

## **Business model innovation: a temporal perspective**

*Full Research*

Niamh O Riordan  
UCD School of Business  
University College Dublin  
Dublin 4, Ireland  
Email: niamh.oriordan@ucd.ie

Philip O'Reilly  
Department of Accounting, Finance and Information Systems  
University College Cork,  
Cork, Ireland  
Email: philip.oreilly@ucc.ie

Aidan Duane  
Business Information Systems  
Waterford Institute of Technology  
Waterford, Ireland  
Email: aduane@wit.ie

Pavel Andreev  
Telfer School of Management  
University of Ottawa  
Ottawa, Canada  
Email: andreevil@gmail.com

### **Abstract**

*Recent years have seen an explosion in the number of academic and practitioner-oriented publications on business models and business model innovation. Indeed, companies that traditionally focused on product and service innovation, are turning toward business model innovation as an alternative or complement to product or process innovation. Nevertheless, companies struggle to innovate the business models through which commercialisable new ideas and technologies will pass. At the same time, the literature remains skewed toward product and process innovation rather than business model innovation. This paper highlights the need for a temporal view of the business model innovation process and proposes a conceptual model of the business model innovation process to enable organizations to identify, model and prioritise potential business models for their technological innovation. It also develops a prioritisation framework to be used for ranking alternative business models, which serves as an input towards developing an IT-based business model decision support system.*

### **Keywords**

Business model innovation process, ideation, evaluation, prioritisation

## INTRODUCTION AND MOTIVATION

Whenever a business enterprise is established, it either explicitly or implicitly employs a particular business model (Teece, 2010), a particular approach to generating revenue at a reasonable cost that is based on assumptions about what customers want and how they want it, and on how the enterprise can best meet those needs, and get paid for doing so (Teece, 2010). Thus, it is increasingly recognised that companies with well-formulated and innovative business models can use them to gain competitive advantages that result in higher profits than competitors (Afuah and Tucci, 2001). In recent years, there has therefore been an explosion in both the number of academic and practitioner-oriented publications on business models (Zott et al., 2011) and business model innovation (Chesbrough, 2010).

Significant definitional ambiguity surrounds the concept of business model (Zott et al., 2011). Initially, business models were defined in general terms. For example, Rappa (2000) defines a business model as “*the method of doing business* by which a company can sustain itself, that is, generate revenue” and develops a business model classification based on observable models present on the net e.g. brokerage, intermediary. Similarly, Timmers (1999) defines a business model as “*an architecture* for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenues”. More recently, authors have argued that business models are based on particular assumptions about how a given firm will create and capture value (Gambardella and McGahan, 2010) and have defined business models in more abstract or conceptual terms. For example, Osterwalder et al. (2005) define a business model as “*a conceptual tool* that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams”. Similarly, Amid and Zott (2012) define a company’s business model as a *system of interconnected and interdependent activities* that determines the way the company “does business” with its customers, partners and vendors. In this view, a business model is a bundle of specific activities - an activity system - conducted to satisfy the perceived needs of the market, along with the specification of which parties (a company or its partners) conduct which activities, and how these activities are linked to each other.

Whilst all firms may indeed have business models (Teece, 2010), legendary firms that shape their industry structures are in fact business-model innovators that organize themselves and their interactions with customers and suppliers in unprecedented ways (Gambardella and McGahan, 2010). In addition, it is increasingly agreed that the same idea or technology taken to market through two different business models will yield two different economic outcomes (Chesbrough, 2010). For these reasons, companies that traditionally focused on product and service innovation, are turning toward business model innovation as an alternative or complement to product or process innovation (Amit and Zott, 2012). Furthermore, many organizations are now re-evaluating their business models on an on-going basis with their dynamic nature serving a transformational approach bringing about innovation within the organization itself (Demil and Lecocq, 2010). According to Casadesus-Masanell and Ricart (2011), seven out of ten companies are trying to create innovative business models, and 98% are modifying existing ones. Further, a recent global survey of more than 4,000 senior managers by the Economist Intelligence Unit found that the majority (54%) favoured new business models over new products and services as a source of future competitive advantage (Amit and Zott, 2012). This trend has also been partly driven by recent advances in communication and information technologies, such as the emergence and swift expansion of the Internet and the rapid decline in computing and communication costs which have offered scope for the creation of unconventional exchange mechanisms and transaction architectures (Amit and Zott, 2001). In turn, a significant number of scholars are now focusing on business model innovation as a key determinant of business performance (Chesbrough, 2003; Chesbrough, 2010) and a vehicle for corporate transformation and renewal (Zott et al 2011).

