

# **IT Governance Strategies for SMEs in the Fourth Industrial Revolution**

*Research-in-Progress*

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## **Abstract**

*Robust IT governance practices are vital in small and medium-sized enterprises (SMEs). In this age of the fourth industrial revolution, good IT governance practices can help enterprises achieve better IT-business alignment, deal with rapid emergence of technologies, and maximize profits. Given that SMEs contribute to 75% of employment in most economies, good IT governance practices are needed if they are to survive in a competitive market. Research suggests that such practices are mostly non-existent in SMEs, even though well-recognized IT governance frameworks exist. Hence, the purpose of this study is to better understand the barriers to implementing IT governance practices in SMEs. Case study research combined with quantitative research will be conducted to gain a deeper understanding of these barriers. This study will also suggest IT management practices that can be included in an IT governance framework for SMEs.*

**Keywords:** IT Governance in SMEs, IT-Business Alignment, Case Study Research

## **Introduction**

The world has experienced three industrial revolutions and many believe that now we have entered the fourth. Unlike the previous three revolutions (water and steam to mechanize production; electricity to facilitate mass production; and electronics and IT to automate production), the fourth displays exponential rather than linear growth. The fourth industrial revolution (FoIR) is an information-driven revolution that will influence systems in all industries, in every nation. It will change the way we live and communicate with each other, treating every entity as a source of information, and blurring the interactions between systems in the physical, digital and biological domains (Schwab, 2016). Although the future is unknown, huge societal changes are taking place due to technologies facilitating the Internet of Things, biotechnology, DNA sequencing, genetic profiling, artificial intelligence, robotics, nanotechnology, materials science, energy storage, and quantum computing. With the use of these emerging technologies, the FoIR will transform production, operations, management and governance of all entities, highlighting the need for aligning IT strategies with business strategies (World Economic Forum, 2018).

In today's knowledge economy, driven by the FoIR, businesses must rapidly adapt to changes in the economy, especially when adopting new and emerging technologies (World economic forum, 2018).

However, this must not be done in an adhoc manner, but done systematically and according to well-established guidelines (World Economic Forum, 2018). To exist and compete, organizations must have IT strategies that closely follow their business strategies, also known as business-IT alignment (Chan and Reich, 2007; Kearns and Lederer, 2003; Tan and Gallupe, 2006). IT governance is an enabler of this business-IT alignment. IT governance includes organizational and leadership structures pertaining to IT, and processes and policies to ensure that IT investments sustain and enhance the organization's objectives and strategies (Devos, Landeghem and Deschoolmeester, 2012; Haes and Grembergen, 2004; Lee, 2013). The objective of IT governance is to implement IT in business operations in order to create value for the business, while ensuring that risk and returns of IT investment are balanced out (Lee, 2013). It enables organizations to increase efficiencies and gain a competitive advantage, thus, minimizing the negative effects of poor IT governance, such as business process inefficiencies, cost escalations, missed deadlines, low quality deliverables, business losses and damaged reputations (Devos et al. 2012; Lee, 2013). Organizations with robust IT governance make higher profits than those that follow similar business strategies without IT governance (Weill and Ross, 2004). Hence, we can deduce that without appropriate IT governance, SMEs will be operating at sub-optimal levels of profitability.

Organizations can adopt many well-recognized IT governance frameworks (Albayrak and Gadatsch, 2012; Ayat, Masrom, Sahibuddin and Sharifi, 2011). For example, two such frameworks are Control Objectives for Information and Related Technology (COBIT) and Information Technology Infrastructure Library (ITIL). Such frameworks comprise numerous best practices, processes, indicators and measures that can be applied in IT governance (Albayrak and Gadatsch, 2012; Ayat et al., 2011). However, these frameworks have been designed for large organizations and can be too complex and costly for SMEs to implement. SMEs tend to find these frameworks intimidating and unachievable (Huang, Zmud and Price, 2010; Olutoyin and Flowerday, 2016). Some SMEs are not even aware that such IT governance frameworks exist (Albayrak and Gadatsch, 2012).

