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## Preface

This e-book describes the research papers presented at the International Conference on Emerging Computational Technologies (ICECoT 2021), organised by Faculty of Computer and Mathematical Sciences (FSKM), UiTM Cawangan Melaka. The main discussions of the conference is on the technological advances that help shape the skills that are required to cope with the Fourth Industrial Revolution (IR 4.0). Considering that this is our first attempt at organising a conference, we are therefore greatly honoured that the Universitas Negeri Semarang (UNNES), Indonesia, Mahasarakham University (MSU), Thailand and University of Hail (UoH), Saudi Arabia have all agreed to become our partners by contributing several reseach papers as well as providing reviewers to assess the quality of the papers.

Out of the numerous research works that had been submitted and reviewed, the Editorial Board have selected 22 papers to be published in the e-book. The discussions of these papers pertain to the use of technologies within the broad spectrum of Computer Science, Computer Networking, Multimedia, Information Systems Engineering, Mathematical Sciences and Educational Technology. It is hoped that the research findings that are shared in this e-book can benefit those who are interested in the various areas of computational technologies; such as graduate students, researchers, academicians and the industrial players, to name a few.

As the Project Manager, I would like to thank all of the committee members from the bottom of my heart for their tireless efforts in ensuring the success of ICECoT 2021. Without their continual support and excellent teamwork, this conference would not have come to fruition. In fact, holding this major event has been a good learning experience for us all, and I sincerely believe that our future conferences will become more outstanding if the same spirit is maintained.

**Dr. Noor Aishikin Adam**

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# Business-IT Strategic Alignment: Exploring A Concept Of Between IT Flexibility and IT Capability in Saudi Arabia

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**Abstract**— Today, almost every organization uses IT system(s) to automate or to streamline business processes. IT solution can be strategic and contribute to organizational performance in terms of better quality products/services. The recent COVID-19 pandemic has demonstrated that IT is one of the greatest enablers for organizations to handle challenges. In this paper, we explore the notion of IT and organizational performance from the perspectives of IT flexibility, IT capability and business-IT strategic alignment. Although, Strategic alignment has been the interest of many researchers, investigation of such issues in Saudi higher education sector are still waiting for research. To addressing this issue, the aim of this study is to examine how IT is using in Saudi Arabian higher education to attain their organizational objectives in this era as recent COVID-19 as world pandemic. This aim is pursued using the following objectives: First, investigate the connection between Flexibility and capability of IT dimensions. Second, investigate the effect of flexibility and capability of IT on the business strategy and Information Technology strategic alignment. Third, investigate how business strategy and Information Technology strategic alignment have influenced the organizational performance. The study will use University of Hail as case study to undertake an in depth study of IT flexibility, IT capability and IT-business strategic alignment with business strategy. This study is using qualitative research design to generate the data and this using multiple tools like interviews and documented analysis. This study is a part of in progress of large project and need time to analysis.

**Keywords**— *business-IT strategic alignment, IT capability and IT flexibility*

## I. INTRODUCTION

Over the years, organizations have grown more and more dependent on their information technology systems and IT has become closely intertwined with business [1]. This is evidenced by the growth in IT budgets, especially as organizations spend to replace technology that is obsolete. For instance, 44 percent of businesses planned on spending money on their information systems in 2020 [2]. In addition, successful business innovations, operation and growth as a result of the use of information technology have also resulted in increased uptake of information technology [3]. However, this spending is unlikely to have a positive impact on organizations, if the IT and business strategies of the firms are not aligned. The role of information technology is often associated with the strategic objectives of an organization. Organizations, therefore, tend to be increasingly concerned

with how to align their IT with the business' strategic aims, in order to reap maximum benefits [4]. IT-business strategic alignment is linked to increased efficacy of organization, better financial performance and generates a sustained competitive advantage [5]. Reference [6] states that, failure to align IT and business strategies can result in wastage of resources, failed IT initiative resulting in severe organizational, as well as economic outcomes. [7] posits that, firms such as Wal-Mart and Dell have experienced significant gains as a result of the alignment of the organization business and IT strategies.

