

Business Model Ontology for Electronic Theses and Dissertations:

An explorative approach

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Abstract:

Objective:

Electronic Theses and Dissertations (ETDs) programs often encounter obstacles of technical, legal, financial and business nature. The existing literature provides valuable insight into each aspect, however a holistic view on these critical success factors is missing. To develop a multifaceted view of ETD programs, the concept of Business model (BM) can be used. BM helps to grasp a detailed understanding of business feasibility and viability, which entails a broad spectrum of key factors and features the business. The existing BM ontologies and frameworks however are often generic and do not match the specific context of ETDs programs. The purpose of this paper is to fill the gap and identify and empirically evaluate a BM ontology that corresponds to the peculiarities of the ETDs context.

Method: In this study a multi-method approach is chosen. First, by means of a systematic literature review, different ontologies and frameworks in the literature were reviewed. The findings were used as an input to conduct a series of interviewing with ETD program's managers around the world.

Findings: Based on the interviews, an ETD-specific BM ontology is proposed, which consists of eight key components, including users, financial aspect, governance, content providers, content, services, technology, and cooperation.

Keywords: Electronic Theses and Dissertations (ETDs), Content, Business Model, Information, Ontology.

INTRODUCTION

Electronic theses and dissertations (ETD) programs are recognized as an effective way to publish and make theses and dissertations (TDs) available – paid or free of charge – for various communities and users. The first ETD programs were launched in the early '90s (Soete 1998) and ever since numerous ETD programs has been launched at institutional, national, regional, and global levels (Rasuli, Alipour-Hafezi, and Solaimani 2015). Becoming more cost effective, while increasing accessibility, visibility, stability, and research impact are among the most important advantages of ETD programs (Ferrerias-Fernandez, et al. 2016). However, ETD programs encounter various issues from technical, legal, financial, and business viewpoint (Dobratz, and Schirmbacher 2001). The community has however studied the ETD programs by looking into technical topics such as data model, standards, interoperability, and software (Gonçalves, et al. 2001; Ivanović, Ivanović, and Surla 2012; Schöpfel, Zendulkova, and Fatemi 2014), legal themes including copyright, embargo, memorandum of understanding (MOU), and deposit law (Fineman 2003; Lippincott 2006; Gould 2016) and financial aspects of ETDs like costs, financial impact on publishers, and revenue streams (Fox, et al. 1997; Teper and Kraemer 2002; Fineman 2003); however, a holistic view on business in its entirety is relatively scarce.

Addressing business challenges, such as business feasibility and viability, in terms of commercialization potentials, market fit and future proof, extent of systems openness, and link between business and technical needs to name a few (Solaimani, 2014; Solaimani et al, 2018), may all be relevant for ETD programs in the context of open access, but relatively new to ETD communities. Arguably, linking ETD to business-oriented topics can be facilitated through Business Models thinking (Rasuli, Solaimani, and Alipour-Hafezi In press).

A business model describes the rationale behind – and the mechanism of – value creation and appropriation, while addressing various challenges that may hinder and trade-offs that may impact the creation and appropriation process. BM is defined as “*a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore we must consider which concepts and relationships allow a simplified description and representation of what value is provided to customers, how this is done and with which financial consequences*” (Osterwalder et al. 2005, p. 3). BM can be considered from three levels, i.e., ontology, taxonomy, and instance level (Osterwalder et al. 2005). At the top level, ontology includes key components of a business, the relationships in-between, and definitions. Taxonomy includes several types or meta-model types of BMs and instance level consists of real world BMs to conceptualize, represent, and describe a certain business in real world (Osterwalder et al. 2005).

As literature shows, designing a robust BM is included in critical success factors for managing ETD programs (Troman, Jacobs, and Copeland 2007; Rasuli, Solaimani, and Alipour-Hafezi, in press). Designing such robust BM in the instance level for ETD programs requires a proper ontology. To develop a ‘useful’ ontology, identification of key BM components is essential. Hamel (2001, p. 63) define the BM’s components, as simple as possible, as “*some parts that comprise the BM concept*”. According to Stewart and Zhao (2000), different components of a BM can conceptualize and simplify a certain business's logic. However, according to Rasuli, Alipour-Hafezi, and Solaimani (2018) current ontologies, which the most of them are generic, have some limitations to be applicable in content businesses, in particular ETDs context. This study aims to develop a BM ontology that is useful for the ETD specific needs. Such ontology may be helpful in developing new businesses related to content, analyzing and describing current businesses, and changing previous BMs.

