Investigating key benefits and benefit drivers of enterprise systems implementation in the higher education institution context

Completed Research Paper

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Abstract

In the last two decades, numerous organizations have implemented Enterprise Systems (ESs) to create value. Higher education institutions (HEIs) are no exception to follow the trend of implementing ES to improve the efficiency and effectiveness of their operations. However, research about ES in HEIs is still in its infancy stage. Therefore, this study aims to investigate important benefits and factors driving the achievement of ES benefits using a single case study methodology at a large Australian university. The contributions of this study are (1) it provides an in-depth understanding of ES benefits and benefit drivers in the context of HEIs; (2) it provides a taxonomy of ES benefits and benefit drivers for HEIs; (3) it identifies two new ES benefits, five new benefit drivers, and two unique ES benefits in the context of HEIs.

Keywords: Enterprise Systems, Higher Education Institutions, Benefits, Benefit Drivers

Introduction

The importance of implementing Enterprise Systems (ESs) by organizations has been well acknowledged by practitioners and researchers in the last two decades (Beard and Sumner 2004; Davenport 1998; Davenport 2000; Davenport et al. 2004; Markus and Tanis 2000; Panorama Consulting Group 2018; Shang and Seddon 2002). Enterprise Systems can be defined as large-scale, integrated packaged software applications that connect various organizational processes and information flows across complex organizations (Davenport 1998; Shang and Seddon 2002). Early studies of Enterprise Systems including Davenport (1998) and Lozinsky (1998) have highlighted the benefits of a successful implementation of enterprise systems, such as reduction in operating costs (Lozinsky 1998) and the technology maintenance costs (Davenport 1998). Furthermore, enterprise-wide information obtained from the system enables better decision making and more effective communication (Seddon et al. 2010).

Many organizations have invested heavily in the implementation of ES to gain various organizational benefits from the integration of organizational processes, systems and data (Abugabah and Sanzogni 2010; Davenport 1998; Panorama Consulting Group 2018; Panorama Consulting Group 2019; Shang and Seddon 2004). However, implementing Enterprise Systems successfully and gaining benefits after the implementation has been challenging because of the involved complexity (Schniederjans and Yadav 2013). There have been multiple failure cases of ES implementation reported in the literature and many organizations continue to struggle to gain the expected benefits (Abugabah and Sanzogni 2010; Garg 2010; Hustad and Olsen 2014; Mahmud et al. 2017).

The higher education institutions (HEIs) are not exempted from this tendency in implementing ES to improve the overall organizational efficiency and effectiveness. However, the circumstances of higher education institutions are arguably more complicated than other business organizations and hence more benefits could be expected from an integrated system (Abugabah and Sanzogni 2010; Pollock and Cornford 2004; Rabaa'i 2009; Thompson et al. 2018). Universities involve a wide range of users with different backgrounds and different information needs including students, academics, researchers, administrators and support staff. These users utilize the systems for different purposes. HEIs are under pressure to provide high-quality services to these diverse groups of users through more effective use of systems and access to information (Abbott and Doucouliagos 2003; Abugabah and Sanzogni 2010; Allen and Kern 2001; Rabaa'i 2009).

While there is a plethora of studies on ES/ERP implementation, only a few studies focus on the educational context within limited geographical areas (Abdellatif 2014; Abugabah and Sanzogni 2010; Arthur 2016; Beekhuyzen et al. 2001; Chae and Poole 2012; Okunoye et al. 2012; Soliman and Karia 2016). Most of those studies investigate critical success factors for Enterprise Systems implementation project (AlQashami and Mohammad 2015; Bologa et al. 2009; Leyh et al. 2017; Pollock and Cornford 2004; Rabaa'i 2009; Thompson et al. 2018) and do not investigate post implementation benefits and long-term benefit drivers. Overall, there have been limited ES implementation studies in the HEIs context especially focusing on benefits achieved several years after the implementation and the associated benefit drivers.

Therefore, to address the identified research gaps, this study aims to investigate key and unique ES benefits in a higher educational institution experienced by various stakeholders and to identify factors driving the achievement of ES benefits over time. The following research questions are addressed in this study:

1. What are the benefits of implementing Enterprise Systems in the context of a higher education institution and which benefits are specific to the higher education institution context?
2. What are short-term and long-term key benefit drivers of Enterprise Systems implementation in the context of a higher education institution?

This paper is structured as follows. The next section provides an overview of previous studies of ES in the HEI context, followed by a section describing the research methodology of the study. Then the study findings with a detailed description of the identified benefits and benefit drivers of ES in HEIs are provided. Finally, the last section concludes the study by outlining research contribution, practical implications, study limitations and future research directions.

