

The Relationship between the Cloud Computing Model and Information Technology Infrastructure Library (ITIL) from the Viewpoint of Experts*

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tional or personal conflicts of interest.

Abstract: Cloud Computing is widely recognized as a recent computing paradigm of digital transformation, in which scalable and elastic computational resources are delivered as a service through internet technologies. Understanding the impacts of the Cloud model on how companies organize their processes is essential. This study aims to investigate the main impacts of the Cloud Computing model on the processes within the Information Technology Infrastructure Library (ITIL) framework. A systematic literature review (SLR) was conducted, whose results suggest that certain aspects may be underexplored in the traditional academic literature. Consequently, we conducted qualitative research using semi-structured interviews with ITIL-certified professionals from nine countries. This approach allowed us to collect valuable and in-depth insights, contributing to a better understanding of the subject. Our analysis of the SLR results indicates that several ITIL framework processes have been affected, which may lead to a re-evaluation of the framework. We identified benefits, constraints to innovation, and strategies for creating a sustainable environment when implementing these processes. The findings revealed a scarcity of studies on the relationship between Cloud Computing and ITIL. Perspectives from ITIL professionals provided useful insights into the benefits, constraints, impacts, and affected processes. This study may serve as a valuable resource for ITIL clients, decision-makers, and developers.

Keywords: Cloud Computing, Information Technology Infrastructure Library (ITIL), interviews.

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Relación entre el modelo de computación en la nube y la Biblioteca de Infraestructura de Tecnologías de la Información (ITIL) desde la perspectiva de expertos

Resumen: la computación en la nube es ampliamente reconocida como un paradigma emergente en el contexto de la transformación digital, en el cual los recursos computacionales escalables y flexibles se proporcionan como servicios mediante tecnologías basadas en internet. Comprender los impactos de este modelo en la organización de los procesos empresariales resulta fundamental. El presente estudio tiene como objetivo analizar los principales efectos del modelo de computación en la nube sobre los procesos definidos en el marco de la Biblioteca de Infraestructura de Tecnologías de la Información (ITIL, por sus siglas en inglés). Para ello, se llevó a cabo una revisión sistemática de la literatura, cuyos resultados indican que ciertos aspectos han sido escasamente abordados en la literatura académica tradicional. En respuesta a esta limitación, se desarrolló una investigación cualitativa basada en entrevistas semiestructuradas a profesionales certificados en ITIL provenientes de nueve países. Esta metodología permitió obtener aportes valiosos y en profundidad, lo que contribuyó a una comprensión más integral del fenómeno. El análisis de los resultados de la revisión de literatura revela que múltiples procesos contemplados en el marco ITIL se han visto afectados, lo que podría justificar una reevaluación del mismo. Se identificaron beneficios, restricciones a la innovación y estrategias para fomentar un entorno sostenible durante la implementación de dichos procesos. Asimismo, los hallazgos evidencian una escasez de estudios que exploren la relación entre computación en la nube e ITIL. Las perspectivas de los profesionales entrevistados ofrecieron conocimientos significativos sobre los beneficios, limitaciones, impactos y procesos involucrados. Este estudio puede constituirse en un recurso valioso para clientes, tomadores de decisiones y desarrolladores que operan bajo el marco ITIL.

Palabras clave: computación en la nube, Biblioteca de Infraestructura de Tecnologías de la Información (ITIL), entrevistas.

A relação entre o modelo de computação em nuvem e a Information Technology Infrastructure Library (ITIL) do ponto de vista dos especialistas

Resumo: A computação em nuvem é amplamente reconhecida como um paradigma computacional emergente no contexto da transformação digital, no qual recursos computacionais escaláveis e elásticos são entregues como um serviço por meio de tecnologias da internet. Entender os impactos do modelo de computação em nuvem na forma como as empresas organizam seus processos é essencial. Este estudo tem como objetivo investigar os principais impactos desse modelo nos processos no âmbito da Information Technology Infrastructure Library (ITIL). Foi realizada uma revisão sistemática da literatura, cujos resultados sugerem que certos aspectos foram escassamente abordados na literatura acadêmica tradicional. Consequentemente, realizamos uma pesquisa qualitativa por meio de entrevistas semiestructuradas com profissionais certificados em ITIL de nove países. Essa abordagem nos permitiu coletar insights valiosos e aprofundados, contribuindo para uma melhor compreensão do assunto. Nossa análise dos resultados da revisão indica que vários processos do framework ITIL foram afetados, o que pode levar à sua reavaliação. Identificamos benefícios, restrições à inovação e estratégias para criar um ambiente sustentável ao implementar esses processos. Os resultados revelaram uma escassez de estudos sobre a relação entre computação em nuvem e ITIL. As perspectivas dos profissionais da ITIL forneceram informações úteis sobre os benefícios, restrições, impactos e processos afetados. Este estudo pode servir como um recurso valioso para clientes, tomadores de decisão e desenvolvedores.

Palavras-chave: computação em nuvem, Information Technology Infrastructure Library (ITIL), entrevistas.

Introduction

Digital transformation has provided new opportunities for organizations and led to evident improvements in the way they structure the delivery of their services (Benavides *et al.*, 2020; Chantias & Hess, 2016; Karkošková, 2018). Cloud Computing (CC) has emerged as a major technological trend in recent years, capturing the attention of both IT professionals and researchers (Branco *et al.*, 2019). Rather than being a standalone technology, CC represents a new paradigm of computing—a business model supported by innovative technologies that optimize how computational resources are provided (Karkošková, 2018; Zaman & Rani, 2022). This model aims to streamline the delivery and utilization of IT infrastructure, platforms, and applications as services offered over the Internet by IT providers.

CC is mainly characterized by its scalability and elasticity (Branco *et al.*, 2017; Goyal, 2014; Shetty & Panda, 2021), which enable organizations to adjust the amount of contracted computational resources or their deployment within the infrastructure, along with opportunities for cost reduction (Branco *et al.*, 2019; Shetty & Panda, 2021). Despite these advantages, there are challenges that need to be addressed in an organization's strategic planning to ensure that IT resources remain properly aligned with business objectives (Bailey & Becker, 2014). In this context, it is crucial to assess whether the Information Technology Infrastructure Library (ITIL) framework, as a widely recognized standard (Beckers *et al.*, 2013; Jansen, 2011; Karkošková, 2018), is, or should be, equipped to meet the specific requirements of the CC model. This alignment is essential to provide organizations with effective management of inherent risks and to maintain the quality standards expected.

