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An Investigation Into the Impact of Enterprise Systems Adoption and Implementation After the Higher Education Institutions After the Introduction of Funding Cuts

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Abstract : The purpose of this paper is to investigate the behaviour of Higher Education Institutions in relation to the adoption of Enterprise Systems after the changes in the funding regime. It can be argued that funding cuts is the significant change the industry has witnessed in recent past. Since Enterprise Systems is becoming the lifeblood of an organisation, we would like to investigate how Higher Education Institutions have embraced the usage and adoption of Enterprise Systems after the funding cuts. In order to accomplish this objective, we begin our research on how industries in general are responding to external changes. The discussion will then move towards the changes in Higher Education and its impact. By undertaking systematic review of literature, we will investigate the changes introduced by Higher Education Institutions in relation to the adoption of EnterpriseSystems.

Keywords : Enterprise Resource Planning,Higher Education

1. INTRODUCTION

Educational institutions are "loosely coupled" systems with various groups operating independently, but must work together to meet the overall goals [1]. To achieve this goal, universities must adopt new modern technologies to maintain standards and cope up with the competition. ERP Systems are highly standardized systems employing single database [2]. Majority of the institutions around the world are in the process of implementing the ERP Systems. Considering the reforms in the Higher Education funding, we investigate how the universities in the United Kingdom have seized the adoption and implementation of Enterprise Resource Planning systems. As it's widely believed that Enterprise Resource Planning systems have migrated from industrial sector,the discussion starts on how they response to "Crisis" and later on moves on to the Higher Education.

2. OMPARISON OF INDUSTRY AND HIGHER EDUCATION

2.1. The Industry Environment

In today's volatile business environment, more than 80% of the Organisations are facing threats. "Environmental Scanning" – a term for a number of techniques for identifying and predicting the potential impact of external trends and developments on internal functioning of an organizationbecomes vital [3]. Much of the research on analyzing the level of competition within an organisation is developed by Harvard Business School. Porter's five forces model on industry analysis and formulation of competitive strategies serves the basis for most of the literature.

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Porter also discusses Government policy as a force in industry competition and stresses the fact that roles of government or technology cannot be understood in isolation, but through the five forces [4].

The Threats faced by organisations could be from the external environment- comprises of wide range of influences-economic, such as demographic, social, political, legal, technological and environmental. – Which not only affects the business activities but also can impinge on the process of resource acquisition, transformation process (transforming input to output) and the consumption of the output and the fact that in analyzing the organisations' external environment attention needs to be paid to the interaction between the different environmental variables, environmental complexity, volatility and change and to the spatial influence is also highlighted [5].

As a result of both external and internal threat in an organization, "Crisis" takes place. It is also argued that industrial crisis is characterized by high economic and social costs [6]. As a result, in the heat of financial crisis, organizations focus on cutting costs ignoring their strategic needs. Also, they invest in improving their business processes aiming to prevent crisis in future.

Organizations adapt three generic strategies to handle crisis. They include cost leadership, differentiation and focus. Currently, organizations are suffering from the risks from the above-mentioned generic strategies or in a "stuck – in –middle " position- lacks the market share, capital investment, and resolve to play the low-cost game, the industry wide differentiation necessary to obviate the need for a low- cost position, or the focus to create differentiation or a low-cost position in a more limited sphere [4].

To minimize the risks associated with the generic strategies and prevent getting into "Stuck-in- middle" position, organisations invest in Information Communications Technology (ICT). It is believed that investment in ICT will improve productivity and improve performance in organisations[7].To improve business performance, organizations require an efficient planning and control system that synchronizes planning of all processes across the organization [8].

The penetration of Enterprise Systems happened as a result of the ICT investments. Enterprise Systems - is a packaged application that supports and automates business processes and manages business data **[**9]. The United Kingdom (UK) ICT market, largest ICT market in Europe, is worth more than £100bn. The UK software market is considered robust and even under economic downturn software demand has remained strong with notable sales growth of 13% to £17.84bn (2014). The broader software and related IT services (SITS) market is of nearly £33bn; with strong IT services growth of 10%. Fig. 1. Depicts the segmentation of UK software market

