

The Effect of External Environment Characteristics on Effective IT Governance through Organizational Performance

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Abstract

During the last decade, information technology (IT) has been playing more important role for organizations in achieving their goals. Recently, information technology governance has become a critical issue for many companies in various industries. The aim of this study is to examine the extent to which influence of external environment characteristics affects the effectiveness of IT governance as well as the performance of organizations in Malaysian manufacturing companies. Moreover, the mediating influence of effective IT governance was also being tested. 357 questionnaires were used in order to conduct the analyses. Structural Equation Modeling (SEM) is used for testing the developed hypotheses generating from the theoretical framework of the study. The data obtained from managers in manufacturing industry; Samples selected from seven states of Malaysia (Selangor, Penang, Johor, Sarawak and Negeri Sembilan, Melaka, Pahang). This topic of research has considerable significance in Malaysia; A significant contribution of this study is the construction of a theoretically based model which assimilates the external environment characteristics, effective information technology governance, and organizational performance.

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Keywords: IT governance in Malaysia, IT governance in Organizations, External Environment Characteristics, Effective IT Governance, Organizational Performance

1. Introduction

IT is fast becoming a strategic tool to create a competitive edge for the information-based economy, IT, information, and intellectual assets (Ahmad et al., 2013). Even though it has been realized that IT investments create value for firms by offering critical systems to businesses, the cost of an IT venture continues to increase, and it has to be properly managed. The pervasiveness of technology usage has caused organizations to be highly reliant on IT. This places businesses at because of being exposed to threats to IT, information and intellectual assets internally and externally from hackers, phishing sites, malware, and viruses (Ahmad et al., 2013). Due to

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the high investment made in IT in addition to the critical effects IT has on the success of the organization, a substantial amount of resources are used to acquire and manage IT with fair distribution across an organization. ITG is a component of the decision-making structure, including processes, as well as relational tools to manage and control. Studies commonly recognize it as a skill of an organization with high significance in aligning and achieving organizational value using IT (Ahmad et al., 2013). However, the development of IT governance remains a challenge to organizations. Recently, creating and implementation of effective IT governance has been highly considered by modern businesses. Effective IT governance guarantees the alignment between business goals and IT (Al Qassimi & Rusu, 2015). In order to achieve the firm's performance goals, it is essential for organizations to have effective IT governance. To do so, some IT governance methods should be used that promotes behaviors in line with the firm's strategy, mission, norms, culture, and values (Al Qassimi & Rusu, 2015). In contrast, companies without effective IT governance will suffer from inaccuracy of information quality, inefficiency of operating costs, wrong estimation of IT projects' costs (under specification and over budget), failure in competitiveness, inefficient performance of IT divisions or the whole organization; these problems will reduce the performance of the organization (Alao et al., 2011). Different decision areas come under IT governance. These include IT Vision & Strategy, IT Architecture and Infrastructure, Business Applications and IT investments. In order to have effective IT governance, companies should use well-designed, well-understood and clear governance methods.

2. Literature Review

2.1. IT Governance in Malaysia

ITG has grown in its significance in the past years spurred by the different IT development trends, Nowadays most of the organizations are using system for different department which those systems are highly IT related. But in many companies there is not enough knowledge that how important is IT in their Organization. Due to the fast-paced development globally and locally in the IT industry, there has been an increased interest in the area of ITG in Malaysia. This study aims to examine the relations of ITG initiatives with the efficacy of ITG and the performance of the organization. Early studies by Tan (2011) in Malaysia on the area of ITG started in the education sector, which is still being continued. Previous research on ITG for manufacturing companies in Malaysia is carried in two various methods, One method tries to generalize the implementation of ITG in manufacturing companies (Teo 2013) and the second method attempts to customize ITG to fit the particular features of the manufacturing companies. The ITG research continues to get more attention in Malaysia (Teo, 2013). The field of ITG is fairly new in Malaysia (Tan, et al., 2011), The IT infrastructure in firms has become rather complicated, as the firms grow larger regarding the number of workers and yearly revenue. ITG has gained more importance in the last decades, mainly due to the different trends in developments in IT. Due to the country's rapid development and the global development in the IT sector, the ITG in Malaysia has also seen a growing interest (Ahmad et al., 2013). In Malaysia, the IT sector has been growing at a rapid pace, According to the yearly report from the Multimedia Development Corporation; the total revenue currently is more than RM 30 billion, which is the highest it has reached since the 2008 financial meltdown. Moreover, the MDeC reported the IT sector's contribution to be RM 9.6 billion to the Gross Domestic Product (GDP) of Malaysia in comparison to the year prior with 25% growth as well. There is also rapid globalization in the IT sector in Malaysia (Al-Najjar & Kalaf, 2012).

