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Abstract

The nexus between Business and IT research is complex. Due to extended research over time, the context of business-IT alignment has resulted in many different conceptualisations that can be applied to ongoing research. It is challenging to select and adopt a suitable approach to study business-IT alignment across any given field due to the variability of the existing conceptualisations. This study reviews the existing literature to identify alignment conceptualisations and contributes to both theory and practice. Theoretically, through the uncovering of gaps in the literature a taxonomy has been developed which can be used as a guide to select an appropriate alignment lens for business-IT alignment studies. In practice, it is expected that this taxonomy will be beneficial for conceptualising the structure and philosophies underpinning future alignment studies. To validate the taxonomy, the paper presents a case study in healthcare applying the developed taxonomy to investigate alignment of big data in health.

Keywords: Business-IT alignment, Taxonomy, Conceptualisation

Introduction

For the past 30 years, "Alignment" has been a major concern to information technology (IT) practitioners and company executives (Kappelman et al. 2013). Similarly, during the past decades many studies have explored the importance of business-IT alignment in various business domains (e.g., Drazin and Van De Ven 1985; Dulipovici and Robey 2013). Thus, alignment has remained one of the dominant fields of information systems research over the years (Chan and Reich 2007; Li and Palvia 2017). Throughout the literature, "Alignment" is also addressed through different terms such as fit, coherence, harmony, integration, congruence, relationship, gestalt, synergy and linkage. Alignment refers to the degree of "fit" between different domains of business and information technology (Henderson and Venkatraman 1993; Jenkin and Chan 2010; Luftman 1996).

Modern businesses are increasingly relying on IT to improve firm performance, investing millions of dollars in IT developments. Traditionally IT investments are undertaken to support organisations to achieve their business goals (Kahre et al. 2017). However, IT expenditure does not automatically guarantee improvements in firm performance. Business-IT alignment is an important and much needed field of study as it allows an understanding of the degree of business and IT congruence, and how

improvements in alignment can lead to better performing organisations (Chan and Reich 2007; Kahre et al. 2017).

This paper presents a comprehensive literature review on existing business-IT alignment to present how and what aspects of business-IT alignment researchers have focused on. This paper strongly supports the work of Chan and Reich (2007) on business-IT alignment and compliments their thinking through the development of a taxonomy for researchers in this field to build their alignment studies on. The paper then presents a case that used this taxonomy to investigate alignment of big data in the context of healthcare. The case demonstrates that the use of this taxonomy was beneficial and strengthened (in a conceptual way) our ongoing alignment research. It is expected that this taxonomy will also be relevant to other alignment scholars working in this space through providing a conceptual platform which they can use dependent on their own needs.

The sections that follow include theoretical foundations of alignment, which discusses the pertinent literature that provides the basis for the taxonomy. This is followed by a discussion on the development of the taxonomy and its potential use. The discussion also presents a case on alignment featuring the application of the taxonomy. Finally, the conclusion section draws the paper together by giving recommendations and discussing implications.

Theoretical Foundations

Being one of the dominant fields in information systems (IS) research for the past three decades, alignment has been conceptualised in many different ways throughout the literature. Most typically, alignment refers to the "fit" between business and IT (Henderson and Venkatraman 1992). Business strategy, business goals and business objectives are central to investigating business-IT alignment. Business strategy typically refers to the business plan/ approach that is followed by the organisation. It is the method of achieving a specific business goal or an objective. According to Michael Porter "strategy is the creation of a unique and valuable position, involving a different set of activities" (Porter 1996, p18). The three key areas a business strategy addresses are: (i) business scope, (ii) distinctive competencies, and (iii) business governance (Henderson and Venkatraman 1992). Business scope is the choices that the business makes relating to its products, services and the market. Distinctive competencies are the attributes of the strategy such as quality, pricing and channels, which aims to bring competitive advantage. Business governance include procedures around business administration such as joint ventures and strategic alliances (Henderson and Venkatraman 1992).

