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Innovation and Transformation of Service Business Models through Cloud Technology to Achieve Co-Creation Value within the Service Ecosystem

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Abstract

The primary purpose of this study is to use the principles of service science as a foundation approach to provide a path for innovation and transformation service business models (SBMs) through the power of cloud technology within the service ecosystem. In addition, this research, contributes to improve the understanding for the business dynamics behind this transformation in such a way that to explain the processes for GDL to transition to SDL business innovation models. Moreover, this paper seeks to answer the question that how cloud to create value in the context of SBMs within the service ecosystem? This paper is one of the first attempts to integrate these disciplines, so that it offers an original contribution by propose the novel trend in the form of a path with 5 steps for SBMs innovation and transformation and also co-create value. This research has a qualitative approach to seek to answer the research questions that has been adopted based on Kitchenham *et al.* (2009) seven steps guidelines for conducting a systematic literature review. This paper is the first systematic reviews on the business models that is supported through cloud technology so that conducted using the 45 research articles shortlisted were discussed and analyzed and finally on that basis, a path with 5 steps is provided to answer the research questions. Moreover, this study provides insights to SMEs, ICT vendors, service providers and government agencies to align the business models with cloud services for the most benefits. It also to act as a guide for practitioners to seek and apply such models in their business in order to produce smart solutions that can provision even smarter services.

Keywords

Cloud, Service, Ecosystem, Business Model, Innovation, Value,

Transformation

1. Introduction

In the future physical, digital and virtual business model ecosystems, become integrated and this will investable open up to new multi business model potential but also require that businesses operate and innovate their multitudes of BM's differently [1]. In such complex situations, having the right business models for businesses will be essential to perform well with long-term sustainability. In this regard, the transformation of old-line organizations to service innovation is one of the most important trends of our time and in the future. On the other hand, service ecosystems could not sustain without the proper use of technology specifically ICT, which determine most of the quality in modern and digital service interactions [2]. Considering all of the above and also given the importance of cloud technology themes, we have provided an approach to face these challenges. We use the principles of service science as a foundation approach to provide a path for innovation and transformation service business models (SBMs) through the power of cloud technology within the Service Ecosystem. In addition, we seek to answer the question that how cloud to create value in the context of SBMs within the Service Ecosystem? Moreover, we provide a novel trend in the form of a path with 5 steps for SBMs innovation and transformation that is useful as an execution plan for the companies that to intent to achieve competitive advantage and be on top in such complex situations. Since, cloud's capabilities to generate new business models and promote sustainable competitive advantage [3], also the uptake of cloud does not only affect the vendors' business models but also the other actors in the business ecosystem [4]. The advent of cloud computing as the new infrastructure underlying the global economy will reopen and transform key issues that will shape the global economy for years to come [5]. Forrester Research's forecast is promising a growth of cloud industry from US $40.7 billion in 2011 to $159.3 billion in 2020 [6]. Cloud providers and their software-as-a-service, offerings making cloud technology an increasingly important platform for business services innovation [7]. Cloud technology breaks up the traditional value chain of IT provisioning and leads to new roles of market players acting in the ecosystem [8]. It boasts attractive properties such as agility, scalability, pay-per-use and cost efficiency [9]. Cloud technology offers a service model on the premise that the consumer has at its disposal the means for manipulating information, over the internet, according to its current needs [10]. The rest of the paper is arranged as follows. First, in section A, a literature review of research area and central concepts provides. Second, in section B, we provide a research methodology for the data collection based on the [11] seven steps guidelines for conducting a systematic literature review and then in section C, we present a path for transformation service business models

(SBMs) through the power of cloud technology within the service ecosystem. Finally, in sections D and E we provide the conclusion and limitations and future works.

2. Research Area and Central Concepts

2.1. Service Ecosystem

As [12] mentioned Service Ecosystems, as emergent structures actors create and recreate through their effectual actions and which offer an organizing logic for the actors to exchange service and co-create value. The service Ecosystem, provides a platform for bilateral or multilateral actor engagement that ultimately joins networks together when individual actors connect with each other [13].

2.2. Cloud Technology

Cloud technology is a recent and significant trend in (ICT) usage paradigm [14]. Cloud computing technology is regarded as a highly useful application for organization due to advantages such as long-term cost saving, easy access of data at any given time and economically [15].