METHODOLOGY

This study follows a qualitative approach, consisted of two phases. Since applying BM in the ETDs context is a new subject, designing ontology is a context-based process, and experts’ view is very important in this domain, qualitative approach was suitable to achieve research objective. In the first phase, several generic BM ontologies were identified through a systematic literature review (SLR) approach. BM related publications were selected by screening the titles, abstracts, and keywords, all retrieved from EBSCO Business Source Complete (EBSC), Web of Science, and Scopus.¹ In the first round of data selection, 15024 records from EBSC, 15200 from Scopus, and 4763 from WOS were retrieved. After removing duplicates and filtering the records based on a set of exclusion criteria (i.e., publication in English language, peer-reviewed, and relevance to research objective), 192 records were identified and fully read. From 192 records 64 unique BM

¹ To retrieve relevant literature, the query included ‘business model’ in title, abstract, and keywords.

ontologies, containing 3 to 12 key components each, were extracted. These components were used to feed the second phase, i.e., interviewing ETD programs' managers.

In total interviews with 10 national ETD programs' managers from different countries, including India, the UK, Canada, the US, Brazil, Iran, and South Africa, are conducted. The interviewees had different academic background, including management, library and information science, computer science, marketing, information systems, education, and commerce. The interviews took place between November 2015 and February 2016. The length of interviews was about 500 minutes on average, and all interviews were transcribed. To analyze the data coding software, namely MAXQDA (version 11) is used. Coding process followed the suggestions of Miles, Huberman, and Saldaña (2014), where they use two cycle for coding data: 'First Cycle Coding' and 'Second Cycle Coding' or 'Pattern Coding'. At the first cycle, some codes initially assigned to the data chunks. In this research, all these codes were descriptive, which are labels to data to summarize in a word or short phrase. The second cycle, pattern coding includes deriving even more general themes or categories through grouping those codes from the first cycle.

FINDINGS

Based on the analysis, eight recurring components are identified: users, financial aspect, governance, content providers, content, services, technology, and cooperation. Each component in the BM ontology has several sub-components. Figure 1 presents the key components and their subsets in a BM for providing digital information resources. As the figure shows, there are components related to technical, financial, and managerial, and other aspects. While there are research on some of these aspects in the ETD domain, but not all to gather something that BM can tackle.

Content is the main input or product of information-driven enterprises. There are different types of content, including TDs, articles, videos, and audio. ETD program should define the level of users' authorization (access to bibliographic information, abstracts, or full-text). The access domain includes local, national, regional, or global reach. A secure collection and infrastructure is important for content providers. The content should be organized, so that the users can access to a qualified collection. Moreover, an ETD program may add value to the content (such as, assign ontological keywords, standard abstract, subject tags, etc.). Content providers have a vital role in submitting their content. ETD programs should consider their needs, requirements, and types (e. g. private or public). Since viability of ETD programs, in particular at national level, is depended on contribution of content providers, signing Memorandum of Understanding (MoU) with them is one of the main activities of ETD programs. Such a MoU should address the needs and requirements of the content providers as well as the ETD programs.

Users of ETD program include students, freelancer researchers, faculty members, policy makers, industry and business owners, with different needs and requirements, attitudes, and backgrounds. There are cultural differences between different contexts (for example, different countries, different education systems, etc.) that should be considered. Another key component is financial aspect of ETD, which includes funds and incomes, costs, and pricing. The most of national ETD programs are supported by public funds that often are allocated to fixed costs such as staff wages, maintenance. However, some programs may have income from content and services; for example, they can cooperate with plagiarism checker software, involve in developing analytical dashboards for institutions and policy-makers, and other information services for their users. Therefore, pricing content and services is important for programs that have their own income.