Information technology (IT) is a crucial for executing and driving business strategy in the current technological era. Since the advent of the Internet and subsequent discovery of IT in the 1990, the business environment has undergone tremendous changes due to incorporation of IT developments in different sectors. The majority of industrial, commercial and government units are now depending on IT systems and this is pressuring many units to adjust their strategies [8]. However, a rapid change cannot be accomplished without aligning IT with business strategies in an effective manner. Thus, IT alignment has become a top concern to various business leaders over the past few decades and they need to be addressed if at all organizations aims to achieve maximum performance in the current dynamic business environment.

Business-IT strategic alignment is the application of IT in a suitable and appropriate way in line with the goals, objectives, and demands of a business [9]. IT has become inextricably related with business and therefore strategic alignment enhances organizational efficacy, increase return on investment (ROI), enable firms to improve their management needs and offers stability for the overall organization [9]. Despite these benefits among others brought by strategic alignment, there exist challenges experienced in maintaining the IT-business alignments especially in today's dynamic business environment. The main challenge that is faced by organizations is adjusting inactive and unstable business settings to embrace and sustain strategic alignment. Other challenges include the change in demand, price wars and increased competition that shake the stability of organizations [10]. In this regard, it is critical to implement a flexible IT with the competency to meet business changes so as to maintain and sustain a strategic alignment in today's organizations.

The previous discussion of research issues and gaps leads to the following research aim and objectives. The aim of study is using the following objectives: First, investigate the connection between Flexibility and capability of IT dimensions. Second, investigate the effect of flexibility and capability of IT on the business strategy and Information Technology strategic alignment. Third, investigate how business strategy and Information Technology strategic alignment have influenced the organizational performance.

## II. LITERATURE REVIEW OF BUSINESS- IT ALIGNMENT

Over the past five decades, the concept of business-IT alignment has been considerably featured in scholarly literature as one of the major concerns of business and IT executives and the increased use of IT in the advanced organizations. [11] [12] [13]. In the ‘2018 State of the CIO’ survey, 37% of IT leaders indicated that they actively collaborate with line-of-business (LOB) managers to identify areas where technology may drive business transformation [14]. A survey conducted in 2019 by International Data Corporation (IDC) revealed that many LOB executives look to their company’s IT function (especially the CIO and IT systems) for guidance on transformative digital initiatives [15]. According to [14], IT and business functions are increasingly devising ways through which they can effectively work together to execute shared objectives concerning digital transformation in order to gain the strategic value of IT. Therefore, the issue of aligning business and IT has gained significant attention among scholars and practitioners.

However, what does the business-IT alignment concept imply? The concept has been widely discussed in literature under different, yet closely related alignment constructs – strategic alignment [16] [13] [17]; fit [18]; linkage [19]; integration [20] [21] [17] [22]; unify [20]; blend [20]; and coordination [22].

IT-business alignment has since been defined differently by various researchers. Reference [18], defined it as the biding of information technology in a suitable way that it conform to business’s strategies, goals, objectives and needs. [23], viewed it as the link between the organizational structure with IT at a planning level, in which IT goals and objectives are supported by a firm’s goals, objectives, and plan. Different approaches have been used to determine the importance of IT-business alignment.

According to [24], there are different types of IT-business alignment that would help managers to understand the whole process better. In this regard, it is critical to investigate different factors that affect IT-business alignment to determine the point of interaction between organizational strategies and information systems. This will help managers to plan on the investments and IT strategies necessary to maintain these points and enhance them to obtain stronger outcomes in their firms. According to [12], various factors impacting IT-business alignment are discussed by different authors especially in the developed countries. Thus, it makes it easier for the research to be conducted even in the developing countries. Some of the factors that affect the strategic alignment include IT flexibility and IT capability. They are termed as IT resources which when combined with human and business resources gives a guarantee of high strategic alignment [18].

Therefore, there are slight differences between various alignment terminologies. However, business-IT alignment is largely conceptualized as the tight or proper integration of an organization’s IT capabilities (information systems, data/information, and IT expertise) and objectives with its mission, business strategy, and goals [11] [17] [20]. Primarily, the proper alignment between business and IT is intended to ensure that IT investments directly contribute to the realization of the business objectives of an organization [11] [17] [22].