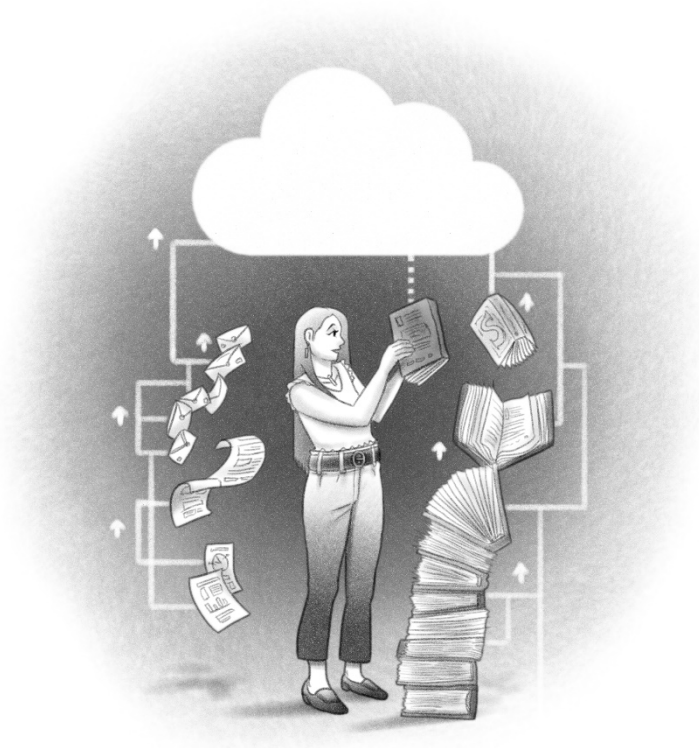
The main objective of this research is to analyze ITIL, as the most adopted IT framework worldwide, in order to understand whether its processes adequately address the specific characteristics of the CC model. The previous objective is then translated into the following research question: Is ITIL still appropriate to be applied in CC model context organizations?

To address this central question, the research further explores the following sub-questions:

1. What are the processes within ITIL that could be impacted by the characteristics of the CC model?
2. Should ITIL be reframed to accommodate the characteristics of the CC model?

To pursue the defined objective and answer the formulated research questions, a systematic literature review (SLR) was conducted, with its steps outlined in the following section. The SLR results indicate that certain aspects may remain unexplored in the traditional academic literature (Heininger, 2012; Karkošková, 2018; Wang *et al.*, 2021). Consequently, a qualitative research

approach using a semi-structured interviews methodology was employed, as it is a widely used technique (DiCicco-Bloom & Crabtree, 2006). The goal of this approach is to gather subjective insights from knowledgeable professionals. This methodology offers the flexibility to gather targeted research inputs as well as unexpected additional information, potentially enriching the current analysis and contributing to a more comprehensive understanding of the topic (Kallio *et al.*, 2016; McIntosh & Morse, 2015; Rabionet, 2011).



This article is structured as follows: the next section introduces the theoretical background necessary to understand the concepts of CC and ITIL. Following this, we conducted an SLR in order to provide a summary of the current knowledge on the topic. The subsequent section outlines the research methodology, including details on data collection and analysis. Finally, the conclusions are presented, highlighting theoretical and managerial implications, along with the study's limitations and suggestions for future research.

Theoretical background

This section defines the scope of the investigation, providing a clear overview of its main topics. It begins with a general introduction to the subject and CC. Next, it details the key studies

related to CC and ITIL. Finally, it presents information on a systematic literature review, along with a synthesis of the findings concerning CC and ITIL.

Cloud Computing (cc)

According to several authors, the definition of CC is formally explained by the National Institute of Standards and Technology (NIST) (Bounagui *et al.*, 2019; Jansen, 2011). NIST describes CC as a “model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Mell & Grance, 2011, p. 2) From a more practical perspective, CC can be defined as applications delivered as services over the internet, supported by systems software hosted in data centers that enable those services (Armbrust *et al.*, 2010).

Additionally, NIST outlines the key characteristics of CC (on-demand self-service, broad network access, resource pooling, and rapid elasticity), as well as the service models (software as a service, platform as a service, infrastructure as a service) and deployment models (private cloud, community cloud, public cloud, and hybrid cloud).

The service and deployment models of cloud

The service and deployment models of the cloud were also clearly defined by Mell and Grance (2011). Therefore, three main service models constitute this business model such as software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS). Using SaaS services, clients can operate on the applications of the provider under a cloud infrastructure, but do not usually detain the management or “control of the underlying cloud infrastructure” (Mell & Grance, 2011). Under PaaS services, the CSP allows its clients to have a development environment where they can manage, run or develop applications under the CSP support. With exception to the applications, clients do not usually detain the management or “control of the underlying cloud infrastructure” (Mell & Grance, 2011).

In the IaaS services, the CSP offers computational resources such as storage, networks, processing, and the client can run and deploy software. Although the client manages the “operating systems, storage, and deployed applications,” they do not usually detain the management or “control of the underlying cloud infrastructure” (Mell & Grance, 2011).

There are four existing deployment models in this context: private cloud, community, public, and hybrid, which can be, among other factors, categorized by ownership and accessibility. In the private cloud model, the infrastructure is exclusively used by a single organization, which may own

and manage it. In the community cloud model, the infrastructure is shared by a limited number of organizations and/or users, who may collectively own and manage it (Mell & Grance, 2011). In a public cloud, the public may use the infrastructure and is managed by "business, academic, or government organization" (Mell & Grance, 2011). The combination of at least two of the infrastructures above mentioned is designated as hybrid cloud. Through this deployment model, data and application mobility is possible between them (Mell & Grance, 2011).