Overview of Previous Studies

Enterprise System implementation usually costs millions of dollars (Abugabah and Sanzogni 2010). Nevertheless, many of ES implementation projects in HEIs result in failure, cost overrun or schedule overshoot (Abugabah and Sanzogni 2010; AlQashami and Mohammad 2015). The high failure rate of implementing ES in HEIs is due to the complicated nature of ES and the special circumstance of HEIs (Abugabah and Sanzogni 2010; Bhamangol et al. 2011). There are aspects of the HEI context that are similar to other industries (Hill 1995; Kashif and Ting 2014; Pollock and Cornford 2004; Rabaa'i 2009). For example, higher education is delivered as services and students are regarded as primary customers of universities (Hill 1995).

However, HEIs could not be considered equivalent to business organizations. They have context-specific issues and complexities when dealing with ES implementation (Pollock and Cornford 2004; Rabaa'i 2009). For example, although students are customers, they are different from industry customers since their choice regarding where to study is influenced by multiple factors which are specific to the higher education environment. Adoption of disruptive learning technologies allow universities to expand into new markets attracting more diverse student groups who require flexible learning opportunities as well as allowing diversification into low margin markets (Archer et al. 1999). Hence, the HEIs context should be considered 'unique' when examining ES implementation (Pollock and Cornford 2004; Rabaa'i 2009).

Our literature review and analysis indicate that many studies have critically analyzed ES implementation projects in universities (Abdellatif 2014; Abugabah and Sanzogni 2010; AlQashami and Mohammad 2015; Beekhuyzen et al. 2001; Bhamangol et al. 2011; Chae and Poole 2012; Guthrie and Guthrie 2000; Pollock and Cornford 2004; Soliman and Karia 2016; Younes 2018; Zornada and Velkavrh 2005). Most studies are conceptual research based on literature review (Abdellatif 2014; Abugabah and Sanzogni 2010; Bhamangol et al. 2011; Guthrie and Guthrie 2000) and are conducted in one country (Beekhuyzen et al. 2001; Chae and Poole 2012; Okunoye et al. 2012; Seethamraju 2007). Only one publication by Soliman and Karia (2016) focuses on identifying benefits of ES in universities. Other six studies identify some benefits while analyzing ES implementation or identify CSFs of ES in HEIs. For example, Abdellatif (2014) and Zornada and Velkavrh (2005) identify three and four different benefits of ES implementations respectively. Sabau et al. (2009) develop an evaluation framework of ERP implementation and classify the identified ES benefits as either business or technology benefits.

To the best of our knowledge, there have been no comprehensive classification of ES implementaion benefits in the HEI sector. In addition, previous research has not explored the benefit drivers of ES in this industry sector. Only a limited number of studies identify several critical success factors of implementing ES in universities (Abdellatif 2014; AlQashami and Mohammad 2015; Bologa et al. 2009; Leyh et al. 2017; Rabaa'i 2009; Sabau et al. 2009; Thompson et al. 2018). Moreover, those previous studies that identify the benefits and critical success factors of ES in HEIs have simply transferred the CSFs and benefits from the business organization context to the HEI context (AlQashami and Mohammad 2015; Thompson et al. 2018). Hence, this study first investigates which of those previously identified key benefits of ES experienced by various stakeholders in the higher education context are the key benefits and unique to HEIs. Then it also explores what factors driving the achievement of these benefits.

Research Methodology

For the purpose of the study, a single in-depth case study was considered to be the most appropriate research method since it allows an in-depth investigation of a contemporary phenomenon of interest within its real-life context (Yin 2017). For the case study we chose a higher educational institution that has implemented Enterprise Systems in the last five years and has undertaken on-going enhancement projects to improve the systems.

We selected one of the large universities in Australia with over 50000 students and around 8000 staff. To maintain the anonymity, the university is referred to as "TopOZUni". Most large universities in Australia and worldwide have a high number of students and staff which affect ES implementations (Department of Education 2018a; Department of Education 2018b; The World University Ranking 2020). Given the similarities in the number of stakeholders involved and the education services offered, the case study context and the ES implementation experienced by the participating university could arguably capture typical HEI contexts and represent the experience of higher education institutions in general. Hence, this case study could be regarded as a representative case study.

Table 1 shows the profile of the research participants. In total, there are 19 students and 10 staff members participated in this study. Interviewed student subjects study Bachelor and Master's degrees across different faculties and departments. Participating staff have different roles representing teaching staff (lecturers, subject coordinators, tutors) and admin (office admin, IT admin).

