneficial for the natural environment recoded	very important	20	14,05
	moderately to not at all important	11	19,55
	Total	31	
Innovations without suppliers are beneficial for our company recoded	very important	19	13,76
	moderately to not at all important	8	14,56
	Total	27	
Innovations without suppliers are beneficial for the natural environment recoded	very important	21	13,50
	moderately to not at all important	9	20,17
	Total	30	
Satisfaction with procurement with innovative suppliers	very important	30	33,13
	moderately to not at all important	24	20,46
	Total	54	
Satisfaction with innovation with innovative suppliers	very important	30	32,48
	moderately to not at all important	23	19,85
	Total	53	
Satisfaction with marketing&sales with innovative customers	very important	30	29,13
	moderately to not at all important	23	24,22
	Total	53	
Satisfaction with innovation with innovative customers	very important	29	30,57
	moderately to not at all important	24	22,69
	Total	53	
Satisfaction with internal innovation activities	very important	30	28,10
	moderately to not at all important	24	26,75
	Total	54	
Satisfaction innovation procurement recoded	very important	23	22,85
	moderately to not at all important	15	14,37
	Total	38	
Satisfaction innovative suppliers recoded	very important	22	22,66
	moderately to not at all important	15	13,63
	Total	37	
Satisfaction MS w customers recoded	very important	12	13,08
	moderately to not at all important	10	9,60
	Total	22	
Satisfaction innovation w customers recoded	very important	21	21,12
	moderately to not at all important	16	16,22
	Total	37	
Satisfaction internal innovation activities recoded	very important	20	21,10
	moderately to not at all important	18	17,72
	Total	38	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,013	,641	11,295	7,781	1,326	4,081	,684	4,938	,086	4,833	10,088	9,964	1,698	4,075	,113	9,084	11,221	2,973	4,563	1,940
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,908	,423	,001	,005	,250	,043	,408	,026	,770	,028	,001	,002	,193	,044	,737	,003	,001	,085	,033	,164

a. Kruskal Wallis Test

b. Grouping Variable: Opportunities with innovative Suppliers - recoded

Table 119: Aggressiveness - uncoded

Ranks

	Aggressiveness in Supplier Markets	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	5	31,50
	important	26	39,92
	moderately important	21	44,95
	not important	23	44,09
	not at all important	7	35,64
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	5	41,80
	important	23	32,43
	moderately important	20	35,55
	not important	19	47,11
	not at all important	7	30,57
	Total	74	
Innovations with supplier interaction are beneficial for our company	very important	10	57,35
	important	31	60,00
	moderately important	27	49,57
	not important	33	55,08
	not at all important	7	42,36
	Total	108	
Innovations with supplier interaction are beneficial for the natural environment	very important	10	56,70
	important	31	64,69
	moderately important	27	49,44
	not important	33	51,36
	not at all important	7	40,50
	Total	108	
Innovations without supplier interaction are beneficial for our company	very important	10	45,85
	important	31	55,56
	moderately important	27	56,72
	not important	33	54,89
	not at all important	7	51,71
	Total	108	
Innovations without supplier interaction are beneficial for the natural environment	very important	10	41,60
	important	31	60,63
	moderately important	27	54,89
	not important	33	53,59
	not at all important	7	48,57
	Total	108	
Innovations with suppliers are beneficial for our company recoded	very important	6	38,83
	important	19	36,68
	moderately important	22	36,18
	not important	18	33,00
	not at all important	5	33,00
	Total	70	
Innovations with suppliers are beneficial for the natural environment recoded	very important	2	20,50
	important	16	33,50
	moderately important	13	22,50
	not important	17	25,09
	not at all important	4	20,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	very important	5	21,40
	important	19	28,79
	moderately important	11	28,27
	not important	16	27,81
	not at all important	3	25,00
	Total	54	
Innovations without suppliers are beneficial for the natural environment recoded	very important	7	22,00
	important	17	32,12
	moderately important	13	29,08
	not important	16	28,00
	not at all important	3	23,33
	Total	56	
Satisfaction with procurement with innovative suppliers	very important	10	67,00
	important	28	49,70
	moderately important	26	55,10
	not important	33	49,39
	not at all important	7	48,00
	Total	104	
Satisfaction with innovation with innovative suppliers	very important	10	65,70
	important	27	46,69
	moderately important	26	47,54
	not important	33	55,53
	not at all important	7	52,86
	Total	103	
Satisfaction with marketing&sales with innovative customers	very important	10	70,55
	important	27	38,52
	moderately important	26	55,67
	not important	33	54,33
	not at all important	7	52,86
	Total	103	
Satisfaction with innovation with innovative customers	very important	10	57,55
	important	27	45,22
	moderately important	26	56,83
	not important	33	50,30
	not at all important	7	60,29
	Total	103	
Satisfaction with internal innovation activities	very important	10	48,40
	important	28	42,77
	moderately important	26	61,71
	not important	33	54,36
	not at all important	7	54,29
	Total	104	
Satisfaction innovation procurement recoded	very important	8	41,00
	important	20	30,95
	moderately important	17	35,09
	not important	17	35,09
	not at all important	5	27,60
	Total	67	
Satisfaction innovative suppliers recoded	very important	8	41,00
	important	15	32,07
	moderately important	20	29,28
	not important	18	39,14
	not at all important	6	29,83
	Total	67	
Satisfaction MS w customers recoded	very important	9	27,78
	important	7	16,50
	moderately important	14	25,25
	not important	15	27,23
	not at all important	4	24,38
	Total	49	
Satisfaction innovation w customers recoded	very important	8	39,50
	important	18	32,00
	moderately important	19	36,42
	not important	22	37,45
	not at all important	5	44,00
	Total	72	
Satisfaction internal innovation activities recoded	very important	6	34,83
	important	15	29,17
	moderately important	19	38,71
	not important	23	34,59
	not at all important	5	33,70
	Total	68	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,160	6,253	3,109	6,811	1,159	3,613	3,000	10,150	1,346	3,044	3,801	4,657	12,147	3,599	6,483	4,371	7,828	6,116	3,404	4,502
df	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Asymp. Sig.	,706	,181	,540	,146	,885	,461	,558	,038	,853	,551	,434	,324	,016	,463	,166	,358	,098	,191	,493	,342

