

Enterprise Business Technology Governance: Validation of Three Technology-Governance Competencies for Boards of Directors

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Abstract

The competent leadership and governance of digital transformation needs to involve the board of directors. The reported lack of such capability in boards is becoming a pressing issue. Underpinning leadership in such transformation are the competencies to effectively govern Enterprise Business Technology (EBTG). In this paper we take the position that EBTG competencies are essential in boards because competent enterprise business technology governance has been shown to contribute to increased revenue, profit, and returns. We report the industry validation processes of a set of three board-of-director competencies needed for effective EBTG related to strategy and planning; investment and risk; and, innovation and value creation. We conclude that gaps in board EBTG competence remain.

Keywords

IT Governance, Competency Development, Board Technology Competence, Competency Development Rigour.

INTRODUCTION

Throughout 2013 multiple consulting survey reports, including PWC's 2013-2014 'Considerations for Boards and Audit Committees', (PWC, 2013) and a small number of academic publications list technology megatrends impacting the business world globally. A growing number of publications suggest that boards need to pay attention to their changing role in the digital economy (e.g., De Haes & Van Grembergen, 2012a, 2012b; Huff, Maher, & Munro, 2006; Van Grembergen & De Haes, 2012). Further, there is growing evidence that digitally mature boards that provide competent and comprehensive digital leadership, financially outperform their peers by 9%, are up to 26% more profitable, and enjoy up to 12% greater market valuation (Westerman, Tannou, Bonnet, Ferraris, & McAfee, 2012).

In the digital economy, the board's role is changing from members having a primarily financial and legal focus (Arensdorf, 2012) to where EBTG is becoming an integral part of corporate governance (Van Grembergen & De Haes, 2012). The board's strategic oversight role, EBTG and the associated competencies differ significantly from operational IT requirements in the same way that strategic and operational management differ (Valentine & Stewart, 2013b). However, they have become interdependent because technology now pervades almost every aspect of modern enterprise operations (Westerman et al., 2012). In this regard, our initial research revealed 74.42% participants agreed (19.77%) or strongly agreed (54.65%) with the statement 'it is now very important that boards include directors with IT governance knowledge, skills and experience among their ranks, so that they can ask the right questions of management and advisors' (Valentine & Stewart, 2013a).

This result would tend to support the need for changed competency and capability requirements for boards as also suggested by Alexander, Apffel, Dawkins, Richard, and Sedlock (2014) and Turel and Bart (2014). However, recent research indicates that overall, board-level IT oversight and planning capabilities are 'often too narrowly conceptualized in corporate governance research' (Turel & Bart, 2014, p. 235). While early research questioned whether technology contributed to business performance and market value (e.g., Grove, Selto, & Hanberry, 1990), the work of more recent researchers such as Cumps, Viaene, and Dedene (2012); De Haes and Van Grembergen (2012a, 2012b); Luftman, Ben-Zvi, Dwivedi, and Rigoni (2012), Nolan and McFarlan (2005) and Turel and Bart (2014)

supports the notion that building strategic technology capability at all levels contributes to organization performance and business results. It is also becoming increasingly clear that irrespective of the size or type of organization, boards can no longer afford to ignore or delegate the responsibilities relating to technology governance (Van Grembergen & De Haes, 2012). Boards also have an ethical duty to be competent (Bayles, 1989).

The impacts of board EBTG capability range from whether the enterprise has a culture that embraces technology and leverages investment value through the use of data and information for decision-making (Marchand, 2007; Marchand & Peppard, 2013) to whether the enterprise creates competitive advantage through understanding the current and emerging role of IT in all aspects of its operation (Bart & Turel, 2010; Marchand, 2008; Turel & Bart, 2014; Valentine & Stewart, 2013b). The board's capability also underpins whether the enterprise effectively oversees a range of technology-related risk (Parent & Reich, 2009) and whether EBTG-related topics make it onto the board agenda (Andriole, 2009). Increasingly too, competence plays a role in whether the board meets the IT governance oversight aspects of its duty of care (Bayles, 1989; Martyn, 2013; Trope, 2005).

After engaging with more than 400 directors, senior IT and non-IT executives and industry practitioners and three years of research by the authors, three new EBTG competencies for boards of directors were published using a multi-method approach (Valentine & Stewart, 2013a). Competency one is about the skills, knowledge and experience to govern technology for strategic advantage and firm performance. Competency two covers making technology decisions and governing risk. Competency three covers using technology to achieve returns and demonstrate value. This competency set was designed to answer the over-arching research question: 'what generic competencies do boards of directors need to effectively govern enterprise business technology?'

While competency sets are most commonly used for recruitment and professional development (L. H. Markus, Cooper-Thomas, & Allpress, 2005), boards can also use the set to discuss strategic digital leadership and whether they are meeting technology governance areas of their overall duty of care.