Semi-structured interviews with stakeholders were used to collect data. The interview questions were based on ES benefits framework of Shang and Seddon (2002) and Organizational Benefits from

Table 1. Background of the Participants

Participant	Roles/Major	Years	Gender	Participant	Roles/Major	Years	Gender
Student_1	Bachelor of Commerce	3	Female	**Student_16**	Master of Computer Science	2	Female
Student_2	Bachelor of Commerce	3	Male	**Student_17**	Master of Human Resource Management	2	Female
Student_3	Bachelor of Psychology	3	Female	**Student_18**	Master of Food Science	1.5	Female
Student_4	Bachelor of Finance and Economics	3	Female	**Student_19**	Master of Bioinformatics	0.5	Female
Student_5	Bachelor of Finance and Economics	3	Female	**Staff_1**	Administrators: IT professionals	5	Male
Student_6	Master of Teaching	2	Female	**Staff_2**	Administrators: Academic Support Coordinator	21	Female
Student_7	Master of Information Systems	2	Female	**Staff_3**	Lecturer	0.2	Male
Student_8	Master of Information Systems	1.5	Female	**Staff_4**	Lecturer	2	Male
Student_9	Master of Information Systems	1	Female	**Staff_5**	Associate Lecturer	1	Male
Student_10	Master of Information Systems	1	Female	**Staff_6**	Senior Lecturer	0.5	Male
Student_11	Master of Information Systems	1	Female	**Staff_7**	Senior Lecturer	1.5	Male
Student_12	Master of Information Systems	1	Female	**Staff_8**	Senior Tutor	7	Female
Student_13	Master of Information Technology	1.5	Female	**Staff_9**	Tutor	0.5	Female
Student_14	Master of Management (Accounting)	2	Female	**Staff_10**	Tutor	1	Male
Student_15	Master of Computer Science	2	Female				

Enterprise Systems (OBES) model of Seddon et al. (2010). Data were then analyzed using exploratory qualitative analysis method employing open, axial and selective coding (Neuman 2014). For the qualitative coding process, a qualitative research analysis tool – HyperResearch was used. During the open coding stage, the process of theme identification remained 'open' to allow the identification of any new themes as recommended by Neuman (2014). In the next phase, the initial codes generated during open coding stage were organized into categories. Lastly, during the selective coding, all the previously generated data and codes were scanned, and the ES benefits and benefit drivers were identified and compared with the results from previous studies and classified using the ES benefits framework of Shang and Seddon (2002) and Seddon et al. (2010)'s OBES model.

Findings and Discussion

ES Benefits in HEIs

Based on the critical analysis and synthesis of previous studies (Abdellatif 2014; AlQashami and Mohammad 2015; Bhamangol et al. 2011; Rabaa'i 2009; Soliman and Karia 2016; Zornada and

Table 2. Summary of the Identified Benefits of ES in HEIs

ES Benefits	LR[1] (N=7)	CS[2] (N=29)	Notes
Operational			
Improve services for all the stakeholders in HEIs	4	17	-
Assist in developing learning and teaching pedagogies	1	13	-
Improved operations, processes and performance	2	10	-
Headcount reduction	1	7	-
Cost reduction and revenue increase due to improved efficiency	5	3	-
Managerial			
Improve internal communication	1	13	-
Improve strategic decision-making and planning	2	5	-
Improve risk management and lower business risks	3	0	-
Strategic			
Provide platforms for change management and on-going process enhancement	1	29	-
Interaction and collaboration beyond the organization	2	16	-
Support data analysis in decision-making	2	11	-
IT Infrastructure			
Higher availability of administrative systems which comprehensively integrated a wide range of functions	2	24	-
More seamless integration between technologies and platforms	3	22	-
Tighten control and automatic e-mail alerts	2	9	-
Provide user friendly web-based interfaces	2	3	-
Eliminated requirement for back-up systems	1	0	-
Open system Architecture enables ease of system expansion or replacement	2	0	-
Improve system-wide security and protection of confidential information	2	0	-
Reinforce accountability and transparency	1	0	-
Standardized data definition	1	0	-
Organizational			
Integrated workflow	3	15	-
Reduce the dependency on paper	3	15	-
Better information quality, accessing, sharing, storage through the integrated database	7	11	-
Improve students' satisfaction of the university	-	11	New
Campus-wide integration of the enterprise systems	2	7	-
Self-service environment for students and faculty	1	6	-
Attract more students	-	6	New

Legend: [1]Literature Review (LR); [2]Case Study (CS)

Velkavrh 2005), 27 benefits in higher education context have been identified. To generate a clear and comprehensive view of the key benefits, a taxonomy based on Shang and Seddon (2002)'s benefits framework has been proposed (see Table 2). The identified benefits have been classified into five operational benefits, three managerial benefits, three strategic benefits, nine IT infrastructure benefits and five organizational benefits.

The case study data analysis indicates that all the ES benefits identified in the existing literature are relevant to the case organization. As shown in the last column in Table 2, two new organizational benefits were identified (marked as N).