2.2. External Environment Characteristics

According to Bianchi & Sousa, (2016), environmental uncertainty is a measurement of the amount of stability, complexity, dispersion or otherwise found in an environment. Bianchi & Sousa, (2016) discovered that effective ITG is a necessity despite the uncertainty of the environment. The measurements use opposing terms to convey the severity of each such as stability vs. instability, homogeneity vs. heterogeneous, concentration vs. dispersion, etc. The three variables widely utilized to define uncertainty in the environment are environmental competition, environmental heterogeneity, and dynamism of the environment (De Haes & Van Grembergen, 2008). Uncertainty in the environment is related to the external environment where the operations of the organization take place. According to Mohamed et al. (2012), uncertainty in the environment is the level at which the environment is balance or imbalanced, complex or simple, dispersed or concentrated. Dimensions are measured stability vs. instability, homogeneity vs. heterogeneous, concentration vs. dispersion, etc. The level of unpredictability in an environment marks the dimension of dynamism, while heterogeneity measures the level diversity and complexity as well as similarities and differences. Heterogeneity involves the complexity and diverse aspects of the external factors and the level of which there are similarities or differentiation. Hostility is described as the level of competition among restrictive environmental situations including resources availability as well as requirements by regulatory bodies. Researchers in the past two decades have paid a lot of attention to the impacts of external environmental traits in the firms. This is due to needing for compliance to requirements by new regulations and the increase in complexity in doing business in the international market. Various business strategies are inter-related to various impacts namely differentiation in marketing strategy is inter-related to composite uncertainties; dynamism and unpredictability; differentiation in innovation are inter-related with unpredictability; and innovation strategy cost is not inter-related to environmental uncertainty. Pick (2015) discovered that effective ITG is a necessity in spite of the environmental uncertainty. According to Elbanna and Child (2007), uncertainty and hostility affect the rationality of strategic decision. According to Yayla et al. (2012), environmental uncertainty is supportive of the success of perceived IT and industry stability and predictability, governments, as well as the economic effect; even though proper test has not been reported in a study before. Nevertheless, external pressures and competitive are contributory factors. Yayla et al. (2012) studied environmental uncertainty and discovered relations with the performance of exports. Environmental dynamism also moderates IS support for strategic flexibility and firm performance relations in a positive manner. In organization's external environment comprise customers, suppliers, competitors, governments, industry associations, and other social and economic forces which impact organizational governance of decision-making processes. IS researchers find that the changing external IT environment often influences IS-related management processes in organizations. Based on prior studies, we expect the external environment to impact IT governance patterns based on the resource and capability requirements they impose on an organizational performance (Xueet a., 2008 and Juliet, et al., 2016).

2.2.1. Heterogeneity

Environmental heterogeneity is described as the industry complexity or diversity of factors including customer demands and buying habits, as well as the amount and variety of products (De Haes & Van Grembergen, 2009). Heterogeneity in the environment creates the need for organizations to not compete as much on cost efficacy given the many different types of products and services (De Haes et al., 2011). It means that companies must now depend on the economies of scope and not the economies of scale in terms of competition in this type of environment. Given the increase in heterogeneity in the environment, the amount and difficulty of determinant that require consideration in strategic decisions and planning go up. Because of this, organizational flexibility is greatly needed to coordinate the business units and product lines that are diversified (De Haes et al., 2011).

2.2.2. Dynamic

Dynamism in the environment denotes the unpredictability and rate of changes in the environment including the obsolescence of products and services, changes in technology, moves by rivals, and rapid changes in demands by consumers (De Haes et al., 2013). Due to the current fast moving technology-based business environment, managers are constantly faced with uncertainty in keeping with the demands with more information as well as the capability of processing this information quickly (Bermejo, 2014). This is why at present having IT capability is of utmost importance and value of this type of dynamic environment since it enables firms to mobilize their resources quickly and effectively. In line with this argument, Etim & Agara (2011), point out that investment in IT seems to affect financial performance in stronger an positive manner when the changes in the environment are higher, while Gad Selig (2016) claim that resources enabled by IT are more valuable in conditions that are more dynamic environmentally. It may be harder to gain a competitive edge as most changes happen at the same time in a more dynamic environment. In addition, it could be especially hard to maintain the competitive advantage that has been created as the change's speed can neutralize any generated benefits or make it obsolete.