In this paper we provide a brief overview of our methodology a summary of the latest version of the competencies, and focus on the validation process used to determine the industry acceptance of this competency set as fit for purpose.

LITERATURE REVIEW

Since business computing took off in the 1980s (Carr, 2004) the operating and competitive environments have seen rapid technology change and the growth of the information and knowledge-orientated enterprise (Marchand, Kettinger, & Rollins, 2001). With the increasing sophistication, convergence and capacity of information and communication technologies (ICTs), awareness that non-IT executives and board directors alike need to engage in information technology governance (ITG) has grown significantly in recent times (e.g., Andriole, 2009; Huff et al., 2006; ITGI, 2003, 2005, 2011; Masli, Richardson, Sanchez, & Smith, 2011). As boards of directors have increasingly come under scrutiny and regulation (Buckby, Best, & Stewart, 2010) all organizational stakeholders, be they public or private sector, expect their enterprises to be governed competently. Competent governance is required to derive value from capital investments, including those in technology (Ho, Wu, & Xu, 2011). However improving performance is difficult when strategy matching competency requirements are not clear or in evidence (Leblanc & Gillies, 2005). This includes the board of directors.

Board-level governance, i.e., organizational oversight of compliance and performance monitoring and accountability, is also changing. Fox, Ward and O'Rourke (2006) find that sociologically, the rise of technology in all its forms is presenting unique problems for those who govern. They suggest that the characteristics and features of an internet-enabled world have the potential to significantly change and reshape balances of power between states, corporations and individuals. This is evident in the rise of the internet-savvy, informed consumer and in the demand for closer scrutiny of governors that has arisen in the past decade (Buckby et al., 2010; Nicholson & Newton, 2010). Fox *et al* add, 'the information age will subvert existing forms of governance and create the need and the potential for new forms' (Fox et al., 2006, p. 319). This observation sits well with suggestions that reviewing board competencies relating to technology governance needs to be contextualized by with the rapid rise, business use and convergence of mobile devices, cloud-based technologies, big data and social media (Bernoff, 2012; Larcker, Larcker, & Tayan, 2012; Rheingold, 2012). This nexus of technologies is an important context for current and future corporate governance across all competency domains: finance, legal, human resources, marketing, operations and technology, as recently borne out by Harvey (2013). He suggests it may be a 'fatal view' to ignore the impacts of technology across business disciplines (including the law) because of the level of continuing disruptive and radical technology change happening, and because there is 'no finishing line for technology or the internet' (Harvey, 2013, concluding remarks). Definitions are also changing.

Changes are occurring rapidly. For example, within 12 months since the first competency set was developed and published, a shift in terminology to the use of the term 'digital', especially digital leadership. This includes an increasing number of scholarly (Bennis, 2013; Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; M. L. Markus & Loebbecke, 2013) as well as government and industry publications (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2014;

Hirt & Willmott, 2014; Toomey & Martinez, 2012; Westerman et al., 2012). A growing number of these publications include discussion of the role of the board of directors in EBTG. However, still no others provide a validated competency set such as Valentine and Stewart (2013a). A further shift is growing evidence that EBTG does need to be considered as part of a director's duty of care responsibilities (Martyn, 2014; Trope, 2005). There is also empirical evidence of positive business impacts and significant organizational advantage in not only understanding digital intensity, but doing this in parallel with significant competence in digital change leadership (Fitzgerald et al., 2014; Westerman et al., 2012).

METHODOLOGY

The various iterations of this competency set including the first published set (Valentine & Stewart, 2013a) have been developed through a rigorous mixed-methods (MM) (Bryman & Bell, 2007) approach as outlined in Figure 1. The review and redevelopment of the competency set contained in this paper is shown as a final review phase (four). In this phase, comprehensive use of the affordances of selected ICTs was made to overcome significant challenges in reaching suitably knowledgeable and experienced participants, as published elsewhere. Further, construct validity was checked at each stage using Schippman et al's (2000) 10 Point rigour scale. The design also illustrates how key literature such as the ISO/IEC standard 38500 (2008) and other operational IT governance frameworks informed the derived competencies (Valentine & Stewart, 2013a).