Benefits and risks of the cc model

The cc model introduces several benefits and risks (Bounagui *et al.*, 2019; Chou, 2015; Taghavifard & Majidian, 2022). The main benefits of cc include accessibility, cost savings in IT, management of external security services, scalability, flexibility, handling of external IT management tasks, and enhanced mobility (Chou, 2015; Zaman & Rani, 2022). However, various significant risks are associated with cc, particularly concerning authentication, data security and privacy, integration with internal systems, system availability, business continuity, and ownership of content alongside other legal requirements (Chou, 2015). The main challenges that the cloud model brought are mainly caused by the lack of a proper cc governance approach regarding the control of cloud environments and risk mitigation (Bounagui *et al.*, 2019).

ITIL

Created by the British government in the late '80s, the ITIL framework provides a set of best practices that are widely accepted as the most popular approach for ITSM (Bailey & Becker, 2014). These best practices have been collected from both global public and private sector entities (Ahmad & Shamsudin, 2013). As a *de facto* standard for IT management processes, this set of best practices is particularly evident in operations and IT maintenance (Cardoso, Moreira, & Escudero, 2018). The primary objective of ITIL is to assist IT in delivering cost-effective services that align with business requirements, which are typically articulated through service level agreements (Iden & Eikebrokk, 2014). The most recent release of this framework, ITIL 4, was published by AXELOS in February 2019, reflecting the themes of the Fourth Industrial Revolution.

In this work, the focus will be on the ITIL v3 2011 edition. Table 1 presents the process groups and their elements (processes and functions).

Table 1. ITIL Process Groups.

Process group/books	Processes
Service strategy	Financial management, service portfolio management, business relationship management, demand management, strategy generation.

Process group/books	Processes
Service design	Service level management, availability management, capacity management, IT service continuity management, service catalog management, information security management, supplier management, design coordination, requirements engineering, data and information management.
Service transition	Change management, service asset & configuration management, release and deployment management, transition planning and support, service validation and testing change evaluation, knowledge management.
Service operation	Incident management, problem management, request fulfilment, access management, event management, technical management, IT operations management, applications management, service desk, operational activities in other lifecycle phases.
Continual service improvement	Service improvement, service measurement, service reporting.

Source: authors.

Almost every entry in the elements section is an operational process, except for those under the service strategy and the continual service improvement domains, which are classified as governance processes. In the context of the service operation domain, technical management, IT operations management, applications management, and service desk are recognized as functions. While a process is a structured set of activities designed to accomplish a specific objective," a function is described as "a team or group of people and the tools or other resources they use to carry out one or more processes or activities.

Related work

To obtain information in the scientific literature, an SLR was conducted following the guidelines of Kitchenham (2009), who defines it as a methodical and rigorous review of research results aimed at aggregating all existing evidence on a research question and supporting the development of evidence-based guidelines for practitioners. Below, the research questions:

1. RQ1: Which topics of ITIL processes applied to cloud-based environments are researched and published?
2. RQ2: What is the activity for SLR?

Table 2. Filtered list and results from repositories.

Research database	Keywords	1st filter: Full text	2nd filter: Abstract	3rd filter: Title	4th filter: Year > 2010	5th filter: English only
ACM	"ITIL" AND Cloud	282	22	1	1	1

Research database	Keywords	1st filter: Full text	2nd filter: Abstract	3rd filter: Title	4th filter: Year > 2010	5th filter: English only
EBSCO	"Information Technology Infrastructure Library" AND Cloud	92	7	1	1	1
	Total	374	29	2	2	2
	"ITIL" AND Cloud	1,541	41	7	7	1
	"Information Technology Infrastructure Library" AND Cloud	43	2	1	1	1
IEEE	Total	1,584	43	8	8	2
	"ITIL" AND Cloud	517	20	2	2	2
	"Information Technology Infrastructure Library" AND Cloud	147	19	0	0	0
	Total	664	39	2	2	2
Scopus	"ITIL" AND Cloud	861	60	11	11	10
	"Information Technology Infrastructure Library" AND Cloud	113	18	2	2	2
	Total	974	78	13	13	12
	"ITIL" AND Cloud	1,158	X	6	4	1
Springer	"Information Technology Infrastructure Library" AND Cloud	232	X	1	1	1
	Total	1,390	0	7	5	2
	"ITIL" AND Cloud	50	34	7	7	6
	"Information Technology Infrastructure Library" AND Cloud	21	15	2	2	2
WOS	Total	71	49	9	9	8
	Grand total	5,057	238	41	39	28

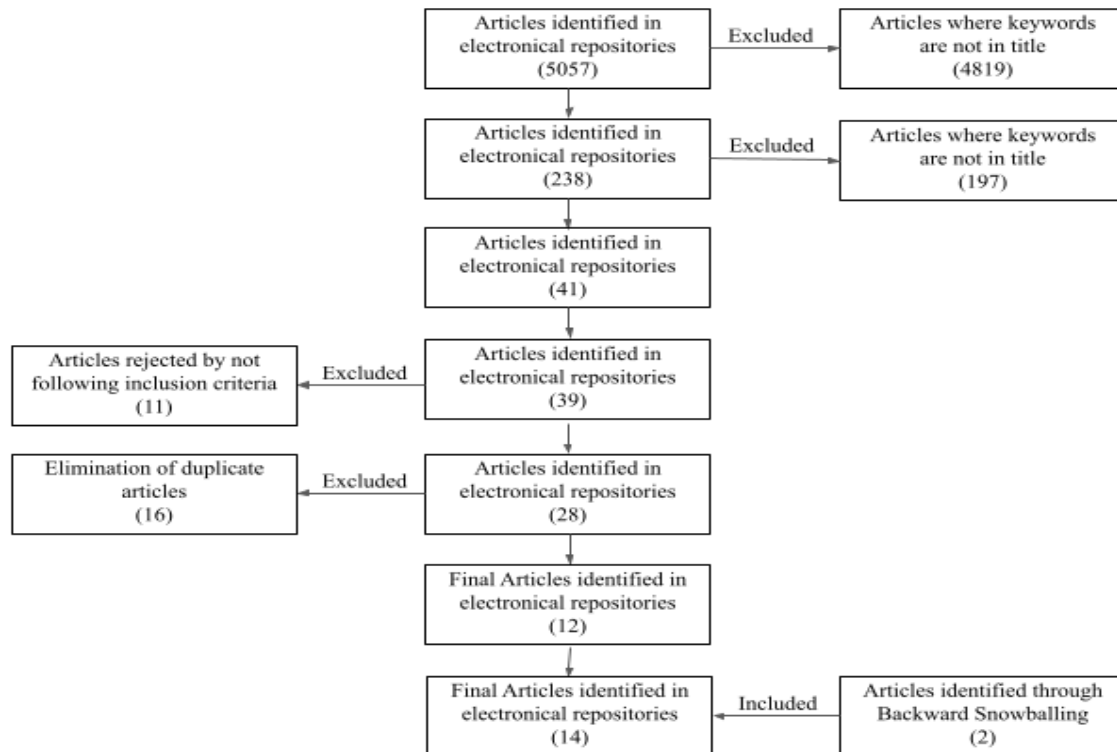
Source: authors.