Miles and Snow (1978) outline a typological classification which identifies four types of business strategies: (i) defender, (ii) prospector, (iii) analyser, and (iv) reactor. A Defender strategy aims to capture a specific portion of a potential target market. This type of strategy allows businesses to achieve competitive advantage by becoming more successful in catering to existing markets with existing products. Defenders enforce high entry barriers to competitors by producing standard high quality products or services at low prices. As opposed to defenders, prospectors constantly look for new product and market opportunities. A prospector strategy is a creator of change and innovation, and invests heavily on research and development as well as environmental scanning. As change is embraced by businesses with prospector strategies, a higher level of flexibility in technology is required. Analyser lies between the two extremes of defender and prospector, and is a combination of both. Analyser strategies seek to minimise risk while maximising opportunities for growth. Although a constant domain of core products is maintained by analysers, this type of business continuously scans for new products and markets. Typically, analysers follow a prospector. A reactor type strategy is defined as a residual strategy, which appears when other strategy types are not properly followed or when in transition from one type of strategy to another. Therefore, later it was indicated that reactor type is identified as not following a conscious strategy. Consequently, reactor was claimed as an invalid type therefore is not included in new versions of Miles and Snow typology. Similar to business strategies, businesses also develop IT strategy that reflects how IT is planned in an organisation (Kanungo et al. 2001). It is typically considered as a functional strategy that focuses on IT capabilities that leverage competitive success (Henderson and Venkatraman 1992). Earl (1989) outlines three categories of IT strategy focus: (i) IS strategy (focuses the business applications of the information systems), (ii) IT strategy (focuses

on technology and related policies) and (iii) Information Management (IM) strategy (focuses on roles for management of IS).

In order to investigate alignment of business and IT strategies, researchers have conceptualised alignment in numerous ways. Henderson and Venkatraman (1992) proposed a conceptual model – the Strategic Alignment Model, which identifies three types of alignment: bivariate fit, cross-domain alignment and strategic alignment. Reich and Benbasat (1996) conceptualise studying business-IT alignment through two dimensions: social and intellectual. Chan and Reich (2007) grounded in past business-IT alignment literature identify different dimensions: strategic/intellectual, structural (formal and informal), social and cultural; and levels: organisational, operational, project, and individual. A paper by Gerow et al. (2014) characterize six types of alignment as intellectual, operational, plus four types of cross domain alignment (strategy execution, technology transformation, competitive potential and service level). Additionally, researchers have emphasised that alignment can be studied as an end state as well as a process (Chan and Reich 2007; Dulipovici and Robey 2013; Sabherwal and Chan 2001). Following is a detailed discussion of these different conceptualisations.

Strategic Alignment Model (Types of Business-IT Alignment)

As mentioned, Henderson and Venkatraman (1992) proposed the Strategic Alignment Model (SAM), which identifies three types of alignment: bivariate fit, cross-domain alignment and strategic alignment. The model explores the degree of fit between the domains of business strategy, organisational structure (refers to measures of administrative structure, processes and skills), IT strategy and IT infrastructure (the configuration of the organisation's technical elements) (Henderson and Venkatraman 1992).

Bivariate fit in the SAM model refers to the simplest form of alignment; it represents alignment at any two domains in the model either horizontally or vertically (e.g., alignment of business strategy and IT strategy, alignment of business strategy and organisational infrastructure, etc.) (Henderson and Venkatraman 1992). Cross-dimensional alignment takes a multi-domain approach to alignment linking any three domains sequentially. Technology exploitation, technology leverage, strategy implementation and technology implementation are identified as the four main perspectives of cross-domain alignment in the SAM model (Henderson and Venkatraman 1992). Strategic alignment according to SAM is much more complex; it takes a more holistic approach giving "simultaneous or concurrent attention to all four domains" (Henderson and Venkatraman 1992, p20). However, scholars referring to business-IT alignment in general too have used the term 'strategic alignment' (Dulipovici and Robey 2013).