a. Kruskal Wallis Test

b. Grouping Variable: Aggressiveness in Supplier Markets

Table 120: Aggressiveness - recoded

Ranks

	Aggressive in Supplier Markets - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	5	21,20
	moderately to not at all important	51	29,22
	Total	56	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	5	26,90
	moderately to not at all important	46	25,90
	Total	51	
Innovations with supplier interaction are beneficial for our company	very important	10	42,35
	moderately to not at all important	67	38,50
	Total	77	
Innovations with supplier interaction are beneficial for the natural environment	very important	10	43,90
	moderately to not at all important	67	38,27
	Total	77	
Innovations without supplier interaction are beneficial for our company	very important	10	33,05
	moderately to not at all important	67	39,89
	Total	77	
Innovations without supplier interaction are beneficial for the natural environment	very important	10	31,45
	moderately to not at all important	67	40,13
	Total	77	
Innovations with suppliers are beneficial for our company recoded	very important	6	28,75
	moderately to not at all important	45	25,63
	Total	51	
Innovations with suppliers are beneficial for the natural environment recoded	very important	2	16,50
	moderately to not at all important	34	18,62
	Total	36	
Innovations without suppliers are beneficial for our company recoded	very important	5	14,50
	moderately to not at all important	30	18,58
	Total	35	
Innovations without suppliers are beneficial for the natural environment recoded	very important	7	16,57
	moderately to not at all important	32	20,75
	Total	39	
Satisfaction with procurement with innovative suppliers	very important	10	48,60
	moderately to not at all important	66	36,97
	Total	76	
Satisfaction with innovation with innovative suppliers	very important	10	46,90
	moderately to not at all important	66	37,23
	Total	76	
Satisfaction with marketing&sales with innovative customers	very important	10	48,50
	moderately to not at all important	66	36,98
	Total	76	
Satisfaction with innovation with innovative customers	very important	10	40,75
	moderately to not at all important	66	38,16
	Total	76	
Satisfaction with internal innovation activities	very important	10	32,55
	moderately to not at all important	66	39,40
	Total	76	
Satisfaction innovation procurement recoded	very important	8	28,00
	moderately to not at all important	39	23,18
	Total	47	
Satisfaction innovative suppliers recoded	very important	8	31,50
	moderately to not at all important	44	25,59
	Total	52	
Satisfaction MS w customers recoded	very important	9	22,67
	moderately to not at all important	33	21,18
	Total	42	
Satisfaction innovation w customers recoded	very important	8	28,63
	moderately to not at all important	46	27,30
	Total	54	
Satisfaction internal innovation activities recoded	very important	6	26,08
	moderately to not at all important	47	27,12
	Total	53	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	1,114	,021	,288	,664	,983	1,504	1,400	,257	,944	1,034	2,847	1,959	2,804	,144	,978	1,936	2,208	,248	,115	,069
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,291	,885	,592	,415	,321	,220	,237	,612	,331	,309	,092	,162	,094	,704	,323	,164	,137	,618	,734	,792

a. Kruskal Wallis Test

b. Grouping Variable: Aggressive in Supplier Markets - recoded

Table 121: Trust uncoded

Ranks

	Trust with innovative Suppliers	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	54	43,93
	important	26	35,98
	moderately important	2	47,75
	Total	82	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	47	38,63
	important	25	36,48
	moderately important	2	23,75
	Total	74	
Innovations with supplier interaction are beneficial for our company	very important	73	48,96
	important	34	66,18
	moderately important	2	85,50
	Total	109	
Innovations with supplier interaction are beneficial for the natural environment	very important	73	47,35
	important	34	69,60
	moderately important	2	86,00
	Total	109	
Innovations without supplier interaction are beneficial for our company	very important	73	55,01
	important	34	54,71
	moderately important	2	59,50
	Total	109	
Innovations without supplier interaction are beneficial for the natural environment	very important	73	51,15
	important	34	62,26
	moderately important	2	72,00
	Total	109	
Innovations with suppliers are beneficial for our company recoded	very important	54	35,47
	important	17	37,68
	Total	71	
Innovations with suppliers are beneficial for the natural environment recoded	very important	39	23,17
	important	12	35,67
	moderately important	1	46,50
	Total	52	
Innovations without suppliers are beneficial for our company recoded	very important	40	28,19
	important	15	27,50
	Total	55	
Innovations without suppliers are beneficial for the natural environment recoded	very important	42	26,00
	important	13	35,54
	moderately important	1	42,00
	Total	56	
Satisfaction with procurement with innovative suppliers	very important	69	57,17
	important	33	44,65
	moderately important	2	20,75
	Total	104	
Satisfaction with innovation with innovative suppliers	very important	69	61,38
	important	32	33,77
	moderately important	2	20,00
	Total	103	
Satisfaction with marketing&sales with innovative customers	very important	70	55,52
	important	32	46,77
	moderately important	2	38,50
	Total	104	
Satisfaction with innovation with innovative customers	very important	69	56,09
	important	32	44,48
	moderately important	2	31,00
	Total	103	
Satisfaction with internal innovation activities	very important	70	53,61
	important	33	53,77
	moderately important	2	18,75
	Total	105	
Satisfaction innovation procurement recoded	very important	47	36,72
	important	19	28,66
	moderately important	1	7,50
	Total	67	
Satisfaction innovative suppliers recoded	very important	49	38,95
	important	17	21,29
	moderately important	1	7,50
	Total	67	
Satisfaction MS w customers recoded	very important	37	26,27
	important	13	23,31
	Total	50	
Satisfaction innovation w customers recoded	very important	51	39,06
	important	21	30,29
	Total	72	
Satisfaction internal innovation activities recoded	very important	47	35,86
	important	21	34,43
	moderately important	1	6,50
	Total	69	