Operational benefits

The operational benefits listed in Table 2 are generated from optimizing day-to-day activities of organizations (Seddon et al. 2010). The interviews provide evidence of the relevance of all operational benefits identified from previous studies. For example, seventeen participants acknowledged that ES implementations improve the services delivered to them. Thirteen participants agree that an operational benefit in terms of *'Assisting in developing learning and teaching pedagogies'*, which is also identified by Soliman and Karia (2016) as one of the most important ES benefits. Ten interviewees agreed that

using ES could reduce the manual processes and improve the operational processes which is also highlighted in previous studies (Sabau et al. 2009; Soliman and Karia 2016). Seven interviewees also provide evidence of the headcount reduction benefit as identified by Bhamangol et al. (2011). AlQashami and Mohammad (2015); Bhamangol et al. (2011); Rabaa'i (2009); Soliman and Karia (2016) and Zornada and Velkavrh (2005) argued that employing Enterprise Systems in HEIs could reduce the cost and increase the revenue due to the improved efficiency of the process and the optimized resource management. This statement is acknowledged by three participating students. For example, one student asserts: *"With efficient systems, the university doesn't need lots of staff to work at stop 1, then there will be a huge amount of cost reduction."* (Student_12).

Managerial benefits

Managerial benefits stem from improvements in activities involving allocation and arrangement of resources, planning and strategic decision-making (Shang and Seddon 2002). Under this sub-category, *'Improve internal communication'* is one of the most significant business benefits that universities could obtain from using integrated Enterprise Systems (Sabau et al. 2009). Thirteen (13) student and staff participants acknowledged the benefit that the ES improves internal communications by providing convenient and flexible communication platforms.

Improvement in decision-making and planning is also an important benefit that universities gain from using ESs. Five staff elaborated on this benefit and explained how the ES helped them in their teaching and decision-making processes. For example, Staff_3 states: *"Decision-making also comes from discussion forum, it informs me what I might do in the lectures, So I can see there are certain topics, I can see that people are struggling with something and I can repeat in next lecture."* (Staff_3). This benefit is also identified by Bhamangol et al. (2011) and Sabau et al. (2009).

However, since our participants are mostly students, academics and a few professional staff who are not dealing with risk management, none of our research participants acknowledges that utilizing ES in HEIs enhances risk management resulting in lower business risks as identified in three previous studies (AlQashami and Mohammad 2015; Rabaa'i 2009; Zornada and Velkavrh 2005).

Strategic benefits

Strategic benefits are derived from improvements in high level activities of organizations including long-term planning and decision making that affect the survival of the organizations (Seddon et al. 2010). All strategic benefits identified in the previous studies are supported by our case study. The benefit *'Provide platforms for change management and on-going process enhancement'* is acknowledged by all twenty-nine interviewees. The ES also provide platforms for HEIs to enhance the on-going processes and enable high-level change management (Sabau et al. 2009).

Sixteen participants agree that Enterprise Systems enable the universities to benefit from interacting and collaborating within the university (Abdellatif 2014; Bhamangol et al. 2011). For example, one student asserts: *"Sometimes, I did get the email and system announcement from university. Then I could arrange my time. If the updates are not noticed to us in advance, it causes inconvenience"* (Student_5). Enterprise Systems also enable the universities to benefit from interacting and collaborating beyond the institutes (Abdellatif 2014; Bhamangol et al. 2011) as the organizations' systems could be linked with the third party website or other enterprise systems. Sixteen students indicate the relevance of this benefit. For example, a student discusses cross-institutional system access: *"For library system, it is good for it to connect with other journal websites, like ScienceDirect. It provides enough information for me to choose from. It gives me a lot of resources"* (Student_14).

Eleven (11) participants commented on universities benefiting from implementing business analysis or business intelligence system which results in high-quality data analysis and improved decision-making (Abdellatif 2014; Sabau et al. 2009). A staff's statement stands in the line with this argument: *"By monitoring all the things like the discussion board. We could see the data immediately. Help students have a better learning experience. After receiving the information, we could know what we need to improve in the long-term."* (Staff_5).

IT infrastructure benefits

According to Shang and Seddon (2002), IT infrastructure benefits arise from optimizing IT resources and building reliable IT infrastructure. The Enterprise Systems are packaged software applications that benefit HEIs benefit directly from a technical perspective. Nine IT infrastructure benefits have been identified in previous studies. The integration benefits – *'Higher availability of administrative systems which comprehensively integrated a wide range of functions'* and *'More seamless integration between technologies and platforms'* are acknowledged by most of the interviewees (24 and 22 interviewees respectively). The benefit *'Tighten control and automatic e-mail alerts'* which was introduced by Bhamangol et al. (2011) and Soliman and Karia (2016) is acknowledged by three staff and six students. For example, one student asserts: *"Whenever there is an announcement issued on LMS, there could be an automatic email that reminds to have a look at this. Without this function, we possibly miss a lot of important information."* (Student_6).