Notwithstanding this interest, companies often have little if any ability to innovate the business models through which commercialisable new ideas and technologies will pass (Chesbrough, 2010). This is at least partly due to the cognitive inability of managers to understand the potential value of a new business model (Bouchikhi and Kimberly, 2003; Chesbrough, 2010). At the same time, discussions in the literature remain skewed toward product and process innovation (O Riordan, 2011; O’Sullivan and Dooley, 2008) rather than business model innovation (Crossan and Apaydin, 2010). Further, much of the literature on business models continues to focus on defining business models (Timmers 1999; Osterwalder et al., 2005) and their constituent elements (Osterwalder et al., 2005; Chesbrough 2010) or on developing descriptive tools to visualize these components such as The Business Model Canvas (figure 1; Osterwalder and Pigneur, 2010). These tools have explanatory powers and are useful in explaining retrospectively why many ventures fail while others have been successful. However, they overlook the temporal dynamics of the business model innovation process and do not, in and of

themselves, provide a process map for organizations wishing to engage in biness model innovation (O Riordan et al., 2013; O Riordan et al., 2012; O Reilly et al., 2014).

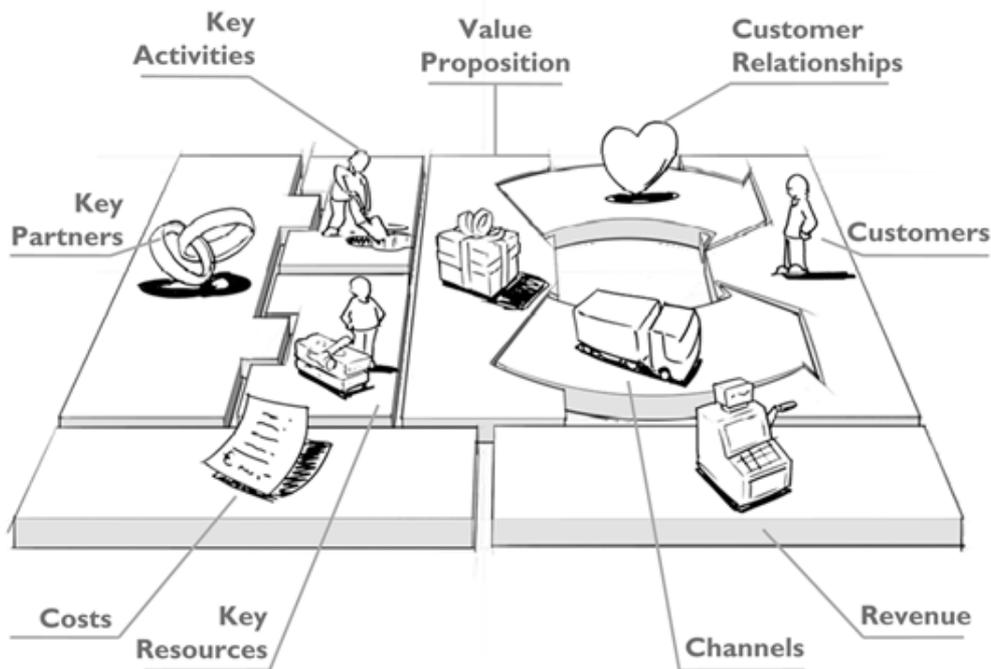


Figure 1: Osterwalder's business models canvas

This paper strives to make a number of contributions to theory and practice. First, it highlights the need for a more temporal view of the business model innovation process. Second, it explores the factors impacting upon business model innovation. Third, it develops a conceptual model of the business model innovation process to enable and facilitate organizations in identifying, evaluating, modelling and prioritizing potential business models. Fourth, it proposes a prioritisation framework to be used for ranking alternative business models in practice.

