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Making the information technology-business alignment works: a framework of IT-based competitive strategy

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Abstract: Seamless IT-business integration enables superior performance and provides value creation opportunities for an enterprise to achieve a sustainable competitive advantage. Yet, creating IT-business alignment remains a challenge. Some users consider the existing IT-business alignment methodologies too complicated for practical implementation. This paper proposes a simplified and practical framework, an IT-based competitive strategy framework, to align an IT strategy with enterprise businesses based on a design science research methodology. The framework consists of three elements to formulate a comprehensive IT-based strategy, i.e., value drivers of IT implementation, competitive factors and an IT competitive strategy. The framework evaluation includes interviewing experts and practitioners, applying the proposed framework in an Indonesian enterprise and assessing the framework benefits on a qualitative basis. The observational evaluation with the experts concludes that the proposed framework is helpful for the targeted users. The framework application in a company also demonstrates the advantage and the usefulness of the proposed framework.

Keywords: IT-business alignment; IT-based competitive strategy; IT-business alignment framework; competitive strategy; IT strategy; IT management.

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Ferry Jie is an Associate Professor at the School of Business and Law in Edith Cowan University. He has published more than 53 articles in leading journals and conferences. In addition, he has received Endeavour Award Research Fellowship in 2014 funded by Australian Government.

1 Introduction

Information technology (IT) has become a vital and integral part of a business process in an enterprise. IT serves as an enabler and a support for an enterprise to achieve a sustainable competitive advantage (Powell and Dent-Micallef, 1997; Drnevich and Croson, 2013; De Haes and Van Grembergen, 2016). IT enables a business to perform its core and supporting activities in its value chain either at a lower cost (Drnevich and Croson, 2013), differently (Melville et al., 2004) or at a superior quality (Ye and Wang, 2013; Stadtler, 2015). An intelligent supply management system can facilitate low-cost leadership by directly linking consumer and market behaviour to production, supply chain and distribution (Trkman et al., 2007; Ye and Wang, 2013; Hugos, 2018). An appropriate application of an information system and technology supports innovative ways to do the business (Powell and Dent-Micallef, 1997; Melville et al., 2004; Wang et al., 2015), e.g., strengthening customer relationship, encouraging product/service innovation and creating highly potential opportunities. These capabilities are the sources of competitive advantages for an enterprise to create unique sets of skills, assets and strategies that enable superior performance compares to other enterprises in the same field (Melville et al., 2004; Drnevich and Croson, 2013; Stadtler, 2015; Wang et al., 2015).

Creating competitive advantage requires aligning an IT implementation strategy with business needs (Bhatt and Grover, 2005; Cui et al., 2015; Wang et al., 2015). A set of framework and methodologies has been proposed to align an IT implementation strategy with an enterprise business vision. Some of the methodologies are enterprise architecture (EA) (Lankhorst, 2013; Simon et al., 2014), IT governance (Cater-Steel, 2008; Tallon et al., 2013; Wu et al., 2015) and IT-business alignment methodologies (Chan and Reich, 2007; Luftman et al., 2017). Whilst these alignment methodologies include theoretical background, complete guidance and practical step-by-step activities, applying those effectively in an enterprise work is an uphill struggle (Bernaert et al., 2016). For example, most of EA stakeholders consider EA content too complicated to be implemented in daily enterprise work (Kruchten, 1999; Puspitasari, 2016). An EA model is usually large and over-engineered, thus making it more difficult to implement (Bernaert et al., 2016). Another case is the application of COBIT (formerly: control objective for information and related technology) 5 to implement enterprise governance of IT (EGIT). COBIT 5 is a comprehensive framework whose implementation in an enterprise involves a large number of objects, processes and relations, resulting in highly complex models (Bartens et al., 2015).

Strategic alignment between IT infrastructure and business needs is essential in any enterprises, regardless of its type, size and situation. New enterprises and small medium enterprise (SMEs) do not usually have adequate skills and resources to implement the existing methodologies. They also encounter difficulties in employing experts and

consultants. Therefore, these enterprises need practical and less complex methodologies to initiate IT-business alignment effort and to formulate proper IT strategy. For enterprises that experience IT chaos, they also need a practical and quick solution to assist with the reorganisation of their IT management.

To alleviate some of the problems in managing IT in an enterprise, this paper proposes a framework of IT-based competitive strategy. The framework contains practical and simplified guidance to align an IT strategy with enterprise businesses toward creating and sustaining the competitive advantages. At the initial phase of IT management, especially in SMEs, this framework serves as a shortcut tool in formulating an IT strategy. The framework facilitates a rapid development of an IT strategy using simplified procedures and less complicated models. For enterprises whose IT management is in a turmoil phase, the proposed framework can be used as a tool to re-identify the value driver of their IT implementation and to revise their IT strategy. The outcome of the framework application can be mapped and developed further using other methodologies in accordance with the enterprise's needs.

2 Research design

This paper adopted *design science research* methodology (Gregor and Hevner, 2013). *Design science research* in information system research focuses on the producing of the IT/IS artefact and evaluating its relevance on the application domain (Hevner et al., 2004). The design science paradigm encompasses three design science cycles in each research project, i.e., relevance cycle, design cycle and rigor cycle. The relevance cycle identifies the requirements for research, defines the problem and opportunities statement from the environment and returns the research output to the environment for study and evaluation purposes. The design cycle consists of core activities of building and evaluating artefacts. The artefacts in design science research include constructs, models, frameworks and instantiations (Hevner et al., 2004). The rigor cycle provides a foundation from knowledge-base that underlies the research project.

Figure 1 exhibits the presence of relevance, design and rigor cycles in this research. The relevance cycle provides a problem statement based on the observation in the contextual environment (i.e., enterprises) and a means to implement artefacts in the application domain. The design cycle consists of the following activities:

1 Drawing on the environmental observation and the literature study synthesis, this paper examines the key elements of a practical and comprehensive strategy formulation. It aims to study the phenomenon, challenges and discrepancies between the expected and the actual outcome in IT management practice and to discover enterprises' actual needs. The observation outcome is used to formulate a research problem and to identify the element of the proposed solution. The research problem in this study addresses the difficulty and complexity in managing IT-business alignment, specifically in SME, enterprise whose IT management is at the initial phase and enterprise whose IT management is in turmoil. The proposed solution provides a practical and simplified guidance to alleviate the existing complexity problem, i.e., IT-based competitive strategy framework.

2   Analysis of the framework elements, which provides the construct to build the framework. The construct is derived from the phenomena (people, system, technology, process) observation and exploration (Hevner et al., 2004).

3   Development of IT-based competitive strategy framework, which consists of the formulation of a competitive strategy using IT and the application of the IT-based competitive strategy framework.

4   Evaluation of the framework. The evaluation method is an observational case study at an internet service provider (ISP) company in Indonesia. This evaluation includes the use of the framework to formulate a competitive strategy in the case study and the analysis of feedback results from contextual interviews and surveys.

The rigor cycle provides knowledge-base from prior research projects and best practises in the field of IT-business alignment methodology and IT strategic management. The result of this study also contributes to the development of related knowledge-base. The artefacts of this study consist of a construct (the element of the framework) and a model (IT-based competitive strategy framework).