In the first filter on table 3, keywords for each repository were entered, and a search was conducted using these keywords within the abstracts. The second filter applied the same logic to the titles of the documents. The third filter involved selecting only journal articles or conference proceedings published after 2010. In the fourth filter, only publications in English were considered. The fifth filter removed duplicate publications, and the final filter applied quality requirements based on the journal or conference ranking.

Due to the reduced number of articles identified in the electronic repositories, an additional step was incorporated into this process, which involved analyzing the references cited in the identified articles. Following the same criteria (filters and inclusion/exclusion criteria), six additional articles containing relevant information for this dissertation were discovered, with Google Scholar and ResearchGate being the repositories that yielded these results.

After conducting a thorough analysis of these 14 contributions, it was determined that 10 of these papers closely aligned with the defined criteria and will be analyzed in the following subchapters. The flow of filtration is illustrated in figure 1.

Figure 1. Flow of filtration process.



Source: authors.

Related work synthesis

From the SLR, although the number of relevant studies identified is not high, the contributions identified provide valuable insights on the studied subject. Therefore, it has been possible to identify some of the ITIL processes that can and/or should be adapted to the cloud context to attest to the importance of the ITIL guidance in the migration to the cloud. Moreover, it allowed us to

understand which and how the widely known cloud model characteristics may impact the ITIL processes (Fiegler *et al.*, 2016).

Some of the identified articles either propose an extension of ITIL to accommodate the characteristics of CC (Karkošková, 2018) or develop a framework to facilitate the transition to cloud-based services (Cardoso *et al.*, 2018). Other studies suggest that—due to the benefits and risks inherent in the cloud-based model—ITIL should be entirely reframed to mitigate these risks and better leverage the benefits to enhance organizational performance (Almourad & Hussain, 2014; Wang *et al.*, 2021).

Concerning the five essential characteristics of CC outlined by NIST (on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service), it is noted that three of them may significantly influence the implementation and operation of ITIL processes in practice (Fiegler *et al.*, 2016). Specifically, rapid elasticity may impact service operation processes, including incident, problem, and event management; resource pooling is likely to affect service transition processes such as change and configuration management; and on-demand self-service may influence the handling of service design processes, particularly in capacity and SLA management.

Table 3 indicates which are the main ITIL processes in which the CC model adoption will require more effort for organizations when compared to the traditional on premise model. It can be verified that service strategy is the most referred process impacted by the migration to the cloud.

Table 3. Final articles selected information.

Author	ITIL processes impact/focus	Type	DB
Fiegler <i>et al.</i> (2016)	Operation, transition, design	Conference proceeding	ACM
Mahalle <i>et al.</i> (2018)	Service operation	Journal article	EBSCO
Cardoso <i>et al.</i> (2018)	All processes	Journal article	ACM
Jansen (2011)	Strategy, design, transition, and operation	Journal article	Scopus
Karkošková (2018)	All processes	Journal article	ACM
López <i>et al.</i> (2018)	Service strategy, service design, service transition, service operation	Conference proceeding	Scopus
Wang <i>et al.</i> (2021)	All processes	Journal article	Scopus
Almourad and Hussain (2014)	Strategy	Journal article	Research Gate

Author	ITIL processes impact/focus	Type	DB
Miller <i>et al.</i> (2013)	Strategy	Journal article	Google Scholar

Source: authors.

Briefly, the SLR produced the expected results. These valuable inputs will serve as a foundation for conducting the subsequent semi-structured interviews aimed at gathering information about the ITIL processes most impacted by the characteristics of the CC model, as outlined in the following sections.

Research methodology

An SLR was conducted to achieve the defined objective and answer the formulated research questions. The results of the SLR suggest the existence of potentially unexplored information within the traditional academic literature (Heininger, 2012; Karkošková, 2018; Wang *et al.*, 2021). Consequently, qualitative research employing a semi-structured interview methodology was applied, as it is a widely utilized technique (DiCicco-Bloom & Crabtree, 2006). The aim of this approach was to gather subjective insights from knowledgeable professionals. This methodology offers the flexibility to collect both anticipated research inputs and unexpected information, which may enrich the current analysis and contribute to a more comprehensive understanding of the topic (Kallio *et al.*, 2016; McIntosh & Morse, 2015; Rabionet, 2011).

Data collection

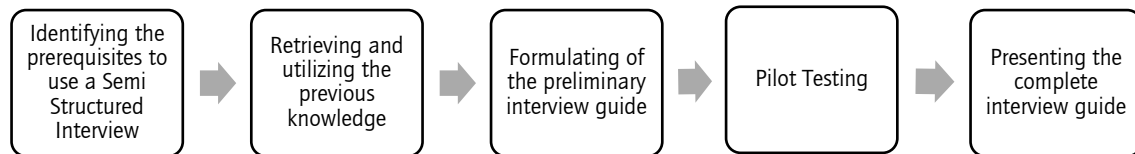
Semi-structured were held using Zoom or Microsoft Teams to record the sessions for further analysis. This technique serves as a valuable tool for gathering in-depth insights into participants' experiences (Creswell, 2013; Myers, 2013; Myers & Newman, 2007), as it combines the use of both specific and open-ended questions, thus providing the interviewer with the flexibility to probe deeper through follow-up questions (Hove & Anda, 2005; McIntosh & Morse, 2015).