2.2.3. Hostility

Environmental hostility describes the presence of undesired external forces in a company's business environment, Etim & Agara (2011). It represents the level at which a company's environment can prevent a continuous rate of organizational or sales growth (Gartner, 2010). Environmental hostility can come from different economic, social, and political factors, including radical changes in the industry, imposing stricter regulatory policies, or stiff competition among rivals (Gartner, 2010). Companies in volatile business arenas could face high tax charges, interferences from the government, no access to technical knowledge offered by educational academies, weak infrastructure, poor market growth, overall economic collapse, or insufficient quality human resource (Gekonge, 2005). Firms may stop accessing and enhancing the required resources in developing their IT ability with the presence of the abovementioned obstacles (Gordon, 2012). Under-developed capabilities in IT may in turn, additionally slow the growth of firms towards innovation; processes in investment, as well as the operational structural changes, would require achieving flexibility and effectiveness through exploitation and exploration (Juliet et al., 2016).

2.3. Effective IT Governance

ITG leads to improvement in the performance of IT and this in turn leads to improvement in the performance of the company (Kairu et al., 2013). The significant framework of ITG links the performance of IT to performance of the company through business value creation and states that value creation optimizes risk while benefiting optimal resources costing (Mario S, 2012). Creation of value can also be defined as having achieved particular IT goals in relation to some of the overall corporate goals found in most companies (Rocheleau & Wu, 2002). Some of the aims are designed to enable the following goals such as the actions that have been planned and those in the works in the IT division should be in line with the company's business strategy, to prioritize the critical business requests; meeting these requests must comply with the deadline, requirements, quality as well as the agreed costs; IT initiatives costs and risks must be properly managed and the anticipated benefits of IT actions must be reached (Kairu et al., 2013). In this research has used of structure, process, and relational mechanism.

2.4. Organizational Performance

Managers tend to use financial measures to gauge performance before but at present it does not seem to sufficient and thus other tools are being developed such as the balanced scorecard which includes both financial and non-financial measurements to gauge performance. Having non-financial measures are equally important and using them both enables a proper findings or results of firm performance (Safdar & Raahemi, 2015), (Sylvie & Anne, 2017). The BSC has been developed from its early stages as a simple framework for measuring performance to a complete system of management and strategic planning. The BSC was introduced due to the requirement to include non-financial components for measuring performance in an organization. The BSC is as a system that a firm can use to assess the major performance measurements based on various perspectives such as financial, customer, internal business processes, as well as learning and growth. It means each staff member who performs the major functions must measure their job performance particularly their contribution to the goals of the firm in the aim to increase the profitability and wealth of the system (Tan et al., 2011). The BSC is categorized into four perspectives namely financial, customers, internal business processes, and learning and growth. This research is based on the four perspectives of the BSC to create a holistic view and understanding of an ITG framework that is effective and its effect on the performance of the firm.

2.4.1. Financial Perspective

According to Tan et al., (2011), the financial perspective identifies the objective of the financial performance expected from the firm's strategy. It is also linked to the projected economic outcomes from reaching the goals identified in the other three perspectives. Tan et al., (2011) Claim that these three core financial components that drive the business strategy include firstly Revenue Growth. Revenue growth involves each action or activity which increases the organization's revenue base (Teo et al., 2013).

2.4.2. Customer Perspective

Teo et al., (2013) claim that this component includes the capability of the firm to offer products and services of good quality, delivery effectiveness, as well as general satisfaction with customer service. The BSC requires the managers to interpret their overall customer service mission statement to particular measures which how the features that are most important to the customers (Grembergen & Steven, 2016).

2.4.3. The Internal Business Process

The perspective of internal processes concentrates on internal business results that are successful financially including satisfied customers as quoted by (Teo et al., 2013). Firms should be able to identify the major business processes that they excel in to address the firm's objectives and expectations of the customers.