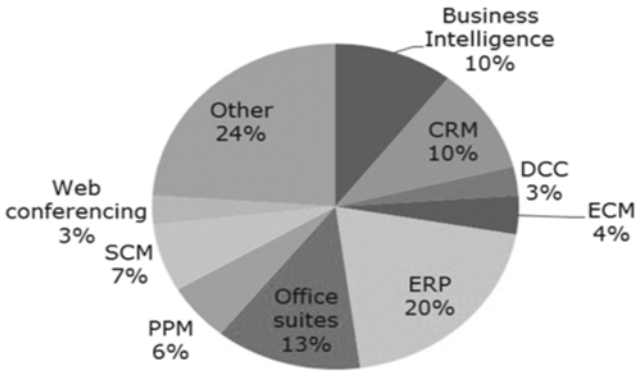

Fig. 1. Software Market in the United Kingdom (Source: Mintel Software-UK-February-2015)

It was believed that business life after the introduction of Enterprise Systems would :

- Reduce process cycle time
- Increase information visibility
- Lay the ground for electronic commerce
- Make tacit process knowledge explicit
- Improve decision-making process and so on [10].

Currently, Enterprise system has become the basic information-processing requirement in many industries [11].

2.2. Higher Education Environment

Higher education institutions are large, complex, adaptive social systems like all other human organizations [12]. Currently, Higher Education is viewed as more of "Corporate "form of an organization. Traditional Universities have become more commercialized and they are struggling to find their identity [13]. This paradigm shift brings many challenges including increased expectations of stakeholders such as students and governments, decreasing governmental support, meeting quality and performance requirements and maintaining competitive education environments [14]. It requires successfully dealing with the changing environment of higher education means acquiring new technology, instituting new programs, adopting new processes and taking other actions—(all of which require funding [15].

Significant challenges faced by the Higher Education includes curriculum design/alignment, student employability, widening participation, quality of learning and teaching, quality of research, accreditation, complete and collaborating globally in research and talent, student retention, adopting emerging technology, assessment, addressing of plagiarism, new generation of staff, tenure, funding, group formation for learning and teaching, critical thinking and argumentation, construction of personal and group knowledge, contribution to economy, integration of knowledge capital and cross-curricular initiatives and Higher education governance and management[12].Finance and funding issues were considered as the main challenge faced by the universities worldwide for the past twenty years and adoption and application of powerful technological innovations as a remedy to it also remains problematical[16].The main barriers to funding are increased student fees, substitution of loans for grants; diminishing subsidies to student facilities form the financial barrier to the universities[12].The student numbers have increased by 40% since 1990s and increase in resources have led to the declining of per capita resource[17].There is evidence to suggest that institutions in England are facing a challenging environment in funding the maintenance of existing infrastructure and funding new investments[18].

Pollock and Cornford [19] describe how historically, universities grew as a type of institution that was, and still is to some extent, "distinctive" with an "autonomous place in society and the right to choose its members, settle its aims, and operate in its own way". Some common challenges are faced by both industries and universities such as survival in competitive environment, increasing needs to improve efficiency and performance in administrative services [20].It was also stated that, "universities as organisations face many problems common to most modern organisations", including, for instance, the problems of co-ordinating resources, controlling costs, of stimulating and facilitating enterprise among staff, and so on [19].

Universities like industries are under high pressure trying to adopt new strategies to improve their performance. There is more pressure to change the business processes than in the past and mostly includes the need for long term cost reductions, increased customer demands, increased competition for students and potentially more government regulations [21].This has led to the changes in the Governance and in the management of higher education institutions [22]. Essentially, part of the Higher Education's strategy to respond to these issues has been to adopt state-of-art technology to reduce duplication of efforts and resources to improve management information provision and ameliorate organizational efficiency and effectiveness [23].

Since universities have problems common to a wide range of organisations, the standard tools of contemporary organisational analysis and institutional management- including computer systems used by large corporations around the world, such as ERP systems- can be similarly applied in universities [19].

Higher Education Funding Cuts and Emergence of MOOC Two significant changes that occurred in the last five years was the cut in government funding and the emergence of Massively Open Online Courses (MOOC). The reduction in grants means students will be spending around £30,000 for a degree against £9000 before [24]. This means students have become more demanding and expect value for money for the fee they pay. Likewise the emergence of MOOC and advances in technology has resulted in participants adopting to learn online and universities are under intense pressure to provide new channels for education. Against this background, it is important for universities to offer more and simultaneously reduce expenses.