Figure 1   Research methodology (see online version for colours)
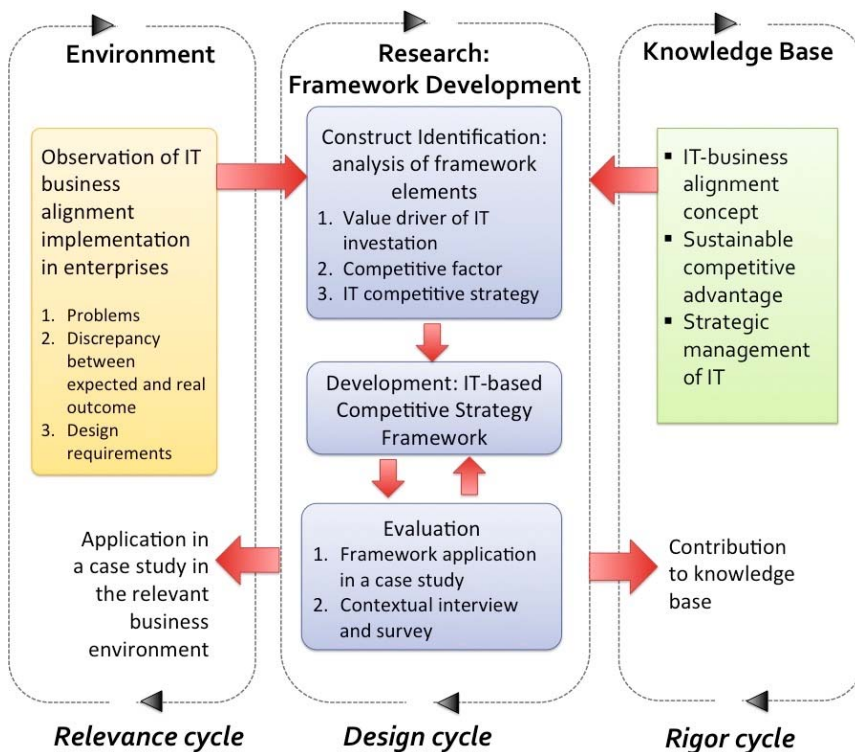
3 Managing IT in business: from IT governance to EA

Aligning an IT strategy with business needs has been a top managerial issue since the implementation and integration of IT in business (Reich and Benbasat, 2000; Luftman et al., 2017). Despite the pervasive role of IT in business, IT value delivery in an enterprise remains a concern. To enhance the capability of IT to meet business requirements, a number of frameworks, best practises and tools have been developed. These includes IT governance framework such as COBIT 5 (De Haes et al., 2013); IT infrastructure library (Cannon, 2011) and EA framework such as Zachman (1999) framework and The Open Group (2009) architecture framework.

IT governance concerns with the achievement of strategic alignment between the objectives of an enterprise and the utilisation of IT in order to achieve these objectives more effectively (Ernest et al., 2004; Buchwald et al., 2014). One of the most widely implemented IT governance tools is COBIT. As a comprehensive framework, COBIT involves a large number of objects, processes and models. Its implementation is perceived as highly complex (De Haes et al., 2013; Bartens et al., 2015); it requires time and efforts to understand COBIT as a framework before it could be practically implemented in an enterprise (Simonsson et al., 2007). The next challenging issue is related to how to start COBIT implementation (Zhang and Le Fever, 2013; Bartens et al., 2015), e.g., which processes are crucial in the starting point, how to develop IT policies and procedures based on COBIT.

Another global standard of best practises in IT service management is information technology infrastructure library (ITIL). In previous studies, researchers concluded two major reasons of ITIL implementation in enterprises, namely to strengthen the customer service and to obtain effective and transparent IT governance (Cater-Steel and Tan, 2005; Pollard and Cater-Steel, 2009). Whilst ITIL provides holistic guidance of IT service management, applying the framework effectively in an enterprise is challenging. ITIL provides general guidance on what process to implement in an enterprise without detailed explanation of how to implement the process (Shang and Lin, 2010). Thus, it commonly requires experts or consultants to assist ITIL implementation in an enterprise. Another issue is quantifying the benefit of ITIL implementation (Cater-Steel and Tan, 2005; Shang and Lin, 2010) due to the nature of the framework.

Managing IT service and infrastructure requires an integrated view of the enterprise organisational system. EA provides an integrated enterprise blueprint in the form of principles, methods and models to design organisational structure, business process, information system and IT infrastructure (Lankhorst, 2013). While the benefit of EA has widely recognised, its application is generally complicated and potentially problematic. The development of EA requires a lot of effort and resources (Morganwalp and Sage, 2004), while the benefits are perceived not directly measurable (Schmidt and Buxmann, 2011).

Strategic alignment between IT strategy and business need is the essential prerequisite to improve the enterprise's performance (Reich and Benbasat, 2000; Luftman et al., 2017), to optimise the return on investment (Abareshi, 2011), to increase the enterprise's business value (Mitropoulos, 2012; Luftman et al., 2017) and to achieve sustainable competitive advantage (Gerow et al., 2014; Miller et al., 2014). However,

most methodologies and frameworks of IT-business alignment are complex and not suitable in some situations, such as for an enterprise in the initial phase of managing its IT, for SMEs and for an enterprise whose IT management is in a turmoil state. New enterprises and SMEs do not usually have adequate skills and resources to implement the existing methodologies. Most SMEs also do not have a dedicated IT department and tend to perceive the benefits of IT in short-term. Therefore, these enterprises need practical and less complex methodologies to initiate IT-business alignment effort and to formulate proper IT strategy. For enterprises that experience IT chaos, they also need a practical and quick solution to assist with the reorganisation of their IT management.

4   IT-based competitive strategy framework

An enterprise operates and interacts with other external entities in a competitive environment. An enterprise strategy defines its performance in its environment. Since the competitive environment has moved to a digital economy (Turban et al., 2007), running an enterprise now relies on an IT-related system and management. Thus, formulating an IT-based enterprise strategy is essential in today's economy. Formulating the strategy requires in-depth understanding of an enterprise vision to assure a strategic IT-business alignment since the beginning of the IT management initiative. IT should be governed by focusing on information that supports a business vision (Bartens et al., 2015).

Table 1   Justification for each framework element

Elements	Justification
Value driver of IT implementation	• Analysing the value driver(s) is an essential element of IT governance (Peterson, 2004).
	• One of the key steps in the initial stage of EA development (The Open Group, 2009). The value driver(s) of IT implementation refer to any factor that boosts the total value created by proposing an IT-based solution.
	• The value drivers of IT determine the IT level position in an enterprise (Nath and Standing, 2010).
Competitive factor	• Bowman (2003) and Lucas (2005) stated in their studies, competitive factors increase the efficiency of an enterprise's competitive strategy.
	• Identifying competitive factors is required to formulate an enterprise's competitive strategy.
	• The competitive factor and IT capabilities establish the competitive actions. The competitive actions are the prerequisite towards superior business performance (Chae and Prybutok, 2015).
IT-based competitive strategy	• IT strategy does not only reflect the business vision, but also enables a value creation and enhances enterprise capabilities.
	• A study of selective implementation of COBIT 5 revealed that the manage strategy process (APO 02) was the most important process in COBIT 5 according to nine COBIT experts (Bartens et al., 2015).
	• Strategy formulation is one of the key constituents of strategic dimensions in EA (Simon et al., 2014).

This study proposes a framework to formulate an IT-based strategy. The framework focuses on the practical approach and contains only essential elements to enable a

strategy formulation in a time-efficient manner. Drawing on the knowledge-based synthesis and the environmental observation, the requirements for the proposed framework are:

1   Holistic view: the framework provides guidance based on the enterprise-wide perspective to ensure the alignment of all elements in the enterprise. The solution works for the enterprise as a whole rather than within individual department.

2   Simplicity: the framework focuses on the practical approach and contains only the essential elements to translate the enterprise vision into daily management and operation, which is driven by IT.

3   Suitability: the framework is designed to suit the target audiences and to minimise the needs of expert assistance. It can be understood and utilised by people from a different domain, even by those with a limited IT background.