Levels of Alignment

Alignment can be studied across different structural levels of an organisation, such as organisational, operational, project, and individual levels (Chan and Reich 2007; Dulipovici and Robey 2013). In addition to this, the sector type can also be identified as a level where alignment is an important consideration and can be studied (Weerasinghe et al. 2018). Ideally, business-IT alignment should be present at all levels but researching all levels at once can be difficult in the scope of a single research project that has limiting parameters. Therefore, researchers are encouraged to focus their work upon the most suitable level for their research question and the context. Figure 2 provides a conceptualisation of how levels of a sector may operate and how alignment could be studied.

Individual alignment represents the most micro-level for studying alignment (Chan and Reich 2007). Studies that explore individual alignment (e.g., Tan and Gallupe 2006) investigate shared cognition of individuals and how this contributes to business-IT alignment within a business context. Such research investigates individuals' work aligning with their user goals. The next level of alignment that can be studied is the **project** level. Jenkin and Chan (2010) define project alignment as "the degree to which the IS project deliverables are consistent with the project's objectives, which are shaped by the organisation's IS strategy" (p37). Inability of a project to face internal and external change triggers may lead to project misalignment which could result in overall business-IT misalignment (Chan and Reich 2007). Misalignment refers to the inefficiencies between business and IT and often promotes changes to the existing IT eco-system (Dulipovici and Robey 2013).

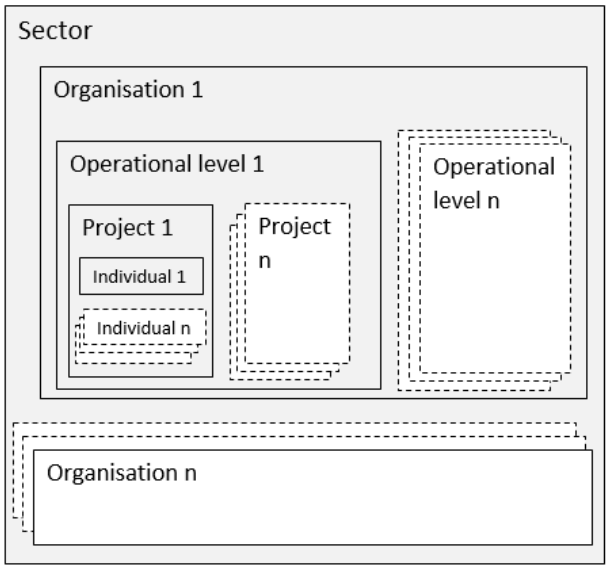

Figure 2: Levels of Alignment

Organisational strategies are often developed at the higher levels of the organisation (i.e., strategic level), while they are executed at a lower level (i.e., operational level). When studying **operational** level alignment, the aim is to understand the alignment of these strategic business goals as they are put into practice at lower levels of the organisation (Chan and Reich 2007). For example, human resource management (HRM) is a key business operation. The higher level goals for HRM may include training goals supported by IS. The goals are realised at the operational level (human resource department). Investigating alignment of the goals that can only be realised with the support of IS used can be identified as an operational level alignment study. **Organisational** level on the other hand identifies broader organisational goals (e.g., a three-year sales goal). Alignment studied at the organisational level refers to the level of integration of organisational goals and strategies with IT. Researchers looking at organisational level alignment, explore the organisation as a whole and investigate different players across the organisation (Chan and Reich 2007).

Apart from the above levels identified by Chan and Reich (2007), few alignment studies in literature have investigated alignment across a sector (e.g., Alghazi et al. 2017; Yusof et al. 2008). Sector refers to an identified industry (e.g., healthcare, banking and so forth), and researchers studying sector level alignment should explicitly state the boundaries. **Sector** level alignment is the most complex, as it requires investigating different categories of players across the sector to provide a complete picture (Weerasinghe et al. 2018).