The interviewees are proven experts in the field, with experience working closely in both traditional on-premise IT models and cloud-based models. Additionally, each interviewee holds a certification in the ITIL framework, with a minimum qualification of ITIL v3 (2007).

In the first phase, a profile analysis was conducted on LinkedIn to gather relevant candidates. The search terms used were "ITIL" and/or "Cloud." For the "ITIL" results, the analysis focused on whether the professionals had experience with cloud-based models, as indicated by their work experience or certifications. For the "Cloud" results, it was assessed whether the professionals held an ITIL certification, ranging from ITIL v3 (2007) to ITIL 4, including 'foundations,' 'expert,' or 'master'

levels. Some interviewees whose profiles met the above criteria were directly invited due to their recognition in the field for contributing ITIL framework 'white papers' or 'articles.' In the second phase, an interview guide was developed following the guidelines provided by McIntosh and Morse (2015), as shown in figure 2.

Figure 2. Main phases of the semi-structured interview guide.



Source: adapted from McIntosh and Morse (2015).

Each interview employed a combination of open and closed questions, allowing interviewees to share both their experiences and perspectives on the topics addressed in this dissertation (see Appendix A and B). This approach also enabled the interviewer to ask additional or follow-up questions to clarify or eliminate ambiguity, by rephrasing or breaking down questions into further sub-questions. Additionally, it allowed for the exploration of more in-depth responses on topics of particular relevance to the present study. The profile of interviewees is presented in table 4.

Table 4. Profile of the interviewees.

ID	Gender	Country	Job title	Years of experience	Industry sector	ITIL certifications
1	M	Portugal	Head of IT processes	22	Telco	ITIL V3 Foundation, ITIL Manager, ITIL Expert
2	M	Brazil	Consultant	14	IT	ITIL V3 Foundation, ITIL MALC, ITIL Capability (OSA, PPO, RCV, SOA), ITIL Expert
3	M	Kenya	Consultant, trainer	16	ICT	ITIL Expert, ITIL Practitioner, ITIL 4 Managing Professional Transition
4	M	USA	Head of service management	28	IT	ITIL Master
5	M	Brazil	Professor	25	Education	ITIL Foundations, ITIL Master
6	M	Bulgaria	Information security officer	15	IT	ITIL Foundations

ID	Gender	Country	Job title	Years of experience	Industry sector	ITIL certifications
7	M	Philippines	IT Director	20	Energy	ITIL v2 and v3 Foundations, ITIL v3 Foundation, ITIL Intermediate (OSA), ITIL 4 Foundations
8	M	Denmark	Process architect	35	Transport	ITIL Master
9	M	Portugal	Project manager	18	IT	ITIL v3 Foundations
10	M	Portugal	Client success manager	12	ICT	ITIL Foundation in Service Management, ITIL Intermediate Certificate in IT Service Transition, Service Operations, Continual Service Improvement, Service Strategy, Service Design, MALC,
11	M	Ireland	CEO	22	Consulting	ITIL Foundation ITSM, ITIL Practitioner Change Management, ITIL Practitioner Problem Management Certificate, ITIL v2 Service Manager, ITIL v3 Expert, ITIL Master

Source: authors.

Data analysis

Qualitative data analysis was performed using MAXQDA, a widely recognized computer-assisted qualitative data analysis software (CAQDAS). This tool was selected for transcribing the recorded video interviews, organizing the content of each interview, and assisting in the extrapolation of conclusions from the interviews. Given the substantial amount of information collected from the eleven interviews, it was essential to adopt a systematic and rigorous methodology. To this end, the Gioia methodology was applied (Gioia *et al.*, 2013) to maintain the quality and authenticity of the data when refining raw data. As outlined by the authors, this methodology seeks to provide a "systematic approach to new concept development and grounded theory articulation that is designed to bring 'qualitative rigor' to the conduct and presentation of inductive research" (p. 15). It is important to mention that the research model of this study does not fall under the "Grounded Theory" approach, as the goal is not to formulate new theories through data analysis. Table 5 below presents the benefits of using this technique in the data analysis step.

Table 5. Features of the Gioia methodology in data analysis.

Step	Key features
Data analysis	Perform initial data coding, maintaining the integrity of 1st-order (informant centric) terms
	Develop a comprehensive compendium of 1st-order terms
	Organize 1st-order codes into 2nd-order (theory-centric) themes
	Distil 2nd-order themes into overarching theoretical dimensions (if appropriate)
	Assemble terms, themes, and dimensions into a "data structure"

Source: authors.

In the first step, first-order concepts were defined by extracting significant fragments from either transcriptions or descriptive data (Gioia *et al.*, 2013) and organizing them into categories or first-order codes through open coding (Corbin & Strauss, 1990). In the second step, axial coding was used to "relate categories to their subcategories" (Corbin & Strauss, 1990). By grouping categories based on their similarities, it was possible to define the "2nd order themes," which are situated at a higher level of abstraction. To achieve the "aggregate dimensions," the same principle was applied. Both the 2nd order themes and aggregate dimensions serve as analytical vectors that align with the research focus of the present study. The results of these steps are described in table 6.

The aforementioned methodology allowed us to identify the dimensions of the topics discussed, which were categorized in three main aggregate dimensions: 'Relationship,' 'Impacts,' and 'Factors.' The 'Relationship' dimension includes 'fit-for-use and adaptation for the CC model' and 'ITIL independence from the model,' which were identified in response to the first interview question focused on ITIL v3 2011. The 'Impacts' dimension includes 'impacted processes of ITIL/coverage of the CC model' and 'impacts on the client and provider side,' which were gathered from the second interview question. Lastly, the third question in the interview guide aimed to explore the 'Benefits' and 'Constraints' of providing IT services via cloud compared to the traditional model, leading to the definition of the 'Factors' dimension. All of this information was supported by the first-order concepts, as previously indicated through the use of this method, which involved extracting relevant data from the interviews.