Based on the requirements, the framework consists of three elements to formulate a comprehensive IT-based strategy, i.e., value driver of IT implementation, a competitive factor and an IT competitive strategy. The rationale for each framework element is presented in Table 1. The relationship among these elements constructs the IT-based competitive strategy framework as shown in Figure 2.

Figure 2   The framework development (see online version for colours)
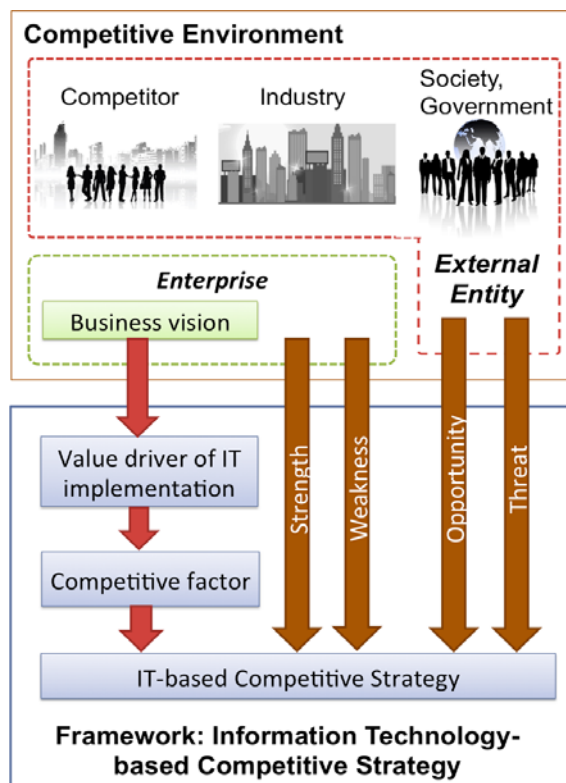
4.1   Value driver of IT implementations

Analysing value driver(s) is an essential element of IT governance (Peterson, 2004) and one of the key steps in the initial stage of EA development (The Open Group, 2009). According to TOGAF, enterprises at their initial maturity levels could use an architectural vision as a starting point. The architectural vision determines the high-level enterprise vision, business goals and strategic value drivers. The value drivers of IT implementation refer to any factors that boost the total value created by proposing an IT-based solution. They come in many forms such as solution integration, cutting edge technology, a cost-efficient business process, an innovation in how to do business and the business outcome, a global collaboration and networking and customer satisfaction. Analysing the right value driver promotes the creation of competitive advantages by aiming at the IT target and development.

The value drivers of IT are derived from enterprise's business visions. The executive and IT manager decide which specific value dimensions to be developed while maintaining other dimensions on an acceptable standard. For example, it is difficult to develop cutting-edge technology and the values of cost-efficient business process simultaneously. Instead, an enterprise can achieve technology leadership in the market while maintaining the cost within a reasonable budget. Based on the IT value model (Ernest et al., 2004) and IT drivers in supply chain (Nath and Standing, 2010), the value drivers determine an IT-level position in an enterprise, i.e., utility, partner and enabler. The utility position provides a standard delivery with lower costs than what a competitor can offer. Reducing costs is the first value driver that should be adopted by new enterprises or SMEs in the initial stage of IT investments. The next position, partner, requires a more complex IT infrastructure to support a collaboration and networking between business units and stakeholders. IT as a partner facilitates business process integration within an enterprise and enhances networking with external stakeholders. IT at the highest-level position enables an enterprise transformation. The drivers in this level are market expansion, business innovation and better customer satisfaction.

4.2   Competitive factors

Recognising the environment is the first step toward achieving competitive advantage (Pitkethly, 2003; Porter, 2011). In digital economy, where most of enterprises operate nowadays, IT is the prerequisite to establish an enterprise's competitive factor. A competitive factor refers to key factors of enterprise advantage that determines enterprise performance and position in its competitive environment (Bowman, 2003; Lucas, 2005). Unique competitive positions in the environment can only be gained and expanded if the enterprise could identify the correct competitive factors to the support business vision and to develop the competitive strategy. As Bowman (2003) and Lucas (2005) stated in their studies, a competitive factor increases the efficiency of an enterprise's competitive strategy. In another study, Chae and Prybutok (2015) stated that the competitive factor and IT capabilities develop the enterprise's competitive actions, a key requirement to achieve superior business performance.

We included a competitive factor as one of the elements in the proposed framework. It extends the strategy formulation, not only to manage the IT department more

efficiently, but also to develop unique capabilities as the source of enterprises' competitive advantage. This unique capability specifies the fundamental basis for strategic choice and the creation of competitive advantage (Simon et al., 2014). Competitive factors depend on the environment where enterprises operate, the characteristics of the industry and the executive perceptions. Enterprise executives and IT managers collaborate to identify competitive factors based on the business vision and the IT implementation value drivers. Some examples of competitive factors are business factors, e.g., business innovative management, the capability to create a new service, a niche market, logistics capabilities, quality service and the capability to create new marketing effort; customer factors, e.g., customer service, personalised service, social media marketing and digital branding; technological factors, e.g., technology infrastructure, distributed networking and interconnected communication.

4.3   IT-based competitive strategy

The importance of IT in today's business is reflected by how it influences and shapes business strategies (Drnevich and Croson, 2013). An IT strategy does not only reflect a business vision, but also enables a value creation and enhances enterprise capabilities. Formulating and managing an IT strategy is one of the essential processes in the governance and management of IT. A study of selective implementation of COBIT 5 revealed that the manage strategy process (APO 02) was the most important process in COBIT 5 according to nine COBIT experts (Bartens et al., 2015).

Formulating an IT-based strategy includes the analysis and identification of capabilities and resources that enterprises can use to gain a competitive advantage over the average industries (Melville et al., 2004; Hsieh and Chen, 2011; Porter, 2011). Despite the importance of IT in shaping the business strategy, IT strategy does not only rely on building an IT infrastructure and service or following the latest technology development, but also involves the use of IT to build up the enterprise's competitive factors. For example, IT can improve customer satisfaction factor by providing helpful customer services and a personalised customer support.

The formulation of an IT strategy requires the articulation of an enterprise's internal domain and the environment's external domain (Henderson and Venkatraman, 1999). A practical and quick way to initiate an IT-strategy formulation is analysing an enterprise's internal strength and weaknesses and identifying the external's opportunities and threats (Simon et al., 2014). The analysis result may range from a list of key points to in-depth elaboration. The next step is mapping each competitive factor to one or more SWOT analysis results. Each competitive factor may correspond to more than one SWOT component. A competitive factor may serve as an enterprise's strength as well as an industrial opportunity. Meanwhile, another competitive factor can be both a current enterprise's flaw and also a growth opportunity. For example, customer support is one of the competitive factors identified in a service company. In the current situation, stakeholders perceive the customer service performance as below expectation based on the customers' reviews and the average time required to deal with customers' request. In the environment where a service company operates, customer support is a decisive opportunity to create a value above the average performance of its competitors.

5   Evaluations

In a design science research, before utilising the artefacts in a field study, all proposed artefacts must be thoroughly evaluated using many potential techniques, such as analytics, case study, simulation and experiment (Hevner et al., 2004; Gregor and Hevner, 2013). In this study, we conducted an observational approach evaluation, which consists of interviewing practitioners and conducting a case study.

5.1   Interview with IT practitioners

The first evaluation, the interviews, was aimed to obtain feedback from experienced professionals and targeted users and to assess the benefit of the proposed framework. We interviewed eight IT practitioners from various enterprises, i.e., two IT industry consultants from a national state company, three academic researchers specialising in IT governance, two production managers responsible for IT infrastructure and service for SMEs and an IT consultant from a consulting firm. We inquired participants' opinion and assessment about three key aspects of the framework evaluation as in Table 2. All interview sessions were audio recorded.