The open system architecture of an ES prompts the integration benefits such as seamless integration with relevant functions and other systems, improved transparency, tight control and standardization as identified in previous studies (see Table 2). However, since most of our research participants are students and lecturers who do not focus on IT infrastructure, most benefits in this category have not been acknowledged.

Organizational benefits

Organizational benefits listed in Table 2 can be described as the overall improvements in focus, cohesion, learning and execution of strategies that organizations can gain from ES its strategies (Shang and Seddon 2002). They imply improvements in stakeholders' satisfaction, empowerment, and performance. All organizational benefits identified in the previous studies are supported by our data. Besides, there are two new context-specific benefits - *'Improve student satisfaction with the university'* and *'Attract more students'* identified in this category.

Fifteen participants mentioned that workflow is integrated through using the ES and the integrated online workflow enables the reduction in paper waste. Moreover, when users are used to working and studying online, the requirement and reliance on paper will reduce. Four staff and three students acknowledged this benefit. For example, a participant asserts: *"Our ERP system is very efficient. We don't need to provide hard copies. All the applications could be done online "* (Staff_10). These two benefits – *'Integrated Workflow'* and *'Self-service environment for students and faculty'* have been identified by several studies (Bhamangol et al. 2011; Sabau et al. 2009; Soliman and Karia 2016).

Eleven participants (2 staff and 9 students) agreed that the university could improve information quality, information accessing and information sharing through the enterprise system's integrated database. Four staff and three students acknowledged that ESs enable campus-wide integration. For example, one student says: *"The new system - Canvas is integrated with the library systems. Then we could just download the readings that lecturers suggested. Before, we should copy the title and search by ourselves. It definitely provides better information sharing to us, especially comparing with the old system."* (Student_17).

Sabau et al. (2009) stated that the ES would provide a self-service environment when all ES functions are implemented successfully. Four staff and six students agreed that the ES provides them with self-service environment as the following comment confirms: *"Let's say the e-student. When I want to pay, I could just go to the system and pay by myself."* (Student_4).

For the two new benefits, there is no doubt that one of the main purposes of implementing an ES is to achieve its stakeholders' satisfaction by meeting their needs. As Hill (1995) asserted, students are the customers of the universities. Therefore, it is in the best interests of universities to utilize ESs to enhance student satisfaction. All the interviewees agree with this view. For example, one student commented: *"It's more about getting your current students satisfied. If you want to keep us satisfied, you have to find some ways to polish your systems."* (Student_4).

In the era of digitalization, advanced Enterprise Systems and user-friendly websites and disruptive educational technologies are factors that could attract more students for the HEIs (Archer et al. 1999). During the application period, providing structured and clear information to the potential students is one of the main requirements of building the application systems. Well-established ESs could help the future students find useful information and increase interest in the courses offered by the university. This claim is supported by one staff and five students. For example, a student asserts: *"It could attract more students. Or maybe it would be a barrier for students to choose this university. "* (Student_15).

ES benefit Drivers in HEIs

As discussed ealier, none of the previous research studies have explored ES benefit drivers in the higher education context. Only six studies concentrated on examining critical success factors (CSFs) of ES implementation in HEIs context. Benefit drivers are factors that influence the achievement of overall organizational benefits from ESs. CSFs are the factors that influence the success of the ES implementation projects. CSFs are not exactly the same as benefit drivers, but they have a strong impact on the achievement of organizational benefits. Therefore, some CSFs have been classified as short-term or long-term benefit drivers in the OBES model (Seddon et al. 2010).

In this study, CSFs identified from the literature are categorized based on the description of each key benefit driver in the OBES model. Three CSFs are considered as benefit drivers which are related to *'Functional Fit'*. Similarly, six CSFs are identified as benefit drivers related to *'Overcoming Organisational Inertia'*. System Integration as a CSF is equivalent to a long-term benefit driver – *'Integration'* (AlQashami and Mohammad 2015; Rabaa'i 2009; Thompson et al. 2018). Business Process Reengineering (BPR) exhibits multiple resemblances to *'Process Optimization'* (AlQashami and Mohammad 2015; Leyh et al. 2017; Rabaa'i 2009; Thompson et al. 2018). Three new benefit drivers identified from the case study are classified into *'Improved Access to Information'*.One new benefit driver and two CSFs identified from previous studies, post-implementation evaluation and management, and monitoring and performance measurement are part of *'On-going Major ES Business Improvement Projects'* category. The proposed ES benefit driver taxonomy is depicted in Table 3.

