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Abstract

This is an introductory paper that discusses components of EA that have been recently adopted in HEIs as a business-IT alignment strategy. It is imperative for universities to meet changing and increasing demands effectively. HEIs acquire new technologies as student demands evolve, thereby causing business processes and other student activities to revolve around the technologies they acquire; for example, new e-Learning technologies, Citrix servers, and integrated-management systems. These institutions find the challenges and opportunities these technologies bring overwhelming which result in some level of misalignment with original business goals and strategy. These technological add-ons easily scotch the free flow of processes, staff, and resources needed to function. Having a master plan or a formal architecture at the start of business is very difficult but inevitable. This idea is compared to having a master model for a new building, a new urban dwelling or an aeroplane. These usually have architectures or blueprints before construction or design so that upgrades can be easily accomplished. HEIs tend to solve problems using ad hoc solutions without a holistic view of the organisation. Enterprise Architecture is reviewed in this study to understand how it can be used to align the business needs of HEIs and IT strategy.

1.0 Dawn of a New IT Innovation

John Zachman initially described the complexities of Information Systems architecture under Business Systems Planning in his organisation stating the need for an enterprise-oriented approach to incorporate flexibility and coherency in managing business changes and resources (Zachman, 1987). He worked at International Business Machines (IBM), a multinational computer, technology and IT consulting
corporation headquartered in the United States (US). He was the Business Systems Planner and a student of Dewey Walker, IBM’s Director of Architecture. He accented the role of a preset structure, blueprint or architecture for an organisation’s information systems (IS). The structure is necessary to reduce chaos effect and disintegration of the enterprise by systematically introducing order and control in information systems investments. In 1982, he defined the need for business managers to control the integration of information systems and their components within the organisation (Zachman, 1982). He then proposed the Zachman Framework (Zachman, 1987) originally known as “Information Systems Architecture Framework” as a business standard for classifying the descriptive elements that constitute an enterprise architecture. The framework gives business managers the ability to bridge the gap between a business strategy, implementation and IS alignment (Zachman, 1987) by designing models of What, How, When, Where, and Why artefacts of the organisation. His work gave further rise to works on EA and was adapted by the United States government in designing the Federal Enterprise Architecture Framework, FEAF (Chief Information Officer Council, 2001).

The Institute of Electrical and Electronics Engineers (IEEE) Standard 1471-2000 defined EA as “the fundamental organisation of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution” (Op’t Land et al, 2009, p.32).

The US National Institute of Health offers a descriptive definition of EA as “a comprehensive framework used to manage and align an organisation’s Information Technology assets, people, operations, and projects with its operational characteristics. In other words, the EA defines how information and technology will support the business operations and provide benefit for the business. It illustrates the organisation’s core mission, each component critical to performing that mission, and how each of these components is interrelated (NIH, 2008). Other government public sectors in the US and United Kingdom (UK) has developed architectures (for example, e-GIF in UK) for interoperability and functionality (Hjort-Madsen & Gotzie, 2004; NCC, 2006), and business benefits have been achieved (JISC, 2009, p.12). The definition proposed a holistic approach of the organisation and its existing activities. Furthermore, the concept of business operating models is proposed (Ross
et al, 2006) so an organisation can understand the type of processes and system structure they adopt. It is the starting point to know ‘how’ information, customers, technologies are shared within the organisation. The purpose of a business operating model (BOM) can be used as a prerequisite for implementing any enterprise-oriented activity. Ross et al, (2006) further proposed that organisations which have integrated Information Technology (IT) into day-to-day processes and operations are more suited to upgrade to higher levels of efficiency, agility, innovation and growth by embracing enterprise architectural techniques. Organisations need to respond faster to changing models of customer requirements and current business environments by adapting processes and technology to fit.