### A) *Information Technology Capability (ITC)*

Capability is the unique compilation of human skills, behaviors, motives, attitudes, and orientation to achieve specific goals and objectives under ideal contexts. According to [25], capabilities comprise a mix of different business, interpersonal, and technical skills that support specific business abilities (p. 29). [26] define IT capability as “the ability of an organization to acquire, deploy, combine, and reconfigure IT resources to support and enhance business strategies and work processes”. Reference [27] define the ITC as the ability of the organization to manage it information systems in related to communicate, process, store and deliver information through its structure to build more efficient, effective, and productive to all over its departments. Therefore, IT capability involves not just IT tools but also the skills and knowledge generated during the business process, often enabling organizations to coordinate IT activities and resources effectively.

Reference [28] argue that an organization’s IT capability affects performance since the subsequent effects interfere with business operations. Creating IT capabilities requires an organization to harness the human resources and infrastructure through a process that needs to be formalized and managed to enact control. Business objectives must interlink with the IT capabilities to facilitate development, creating an operational competence. The operational competence varies depending on the industry and largely depends on business systems thinking relationship building, and improvement of core competencies necessary to maintain business competitiveness. IT capability relies on IT architecture, human resources, relationships, and infrastructure.

#### 1) *IT architecture*

IT architecture facilitates the development of necessary IT competencies through technological design and delivery. Organizations need to adopt long-term strategic focus and directions by creating coherent blueprints to guide the IT infrastructure and capabilities to respond to current and future organizational needs [25]. Another study by [29] acknowledged the significance of internet architecture in “reducing the subsequent integration costs” associated with IT infrastructure.

#### 2) *IT infrastructure*

IT infrastructure lays the organization’s foundation of the pooled IT services that, according to Aral and Weill, include human and technical [29]. Servers, network connections, laptops, personal computers, and shared databases comprise the technical infrastructure. Usually, IT infrastructure has a high initial cost but a vast horizon creating long-term benefits. Creating a suitable IT infrastructure requires the

alignment of strategic business plans with organizational objectives.

### 3) *IT human resources*

Training the human resources for IT strategic development creates current high demands and long-term organizational benefits, including creating harmonious relationships between IT and other departments. Help desks, application developers, and human practices in the IT department symbolize the technological infrastructure's human resource element. According to [29], organizations make investments on human and technical infrastructure to anticipate future businesses [29].

### 4) *IT relationships*

Organizations usually have internal and external factors or departments should be in relation with each other. Therefore, the communication requires efficient and effective way amongst the parties and organization units. According to Bhatt and Grover, IT relationship infrastructure is the extent of a positive association between IT and other organizational departments, such as management [31]. Organizational IT strategies are beneficial when there exists a proper relationship.

### B) *Information Technology Flexibility (ITF)*

Flexibility denotes an organization's capability to adapt to the organization's changing conditions and in the market. IT flexibility is one of the core principles of the planned configuration of business information technology (IT). To make any progress in the success company technological assets, it is necessary to employ information technology flexibility. By saying that an information system needs to be flexible, it implies the ability to align with the certain changes in business process needs. Reference [32] notes that IT flexibility and with the improvement of technological readiness within an enterprise puts management in a dilemma on the allocation of financial resources, controlling these financial risks and maximizing the effectiveness of IT. Technological readiness in this prompt highlights the workforce's readiness to use and embrace technology. The factors spearheading technological readiness and technological flexibility include innovativeness, insecurity, discomfort, and optimism. When functioning optimally, these drivers of IT flexibility motivate the management, customers, and employees to use technology to enhance organizational competitive advantage. IT flexibility is linked with the acquisition of networking hardware to aid in the improvement of IT modularity, IT connectivity and IT compatibility.

#### 1) *IT modularity*

IT modularity is a feature of IT flexibility that determines how effectively progressive changes are implemented [32]. Reference [32] further present IT modularity as a precursor to dynamic capabilities. Additionally, recent research surrounding IT modularity identifies it as the examination of the IT governance structure decentralization and the flexibility of the IT architecture. Previous scholars have linked IT modularity to good business performance in both developing and developed countries. Reference [30] conducted an empirical study on the effect of IT flexibility on organizational responsiveness and competitive advantage. After assessing data collected from 105 senior executives of manufacturing and service firms in the United States, the study concluded that modularity significantly influenced

organizational responsiveness by positively impacting information generation and dissemination. Another study conducted in China outlined that IT infrastructure modularity positively affected absorptive capacity and supply chain agility, which ultimately affected the organizational performance [33]. The impact of IT modularity is not only confirmed in developing countries but also developing countries with a small Gross Domestic Product. In a study assessing the supply chain dynamics in Malaysia among the manufacturing firms, [34] found that IT systems that adopt progressive changes contribute to the supply chain flexibility, which improves the business performance. The studies cited above recommended that managers should invest in a modular IT infrastructure to enable quick and swift reconfigurations in response to variations and uncertainties in the business environment [30][33].