Table 3. Summary of the Identified Benefits Drivers of ES in HEIs

ES Benefits Drivers		LR[1] (N=7)	CS[3] (N=29)	Notes
Short-term Model: Factors driving benefits from each project				
Functional Fit (FF)	Functional compatibility	2	29	-
	Data management function	1	11	-
	ES systems and system vendor selection	5	1	-
	Software testing and troubleshooting	1	1	-
Overcoming Organizational Inertia (OOI)	Continuous systems support	-	29	New
	User training	2	29	-
	Change management	5	14	-
	Effective campus-wide communication	3	13	-
	Organizational culture	4	4	-
	ES system acceptance and adoption	1	3	-
	Top management commitment and support	6	1	-
	Project management which includes project leader selection, ES implementation team selection, and consultant	5	1	-
Long-term Organizational Benefits model				
Integration	Front-end integration	3	24	-
	Back-end integration		12	-
Process Optimization	Business process reengineering (BPR)	4	10	-
Improved Access to Information	Clear and structured guidance and description for the system	-	24	New
	Improved search engine	-	14	New
	Easier accessing method to information	-	12	New
On-going Major ES Business Improvement Projects	Establishing new enhancement projects	-	29	New
	Monitoring and performance measurement	1	8	-
	Post-implementation evaluation and management	3	1	-

Legend: [1] Literature Review (LR); [2] Case Study (CS)

Short-term Benefit Drivers Model

The short-term benefit driver model of Seddon et al. (2010) described in the OBES model involves factors that affect organizational benefits resulting from each ES business improvement project. 'Functional Fit' is "the extent to which the functional capabilities embedded and configured within an ES package match the functionality that the organization needs to operate effectively and efficiently" (Seddon et al., 2010, p.307). Functional Fit is the first category of short-term benefit drivers that is a precondition for the universities to benefit from ES. Functional fit is the key goal of implementing an ES and most of the operational benefits and IT infrastructure benefits are driven by this factor. As shown in Table 3, four benefit drivers are included in this category which are *'Functional compatibility'*, *'Data management function'*, *'ES systems and system vendor selection'*, and *'Software testing and troubleshooting'*.

'Functional compatibility' is confirmed by all the interviewees. Besides, both Leyh et al. (2017) and Abdellatif (2014) mentioned the importance of ES's capability to handle a number of functions that connect and co-ordinate the organization itself. Obviously, only when the systems satisfy the majority of functional requirements, a university could benefit from the systems as revealed in the following interview excerpt: *"It provides enough functions. Besides, it provides the integrated function to discuss with students."* (Staff_9).

Eleven participants (6 staff members and 5 students) emphasized that the ESs implemented by the universities need to satisfy basic data management requirements. Umble et al. (2003) also identified *'data management'* as a CSF. The IT administrator (Staff_1) acknowledged that it is vital for the organizations to select a proper system vendor and the ESs need troubleshooting to ensure the systems run properly. These are the basic technical requirements to meet users' requirements of ESs.

Overcoming organizational inertia refers to "the extent to which members of the organization have been motivated to learn, use, and accept the new system" (Seddon et al., 2010, p.307). Six CSFs identified from the literature are classified into this category. In this category, a new benefit driver – *'Continuous systems support'* has also been identified from analyzing the interview data.

Dezdar and Sulaiman (2009) pointed out that user training is necessary to empower the users of Enterprise Systems. All the research participants agreed that effective and reasonable training could equip users with sufficient and necessary skills and tools. The administrator confirmed: *"All the staff who use the two systems required extensive training before being given access to the systems"* (Staff_2).

All the staff and four students (14 interviewees in total) agreed that *'Change management'* is of high importance if the university plans to update an existing system or build a new system. This is in line with Somers and Nelson (2001) who assert that change management is a primary concern when implementing Enterprise Systems as the large-scale change may cause resistance, misunderstanding and mistakes.

ES implementation projects require organization-wide communication due to its complex nature. This benefit driver is acknowledged by thirteen interviewees. Moreover, organizational culture determines how people behave when implementing a new system. This claim is acknowledged by four staff. Users' acceptance and adoption of the ES systems will also interplay with *'Organizational culture'* and three participating staff acknowledged this benefit driver.

Nah et al. (2003) emphasize that ES projects should be approved by top managers who need to allocate adequate finances and resources to the project. The IT department administrator supported the finding of Nah et al. (2003): *"How often that's ongoing but it depends on the availability of funds and whether they (top managers) want actually to do that implements or they want to just use the robotics team to make that change."* (Staff_1). The IT administrator also mentioned that good project management is indispensable.

Lastly, the new benefit driver *'Continuous systems support'* has also been identified. All the participants confirmed the importance of the university providing continuous system support. If the university could not achieve sustainable systems support, misfits will happen causing service interruptions and inconvenience to users.

Long-term Benefit Drivers Model

The long-term model that Seddon et al. (2010) described as the OBES model involves factors that affect organizational benefits stemming from ES use and improvement overtime.

