

Adopting an ISMS based Model for better ITSM in Financial Institutions

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Abstract—In recent times, the day-to-day business operations in financial institutions have shown dependence on information systems and Information Technology (IT). IT service management systems have helped in managing the complexity of IT service delivery for delivering financial institutions' critical business. IT service management systems have become fully integrated into IT organizational arrangements as a micro part of financial institutions. However, the emergence and ever-increasing information security challenges have become a source of worry not only for financial institutions, but all other organizations. Despite this, limited attention has been given to the improvement of IT service management. The purpose of this research-in-progress is to investigate Information Security Management Systems (ISMS) in terms of their capability of improving Information Technology Service Management (ITSM) in financial institutions using International Organization for Standardization (ISO) 27001 standards as a guideline.

Keywords- *Information Security Management System; Information Technology Service Management; ISO Standards; IT services; Service Operation.*

I. INTRODUCTION

Information has been identified as a very important aspect of information technology in recent years, such that most organizations and businesses are now focusing on the service-oriented economy rather than a goods-based one as was always the case in the past [1]. The huge rise in threats and cybersecurity breaches across industries including financial institutions has brought about a substantial financial loss and failure of IT service availability. This has led to an increased focus on information security in the sector [2]. One of the effective ways of strengthening an organization's cybersecurity is the implementation and periodic auditing of efficient Information Security Management System (ISMS). [3] stated that ISMS is a management system that embodies policies, processes and procedures that consider the fundamentals of cybersecurity, which are confidentiality, integrity and the availability of IT services and business information [3].

Information Technology Service Management (ITSM) has long been considered a key player for integrating business and IT services. IT service availability and continuity

management are part of IT service delivery. Downtime and service failures occur, because of poor IT service availability management systems, which can adversely affect an enterprise's business prospects [4]. Given that the business activities and IT services of an organization are greatly dependent on information security, it is essential that an ISMS ISO based model guided by international standards and frameworks be adopted [5]. To ascertain clearly the relationship between information security and IT service availability, for this research, a detailed analysis of the ITIL 2011 for an ITSM framework, a systematic review of the ISO/IEC 20000 – 1:2011 being a Service Management System (SMS) standard [6] and an investigation into the top ISMS standards, such as ISO 27001, CIS 20 and NIST SP 800-53 will be carried out.

The structure of the paper is in sections. In Section II, a critical review of existing literature is done. In Section III, the possible benefits of ITSM are highlighted. Section IV explains the research methodology to be followed. In Section V, the components of ITIL are discussed. Section VI discusses some of the ISO 27001 controls and their relevance to ITSM. We conclude in Section VII with the findings from related research and an online survey.

II. LITERATURE REVIEW AND RELATED WORK

Recent research has shown that the finance sector has completely embraced the adoption of Information Technology for the enhancement of organizational performance and efficiency [2] but has brought with it many challenges to the sector [7]. Business continuity has been noted to be one of the key business values often identified with the banking industry [7]. Some of the valuable drivers of financial banking, service availability and business continuity are the integration of ITSM to the business operations of these financial institutions. [2]. Thomas Peltier described good security as protecting the assets of an organization and at the same time meeting the objectives and goals of the business [8].

There is a gap in the management and adoption of relevant standards to improve the efficiency of ITSM. This research proposes the adoption of an ISO driven ISMS based model that will bring about a change in the management of IT services and infrastructure.

ITSM is a key player in the process of integrating business and IT services [9]. In a bid to increase the business gains of financial organizations, material resources, human resources,

management policies and objectives are being connected through the sharing of information [10]. This linkage has led to the potential for more serious attacks on information and the systems that are used for communicating and processing it than previously [11]. The security and protection of these valuable information assets is now one of the highest priorities for many organizations in the finance sector [12]. Whilst there are some approaches and technologies that have been developed to bring about information security, however none of these can guarantee watertight security [13]. The London Stock Exchange system failure that happened in 2008 is an example of the huge financial loss that can be caused by insufficient protection in the use of IT due to the conflicting interests of stakeholders [14]. Given the potential for big losses, professionals in the industry have started investigating IT related risks intensively [15].

While IT infrastructure failure is classified as an operational risk, it can also be identified as an availability failure from the service delivery management perspective [2]. If ITSM is to deliver its core objectives, an acceptable level of security must be attained, and hence, the need for robust ISMS standards being devised and followed, thereby ensuring the best security practices [16].

ITSM is considered part of the service sciences focusing on IT operations [17]. Specifically, it can be defined as a combination of processes established to ensure quality IT services, in accordance with levels pre-agreed with the customers [18]. Manuel Mora et al (2015) hold that ITSM centers on defining and delivering IT services that support business' goals whilst meeting customer needs [19]. It involves a systematic approach to the management of IT services, covering design, execution, operation, process and review aimed at providing improvement on a continual basis. Moreover, it focuses on the alignment of services and functions rendered by IT within an establishment as much as on the technical aspects of IT. Whilst cost effectiveness is one of the main aspects of the IT services management, it also concerns the whole lifecycle of all IT services [20].

There are various ITSM frameworks with the most common one being the Information Technology Infrastructure Library ITIL, which is the basic standard for most IT service providers [21]. ITIL has been deployed by Hewlett-Packard (HP), IBM and in the Microsoft Operation Framework (MOF) [22]. Microsoft's Operation Framework (MOF) also mirrors the provisions of ITIL standard [23]. ITIL 2011 being the most recent update of version 3, was published in May 2007. There are 26 sections, which are part of the five lifecycle phases, these being: Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. There is a great difference

between the current and previous versions. That is, the previous version, Version 2 comprised a total of ten processes in just two main domains, namely: Service Support and Service Delivery [24] [25].