Op’t Land et al, (2009), proposed that EA can be used to establish better and more informed governance structures within an organisation. While governance informs and guides overall business decisions; IT Governance Framework is considered as the engineering element of successful decisions made in securing IT investments suited for the strategy and growth of the organisation. IT Governance Framework is integrated in EA framework and used to enforce controls over IT projects, new applications, performance, and risk management within the organisation. EA is invaluable if businesses are to remain relevant and competitive in confronting intermittently emerging challenges, e.g. new policies and regulations for HEIs, business mergers and acquisitions, new technologies, and globalisation (Butler, 2009). Also, EA frameworks are used to provide a high-level, top-down view of an organisation showing different perspectives of operations and functions within the organisation (Ross, et al., 2006; Bernard, 2004; Doucet et al., 2008).

1.1 HEIs in Technology Era

The environment for HEIs is characterized by disparate demands from regulatory bodies, industry partners, students and staff development in the face of constrained resources (JISC, 2009 and Op’t Land, et al, 2009). Other issues faced by these institutions include:
• being uninformed about business product opportunities, services, capabilities, and internal structures;
• lack of common understanding and governance of key data resources;
• need for diversity and coherent governance structures;
• a plethora of legacy applications and infrastructures;
• duplicated functionalities in terms of people and technology;
• organisational silos, self-contained business units who operate on their own, with no sharing of data;
• silo applications, (self-contained and isolated applications), which only provide functionality to a specific business process;
• old and under-utilised enterprise resource tools embedded in the organisation’s package based silos (JISC, 2009).

These issues often result in major changes to internal activities and structures within the organisation. HEIs are also involved in the cross-selling and co-branding of services and products to clients and these involve collaboration with third parties, businesses and other institutions. The ability to improve on quality service and product quickly is vital to preserve these relationships (JISC, 2009). Thus, when these institutions develop new businesses, relationships, virtual spaces and learning technologies without a formal architecture for the organisation; the management inadvertently misses out on business capabilities, efficiencies, opportunities for innovation, savings or timeliness to market new products. Technologies become capped in their potentialities which have and may further result in abandoned projects, completed but failed implementation of new systems, structural reorganisation, layoffs and other business setbacks.

1.2 Current HEIs Research into EA

JISC as a collaboration of UK Higher Education and Further Education funding bodies collaborate to provide world-class leadership in innovative ICT use to support education and research. JISC has described EA as “a high-level, strategic technique designed to help senior managers achieve business and organisational change by describing and aligning functional aspects. It involves aligning its people, activities, tools, resources and information
repositories so that they work more effectively together to achieve its business goals” (JISC, 2009). So far, this collaboration has afforded support to a few universities to improve key business processes and align appropriate structures and resources to match the processes (JISC TechWatch, 2009).

1.3 Restructuring for Enterprise Architecture

Large organisations today reassess their business processes and IT investment for cost reduction, provision of value added services to business customers, and in conformity to policies that regulate the industry (The Clinger-Cohen Act 1996 and The Sarbanes-Oxley Act 2002). Most HEIs are beginning to operate more like commercial institutions because of the need to source for more independent funding to boost government support, increased running costs, more diverse demography of students and demand for a higher quality of graduate education (Williams, 1993). HEIs as large and decentralised organisations are required to create a level of transparency in governance structures and adhere to other policies from external auditory agencies like The Higher Education Statistics Agency (HESA), The Higher Education Funding Council for England (HEFCE), Office for Standards in Education (OFSTED) and The Quality Assurance Agency for Higher Education (QAA Report, 2009). Senior management needs to be able to understand interactions between its external business collaborations and customers in a more coherent way. HEIs need to have an architectural viewpoint of their internal processes and infrastructure. EA work helps senior management gather information to understand the current status of business and effect improvements needed. Previous studies (Ross, et al., 2006; Bernard, 2004; Doucet et al., 2008) have shown that different modelling methodologies and concepts of EA which include business process improvement, operating model design, strategy maps, information and technology architectural descriptions are used in other large organisations. Hence EA is used more strategically, e.g. for business strategy and IT alignment, process improvements or business change via standardisation/integration, mergers and acquisitions, cost reduction, infrastructure simplification, and compliance with policies (Infosys, 2009). Using EA within a university system would help support business plans, from managing funding for internal operations,
standardisation of processes or streamlining for value added services to its customers, and to managing IT governance structures (Ross, et al., 2006).