Although they tend to be less visible than large well-known organizations, SMEs play an important role in most economies worldwide (Cragg, 2006; Lee, 2013). SME's contribute to 75% of employment in most economies (Apulu and Ige 2011; Olutoyin and Flowerday, 2016). In the OECD, 99% of all firms are SMEs, accounting for 70% of employment and generating between 50% and 60% of value added on average (OECD, 2017). Many researchers argue that a SME cannot be viewed through the lens of a large enterprise (Ballantine, Levy and Powell, 1998; Devos et al 2012; Olutoyin and Flowerday, 2016). This is because SMEs differ from large enterprises in a number of ways (Lee, 2013).

SMEs significantly differ from large corporations in their management structures, organizational cultures, and financial capacities (Devos et al., 2012; Huang et al., 2010; Jokonya, Kroeze and Poll, 2012). These factors negatively impact SMEs if they attempt to implement complex IT governance frameworks and policies (Devos et al., 2012; Huang et al., 2010; Jokonya et al., 2012). For this reason, COBIT Quickstart from the IT Governance Institute was created as a scaled-down version. However, implementation of COBIT Quickstart by SMEs has been disappointing (Devos et al., 2012; Olutoyin and Flowerday, 2016).

The lack of success of COBIT Quickstart illustrates the challenges that SMEs face in trying to adopt IT governance frameworks (Devos et al., 2012; Huang et al., 2010). Research has highlighted that IT governance implementations in SMEs, which most often follow the practice of large organizations, are challenging and costly, resulting in project failures (Olutoyin and Flowerday, 2016).

Hence, the purpose of this study is to gain a deeper understanding of the barriers to implementing IT governance practices in SMEs. The first phase of the research project involves analyzing the existing literature and frameworks on IT governance, and evaluating their relevance to SMEs. The second phase will use in-depth case study research to document the challenges faced by SMEs in IT governance. The third phase will be a quantitative study. The fourth and final phase will involve the design of an IT governance framework that is adapted to the needs of SMEs.

With new rapidly emerging technologies and global digitalization in the FoIR, we believe that this research has the potential to contribute to better understanding the implications of IT governance in SMEs. If they are to survive and remain profitable, SMEs need appropriate IT governance frameworks.

## **IT Governance**

To compete in the current global digitalized economy, it is strategically important for enterprises to align their business strategies with their IT strategies (Chan and Reich, 2007; Kearns and Lederer, 2003; Tan and Gallupe, 2006), especially in the (FoIR) when constant emerging technologies are expected (World Economic Forum, 2018). Business-IT alignment enables enterprises to maximize their IT investments and stay consistent with the business objectives and strategies, and in turn, increase profits and improve competitiveness (Tan and Gallupe, 2006). IT governance has been considered a critical condition for better business-IT alignment (De Haes, Haest and Grembergen, 2010; Luftman and Kempaiah, 2007; Weill and Ross, 2004).

IT governance is the strategic alignment of business and IT, using effective IT controls, risk management, performance management and accountability to maximize business value in the long-run (Ayat et al., 2011; Lee, 2013; Weill and Ross, 2004). It plays a crucial role in the organization's overall success, as it helps organizations gain a competitive advantage and increase productivity (Devos et al. 2012). It is the responsibility of an organization's senior management to implement organizational leadership structures, processes and policies, so as to ensure that IT investments sustain and enhance the organization's objectives and strategies (De Haes et al. 2010; Devos et al. 2012; Haes and Grembergen, 2004; Lee, 2013). The focus areas of IT governance include strategic management, process management, risk management, resource management, performance management, transparent decision making in IT, sustainable policies, regulatory compliance and value delivery (Devos et al. 2012; Lee, 2013).