Dimensions of Alignment

Reich and Benbasat (1996) conceptualise studying business-IT alignment through two dimensions: social and intellectual. Chan and Reich (2007) grounded in past alignment literature and complimenting dimensions conceptualised by Reich and Benbasat (1996) identify four different dimensions: strategic/intellectual, structural (formal and informal), social and cultural. This section will discuss those four dimensions of business-IT alignment.

Strategic/intellectual Dimension

The strategic dimension of alignment is conceptualised as the degree of fit between business strategy and IS/IT strategy and plan (Chan and Reich 2007; Jenkin and Chan 2010). Similarly, the intellectual dimension of alignment discussed by Reich and Benbasat (1996) refers to having a higher level of agreement between business and IT plans. Therefore, the strategic/intellectual dimension of alignment could be conceptualised as the alignment between the organisations' business strategy and the intended use of its IT plan. Research that looks at business-IT alignment through this dimension often maps the

business strategy attributes with IT strategy attributes to assess alignment (e.g., Sabherwal and Chan 2001).

Structural Dimension

The structural dimension refers to the congruence between the organisation's structure and IT. According to Chan (2002), structural alignment observes IS skills/business skills, centralised/ decentralised reporting relationships, career paths, cross-functional linkage, incentives, rewards and performance measures. Chan and Reich (2007) noted that although typical investigation of structural dimension focuses on formal structural division of the organisation, adapting an informal structural lens to examine alignment is also beneficial. Informal structure is defined as "relationship-based structures that transcend the formal division of labour and coordination of tasks" (Chan and Reich 2007, p301).

Cultural Dimension

The cultural dimension denotes the degree of agreement between the approach taken to implement the IT strategy and organisational culture of the firm. The IT planning should be consistent with the cultural elements such as employee mind-set, top management communication style and business planning style. As stated by Chan and Reich (2007), studies show that it is important to align IT with the company culture (Pyburn, 1983).

Social Dimension

IT implementation involves utilisation of a set of technological, social and organisational interactions. It could mean having to deal with groups of stakeholders with different interests, interpretations and perceptions of IT and its purpose (Gal and Berente 2008). Thus, the social dimension of alignment explores how IT is perceived by different players at different levels of the organisation. Further, the social dimension has strong ties with individual level alignment (Chan and Reich 2007). According to Reich and Benbasat (1996) the social dimension can be defined as "the level of mutual understanding of commitment to the business and IT mission, objectives and plans" (p.58). Unpredictable social aspects influence the business-IT alignment of an organisation; accordingly, the social dimension of alignment explores the situated use of IS to determine how users perceive and understand IT implementation and how it is actually used (Dulipovici and Robey 2013). Compared to strategic/ intellectual and structural dimensions of alignment, fewer studies have been carried out to investigate the social dimension of alignment. Tan and Gallupe (2006) and Dulipovici and Robey (2013) are two studies found in the literature investigating business-IT alignment through a social dimension lens.

States of Alignment

Jenkin and Chan (2010) conceptualise alignment through two components: (i) the process of aligning, and (ii) the outcome. This promotes the idea that alignment studies can be framed through two states: as a process and as a (end) result (Chan and Reich 2007). Alignment is considered as a process where it will be ongoing and parallel to the changes in internal and external factors influencing an organisation. A process approach looks at a sequence of events where as the result approach is typically an identified outcome (Jenkin and Chan 2010). The result (outcome/ end state) approach investigates a point of failing or achieving alignment with core business objectives (Tallon 2007).

Environments to Study Business-IT Alignment

Chan and Reich (2007) in their review of the alignment literature identify that while organisations must be aligned internally in different aspects (i.e., levels, dimensions) they must also be aligned externally with industry and technology forces positioning business in the external product-market space (Chan and Reich 2007; Henderson and Venkatraman 1993). This provides the rationale for studying alignment with its environment conceptualised as internal and external.