## THE BUSINESS MODEL INNOVATION PROCESS

This section presents a conceptual model of the business-model innovation process (see Figure 2). At a high level, the model recognises business model innovation as a form of innovation (cf. Crossan and Apaydin, 2010). For this reason, its composition is consistent with a number of well established innovation process models (e.g. Bernstein and Singh, 2006). More specifically, the model proposes that the business-model innovation process is composed of three phases (ideation, evaluation and prioritisation) and that each phase is associated with particular activities that lead to the production of particular deliverables that are in turn used to inform decision making throughout the business model innovation process. Whilst recognising that in practice, these phases may be neither fully discrete nor sequential, the dotted lines in the figure indicate that organizations should make explicit go/no-go decisions (represented in the figure using decision diamonds) based on the consistent application of clear selection criteria about particular business model concepts during each phase. This recommendation corresponds with Cooper's (1988) stage-gate perspective of decision making within the new product development process and is reflective of the management of the organizational innovation process (O'Sullivan and Dooley, 2008; Crossan and Apaydin, 2010). The model also incorporates a number of unique features designed to enhance its overall utility. For example, the model explicitly identifies a number of key strategies, tactics and tools that can be used by organisational stakeholders during each phase of the business model innovation process. From an IS perspective, the model itself has also been designed to provide a platform to build effective software-based business-model innovation support tools. The following subsections develop each of the four stages of the proposed process framework presented in Figure 2.

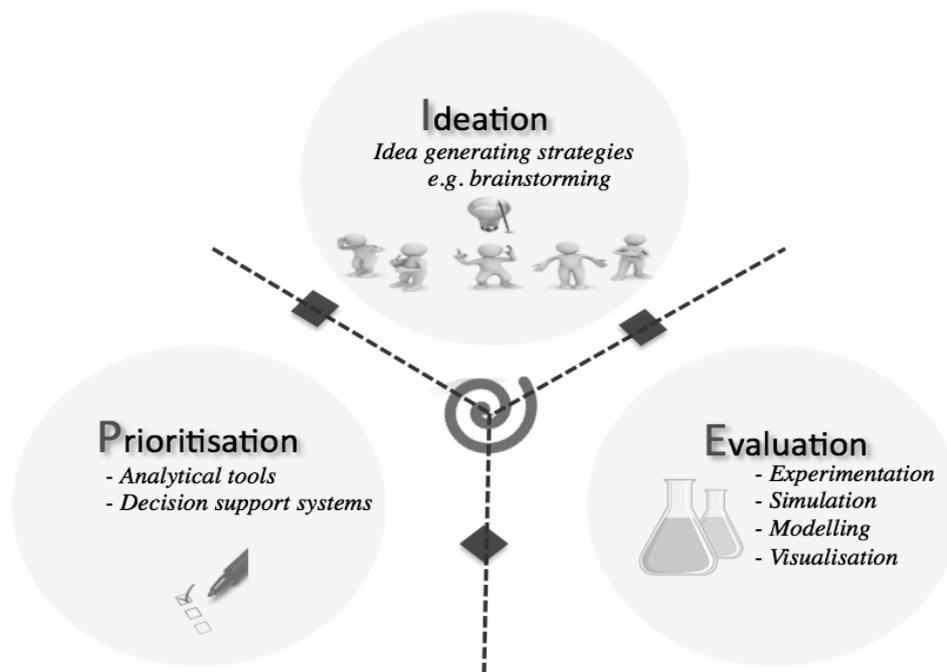


Figure 2: Conceptualising business model innovation as a process

### Phase 1: Ideation

In terms of the overall innovation process literature, the ideation phase corresponds with what has been referred to in the innovation process literature as the “fuzzy front end” of the innovation process, where ideas are created and selected (Montoya-Weiss and O’Driscoll, 2000). When it comes to business model innovation, the ideation phase involves in engaging in particular activities that lead to the identification of potential value activities which the organization can provide to market. These value activities pertain to the creation of a company’s products and services (Osterwalder et al 2005; see also Casadesus-Masanell and Ricart, 2011) and according to Amit and Zott (2012), this process can lead to the identification of (i) novel value activities, (ii) novel combinations of activities, or (iii) the reallocation of activities (or combinations of activities) to different parties. The significance of the ideation phase of business model innovation is that value activities not considered at this stage are unlikely to be considered in the future (cf. Adam and Pomerol, 2008). Further, opportunities for business model innovation are greatest during this phase of the process because the manner in which new opportunities are framed (cf. Tversky and Kahneman, 1981) at this time will fundamentally condition all subsequent decision making (Adam, 2008; Daly et al., 2008). For this reason, the objective at this phase of the process is to “cast the search-net” as wide as possible and expose the organization to an array of alternative business models and it is therefore important that business model innovators make every effort to maximise idea generation at this stage.

