

Analysis of the Fit of Learning and Management Systems in Higher Education Institutions: A Case Study from Saudi Arabia

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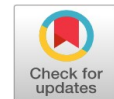
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Abstract: Higher Education Institutions (HEIs) are heavily investing in learning and management systems to support and enhance the quality of services provided to key stakeholders; namely, the students. However, the degree of fit of such systems with the needs of students varies significantly from one higher education institution to another. Therefore, continuous assessment of this kind of fit has to be undertaken by HEIs to ensure that these systems are continuously adding business value and maintaining appropriate level of return on investments. The problematic issue is that there is a scarcity of business and Information Technology (IT) alignment evaluation research or tool that is dedicated to this purpose in this sector. This motivates this ongoing research to be undertaken devising a theoretical framework as an artefact that incorporates set of business analytics tools to facilitate the evaluation of the business value from IT. The Design Science Research is adopted as the research methodology in this research to guide the development process of this artefact. This paper, however, focuses mainly on providing background information about the issue of business and IT alignment in general and in the higher education sector in particular. It then describes the alignment influencing factors that impact on the alignment between business and IT. Through a real life case study from a higher education institution in Saudi Arabia, the paper aims to present the IT alignment issue in this sector, and also discuss some of its influencing factors to illustrate how they influence the degree of fit between business and IT.

Key Words: Learning systems, Management systems, Higher education institutions, IT alignment, Information technology

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INTRODUCTION

Business and IT alignment

For nearly five decades, the issue of business and IT alignment has remained as an issue of considerable attention in both the academic and practitioner research literature (Karpovsky & Galliers, 2015). Business and IT alignment can be defined at both strategic and operational levels as presented by (Henderson & Venkatraman, 1993). Strategically, Reich and Benbasat (1996) define alignment as the degree to which the IT mission, objectives, and plans support and are supported by the business mission, objectives, and plans. On the other hand, Silvius, De Waal, and Smit (2009) define business and IT alignment at the operational level as the degree to which IT applications, infrastructure and organisation enable and support the business strategy and processes. For an organisation to be competitive and successful, it should obtain a holistic level of alignment at both levels.

Researchers and practitioners have found positive relationship between business and IT alignment and business performance improvement (Coltman, Tallon, Sharma, & Queiroz, 2015; Pandla, 2016; Yayla & Hu, 2012). Kearns and Lederer (2003) state that organisations that are capable of aligning business and IT have shown better performance than their competitors. Other considerable benefits from achiev-

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ing and maintaining alignment are represented in saving IT costs, achieving greater operational efficiency and improving the flexibility towards change (Wagner & Weitzel, 2006).

This concern of achieving a high level of alignment between business and IT was first documented during 1970s (Luftman & Kempaiah, 2007). Since then, the issue has been addressed under various terminologies such as fit (Chan, 1992), fusion (Smaczny, 2001), linkage (Henderson & Venkatraman, 1992), integration (Weill & Broadbent, 1998), coordination (Lederer & Mendelow, 1986), harmony (Luftman, 1996) and bridge (Ciborra, 1997). This has contributed to the growing body of business and IT alignment literature, yet achieving it proves to be complex, challenging and chaotic (Coertze & Von Solms, 2014; Coltman et al., 2015). During the last ten years only, the issue of business and IT alignment among other IT issues was ranked most frequently as the number one concern facing IT managers in organisations (Kappelman et al., 2014). According to Ullah and Lai (2013), business and IT alignment as a concept is one of the most studied concepts in both academic and industry sectors and yet there are many organisations failing to exploit the full advantages from IT resources. For the Information Systems community, the issue of business and IT alignment has remained as an open challenge (Schlosser, Beimborn, Weitzel, & Wagner, 2015).