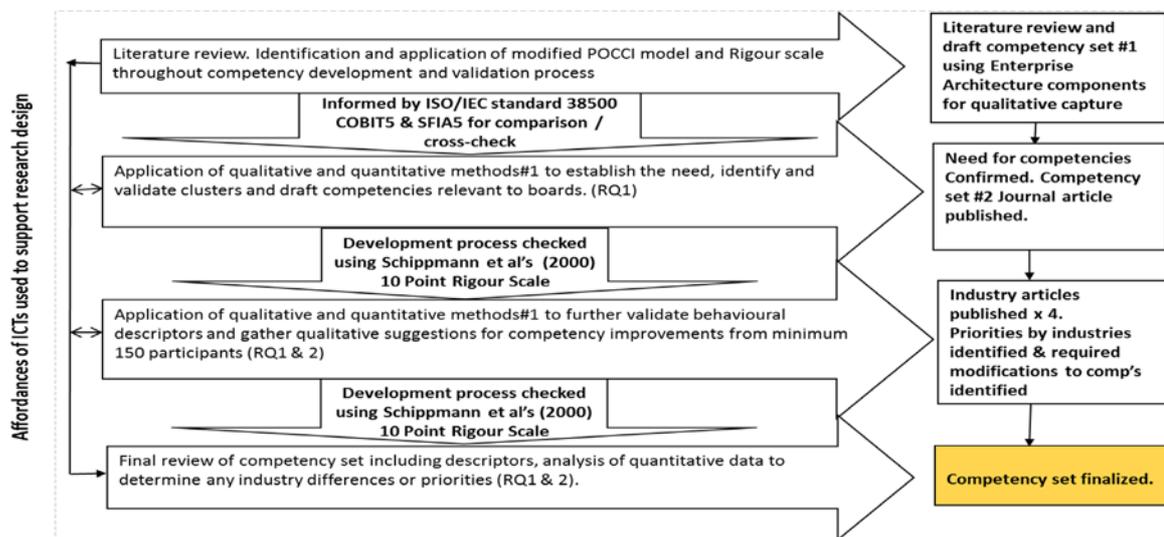


Figure 1: Mixed methods design overview

In designing the review methodology, a mixed method (quantitative and qualitative) design (Bryman & Bell, 2007) was used to answer the research questions. RQ1: *In what ways do perceptions of enterprise technology governance competency needs and priorities vary between industry types?* RQ2: *What improvements, changes or additions to the competency are required?*

Mixed methods (MM) also supported three underlying design considerations which were 1) the need to review and update the competency set; 2) how to ensure the epistemological view of importance of the set from the participant's world (Bryman & Bell, 2007) was enabled; and 3) how the design would support the validation of the competencies from an industry / user perspective. SurveyMonkey™ was used with a minimum of 150 participants sought from the potential target audience of chairmen/women, directors and experienced IT and non-IT executives and consultants.

RESULTS: BOARD-LEVEL TECHNOLOGY GOVERNANCE COMPETENCY SET

This section commences with the summarized final competency set for board-level enterprise business technology governance. The results report the quantitative study to evaluate any variance in the importance of the competencies as a function of industry sector, level and experience.

There are three competencies developed through this research. These competencies are shown in table 1. For each competency, a capability statement was developed and tested. From this capability statement, detailed descriptors were developed and tested over the first three phases of the research, as shown in Figure 1. The capability statements and descriptors are reported elsewhere (e.g., Valentine & Stewart, 2013a). The descriptors for each competency are summarized in Table 2 below. The summary records the analysis undertaken to determine any variations in descriptors as a function of role, industry cluster and organizational size, and input and industry validation.

Table 1: Competency set for Board Level Enterprise Business Technology Governance

Competency Number	Abbreviated Competency Heading	Full Competency Title
1	Strategy and Planning	Direct and govern technology-enabled strategy and planning to maximize the advantages of technology and enhance performance at all levels of the organization
2	Investment and Risk	Lead and govern business technology investment and risk
3	Innovation and Value Creation	Lead and govern technology-enabled innovation and value creation

Table 2: Descriptors for each competency

Descriptor	C1: Strategy & Planning	C2: Investment & Risk	C3: Innovation & Value Creation
1	<i>Knowledgeable about current and emerging business technologies and their potential to add organizational, customer and stakeholder value</i>	<i>Able to champion the strategic use of business technologies, and data and information use for decision-making.</i>	<i>Understands how to derive business value from technology investments</i>
2	<i>Skilled in business, environmental and competitive analysis including how industry sector and similar organizations are using new and emerging technologies</i>	<i>Able to evaluate IT risk to ensure the continued operation of the business.</i>	<i>Experienced in board-level governance oversight of large scale IT project investments. IT assets are acquired, implemented and monitored with risk and value balanced throughout.</i>
3	<i>Skilled in over-seeing the inclusion of current and future technologies into the organization's strategy, business plan development and organizational performance measures and management Key Performance Indicators).</i>	<i>Demonstrates an understanding of technologies for identifying, tracking, mining and exploiting the data and information relevant to the organization's needs.</i>	<i>Knowledgeable about or experienced in technology asset life-cycle oversight to derive expected returns</i>
4	<i>Knowledgeable about the business processes that underpin peak performance</i>	<i>Knowledgeable about the unique issues associated with digital leadership and IT user experience.</i>	<i>Demonstrates knowledge of IT system and infrastructure components such as software, applications and hardware, mobile and social technologies; and outsourced services, and the implications, costs and benefits of their uses</i>
5	<i>Knowledgeable about and skilled in evaluating the level of technology dependency the organization has now and may need in the future</i>	<i>Able to oversee the governance of IT acquisition, implementation, maintenance and disposal to balance risk with opportunity and to support retention of intellectual property and organizational memory</i>	
6	<i>Experienced in selecting, implementing and monitoring the effectiveness of enterprise technology governance mechanisms (systems and processes)</i>	<i>Knows what to measure and how to interpret performance data</i>	
7	<i>Able to oversee IT acquisition, implementation, maintenance and disposal to meet the board's fiduciary, regulatory, compliance, ethical, contractual and legal obligations</i>		