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for our company recoded	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for our company recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction MS w customers recoded	Satisfaction innovation w customers recoded	Satisfaction internal innovation activities recoded
Chi-Square	2,123	1,019	9,867	15,957	,051	3,958	,751	15,052	,028	5,463	7,141	24,452	2,777	5,071	2,953	8,460	24,677	,772	5,282	4,922
df	2	2	2	2	2	2	1	2	1	2	2	2	2	2	2	2	2	1	1	2
Asymp. Sig.	,346	,601	,007	,000	,975	,138	,386	,001	,868	,065	,028	,000	,249	,079	,228	,015	,000	,380	,022	,085

a. Kruskal Wallis Test

b. Grouping Variable: Trust with innovative Suppliers

Table 122: Trust recoded

Ranks

	Trust with innovative Suppliers - recoded	N	Mean Rank
Estimated number of innovations developed with all suppliers last 3 yrs	very important	54	28,40
	moderately to not at all important	2	31,25
	Total	56	
Estimated % of turnover from innovations developed with all suppliers last 3 yrs	very important	47	25,47
	moderately to not at all important	2	14,00
	Total	49	
Innovations with supplier interaction are beneficial for our company	very important	73	37,34
	moderately to not at all important	2	62,00
	Total	75	
Innovations with supplier interaction are beneficial for the natural environment	very important	73	37,32
	moderately to not at all important	2	62,75
	Total	75	
Innovations without supplier interaction are beneficial for our company	very important	73	37,92
	moderately to not at all important	2	41,00
	Total	75	
Innovations without supplier interaction are beneficial for the natural environment	very important	73	37,64
	moderately to not at all important	2	51,25
	Total	75	
Innovations with suppliers are beneficial for our company recoded	very important	54	27,50
	Total	54[a]	
Innovations with suppliers are beneficial for the natural environment recoded	very important	39	20,05
	moderately to not at all important	1	38,00
	Total	40	
Innovations without suppliers are beneficial for our company recoded	very important	40	20,50
	Total	40[a]	
Innovations without suppliers are beneficial for the natural environment recoded	very important	42	21,71
	moderately to not at all important	1	34,00
	Total	43	
Satisfaction with procurement with innovative suppliers	very important	69	36,70
	moderately to not at all important	2	11,75
	Total	71	
Satisfaction with innovation with innovative suppliers	very important	69	36,79
	moderately to not at all important	2	8,75
	Total	71	
Satisfaction with marketing&sales with innovative customers	very important	70	36,83
	moderately to not at all important	2	25,00
	Total	72	
Satisfaction with innovation with innovative customers	very important	69	36,54
	moderately to not at all important	2	17,50
	Total	71	
Satisfaction with internal innovation activities	very important	70	37,19
	moderately to not at all important	2	12,50
	Total	72	
Satisfaction innovation procurement recoded	very important	47	24,94
	moderately to not at all important	1	4,00
	Total	48	
Satisfaction innovative suppliers recoded	very important	49	25,97
	moderately to not at all important	1	2,50
	Total	50	
Satisfaction MS w customers recoded	very important	37	19,00
	Total	37[a]	
Satisfaction innovation w customers recoded	very important	51	26,00
	Total	51[a]	
Satisfaction internal innovation activities recoded	very important	47	24,93
	moderately to not at all important	1	4,50
	Total	48	

a. There is only one non-empty group. Kruskal-Wallis Test cannot be performed.

Test Statistics[a,b]

	Estimated number of innovations developed with all suppliers last 3 yrs	Estimated % of turnover from innovations developed with all suppliers last 3 yrs	Innovations with supplier interaction are beneficial for our company	Innovations with supplier interaction are beneficial for the natural environment	Innovations without supplier interaction are beneficial for our company	Innovations without supplier interaction are beneficial for the natural environment	Innovations with suppliers are beneficial for the natural environment recoded	Innovations without suppliers are beneficial for the natural environment recoded	Satisfaction with procurement with innovative suppliers	Satisfaction with innovation with innovative suppliers	Satisfaction with marketing&sales with innovative customers	Satisfaction with innovation with innovative customers	Satisfaction with internal innovation activities	Satisfaction innovation procurement recoded	Satisfaction innovative suppliers recoded	Satisfaction internal innovation activities recoded
Chi-Square	,060	1,265	2,793	3,036	,044	,837	7,000	1,263	3,498	4,514	,737	2,107	3,196	5,857	11,500	5,000
df	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	,806	,261	,095	,081	,833	,360	,008	,261	,061	,034	,391	,147	,074	,016	,001	,025

a. Kruskal Wallis Test

b. Grouping Variable: Trust with innovative Suppliers - recoded

Chapter 8: Survey II – Key Variables & Best-Practises
§8.2 Round-Table Discussion Formats and Results