Business and IT alignment in the higher education sector

In ©previous research, we have highlighted the scarcity of business and IT alignment theoretical and practical research devoted to the higher education sector (Alghamdi & Sun, 2017). In summary, we found that the majority of business and IT alignment research was intensively developed and evaluated within public and private sector organisations such as banking, health care, manufacturing, insurance and other public organisations but with no obvious attention that was given to the education sector. The idiosyncratic nature of the higher education sector makes the IT alignment in this sector to be unique (Pirani & Salaway, 2004). This is because organisational cultures among schools and universities are different and also research activities and academic courses are also independent making the alignment efforts to be more complex and challenging. The IT planning as one of the challenges in the higher education sector is also difficult where a technology can go obsolete within less than five years (Tuller & Oblinger, 1998). Managing IT in this sector according to Bytheway, Whyte, and Venter (2015) is under researched adding to the challenges facing IT alignment in this sector. The U.S Department of Education mentioned in a report in 2006 that aligning technology in HEIs is one of the most complicated issues facing this sector (Spellings, 2006).

Along with all these challenges, the reliance on information technologies in the education sector has increased significantly in recent years (Newman & Scurry, 2015; Price, Richardson, & Jelfs, 2007), with more emphasis on the role of IT in supporting teaching and learning activities (Deniz, 2014). This motivates many teaching institutions including higher education institutions to invest in advanced technologies to enhance academic services provided to their students (David & Abreu, 2014). A recent survey conducted in the United States shows that almost 99% from 151 HEIs have invested in Learning Management Systems (LMS) (Dahlstrom, Brooks, & Bichsel, 2014). The survey indicates that 75% from the faculties within these HEIs found these LMSs to be very useful to enhance academic services. Likewise, students perceived these systems to be useful to enhance their learning experience.

However, not all HEIs are capable of exploiting the benefits of learning and management systems to streamline their provided services and the percentage can vary from one institution to another. According to Bytheway et al. (2015), the expected benefits from the adoption of advanced technologies in HEIs are not usually realised or delivered. On the contrary, Pirani and Salaway (2004) state that the benefits from IT in HEIs have been realised, but they argue that these benefits have not been effectively assessed. This brings the need of continuous assessment of this kind of fit to be undertaken by HEIs to ensure that IT systems and technologies are continuously adding business value, maintaining appropriate level of return on investments and increasing students level of satisfaction. Failing to maintain good fit between IT resources and supported business services in higher education institutions may lead not only to negative impacts on students level of satisfaction, but also may affect the institution national and international image and its future revenues (Tareen, 2014).

Business and IT alignment influencing factors

There are several factors that have been discussed in the business and IT alignment literature to affect the relationship between these two dimensions at the operational level of organisations. These factors can be either socially or technically oriented affecting the interactions between business and IT as emphasised in the socio-technical systems theory (Baxter & Sommerville, 2011). Social aspects such as culture values, behaviour, knowledge and skills can affect the business and IT alignment relationship. Similarly, technical aspects related to IT systems can affect the business performance and therefore the alignment between these two dimensions. Managing these social and technical aspects and maintaining balanced relationship between them are essential to ensure their effectiveness (Avgerou & Madon, 2004; Harteloh, 2003).

Among these influencing factors, there are some factors that are relevant to the business dimension such as the business service importance and quality which affect the degree of fit between business and IT. First, the level of strategic importance of a business service to the organisation is a tangible factor that specifies whether a business service is primary or secondary to the organisation (Porter, 1985). Suitable and effective IT solutions have then to be effectively tailored and aligned with business services that are deemed critical to the organisation. Another tangible perspective that can affect the alignment is the business service efficiency. Turning the inputs into outputs in the shortest possible time with allocated resources can reflect on the quality of the business service (Trischler, 1996). The perceptions of involved stakeholders about the business service performance is another intangible factor that demonstrates the quality of the business service as perceived by its engaged stakeholders. A low quality business service in terms of efficiency and effectiveness may not realise the benefits provided by an IT resource. Therefore, these tangible and intangible business service related factors can impact on the level of alignment between business and IT.