#### 2) *IT connectivity*

IT connectivity connotes the degree to which IT systems allow the sharing of applications and data within a wide array of technological components. The sharing of data enabled by IT connectivity makes it possible to have prompt responses to change. According to [8], "connectivity enhances strategic alignment. In a study, examining the relationship between strategic information technology alignment and organizational ability among the publicly traded companies in the United States, [2] found that connectivity was integral in linking the two parameters. Firms with good connectivity within the IT infrastructure had better strategic information technology alignment that resulted in organizational agility. More to that, IT connectivity connotes the capacity of IT mechanisms to link with internal and external elements of the IS [35]. Reference [36] outlined that connectivity affected a wide range of physical capabilities in that once connectivity was established; the range of physical activities was independent of other technical-enabling dimensions. These findings were deduced from an empirical study on 361 IT professionals in management positions based in Israel.

#### 3) *IT compatibility*

Within the scope of IT flexibility literature, compatibility is defined as an IT system's ability to cross share data and information with all types of software and hardware [37]. The definition of IT compatibility is added to a finer level of detail by identifying that the data needs to be shared both automatically and directly across all hardware and software. Reference [38], divided IT compatibility into four major constructs; compatibility with the favourite style of work, compatibility with values, compatibility with prevailing work dynamics, and compatibility with work practices. After testing this theoretical model with a sample of 278 users of a large bank's customer relationship management systems based in the USA, the study confirmed that IT compatibility largely affected the technology acceptance in all the four constructs. In another study, [39] concluded that compatibility had an impact on the extent of Electronic Commerce adoption in the Hotel Industry. The data used in this study was derived from a sample of 332 hotels in South Africa, which is a developing country.

For information to be shared across all types of software and hardware, connectivity is paramount. As such, the relationship between compatibility and connectivity is an important element to the field of IT flexibility. According to [40], the ability to share information within an information

technology configuration heavily depends on the aptitude of any technology to link to any of the components involved. In a study done in Malaysia, the authors found a high correlation between compatibility and connectivity in determining the level of IT flexibility, thus, confirming the findings by [41].

### III. CONCEPTUAL FRAMEWORK

Due to increased technological advancements, there is an increased application of IT in organizations. However, it has been observed that in areas that IT supports business strategy, it is difficult for IT to maintain the same speed as the rapid changes taking place in many firms which are resulting in changes in business strategies [42] [23] [43]. In this case, IT reacts slowly to changes making it unable to provide a sustainable advantage to organizations. This has created a need for the adoption of flexible IT, which is capable of reacting rapidly to the changing business environment and aligns easily with the business strategies. Currently, IT is lacking flexibility and thus creating a gap between developing strategies and the ability of IT to support them. According to [9], IT flexibility leads to a sustainable strategic alignment. It can be discussed based on its three components: connectivity, compatibility, and modularity.

Most existing literature explored IT flexibility in one dimension only; its benefits in its association to strategic alignment, particularly in the developing countries. From practical perspective, the investigation of IT capability, IT flexibility, strategic alignment and how they might influence IT-business alignment it is perhaps possible to help managers make proper planning to obtain and optimum performance. IT capability is the capacity of an organization to use its IT resources and position them with other resources and capability in order to achieve its objectives through IT execution [44].