Discussion

Drawing on the literature outlined in the previous section, this discussion section focusses on the development of a taxonomy of business-IT alignment conceptualisations. The paper then goes on to present an application of the taxonomy using a case study to illustrate the taxonomy's applicability and effectiveness.

Development of a Taxonomy for Alignment

All conceptualisations of alignment present ways in which business-IT alignment can be studied. The literature provides researchers with different conceptualisations to look at business-IT alignment, but what seems to be missing is a taxonomy of these different conceptualisations, which can be used to guide future alignment studies (see Table 1). Use of this taxonomy will aid business-IT alignment researchers in establishing a robust framework for their alignment study by identifying an appropriate lens to study alignment through the identification of type, level, dimension, state and environment. This taxonomy represents different types of conceptualisations as classes and identifies characteristics/aspects of each class as properties.

Table 1. Taxonomy of Alignment Conceptualisations

Classes	**Properties of Each Class**					
Types	Bivariate fit		Cross-domain alignment		Strategic fit	
Levels	Organisational	Operational	System	Project	Individual	Sector
Dimensions	Strategic/Intellectual		Structural (Formal/Informal)		Social	Cultural
States	End (Result)			Process		
Environment	Internal			External		

The idea of this taxonomy is that, when studying business-IT alignment one property of each class can be identified to frame the study. For example, a type of alignment (e.g., bivariate fit) would be studied at an identified level (e.g., project) within an identified environment (e.g., internal). The researcher should distinguish the most suitable dimension (e.g., cultural) for investigating alignment; dimensions are typically used as lenses to observe business-IT alignment. Based on the purpose of the research, the state of alignment (e.g., process) to be examined should also be determined. Having selected properties for each alignment class in the taxonomy researchers will be able to build a conceptual framework to carry out their own alignment study.

Some studies in the existing alignment literature tend to conceptualise alignment with one property from all of the classes in the taxonomy; although they do not clearly acknowledge such conceptualisations (e.g., Dulipovici and Robey 2013). Dulipovici and Robey (2013) studied bivariate fit of a knowledge management system (project alignment) by investigating perceptions on individuals (social dimension) within the organisation (internal environment). Because their investigation was focussing on the process of the system being developed they have studied alignment as a process. It is also noted that, some studies only pay attention to features from one or two classes of the identified conceptualisations of alignment (e.g., Bush et al. 2009). As such, the validity could be further improved. Indeed, in some scenarios discussing alignment through all classes may not be possible.

The Case: Alignment of Big Data in Health

This section discusses application of the proposed taxonomy in a case to investigate alignment of big data across the New Zealand (NZ) healthcare sector. This is an important area with the requirement for IT alignment with business strategy so that the health sector gains optimal performance. NZ health system is a forward-thinking system that shows significant developments despite the challenges (MoH, 2014). Being an early adapter of technology for healthcare delivery, NZ health system demonstrates possible positive avenues for big data applications (Weerasinghe et al. 2018). Therefore, it is identified

as an ideal context to study business-IT alignment and is taken as the case context to report application of the developed taxonomy.

The increasing use of information systems in healthcare, together with rising patient populations, diseases and medication, generates enormous amounts of unstructured and complex data (Ward et al. 2014). This data depicts characteristics of big data, which is commonly known as 3V's: volume (large in size), variety (many different types of data), and velocity (availability of data in near real-time) (McAfee and Brynjolfsson 2012). Performing advanced analytics to analyse big data has resulted in identifying two additional Vs': veracity (accuracy of data) and value (potential value that can be created) (Kacfah Emani et al. 2015). Technological developments around big data analytics to create value from big data have opened promising avenues for healthcare to make use of big-healthcare-data for more effective healthcare management and delivery (Mace 2014).