On the other hand, there are some factors that are related to the IT resource (i.e., IT application or an IT system) and can also affect its level of alignment with the business dimension. First, the technical quality of an IT application in terms of its reliability, interoperability, response time, etc. can impact on the performance of the business operations (Luftman, Papp, & Brier, 1999). The usage pattern of an IT application or system is another factor that reflects on the maturity level of alignment between business and IT, which can be measured based on the usage frequency level of an IT application (Davis, 1989). IT costs and financial benefits incurred and acquired from the implementation of an IT resource to support the business are found to have influence on the level of business aligned IT (Sun, Liu, Jambari, & Michell, 2014). Finally, the perceptions of associated stakeholders about the usability and suitability of an IT resource to support the business service is an important intangible factor that can provide an indication of the level of alignment between business and IT.

Among these introduced factors, this paper focuses mainly on examining the impacts of the intangible factors (i.e., the perceptions of stakeholders about the performance of both the business service and the IT resource) in affecting the alignment between business and IT.

METHODOLOGY

Preston (2014) points out that a better way to describe and evaluate the business IT alignment is still needed and the focus should be shifted from measuring performance indicators to measuring level of satisfaction and the business value added. The Design Science Research (DSR) is adopted in this ongoing research as a research methodology to devise an artefact that can be used to evaluate the business and IT alignment at the operational level of organisations. Through DSR principles and guidelines, the knowledge base is examined along with a real-life case study from the environment to facilitate the development of the artefact in an iterative process (Hevner & Chatterjee, 2010).

This paper does not aim to explain this methodology nor to illustrate the artefact as it is still under validation. It aims, however, to highlight the importance of articulating the perceptions of stakeholders about business and IT dimensions as intangible social factors that impact on the level of alignment between business and IT. The valuation framing method is adopted in this research and presented in this paper to articulate these social perspectives from stakeholders at Albaha University (Liu, Sun, Jam-

bari, Michell, & Chong, 2011). The valuation framing technique is typically applied after stakeholder identification (Qin, Liu, & Han, 2010), then the perception of each stakeholder can be assessed as either gains or losses based on a set of defined criteria. Gains represent the most positive value, whereas losses represent the most negative value. The application of the method is illustrated in an example in the next section.

CASE STUDY AND FINDINGS

Albaha University is a public Saudi Arabian University that was founded in late 2006. According to official statistics shared by the university, the university has 15 faculties, more than 25000 students and more than 1600 academic staff. The university offers 64 undergraduate programs and 14 master programs in many disciplines including medicine, science, education, arts, business and engineering. The university invested in two large IT systems (i.e., Banner 8.5.4 and Blackboard 9.2.1) to support teaching, learning and management services provided to students at the university.

Four sets of questionnaires were distributed among 509 students with a collaboration from academic staff at Albaha University in 5 faculties. The first two sets aim to assess students perceptions about teaching services (i.e., lecturing, content delivery, assessment and feedback) and management services (i.e., admission, module enrolment, term deferral, timetabling, borrowing and attendance monitoring) independently from IT services. Same students who did the first two sets of questionnaires were then asked to complete another two sets of questionnaires to demonstrate their perceptions towards supporting IT systems (i.e., Blackboard Learn 9.2.1 and Banner 8.5.4) for teaching & learning and management services, respectively. The purpose of conducting these questionnaires was not to examine how individual faculties are performing, but to test how the perceptions about either business or IT dimensions can affect the degree of fit and assist for the evaluation of the business and IT alignment.

The application of the valuation framing method is illustrated through the following example of articulating the perceptions of Albaha Universitys students towards the performance of teaching and learning services (see Table 1).

Table 1: Perceptions of students towards teaching and learning services provided at Albaha University

No	Assessment Criteria	CW / SW	Student 1	Student 2	..	Student 239
1	Goals and objectives of studying each module have been made clear to me at the beginning of each term	0.17	2.00	2.00	..	3.00
2	Adopted teaching methods by academic staff were effective in modules that I have studied so far	0.13	2.00	1.00	..	1.00
3	Assessment methods were clear and concise in modules that I have studied so far	0.10	0.00	-1.00	..	-1.00
4	Feedback from academic staff on my assignments were clear and useful	0.10	1.00	-1.00	..	-1.00
5	I usually receive feedback from my instructors on time	0.10	1.00	-2.00	..	-1.00
6	Modules content usually delivered on pre-specified time in all modules that I have studied so far	0.08	3.00	1.00	..	3.00
7	Content density of each module that I have studied so far was appropriate	0.07	-2.00	-2.00	..	1.00
8	T&L services including (content delivery, assessment, feedback) are delivered to me effectively with a high level of quality	0.13	1.00	-2.00	..	-1.00
9	My expectations are met in this program through the delivery of effective T&L services in each module	0.12	2.00	1.00	..	-2.00
	$V_i = (\sum_{j=1}^9 sv_j \times cw_j) \times sw_i$		0.005	-0.001	..	0.001
	Perceptions of 239 students = $1 + (\sum_{i=1}^n V_i - LV) \times \frac{(5-1)}{(HV-LV)}$					3.32