Cloud-based solutions give businesses and users easy access to massive computing power at negligible costs [16]. Cloud computing is a pay-per-use consumption and delivery model that enables real-time delivery of configurable computing resources (for example, networks, servers, storage, applications, services). Typically, these are highly scalable resources delivered over the Internet to multiple companies, which pay only for what they use [3].

2.2.1. Cloud Services Models

Services offered by cloud computing can be classified into three types. 1) Infrastructure as a Service (IaaS): The basic units of computing power and storage are cloud-based and available on demand. 2) Platform as a Service (PaaS): The service provider offers an integrated solution stack for creating and deploying applications from the cloud (e.g., Salesforce, Google App Engine, and Microsoft Azure). 3) Software as a Service (SaaS): Users access the applications centrally hosted in the cloud using a thin client (such as a web browser or a mobile application) instead of installing software on their own computers. (e.g., SalesForce CRM) [17].

2.2.2. Cloud Deployment Models

1) Private Cloud: The Cloud infrastructure is operated solely for an organization. 2) Public Cloud: The Cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling Cloud services. 3) Hybrid Cloud: The Cloud infrastructure is a composition of two or more Clouds that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability [17].

3. Research Methodology

This part of the paper aims to guide the reader into the methodology process applied with the intention of gaining understanding for each fraction of the research and information follow-up till the final sector. This research has a qualitative approach which means that qualitative data needs to be collected. This method is commonly used and can grant researchers a detailed understanding when a social process or an event is complex and hard to revise with quantitative methods [18]. We adopt seven steps for conducting a systematic literature review based on Kitchenham *et al.* (2009). They have offered seven steps guidelines the following [11].

3.1. Research Questions

The first step of the research process is to identify the research questions. The authors have tried to compose research questions based on previous knowledge and after research knowledge of SBMs and cloud Technology in service ecosystem and papers. The questions of this literature review study are as follows:

RQ1. How cloud technology, impact on business ecosystem?

RQ2. How cloud technology, impact on business models?

RQ3. How cloud technology, can transition GDL to SDL business innovation models?

RQ4. How cloud technology, can transform service business models?

RQ5. How cloud technology, can create value in service ecosystem?

3.2. Search Process

In this step, the search process spans across several electronic sources and uses a manual search strategy. The authors found various resources, including articles, reports, cases, thesis and conference papers from online resource databases such as: Diva-Portal, Emerald Insight, SAGE Journals, LIBRIS, Science direct, Scopus, Springer Link and Google Scholar. Those resources are helpful for the purpose of collecting relevant previous research, which is collected through detailed research using key words: Cloud, Service, Ecosystem, Business Model, Innovation, Value, Transformation.

3.3. Search Criteria

In this step, we use a search criterion that looks for a combination of keyword and the word cloud in either the abstract or keyword. Inclusion criteria was all articles that fulfill search criteria and exclusion criteria was non-peer-reviewed, duplicate and inaccessible articles.

3.4. Quality Assessment

In this step, we used the quality assessment criterion (QAC) in selection of an article for review, on the based that an article is deemed to have passed the QAC if it pertains to an application of a cloud to a business aspect of service ecosys-

tem. As a result 53 articles are short-listed at the end of QA.

3.5. Data Collection

In this step, we downloaded the 53 articles identified at the end of QA process and recorded the journal/conference names, author name, year of publication, keywords and the abstract.

3.6. Data Analysis

In this step, we examine the research contents of the 53 articles so that it subsequently is developed used in answering the research questions.

3.7. Deviations from protocol

In this step, we eliminated 10 articles due to the lack of adequate relevance with the research questions and consequently we set the final 43 articles (See Table 1). After surveying a vast array of available publications on basis of the previous steps and also after completing the collection of relevant theories and models, it is used in order to set a novel trend for achieving to the research purposes. In this way, we present a path in section C for transformation of service business models through the power of cloud in service ecosystem for organizations that to intent to be successful in this transformation also in innovation and co create value. This chart is a process flow with consecutive steps that is presented in the Figure 1.

Table 1. Research papers in the context of current research questions.