Organizations with strong IT governance make higher profits than those that follow similar business strategies but do not have proper IT governance (Chong and Tan, 2012; Weill and Ross, 2004). Effective IT governance helps organizations protect their IT investments and appropriately manage their information assets that are the key to the growth and survival of the business. It ensures that business goals are supported, IT investment returns are maximized, and IT-related risks are efficiently managed. This in turn allows organizations to effectively deploy secure and reliable IT that helps the business in achieving critical success factors (Callahan, Bastos and Keyes, 2004; Lee, 2013). Ineffective IT governance can lead to failed IT initiatives. Poor IT governance affects the efficiency of business processes, leading to missed deadlines, higher costs, lower quality deliverables, business losses and damaged reputations (Lee, 2013).

## **IT Governance Frameworks**

IT governance frameworks such as COBIT and ITIL are well-recognized and widely accepted in industry (Albayrak and Gadatsch, 2012; Ayat et al., 2011). COBIT was developed in 1996 by the Information Systems Audit and Control Association, with the latest version of COBIT 2019 released in November 2018. COBIT focuses on what is required for adequate management and control of IT (Devos et al., 2012; De Haes et al., 2010). ITIL was developed in the 1980s by the Office of Government Commerce (OGC), in the United Kingdom. ITIL is a set of best practices for designing, developing and implementing IT management in organizations (Ayat et al., 2011). These frameworks include a number of features that support best practices, processes, measures and indicators that can be implemented by businesses (Albayrak and Gadatsch, 2012; Ayat et al., 2011).

However, both of these IT governance frameworks are complex and require significant financial outlays, especially in the form of consultation fees (Olutoyin and Flowerday, 2016). Hence, they

are adopted mainly by large organizations with significant IT budgets. Very few SMEs have adopted them, leading to the IT Governance Institute creating a scaled-down version of COBIT, called COBIT Quickstart. However, implementation of COBIT Quickstart by SMEs has been disappointing (Devos et al., 2012; Olutoyin and Flowerday, 2016).

## **IT Governance in SMEs**

SMEs play a critical role in creating economic growth in most economies worldwide (Devos et al. 2012; Lee, 2013; Olutoyin and Flowerday, 2016). However, SMEs are quite different from large enterprises in terms of management, leadership, culture, markets, resources, flexibility and financial capacities (Albayrak and Gadatsch, 2012; Devos et al. 2012; Huang et al., 2010; Jokonya et al., 2012; Lee, 2013; Olutoyin and Flowerday, 2016). Characteristics of SMEs in comparison to large enterprises include an informal culture, quick communication due to simple communication channels and processes, flexibility and responsiveness to changing situations due to quick decision making, restricted financial capacity, and limited IT knowledge (Ayat et al., 2011; Huang et al., 2010). Limited IT knowledge leads to generalized knowledge being shared and utilized within the enterprise, and reliance on a few knowledgeable individuals with a combination of skills to carry out multiple tasks. This in turn leads to high unit costs for employing and supporting employees with knowledge in multiple areas (Ayat et al., 2011; Huang et al., 2010). Hence, IT governance in large enterprises is not always applicable to SMEs (Devos et al., 2012; Huang et al., 2010; Jokonya et al., 2012; Olutoyin and Flowerday, 2016).

IT governance structure and operational governance processes are two important components of IT governance. An IT governance structure refers to an organization's IT strategic plans, which are based on the business needs, risk level, and financial resources. The operational governance processes refer to an efficient and well-planned process for implementing an appropriate IT governance framework (Olutoyin and Flowerday, 2016). Studies show that the two components of IT governance are implemented inadequately in SMEs due to a lack of maturity in structural controls to assist in strict compliance to requirements of IT governance frameworks (Devos et al. 2012; Huang et al., 2010; Olutoyin and Flowerday, 2016).