V: A total rated value for each student; sv: A student perceived value ranging from totally disagree (-3) to totally agree (3); cw: A weight assigned to a criterion; sw: A weight assigned to a student; LV: The lowest value of V; HV: The highest value of V

Criteria are assigned weighting values by the researcher and adjusted and confirmed with program directors to determine the importance of each criterion in the assessment. Students were assigned a similar weighting value at 0.0041 because they were from the same year classes. The perceptions of 239 students were aggregated into a single value through the adoption of valuation framing method. This single value is then transformed into a value in a scale from 1 to 5 using the linear conversion equation as follows.

$$V = 1 + (x - LV) * \frac{5-1}{HV-LV}$$

Where

V: Relative value

LV: The lowest value in the dataset

HV: The highest value in the dataset

x: (LV.. HV)

The perceptions of 239 students about teaching and learning services provided to them at Albaha University according to specified criteria in Table 1 is resulted as 3.32. This value in a scale from 1-5 is considered to be medium. The same group of students was handed another set of questionnaire to determine their perceptions about the use of Blackboard system to support the teaching and learning services. Only 173 valid responses were considered as some students did not use Blackboard before. The perceptions of 173 students resulted in a 2.18 out of 5. This is considered to be low value indicating unsatisfactory level among students about the usability and suitability of Blackboard to support their learning and teaching services.

Students management services were also evaluated in another set of questionnaire. 270 students from 5 faculties have participated in this questionnaire to provide their perceptions about management services provided to them including (admission, module enrolment, module withdrawal, term deferral, timetabling, borrowing and returning materials, attendance monitoring and certification). Applying the valuation framing method, the perceptions of 270 students is resulted to be 3.63. This above the average value indicates a satisfactory level of students perceptions towards the clarity, quality and performance of provided management services. The same number of students responded to a questionnaire that was set to examine their perceptions towards the use of Banner 8.5.4 to support these management services. The outcomes show an average acceptance level value among students towards using Banner 8.5.4 to support management services at the university at 3.05. The outcomes of the four sets of questionnaires are illustrated in Figure 1 along with the perceptions values.