In terms of *stimulating ideation*, three main strategies exist (Robbins and Judge, 2006). In the individual method, individuals work alone. In the team-based method, group members work together as a team. In the hybrid approach, individuals first work alone and then work together (ibid) in what are known as nominal groups (Dennis and Valacich, 1993). In terms of effectiveness, the hybrid approach has been found to be the most effective, resulting not only in more ideas, but better ideas as well (Girotra et al. 2010). In terms of *supporting ideation*, the application of ICT to support the creative process can facilitate interaction across geographic boundaries (Finholt and Olson, 1997), develop individual’s knowledge by exposure to new ideas and routines of operation (Brennan and Dooley, 2005) and enhance motivation to challenge the existing organizational status quo. Indeed, previous empirical studies have found that large computer-based groups may in fact outperform groups using the hybrid approach for brainstorming activities (Dennis and Valacich, 1993). As a result, a number of creativity tools have been specifically designed (e.g. Forgiionne and Newman, 2007). According to Shneiderman (2002), these tools should be designed to support searching and browsing, consulting with peers and mentors, visualizing data and processes, thinking by free association, exploring ‘what if’ possibilities, reviewing and replaying session histories and disseminating results. Similarly, when identifying the functional requirements that would underpin a system to support networked creativity, Brennan and Dooley (2005) identify a number of functional requirements (Table 1).

Table 1. Adapted from Brennan and Dooley (2005)

Framework of Networked Creativity Functional Requirements	
Req 1	To support new knowledge creation and creative idea generation through the provision of relevant tools and information systems, to allow employees access to critical business information, in order to make better decisions. Such tools will facilitate effective communication and employee empowerment
Req 2	Tools and infrastructure that assist in expanding the world-view and assist in breaking perceptual and cognitive sets.
Req 3	Tools that support both the behaviourist and the genius view and also contribute to the creation of an organisational environment that is supportive of creativity.
Req 4	Processes that support and encourage employee engagement and provide an infrastructure that reflects the stages of the creative process
Req 5	Provide an organisational environment that empowers, nurtures and supports employees in their creative initiatives.
Req 6	Train and educate employees in the need to be empowered and creative.
Req 7	Provide support for individual preferred learning styles.

In applying such logic to the generation of potential value activities for a new Business Model and adopting the approach utilized by Girotra et al. (2010), the following method is proposed to identify and generate potential value activities.

- i) Participants are informed of the scope and set the task of researching potential business models in use in the market-place. In doing so, participants should try to identify (a) novel value activities, (b) novel combinations of activities, or (c) the reallocation of activities (or combinations of activities) to different parties (cf. Amit and Zott, 2012)
- ii) Each individual submits their ideas around potential value activities, together with an assessment of the perceived value contribution of each activity. This can be assessed, according to Amit and Zott (2001) by considering the novelty, lock-in, complementarities and efficiency of each proposal.
- iii) Next, groups are created to permit participants share and discuss the specifics of proposed business models, identify synergies and explore the relative fit with both the predefined task scope and the overall organizational product/service portfolio.

As an output of this collective ‘mulling-over’, we propose that a single unranked listing of the various business model value activity concepts is created. In particular, we propose that for each option, business model innovators explicitly state how the organisation and its partners plan to generate revenue from it and that all concepts deemed of potential value are then progressed to phase 2 for more detailed evaluation. In terms of making an explicit go/no-go decision, we propose that participants assess the perceived likelihood that significant opportunities to identify (i) novel value activities, (ii) novel combinations of activities, or (iii) the reallocation of activities (or combinations of activities) to different parties have been overlooked.

## Phase 2: Evaluation

While the objective of the ideation phase is to expose the organization to the maximum spectrum of potential business model value activities, the evaluation phase strives to evaluate these potential value activities. In this phase of the process, the evaluation is done at the level of an individual business model proposal. The conceptual model suggests three main strategies can be used to facilitate this evaluation: visualisation, experimentation and systematic analysis.

- i) *Visualisation* techniques have been used extensively by business model innovators during the innovation process (cf. Osterwalder et al, 2005) and will not therefore be discussed in detail here. Visualisation is known to support strategic thinking in that it reduces cognitive load, offloads short-term memory, helps focus discussion, and facilitates the creation of inferences (Bresciani and Eppler, 2009).
- ii) *Experimentation* is also widely used in practice. Indeed, Sosna *et al.* (2010) argue that an emerging dynamic perspective sees business model development as an initial experiment followed by constant

revision, adaptation and fine tuning based on trial-and-error learning. The importance of experimentation and trial-and-error learning is highlighted by Chesbrough (2010) who argues that “active tests to probe nascent markets with new potential configurations of the elements of a business model can allow a firm to learn ahead of the rest of the market” (p. 359).