According to Seddon et al. (2010), the **integration** of all business functions in universities involves the incorporation of various modules into one cross-functional system covering areas of student administration, human resource (HR) management, finances and other operational areas. To enable advanced integration, a central database should be created in the first implementation stage (Guthrie and Guthrie 2000). According to Seddon et al. (2010), there are two types of integration that ES provides: *'back-end'* and *'front-end'*. *'Front-end integration'* refers to the integration of the functional systems and activities. Twenty-four participants (six staff and eighteen students) indicated that the *'front-end integration'* is the most important benefit driver for a university to benefit from integrated functions. The shared data integration is classified as *'back-end integration'* importance of which was acknowledged by twelve participants.

Process optimization refers to "any attempt to improve the efficiency and effectiveness of an organization's processes" (Seddon et al. 2010). Enterprises employ *Business process reengineering (BPR)* to restructure and optimize their processes and thus to align with the new business activities (Shang and Seddon 2007). This benefit driver is asserted by six staff and four students.

Seddon et al. (2010) defines **improved access to information** as "any step taken to increase the provision of timely, accurate, relevant information to users" (p.309). The information should be available for transfer between individuals and accessible by different users in real-time. Providing modern information access methods (web technologies, mobile technologies, online portals, etc.) could be an additional advantage. This benefit is available to various stakeholders who constantly interact with the university (administration, students, researchers, future students, etc.). This factor has not been discussed by any previous research into HEIs context. Three previously omitted benefit drivers have been identified and classified into this category.

First, new staff and students expect clear and structured guidance or online support supporting them when they need to use the ES. The difficulties users are facing mainly stem from not very intuitive user interfaces and shortage of clear and structured instructions on how to perform a task when using the system. New staff and students usually need support in figuring out which part of the system is suited for each task and how to use the system properly. Eight staff and sixteen students commented on the importance of having structured system usage guidance.

Second, a search engine to help users to find relevant as well as accurate data is highly recommended since modern online portals lead into complex websites. This newly identified benefit driver is confirmed by five staff and nine students.

Third, the university needs to provide easier access to information. Twelve participants (five staff and seven students) agreed as echoed in the following excerpt: *"I just tried again and again. The useful information is too difficult to find."* (Staff_10).

Lastly, **on-going major ES business improvement projects** is defined as "the number and extent of investment in major business improvement projects that an organization has undertaken for improving and extending its enterprise system" (Seddon et al. 2010, p.308). As shown in Table 3, two CSFs are classified in this category: *'post-implementation evaluation'* and *'management and monitoring and performance measurement'*. Furthermore, a new benefit driver – *'establishing new enhancement projects'* has been identified.

ES projects need post-implementation feedback to ensure all parts of the systems are working properly (AlQashami and Mohammad 2015). Staff_4 confirmed that post-implementation evaluation and management is as important as the implementation stage of Enterprise Systems.

After the implementation of the ES project, continuous monitoring and performance measuring process are essential for the organization to obtain benefits from using ES. Eight participants supported that monitoring and measuring the performance of the system is an important step for establishing new enhancement projects.

The importance of implementing enhancement projects to drive ES benefits is acknowledged by all twenty-nine interviewees. Only when the university establishes new enhancement projects, could the organization continuously benefit from ESs. HEIs need to identify outdated systems or their parts which are getting obsolete and plan for their update or replacement.

Validity of the Study

It is vital for a study to ensure its research rigor (Long and Johnson 2000; Seale and Silverman 1997). According to Kumar (2019) and Lincoln and Guba (1985), four indicators that reflect the validity and reliability in qualitative research are credibility, transferability, dependability and confirmability.

Credibility demonstrates that research findings represent correct representation and interpretation of participants' views. Credibility strategies include prolonged time in the field which would allow the researcher to get better understanding of the context of the study, as well as spending time with the subjects to gain their trust. After studying relevant research literature and gaining insights into the university environment, interview questions were developed comprehensively for different stakeholders of the university.

Transferability is whether results of the study can be generalized or transferred to another context. In this context of higher education, on the one hand we transferred results related to ES short term and long-term benefits and benefit drivers from other industries to HEIs context. On the other hand, the chosen university is representative of large universities. Therefore, the results of this study can arguably be generalized to other similar universities.

Dependability (Anney 2014) ensures the validity of findings over time, i.e. there is some audit applied to findings over a period of time. This could be done by providing a detailed account of how data was collected, coded and analyzed. In this study all data collection details have been documented, an interview repository containing audio recordings and interview summaries was utilized to store the documents of each interview. Code-recode strategy was also deployed where the researcher codes data, then after a period of time codes it again and compares that the results are the same.

Confirmability refers to the degree by which results can be corroborated by others. This research has critically reviewed the relevant studies. Then multiple participants from different departments of the university and having different roles were interviewed. The data was analyzed to ensure that each identified benefit and each benefit driver is corroborated by several participants as depicted in Table 2 and Table 3.