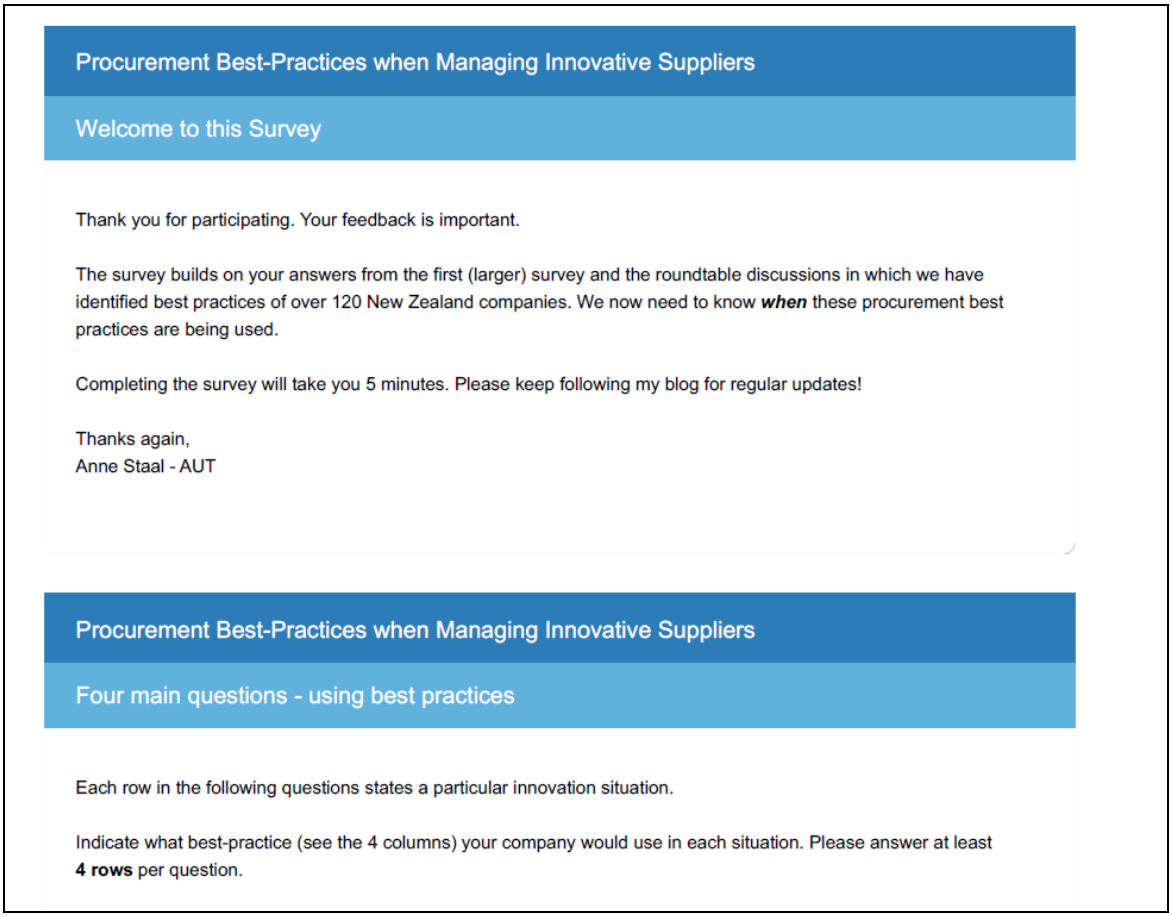
Table 123: Negotiate-contract: findings from roundtable discussion

	Negotiating & contracting: PRACTICES with innovative suppliers				
VARIABLES	Our supplier negotiations focus on managing risks ??=3;NO=8;YES=2	Our supplier negotiations focus on opportunities ??=7;NO=5;YES=2	We reward innovative suppliers f successful innovations ?? =6;NO=3;YES=5	Our supplier negotiations focus on total costs ??=7;NO;YES=4	We focus on formal written contracts ??=5;NO=6;YES=3
when we are mainly in IDEA phase	**NO**	YES	YES	**NO**	**NO**
when we are mainly in DEVELOP phase	??	YES	**NO**	**NO**	??
it is more for a PRODUCT innovation	**NO**	??	YES	??	**NO**
it is more for a PROCESS innovation	YES	??	YES	**NO**	**NO**
it is more with a RADICAL innovation	YES	**NO**	??	??	**NO**
it is more with an INCREMENTAL innovations	**NO**	**NO**	YES	??	YES
when GREEN rating is important	**NO**	??	??	YES	**NO**
when GREEN rating not so important	**NO**	??	??	YES	??
when QUALITY is more important	??	**NO**	??	??	YES
when COST is more important	**NO**	**NO**	**NO**	YES	??
when we mainly deal w. NEW suppliers	**NO**	??	??	??	??
when we mainly deal with w. CURRENT suppliers	**NO**	??	YES	??	**NO**
when we mainly deal w. FOREIGN suppliers	??	**NO**	**NO**	??	YES
when we mainly deal w. DOMESTIC suppliers	??	??	??	YES	??

Table 124: Manage-relations: findings from roundtable discussion

	Manage relations: PRACTICES with innovative suppliers				
VARIABLES	We build trust and strong ties with innovative suppliers; ??=4;NO=5;YES=5	Innovative suppliers are always involved early in innovation processes ??=5;NO=8;YES=1	Relations with innovative suppliers focus on delivery of a specific innovative product ??=4;NO=8;YES=2	**We mainly use contracts to manage innovative suppliers** ??=2;NO=5;YES=7	**Relations with innovative suppliers are based on trust and mutual goals** ??=4;NO=5;YES=5
when we are mainly in IDEA phase	??	YES	**NO**	??	??
when we are mainly in DEVELOP phase	YES	??	??	??	??
it is more for a PRODUCT innovation	YES	??	??	YES	**NO**
it is more for a PROCESS innovation	??	??	**NO**	YES	??
it is more with a RADICAL innovation	YES	??	??	**NO**	YES
it is more with an INCREMENTAL innovations	??	**NO**	??	YES	**NO**
when GREEN rating is important	**NO**	??	**NO**	**NO**	YES
when GREEN rating not so important	**NO**	**NO**	**NO**	YES	**NO**
when QUALITY is more important	**NO**	**NO**	**NO**	**NO**	YES
when COST is more important	??	**NO**	YES	YES	**NO**
when we mainly deal w. NEW suppliers	**NO**	**NO**	YES	YES	??
when we mainly deal with w. CURRENT suppliers	YES	**NO**	**NO**	**NO**	YES
when we mainly deal w. FOREIGN suppliers	**NO**	**NO**	**NO**	YES	**NO**
when we mainly deal w. DOMESTIC suppliers	YES	**NO**	**NO**	**NO**	YES

§8.3 Questionnaire of online Survey II



Procurement Best-Practices when Managing Innovative Suppliers

Welcome to this Survey

Thank you for participating. Your feedback is important.