- iii) *Systematic analysis*: where visualisation and experimentation are already commonly used in practice, the conceptual framework also proposes that business model innovators should systematically analyse the fit between proposed value activities and the organisation.

According to Casadesus-Masanell and Ricart (2011), business model innovators should assess the extent to which a potential business model is aligned with company goals, is self-enforcing and is robust in terms of its capacity to fend off threats such as imitation and substitution. More generally, business model innovators should assess the appropriateness of each potential model for the focal firm and the environment within which the focal firm is embedded. According to Contingency Theorists, this is because organizations are most effective when the design of their structures and processes is internally coherent and matches their environment (cf. Lawrence and Lorsch, 1967; Child, 1972; Galbraith, 1977). Indeed, a variety of factors have been shown to affect business performance, including environmental uncertainty (O Riordan et al., 2014), organizational structure (e.g. Mintzberg 1979; Meijard et al., 2005), product quality (e.g. Eisenhardt and Martin, 2000), access to scarce resources (e.g. Arrow, 1974), corporate culture and management skills (e.g. Buzzell and Gale, 1987). Ultimately, however, organisations should strive to maximise “performance outcomes by minimizing the misfit between diverse environmental demands and internal organizational arrangements, which in turn required maximizing the benefits of organizational differentiation and minimizing costs of integration” (Sinha and Van de Ven, 2005, p. 395).

For these reasons, we propose that potential business models should be evaluated with reference to a variety of competing factors including potential fit with the organization, potential fit with potential supply chain/value chain, potential fit with existing product and service portfolios, risk exposure and relative ability to capture value for the organization (O Reilly et al., 2014). To facilitate this analysis, the conceptual model suggests that business model innovators focus on three key factors: organisational knowledge, organisational capacity, organisational network (see Table 2). The output of this phase will ultimately be determined by the type of analysis that is conducted but an explicit go/no-go decision should again be made based on participants’ subjective evaluations of the completeness of the analysis.

Table 2. Business model evaluation criteria

	Theoretical grounding	Potential issues to consider
<b>Organisational Knowledge</b> <i>The background and expertise of an organisation’s personnel</i>	Cohen & Levinthal (1990)	The perceived capacity of the organisation to leverage its existing knowledge in order to create and appropriate the skills and knowledge needed to deliver the proposed product/service
<b>Organisational Capacity</b> <i>The ability of an organisation to bring the product/service to market in a timely manner</i>	Eisenhardt & Martin (2000) O’Reilly & Finnegan (2010)	The perceived capacity of the organisation to deliver the proposed product/service including its capacity to absorb both sunk costs and operating costs
<b>Organisational Network</b> <i>The entities with which the organisation cooperates within the ecosystem, including the customers who utilise the organisation’s products and services</i>	Osterwalder et al (2005) Porter (1980)	The perceived capacity of the organisation to leverage its current and potential future network to deliver either the proposed product or service or to deliver complementary services. This analysis should be based upon an analysis of the likely impact the proposed offering on existing market offerings and market agents in terms of value generation, risk exposure and future bargaining power

### Phase 3: Prioritisation

Girotra et al. (2010) note that all innovation processes involve the identification of numerous opportunities before selecting a few which it will pursue. Few, if any organisations have infinite resources and therefore must select amongst these alternatives to prioritise the business models which they wish to prioritise. Nevertheless, the extant business models literature does not include a theoretical lens for such prioritisation. For this reason, the conceptual model explicitly includes a prioritisation phase, where a comparative (rather than individual) assessment of potential business models is conducted.

During this prioritisation phase, business model innovators must evaluate competing proposals with reference to multiple criteria. To facilitate this analysis, we propose that a multi-attribute utility tool should form part of an IT-based business model decision support system. For this reason, we propose that business model innovators make use of a weighted decision matrix where a given number of options can be scored according to a predetermined list of weighted criteria (Ward & Peppard, 2002). This approach has several advantages. First, this approach enables business model innovators to explicitly incorporate a number of selected different criteria or equations into their analysis and to construct a simple matrix structure that can evolve to a more complex model depending on the detail of the analysis required (Green and Wind, 1973; Min, 1994). Second, by making the machinations of the prioritisation phase explicit, business model innovators are able to reflect on previously considered business models, thereby ensuring a level of longitudinal decision making. Finally, this approach is based on and guided by Multi-Attribute Utility Theory (MAUT), a quantitative technique used to rank or prioritise various options with multiple dimensions (Green and Wind, 1973; Zionts, 1979; Saaty, 1980).