Descriptor	C1: Strategy & Planning	C2: Investment & Risk	C3: Innovation & Value Creation
8	<i>Knows what to measure and monitor and how to interpret business technology performance data against plans and policies to derive expected benefits, and ensure strategic intent is achieved.</i>		
9	<i>Understands how enterprise technology architecture and infrastructure investments help achieve enterprise business goals</i>		

DEMOGRAPHICS

A total of 199 qualified participants took part in the survey, of which 177 surveys were complete and useable. Demographics tracked included gender (M/F), birth year, qualifications (IT, other, none), Industry sector (using the ANZSCO codes), role in the company (board member, executive member, consultant, other), and organizational size Small (ME), medium (ME), and large enterprises (LE). Research participant demographics of those involved in the qualitative and quantitative analysis of these competencies, capability statements and descriptors are shown in table 3.

Table 3: Participant demographics

Category	Results	Other info
Number (150 = sufficient)	Total n = 199	Fully complete n = 177
Gender	Male 78%	Female 22%
Age ranges	73% born between 1950 - 1969	11% born between 1940 to 1949', 13% born between 1970 - 1979
Qualifications	39.7% (78/199) had IT- related qualifications	128/199 had other qualifications 12/199 had no formal qualifications
Industries	25 sectors	Rationalized to 7 clusters
Roles	58% had board experience	32% were senior executives 10% were consultants
Org size	76% SME (<2500 FTE)	20% <50,000 4% >50,000

The roles of participants are shown in table 4.

Table 4: Roles of Participants

Role	Frequency	Percentage of Sample	Cumulative Percentage
Chair	51	28.8	28.8
Director and Governance Committee Member	26	14.7	43.5
Director	27	15.3	58.8
Chief Executive	18	10.2	68.9
Consultant	9	5.1	74.0
Others	46	26.0	100.00

Participants were qualified to take part in the survey by having worked on boards or by reporting to boards. Of the 177 valid responses, 58.8% were on the board as chair, as a director and member of the governance committee or a director. Significance differences were detected as a function of roles and as a function of organizational type. These are discussed in the next section. The distribution of the organization by size is shown in table 5 below.

Table 5: Distribution of organizations by size (total 177).

Number of employees	Frequency	Percent	Cumulative percent
1-99	82	46.3	46.3
100-499	28	15.8	62.1
500-2500	24	13.6	75.7
2501-10000	22	12.4	88.1
10001-50000	14	7.9	96.0
50001=150000	5	2.8	98.8
More than 150001	2	1.1	100.00 (rounded)

Thus, in this data collection process, though the majority of respondents were from the SME sector (accounting for 62.1% of the sample), all sizes of companies were reported. There were no significant differences detected in any descriptor as a function of company size.

The highest held qualification was recorded by the participants. These qualifications were categorized as IT related, non-IT related and other. The distribution for this demographic is shown in table 6. There were no significant differences detected as a function of qualification.

Table 6: Distribution qualifications held by respondents (total 177)

Qualification	Frequency	Percent	Cumulative percent
Non-IT related	111	62.7	62.7
IT related	52	32.2	94.9
None	9	5.1	100.00

Industry sectors were clustered in order to detect any variation as a function of this clustering. A variety of clustering methods were used, resulting in seven final clusters. The distribution by these clusters is shown in table 7.

Table 7: Distribution of participants by industry cluster (total 177)

Industry Cluster	Frequency	Percent	Cumulative percent
Public Services (incl. Utilities & Health)	43	24.3	24.3
Professional Services	39	22.0	46.3
Education & Training	31	17.5	63.8
IT and Telecommunications	23	13	76.8
Transport (Air, land and sea)	16	9	85.8
Building, Construction, Manufacturing	13	7.3	93.1
Arts, Food, Tourism and Hospitality	12	6.8	100 (rounding)

No significant differences were detected as a function of industry cluster, an indicator that participants generally considered the competency descriptors as fit for purpose (ITGI, 2003; Markus et al, 2005).