Common challenges and barriers for IT governance adoption in SMEs include centralized structure, where decisions on IT investments are often made by the business owner. The owner often has limited IT knowledge, preventing them from seeing the importance of allocating sufficient budget and appropriately investing in IT (Devos et al. 2012; Chen, 2009; Hadjimanoulis, 2000; Huang et al., 2010; Lee, 2013; Olutoyin and Flowerday, 2016). This leads to limited financial resources affecting IT investment - spending less on IT infrastructure, IT training for employees, specialized IT personnel, and consultation to implement complex IT governance frameworks (Montazemi, 2006; Albayrak and Gadatsch, 2012; Huang et al., 2010; Yang and Jing, 2008; Lee, 2013; Olutoyin and Flowerday, 2016). SMEs often have small to non-existent IT departments (Albayrak and Gadatsch, 2012; Caldeira and Ward, 2002; Cragg, 2008; Lee, 2013). Hence, there is limited IT knowledge and skills to efficiently manage IT resources. Without IT governance, IT expenditures tend to occur on an ad hoc basis (Devos, Landeghem and Deschoolmeester, 2009; Apulu and Ige 2011; Huang et al., 2010), making many SMEs more reliant on costly outsourcing (Lee, 2013). These challenges makes it harder to fully analyze and understand the value of IT to SME business success (Devos et al., 2009; Jokonya et al., 2012; Olutoyin and Flowerday, 2016; Yang and Jing, 2008).

Increasing global competition and market convergence puts pressure on SMEs to stay profitable. As economies become more digitalized, it is important for businesses to efficiently invest in IT for better business performance (Chan and Reich, 2007; Kearns and Lederer, 2003). Hence, a more robust structure is required in governing IT in SMEs (Olutoyin and Flowerday, 2016).

However, there is a shortage of dedicated research on SME adoption of IT governance practices relative to research on large enterprises (Lee, 2013; Mahmood, 2008). This makes it difficult to generalize conclusions regarding best practices for IT governance in SMEs (Devos et al., 2012;

Olutoyin and Flowerday, 2016). Hence, more research that focuses on IT governance adoption in SMEs is needed.

## **Research in Progress and Methodology Followed**

The main purpose of this research is to get a deeper understanding of the barriers to implementing IT governance practices in SMEs. To do this, a qualitative research approach will be conducted, using multiple case studies. This will allow us to systematically analyze and synthesize the problems that SMEs face in adopting formal IT governance strategies.

Qualitative research enables the researcher to explore the perceptions of participants (Strauss and Corbin, 1998), and obtain an in-depth understanding of people's motivations, reasons, decisions, actions and the context for their actions (Myers, 2013). Given that this research is exploratory in nature, a case study research was considered most suitable (Yin, 2003). Multiple case studies will be conducted for this research in order to get in-depth information on the IT governance practices, issues and requirements in SMEs. Many governmental institutions and researchers define SMEs as organizations with less than 250 employees (OECD, 2018; European Commission, 2018; Devos et al. 2012; Ayat et al., 2011). Hence, the SMEs selected for the study will be ones that have less than 250 employees, and rely on IT for their daily operations. A series of semi-structured interviews will be carried out at the companies with different levels of management to gather information from different perspectives across the organizational hierarchy. The data collected from the interviews will be analyzed against the findings in the research literature to identify new constructs. The major advantage of case study research is that it provides opportunities to capture a phenomenon with more breadth and depth than most other approaches (Creswell, 1998; Eisenhardt, 1989; Eisenhardt and Graebner, 2007). As this research aims to provide a generalizable, yet detailed view of the issues and challenges of IT governance in SMEs, a quantitative study will follow the qualitative study. We realise that the findings may vary from country to country. Hence, cultural differences may need to be considered in this study. The final phase of this project will involve the design of an artefact in the form of a flexible IT governance framework that is adapted to the needs of SMEs. Future researchers may use the framework to test its validity and generalizability in different countries. With constant emerging technologies and global digitalization, one can assume that there is more to this phenomenon than what past researchers have identified, especially in the FoIR. Ethics approval for this research is currently in progress.

## **Conclusion**

Recognizing the importance of SMEs preparing for the FoIR, this study will firstly investigate why IT governance practices are neglected by SMEs. The existing research literature will be explored, and several IT governance frameworks deployed in large enterprises will be investigated to identify key principles and features of such frameworks. Then, following a case study based research methodology, reasons behind the non-adoption of such practices in SMEs will be ascertained. A quantitative study will follow to consolidate the findings from the qualitative study, and hopefully improve the generalizability of its findings. Finally, the research will make a practical contribution to IT governance in SMEs by identifying key requirements for an IT governance framework developed to suit SMEs.