In particular, we propose that business model innovators choose criteria that are appropriate for their particular contexts and then systematically apply those criteria across all potential business models. These criteria should be business value driven and may include measures of strategic impact, increased revenue, reduced costs, intangible benefits, business risk mitigation and IT efficiency (Application Executive Council, 2009). The criteria should also be weighted by business model innovators according to their perceived criticality for the focal firm. Given the turbulence of the external environment, the relative importance of decision criteria can alter; thus applying a relative weighting to each criteria allows an organization prioritise certain criteria more than others to reflect their 'current' importance. The following example (table 3) illustrates the power and simplicity of this approach and its potential utility during the prioritisation process.

Table 3. A Decision Making Matrix Example

Criterion	Weight	Project A		Project B		Project C		Project D	
		Score	Weighted Score						
C1	1	3	3	1	1	5	5	1	2
C2	2	4	8	4	8	5	10	4	8
C3	1	4	4	3	3	3	3	1	1
C4	2	1	2	3	6	4	8	4	8
C5	4	4	16	3	12	2	8	5	20
Totals:			<b>33</b>		<b>30</b>		<b>35</b>		<b>39</b>

In this example, four projects (projects A-D) need to be prioritized. Five criteria, C1 to C5, have been selected against which each project will be assessed. The importance of each criterion has been identified by allocating a weighting between 1 and 5 with 5 being the highest. It is clear that C5 is deemed by the organization as important as it has been allocated the highest weighting. Each project has then been scored based on its level of alignment with the criterion in question. Weighted scores have then been calculated by multiplying this score value by the assigned criteria weighting. Once values have been inputted for all decision criteria and business model options, then a Total Score for each option is calculated. In the example (table 3), the results illustrate that by analysing the total weighted scores allocated to each project, organizational prioritization indicates preference towards project D, followed in a reduced preference by project C, project A and finally project B.

### CONCLUSION

This paper highlights the need for a more temporal view of the business model innovation process and therefore develops a three phase innovation process framework to enable and facilitate organizations in identifying, evaluating, modelling and prioritizing potential business models relating to IT innovations. The need for such a process-oriented model was abundantly clear upon reviewing extant literature and identifying the lack of such tools to aid technologists to successfully commercialise their innovations. In particular, the development of this

conceptual understanding of business model innovation process has been identified as a prerequisite for any software based business model tool (Buckhart et al, 2011). With conclusive evidence in the literature that business models are now priority for organizations, the need for research focusing on this issue is clearly apparent.

In developing the business model process framework, this paper utilizes and adopts theories and literatures from a myriad of domains including Contingency theory, Multi-Attribute Utility Theory (MAUT), data visualization, idea generation and decision making. Through a combination of these theories, a business model modelling process tool and prioritization framework are created. The researchers believe that the creation of such a tool is a necessary first step towards developing an IT based information system to enable organisations to rigorously identify, construct and select suitable business models. Utilization of such a tool would enable organisations to assess and prioritize potential business models which are key issues in the current environment. Therefore, the current conceptual framework grounds the development of a software tool to aid organizational management in decision making.

In order to test and refine the proposed framework, the researchers recommend the use of a series of industry focused workshops within a specific industry sector. Such research will enable the creation of a rich body of qualitative empirical data focusing on the creation and adoption of business models, going beyond the definitional and categorization research which currently dominates the literature. Furthermore, it will also serve to gather benchmark data, which will be utilized as a key input for the software based tool. This will enable users of the business model application to test all potential business models against the benchmarks within their particular ecosystem, facilitating more informed decisions. In time, data from numerous sectors can be gathered and inputted into the business model framework tool.