III. EXPLORING THE IMPACT OF IT SERVICE MANAGEMENT

Jantti et al. highlighted how IT organizations globally have begun to take their service management processes to a higher level based on the adoption of best practice frameworks, like (ITIL). However, many of these companies have yet to demonstrate positive impact from the adoption of such as ITIL as a framework for ITSM [26]. This has stimulated the current investigation that addresses the questions: Has the IT service management process experienced any improvement? What are the factors that could be responsible for poor efficiency of ITSM?

The cardinal objective of this work is to capture the best practices of adopting ISMS frameworks and to identify the factors that will enhance the expected efficiency and improvement of ITSM. Some studies have highlighted the possible benefits of ITSM. For instance, Mauricio and Kolbe identified six benefits from its implementation, internal processes improvement, customer satisfaction, service quality improvement, processes standardization, efficiency increment, and improvement in return on investment (ROI) [27]. Organizations that have implemented ITIL in organizational change projects, have ultimately improved the quality of their services through better IT service management processes. In sum, modelling IT assets that form the IT business process has been identified as the key to IT service management improvement [28].

IV. RESEARCH METHODOLOGY

This exploratory research is a work in progress and is being conducted following the Design Science Research (DSR) methodology [29]. DSR is basically a methodology that encourages the researcher to understand the various aspects of the Information System (IS) being researched and the subsequent creation of new knowledge in the form of a theoretical model.

The steps involved in DSR are:

- Awareness of the problem (This was done through system literature review and conduction of an online survey)
- Suggestion (Adoption of an ISO based ISMS model to improve the efficiency of ITSM)
- Development (Design a framework for the implementation of ISO 27001 as an adopted ISMS model)

- Evaluation (Evaluation to be done using expert judgement)
- Conclusion

In the light of this, there will be two primary iterations, the first to understand the concepts of ITSM and ISMS. The second iteration involves focusing on the designing of a theoretical model [29]. The realization of the artefact of this research work is centered on precise problems, data quantification and a data gathering technique in the form of an online survey questionnaire sent to IT professionals in different financial institutions. Questions 2 - 9 of which inquire about the components of ITSM, while questions 10 - 32 the relevance of ISMS to its efficiency. Before the creation of the theoretical model, in financial Institutions, it is important that the components of ITSM and ISMS be defined.

V. COMPONENTS OF ITIL

As aforementioned, ITIL is one of the widely accepted ITSM frameworks that describes the best practices for managing IT services. It was developed in the early eighties by the Central Computer and Telecommunications Agency (CCTA) following a serious economic downturn, to reduce cost and to manage IT service delivery better. CCTA merged later with the Office of Government Commerce (OGC) and since then, ITIL has been constantly reviewed and updated by the OGC as a service management standard library dealing with information technology (IT). The current version is ITIL 2011, which aims at providing high quality IT services that focus more on the customer and effective IT governance than previously [30]. Most financial organizations have adopted the ITIL framework, because it provides a systematic way of managing their IT services which can enhance customer satisfaction at a much-reduced cost [31].

The life cycle stage of ITSM is the IT operation and maintenance, which is referred to as the “service operation” in ITIL. It functions basically to ensure the normal operation of daily business activities and handles all events and incidents that occur during the information system operations and maintenance process. ITIL service operation consists of five processes namely Incident Management, Problem Management, Event Management, Request Fulfilment, Access Management and four functions - Service Desk, Technical Management, IT Operations Management, and Application Management [32].

VI. ISO 27001 CONTROLS

ISO 27001 is structured into two divisions, which are: ISMS requirements and reference control objectives [33]. It

has 14 clauses and 35 domains which include 114 controls. Some of these controls will be focused on in this project, because they are detailed enough to form the basis for an ISMS that will lead to improvement in the efficiency of ITSM in financial Institutions.

Table 1 shows the ISO 27001 controls that will be referenced for this research.

TABLE I. SOME ISO CONTROLS AND THEIR RELEVANCE TO ITSM

S/N	Control No.	Control Statement	Relevance to ITSM
1	A.6.1.1	“All information security responsibilities shall be defined and allocated”	IT Access Management, IT Technical Management, IT Event Management
2	A.6.1.2	“Conflicting duties and areas of responsibility shall be segregated to reduce opportunities for unauthorized or unintentional modification or misuse of the organization’s assets”	IT Access Management, IT Technical Management, IT Event Management
3	A.7.2.2	“All employees of the organization and, where relevant, contractors shall receive appropriate awareness education and training and regular updates in organizational policies and procedures, as relevant for their job function”	IT Access Management, IT Technical Management, IT Event Management,

ISO 27001 is the most adopted ISMS standard that allows freedom in implementation. All the controls are classified into one of the following: Data, software, hardware, network and people. The classification of the controls help in evaluating the performance of the standard.

VII. CONCLUSION

The findings from related research and a conducted online survey have shown that financial organizations rely heavily on IT systems to create value for customers and to maximize IT service delivery. The management and adoption of relevant standards and best practice frameworks in the sector is a critical issue in the day to day management of IT services but has received limited attention. For this research, the adoption of an ISO driven ISMS based model that will bring about a change in the management of IT services and infrastructure is proposed. Further research and results from the survey will allow for the development of a theoretical model that it is anticipated will have a positive impact on the efficiency and offerings of ITSM.

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