SIGNIFICANT DIFFERENCES IN DESCRIPTORS PER COMPETENCY SET

The next section presents and discusses the results of variation in descriptors as a function of roles. This was assessed using the independent samples, Kruskal-Wallis test. Significant differences as a function of role were found for 3 descriptors in competency 1 and 2 descriptors for competency 3. No significant differences were found as a function of role for competency 2.

Competency 1 - descriptor differences as a function of role

Based on the Kruskal-Wallis Test, the distribution of Competency 1, Descriptor 1 is found to be significantly different across categories role with a p value = 0.026. Distributions of Competency 1, Descriptor 2 and Competency 1, Descriptor 4 have also been found to be significant across categories (p value of 0.46 and 0.18 respectively). However, pairwise comparisons show the differences in these three descriptors are not attributed to any specific pair of role categories. The result indicates that with exception of these three descriptors, all the other descriptors show no significant variations across role. A mean ranking was undertaken for these descriptors.

Table 8: Mean ranking per role Competency 1: Strategy & Planning

Descriptor	Role	Number in role	Mean Rank
<i>D1: Knowledgeable about current and emerging business technologies and their potential to add organizational, customer and stakeholder value.</i>	Consultant	9	119.17
	Director & Governance	26	104.96
	Committee member		
	Chief Executive	18	102.03
	Chair	51	87.81
<i>D2: Skilled in business, environmental and competitive analysis including how industry sector and similar organizations are using new and emerging technologies</i>	Director	27	66.46
	Chair	51	98.74
	Director & Governance	26	91.00
	Committee member		
	Consultant	27	75.78
	Director	18	72.87
	Chief Executive	9	64.50

Descriptor	Role	Number in role	Mean Rank
D4: <i>Knowledgeable about the business processes that underpin peak performance</i>	Director & Governance Committee member	26	113.15
	Director	27	81.13
	Chair	9	78.61
	Chief Executive	18	73.81
	Consultant	51	73.17

Competency 1 focused on Strategy & Planning. Three descriptors (1, 2 and 4) were found to be significantly different across roles. Descriptor 1, for competency 1 is *Knowledgeable about current and emerging business technologies and their potential to add organizational, customer and stakeholder value*. Consultants ranked this more highly than all others, while Director & Governance Board members and CEO ranked this element highly as well. Directors and Chairs of Boards did not rank this descriptor as highly, demonstrating their lack of current knowledge in this role. This lack of current knowledge supports the literature findings. It is not surprising that this knowledge difference exists across roles as board members may not have developed currency regarding emerging business technologies, while consultants of the firms may have better awareness of these trends.

Descriptor 2 for this competency is *Skilled in business, environmental and competitive analysis including how industry sector and similar organizations are using new and emerging technologies*. The chair and director in the governance committee rank this more highly than other roles in the organization, showing the need to maintain visibility of their competitors as well as concern for meeting performance and conformance of the board’s duty of care (ISO/IEC, 2008).

Descriptor 3 for this competency is *Knowledgeable about the business processes that underpin peak performance*. The directors who were members of the governance committee rated this highest, demonstrating the relationship of business process knowledge to effectiveness and efficiency as a competitive component to organizational performance.

Competency 3 - descriptors as a function of role

Competency 3 was focused on Innovation & Value Creation. Significant differences as a function of role were found for Descriptor 1 (*Understands how to derive business value from technology investments*) with $p < 0.007$ and Descriptor 2 (*Experienced in board-level governance oversight of large scale IT project investments. IT assets are acquired, implemented and monitored with risk and value balanced throughout*), with $p < 0.013$. Table 9 shows the mean ranking per role of these descriptors.

Table 9: Mean ranking per role for Competency 3 Innovation & Value Creation

Descriptor	Role	Number in role	Mean Rank
D1: <i>Understands how to derive business value from technology investments</i>	Consultant	9	111.89
	Director	27	107.56
	Chair	51	94.89
	Chief Executive	18	93.22
	Director & Governance Committee member	26	61.33
D2: <i>Experienced in board-level governance oversight of large scale IT project investments. IT assets are acquired, implemented and monitored with risk and value balanced throughout</i>	Director & Governance Committee member	26	99.04
	Chair		
	Director	51	96.13
	Chief Executive	18	77.43
	Consultant	9	62.42
		27	57.17

Again, it is not surprising to see consultants rank the ability to understand how to derive business value from technology investments more highly. Deriving business value is the normal work of consultants. What is surprising is the low rank attributed to this skill by the directors in the governance committee. Subcommittees focused on audit and risk would normally evaluate conformance, risk reduction or risk avoidance. The finding is concerning because, if there is any IT risk monitoring within current boards, risk sub-committees are the most likely mechanism. This focus is seen where directors and governance committee members rank more highly board level governance of large scale projects and assets, while the consultants’ ranked this skill lowest. This result might provide insights into possible reasons why large scale technology projects in both public and private organizations can fail.