The survey builds on your answers from the first (larger) survey and the roundtable discussions in which we have identified best practices of over 120 New Zealand companies. We now need to know ***when*** these procurement best practices are being used.

Completing the survey will take you 5 minutes. Please keep following my blog for regular updates!

Thanks again,
Anne Staal - AUT

Procurement Best-Practices when Managing Innovative Suppliers

Four main questions - using best practices

Each row in the following questions states a particular innovation situation.

Indicate what best-practice (see the 4 columns) your company would use in each situation. Please answer at least **4 rows** per question.

Please note the following:

- Survey results are confidential and cannot be related to your answers or your company.
- Survey results will only be used for academic purposes.
- You must not disclose information that may harm your company, your position or others.
- You have been selected as we assume from information on the Internet that your company has experience in working with innovative suppliers.
- Your participation is voluntarily.
- You may withdraw from the survey at any time.
- Survey results can be beneficial to your company & others as it may give insights in procurement & innovation practices with suppliers.
- Survey results can be beneficial for the PhD researcher as it helps in developing his insights for a PhD project.
- The researcher has extensive industry experience and is involved in Dutch research on procurement in SMEs.
- The research is supervised by Professor John Tookey and Dr. Jeff Seadon of AUT.
- The research is approved by AUT Ethics Committee 15/237.
- Please contact in the first instance the Project Supervisor Professor John Tookey, jtookey@aut.ac.nz, phone 09 21 9999 (ext. 9512) for any concerns regarding the nature of this research.
- Please contact the Executive Secretary of AUTEC, Kate O'Connor, ethics@aut.ac.nz, phone 09 21 9999 (ext. 6038) for any concerns regarding the conduct of this research.
- You can receive survey results, and indicate your interest in the round-table discussion.
- Allow us to send you one or two follow-up emails.
- Please forward the survey link to other interested persons.

You can now start with the survey!

1. Specifying what we need from innovative suppliers

	We focus on the **technology** our supplier provides	We focus on the **economic value** our supplier provides	Our supplier contributes to **functional specifications**	Don´t know, or We Use Other Practices
When we mainly deal with a RADICAL innovation	○	○	○	○
When we mainly deal with an INCREMENTAL innovation	○	○	○	○
When GREEN aspects are most important	○	○	○	○
When QUALITY aspects are most important	○	○	○	○
When COST aspects are most important	○	○	○	○
When we mainly deal with NEW suppliers	○	○	○	○
When we mainly deal with CURRENT suppliers	○	○	○	○
When we mainly deal with DOMESTIC suppliers	○	○	○	○
When we mainly deal with FOREIGN suppliers	○	○	○	○

2. Finding or Selecting Innovative Suppliers

	Our innovative supplier must be **flexible and cooperative**	We use **price and availability criteria** for supplier selection	We **know the resources & capabilities** of our supplier	Don´t know, or We Use Other Practices
When we mainly deal with a RADICAL innovation	◯	◯	◯	◯
When we mainly deal with an INCREMENTAL innovation	◯	◯	◯	◯
When GREEN aspects are most important	◯	◯	◯	◯
When QUALITY aspects are most important	◯	◯	◯	◯
When COST aspects are most important	◯	◯	◯	◯
When we mainly deal with NEW suppliers	◯	◯	◯	◯
When we mainly deal with CURRENT suppliers	◯	◯	◯	◯
When we mainly deal with DOMESTIC suppliers	◯	◯	◯	◯
When we mainly deal with FOREIGN suppliers	◯	◯	◯	◯

3. Negotiating or Contracting Innovative Suppliers

	Our negotiations with innovative suppliers focus on **total costs**	Our negotiations with innovative suppliers focus on **opportunities**	Negotiations with our suppliers focus on managing **risks**	Don´t know, or We Use Other Practices
When we mainly deal with a RADICAL innovation	◯	◯	◯	◯
When we mainly deal with an INCREMENTAL innovation	◯	◯	◯	◯
When GREEN aspects are most important	◯	◯	◯	◯
When QUALITY aspects are most important	◯	◯	◯	◯
When COST aspects are most important	◯	◯	◯	◯
When we mainly deal with NEW suppliers	◯	◯	◯	◯
When we mainly deal with CURRENT suppliers	◯	◯	◯	◯
When we mainly deal with DOMESTIC suppliers	◯	◯	◯	◯
When we mainly deal with FOREIGN suppliers	◯	◯	◯	◯

4. Managing Relations with Innovative Suppliers

	Innovative suppliers are **involved early** in innovation processes	We **build trust and strong ties** with innovative suppliers	Relations with innovative suppliers are **based on mutual goals**	Don´t Know, or We Use Other Practices
When we mainly deal with a RADICAL innovation	◯	◯	◯	◯
When we mainly deal with an INCREMENTAL innovation	◯	◯	◯	◯
When GREEN aspects are most important	◯	◯	◯	◯
When QUALITY aspects are most important	◯	◯	◯	◯
When COST aspects are most important	◯	◯	◯	◯
When we mainly deal with NEW suppliers	◯	◯	◯	◯
When we mainly deal with CURRENT suppliers	◯	◯	◯	◯
When we mainly deal with DOMESTIC suppliers	◯	◯	◯	◯
When we mainly deal with FOREIGN suppliers	◯	◯	◯	◯

5. Company type / profession

- ☐ Residential Builders & Developers
- ☐ Commercial Property Developers
- ☐ Building Contractors
- ☐ Building Product Manufacturers & Distributors
- ☐ Architects & Design
- ☐ Engineers
- ☐ Property & Construction Professionals (e.g. surveyors, consultants, project or facilities managers)
- ☐ Commercial Property Developers
- ☐ Property Owners or Property Occupiers