Table 2   Coverage for interview and survey questions

Key evaluation	Interview question	Assessment survey
The suitability of each construct in the framework.	Is each element in the framework required for the strategy formulation?	The suitability of each construct in the framework. (1 = very unsuitable, 5 = very suitable)
	Does each element contribute to the expected outcome of the framework?	
The comprehensiveness of the proposed framework to meet its requirements and objectives.	Does the proposed framework meet the requirements, i.e., delivering holistic view, ensuring suitability and providing simplicity?	The comprehensiveness of the proposed framework to meet its requirements and objectives. (1 = very incomprehensive, 5 = very comprehensive)
	Does the proposed framework comprise adequate elements to aid IT-based competitive strategy formulation?	
The usefulness of the proposed framework for the targeted users.	Does the proposed framework really help in IT-based competitive strategy formulation?	• The easiness of understanding and using the existing frameworks and methodologies. (1 = very difficult, 5 = very easy)
	Does the proposed framework reduce/solve the complexity issue in other methodologies or framework? How does it complement other methodologies or framework?	• The easiness of understanding and using the proposed framework. (1 = very difficult, 5 = very easy)
	Does the proposed framework provide ease of use? Do you think the proposed framework can be understood and utilized by people with a limited background in IT?	• The usefulness of the proposed framework for the targeted users. (1 = very useless, 5 = very helpful)
General feedback	Please explain your overall impression and general feedback of the proposed framework.	---

5.2 Results of the interview

The result of the assessment survey is presented in Table 3. On average, the participants assessed the suitability of each element in the framework as 3.13 (on a scale 1 to 5). The participant from the consulting firm questioned the relation between the value driver of IT implementation and the competitive factor. Participants from SMEs suggested examples of the framework application in case studies. The participants from a national state company acknowledged that the proposed constructs could help the initial strategy formulation. However, the constructs were not adequate to build a comprehensive strategy.

Table 3 Result of assessment survey by experts and practitioners in evaluation 1

Question	Mean	Std. dev.
The suitability of each construct in the framework.	3.13	0.64
(1 = very unsuitable, 5 = very suitable)		
The comprehensiveness of the proposed framework to meet its requirements and objectives.	3.25	0.89
(1 = very incomprehensive, 5 = very comprehensive)		
The easiness of the understanding and using the existing frameworks and methodologies.	2.25	0.89
(1 = very difficult, 5 = very easy)		
The easiness of the understanding and using the ITCS framework.	3.75	0.71
(1 = very difficult, 5 = very easy)		
The usefulness of the proposed framework for the targeted users.	3.38	0.74
(1 = very useless, 5 = very helpful)		

In the case of the comprehensiveness of the framework, the participants gave 3.25 on average (on a scale of 1 to 5). The participant from a consulting firm considered the proposed framework loose in methodology and lacking in detailed procedures, thus the holistic aspect of the framework was questionable. On the contrary, participants from SMEs argued that the proposed framework was sufficiently comprehensive to develop an IT strategy. Academic researchers and IT consultants from national state companies also recognised that the proposed framework captured the essential requirement to transform an enterprise vision to a practical IT-based strategy. However, they argued that the proposed framework was more relevant for the initiation tool in the IT-business alignment effort.

The proposed framework aims to reduce the complexity issue that mostly occurs when adopting methodologies and frameworks to achieve IT-business alignment. In general, most participants found the proposed framework more understandable than the existing methodologies. However, a participant believed that the proposed framework was just as difficult as the existing methodologies. The existing methodologies (e.g., ITIL, ITSM, COBIT and TOGAF) were difficult because of the complexity in the scope, process definition, library and data management. On the other hand, the proposed framework was also considered difficult because it was too simple, hence confusing; there was no detail explanation on the framework methodology and the relation among the framework elements.

All in all, most participants acknowledged that the proposed framework was helpful for the targeted users, i.e., the small-medium enterprise whose resources are limited, the enterprise whose IT management is at its initial phase or has been running ineffectively for an extended period of time. Additionally, seven out of eight participants suggested applying the framework in the targeted user environment to evaluate the framework more thoroughly. Most participants also acknowledged that the framework was excellent in terms of its easiness and practicality compared to other existing methodologies. Participants from national state companies and the consulting firm suggested that the application of IT-based competitive strategy framework should be combined with more developed methodologies or frameworks.

6   The application of IT-based competitive strategy framework in a case study

The second part of the evaluation was using the framework to formulate an IT-based competitive strategy in an ISP in Indonesia. This paper used a pseudonym name MMI Inc. with respect to the consent given by the company for the sake of privacy and security.

6.1   Profile of MMI Inc.

MMI Inc. is one of the ISP pioneers in Indonesia. The company provides high speed internet, TV cable, VPN, mobile data and dial up internet. The prepaid mobile data (PMD) service was released in 2008. It was a breakthrough in the internet access service at that time. The service introduced a flexible payment and affordable rates for personal market. This new service boosted the customer growth to 400% by the end of the first semester in 2012.

Unfortunately, the vigorous marketing effort was not followed by technology development. The number of customers multiplied, but the infrastructure capacity remained stationary. The fast connection only occurred in the first few months of subscription. Afterward, the speed connection dropped and the service became more inaccessible. The high network load also caused disruptions to other company's internet services that shared the same infrastructure with PMD. This problem briefly damaged the MMI's reputation including the corporate cable service, the company's highlight on internet service and its reputation as one of the market leaders. This situation shows that unsynchronised strategy between business marketing and IT management led to company's loss.

6.2   Value drivers of IT implementation and competitive factors

MMI's core business is providing services to access and to use the internet that is part of and heavily depends on the IT infrastructure and services. In order to support the core business, IT optimises the business process operation, enhances the company's performance and provides a significant competitive factor in the industry. Thus, the value drivers of IT implementation at MMI Inc. are as follows:

1   Progressive expansion of IT infrastructure and services

IT service availability and IT infrastructure reliability are essential in MMI business. Investing in cutting-edge technology is necessary to stay in front line in business competition. However, this investment requires enormous costs and comes with high risks. IT implementation at MMI Inc. addresses optimisation of the expansion strategy, progressive infrastructure development with a reasonable budget that yields optimum return.

2   Integration of business processes

Correctly applied technology brings advantages to business processes, such as superior performance, cost-effective operation and integration processes across multiple divisions/organisations. Business process integration plays a key role in terms of its adaptive capability in the digital environment, where MMI Inc. operates.

3   Customer satisfaction

Keeping customers satisfied is crucial, especially in a competitive ISP industry.

Competing in digital environment requires agility and flexibility to stay ahead of the competition. As in the case of MMI Inc., change occurs frequently in its digital environment, especially in technology advancement and internet service business. The competitive factors of MMI Inc. are defined as follows:

1   Business innovation management (CF1)

Business innovation management refers to administering innovation processes for both the outcome and the business processes (service creation and delivery). Innovation is encouraged at every level of the company. The innovation management provides agility and flexibility for the company by performing continuous development internally, integrating business processes among internal divisions and between the company and external stakeholders and developing improved solutions to meet customers' needs.

2   Customer support (CF2)

Building a good reputation via customer support excellence is a valuable competitive factor. A growing number of cellular network operators had entered the ISP market in Indonesia since 2008. These companies operate with well-equipped supports, such as established mobile infrastructure, aggressive promotional effort and prominent branding. This situation has created a competitive market. Customers can shift to other providers whenever they feel dissatisfied or want to get more suitable service (e.g., higher access speed, larger bandwidth, more responsive customer support and cheaper cost).

3   Technology infrastructure (CF3)

Technology advancement in ISP industry is a challenge for the company. A conscientious plan and execution is necessary to keep up with technology advancement. If the company does not move at the same level as the advancement, its progress is hindered and this causes loss. On the other hand, hastily following the latest advancement is expensive and ineffective.