Competency descriptors as a function of organisation type

Table 10 summarizes the distribution of the organizations by type.

Table 10: Distribution of sample by organization type

Organization Type	Frequency	Percentage	Cumulative Percentage
Company not listed (private)	70	39.5	39.5
Government Agency or Ministry	37	20.9	60.4
Publically listed company	25	14.1	74.5
State-owned Enterprise	17	9.6	84.1
Not for profit	17	9.6	93.7
Registered Charity	11	6.2	100.00 (rounding)
total	177		

Only Competency 2 (Investment & Risk), descriptor 3 (*Demonstrates an understanding of technologies for identifying, tracking, mining and exploiting the data and information relevant to the organization’s needs*) showed any significant variation by organizational type ($p < 0.46$). A pairwise comparison and mean ranking led to the following results shown in table 11.

Table 11: Mean ranking per role for Competency 2 Investment & Risk

Descriptor	Organizational Type	Number in role	Mean Rank
D3: <i>Demonstrates an understanding of technologies for identifying, tracking, mining and exploiting the data and information relevant to the organization’s needs</i>	Registered Charity	11	106.82
	Government Agency or Ministry Chair	37	106.32
	Not for profit	17	103.00
	State-owned Enterprise	17	84.18
	Company not listed (private)	70	79.09
	Publically listed company	25	77.02

The meaning of this difference needs further investigation. It may be that a registered charity needs to be able to mine its data to identify funding sources, and thus indicated elevated appreciation of this skill. It could suggest that publically listed companies are not as aware of or as dependent on its data and do not seek to monetize or profit from this data asset. However this is unlikely given emerging trends in the competitive use of big data as discussed by McAfee and Brynjolfsson (2012) and Libert (2013). Further work is required to understand this difference. The detection of variation as a function of role can be explained through the experiential lens that the various participants used in their particular roles. Consultants may be seeking to apply IT enabled transformation while directors on governance committees are exercising due fiduciary care and risk oversight. However a more concerning conclusion could be that boards may lack the EBTG competence to fully appreciate the strategic risks and opportunities afforded by digital technologies and may not yet realize that technology governance is part of their fiduciary care role, especially in relation to cyber security, as cautioned by Commissioner Aguilar (2014).

The lack of variation in the ranking of the descriptors as a function of qualification or organizational size and the few significant variations as a function of role and organizational type indicates that these competencies and their descriptors are valid across organizations of different types and sizes. Importantly, this lack of significant difference or variation is considered strong validation of the competency set (Markus et al, 2005). Lack of variation in competency development strongly indicates that the derived competencies are considered fit for purpose by those who will use them. The result suggests that each of the three competencies will likely be required across all industries. However, the identified variations could suggest that not all descriptors will be required. As suggested by Leblanc and Gillies (2005) board skill-requirements need to flow from an analysis of what constitutes a strategy-matching range and mix of board competencies across all technical disciplines. Recruitment criteria are a matter for board evaluation and discussion. This competency set provides the basis for making board EBTG competency choices relevant to the organization.

CONCLUSION AND FURTHER RESEARCH

This paper presented findings relating to the validation of the final set of three EBTG competencies. The competencies were developed in a multi-method research project over three years. Over 400 senior executives and board members were involved in different phases of the research. This paper presented the validation of these elements through a quantitative and qualitative survey involving 177 participants. The paper focused on the robustness of the derived competencies across role, organizational size, organizational type, industry cluster and participant qualifications. This research contributes to articulating board level competencies for enterprise board level governance and contributes to the growing body of literature on digital leadership. Further work has been undertaken in presenting these competencies and descriptors to practicing directors and CIO’s. Work is underway to develop professional development programs for board members which operationalize these competencies. These competencies can be used to select and develop board members who are more capable of exercising Enterprise Business Technology Governance and orienting their organizations to more effective uptake of technology as part of organizational strategy, risk and opportunity. Further research is suggested to better understand identified role-related variances, especially relating to why the governance sub-committee results varied significantly from other board roles (chair and director). This is of particular interest while EBTG within boards remains delegated to such sub-committees, if at all. Additional

investigation might include examining any correlation between IT project failure and a lack of competent board-level EBTG oversight, within both public and private enterprises. Further investigation might also empirically examine apparent disconnects between IT governance and board governance oversight of technology, as also raised by Musson and Jordan (2005).

In conclusion, Enterprise Business Technology Governance is an important and still too often neglected activity for boards. This has been acknowledged by the participants who clearly indicated that EBTG competency within boards is now important or very important. The literature has shown that boards that do not effectively shape their digital future or lead business technology strategy development, investment and risk management may have an uncertain future. This revised, updated and now validated set of competencies should assist boards in developing or recruiting directors in bridging the knowledge, skills and experience gap required for effective governance as organizations digitize.