Traditional higher education system is dependent heavily on government funding for its proper functioning. The MOOC delivered higher education will result in reduced Government spending on higher education with improvements in the quality of teaching and learning and greater scope for innovation in higher education[25]. Also, the Department of Business, Innovation and Skills report, suggest that MOOC will challenge the existing Higher Education Business models, pedagogy, and International education provision [26][27]. Though MOOC proposes challenges like academic dishonesty, online cheating, demand of digital literacy, ICT infrastructure, etc. [25], the potential impact still is a mixture of both advantages and disadvantages.

As discussed earlier, enterprise systems do have the capability to provide better support to students and enhance their learning experience. Forthcoming section will provide a gist of various studies on ERP in higher education

2.2.1. United Kingdom Higher Education

The government policy in the UK has encouraged and focused on the expansion of higher education to increase participation and with an aim of creating a more educated workforce and this expansion has led to competition between higher education institutions, with students increasingly positioned as consumers and institutions working to improve the extent to which they meet'consumer demands' [28]. To meet up this subrogation demand, government focussed on the "Finance" sector. Considering the recent government funding cuts, the most prevalent outlook in higher education today is one of business, forcing institutions to reassess the way they are managed and promoted to ensure maximum efficiency, sales and 'profits' where Students view the opportunity to gain a degree as a right, and a service that they have paid for, demanding a greater choice and a return on their investment [28].

Reports in United Kingdom Higher Education shows that there is a significant change in the United Kingdom Higher education with ongoing funding cuts across the four United Kingdom nations with a shift in the main source of funding, as the proportion of income across the UK made up of funding body grants has fallen from(39% to 20% and the proportion made up by tuition fees has risen from 24% to 44% in the year 2012-2013[29].

2.2.2. ERP in Higher Education

ERP adoption and implementation in Higher Education has been a subject of choice amongst researchers and a wide range of studies have been undertaken in this area. Higher education worldwide is powerfully influenced by IT development, especially in universities around the world due to the government's call to improve its performance and efficiency [30]. The competitive educational environment and the expectations from the students around the world are forcing universities to improve their overall performance [31]. These prime aspects turned universities to consider ERP systems an important strategic tool in today's environment. The standalone applications designed for academic and administrative departments were replaced by ERP in the universities [19]. They also argue that ERP implementations create tensions irrespective of the nature of the organisation in which they are implemented and "refashioning the identity of the universities" with raising new organisational issues during it's implementation in Higher Education. ERP systems are the largest software applications adopted by universities, along with quite significant investments in their implementation [32]. Researchers have studied ERP in various context and situations in various organisations [33].

ERP implementation in Higher Education sector has been increasing globally.

The bibliography of ERP literature till date was categorized based on

- ERP life cycle frameworks [34];
- Research issues and trends, business modeling and development [35];
- Implementation issues, optimization of ERP, Management through ERP, ERP software, ERP for supply chain management and case studies [36].

There is still a gap that irrespective of these two broad spectrum "ERP " and "Government funding cuts". Is Higher Education implementing ERP with the internal funds aiming for long-term sustainability?

Large amount of literature focusing on various dimensions (like Success and Failure factors) of ERP implementation is available especially in the United States and Australia. An experiential view about ERP implementation in two large universities and highlighted the complexities associated with its implementation was provided [37]. Past studies on ERP implementation in Australian Higher Education and argued the need for further research on the benefits and impact of ERP systems on educational institutions [32].

Research by Beekhuyzen [39]shows that in 2002,86% of Australian universities tried implementing at least one module of an ERP system of which 38% adopted ERP from a single vendor and 48% adopted best-of breed and 14% favoured their old legacy systems. Indian Higher Education has started to adopt and implement ERP systems.

It has only been in the past 10 years that ERP appeared the higher education sector rooting its appearance to Information Systems literature [38]. These systems were formerly designed for commercial organizations, and minor efforts have been taken to fit them to universities requirement [39]. The purpose of implementing ERP in universities is to provide institution with a greater capacity for research and education [40].