The components of IT capability include IT architecture, infrastructure, human resources and IT relationship. The components of IT flexibility have a direct link with IT capability which in turn influences the strategic alignment. Given the lack of literature in this area, the study will fulfill the gap in knowledge concerning the impact of business-IT alignment in Saudi Arabia's organizations. Further, there exists a gap in method and implementation strategy for a flexible strategic alignment. This is evident from the available literature as [8] recommended that the adoption of IT strategy should implement an IT strategy blueprint. This is an indication that there is lack of empirical evidence or cases of such implementation in Saudi Arabia. In this case, the theoretical framework is derived from the research model below as it is shown in Fig.1 which proposes that both IT capability and IT flexibility positively impact the IT-business alignment which in turn allows all operations to work towards organizational objectives. The Fig.1 below represents the proposed theoretical framework. The framework is based on the argument that IT flexible and IT capability will determine or significantly influence IT –Business strategic alignment. The degree of strategic alignment will in turn significantly influence organizational performance. The framework also proposes that IT flexibility and IT capability are interrelated. For example, the degree of IT capability will depend on IT compatibility. Similarly, the degree of IT flexibility will depend on IT infrastructure. Therefore, the two constructs (IT flexibility and IT capability) are indispensable to each other. For IT to have efficacy on organizational performance through strategic alignment, both constructs have to be

positively related. Given the focus of this study on educational sector, organizational performance will be measured using the following elements: Student satisfaction with the IT, Staff satisfaction with the IT, other stakeholders' satisfaction, efficiency and effectiveness of organizational processes using IT.

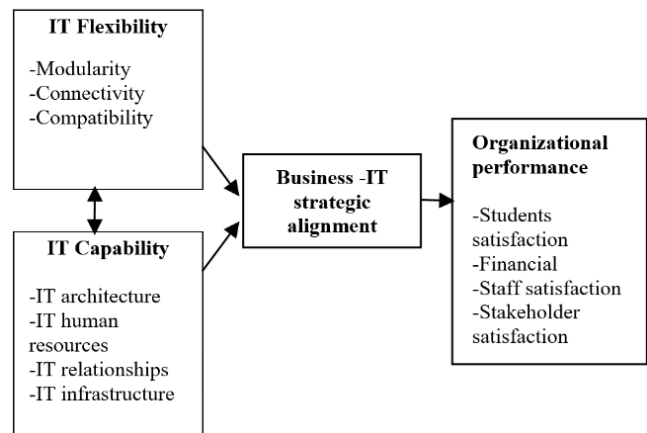


Fig. 1. Research model, [8] and developed by the researcher.

### IV. RESEARCH METHOD APPLIED IN THIS STUDY

This study will use case study to examine the use of IT to achieve organizational objectives in the educational sector of Saudi Arabia. The use of case study design will help in understanding the lived experience and current opinion, thoughts, and feelings of faculty, students and managers pertaining to the link between IT Flexibility and IT capability dimensions in the educational sector of Saudi Arabia. The specific case study in this research is limited to a local university. In the recent past, learning institutions in Saudi Arabia have focused on implementing IT uptake as an integral part of improving organizational productivity [45] [46] [47]. However, there is a paucity of literature insights on how the education sector in northwestern Saudi Arabia has used IT to achieve organizational objectives. Additionally, there is limited information regarding the extent IT flexibility and IT capability aligned within the Saudi Arabian education sector, nor how business-IT strategic alignments impact organizational performance in Saudi Arabia.

Thus, using a local university as in depth case study will help answer the research questions. For example, using interview responses from the dean, faculty members, IT professionals, Strategic administrative staff from University of Hail will identify how IT is used to support both learning, teaching, and providing support to learners. Additionally, the documented analysis will be used as a tool to analyses the case more deeply for more reliability of the results. The information will also help assess the connection between IT flexibility and IT capability dimensions such as building 21st-century skills, increasing student motivation and engagement, and accelerating learning. The case study of University of Hail will further aid in examining how business-IT strategic alignment impacts organizational performance including transforming teaching through new models of connected teaching, student-teacher interaction and improving instruction through personalized learning.

### V. CONCLUSION

This paper discussed the relationship between business-IT strategic alignments. It also explored elements of IT

Flexibility and IT Capability. IT capability relies on IT architecture, human resources, relationships, and infrastructure. However, IT flexibility is related to IT modularity, IT connectivity and IT compatibility. This study contribute into the enhancement of research in the field of IT and business and create a path or an opening for more research to be conducted for the benefit of educational institutions, businesses, and the government. Moreover, the data collection of this study is still in progress as the results can be used to measure the effectiveness of IT application in the business world.

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