6.3   IT-based competitive strategy in MMI Inc.

The formulation of IT-based competitive strategy for MMI Inc. adheres to the following procedure.

1   Analysing the current strength, weaknesses, opportunities and threats of MMI Inc.

     Example of MMI Inc.'s SWOT analysis result is presented in Table 4.

2   Formulating an IT-based competitive strategy by mapping each competitive factor in SWOT elements.

     Example of IT-based strategy based on SWOT analysis is presented in Table 5.

Table 4   Example of SWOT analysis

Strength (S)		*Weakness (W)*	
S1	Good reputation in corporate/business internet access. MMI Inc. has established partnerships with office buildings and shopping centres.	W1	Limited infrastructure and coverage areas outside major cities.
S2	High-speed data infrastructure in major cities in Indonesia, e.g., fibre optic cables and copper wires, public WIFI-hotspot.	W2	Declining customers' trust in prepaid mobile data service.
S3	A number various internet access services, such as corporate dedicated internet access, broadband services and personal cable internet.	W3	Mediocre customer support based on customer reviews.
Opportunity (O)		*Threat (T)*	
O1	An increase in internet access demand and the potential growth of internet users at a significant rate.	T1	Internet access services provided by cellular network operators, e.g., mobile data plan, prepaid mobile data and unlimited data plan. These services are supported by more established infrastructure, wider coverage and cheaper price.
O2	Corporate demands of the fast and superior internet access services.	T2	Government regulation and legal matters pertaining to infrastructure lease and spectrum utilisation policy of frequency band.

6.4   Case study evaluations

We conducted contextual in-depth interviews and surveys to assess the framework application in MMI Inc. The participants of the in-depth interviews and surveys were six representatives of MMI Inc., i.e., a manager of business development division, a manager of technology and infrastructure division, two assistant managers of business development division and two assistant managers of technology and infrastructure division. The interviews and surveys aimed to obtain feedback from the experienced professionals and to assess the benefits of the proposed framework. The evaluation was conducted in the following steps:

1   Pre-evaluation, the participants examined the strategy formulation report provided by the authors. The report described the application of the proposed framework to formulate MMI Inc.'s competitive strategy and its results.

2   Assessment questionnaire, the questionnaire assessed the following criteria:

    a   The easiness of understanding the framework.

    b   The easiness of using the framework. This criterion assessed the degree of easiness of using the framework to formulate competitive strategy considering the company's situation.

    c   The suitability of the framework with the company's needs, this criterion assessed the framework fitness for the company's profile, needs and situation.

    d   The usefulness of the result obtained from applying the framework, this criterion assessed the usefulness of the result (an IT-based competitive strategy) for the company's needs.

    e   The confidence level of the result quality, this criterion assessed how confident the participant was with the result quality obtained from applying the framework.

3   In-depth interviews with each participant. The interview questions included the role and responsibility of each participant in MMI Inc., the roles of IT in business, the degree of integration between IT and business, the usefulness of the IT-based competitive strategy framework in helping to formulate a good strategy, the willingness to use the framework and feedback about the framework. All interview sessions were audio recorded.

6.5   Results of case study evaluations

The results of the assessment questionnaire are presented in Table 6. The results showed that none of the participants found it difficult to learn and use the IT-based competitive strategy framework. In the interviews, four participants mentioned the framework simplicity as an advantage. On the contrary, a participant from business development division argued that the simplicity was inadequate for an IT-based framework. Indeed, the participant suggested that the framework should include a strategy evaluation and a more detailed procedure to translate the value drivers of the IT implementation in order to foster business competitive factors.

   In the case of the framework suitability with the company's profile, needs and situation, 66.67% participants rated it as moderately suitable and highly suitable. Three participants acknowledged the sequence of competitive factors, the SWOT analysis and the IT-based competitive strategy as a clear-cut solution in the IT-business alignment effort. These solutions could be developed further according to the company's needs.

   As a tool to help formulate an IT-based competitive strategy faster, participants rated the framework as somewhat useful (50%), moderately useful (33.33%) and highly useful (16.67%). Regarding the results, most participants were somewhat confident (33%) and moderately confident (33%) that the framework results were qualified, i.e., applicable and reasonable.

Table 5 Example of IT-based competitive strategy for MMI Inc.

Competitive factor			IT-based competitive strategy
Strength (S)			
CF1	Business innovation management	S1.CF1.1	Expanding corporate partnerships to strengthen the corporate data service brand.
		S3.CF1.2	Providing a customised internet access service based on customer's needs. For example, offering larger bandwidth and higher speed or adding optional value-added service.
CF3	Technology infrastructure	S2.CF3.1	Analysing the customer growth and strengthening the infrastructure at the busiest locations (sites with top customer growth).
		S2.CF3.2	Installing new public WIFI hotspots in strategic locations.
Weakness (W)			
CF2	Customer support	W2.CF2.1	Strengthening the customer service via social media to improve the reputation and to rebrand the PMD service.
		W3.CF2.1	Improving the customer support management: emphasising responsive and accurate customer solution, offering appropriate compensation to affected customers.
		W2/W3.CF2.2	Building a customer support system that is integrated with infrastructure and service division and sales and marketing division.
		W2.CF2.3	Revising the promotional and sales program of PMD service or temporarily terminating PMD's customer growth until attaining an acceptable ratio between the number of customers and the service quality.
CF3	Technology infrastructure	W1.CF3.1	Creating the infrastructure and service development plan in potential areas, such as special economy zone and tourist destinations outside Java and Bali.
			Investing and building infrastructure progressively based on the development plan.
		W1.CF3.2	Collaborating with other providers to provide larger bandwidth capacity and to expand the market by renting infrastructure and sharing resources.
		W2.CF3.1	Increasing bandwidth capacity for PMD service until attaining an acceptable ratio between the number of customers and the bandwidth provided.
Opportunity (O)			
CF1	Business innovation management	O1.CF1.1	Utilising social media to advertise internet services in accordance with each market segment.
		O1.CF1.2	Introducing an economic corporate internet plan for educational institutions and small medium enterprises.
		O1.CF1.3	Promoting a bundling service (internet access and network device) for personal customers.
		O2.CF2.1	Introducing MMI Inc.'s corporate internet service to the new market via partnership with regional government.
CF2	Customer support	O1.CF2.1	Providing a personalised customer support for personal customers.
		O2.CF2.1	Providing a dedicated customer support for corporate customers.
Threat (T)			
CF1	Business innovation management	T1.CF1.1	Establishing a joint venture with a cellular network operator to supply reliable mobile internet access outside major cities in Indonesia and in rural areas.
		T2.CF1.1	Performing a regular audit and ensuring that all business activities comply with the government and ISP industry regulations.

Table 6 Questionnaire result in evaluation 2 (case study)

Assessment	Result					
Easiness level of understanding the framework	Very difficult	Difficult	Average	Easy	Very easy	Σ
	0%	0%	33.33%	50%	16.67%	100%
Easiness level of using the framework	Very difficult	Difficult	Average	Easy	Very easy	Σ
	0%	0%	50%	50%	0%	100%
Suitability of the framework	Not suitable	Slightly suitable	Somewhat suitable	Moderately suitable	Highly suitable	Σ
	0%	16.67%	16.67%	50%	16.67%	100%
Degree of usefulness	Not useful	Slightly useful	Somewhat useful	Moderately useful	Very useful	Σ
	0%	0%	50%	33.33%	16.67%	100%
Confidence level of the result quality	Not confident	Slightly confident	Somewhat confident	Confident	Highly confident	Σ
	0%	16.67%	33.33%	33.33%	16.67%	100%

All participants also agreed that IT is one of the key competitive factors in the company's industry. Hence, the IT strategy must be aligned with the business strategy. However, aligning IT with business was not always easy at MMI Inc. The IT-related division had used several approaches and tools of IT management frameworks with less success. Some of the approaches were too complicated and other tools lacked business perspective presence. On the other hand, business-related divisions sometimes had different perspectives about the IT-business alignment.