Strong communication between the departments in the university was identified as the main success factor when he investigated the impacts of a successful ERP system implementation in a university in Switzerland [41]. A previous study from the researchers of Australia found that 86% of Australian universities are in the process of implementing at least one module of an ERP system [39].Knowledge management was cited as an important factor to successfully implement ERP systems in the Australian public sector organisations including Higher Education [42]. Researchers [43] conducted a case study at Queensland University of Technology in Australia focussing on ERP system selection, customization, and integration factors with high emphasis on ERP evaluation in Australian Higher Education. Later on, the benefits of ERP systems and related it to the employee's performance by gathering previous researches on ERP in Higher Education with a special focus on Australian universities were identified too [14]. The positive factors were highlighted including the challenges faced during ERP implementation at King Saud University in Saudi Arabia [44]. The risks in implementing ERP systems at the University of Massachusetts, Wisconsin Technical College and at the University of Wisconsin-Superior were examined by researchers too. [45].

Unfortunately 60% to 80% of all ERP system implementations failed to meet the expected outcomes [46]. The ERP implementation at the University of New South Wales, Adelaide University and Royal Melbourne Institute of Technology from Australia are the examples of failed projects. The most recent example of ERP implementation failure in Higher Education is at the University of Massachusetts, where the new online registration system crashed on the day before enrolment and affected 24,000 new students. Similar cases can be found at the Stanford University and Indiana University too where students suffered with class timetables because of the faulty ERP system. Also ERP is designed into certain modules; this is problematic for universities to adopt these packaged systems because institutions need to alter their business processes to fit into these systems [47]. Ferrelfound that ERP implementation in universities is challenging, with high risk and medium return on investments compared to the expenditure [48]. For example, a survey of 30 Information Technology directors found that around 40% actually measured the value received from their ERP system with Return –on-investment as a main component [49]. Allen and Kern [30] found organisational culture and communication as a vital factor by conducting a study in four United Kingdom Universities. The effect of sub-cultures in an Australian University on ERP implementation were analysed and found out that the outcomes were for a change to successfully happen, the needs and values of sub-cultures have to be realised and academic sub-culture ranks the top in it [31].

The impacts of ERP system on business process and performance in higher education were analysed and the projected outcomes were definite improvement in business performance by enhancing services offered to students, academic and non-academic staff [21]. Large amount of literature in higher education has focused on the ERP software selection. The factors discussed in literature with regards to ERP software include the customisation of ERP software to fit the business and adjusting the business processes to fit the ERP software (i.e.) fit between ERP software and business. The ERP implementation in Midwestern University between 1997-2003 is the best example [50]. Some literature highlights the problems faced with the ERP vendors- In 1998, the Cleveland State University had to take legal action against the vendor as the implemented ERP could only handle half of their total transaction.

It is proved that ERP implementation is successful in business organisations and researchers conducted a study in Australia and found that higher educational institutions do not realise the significance of ERP systems as very few have successfully implemented [47]. Another problem that was discussed in the Literature was the budget factor, the raise in projected cost compared to the estimated cost. The University of Minnesota's projected cost was $38M, which finally reached $60M.The implementation cost of Ohio state university reached $85M from it's projected cost $53M. Researchers also highlighted the experience of ERP implementation at University of Winsconsin-superior, George Washington University West Viginia University, and University of Nebraska [51]. The ERP implementation at Agora University was published and the journal highlighted the involvement of faculty during the design phase of the implementation project as a vital factor[52].

Researchers also raised questions regarding the effective evaluation of ERP in higher education sector. It becomes very important to determine the success of ERP implementations, because a huge budget and human resources are invested therein [43]. Thus implementation of an ERP system is a careful exercise that involves strategic thinking, precision planning and negotiations with departments and divisions [53]. Large volumes of academic journals focus on the implementation issues and how they can be avoided, but research focusing on understanding the potential of an ERP system is still lacking [54]. However implementation of ERP Higher Education in the United Kingdom is still in their institutional repositories or blogs. There is comparatively little attention and researches that measures ERP success or failure in this sector [43]. Research in British Higher Education unfolds the fact that universities started ERP implementation projects, unfortunately concluding's are unavailable as the projects are finished yet [48]. The situation still prevails….

3. CONCLUSION

This paper projected the entry of the Enterprise resource planning systems into industrial and university environment from a funding perspective. Enterprise Resource Planning Systems is still considered as a solution to "crisis" in both industrial and Higher Education sector. Though ERP implementation in Higher Education is associated with a history of major failures, the sector is still in the process of implementing them with hope of marching towards success.

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