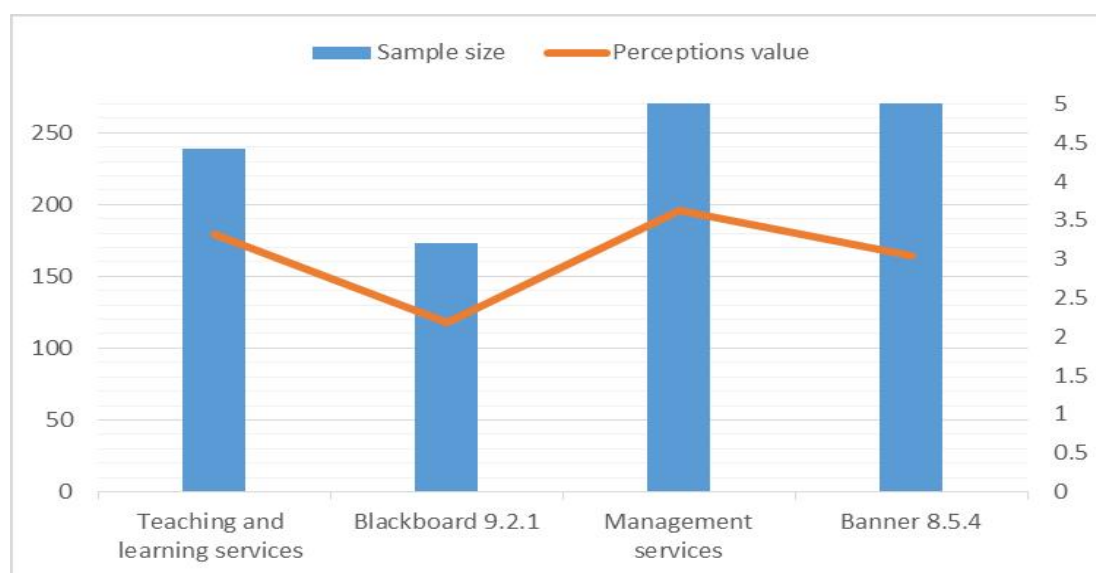


Figure 1. Perceptions of Albaha University students towards provides services and supporting IT systems

Figure 1 illustrates that students who attended these four sets of questionnaires are mainly satisfied with teaching, learning and management services provided to them. They are also satisfied about the usability of Banner 8.5.4 to support their management services, but not satisfied about Blackboard 9.2.1. It is not aimed in this paper to discuss why satisfactory or unsatisfactory level of perceptions are resulted, but the aim is to point out that intangible perceptions of stakeholders from both business and IT dimensions should be articulated in the evaluation of the degree of fit between business and IT. These intangible factors can affect the usability of highly invested IT resources in this educational sector. Previous studies point out that there are many IT technologies and systems that have been either unused or underutilised in the higher education sector due to limited user acceptance (Liu, Liao, & Pratt, 2009; Teo, 2009).

Considering stakeholders perceptions from both dimensions as intangible factors in the evaluation of the alignment between business and IT is very critical, as enhancing the aspects that cause unsatisfactory results could lead to a better alignment between business and IT. For instance, the business service itself may have problems in terms of its efficiency or effectiveness as perceived by its stakeholders. These issues must be resolved first before moving on to assess the suitability of an IT solution to support a business service. The vice versa is also valid. An IT system might be perceived to be not suitable to support stakeholders requirements and working on the issues that resulted in such perceptions is mandatory not only to ensure better alignment, but also to improve return on IT investments.

These intangible values provide valuable information in the assessment of the degree of fit between business and IT. However, they would be more valuable if they are integrated with tangible values from both business and IT dimensions such as IT resource technical quality, cost benefits from IT and business service efficiency to holistically assess and reflect on the degree of fit between business services and IT resources.

CONCLUSION AND REMAINING WORKS

Business and IT alignment remains as a challenging issue that faces researchers and practitioners. Previous literature in the alignment provides principles, concepts and methods to evaluate the business and IT alignment. However, there are still continuous calls for more comprehensive approaches to assess the fit between business and IT to overcome the consequences of misalignment and also ensure that these two dimensions are maintaining a satisfactory level of fit with each other.

We have studied a number of factors that are found to affect the level of alignment between business and IT at the operational level of organisations. Then we established through the adoption of the Design Science Research the development of a method that can be used not only to evaluate business and IT alignment, but also to propose recommendations to enhance this alignment if misalignment appears. The devised method integrates tangible and intangible factors that have been found to impact on the level of alignment between business and IT into one comprehensive assessment tool. The integration of tangible and intangible factors to assess the alignment between business and IT would provide more robust approach of alignment assessment that considers multiple aspects influencing the alignment. This paper focuses mainly to shed some lights on the intangible aspects influencing the alignment between business and IT. Other tangible aspects are still at the final stage of analysis along with the method validation process.

The idiosyncratic nature of the higher education sector poses another complex situation of alignment and therefore there is a need to thoroughly study and evaluate the alignment in this sector. The importance of addressing the business and IT alignment issue in the higher education sector is represented in its importance as a front-line partner to many other sectors. We have then decided to develop and evaluate the evaluation method in a higher education institution from Saudi Arabia that represents the environment where the evaluation and validation activities are performed on an iterative basis to enhance the usability and viability of the devised method.

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