	Title	Journal/Book/Conference	key words	Authors
1	Advanced Business Model Innovation Supported by Artificial Intelligence and Deep Learning.	*Wireless Personal Communications.*	Innovation. Business Model.	Valter *et al.* (2018).
2	Value Co-Creation and Proposition in Service Business Models and Eco-Systems: Interactions, Perspectives, Roles.	*Master Dissertation.*	Eco-Systems Business Model.	Tosic and Bhatty, (2014).
3	How cloud computing enables process and business model innovation.	*Stratgy and leadership.*	Cloud. Innovation.	Berman *et al.* (2012)
4	The shift to Cloud Computing: The impact of disruptive technology on the enterprise software business ecosystem.	*Technological Forecasting and Social Change,*	Cloud. Ecosystem.	Nieuwenhuis *et al.* (2018).
5	Cloud Computing: From Scarcity to Abundance.	*Journal of Industry, Competition and Trade.*	Cloud.	Kushida *et al.* (2015).
6	Synergy Research Group.	*A strategic partner of Tele Geography.*	Cloud.	(2018).
7	Cloud-based business services innovation: A risk management model.	*International Journal of Information management.*	Cloud. Service. Innovation.	Ali *et al.* (2017).
8	A Revised Model of the Cloud Computing Ecosystem.	*International Conference.*	Cloud. Ecosystem.	Floerecke. and Lehner, (2016).
9	Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors.	*Information and Management.*	Cloud. Service.	Oliveira *et al.* (2014).
10	Key Issues for the Successful Adoption of Cloud Computing.	*Procedia Computer Science.*	Cloud.	Branco *et al.* (2017).

Continued

11	Service innovation: A Service—Dominant Logic Perspective.	*MIS Quarterly.*	Service. Innovation.	Lusch, and Nambisan, (2015)
12	Actor engagement as a micro foundation for value co-creation.	*Journal of Business Research.*	value.	Storbacka, *et al.* (2016).
13	Cloud Computing: Business Perspectives, Benefits and Challenges for Small and Medium Enterprises (Case of Latvia).	*Procedia Engineering.*	Cloud. Business.	Vasiljeva *et al.* (2017).
14	Review on Cloud Computing Acceptance Factors.	*Procedia Computer Science.*	Cloud.	Amron *et al.* (2017).
15	Understanding the determinants of cloud computing adoption.	*Industrial Management and Data Systems.*	Cloud.	Low*et al.* (2011).
16	A QOS-oriented inter-cloud federation framework.	*IEEE Conference.*	Cloud.	Salam and Shawish, (2014).
17	Cloud as a Service: Understanding the Service Innovation Ecosystem.	*Apress publisher (book).*	Cloud. Service.	Castro-Leon and Harmon, (2016).
18	A service science perspective on business model innovation.	*Industrial Marketing Management.*	Business Model.	Magilo and Spohrer, (2013).
19	Towards a service-based business model—Key aspects for future.	*European Management Journal.*	Service.	Kindstrom, (2010).
20	Expanding understanding of service exchange and value co-creation: a social construction approach.	*Journal of the Academy of Marketing Science.*	Value.	Edvardsson *et al.* (2011).
21	Public organizations flying in the cloud: A case study of cloud computing value creation in Moldova central public administration.	*Master Dissertation.*	Cloud. Value.	Abeywickrama and Rosca, (2015).
22	The Business Model Ecosystem.	*Journal of Multi Business Model Innovation and Technology.*	Ecosystem. Business Model.	Lindgren, (2016).
23	Innovative companies and cloud computing.	*Zero-In e Magazine.*	Cloud. Innovation.	Edlund, (2010).
24	Impact study of Cloud Computing on Business development.	*Operations Research and Applications Journal.*	Business. Cloud.	Devasena, (2014).
25	The Impact of Cloud Computing on Entrepreneurship and Start-ups: Case of Greece.	*Master Dissertation.*	Cloud.	Gkikas.
26	Cloud computing as a facilitator of SME entrepreneurship.	*Technology Analysis and Strategic Management.*	Cloud.	Ross and Blumenstein, (2015).
27	The development that leads to the Cloud Computing Business Framework.	*International Journal of Information Management.*	Cloud. Business.	Chang *et al.* (2013).
28	Cloud Computing Beyond the Obvious: An Approach for Innovation.	*Part of the book series* (*CCIS*).	Innovation. Cloud.	Verstraete, (2014).
29	Cloud computing concept in Ukraine: a study of innovative development.	*Economic Annals-XXI.*	Cloud Innovation.	Kaminsky *et al.* (2017).
30	Cloud computing—The business perspective.	*Decision Support Systems.*	Cloud. Business.	Marston *et al.* (2011).
31	Transition to the Cloud: A Vendor Perspective.	*International Conference.*	Cloud.	Hedman and Xiao, (2016).
32	Representing Service Business Models with the Service Business Model Canvas—The Case of a Mobile Payment Service in the Retail Industry.	*International conference.*	Service. Business Model.	Zolnowski *et al.* (2014).