All participants were aware of the consequences of loose linkage between IT and business. One of the most significant examples was the PMD service when the aggressive marketing effort was not followed by the infrastructure development. It took years to fix the damage, including restoring the reputation. The alignment remains a challenge in MMI Inc. The executives and managers from IT-related and business-related divisions continue to develop the best methods to achieve better-aligned management in the future.

All participants agreed that the proposed framework was useful as a quick help to formulate an IT-based strategy to gain business advantages. Participants from the technology and infrastructure division acknowledged the simplicity of the framework and its potential benefits. All participants were also willing to use the framework as the first step to achieve better IT-business alignment.

7 Discussions and feedbacks to the proposed framework

7.1 Making the IT-business alignment works using a practical and simplified approach

For more than 30 years, IT practitioners and academics have identified IT-business alignment as one of the most pervasive problems in IT management practice. Prior studies have proposed numerous methodologies, frameworks and best practices, yet the

alignment concept remains obscure. Some of the methodologies view IT-business alignment as a static relationship, thus lacking practical guidance on how to improve the alignment sustainability (Luftman et al., 2017). Most methodologies and frameworks of IT-business alignment are also complex and not suitable in some situations. Hence, this study proposes a simplified and practical framework to alleviate some of the problems in IT-business alignment, i.e., IT-based competitive strategy framework. The framework serves as straightforward guidance and first aid in IT-based strategy formulation. The framework simplicity aims to solve the difficulty and complication in actualising IT management conceptual models into practical application. The IT-business alignment is demonstrated by analysing the value drivers of IT implementation based on the enterprise's visions, by identifying business competitive factors and by developing an IT-based strategy to optimise the competitive factors.

The results of the interview evaluation and the case study evaluation support the simplicity of the framework. Based on the practitioners' judgement, the simplicity is the main advantage of the proposed framework and it creates a user-friendly methodology. They also acknowledge that simplicity provides benefits in terms of reducing the difficulty of applying the IT management framework in an enterprise. However, a participant from the first evaluation raises a concern that the simplicity is inadequate for an IT-based framework because it may lead to confusion in the framework application. We acknowledge the concern, but we retain the simplicity requirement to facilitate the framework application in the targeted user's environment and to minimise the need of experts' assistance.

IT adoption in SMEs is still lagged behind due to several factors (Chong et al., 2012; Steinfield et al., 2012; Dahnil et al., 2014), e.g., lack of resources and expertise, limited IT literacy and lack of awareness of IT advantages for SMEs, expensive initial cost and the perceived complexity of IT adoption. The proposed framework could help SMEs resolve IT adoption barriers. The simplicity of the framework offers straightforward procedures to identify IT requirements that best serve the ongoing business in the long-run. It enables IT-based strategy development using the current resources and diminishes the need of expert' assistance. Another barrier of IT adoption in SMEs is the common perception that the technology adoption cost outweighs its benefit. The proposed framework works on this perception by initiating the IT adoption process from the enterprise's business perspective.

Several research works have addressed the importance of simplicity in model and framework development such as the unified framework of the business model concept (Al-Debei and Avison, 2010), the framework for assessing the business value of IT infrastructures (Kumar, 2004), a simplified model for performing a quick and easy usability and adoption evaluation of a recommender system (Pu and Chen, 2011), a role-based access control model (Takabi et al., 2010) and business model conceptualisation in digital entrepreneurship (Standing and Mattsson, 2016). Simplicity supports agility and flexibility, which are an enterprise's essential capabilities to achieve sustainable competitive advantage (Overby et al., 2006; Tallon and Pinsonneault, 2011). Agility enhances responsiveness in formulating an IT-based competitive strategy and revising the previous strategy due to the changes in the environment. Business environment is always changing, especially in today's digital economy environment. Hence, responsiveness to adapt to change is important. The framework facilitates a rapid IT strategy formulation and revision because the content covers only necessary elements. Since the result of the framework application is obtained based on a holistic approach, it

also provides some degree of flexibility. The flexibility could accelerate enterprise adaptability to change.

Most participants from the first and second evaluation agree that the proposed framework is potentially helpful for the targeted users with some suggestions for improvement. IT practitioners from national state company and consulting firm suggested combining the proposed framework with other established methodologies. Another justification why we retain the simplicity is to enable extensibility in the framework application. Enterprises can use and combine the framework with other methodologies, instruments, or frameworks as necessary. For example, the IT-based competitive strategy obtained from applying the framework may serve as input for strategy implementation in a strategic planning process.

Another suggestion from the case study application is related to the prioritisation of strategy implementation. The proposed framework does not specify the prioritisation, but managers can adopt one or more prioritisation techniques in software requirements or in IT project prioritisation to setup the strategy implementation. Some prioritisation methods in software requirements are a genetic algorithm approach to maximise the weigh benefit for all stakeholders (Achimugu et al., 2014), value oriented requirements prioritisation (Azar et al., 2007) and a data mining technique to prioritise requirements based on stakeholders' interests, business goals and cross-cutting concerns (Duan et al., 2009). In addition, some examples of IT project prioritisation are agile project management (Stettina and Hörz, 2015) and an IT project evaluation technique (Asosheh et al., 2010).

7.2 Implications for managerial practice

The findings on the development and application of IT-based competitive strategy framework have several implications on the IT-business alignment efforts. First, SMEs could utilise the framework to develop IT strategy that best meets business requirements and resource constraints. Since most of SMEs do not have a dedicated IT department/expertise, this approach helps them adopting and adapting necessary technologies to keep operating in the competitive environment. Second, the proposed framework could be used as a quick tool to reassess the IT strategy. It enables a rapid IT evaluation to ensure the ongoing IT strategy implementation is still on the track.

For enterprises that experience IT chaos, the framework serves as a practical and quick solution to assist with the reorganisation of their IT management. When in chaos, it is easier to build the foundation from the beginning than to repair the turmoil IT management. The enterprise could use the proposed framework to build the underlying structure and continue refining the process with other methodologies as necessary.

7.3 Limitations and future studies

While most of the results obtained in this study correspond to our goals, the generalisability is limited. A more comprehensive case study application is necessary to further validate the framework and to continue the design science activities. The future study encompasses the framework application in SMEs, enterprises that experiences IT chaos and general enterprises and the framework refinement based on the application feedback and evaluation. The IT-based strategy framework is designed as an evolutionary

framework that develops over time. It is expected that the current framework will be enhanced by refining the current construct (i.e., the framework element) and relationships between constructs or adding new construct and relationship.

8   Conclusions

This study proposes a framework of IT-based competitive strategy to resolve the common challenges towards achieving IT-business strategic alignment. The results of this study support two main contributions. First, a framework of IT-based competitive strategy is presented to assist enterprises with optimising IT implementation for business outcome. The framework serves as practical guidance and first aid in an IT-based strategy formulation. The IT-business alignment is demonstrated from analysing the value driver of IT implementation based on an enterprise's vision, identifying business competitive factors and developing an IT-based strategy to optimise the competitive factors. Second, this study applies a simplified and practical approach in the framework construction. The framework's simplicity provides agility and flexibility, the essential capabilities of competitive advantage. Another advantage of the proposed framework is the extensibility to be utilised with other methodologies and models. The findings on this study have several implications on IT-business alignment efforts, particularly for SMEs and enterprises that experience IT chaos. Finally, while most of the results address the goals of this study, the generalisability is rather limited. Therefore, a comprehensive case study is required for improving the generalisability and refining the framework.