## REFERENCES

- Adam, F. 2008. "An Investigation into How Managers and Organisations make Decisions and Implications for Decision Support", Thèse d'Habilitation à Diriger des Recherches l'Université Pierre et Marie Curie - Paris VI.
- Adam, F. and Pomerol, J.C. 2008. "Developing Practical Support Tools using Dashboards of Information." *Handbook on Decision Support Systems*. F. Burnstein and Holsapple, W. London Springer-Verlag: 151-174
- Afuah, A and Tucci, CL. 2001. *Internet Business Models and Strategies: Text and Cases*. McGraw-Hill, Boston.
- Amit, R and Zott, C. 2001. "Value creation in e-business". *Strategic Management Journal*, (22:6-7), pp. 493-520.
- Amit, R and Zott, C. 2012. "Creating value through business model innovation". *MIT Sloan Management Review*, 53.
- Arrow, K. 1974. *The Limits of Organization*. Norton, New York
- Application Executive Council.2009. <https://aec.executiveboard.com/Public/>
- Bernstein, B., and Singh, P.J. 2006. "An Integrated Innovation Process Model Based on Practices of Australian Biotechnology Firms," *Technovation* (26:5-6), pp. 561-572.
- Bouchikhi, H. and Kimberly, J.R. 2003. "Escaping the identity trap." *MIT Sloan Management Review*, (44:3), pp. 20-26
- Brennan, A. and Dooley, L. 2005. "Networked Creativity: A structured management framework for stimulating innovation". *Technovation*, (25:12), pp. 1388- 1399.
- Bresciani, S and Eppler, M.2009. "The Benefits of Synchronous Collaborative Information Visualization: Evidence from the Experimental Evaluation" *IEEE Transactions on Visualisation and Computer Graphics*. (15:6) pp. 1073 – 1080.
- Buckart, T.; Werth, D.; Krumeich, J. and Loos, P. 2011. "Analysing the Business Model Concept: A Comprehensive Classification of Literature", *Thirty Second International Conference on Information Systems*, Shanghai
- Buzzell R.D. and Gale B.T. 1987. *The PIMS principles: linking strategy to performance*. Free Press, New York.
- Casadesus-Masanell, R, and Ricart, J. 2011. "How to Design A Winning Business Model." *Harvard Business Review*, (89), pp. 100-107

- Chesbrough, H.W. 2003. *Open Innovation: The new imperative for creating and profiting from technology*. Boston; Harvard Business School Press.
- Chesbrough, Henry. 2010. "Business Model Innovation: Opportunities and Barriers", *Long Range Planning*, (43:2/3), pp. 354-363
- Child, J. 1972. "Organisational Structure, Environment and Performance: The Role of Strategic Choice", *Sociology*, (6), pp. 1-22
- Cooper, B. 1988. *Winning at new products*, Kogan Page: London.
- Crossan, M., and Apyaydin, M. 2010. "A multi-dimensional framework of organizational innovation: A systematic review of the literature." *Journal of Management Studies*, (47:6), pp. 1154-1191
- Daly, M., Adam, F., and Pomerol, J.C. (2008). "Understanding the true Contribution of Decision Support Tools to Managerial Decision Making – Case Studies in Irish Organisations". In Z. e. al. (Ed.), *Collaborative Decision making: Perspectives and Challenges* (pp. 16-27). Amsterdam: IOS Press.
- Demil, B., & Lecocq, X. 2010. "Business Model Evolution: In Search of Dynamic Consistency". *Long Range Planning*, (43:2), pp. 227-246.
- Dennis, Alan R., & Valacich, Joseph, S. (1993). "Computer brainstorms: more heads are better than one". *Journal of applied psychology*, 78(4), 531-537.
- Eisenhardt, K., and J. Martin. 2000. "Dynamic capabilities: what are they?" *Strategic Management Journal*, (21), pp.1105-1121
- Finholt, T and Olson, G. 1997. "From laboratories to collaboratories: A new organisational form for scientific collaboration". *Psychological Science*, 8(1), pp. 28-36
- Forgionne, G. and J. Newman (2007). "An experiment on the effectiveness of creativity enhancing decision-making support systems." *Decision Support Systems* 42(4): 2126-2136.
- Galbraith, J. 1977. *Organisation Design*, Addison Wesley
- Galbraith, J.R. 1982. "Designing the Innovating Organization" *Organizational Dynamics*, Winter, pp. 5-25
- Gambardella, Alfonso, and Anita M. McGahan. 2010. "Business-model innovation: general purpose technologies and their implications for industry structure" *Long range planning*, (43.2) pp. 262-271
- Girota, K; Terwiesch, C and Ulrich, K. 2010. "Idea Generation and the Quality of the Best Idea" *Management Science*, (56:4), pp. 591-605
- Green, P.E and Wind, Y. 1973. *Multi Attribute Decisions in Marketing: A Measurement Approach*. The Dryden Press, Hinsdale, 1973.
- R and Norton, D. 1996. "Using the Balanced Scorecard as a Strategic Management System". *Harvard Business Review*, (74:1), pp. 31-38
- Lawrence, P., and Lorsch, J. 1967. "Differentiation and Integration in Complex Organizations" *Administrative Science Quarterly* (12), pp. 1-30
- C.J., Lynch, R.L. and Cross, K.L. 1990. "Do financial and nonfinancial measures have to agree?" *Management Accounting* (72:5) pp. 28-39
- Meijaard, J; Brand, M. and Mosselman, M. 2005. "Organizational Structure and Performance in Dutch Firms". *Small Business Economics*, (25:1) pp. 83-96
- Min, H. 1994. "International Supplier Selection: A Multi-Attribute Utility Approach", *International Journal of Physical Distribution & Logistics Management* (24:5), pp. 24-33.
- Mintzberg, H. 1979. "Patterns is strategy formation", *International Studies of Management and Organisation* IX (3), pp. 67–86
- Montoya-Weiss, M.M., and O'Driscoll, T.M. 2000. "From Experience: Applying Performance Support Technology in the Fuzzy Front End," *Journal of Product Innovation Management* (17:2), pp. 143-161.
- O'Reilly, P and Finnegan, P. 2010. "Intermediaries in inter-organisational networks: building a theory of electronic marketplace performance" *European Journal of Information Systems* (19), pp. 462–480
- O'Reilly, P., Duane, A., Prasath, R., and Andreev, P. 2014. "Evaluating Business Models: Developing a Business Model Process Roadmap and Prioritisation Tool". *IFIP WG 8.3* , Paris