Continued

33	Customer value co-creation: a conceptual measurement model in a Service Dominant Logic perspective.	*Naples Forum on Service.*	Service. Value.	Tommasetti *et al.* (2015).
34	Value Co-Creation as Precondition for the Development of a Service Business Model Canvas.	*Negotia Journal.*	Business Model. Value.	Daxböck, (2013).
35	The service system is the basic abstraction of service science.	*Information Systems and e-Business Management.*	Service.	Maglio *et al.* (2009).
36	How Service Innovation Contributes to Co-Create Value in Service Networks.	*International Conference.*	Value.	Ciasullo *et al.* (2016).
37	The business value of cloud computing: The partnering agility perspective.	*Industrial Management and Data Systems.*	Value.	Liu *et al.* (2016).
38	Inter-organizational innovation and cloud computing.	*Electronic Commerce Research.*	Cloud. Innovation.	Loukis *et al.* (2017).
39	Business view of cloud: Decisions, models and opportunities—a classification and review of research.	*Management Research Review.*	Cloud.	Karunakaran *et al.* (2015).
40	An end-to-end framework for context-aware business process outsourcing to the cloud.	*Computers and Electrical Engineering.*	Cloud. Business.	Rekik *et al.* (2017).
41	The role of technology and institutions in tourism service ecosystems: Findings from a case study.	*The TQM Journal.*	Service. Ecosystems.	Barile *et al.* (2017).
42	Cloud manufacturing, a critical review of recent development and future trends.	*International Journal of Computer Integrated Manufacturing.*	Cloud.	Adamson *et al.* (2017).
43	Establishing User-centric Cloud Service Registries.	*Future Generation Computer Systems.*	Cloud. Service.	Slawik *et al.* (2018).

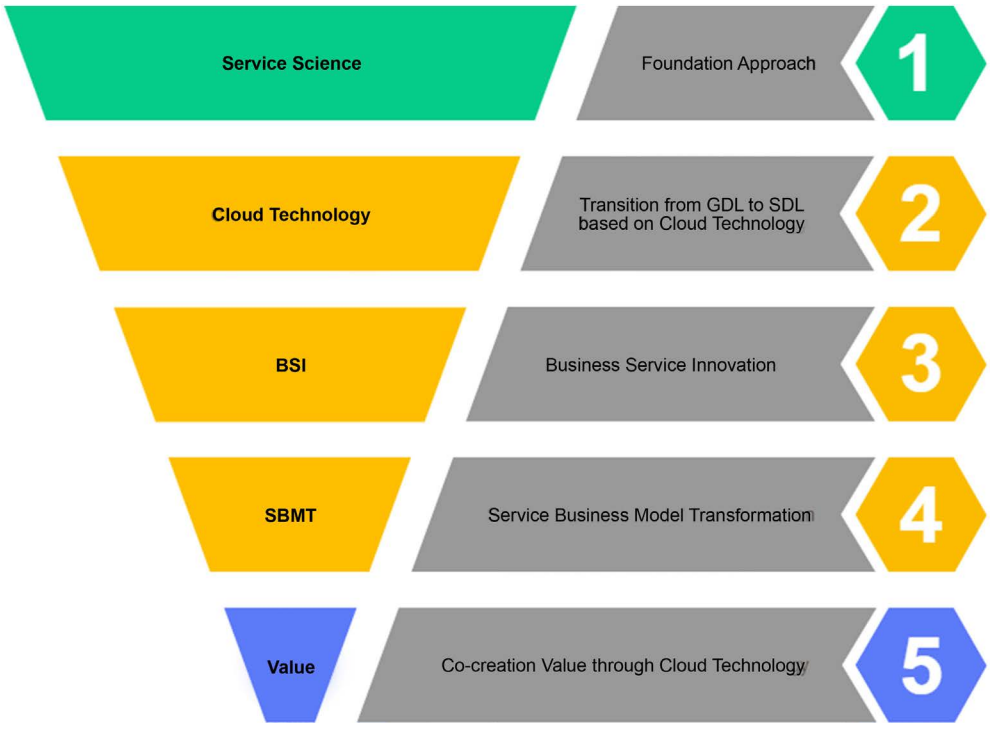

Figure 1. The proposed path to transform service business models and Co-create value through the cloud Technology.