Implementing big data capabilities in traditional businesses like healthcare requires the management of change in the socio-technical aspects of an organisation such as analytics platforms, IT architecture, IT infrastructure, security measures, required expertise and organisational structure (Weerasinghe et al. 2018). Such change may influence business-IT alignment and therefore is important to be investigated (Bush et al. 2009). However, alignment studies are often complex and challenging (Chan and Reich 2007). The complicated nature of the NZ healthcare sector along with big data has increased this complexity making it difficult for the researchers to frame the study to investigate alignment of big data. The use of the taxonomy to identify aspects to study has not only simplified the study but also informed the development of a conceptual framework to guide the research. The aspects of alignment identified as important to study are highlighted in Table 2 and the rationale for selection is discussed.

Table 2. Application of Taxonomy for the case of NZ healthcare

Classes	**Properties of Each Class**					
Types	Bivariate fit		Cross-domain alignment		Strategic fit	
Levels	Organisational	Operational	System	Project	Individual	Sector
Dimensions	Strategic/Intellectual		Structural (Formal/Informal)		Social	Cultural
States	End (Result)			Process		
Environment	Internal			External		

Because of the complex nature of big data and its potential to transform business activity, researchers investigating alignment of big data need to pay attention to business strategies, structures, big data strategy and infrastructure. Based on this requirement for understanding, the case study presented investigates strategic fit of big data. In the NZ healthcare context, big data projects have their roots across the sector. Such projects may be strategized by the policy makers, but planned by different organisations and used by other organisations making them sector wide projects as opposed to single organisational projects (Weerasinghe et al. 2018). This suggests a high degree of complexity and there is little understanding of the degree to which alignment occurs. As such, alignment across the sector is being investigated. Due to the complexity of the NZ health sector, three sub sector levels were identified to be investigated: macro (policy makers), meso (planners, funders and vendors) and micro (healthcare providers) (Scahill 2012; Weerasinghe et al. 2018).

Because big data is a technological phenomenon, technical dynamics of big data (challenges, opportunities, security measures, etc.) have been extensively researched but little emphasis has been placed on understanding social dynamics (perceived value, usability, etc.) (Shin 2015). In order to study the social dynamics our work uses the social dimension of alignment as a lens. This study focuses on internal alignment by capturing data from the three subsector levels, which includes policy makers, planners and funders, IT vendors and healthcare providers regarding their perceptions of big data in the New Zealand health system. Had the study investigated alignment across the sector by looking into how other related bodies (i.e., education providers, connected government bodies) align with the healthcare sectors' current state of big data this study would have been investigating the external environment. However, healthcare software vendors do not fall into the external environment, as they form part of

the health system itself. Understanding alignment as a process as opposed to an end state addresses the potential of having various degrees of alignment across the sector. Therefore, it is anticipated that some organisations across the healthcare sector may have different levels of alignment with big data than others.

This identification of alignment conceptualisations has informed the development of a conceptual framework to underpin the case investigation (see Figure 3).

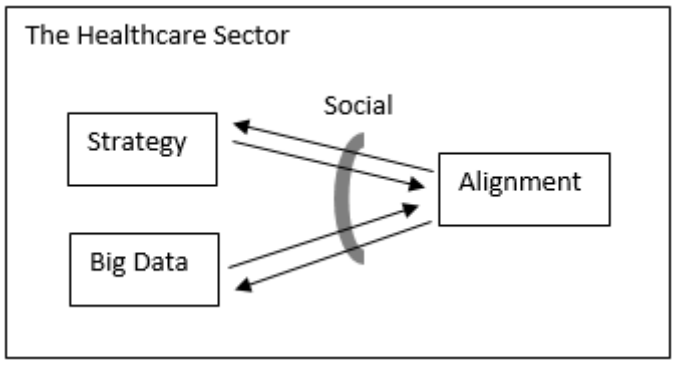

Figure 3: Conceptual Framework based on taxonomy

As shown in the Figure 3 big data and healthcare strategy is studied for its strategic fit, exploring the internal environment of the healthcare sector through a social dimension lens. The two way arrows in the conceptual framework represent the idea that the state of alignment studied is a process with the assumption being made that big data and strategy will be continuously changing to align with each other. Use of the above taxonomy has strongly shaped the case study and helped the researchers to understand what is important to study in such a vast and complex context. Alignment is investigated within the identified subsector levels and then across them to gain a sector wide perspective.