REFERENCES

- Aguilar, L. A. (2014). *Boards of Directors, Corporate Governance and Cyber-Risks: Sharpening the Focus*. Paper presented at the New York Stock Exchange, New York, NY. http://www.sec.gov/News/Speech/Detail/Speech/1370542057946#%2EU8F2-z_QdEY
- Alexander, W., Appfel, C., Dawkins, W., Richard, B., & Sedlock, G. (2014). Digital expertise in the boardroom: delivering the right impact *Point of View: Deeper on Digital 2014*: SpencerStuart.
- Andriole, S. J. (2009). Boards of directors and technology governance: the surprising state of the practice. *Communications of the Association for Information Systems, 24*(1).
- Arendsdorf, B. (2012). Board Competencies Beyond Fin Lit. *Credit Union Times, 1-2*.
- Bart, C., & Turel, O. (2010). IT and the Board of Directors: An Empirical Investigation into the "Governance Questions Canadian Board Members Ask about IT. *Journal of Information Systems, 24*(2), 147-172.
- Bayles, M. D. (1989). *Professional Ethics* (Wadsworth, Belmont CA).
- Bennis, W. (2013). Leadership in a digital world: embracing transparency and adaptive capacity. *MIS Quarterly, 37*(2), 635-636.
- Bernoff, J. (2012). Social Winners. *Marketing News, 46*, 12-12.
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly, 37*(2), 471-482.
- Bryman, A., & Bell, E. (2007). *Business research methods*: Oxford University Press, USA.
- Buckby, S., Best, P., & Stewart, J. (2010). The Current State of Information Technology Governance Literature. In I. R. M. A. (USA) (Ed.), *Business Information Systems: Concepts, Methodologies, Tools and Applications* (pp. 1657-1705). Hershey, Pennsylvania USA: IGI Global.
- Carr, N. G. (2004). *Does IT matter? Information technology and the corrosion of competitive advantage*. Boston: Harvard Business School Press.
- Cumps, B., Viaene, S., & Dedene, G. (2012). Linking the Strategic Importance of ICT with Investment in Business-ICT Alignment: An Explorative Framework. In W. Van Grembergen & S. De Haes (Eds.), *Business Strategy and Applications in Enterprise IT Governance* (pp. 37-55). Hershey, Pennsylvania, USA: IGI Global.
- De Haes, S., & Van Grembergen, W. (2012a). Analysing the Impact of Enterprise Governance of IT Practices on Business Performance. In W. Van Grembergen & S. De Haes (Eds.), *Business Strategy and Applications in Enterprise IT Governance* (pp. 14-36). Hershey, Pennsylvania, USA: IGI Global.
- De Haes, S., & Van Grembergen, W. (2012b). Prioritising and Linking Business Goals and IT Goals in the Financial Sector. In W. Van Grembergen & S. De Haes (Eds.), *Business Strategy and Applications in Enterprise IT Governance* (pp. 123-144). Hershey, PA, USA: IGI Global.
- Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing Digital Technology: A New Strategic Imperative. *MIT Sloan Management Review, 55*(2), 1-12.
- Fox, N., Ward, K., & O'Rourke, A. (2006). A Sociology of Technology Governance for the Information Age: The Case of Pharmaceuticals, Consumer Advertising and the Internet. *Sociology, 40*(2), 315-334. doi: 10.1177/0038038506062035
- Grove, H. D., Selto, F. H., & Hanberry, G. (1990). The effect of information system intangibles on the market value of the firm. *Journal of Information Systems, 4*(2), 36-47.
- Harvey, D. (2013). *Law, information and technology*. Paper presented at the New Zealand Law Society Technology Law Conference, Auckland, NZ.
- Hirt, M., & Willmott, P. (2014). Strategic principles for competing in the digital age. *McKinsey Quarterly, May 2014*, 1-13. Retrieved from Insights website: http://www.mckinsey.com/insights/strategy/strategic_principles_for_competing_in_the_digital_age
- Ho, J. L. Y., Wu, A., & Xu, S. X. (2011). Corporate Governance and Returns on Information Technology Investment: Evidence from Emerging Market. *Strategic Management Journal, 32*(6), 595-623. doi: 10.1002/smj.886
- Huff, S. L., Maher, M. P., & Munro, M. C. (2006). Information technology and the board of directors: is there an IT attention deficit? *MIS Quarterly Executive, 5*(2), 55 – 68.
- ITGI. (2003). Board briefing on IT governance (2nd ed.): IT Governance Institute (ITGI).