1.4 Aligning Business Strategy and IT for HEIs

For this research purpose, business requirements have been identified in dealing with organisations with technology-related needs. They include organisations acquiring new or additional ventures or technologies breed newer challenges. For example, products rushed to consumers fail to meet quality standards and growing needs. There is also the need to build enterprises that are resilient to changing environments and responsive to consumer demands. Some projects are implemented independently and implementers are unaware of the linkages they must adhere to, thereby fracturing the current system. What EA can deliver (Covington and Jahangir, 2009) within HEIs can include:

- The current model of key infrastructure, systems or processes;
- The future reference model based on proposed business strategy;
- Gap analysis within the system that identifies shortfalls of the current model in terms of its ability to support future objectives;
- Architectural roadmap that defines the steps required to migrate to another level of enterprise maturity.

Using an EA tools would help highlight existing technology, eliminate IT as a bottleneck and reuse resources more efficiently (Butler, 2009). The architecture or ‘blueprints’ of the organisation is formulated for various stakeholders to show relationships existing in the current state of the business, mediated vision and systems infrastructure. They are also used to highlight current IT capabilities and potentialities for implementing new technologies in order to respond to changing customer demands. The concept is summarised by the definition by Bernard, (2004) that “EA is the analysis and documentation of an enterprise in its current and future state from an integrated strategy, business and technology perspective”
EA principles highlighted by Ross et al, (2006) are not resolutely applicable to HEIs because of its decentralised nature of operation. HEIs thrive on diversity in decision-making due to the involvement of stakeholders, external business clients, disparate business units, and the need for continuous innovation. HEIs would not readily initiate IT projects without a thoroughly informed decision-making process which would allow a better understanding of the benefits to be achieved. This justifies the use of EA as a holistic approach to align future IT projects, create faster routes to decision-making, innovation and standardisation of systems, to establish an agile enterprise (JISC, 2009). A summary of possible deliverables for HEIs using EA as a business and IT alignment tool can be categorised in three parts:

- A coordinated strategy usually described in the corporate vision to which the architecture could be aligned (Bernard, 2004);
- A central decision-making system via a channel of diversified hierarchy of stakeholders (Op’t Land et al, 2009);
- Standardisation and integration on key systems and processes to enable a unified view of the organisation (Ross et al, 2006).

1.5 **Highlighting Drawbacks for EA in HEIs**

Academics are considered to be the second largest community that contribute to the EA discipline, but very little investigation has been undertaken in EA research (Langenberg and Wegmann, 2004, JISC, 2009). There is need for more research to be conducted to guide the process of HEIs using EA and add to the body of knowledge. Future research would cause certain questions to be raised in line with HEIs adopting EA as a holistic business/IT strategy. They may include the feasibility of a formalised frameworks and components of EA specifically tailored to suit the structure of HEIs. Would the formalisation help HEIs develop a more pragmatic approach to business strategies?
1.7 Conclusion

The concept of model architecture designed to build an upcoming urban community shows that architectures are needful if enterprises are to run cohesively. Organisations should create dynamic structures that can withstand business changes and customer demands caused by advancements in technology. Organisations like HEIs should easily adapt to these changes. EA would help HEIs identify the need to standardise or integrate key processes, manage efficiently huge infrastructure investments, provide a consistent view for all stakeholders, and establish a more agile enterprise. Further research should be conducted for HEIs to use EA or developed as an evolutionary approach to incrementally modify existing processes within the institution. The knowledge of EA should be encouraged in HEIs either as a business module or a business-IT alignment strategy.
References