References

Abareshi, A. (2011) 'The antecedents of IT-business alignment in manufacturing firms', *International Journal of Business Information Systems*, Vol. 8, No. 3, p.322, DOI: 10.1504/IJBIS.2011.042412.

Achimugu, P. et al. (2014) 'A systematic literature review of software requirements prioritization research', *Information and Software Technology*, Vol. 56, No. 6, pp.568–585, Elsevier, DOI: 10.1016/J.INFSOF.2014.02.001.

Al-Debei, M.M. and Avison, D. (2010) 'Developing a unified framework of the business model concept', *European Journal of Information Systems*, DOI: 10.1057/ejis.2010.21.

Asosheh, A., Nalchigar, S. and Jamporazmey, M. (2010) 'Information technology project evaluation: an integrated data envelopment analysis and balanced scorecard approach', *Expert Systems with Applications*, Vol. 37, No. 8, pp.5931–5938, Pergamon, DOI: 10.1016/J.ESWA.2010.02.012.

Azar, J., Smith, R. and Cordes, D. (2007) 'Value-oriented requirements prioritization in a small development organization', *IEEE Software*, Vol. 24, No. 1, pp.32–37, DOI: 10.1109/MS.2007.30.

Bartens, Y. et al. (2015) 'On the way to a minimum baseline in it governance: using expert views for selective implementation of COBIT 5', *in 2015 48th Hawaii International Conference on System Sciences*, IEEE, pp.4554–4563, DOI: 10.1109/HICSS.2015.543.

Bernaert, M. et al. (2016) 'CHOOSE: towards a metamodel for enterprise architecture in small and medium-sized enterprises', *Information Systems Frontiers*, Vol. 18, No. 4, pp.781–818, Springer, USA, DOI: 10.1007/s10796-015-9559-0.

Bhatt, G.D. and Grover, V. (2005) 'Types of information technology capabilities and their role in competitive advantage: an empirical study', *Journal of Management Information Systems*, Vol. 22, No. 2, pp.253–277, Routledge, DOI: 10.1080/07421222.2005.11045844.

Bowman, C. (2003) 'Formulating strategy', in Faulkner, D.O. and Campbell, A. (Eds.): *The Oxford Handbook of Strategy: A Strategy Overview and Competitive Strategy*, pp.410–442, Oxford University Press, Oxford.

Buchwald, A., Urbach, N. and Ahlemann, F. (2014) 'Business value through controlled IT: toward an integrated model of IT governance success and its impact', *Journal of Information Technology*, Vol. 29, No. 2, pp.128–147, Palgrave Macmillan, UK, DOI: 10.1057/jit.2014.3.

Cannon, D. (2011) *ITIL 2011 – Service Strategy*, TSO for the Office of Government Commerce, London.

Cater-Steel, A. (2008) *Information Technology Governance and Service Management: Frameworks and Adaptations*, 2009th ed., IGI Global, Queensland, Australia, DOI: 10.4018/978-1-60566-008-0.

Cater-Steel, A. and Tan, W-G. (2005) 'Implementation of IT infrastructure library (ITIL) in Australia: progress and success factors', *2005 IT Governance International Conference*, DOI: 10.1145/1506409.1506439.

Chae, H-C. and Prybutok, V.R. (2015) 'Information technology capability and firm performance: contradictory findings and their possible causes', *MIS Quarterly*, Vol. 38, No. 1, pp.305–326, DOI: 10.25300/MISQ/2014/38.1.14.

Chan, Y.E. and Reich, B.H. (2007) 'IT alignment: what have we learned?', *Journal of Information Technology*, Vol. 22, No. 4, pp.297–315, Palgrave Macmillan, UK, DOI: 10.1057/palgrave.jit.2000109.

Chong, A.Y-L., Chan, F.T.S. and Ooi, K-B. (2012) 'Predicting consumer decisions to adopt mobile commerce: cross country empirical examination between China and Malaysia', *Decision Support Systems*, Vol. 53, No. 1, pp.34–43, North-Holland, DOI: 10.1016/J.DSS.2011.12.001.

Cui, T. et al. (2015) 'Information technology and open innovation: a strategic alignment perspective', *Information & Management*, Vol. 52, No. 3, pp.348–358, North-Holland, DOI: 10.1016/J.IM.2014.12.005.

Dahnil, M.I. et al. (2014) 'Factors influencing SMEs adoption of social media marketing', *Procedia – Social and Behavioral Sciences*, Vol. 148, pp.119–126, Elsevier, DOI: 10.1016/J.SBSPRO.2014.07.025.

De Haes, S. and Van Grembergen, W. (2016) *Enterprise Governance of Information Technology: Achieving Alignment and Value, Featuring COBIT 5*, 2nd ed., Springer, Cham, Switzerland.

De Haes, S., Van Grembergen, W. and Debreceny, R.S. (2013) 'COBIT 5 and enterprise governance of information technology: building blocks and research opportunities', *Journal of Information Systems*, DOI: 10.2308/isys-50422.

Drnevich, P.L. and Croson, D.C. (2013) 'Information technology and business-level strategy: toward an integrated theoretical perspective', *MIS Quarterly*, DOI: 10.1016/j.sbspro.2013.06.099.

Duan, C. et al. (2009) 'Towards automated requirements prioritization and triage', *Requirements Engineering*, Vol. 14, No. 2, pp.73–89, Springer-Verlag, DOI: 10.1007/s00766-009-0079-7.

Ernest, L.M. et al. (2004) *The IT Value Model: Winning the Business 'Battle' with the Right IT 'Nails'*, IBM [online] https://www-935.ibm.com/services/us/its/pdf/g510-3887-00.pdf (accessed 27 May 2017).

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*, Vol. 24, No. 5, pp.465–491, DOI: 10.1057/ejis.2014.6.

Gregor, S. and Hevner, A.R. (2013) 'Positioning and presenting design science research for maximum impact', *MIS Quarterly*, DOI: 10.2753/MIS0742-1222240302.

Henderson, J. and Venkatraman, N. (1999) 'Strategic alignment: leveraging information technology for transforming organizations', *IBM Systems Journal*, DOI: 10.1086/250095.

Hevner, A.R. et al. (2004) 'Design science in information systems research', *MIS Quarterly*, DOI: 10.2307/25148625.

Hsieh, Y.H. and Chen, H.M. (2011) 'Strategic fit among business competitive strategy, human resource strategy, and reward system', *Academy of Strategic Management Journal*, Vol. 10, No. 2, pp.11–32.

Hugos, M.H. (2018) *Essentials of Supply Chain Management*, 4th ed., John Wiley & Sons, New Jersey.

Kruchten, P. (1999) *The Software Architect*, pp.565–583, Springer, Boston, MA, DOI: 10.1007/978-0-387-35563-4_33.

Kumar, R.L. (2004) 'A framework for assessing the business value of information technology infrastructures', *Journal of Management Information Systems*, DOI: 10.3727/1098305077779637585.

Lankhorst, M. (2013) *Introduction to Enterprise Architecture*, pp.1–10, Springer, Berlin, Heidelberg, DOI: 10.1007/978-3-642-29651-2_1.

Lucas, H.C. (2005) *Information Technology: Strategic Decision Making for Managers*, John Wiley & Sons, Hoboken, NJ.

Luftman, J., Lyytinen, K. and ben Zvi, T. (2017) 'Enhancing the measurement of information technology (IT) business alignment and its influence on company performance', *Journal of Information Technology*, Vol. 32, No. 1, pp.26–46, Palgrave Macmillan, UK, DOI: 10.1057/jit.2015.23.

