

Information Technology and Organizational Agility

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Abstract— This paper provides a review of the literature while contributing to academic understanding of the concepts of organizational agility and Information Technology Infrastructure Flexibility. The research identified fifty articles from total nine databases and e-resources. The paper identified focus on Malaysian organizations especially automobile industry. The findings in this paper will help academics to gain a better understanding and to develop the concepts on organization agility with the help of IT infrastructure flexibility as a driver. Realizing Information Technology and human as important assets of organization. Evolving on how to manage these critical assets effectively in enhancing organizational performance. Correspondingly towards achieving optimum competitive advantage and sustaining the longevity in the industry.

Index Terms— flexibility; learning orientation; organizational agility; automotive

1. Introduction

In recent years, organizations encountered challenges in sustaining competitive advantage. Agility (responsive) is one of the issues, where organizations have to be more efficient in identifying, sensing and responding to opportunities and threats. Organization need to have a capability to adapt quickly, flexibly, and effectively to changing requirements. This changing requirement can be from internal as well as externally. IT play a huge role in facilitating the business operation. However a large investment on IT infrastructure not guarantee the most efficient processes will be achieved. Detail analysis prior purchasing software and hardware is a key. IT infrastructure of an organization should be flexible in terms of compatibility, connectivity, and people who handle them must be competent enough.

Come across to the scenario in Malaysia, organizations still lacking in responsive characteristic (Ghani et. al 2011). The rapid growth of IT use in business operation required organizations in Malaysia to be prepared with responsive strategies and implementation. Specifically to automobile organizations in Malaysia, they need to be competitive in order to increase their market share that stand with established foreign organizations from Japan, South Korea and Europe (Othman et al. 2016). Malaysian automobile industry mostly depends on the quality, efficiency and delivery capabilities of the auto components and parts sector. Malaysian automobile organizations are found not internally competitive need critical improvement. (Wad and Chandran).

To address the above objective, the related literatures on organizational agility and IT are reviewed. Specifically, the literatures were summarized on the relationship between IT infrastructure flexibility and organizational agility.

2. Conceptual Background

Before extending the IT infrastructure flexibility relationship to organizational agility, relevant literatures are reviewed.

2.1. Organizational agility

As per the definition by Tallon & Pinsonneault (2011), agility is defined as the capability to identify and answer to prospects and hazards with speed, easiness and convenience. Organizational agility refers to improving the speed and flexibility of the overarching processes, decisions, and concerns at the company level. It deals with high-level process improvements to streamline activities for efficiency and effectiveness. All aspects of the business are reviewed and improved, such as IT, human capital management, operations, production/manufacturing, and customer/supplier relation (Heckler et al. 2016). Research which examines the association between IT and organizational agility is increasingly encountered in Information Systems (IS) areas (Bi et al. 2011). Major areas of research on organizational and IT agility were identified, these include: workforce issues, organizational characteristics, it structure characteristics, and types of agility. Relating to this, this paper examine the relationship that exist between the flexibility of IT infrastructure and organizational agility. In which the focus area is on manufacturing industry (automobile) in Malaysia.

2.1.1. Agility in manufacturing

The origin of agility is rooted in the manufacturing industry where adaptability to changes in the supply chain required both flexibility and nimbleness (Harraf et. al 2015). Manufacturing industry involved the process of raw material to end product. The daily business processes is intense. The need of quick, responsiveness in supply chain is assured. Looking at automobile industry in Malaysia, with small number of organizations that considered as local organizations required good strategies for competition with foreign organizations from developed countries. Though until this date, Malaysian organizations requisite Transfer Of Technology (TOT) from established organizations like Toyota, Daihatsu, Mitsubishi. It is time for local organizations to innovate and developed the

brand with Malaysian unique quality that cater the customers' requirement and satisfaction.

2.2. Information Technology

Nevertheless, the importance of technology for an organization is certain. Without IT all business operations are more time and cost consuming. IT should be view as provider of better and improved processes (Anwar and Masrek 2014). If IT incapable to improve the processes, then organization should re-analyze their IT infrastructure capability and flexibility. Existing literature defined IT Infrastructure capability (ITI) as the shareable technical and common enterprise-wide platforms to provide various IT services and initiatives. Numerous research studies focus on the flexibility characteristic of IT infrastructure. Many researchers named it as Information Technology Infrastructure Flexibility (ITIF). Further discussion of ITIF is presented in the following subsection.