4. The Necessary Steps for Transformation SBMs to Create Value through Cloud within the Service Ecosystem

Step 1. Service science as a foundation approach

Service Science, merges technology with an understanding of business management to develop and apply tools to address business problems and create market opportunities, as well as how service systems interact and evolve to co-create value [19]. Service Science (SS) is the study of service systems and the co-creation of value within complex configurations of resources. (SS) aims to explain and improve interactions in which multiple entities work together to achieve win-win outcomes or mutual benefits. There are four basic principles of SS to value creation in the context of business model innovation (BMI): 1) Service System dynamically configure four types of resources (people, technologies, organizations, information). 2) Service System, compute value given the concerns of multiple stakeholders. 3) The access rights associated with entity resources are reconfigured by mutually agreed to value propositions. 4) Service System, coordinate actions with others through symbolic processes of communicating [20].

Step 2. Cloud-based transition GDL to SDL

The goods-dominant logic (GDL) and the services-dominant logic (SDL) are conceptual paradigms as the primary lens by which organizations analyze, understand and interact with their business ecosystems from a service innovation and value co-creation perspective. The Services-dominant logic (SDL) is a Service Business Model has recognized as a foundation for sense making in complex networked systems and service economies [19].

The transition from a pure product business model to service-oriented business models is to increase competitive advantage by developing novel value propositions and opening new markets [21]. Service development from a SDL perspective requires methods that can grasp not only resources but also the activities and interactions during value co-creation [22] and also it to increases customer engagement and offers new opportunities for co-creation of value [19].

Cloud are engaged in a service transition process that might result in full transformation to a world-class provider of innovative service solutions [19]. The CC paradigm enables the provision of IT resources as services (not as products) available remotely via the Internet. This approach highlights one of the main characteristics of Cloud Computing which are dynamic resource accessibility and massive scalability [23].

Step 3. Cloud-based Services Business Models Innovation

As [19] mentioned, cloud-based service innovation, would not be possible without the ability to collect, analyze, and leverage information from customers and other actors in the service ecosystem. Cloud providers offerings making cloud technology an increasingly important platform for business services innovation [7]. Businesses should expect to be able to build competence and thereby be capable in the future to innovated BM's and operate BM's in new types busi-

ness model Ecosystems (BMES) [24]. To maintain a competitive advantage through innovation, companies of today must handle increasingly dynamic environments and increasingly rapid innovation cycles. Cloud computing is addressing many of these challenges, especially the possibility of rapid and cost-efficient prototyping and scaling [25]. Adopting cloud, allows the customer to focus on deploying more applications, new projects and innovation [26]. Cloud technology increases IT flexibility and helps focusing on core businesses so that it accelerates innovation [27]. In addition, cloud is providing greater access to global markets and supporting collaboration and innovation in an increasingly connected world [28].

Step 4. Cloud-based Service Business Models Transformation

As mentioned Service transformation processes for GDL organizations to transition to SDL business models needed to operate in cloud space [19]. Extensive work has been carried out on investigating business models empowered by cloud technologies [29]. The combination of cloud computing, mobility, social media and big data is fundamentally transforming our lives and our way of doing business [30]. The concept of cloud computing is not only technological innovation in IT but also a way to create new business models when small manufacturers of IT products have an opportunity to quickly offer the market their services and realize their business ideas [31].

Cloud computing technology is regarded as a highly useful application for organization due to advantages such as long-term cost saving, easy access of data at any given time and economically [15]. Cloud technology represents a major trend in information technology through business agility whereby IT can be used as a competitive that respond in real time to user requirements [32]. To take advantage of the cloud's potential to transform internal operations, customer relationships and industry value chains, organizations need to determine how best to employ cloud-enabled business models that promote significant and sustainable competitive advantage [3]. Cloud has triggered a major paradigm change in the way that services are offered to customers. with service infusion through cloud, the traditional way of delivering software to the end customers is changing [33].