Table 6 presents the coding of the interviews conducted. This study identified eight benefits, which are in line with the literature (Wang *et al.*, 2021). The results show the different ITIL processes affected with the adoption of cloud computing. Table 7 presents the experts' point of view regarding the need of reframing/revamp (ITIL v3 2011).

Table 6. Data analysis procedure, steps and outcomes under Gioia methodology.

1st order concepts	Second order themes	Aggregate dimensions
<ul style="list-style-type: none"> • Need of managing Cloud providers • Important role "in several aspects of strategy" • CC model has influenced ITIL latest evolution • "The Framework still relevant for both contexts" • ITIL still can be used but not fully due to the "gaps in finance and governance" • There are benefits of the CC model that "must be managed" • "ITIL v3 2011 is not adapted to the newest technologies that are cloud-based" • "[...] when it comes to ITIL and Cloud adoption, the focus should be in several aspects in terms of the strategy" • "[...] you can use ITIL for all your cloud solutions" • "ITIL will always be ITIL. In general, ITSM frameworks will be always relevant both in on-prem and in Cloud context" 	Fit-for-use and adaptation for CC model	Relationship
<ul style="list-style-type: none"> • Approach must be the same regardless of the model used • "ITIL must have an agnostic approach when it comes to the technology" 	ITIL independence from the model	
<ul style="list-style-type: none"> • Some of the ITIL v3 Processes were impacted by the CC model adoption • "Supplier management, the operational management with all these suppliers must be performed differently" • "The change management must also be carefully reviewed" from the provider side • "The biggest impacts are in the Service Transition (...) such as asset and configuration management, release and deploy management and change management" • "Supplier management would be the most important process in terms of Cloud integration" • "There are two processes in which Cloud had a huge impact: Continuity management and availability management" • "Incident and problem management [...] didn't change a lot in practice, with the introduction of the Cloud" • "For instance, incident management is different in the Cloud" • "[...] Incident management remains the same, problem management remains the same" • "ITIL covers, in its processes, the Cloud characteristics very good" • Strategy and design are the most important for the client because the operational processes are more on the provider side • "Change management is impacted there because one of the cloud characteristics is 'on-demand self-service'" • "All processes should be addressed in a different way. Some of them, more than the others" • "The approach of ITIL shouldn't be different because of the Cloud computing model" 	Impacted processes of ITIL / coverage of CC model	Impacts

1st order concepts	Second order themes	Aggregate dimensions
<ul style="list-style-type: none"> • The client-side approach is different but “in the provider side is the same” • “The change management must also be carefully reviewed. Frequently, a Cloud provider must perform its technological evolution,” and “it may affect the client” • “Probably, the more weight is on the customer side. Because in the end, you’re accountable and responsible for your own choice. For the Provider, it’s almost the same due to reputational or brand image risks” 	Impacts on client and provider side	
<ul style="list-style-type: none"> • “Cost efficiency” • Scalability and elasticity of computational resources • Delegation of technical effort to the Provider • Availability and business continuity • “Focus on the core business” • “Knowledge and volume synergies” • “Access to latest technologies” • “Quicker time-to-market” 	Benefits	Factors
<ul style="list-style-type: none"> • “Exposure of data” due to unexpected privacy laws • Effort in “choosing the most suitable provider” • Proper transition planning • “Lack of control” from the client-side • Monitoring, transition, and “upskilling costs” • Services “measured in providers terms” 	Constraints	

Source: authors.

Table 7. Interviewee’s view about ITIL v3 2011.

Interviewees	Framework used	Need of reframing/revamp (ITIL v3 2011)	Main group/processes affected (ITIL v3 2011)
Interviewee 1	ITIL v3 2011	No	Change management, service asset & configuration management
Interviewee 2	ITIL v3 2011	No	Service design and service transition groups
Interviewee 3	ITIL 4	No	Release and deploy management, service validation, and testing, change management, supplier management
Interviewee 4	ITIL v3	N/A	Supplier management, information and security management
Interviewee 5	ITIL v3 2011	N/A	IT service continuity management, availability management, capacity management
Interviewee 6	Other (soc)	No	Incident management
Interviewee 7	ITIL 4	No	N/A

Interviewees	Framework used	Need of reframing/revamp (ITIL v3 2011)	Main group/processes affected (ITIL v3 2011)
Interviewee 8	ITIL v3	No	Change management, incident management, service level management, and continual service improvement
Interviewee 9	ITIL v3 2011	No	Change management
Interviewee 10	ITIL v3 2011	No	None
Interviewee 11	Other (Verism)	No	Change management, incident management, service level management, capacity management

Source: authors.

For example, the study by Fiegler *et al.* (2016) identified that the ITIL processes most impacted were operation, transition, and design. Similarly, Cardoso *et al.* (2018) and Karkošková (2018) found that all ITIL processes were affected. In studies conducted by Almourad and Hussain (2014), the strategy processes were identified as the most affected. The study by Mahalle *et al.* (2018) found that the impacted ITIL processes included service strategy, service design, service transition, and service operation. In the present study, several ITIL processes, such as incident management, service management, and configuration management, were impacted. These results complement previous studies in the literature, which indicate that more than one ITIL process tends to be affected.

Results and discussion

Insights gathered during the interviews revealed information about the frameworks used in each interviewee's organization. Nearly 50% of participants indicated that ITIL v3 2011 is the framework used for managing IT services. The other frameworks mentioned were ITIL 4, ITIL v3, SOC, and Verism, each representing 18% of the responses. Regarding the need to reframe ITIL v3 2011, all interviewees unanimously agreed that the CC model does not require reframing or revamping. The impacts of the Cloud-based model were more pronounced in certain ITIL v3 2011 processes. Specifically, change management, incident management, and supplier management were highlighted by 30% and 15% of respondents, respectively. Additionally, service asset and configuration, supplier management, and capacity management were each identified by 10% of interviewees.