- O Riordan, N. 2011. "An investigation of innovation and knowledge creation in virtual worlds". Ph.D., University College Cork.
- O Riordan, N., Acton, T., Conboy, K., Golden, W. 2012. "A Clockwork Organisation: Proposing a New Theory of Organisational Temporality". *The JAIS-Sponsored Theory Development Workshop* with ICIS 2012.
- O Riordan, N., Adam, F., O'Reilly, P. 2014. "Where The Streets Have No Name: Exploration and exploitation in novel digital settings". *European Conference on Information Systems*, Tel Aviv
- O Riordan, N., Conboy, C., and Acton, T. 2013. "How soon is now? Theorizing Temporality in Information Systems Research." *International Conference on Information Systems*
- Osterwalder A, Pigneur Y, Tucci CL. 2005. "Clarifying business models: Origins, present, and future of the concept" *Communications of the Association for Information Systems (AIS)*, (15)
- Osterwalder A, Pigneur Y. 2010. *Business Model Generation – A Handbook for Visionaries, Game Changers and Challengers*. John Wiley and Sons, Inc., Hoboken, New Jersey.
- O'Sullivan, D., and Dooley, L. 2008. *Applying Innovation*. Thousand Oaks, CA. Sage Publications
- Porter, M.E. 1980. *Competitive Strategy*, Free Press, New York, 1980.
- Rappa, M. 2000. *Business models on the Web: managing the digital enterprise*. North Carolina State University, USA. Online at [www.digitalenterprise.org/models/models.html](http://www.digitalenterprise.org/models/models.html)
- Robbins, S.P and Judge, T.A. 2006. *Organizational Behavior*. Upper Saddle River, NJ: Prentice Hall.
- Saaty, T.L. 1980. *The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation*. New York: McGraw-Hill.
- Shneiderman, B. 2002. "Creativity Support Tools". *Communications of the AMC*, (45:10).
- Sinha, K and Van de Ven, A. 2005. "Designing work within and between Organizations". *Organization Science* (16:4) pp. 89-408
- Sosna, M., Treviño-Rodríguez, R., and Velamuri, S. R. 2010. "Business model innovation through trial-and-error learning: The Naturhouse case." *Long Range Planning*, (43:2), pp. 383-407
- Teece, D. 2010. "Business Models, Business Strategy and Innovation", *Long Range Planning* (43). pp 172-194.
- Timmers, P. 1999. *Electronic Commerce: Strategies and Models for Business-to-Business Trading*, John Wiley & Sons, Ltd, Singapore
- Tversky, A. and Kahneman, D. 1981. "The framing of decisions and the psychology of choice", *Science* (211:4481), pp. 453-458.
- Ward, J., and Peppard, J. 2002. *Strategic Planning for Information Systems*, 3rd ed. New York. Wiley.
- Zionts, S. 1979 "MCDM—If Not a Roman numeral, Then What?" *Interfaces*, (9) pp. 94-101
- Zott, C., Amit, R., and Massa, L. 2011. "The business model: recent developments and future research". *Journal of Management* (37:4), pp. 1019-1042.

## **COPYRIGHT**

O Riordan, O Reilly, Duane and Andreev © 2014. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Papers and Proceedings. Those documents may be published on the World Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.