3. Problem Statement

Recently, information technology governance has become a critical issue for many companies in various industries; this is even more important for large enterprises due to the more complex business processes, more specified tasks and departments. Many companies suffer from extra costs of IT and other processes due to failure inefficient alignment between IT and business strategies which in turn, leads to a low performance of the company (Al Qassimi & Rusu, 2015). Hence, the research problem for this research is that the importance of IT governance has been known by organizations, the effect of external environment characteristics and effective IT governance on organization Performance in Malaysian manufacturing companies is still not well established.

4. Significant of Research

Information Technology Governance is very important in manufacturing sectors. Also the topic of research has considerable significance in Malaysia. In fact, there are limited studies about IT governance in Malaysia and a seemingly lack of awareness studies on IT governance from the Malaysian perspective. A significant contribution of this research is the construction of a theoretically based model which assimilates the external environment characteristics, effective IT governance and Organizational Performance.

5. Research Questions

The research questions in this study are including:

RQ1. What is the effect of external environment characteristics on Effective IT Governance?

RQ2. What is the effect of external environment characteristics on organizational performance?

RQ3. To what extent effective IT governance mediates the relationship between external environment characteristics and organizational performance?

RQ4. How does effectively IT governance influence organizational performance?

6. Hypothesis Development

H_{1a}. There is a significant relationship between external environment characteristics and Effective IT Governance.

H_{1b}. There is a significant relationship between external environment characteristics and Organization Performance.

H_{1c}. Effective IT Governance mediates the relationship between external environment characteristics and Organization Performance.

H₂. There is a relationship between Effective IT Governance and Organization Performance.

7. Research Framework

Hence the Proposed of Conceptual Framework is shown in Figure 1.

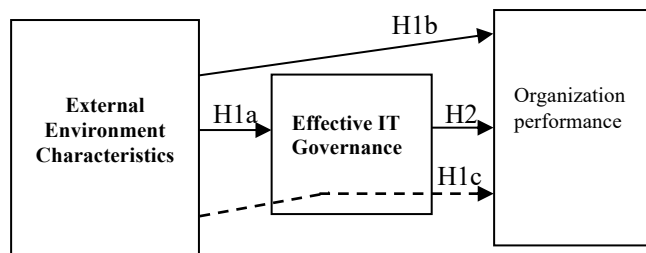


Fig. 1: Conceptual Framework

8. Research Methodology

This study tries to focus on IT Managers working in manufacturing companies. Samples have selected from seven states of Malaysia because of heavily populated and rather various manufacturing industries in order to let the results to be generalized to a larger population, and the main reason for the selection of seven states is

because Malaysia's manufacturing industries are largely concentrated in these states. The majority of manufacturing organizations are established in (Selangor (29.7%), Penang (13.6%), Johor (12.6%), Sarawak (10.3%) Negeri Sembilan (7.0%) Melaka (4.6%) and Pahang (4.6%) (statistic.gov.my, 2017). This is a combination of exploratory and descriptive research that aims to investigate the determinants of Malaysian IT governance and its influence on organizational performance. This research has applied a correlation (quantitative method) study to examine variables obtained from the member of the list from the Federation of Malaysian Manufacturer (FMM, 2014) and SME Corp Malaysia. There were a total of 335 responses achieved. 222 Out of 335 were returned from SMEs companies, and 113 returned from FMM companies. This study has used a simple random sampling. For this study, AMOS was select to perform SEM.

9. Results of Hypothesis Testing

As shown in Table1, the results of hypotheses testing are listed according to the finalized structural model of IT governance initiative, effective of IT governance, organizational performance.

Table 1: Hypotheses Testing Results

	Paths	Unstandardized Estimates	Std. Error	Critical Ratios	p-value	Results
H1a	X → G	0.245	0.078	3.141	0.051†	Supported
H1b	X → P	0.084	0.076	1.105	0.233	Not Supported
H1c	X → G→ P	0.102	0.045	2.267	0.009**	Supported
H2	G → P	0.397	0.145	2.738	0.000***	Supported