Mahalle *et al.* (2018) analyzed the need of having well-established ITIL Operation processes, focusing on incident management, SLA management, and change management, for the banking and financial sector, in the Cloud-based architecture context. These processes are detailed in the analysis performed, which focuses on the banking and financial sector, characterized by a substantial cloud architecture involving multiple teams. A key finding is the high frequency of high-

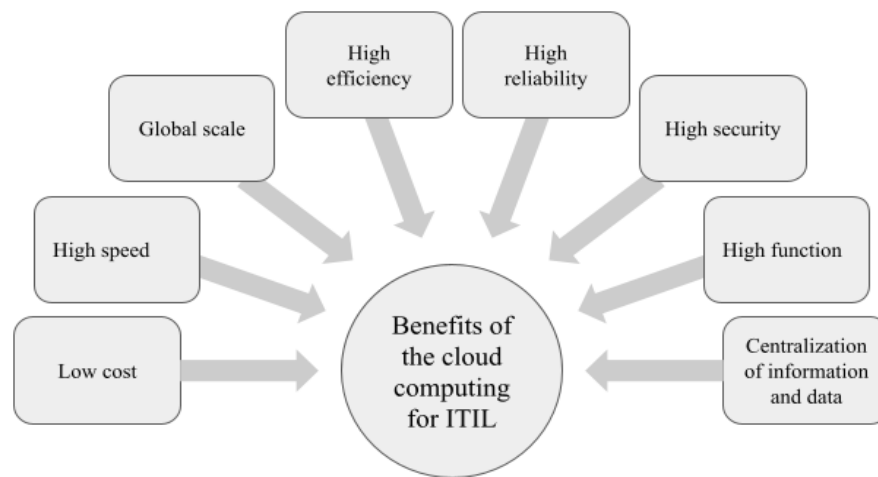
priority incidents, often leading to emergency changes within the cloud architecture. For this sector, such incidents can result in significant financial losses. To reduce their occurrence, the authors identify several contributing factors, including incorrect incident priority assignment, insufficient training of CSPs, poor communication with stakeholders, unavailability of staff to perform changes outside working hours, and incorrect approval of emergency changes by the Cloud service manager. These risks can be mitigated by increasing the experience of the CSP, implementing strict operational controls, and enhancing collaboration between the entities and the CSP.

Wang *et al.* (2021) performed a literature review to investigate the effects of the cloud-based model on ITIL processes. The goal was to identify how issues within ITIL processes can be addressed and to understand the role of the Cloud Computing model in achieving these solutions. The related work results were categorized into two groups: cloud service providers and cloud server providers. After analyzing the findings, the study presents two main conclusions:

1. The CC model significantly impacts not only the utilization of IT resources but also the role of enterprise architecture, highlighting the increased need for ITSM. When using a cloud-based model, organizations can focus more on their core business activities while reducing the costs associated with building information services. Consequently, ITSM frameworks such as ITIL play a crucial role in managing CC, but they must be adapted to address the specific needs and context of the CC environment.
2. There is no research activity about the application of the Cloud system with ITIL, although ITIL provides high-level guidance for organizations in the way the services are managed. Introducing cloud systems in ITIL is a complex, costly, and risky task.

The benefits of the CC model for ITIL implementations are identified in figure 3. However, migrating to the Cloud represents a serious decision and organizations must be aware of it. The authors suggest that further research on these topics should be conducted through the adoption of a broader method to the investigation design.

Figure 3. Benefits of CC for ITIL.



Source: Wang *et al.* (2021).

We identified eight benefits and six constraints from ITIL experts. The benefits provide significant value and contribute to the existing literature, aligning with the findings of Wang *et al.* (2021). Furthermore, the constraints offer a new perspective on the topic, which remains an area of ongoing exploration.

Benefits:

- Cost efficiency
- Scalability and elasticity of computational resources
- Delegation of technical effort to the provider
- Availability and business continuity
- Focus on the core business
- Knowledge and volume synergies
- Access to latest technologies
- Quicker time-to-market

Constraints:

- Exposure of data
- Effort in choosing the most suitable provider
- Proper transition planning
- Lack of control from the client-side
- Monitoring, transition, and upskilling costs

- Services measured in providers terms

The results from the interviews revealed several key points regarding ITIL as a tool for managing services within organizations. While ITIL v3 2011 remains applicable in the Cloud context, two distinct perspectives must be analyzed: the client-side and the provider-side, as the impacts of Cloud implementation on ITIL processes differ significantly between these groups.

From the provider-side perspective, ITIL serves as a framework for delivering more reliable services. Consequently, the 'service design' process group must be addressed differently within the Cloud context. On the client-side, ITIL must be adapted to reflect the characteristics of Cloud services, as clients do not own the infrastructure, necessitating an adjusted management approach.

The impact of the Cloud-based model on ITIL processes should be viewed from both perspectives; however, the impact on the client-side is more readily identifiable. In the service strategy group, financial management must also be approached differently.

ITIL offers a flexible guide of best practices in its implementation and should remain agnostic to the model used. Although ITIL has been perceived as somewhat bureaucratic due to certain controls and processes, the latest version introduces new concepts such as *Agile* and *DevOps*. More than merely adopting technology, it is essential to adapt processes to maximize the benefits of the Cloud-based model, mitigate risks, and ensure that control is not lost.

Regarding specific ITIL processes, the impacts are particularly noticeable in the service design and service transition process groups.

In service design, supplier management and service level management processes have gained importance due to the increased reliance on external providers, necessitating a clear understanding and agreement of contracts by both parties. Capacity Management is also critical because of the elasticity and scalability characteristics of Cloud services. Additionally, Information Security Management has become crucial, as vulnerabilities must be assessed, and providers must ensure a robust disaster recovery plan for the client's data.

In the service transition group, change management requires a different approach; the Cloud-based model allows for greater agility and automation, which may eliminate the need for traditional change request and approval procedures. Service asset and Configuration management also necessitates enhanced control over assets and their relationships. Through automation, it is now possible to quickly provision servers, underscoring the need for vigilant asset management.