## **References**

- Albayrak, A. C. and Gadatsch, A. 2012. "IT Governance Model for Small and Medium Sized Enterprises", in *Proceedings of the Munich, European, Mediterranean & Middle East Conference on Information Systems (EMCIS)*, pp. 380–390.

- Apulu, I. and Ige, E. 2011. "Are Nigerian SMEs Effectively Utilizing ICT?" *International Journal of Business and Management*, (14:4), pp. 207–214.
- Ayat, M., Masrom, M., Sahibuddin, S. and Sharifi, M. 2011. "Issues in Implementing IT Governance in Small and Medium Enterprises", in *Second International Conference on Intelligent Systems, Modelling and Simulation (ISMS)*, California, USA, pp. 197–201.
- Ballantine, J., Levy, M. and Powell, P. (1998). "Evaluating Information Systems in Small and Medium- Sized Enterprises: Issues and Evidence", *European Journal of Information Systems* (7:4), pp. 241- 51.
- Callahan, J., Bastos, C. and Keyes, D. 2004. "The Evolution of IT Governance at NB Power", in *Strategies of Information Technology Governance*, Van Grembergen, W. (ed.), Hershey, PA: Idea Group Publishing, pp. 343-356.
- Chan, Y. E. and Reich. B. H . 2007. "IT Alignment: What Have We Learned?" *Journal of Information Technology* (22), pp. 297–315.
- Chen, R. X. 2009. *China's SMEs Development Report (2008–2009)*, China Economic Publishing House, Beijing.
- Chong J. L. and Tan F. B. 2012. "IT Governance in Collaborative Networks: A Socio-Technical Perspective", *Pacific Asia Journal of the Association for Information Systems* (4:2), pp. 31-48.
- Cragg, P. 2006. "Identifying Key Information Systems Competences in Small Firms", *World Congress for TQM*, 4-6 December.
- Cragg, P. 2008. "Identifying key Information Systems Competencies in Small Firms", *Total Quality Management & Business Excellence* (19:1-2), pp. 29-35.
- Caldeira, M.M. and Ward, J.M. 2002. "Understanding the Successful Adoption and Use of IS/IT in SMEs: An Explanation from Portuguese Manufacturing Industries". *Information Systems Journal* (12:2), pp. 121-152.
- Creswell, J. W. 1998. *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*, Thousand Oaks, CA, US: Sage Publications, Inc.
- De Haes, S., Haest, R., and Van Grembergen, W. 2010. "IT Governance and Business-IT Alignment in SMEs". *ISACA Journal*, Volume 6.
- Devos, J., Van Landeghem, H. and Deschoolmeester, D., 2009. "IT Governance in SMEs: Trust or Control?" in *Information Systems-Creativity and Innovation in Small and Medium Sized Enterprise*, Dhillon, G., Stahl, B. C., Baskerville R. (eds.), pp. 135–149.
- Devos, J., Van Landeghem, H., and Deschoolmeester, D. 2012. "Rethinking IT Governance for SMEs". *Industrial Management & Data Systems*, (112:2), pp. 206 - 223.
- Eisenhardt, K. M. 1989. "Building Theories from Case Study Research", *The Academy of Management Review*, (14:4), pp. 532-550.
- Eisenhardt, K. M. and Graebner, M. E. (2007). "Theory Building from Cases: Opportunities and Challenges", *Academy of Management Journal*, (50:1), pp. 25-32.
- European Commission, 2018. "What is a SME?" Retrieved 13 January, 2018, from European Commission: [https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition\\_en](https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en)
- Hadjimanoulis, A. 2000. "A Resource-Based View of Innovativeness in Small Firms", *Technology Analysis and Strategic Management*, (12:2), pp. 263-281.
- Haes, S.D. and Grembergen, W.V. 2004. "IT Governance and its Mechanisms", *Information Systems Control Journal*, (1), pp.27–33.
- Huang, R., Zmud, R.W. and Price, R.L. 2010. "Influencing the Effectiveness of IT Governance Practices through Steering Committees and Communication Policies", *European Journal of Information Systems*, (19:3), pp. 288-302.
- Jokonya, O., Kroeze, J. H. and Van der Poll, J.A. 2012. "Towards a Framework for Decision Making Regarding IT Adoption", in *Proceedings of the South African Institute for Computer Scientists and Information Technologists Conference (SAICSIT '12)*. ACM, New York, NY, USA, 316-325.
- Kearns G. and Lederer A. 2003. "A Resource-Based View of Strategic IS Alignment: How Knowledge Sharing Creates Competitive Advantage", *Decision Sciences* (34:1), pp. 1–29.
- Lee. M. C. 2013. "IT Governance Implementation Framework in Small and Medium Enterprise", *International Journal of Management and Enterprise Development*, (12:4-6), pp. 425-441.
- Luftman, J. and Kempaiah, R. 2007. "An Update on Business/IT Alignment: A Line Has Been Drawn", *MISQ Executive* (6:3), pp. 165-177.