Step 5. Cloud-based Co-Create Value in SBM

The service ecosystem is the core asset of the cloud service platform and data analytics is the service ecosystem's digital health monitor that ensures the platform is running properly, provides state-of-the-art services, develops market-leading value propositions, rates highly engaging user experiences and generates superior value [19]. The key to successful SBM is value co-creation. Value co-creation and resources integration applies to a SBM per the fundamental premises of SDL [34]. According to SDL the success of a value creation process depends on proper integration of resources [19]. As [35] in their work mentioned that value co-creation activities offers businesses a tool for better management of the process itself. SBM tends to be more complex because of the val-

ue co-creation focus. Thus companies should facilitate collaborative value co-creation by setting supporting infrastructure for customer integration process [36]. Value creation in context of BM has emerged from networked markets in the ICT revolution [2].

For organizations moving to the cloud has a more economic value due to cost savings that result from hardware and software non-acquisition [23]. Actors co-create value within a service ecosystem for arriving at mutually beneficial outcomes [37]. Cloud-based platforms can function as multisided intermediaries for communications that enable actors to engage other actors in resource integration for value co-creation [19]. ICT solutions (such as cloud), are able to recombine the existing resources and design a new value proposition in service networks [38]. Cloud infrastructure flexibility has a positive effect on partnering agility and the flexibility-related and integration-related features of cloud computing can create value for firms by facilitating inter-firm collaboration in exploiting business opportunities [39].

5. Conclusion

Two important and widely debated trends in the modern economy are the gradual shift of firms from the closed internal innovation paradigm towards the open inter-organizational innovation paradigm and also the emergence of cloud computing as a new more efficient paradigm of business computing [40]. In addition to taking into consideration the fact that the transformation of old-line organizations to service innovation is one of the most important trends of our time and in the future. In such complex situations, having the right business models for businesses will be essential to perform well with long-term sustainability. In this regard, we present a path for innovation and transformation of service business models through the power of cloud in service ecosystem for organizations that to intent to be successful in this transformation. We in this study through the theoretical lens of service science and service ecosystem and with conducting a systematic review with using key words included (ecosystem, service, model, cloud, Innovation, business and value), we were able to analyze the relationship between cloud technology and business models innovation and transformation. We found that, as [2] indicated, this transformation is enabled by ICT, most notably the cloud technology. Our findings are consistent with results of [41] found that, cloud computing offers solutions spread across the wide-spectrum of information technologies and hence will consolidate its position as a viable model in the years to come, also Similarly, [42] stated that cloud computing offers multiple advantages to (SME) that these advantages motivate several enterprises to consider outsourcing their applications (business processes) to this emerging computing environment. As [43] findings reveal that usage of technology in the field of tourism, can adjusting the tourism service ecosystem. Our study emphasizes the consequences of adopting cloud technology in business organizations and explain how it affects business models innovation and

also to investigate the different roles of cloud computing in value creation within the service ecosystem. As [44] stated that, proactive companies searching methods to continuously improve the quality of their manufacturing solutions and looking for cloud-based technologies for accelerating their performances. Also [4] mentioned that the uptake of cloud does not only affect the vendors' business models but also the other actors in the business ecosystem. According to [45], when enterprises contract and consume cloud services, these services need to be assessed by matching them against business requirements and then the best service has to be selected. Hence, in this way, we have provided a path with 5 steps as guidelines (**Figure 1**) that can offer BM high technology innovators in order to produce smart solutions that can provision even smarter services and will support business to realize their business ideas. This path could be helpful for companies that to intent for redesign their core business processes and to run their businesses with cloud as an enhanced technology. Finally, as a suggestion, as indicated by [31], public support for cloud computing along with investments in young companies will quickly create an ecosystem of innovative productions.

6. Limitation of the Research and Future Works

Given the fact that the transformation of old-line organizations to service innovation is one of the most important trends of our time and in the future and also given the importance of cloud technology themes, we present a path for innovation and transformation of service business models through the power of cloud in service ecosystem for organizations that to intent to be successful in this transformation. There are two limitations in this study which should be addressed by future research. First, we have not looked into negative factors that may deter the adoption of cloud computing services. Some such factors include security, trust and privacy always remain challenges for organizations that adopt cloud technology, also concerns related to the threat to intellectual property. In addition our review is limited to academic articles and does not include industry reports. This study offer a reasonable ground for further research, aiming thorough investigation of factors driving the adoption of cloud-based services for businesses.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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