Conclusion

Business-IT alignment has been in existence for over 30 years resulting in large amounts of literature and many valid yet disparate ways of investigating it. Researchers often find alignment studies cumber-some and complex due to this diversity (Chan and Reich 2007). This paper contributes to both theory and practice of business-IT alignment. A gap in literature was identified with a need to bring together all existing work into a robust framework to underpin our ongoing alignment work and to provide a sound platform for other alignment researchers to use. Thus, a taxonomy was developed grounded on literature. Theoretically, the taxonomy is a much needed development for the alignment literature. It brings together different conceptualisations of alignment under one frame, which has been fragmented. The paper presents a case study applying the developed taxonomy demonstrating the validity and applicability. The case study, which investigates alignment of big data in the healthcare context, demonstrates a solid foundation to the work by applying the developed taxonomy. The developed conceptual framework based on the direction provided by the taxonomy provides the researchers with a robust foundation upon which to understand the concept of business – IT alignment.

Practically, the developed taxonomy provides a sound platform for business-IT alignment research for both novice and experienced alignment researchers. This foundation has reduced the complexity of our research by providing a platform, which reduces complexity when moving forward with our alignment studies. It is expected to offer the same for other alignment researchers whilst bringing a degree of rigor into alignment studies and helping to streamline the pathway for ongoing alignment research. Therefore, we recommend that alignment researchers use this taxonomy to frame their business-IT alignment research in any context.

Proposed future work includes carrying out an empirical study based on the conceptual framework to investigate business-IT alignment to validate the use of the taxonomy in practice. In addition, further validation of the taxonomy in different contexts both conceptually and practically is required.

References

Alghazi, A., Li, M., Shen, J., and Fosso Wamba, S. 2017. Aligning Business Strategy with IT Strategy from Business Model to Enterprise in Saudi Arabia Public Sector. Paper presented at the 21st Pacific Asia Conference on Information System, Australia.

Bush, M., Lederer, A. L., Li, X., Palmisano, J., and Rao, S. 2009. "The alignment of information systems with organizational objectives and strategies in health care," International Journal of Medical Informatics (78:7), pp. 446-456.

Chan, Y. E. (2002). "Why haven't we mastered alignment?" The importance of the informal organization structure. MIS Quarterly (1:2), pp. 97-112.

Chan, Y. E., and Reich, B. H. 2007. "IT alignment: what have we learned?" Journal of Information Technology, (22:4), 297-315.

Drazin, R., and Van De Ven, A. H. 1985. Alternative Forms of Fit in Contingency Theory. Administrative Science Quarterly (30:4), pp. 514-539.

Dulipovici, A., and Robey, D. 2013. "Strategic Alignment and Misalignment of Knowledge Management Systems: A Social Representation Perspective," Journal of Management Information Systems (29:4), pp. 103-126.

Earl, M. J. 1989. Management strategies for information technology: Englewood Cliffs, NJ: Prentice-Hall.

Gerow, J. E., Thatcher, J. B., and Grover, V. 2014. "Six types of IT-business strategic alignment: an investigation of the constructs and their measurement," European Journal of Information Systems (24:5), pp. 1-27 (doi: 10.1057/ejis.2014.6).

Henderson, J. C., and Venkatraman, N. 1992. "Strategic Alignment: A Model for Organizational Transformation through Information Technology", in Transforming organizations, T. A. Kochan and M. Useem (eds.), New York: Oxford University Press, pp. 97-116.

Henderson, J. C., and Venkatraman, N. 1993. "Strategic alignment: leveraging information technology for transforming organizations," IBM systems journal (32:1), pp. 472-484.