Melville, N., Kraemer, K. and Gurbaxani, V. (2004) 'Review: information technology and organizational performance: an integrative model of IT business value', *MIS Quarterly*, Vol. 28, No. 2, p.283, Management Information Systems Research Center, University of Minnesota, DOI: 10.2307/25148636.

Miller, S., Dwivedi, Y.K. and Williams, M.D. (2014) 'Business/information technology alignment for financial services: a review and synthesis of existing literature', *International Journal of Business Information Systems*, Vol. 17, No. 2, p.221, DOI: 10.1504/IJBIS.2014.064569.

Mitropoulos, S. (2012) 'A simulation-based approach for IT and business strategy alignment and evaluation', *International Journal of Business Information Systems*, Vol. 10, No. 4, p.369, DOI: 10.1504/IJBIS.2012.048334.

Morganwalp, J.M. and Sage, A.P. (2004) 'Enterprise architecture measures of effectiveness', *International Journal of Technology, Policy and Management*, DOI: 10.1504/IJTPM.2004.004569.

Nath, T. and Standing, C. (2010) 'Drivers of information technology use in the supply chain', *Journal of Systems and Information Technology*, DOI: 10.1108/13287261011032661.

Overby, E., Bharadwaj, A. and Sambamurthy, V. (2006) 'Enterprise agility and the enabling role of information technology', *European Journal of Information Systems*, DOI: 10.1057/palgrave.ejis.3000600.

Peterson, R. (2004) 'Crafting information technology governance', *Information Systems Management*, DOI: 10.1201/1078/44705.21.4.20040901/84183.2.

Pitkethly, R. (2003) 'Analysing the environment', in Faulkner, D.O. and Campbell, A. (Eds.): *The Oxford Handbook of Strategy: A Strategy Overview and Competitive Strategy*, pp.231–266, Oxford University Press, Oxford.

Pollard, C. and Cater-Steel, A. (2009) 'Justifications, strategies, and critical success factors in successful ITIL implementations in U.S. and Australian companies: an exploratory study', *Information Systems Management*, DOI: 10.1080/10580530902797540.

Porter, M.E. (2011) *Competitive Advantage of Nations: Creating and Sustaining Superior Performance*, Simon & Schuster Inc., New York.

Powell, T.C. and Dent-Micallef, A. (1997) 'Information technology as competitive advantage: the role of human, business, and technology resources', *Strategic Management Journal*, Vol. 18, pp.375–405, Wiley, DOI: 10.2307/3088167.

Pu, P. and Chen, L. (2011) 'A user – centric evaluation framework for recommender systems', *Proceedings of the 5th ACM Conference on Recommender Systems – RecSys '11*, DOI: 10.1145/2043932.2043962.

Puspitasari, I. (2016) 'Stakeholder's expected value of enterprise architecture: an enterprise architecture solution based on stakeholder perspective', *in 2016 IEEE/ACIS 14th International Conference on Software Engineering Research, Management and Applications, SERA 2016*, DOI: 10.1109/SERA.2016.7516152.

Reich, B.H. and Benbasat, I. (2000) 'Factors that influence the social dimension of alignment between business and information technology objectives', *MIS Quarterly*, Vol. 24, No. 1, p.81, Management Information Systems Research Center, University of Minnesota, DOI: 10.2307/3250980.

Schmidt, C. and Buxmann, P. (2011) 'Outcomes and success factors of enterprise IT architecture management: empirical insight from the international financial services industry', *European Journal of Information Systems*, DOI: 10.1057/ejis.2010.68.

Shang, S.S.C. and Lin, S-F. (2010) 'Barriers to implementing ITIL – a multi-case study on the service-based industry', *Contemporary Management Research*, DOI: 10.7903/cmr.v6i1.1131.

Simon, D., Fischbach, K. and Schoder, D. (2014) 'Enterprise architecture management and its role in corporate strategic management', *Information Systems and e-Business Management*, Vol. 12, No. 1, pp.5–42, Springer, Berlin, Heidelberg, DOI: 10.1007/s10257-013-0213-4.

Simonsson, M., Johnsom, O. and Wijkström, H. (2007) 'Model-based IT governance maturity assessments with COBIT', *ECIS*.

Stadtler, H. (2015) *Supply Chain Management: An Overview*, pp.3–28, Springer, Berlin, Heidelberg, DOI: 10.1007/978-3-642-55309-7_1.

Standing, C. and Mattsson, J. (2016) 'Fake it until you make it': business model conceptualization in digital entrepreneurship', *Journal of Strategic Marketing*, pp.1–15, DOI: 10.1080/0965254X.2016.1240218.

Steinfield, C. et al. (2012) 'Small and medium-sized enterprises in rural business clusters: the relation between ICT adoption and benefits derived from cluster membership', *The Information Society*, Vol. 28, No. 2, pp.110–120, Taylor & Francis Group, DOI: 10.1080/01972243.2012.651004.

Stettina, C.J. and Hörz, J. (2015) 'Agile portfolio management: an empirical perspective on the practice in use', *International Journal of Project Management*, Vol. 33, No. 1, pp.140–152, Pergamon, DOI: 10.1016/J.IJPROMAN.2014.03.008.

Takabi, H., Joshi, J.B.D. and Ahn, G-J. (2010) 'Security and privacy challenges in cloud computing environments', *IEEE Security & Privacy Magazine*, DOI: 10.1109/MSP.2010.186.

Tallon, P.P. and Pinsonneault, A. (2011) 'Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model', *MIS Quarterly*, Vol. 35, No. 2, p.463, Management Information Systems Research Center, University of Minnesota, DOI: 10.2307/23044052.

Tallon, P.P., Ramirez, R.V. and Short, J.E. (2013) 'The information artifact in IT governance: toward a theory of information governance', *Journal of Management Information Systems*, Vol. 30, No. 3, pp.141–178, DOI: 10.2753/MIS0742-1222300306.

The Open Group (2009) *TOGAF 9 – The Open Group Architecture Framework Version 9*, The Open Group.

Trkman, P. et al. (2007) 'Process approach to supply chain integration', *Supply Chain Management: An International Journal*, Vol. 12, No. 2, pp.116–128, Emerald Group Publishing Limited, DOI: 10.1108/13598540710737307.

Turban, E. et al. (2007) 'Information technology for management information: transformation organizations in the digital economy', *Text*, DOI: 10.1017/CBO9781107415324.004.

Wang, Y., Chen, Y. and Benitez-Amado, J. (2015) 'How information technology influences environmental performance: empirical evidence from China', *International Journal of Information Management*, Vol. 35, No. 2, pp.160–170, Pergamon, DOI: 10.1016/J. IJINFOMGT.2014.11.005.

Wu, S.P-J., Straub, D.W. and Liang, T-P. (2015) 'How information technology governance mechanisms and strategic alignment influence organizational performance: insights from a matched survey of business and IT managers', *MIS Quarterly*, Vol. 39, No. 2, pp.497–518, Society for Information Management and The Management Information Systems Research Center, DOI: 10.25300/MISQ/2015/39.2.10.

Ye, F. and Wang, Z. (2013) 'Effects of information technology alignment and information sharing on supply chain operational performance', *Computers & Industrial Engineering*, Vol. 65, No. 3, pp.370–377, Pergamon, DOI: 10.1016/J.CIE.2013.03.012.

Zachman, J.A. (1999) 'A framework for information systems architecture', *IBM Systems Journal*, Vol. 38, Nos. 2–3, pp.454–470.

Zhang, S. and Le Fever, H. (2013) 'An examination of the practicability of COBIT framework and the proposal of a COBIT-BSC model', *Journal of Economics, Business and Management*, DOI: 10.7763/JOEBM.2013.V1.84.