10. Data Analysis and Result

In this research, there are 30 items. Furthermore, selecting AMOS course was strongly reinforced by its comprehensive make use of evaluating mediating results in the new professional and organizational analyses. Also In this study, confirmatory factor analysis (CFA) was done using Covariance-based structural equation modeling by the software tools of AMOS 20. SEM test is the proper tool for this study; SEM permits both confirmatory and exploratory models forming. The confirmatory factor analysis was conducted by 30 scale items that derived from the EFA output fit indices. The first CFA model fit indicate that Good (GFI) =0.886, (AGFI) = 0.869 were poor (acceptable threshold. 0.90), and (RMSEA) =0.077 (< 0.06). Therefore the CFA was finalized with 26 items, resulting in Model 2: also all of the fit indexes had acceptable amounts (Chi square=443.957, df =179, P-value=0.000, AGFI=0.912, GFI=0.934, CFI=0.953, NFI=0.902, and RMSEA=0.053).

11. Hypothesis Testing

To assess the mediating path the bootstrapping option in AMOS was selected.

[H1a]: There is a significant relationship between external environment characteristic and effective IT governance.

[H1b]: There is a significant relationship between external environment characteristic and organization performance.

[H1c]: Effective IT governance mediates the relationship between external environment characteristic and organization performance.

In this case external environment characteristic ($\beta = 0.245$, $z = 3.141$, $p = 0.051$) was tested to show significant influence on effective IT governance confirming H1a. External environment characteristic ($\beta = 0.084$, $z = 1.105$, $p = 0.233$) was not confirm to demonstrate significant impact on organization performance, not supporting hypothesis H1b. Effective IT governance ($\beta = 0.102$, $z = 2.267$, $p = 0.009$) was found to have a full mediator role between external environment characteristic and organization performance and hence H1c was supported. As a whole, hypotheses H1a, H1c are accepted and H1b is rejected.

[H2]: There is a significant relationship between effective IT governance and organization performance.

The research outcomes showed that effective IT governance ($\beta = 0.397$, $z = 2.738$, $p = 0.000$) was associated significantly with organization performance and hence Hypothesis H2 was accepted. This also implied that greater effort ineffective IT governance would result in higher level of performance a company can achieve.

12. Research Findings

Researchers in the past two decades have paid a lot of attention to the impacts of external environmental traits in the firms. This is due to needing for compliance to requirements by new regulations and the increase in complexity in doing business in the international market. Various business strategies are inter-related to various impacts namely differentiation in marketing strategy is inter-related to composite uncertainties; dynamism and unpredictability; differentiation in innovation are inter-related with unpredictability, and innovation strategy cost is not inter-related to environmental uncertainty. Environmental uncertainty is supportive of the success of perceived IT and industry stability and predictability, governments, as well as an economic effect; even though proper test has not been reported in a study before. Nevertheless, external pressures and competitive are contributory factors. Environmental dynamism also moderates IS support for strategic flexibility and firm performance relations in a positive manner. Therefore In this study, external environment characteristic has no direct influence on organization performance. In this research supported the mediating effect of effective IT governance between external environment characteristic and organization performance in Malaysian manufacturing companies. Maturity in IT is not the same as the investment level in IT and a better way of measuring would be through IT capability in the company, therefore, less investigation has been done on its effect IT function characteristics and organization performance. However, its significant effect on IT functions characteristics on organization performance in Malaysian manufacturing companies. Hence this research result has added confirmation that the mediating effect of effective IT governance between IT function characteristics and organization performance in Malaysian manufacturing companies.

13. Conclusion

This research has concentrated on the external environment characteristics that effective ITG and organization performance in manufacturing companies in Malaysia. Due to the importance of the IT governance in Malaysia, this study could aid Managers and researchers to promote their knowledge about the importance of ITG and how it can benefit organization performance. By considering both external environment characteristics and effective ITG and their impact on manufacturing companies, effective ITG could enhance organization performance. Indeed, the findings provided useful information related to ITG that enlightened companies to their Productivity and performance, and assists them to survive in the hypercompetitive world.

13.1. Further Research

Data was collected from production institutions covering, both MNCs and SMEs in Malaysia. The justification for selecting the cross-sectional style was to acquire enough sample size for analyses. Because the

device of evaluation in analysis was organizations instead of individuals, the inclination is normally that the sample size was likely to be little, especially therefore, when the questionnaires had been distributed to a making sector alone. This research ought to be extended due to the accessible and different sample size. Additional analysis in replicating this research can be carried out an industry-specific setting, such as service.

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