Your remarks (please specify)

6. The size of our company

- ◯ 0 - 4 employees
- ◯ 5 - 9 employees
- ◯ 10-19 employees
- ◯ 20-99 employees
- ◯ 100-249 employees
- ◯ 250-499 employees
- ◯ more than 500 employees

7. Our main turnover comes from ...

- ◯ Providing services
- ◯ Manufacturing & selling products
- ◯ Wholesale or distribution of products
- ◯ Not relevant or coming from other activities

Your remarks (please specify)

8. Our strategy towards our customers mainly is ...

- ◯ Product Leadership - providing leading edge products or services
- ◯ Customer Intimacy - tailoring the products or services to exactly meet customer demands
- ◯ Operational Excellence - providing reliable services/products at competitive prices

Your remarks (please specify)

Thank you for completing the survey.

All results are anonymous but please leave your name and email address if you want to be updated about this research. Please contact Professor John Tookey (jtookey@aut.ac.nz) or me (astaal@aut.ac.nz) for any questions or remarks. Your comments and feedback are welcome!

9. Please submit your name and email address

Name

City/Town

Email Address

Follow the blog for updates on this research

§8.3 SPSS Codebook on Survey II

Name	Label	Values	Measures
SpecRadIn	Specify for radical innovations	{1, focus on technology}...	Nom.
SpecIncIn	Specify for incremental innovations	{1, focus on technology}...	Nom.
SpecGreen	Specify when green aspects are important	{1, focus on technology}...	Nom.
SpecQual	Specify when quality aspects are important	{1, focus on technology}...	Nom.
SpecCost	Specify when cost aspects are important	{1, focus on technology}...	Nom.
SpecNwSup	Specify with new innovative suppliers	{1, focus on technology}...	Nom.
SpecCuSup	Specify with existing innovative suppliers	{1, focus on technology}...	Nom.
SpecDomSup	Specify with New Zealand innovative suppliers	{1, focus on technology}...	Nom.
SpecForSup	Specify with foreign innovative suppliers	{1, focus on technology}...	Nom.
FSRadIn	Find & select for radical innovations	{1, supplier must be flexible and cooperative}...	Nom.
FSIncIn	Find & select for incremental innovations	{1, supplier must be flexible and cooperative}...	Nom.
FSGreen	Find & select when green aspects are important	{1, supplier must be flexible and cooperative}...	Nom.
FSQual	Find & select when quality aspects are important	{1, supplier must be flexible and cooperative}...	Nom.
FSCost	Find & select when cost aspects are important	{1, supplier must be flexible and cooperative}...	Nom.
FSNwSup	Find & select with new innovative suppliers	{1, supplier must be flexible and cooperative}...	Nom.
FSCuSup	Find & select with existing innovative suppliers	{1, supplier must be flexible and cooperative}...	Nom.
FSDomSup	Find & select with New Zealand innovative suppliers	{1, supplier must be flexible and cooperative}...	Nom.
FSForSup	Find & select with foreign innovative suppliers	{1, supplier must be flexible and cooperative}...	Nom.
NCRadIn	Negotiate & contract for radical innovations	{1, negotiations focus on total costs}...	Nom.
NCIncIn	Negotiate & contract for incremental innovations	{1, negotiations focus on total costs}...	Nom.
NCGreen	Negotiate & contract when green aspects are important	{1, negotiations focus on total costs}...	Nom.
NCQual	Negotiate & contract when quality aspects are important	{1, negotiations focus on total costs}...	Nom.
NCCost	Negotiate & contract when cost aspects are important	{1, negotiations focus on total costs}...	Nom.
NCNwSup	Negotiate & contract with new innovative suppliers	{1, negotiations focus on total costs}...	Nom.

Name	Label	Values	Measures
NCCuSup	Negotiate & contract with existing innovative suppliers	{1, negotiations focus on total costs}...	Nom.
NCDomSup	Negotiate & contract with New Zealand innovative suppliers	{1, negotiations focus on total costs}...	Nom.
NCForSup	Negotiate & contract with foreign innovative suppliers	{1, negotiations focus on total costs}...	Nom.
MRRadIn	Manage relations for radical innovations	{1, we involve suppliers early}...	Nom.
MRIncIn	Manage relations for incremental innovations	{1, we involve suppliers early}...	Nom.
MRGreen	Manage relations when green aspects are important	{1, we involve suppliers early}...	Nom.
MRQual	Manage relations when quality aspects are important	{1, we involve suppliers early}...	Nom.
MRCost	Manage relations when cost aspects are important	{1, we involve suppliers early}...	Nom.
MRNwSup	Manage relations with new innovative suppliers	{1, we involve suppliers early}...	Nom.
MRCuSup	Manage relations with existing innovative suppliers	{1, we involve suppliers early}...	Nom.
MRDomSup	Manage relations with New Zealand innovative suppliers	{1, we involve suppliers early}...	Nom.
MRForSup	Manage relations with foreign innovative suppliers	{1, we involve suppliers early}...	Nom.
ComType	Profession of respondent	{1, Residental builders and Developers}...	Nom.
Turnover	Sources of our turnover ...	{1, providing services}...	Nom.
CustStrat	Customer value proposition	{1, Product Leadership - Providing leading edge products or services}...	Nom.
CompSize_Small _Large_recoded	Company Size recoded into small and large	{1.00, small: 1 - 19 staff}...	Nom.

§8.4 Supplier-innovation Variables and Best-Practices

The chart below shows the variety in the specify-needs procurement step. (*N*=33).