2.2.1 Information Technology Infrastructure Flexibility

IT infrastructure flexibility is defined as "infrastructure flexibility is the issue of responsiveness: infrastructure is flexible as the IT organization is able to respond rapidly and effectively to emergent needs or opportunities" (Duncan, 1995 p.40). IT flexibility is indicated as the quick employment of technology that is aided with the help of IT infrastructure (Jorfi et. al 2011). In this context of research three ITIF constructs analyzed are:

- IT compatibility is defined as the ability to share any type of information across any technology component within the organization and/or to any party outside the organization.
- IT connectivity is referring to the ability of any technology component to attach to any other component inside and outside of the organizational environment.
- IT personnel competency is stated as the capability of IT personnel to deal with IT related technical problems and business demands.

3. Theoretical Foundation

This paper adopted three information system theories as lenses. These theories are discussed in the following subsection.

3.1 Systems Theory and Organizational Agility

Systems Theory and Organizational Agility - this research uses the systems theory and the concept of emergent properties from Nevo and Wade (2010). Following Chen & Siau (2012) that defined organizational agility as an emergent property; in which explained two antecedent components of organizational agility; 1) sensing and detecting environmental changes and 2) acting on and responding to environmental changes.

3.2 Awareness-Motivation-Capability (AMC) Framework

Awareness-Motivation-Capability (AMC) Framework – the AMC framework suggested three behavioral drivers influence

organization's decision to act or respond: awareness, motivation, and capability. This lens provide this research theoretical relation on how IT infrastructure flexibility have the potential impact on competitive advantage through organizational agility. IT infrastructure flexibility can help an organization's capability to respond opportunities and threats in marketplaces.

3.3 The Dynamic Capabilities View (DCV)

The Dynamic Capabilities View (DCV) was initiated by Teece et al. (1997) the authors explained that competitive advantages of organizations rooted from dynamic capabilities, which include timely responsiveness, rapid and flexible product innovation, along with the management's capability to coordinate and reorganize internal and external proficiencies (Teece et al. 1997). Dynamic capability describes several dimensions which include (1) sensing (and shaping) opportunities and threats, (2) seizing opportunities, and (3) managing threats and reconfiguration (Chen, 2012). Similarly, others literature suggested that dynamic capabilities comprise of the following routines: 1) sensing, 2) coordinating, 3) learning, 4) integrating, and 5) reconfiguring.

Organizational agility has a close relationship with dynamic capability, which has been used in various strategic management literatures. This theory outlines that organizations are capable of reconfiguring, build and integrate internal and external competence to counter to the rapidly fluctuating environment. It is considered an appropriate framework to explain how organizations can differentiate and compete in a turbulent economy, taking into account that they must develop and co-evolutionary reconfigure there IT and IS in order to remain competitive (Van de Wetering et al. 2017).

3.4 IT infrastructure flexibility impact on organizational agility

Existing literatures found that providing standardized specifications, interfaces, and criteria allow organization to make quick and easy modification for integration of new technologies. The capability helps organization to improve their business processes as well as learn the market trends, customer and supplier changes. This is added with human capital interaction to IT as strategy to improve overall business agility

Tools provided by IT for collaboration, processing, automation, and communication assist workers in their day-to-day activities and seek to make them more productive. Tools provide the speed and flexibility needed to achieve and improve agility. Organization that values learning will provide opportunities for training and development etc.

4. Methodology

This review was restricted to be published in academic articles provided Universiti Teknologi PETRONAS through My Athens. Databases that included in My Athens are listed in the following table (Table 4). However, only relevant database was used substantiating with the literature related to IS research.

With systematic literature review through access provided by the University, a list of related literature was reviewed within the period of January 2018 to June 2018, total of nine databases/e-resources were used in this research with 50 number of relevant literatures retrieved from several keywords. These keywords included “organizational learning”, “learning orientation”, “information technology infrastructure”, “information technology capability”, “information technology infrastructure flexibility”, “information technology flexibility” and “organizational agility”.

Table 1 List of databases utilized

No	Databases / E-resources
1	ACM Digital Library
2	Emerald Management eJournals
3	IEEE_XPLORE
4	ScienceDirect
5	SCOPUS
6	SpringerLink
7	Taylor & Francis Online
8	Web of Knowledge
9	Wiley Online Library

5. Results and Discussion

The result that concluded from the literatures analysis that there is a positive relationship between IT infrastructure flexibility and organizational agility. However it need to be empirically tested. The verification that take place in the next stage of this research will come with hypotheses. This research hypothesized the following;

- H1: IT compatibility positively drives organizational agility
- H2: IT connectivity positively drives organizational agility
- H3: IT personnel competency positively drives organizational agility

6. Conclusions

The paper contributed by providing an overview of the different research methods employed by researchers involved with organizational agility and IT infrastructure flexibility. Additionally, this paper serves to remind researchers of some of the issues relating to factors that driving organizational agility. The need of organization to deeply analyze and monitor the IT infrastructure as enabler of business processes. Extending the above, this paper contribute to the better understanding of agility and IT flexibility and their relation to automobiles industry in Malaysia. Future research has many opportunities in extending the research to different domain.

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