Jenkin, T. A., and Chan, Y. E. 2010. "IS project alignment - a process perspective," Journal of Information Technology (25:1), pp. 35-55.

Kacfah Emani, C., Cullot, N., and Nicolle, C. 2015. "Understandable Big Data: A survey," Computer Science Review (7), pp.70-81 (doi: 10.1016/j.cosrev.2015.05.002)

Kahre, C., Hoffmann, D., and Ahlemann, F. 2017. Beyond Business-IT Alignment-Digital Business Strategies as a Paradigmatic Shift: A Review and Research Agenda. Paper presented at the The 50th Hawaii International Conference on System Sciences.

Kanungo, S., Sadavarti, S., and Srinivas, Y. 2001. "Relating IT strategy and organizational culture: an empirical study of public sector units in India," The Journal of Strategic Information Systems (10:1), pp. 29-57 (doi: 10.1016/S0963-8687(01)00038-5)

Kappelman, L. A., McLeon, E., Luftman, J., and Johnson, V. 2013. "Key issues of IT organizations and their leadership: The 2013 SIM IT trends study," MIS Quarterly Executive (12:4), pp. 227-240.

Li, X., and Palvia, P. C. 2017. Business-IT Alignment Maturity in the US and China: Perspectives of IT and non-IT Employees. Paper presented at the Americas Conference on Information Systems, Boston.

Luftman, J. N. 1996. Competing in the information age: strategic alignment in practice: New York: Oxford University Press.

Mace, S. 2014. "Big Data and the Analytics Imperative," HealthLeaders Magazine (17:9), pp. 12-24.

McAfee, A., and Brynjolfsson, E. 2012. "Big Data: The Management Revolution," Harvard Business Review (90:10), pp. 60-68.

Miles, R. E., and Snow, C. C. 1978. Organizational strategy, structure, and process. New York: McGraw-Hill.

MoH. (2014). Briefing to the Incoming Minister 2014. Wellington, New Zealand.

Porter, M. E. 1996. What is strategy? in Strategy for Business: A Reader M. Mazzucato (eds.), London: SAGE Publications Ltd, pp. 10-31.

Pyburn, P. J. 1983. "Linking the MIS Plan with Corporate Strategy: An Exploratory Study," MIS Quarterly (7:2), pp. 1-14.

Reich, B. H., and Benbasat, I. 1996. "Measuring the Linkage Between Business and Information Technology Objectives," MIS Quarterly (20:1), pp. 55-81.

Sabherwal, R., and Chan, Y. E. 2001. "Alignment Between Business and IS Strategies: A Study of Prospectors, Analyzers, and Defenders," Information Systems Research (12:1), pp. 11-33.

Scahill, S. L. 2012. "The 'Way things are around here': organisational culture is a concept missing from New Zealand healthcare policy, development, implementation, and research," New Zealand medical journal (Online).

Shin, D.H. 2015. "Demystifying big data: Anatomy of big data developmental process," Telecommunications Policy (40:9), pp. 837-854.

Tan, F. B., and Gallupe, R. B. 2006. "Aligning Business and Information Systems Thinking: A Cognitive Approach," IEEE Transactions on Engineering Management (53:2), pp. 223-237 (doi:10.1109/TEM.2006.872243)

Ward, M. J., Marsolo, K. A., and Froehle, C. M. 2014. "Applications of business analytics in healthcare," Business Horizons (57:5), pp. 571-582 (doi: 10.1016/j.bushor.2014.06.003)

Weerasinghe, K., Pauleen, D., Scahill, S., and Taskin, N. 2018. "Development of a Theoretical Framework to Investigate Alignment of Big Data in Healthcare through a Social Representation Lens," Australasian Journal of Information Systems, (22).

Yusof, M. M., Kuljis, J., Papazafeiropoulou, A., and Stergioulas, L. K. 2008. "An evaluation framework for Health Information Systems: human, organization and technology-fit factors (HOT-fit)," International Journal of Medical Informatics (77:6), pp. 386-398.