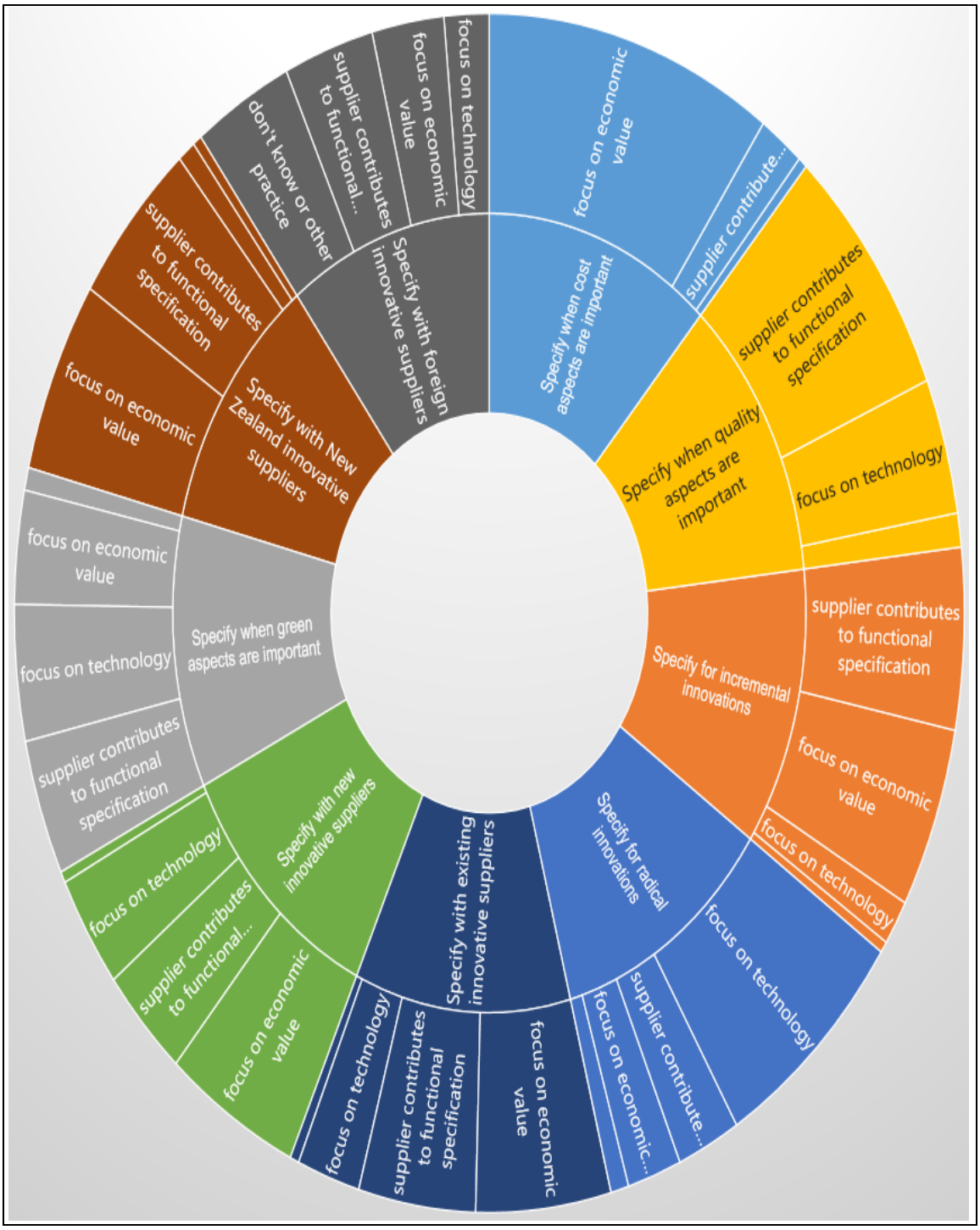


Figure 11: Visualisation supplier-innovations (inner) & specify-needs practices (outer circle)

The chart below shows varying preferences for the four find-select practices with the nine supplier-innovation variables. (*N*=33).

Figure 12: Visualisation supplier-innovations (inner) & find-select practices (outer circle)

The pie chart below shows varying preferences for the four negotiate-contract practices with the nine supplier-innovation variables. (*N*=33).

Figure 13: Visualisation supplier-innovations (inner) & negotiate-contract practices (outer circle)

Finally, the chart below shows varying preferences for the four manage-relations practices with the nine supplier-innovation variables. (*N*=33).

Figure 14: Visualisation supplier-innovations (circle) & manage-relations practices (outer circle)

Chapter 10: Conclusions, Limitations, and Implications

10.4 Limitation on Execution of the Research

10.4.3 On the Sample Size and Response Rate of Survey I

Text books and experts generally prefer a minimum response rate of 12%. For example Bassioni et al. (2005) mentioned a minimum response rate of 10%; Kumar (2012) mentioned that 12-15% was appropriate for statistical testing; Saunders et al. (2009) mentioned that a response rate of 11% was acceptable for online surveys. The necessary response rate (and sample size) also depends on the business context (conventions) and purpose of the research (Cramer & Howitt, 2004: 144).

Table 125: Comparable SME Surveys (company size; population & samples sizes; response rates)

