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Executive Summary

Rationale: Modern institutions use different kinds of complex software applications to support organizational activities that fulfil their institutional mandate. Often these software applications run on a variety of technology platforms either on premise or using cloud computing services. In the past information technology (IT) professionals would be able to provide a simple diagram of the software applications but that is difficult with the increasingly complex environment. This study explored the challenges of the new technological environment records professionals work and the contributions that enterprise architecture could make to assist in managing records generated by sophisticated software applications.

Methodology: This study investigated the challenges faced by records professionals that work in complex technology ecosystems. The study was conducted in two phases: the first phase a review of general literature and the second phase a four-step process to explore The Open Group Architecture Framework (TOGAF) and develop a model incorporating recordkeeping requirements.

Findings: In the first phase provided a background to the study through an extensive review of literature on the nature of modern technological ecosystems in general and particularly the contribution of enterprise architecture. The second phase explored enterprise architecture principles and frameworks and constituted four steps: review of literature on enterprise architecture, assessment of a specific enterprise architecture framework (TOGAF), the design of an integrated model for one of TOGAF's domains and the validation of that integrated model.

Title:

TR04 Assessing Information Systems: A Template for Analysis

Research team

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Background

Modern institutions invest large amounts of resources to build technology platforms and business applications that will support organizational activities to fulfil their institutional mandate. According to Gartner, the worldwide spending on IT is projected to total US$3.7 trillion in 2018 (van der Meulen and Pettey 2018). Although technology is the underlying constant across an organization's business areas, its benefits are not widely understood (Samuels 2018). Harvey Nash/KPMG's 2017 survey of chief information officers (CIOs) revealed that 61% of those surveyed found technology projects to be more complex than in the previous five years (Ellis and Heneghan 2017 p. 19).

Large companies operate hundreds of computer-based information systems or applications to support their institutional activities (Riempp and Gieffers-Ankel 2007 p. 359). For many such institutions, creating an inventory of systems or applications is just the beginning of the management process (Katuu 2018b p. 94). Effective management has necessitated the development of portfolio management techniques and models to map out the complete IT ecosystem in their institutions (Ajjan, Kumar et al. 2016; Katuu 2018a; Kaushik and Raman 2015; Panyard, Ramly et al. 2018). In the past information technology (IT) professionals would be able to provide a simple diagram of the software applications but that is difficult with the increasingly complex environment.

For records professionals in institutions with a complex technological environment, the challenge is how best to understand the complexity in a way that they can fulfil their professional mandate, the identification, capture and management of records for as long as they are required. Records professionals need to make sense of the vast array of software applications as well as technological infrastructure and how they relate to each in supporting the institution's functions and activities. This is necessary to institute any lifecycle manage of records or potential records generated by these software applications. The information technology field has several options to understanding the technological complexity, one being enterprise architecture.

Objective

The objective of this study was to explore methodologies and frameworks that could assist records professionals understand technology ecosystems in order to better mange records generated in large and sophisticated software applications.

Methodology

This study investigated the challenges faced by records professionals that work in complex technology ecosystems. The study was conducted in two phases. The first phase provided a background to the study through an extensive review of literature on the nature of modern technological ecosystems in general and particularly the contribution of enterprise architecture.

The second phase explored enterprise architecture principles and frameworks and constituted four steps:

- The review of relevant literature on enterprise architecture
- An assessment of a specific enterprise architecture framework chosen for this study i.e. The Open Group Architecture Framework (TOGAF)
- An assessment and design of an integrated model within one of the TOGAF's domains that incorporates recordkeeping considerations
- A validation process of the integrated model

Findings

The two-phased study produced several findings as outlined below.

The first phase produced a literature review constituting over 40 publications. The review explored the challenges of the new technological environment records professionals work characterized by contradicting realities. For instance, the increased nature of connectivity while at the same time the lack of integration between systems and/or technology applications. Or the increasing centralization of enterprise wide systems yet at the same time the dispersion of repositories in varied geographical locations.

The second phase produced outcomes in the different stages. The first stage entailed selecting and reviewing relevant literature on enterprise architecture. The literature demonstrated that enterprise architecture is a promising concept to cope with the complexity caused by complex technology ecosystems (Riempp and Gieffers-Ankel 2007 p. 359). With the help of enterprise architectures, the relevant aspects of both business and information technology realms are mapped by means of comprehensive models that, for example, detect misalignments, resolve redundancies, or spot missing integration links (Riempp and Gieffers-Ankel 2007 p. 360).

The second stage entailed an assessment of The Open Group Architecture Framework (TOGAF), a specific enterprise architecture framework chosen for the study. TOGAF was created by the open group as a technology architecture methodology based on the technical architecture framework for information management (TAFIM), a framework developed by the United States Department of Defence (Armour, Kaisler et al. 1999 p. 37). It has become a well-defined method for designing an information system in terms of building blocks and for showing how the building blocks fit and interact (Raj and Periasamy 2011 p. 72).

TOGAF has three main pillars: (1) enterprise architecture domains (EAD); (2) architecture development method (ADM); and (3) enterprise continuum (EC).

The third stage constituted exploring the enterprise architecture domains (EAD) within TOGAF. There are four domains: Business Architecture, Application Architecture, Technology Architecture and Data Architecture. This study used these four domains to map information technology assets within an international organization. In order to do this successfully the EAD TOGAF framework was expanded to accommodate a modified form of the records and information lifecycle model. The normal lifecycle model usually constitutes creation or receipt of records or information, their capture, storage and maintenance, use, and disposition (Shepherd and Yeo 2003 p. 5-8). The modified lifecycle has four phases: (1) information authoring; (2) information management; (3) records management; and (4) archives management. The resulting model had a gap in the Data Architecture. Therefore, this study adapted work that was conducted in a previous phase of the InterPARES Project that had developed a framework for identifying authenticity metadata (InterPARES 3 Project: TEAM Canada 2012 p. 1). The fourth stage of validation of the integrated model is an ongoing process

Conclusions

This study has explored the challenges of the new technological environment records professionals work and the contributions that enterprise architecture could make to assist in managing records generated by sophisticated software applications. Enterprise architecture is a holistic strategy used to improve the alignment of an enterprise's business and IT (Nikpay, Ahmad et al. 2017 p. 927). It entails abstracting the essentials of business and IT components to identify and address gaps and weaknesses in their processes and infrastructure (Dang and Pekkola 2017 p. 130; Lankhorst 2009 p. 3).

This study demonstrated how an enterprise architecture framework based on TOGAF assessed an institutional model with four layers: (1) business

capabilities; (2) application; (3) technology; and (4) data. Since in most models the data layer is left blank, the study offered an opportunity to adapt metadata categories and types. The study began steps to integrate metadata categories and types into the TOGAF conceptual model. The final step in the process would be to validate the integrated TOGAF conceptual model. The validation process is necessary when clarifying two issues:

1. Capabilities in the business layer using best practice guidelines and standards
2. Metadata in the data layer by developing a detailed inventory of the individual metadata types within each of the categories so that the model provides practical guidance (Katuu 2017).

The study demonstrated how an enterprise architecture framework like TOGAF allows for abstraction, as well as provides flexibility and adaptivity to remain relevant to institutional requirements.

Products

A literature review (version 2 July 2017)

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