Conclusion

Enterprise System implementations that constitute the largest expenditure in organizations in general and HEIs in particular show a high failure rate. Currently, there is limited research focus on the benefits of ES in HEIs. Moreover, no previous study has focused on identifying benefit drivers of ESs in the context of HEIs. Therefore, this study investigated two research questions - "*What are the benefits of implementing Enterprise Systems in the context of a higher education institution?"* and *"What are short-term and long-term key benefit drivers of Enterprise Systems implementation in the context of a higher education institution?"*.

This study identified 27 benefits based on the literature review and the case study findings. Most of the benefits are well supported by the interviewees. Five benefits are highly acknowledged by the participants (more than half of the participants confirmed the importance of these benefits). Two benefits – *'Improve services for all the stakeholders in HEIs' and 'More seamless integration between technologies and platforms'* that have been identified in the majority of the previous studies have also been experienced by the majority of the interviewees.

For the reviewed benefits of ES in HEIs, three of them are specific to the higher education context. These three unique benefits comprise one operational benefit – *'Assist in developing learning and teaching pedagogies'* and two organizational benefits – '*Improve student satisfaction of the university*' and *'Attract more students'*. In particular, these three identified benefits prove that the HEI context

should be treated as "unique" compared to other organizations in different industry sectors when dealing with ES implementation projects.

In response to the second research question this study presents a taxonomy of 21 benefit drivers of ESs in HEIs identified from the previous studies and compared to the case study findings. The short-term main factors are *'functional fit'* and '*overcoming organizational inertia'* which include four and eight benefit drivers respectively. The long-term main factors involve *'integration', 'process optimization', 'improved access to information'* and *'on-going major benefit business improvement project'*. The improved access information main factor covers three new benefit drivers. Moreover, one new benefit driver is added to the *'on-going major benefit business improvement project'* factor. All the benefit drivers identified in the literature are confirmed in this study.

To the best of our knowledge, this is arguably one of the early studies which comprehensively identifies benefits and benefits drivers of ES in HEIs which involves an in-depth case study with one large Australian University that have successfully implemented various Enterprise Systems over time. In particular, there has been limited in-depth studies of ES benefits in the HEI context and there is no previous research concentrating on evaluating benefit drivers of ES in universities. This study is built upon previous studies of ES benefits and benefit drivers in both general organization and HEIs contexts. By combining the detailed analysis and synthesis of the literature on ES benefits and benefit drivers with the case study findings, this study has proposed comprehensive and useful taxonomies of benefits and benefit drivers of ES implementation in the HEI context. There are two new ES benefits, five new benefit drivers, and two unique ES benefits in the context of HEIs that have been included. These taxonomies enhance the current understanding of ES benefit and benefit drivers in the HEI context and they can be used to guide future empirical investigations in this realm. Furthermore, through the case study with one large Australian university, this study provides valuable insights into the experience of various stakeholders with ES benefits and their perception regarding factors driving the achievement of these benefits.

In terms of practical contributions, the identified benefits could help higher education institutions manage their expectation of enterprise systems. The identified benefit drivers could also help HEIs recognize and manage those important factors that affect the achievement of ES benefits by universities. Additionally, the study findings could aid universities in devising appropriate strategies to maximize the chance of realizing benefits from their ES investment. Finally, reflecting on the current world's situation due to the COVID-19 pandemic, this study particularly highlights the practical importance of ESs in enabling educational institutions to continue offering quality teaching and learning despite the restrictions stemming from the global crisis.

This study has some limitations. First, due to the limited availability of IT staff, only one administrator from the IT department was interviewed. This lack of interviewees from the IT department resulted in insufficient evidence supporting IT infrastructure benefits. Second, this study interviewed twenty-one female and eight male participants. Although during the data analysis, no specific differences were identified across the two groups, the gender imbalance may have caused some bias in the findings. The findings of this study could be further enhanced by conducting additional interviews with stakeholders of the participating university. In particular, interviewing more IT department staff could provide deeper insights resulting in additional IT infrastructure benefits. Also, exploring experiences of other higher education institutions within and beyond Australia could refine and enrich the study findings. Furthermore, a study involving various universities in countries with different cultures would enhance the generalizability of the findings on ES benefits and benefit drivers that are relevant and unique to the HEIs context. Finally, future studies can investigate how ES could effectively facilitate digital learning and virtual campus under global crisis conditions such as the COVID-19 pandemic period.

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Author/s:
Wang, W;Kurnia, S;Linden, T

Title:
Investigating key benefits and benefit drivers of enterprise systems implementation in the higher education institution context

Date:
2020

Citation:
Wang, W., Kurnia, S. & Linden, T. (2020). Investigating key benefits and benefit drivers of enterprise systems implementation in the higher education institution context. Proceedings of the 24th Pacific Asia Conference on Information Systems: Information Systems (IS) for the Future, PACIS 2020, Association for Information Systems.

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