Authors	Topic	Country	SME size	N	n	%
Adams (2004)	SME procurement maturity	US	1-500	1560	185	12%
Ahn et al. (2015)	Collaboration open innovation	KR	avg. 28	3000	306	10%
Arend & Wisner (2005)	Strategy & Supply Chain Mgmt	US	1-500	5470	421	7%
Cambra & Polo (2008)	Type of supplier relationship	ES	1-99	950	211	22%
De Waal (2011)	Open innovation tools	NZ	1-100	566	99	17%
Esbjerg (2012)	Diffusion open innovation practices	DK	5-499	3540	355	10%
Kumar (2012)	Collaboration supplier-SME buyers	UK	1≥350	850	112	13%
Morrissey&Pittaway(2004)	Procurement Maturity	UK	1-250	1129	190	16%
Nitzsche et al. (2016)	Open inbound innovation	DE	n.a.	5048	496	10%
Paik (2014)	SME procurement maturity	US	1-500	1170	230	20%
Pressey et al. (2009)	Strategic Procurement & Relations	UK	1-250	750	97	13%
Quayle (2002)	Strategic Procurement & Relations	UK	1-250	400	232	58%
Ritvanen (2008)	Procurement maturity and tools	FI	1-250	546	94	17%
Spithoven et al. (2012)	Open innovation sourcing & scouting	NL	1-250	1427	792	55%
Knudsen & Servais (2007)	International sourcing	DK	1-250	1229	94	8%
Villiers et al. (2014)	Entrepreneurship in small firms	NZ	10-100	2000	320	16%
Vörösmarty (2015)	Green procurement adoption	HU	1-250	n.a.	102	"low"
Zabala (2012)	Open innovation in low tech firms	ES	1-250	1200	136	11%
Weighted average %[15] Unweighted average %				2011	231	**W**=11.5% **U**=13.6%

The above Table shows topic, country, company sizes, target-populations, sample sizes and response rates from comparable procurement and open innovation research. These response rates and sample sizes varied considerably. In some instances, authors used their survey as a single mode method, in other

[15] Quayle and Spithoven were excluded as they used a permanent network. Vörösmarty was excluded due to missing data.

instances surveys were complemented by interviews. In several instances (e.g. Cambra & Polo, 2008) the method of data collection remained unclear.

It could be argued that SME professionals in low-tech industries were not interested in completing procurement surveys nor in learning from surveys (e.g. Axelsson & Larsson, 2002). Similarly, it could be argued that especially smaller companies had less resources and skills available for completing surveys and learning from surveys. Alternatively, company failure rates (Paxson, 1995) or outdated Internet contact details would yield lower response rated. (Note that the population size decreased from *n*=1,491 to *n*=1,097 due to this aspect; this 18% reduction in available addresses affected the nett response rate). (§3.6.4.1).

It could be argued that New Zealand SME response rates could be lower than e.g. in Europe or the US, as the average New Zealand company size was smaller and as industry-academia interaction seemed lower. Research in low-tech industries also suggested lower response rates (e.g. Zabala, 2012).

However, the above-mentioned Table also revealed that Adams (2004; with US large-size SMEs) had a lower response rate than De Waal (2011; with small-size New Zealand SMEs). For his small business innovation research in New Zealand De Waal (2011: 104) worked with a dataset of 99 innovative companies (1-100 staff) which equated a response rate of 17.5% (De Waal, 2011: 79). He explained (ibid: 79) the small dataset by stating "*New Zealand is a small country*". In the North-American context, Adams (2004: 117) on SME procurement PhD research (1-500 staff) worked with a dataset of 185 cases and generated a response rate of 11.8%. In her PhD research Ritvanen (2008) in Finland used a sample size of 94 respondents with a response rate of 17%. Adams and Ritvanen both focused on quantitative research and did not use a mixed-mode approach. However, De Waal combined his Survey study with case studies.

Nevertheless, a higher response rate would have reduced the margin of error and would have enable the use of parametric tests. A basic online statistics calculator indicated that a population of N=1,097 and a confidence level of 95% with N=112 respondents yield a margin of error of 8.8%. Non-normal distributions are more sensitive to size-effects. Hence the researcher preferred larger sub-samples (n≥30) to neutralise for any non-normality. To be externally valid, this research preferred a margin of error of 10%. This would mean that any statistically-significant difference must be higher than 20% to be practically significant for the larger population (Muller et al., 2009: 302; Cramer & Howitt, 2004).

Note that throughout Chapter 6, the research applied a lower cut-off of ≥10% for analysing potentially-relevant differences among procurement practices. Similarly, the research applied cut-offs of ≥15% and ≥20% for identifying significant relations in the Tables in §6.5 and §7.8. The objectives of these cut-off strategies was to reveal potentially-relevant practices or relations.

A higher sample size would also have enabled the use of parametric tests that have more power. This would have resulted in lower levels of Type II errors and a higher validity of the statistical effects.

Forsgren (1989) suggested that response rates on (mail) Surveys vary with perceived relevance and the respondent's knowledge about the topic. Response rates tend to be lower with larger online questionnaires. SurveyMonkey (2017) recommended a maximum of 10 questions or necessary completion time of 5-10 minutes. As described in §3.6, Survey I contained 32 questions and 54.2% of respondents had a completion time of less than 20 minutes. The research à priori had estimated and communicated that completing Survey I would take 15-20 minutes. Naturally, time-pressed business professionals would not invest their time on surveys they did not considered relevant. Grant *et al.* (2005: 151) mentioned the fact that internet users become hesitant to use email links. They would fear that a virus could infect their computer. Grant (ibid) mentioned 11% response rates for their web-based Surveys.

Comments from Survey I respondents

	Q32 - Add your comments on this survey
1	Survey seems very broad and interpretation might vary dependent on the industry.
2	nn

3	The biggest challenge for any new company in new zealand is capital . We would like to sell these innovative products world wide but again capital slows this process The big companies could benefit themselves and the new zealand housing market by being more of a big brother
4	The answers have been made as a consultant helping other companies on their innovation path.
5	Happy to participate. Need further collaboration => please ask.
6	I had found question/point 27 a) an irrelevant and poorly worded question to answer and not answering it was not possible.
7	To be honest I don't think you are going to get a high level of accuracy with this survey for the simple reason that "innovation" is a somewhat subjective term. Also the option of an N/A for some selections would have been much more appropriate. Otherwise all the best with your research.
8	Its great to encourage innovation. However, I have seen some great innovations achieve sub-optimal outcomes due to poor planning and manigerial support (people, processes and systems0 of implimentation and operational stages
9	Thanks for the workings.
10	Contact per phone could also be: (see below)