- Mahmood, S. 2008. "Corporate Governance and Business Ethics for SMEs in Developing Countries: Challenges and Way Forward", in *International Society of Business, Economics, and Ethics World Congress*, 15-18 July, Cape Town, South Africa.
- Montazemi, A. R. 2006. "How They Manage IT: SMEs in Canada and the U.S.", *Communications of the ACM*, December 2006, (49:12), pp. 109-112.
- Myers, M. D. 2013. *Qualitative Research in Business & Management* (2nd Ed.), London: Sage Publications.
- OECD, 2017. "Enhancing the Contributions of SMEs in a Global and Digitalised Economy", *Meeting of the OECD Council at Ministerial Level*, Paris, 7-8 June 2017. Retrieved 28 January, 2018, from OECD: <https://www.oecd.org/mcm/documents/C-MIN-2017-8-EN.pdf>
- OECD, 2018. "Enterprises by business size". Retrieved 13 January, 2018, from OECD: <https://data.oecd.org/entrepreneur/enterprises-by-business-size.htm>
- Olutoyin, O. and Flowerday, S. 2016. "Successful IT Governance in SMEs: An Application of the Technology–Organization– Environment Theory", *South African Journal of Information Management* (18:1), pp. 1-8.
- Schwab, K. 2016. "The Fourth Industrial Revolution: what it means, how to respond", World Economic Forum. Retrieved 14 January, 2018, from World Economic Forum: <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>
- Strauss, A., and Corbin, J. 1998. "Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory", Thousand Oaks, CA: Sage Publications, Inc.
- Tan, F. B. and Gallupe, B. R. 2006. "Aligning Business and Information Systems Thinking: A Cognitive Approach", *IEEE Transactions on Engineering Management* (53:2), pp. 223-237.
- Weill, P. and Ross, J. 2004. "IT Governance Process on One Page", MIT Sloan Working Paper No. 4517-04; CIS Research Working Paper No. 349.
- World Economic Forum. 2018. "Agile Governance: Reimagining Policy-making in the Fourth Industrial Revolution" [White paper]. Retrieved January 29, 2019, from World Economic Forum: [http://www3.weforum.org/docs/WEF\\_Agile\\_Governance\\_Reimagining\\_Policy-making\\_4IR\\_report.pdf](http://www3.weforum.org/docs/WEF_Agile_Governance_Reimagining_Policy-making_4IR_report.pdf)
- Yang, X., and Jing, F. 2008. "Review of IT/IS Adoption and Decision-Making Behavior in Small Businesses", *Tsinghua Science and Technology* (13:3), pp. 323-328.
- Yin, R. 2003. *Case Study Research: Design and methods* (3rd ed.), Beverly Hills, CA: Sage.