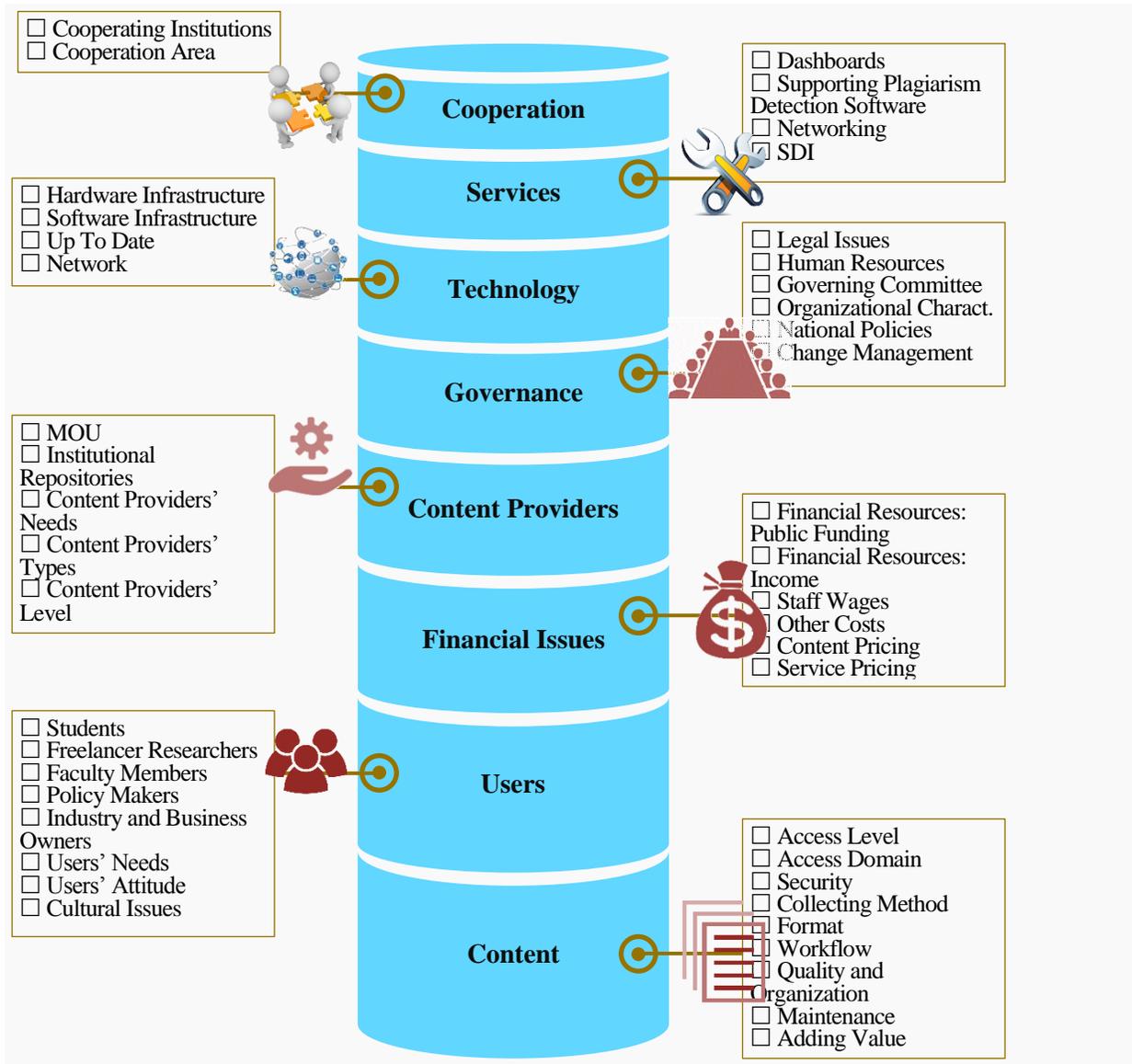


Figure 1. BMs' key components and their subsets for content provision

ETD program needs a governance committee to manage financial, cultural, organizational, and structural issues related to the program. The first topic to focus on is the programs' mission, goals, and strategic plan. Accomplishment of a program's mission(s) is dependent on human resources who must be skillful in their jobs to indexing, abstracting, system maintenance, etc. Furthermore, national policies and regulations have significant role on governing the program. For example, deposit law, public or private funding of academic institutions, labor law, etc. A broadly recognized aspect of ETD is technology, which is related to software, hardware and network infrastructure. All the equipment and software should be up to date. To address users' (changing) needs, ETD programs may design and perform several services, such as dashboard to monitor usage of TDs, supporting plagiarism detection software, developing networks among authors and documents, and selective dissemination of information (SDI). Finally, ETD programs need to cooperate with other institutions. Two important matters in this regard are the institutions that want to cooperate and the area of cooperation. For example, an ETD program

may outsource the digitization of archival TDs. Note that due to lack of space the references are not included in the foregoing description of findings.

CONCLUSIONS

The ETD programs are one of the most efficient channels to deliver TDs, which contain valuable content for society in general and academic communities in specific. There are many efforts for developing and maintaining ETD programs at institutional, national, regional, and global levels. One of the main concerns about these programs is business viability, which ensures a sustainable ETD programs. For establishing a viable ETD program, the business aspects of ETD programs should be stressed (Rasuli, Alipour-Hafezi, and Solaimani 2018). To do so, this study argues that the ETD programs need to outline a well thought out BM prior to digging into technicalities and implementation. Having said that, the BM should address the specific needs of ETD programs. A BM ontology that zooms in on the ETD context is however lacking in the literature. By means of systematic literature review and expert interviews, an ETD specific BM framework is proposed that help the ETD scholars further the discussion on ETD business viability and feasibility, while helping the practitioners and professionals to meticulously prepare the ETD program in terms of sustainability and commercialization, before jumping to implementation challenges. The external validity of the proposed BM ontology remains a weak spot of this study; a topic that future research can focus on by looking into the frameworks' applicability and whether the framework indeed leads to long-lasting ETD programs.

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