- ITGI. (2005). IT alignment: Who is in charge? : IT Governance Institute (ITGI).
- ITGI. (2011). Global status report on the governance of enterprise IT (GEIT) - 2011. Rolling Meadows, IL: IT Governance Institute.
- Larcker, D. F., Larcker, S. M., & Tayan, B. (2012). What do corporate directors and senior managers know about social media? Canada: Conference Board /Stamford University.
- Leblanc, R., & Gillies, J. (2005). *Inside the Boardroom*. Ontario: Wiley & Sons.
- Libert, L. (2013). Why boards must embrace big data. *Directorship: Boardroom Intelligence*, (September 11, 2013). <http://www.directorship.com/why-boards-must-embrace-big-data/>
- Luftman, J. N., Ben-Zvi, T., Dwivedi, R., & Rigoni, E. H. (2012). IT Governance: An Alignment Maturity Perspective. In W. Van Grembergen & S. De Haes (Eds.), *Business Strategy and Applications in Enterprise IT Governance* (pp. 87-101). Hershey, PA, USA: IGI Global.
- Marchand, D. A. (2007). Realizing IT Value: A Shared Responsibility between Senior Managers and the CIO. *Perspectives for Managers*, 147, 1-4.
- Marchand, D. A. (2008). The chief information office: achieving credibility, relevance and business impact *Perspectives for Managers*(164), 1-4.
- Marchand, D. A., Kettinger, W., & Rollins, J. (2001). *Making the Invisible Visible: How Companies Win with the Right Information, People and IT*. UK: John Wiley & Sons.
- Marchand, D. A., & Peppard, J. (2013). Why IT fumbles analytics. *Harvard Business Review*, 91(January-February 2013), 104-112.
- Markus, L. H., Cooper-Thomas, H. D., & Allpress, K. N. (2005). Confounded by Competencies? An Evaluation of the Evolution and Use of Competency Models. *New Zealand Journal of Psychology*, 34(2), 117-126. doi: 10.1037/0033-2909.124.2.262
- Markus, M. L., & Loebbecke, C. (2013). Commoditized digital processes and business community platforms: new opportunities and challenges for digital business strategies (Vol. 37, pp. 649-653): *MIS Quarterly & The Society for Information Management*.
- Martyn, K. (2013, September 2013). [Notes from Professional Ethics Seminar].
- Martyn, K. (2014, 20 January 2014). [Boards must take responsibility for all projects].
- Masli, A., Richardson, V. J., Sanchez, J. M., & Smith, R. E. (2011). The Business Value of IT: A Synthesis and Framework of Archival Research. *Journal of Information Systems*, 25(2), 81-116.
- McAfee, A., & Brynjolfsson, E. (2012). Big data: The management revolution. *Harvard Business Review*, 90(10), 60-68.
- Nicholson, G. J., & Newton, C. J. (2010). The role of the board of directors: perceptions of managerial elites. *Journal of Management and Organization*, 16(2), 201-218.
- Nolan, R., & McFarlan, F. W. (2005). Information technology and the board of directors. *Harvard Business Review*, 83(10), 96-106.
- Parent, M., & Reich, B. H. (2009). Governing information technology risk. *California Management Review*, 51(3), 134-152.
- PWC. (2013). Considerations for Boards and Audit Committees. In P. C. f. B. Governance (Ed.), (pp. 1-20). USA: Price Waterhouse Coopers.
- Rheingold, H. (2012). *Net smart : how to thrive online*. Cambridge, MA, USA: MIT Press.
- Toomey, M., & Martinez, J. P. (2012). *Waltzing with the Elephant*: Infonomics Pty Limited.
- Trope, R. L. (2005). Directors' digital fiduciary duties. *Security & Privacy, IEEE*, 3(1), 78-82. doi: 10.1109/msp.2005.11
- Turel, O., & Bart, C. (2014). Board-level IT governance and organizational performance. *European Journal of Information Systems*. doi: doi:10.1057/ejis.2012.61
- Valentine, E., & Stewart, G. (2013a). Director competencies for effective enterprise technology governance. *24th Australian Conference on Information Systems*.
- Valentine, E., & Stewart, G. (2013b). The emerging role of the board of directors in enterprise business technology governance. *International Journal of Disclosure and Governance*(April), 1-17. doi: 10.1057/jdg.2013.11
- Van Grembergen, W., & De Haes, S. (2012). A Research Journey into Enterprise Governance of IT, Business/IT Alignment and Value Creation. In W. Van Grembergen & S. De Haes (Eds.), *Business Strategy and Applications in Enterprise IT Governance* (pp. 1-13). Hershey, PA, USA: IGI Global.
- Westerman, G., Tannou, M., Bonnet, D., Ferraris, P., & McAfee, A. (2012). The digital advantage: How digital leaders outperform their peers in every industry (pp. 2-23). Massachusetts: MITSloan Management and Capgemini Consulting.

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