The latest version of ITIL is aligned with the Cloud context, representing a significant update from the previous iteration and adapting to the digital age. This transition necessitates adjustments to modern work practices and the integration of the latest technologies, including Cloud

computing. Clients are increasingly demanding greater resilience and agility. Agility is defined as the flexibility and speed with which organizations can implement changes to existing products and services, while resilience refers to an organization's ability to recover from crises or disasters and rebound effectively. These values are emphasized in ITIL 4, which leverages Cloud capabilities to ensure that customer needs are met, and that optimal value is delivered. The guiding principles of ITIL 4 can be effectively supported by Cloud capabilities, particularly when adopting an agile working methodology. One interviewee noted a strong relationship between ITIL 4 and Cloud, asserting that ITIL 4 is designed for the digital economy, with Cloud computing at its core. In contrast, ITIL v3 was developed for an on-premises environment; however, despite its lack of coverage regarding Agile, DevOps, Lean, and other contemporary practices, it remains suitable for Cloud implementations.

The framework used by the interviewee is ITIL 4; however, he has previously worked with ITIL v3 2011. Regarding ITIL v3 2011, the interviewee considers that the most significant impacts of the Cloud are primarily felt within the service transition domain, particularly in areas such as release and deployment management, service validation and testing, and change management. In the service design domain, supplier management and financial management in the service strategy have become increasingly important.

Release and deployment management, as well as service validation and testing, are significantly affected by the technologies that the Cloud provides, especially in the context of DevOps and continuous integration/continuous deployment (CICD), as Cloud facilitates automated testing. Change management must also be approached differently due to the speed and flexibility that the Cloud offers, allowing for a higher volume of change requests compared to the traditional model, particularly when utilizing CICD.

In the service design domain, supplier management has gained importance, as suppliers now play a crucial role in ensuring continuity, shifting much of the responsibility to the Provider. This shift grants providers greater control than in an on-premises model.

From the service strategy perspective, financial management was identified as a critical topic. The transition from purchasing to renting in the Cloud necessitates a different approach to cost management. The interviewee noted that even within ITIL 4, this process requires enhancement, as organizations are encountering unexpected bill shocks related to Cloud usage. Providers are improving cost monitoring for users by implementing thresholds to help avoid unexpected expenses. Thus, addressing Cloud pricing and bill shocks will be essential for future iterations of ITIL to ensure organizations have adequate controls to monitor their Cloud spending.

Interviewees recognize the benefits of providing services via the Cloud, noting that implementing ITSM tools was a considerable challenge in the traditional IT context. Typically, these tools require customization, leading to efforts in bug fixing and communication issues between

clients and vendors. Cloud-enabled service management allows practitioners to concentrate on service delivery rather than managing infrastructure, platforms, and updates. However, there are constraints associated with a Cloud-based model, such as data exposure in countries where data privacy laws may not align with expectations. Therefore, it is crucial to select a reputable provider that has the necessary mechanisms in place to meet organizations' data storage requirements. These findings align with the literature review and contribute to the body of knowledge related to ITIL and CC.

Conclusions

The Cloud-based model offers several benefits for companies, along with associated risks, which have been thoroughly examined in this study. Consequently, it is essential for organizations to adapt both their internal and external procedures. Although the impacts of the Cloud are not experienced uniformly by clients and providers, both parties must cultivate a close partnership to maximize service delivery value. Transitioning to the Cloud is not merely a technical decision; it is a business decision that also affects technical operations. Therefore, a strategic approach is necessary, particularly in the financial domain, where costs must be accurately predicted in conjunction with supplier relationships. Failing to do so may result in unexpected bill shocks, rather than achieving financial cost-efficiency, particularly arising from operational and transition domains.

Nevertheless, when it comes to the most significantly impacted ITIL v3 processes, change management was frequently described as "completely different [...] from the on-premise environment," largely due to "the speed and flexibility that the Cloud provides" and the "control on the Provider side," which introduces "additional responsibilities and risks." Incident management was identified as the second most frequently mentioned process, primarily due to the "nature of the incidents that arise from the Cloud Computing model," which necessitates management "end-to-end with the supplier," especially since "control is delegated to the provider."

Regarding the need of having a reframed ITIL version adapted to the Cloud, all interviewees consider that the framework "is still applicable" and "does not need any revamp to support cloud characteristics," although this framework was "written having on-premise in mind."

Contributions to the scientific and business community

The SLR conducted indicates that there is a lack of comprehensive research on the specific topics addressed in this study. Therefore, this research may contribute significantly to the field by incorporating insights from knowledgeable professionals, thereby bringing empirical experience into academic discourse.

At the business level, as previously mentioned, there are critical implications that organizations must consider when transitioning from a traditional on-premise structure to a Cloud-based model. In this context, the objective of this study is to raise awareness among decision-makers regarding the factors they should evaluate when migrating their services to the Cloud, particularly from the client perspective. By implementing ITIL framework processes to guide IT management, this study suggests that organizations can maximize the benefits of Cloud computing while mitigating its associated constraints.

Limitations and future research

This research has some limitations. Firstly, the data collected was restricted to eleven experts from nine countries. Out of the 40 invitations extended, only 13 professionals accepted, and two of them acknowledged a lack of specific knowledge after introducing the interview questions. The remaining 22 invited professionals were unavailable. We recognize that the schedules of Chief Information Officers are often demanding; however, we will continue to seek the involvement of more ITIL-certified experts to strengthen the conclusions related to Cloud computing and ITIL. The valuable insights from the interviewees have undoubtedly enhanced the information available in traditional literature and provided additional perspectives beyond the scope of this study.

According to the results of the SLR, there is significant potential for further research on topics related to frameworks such as ITIL and the CC model. Additionally, for other well-known ITSM frameworks, there has been a limited number of published studies. Applying the same methodology to examine the specific ITIL v3 processes mentioned would be of interest, as would exploring the implications of the newest version, ITIL 4, for academic research.

References

- Ahmad, N., & Shamsudin, Z. (2013). Systematic approach to successful implementation of ITIL. *Procedia Computer Science*, 17, 237-244. <https://doi.org/10.1016/j.procs.2013.05.032>
- Almourad, B., & Hussain, M. (2014). The impact of cloud computing on ITIL service strategy processes. *International Journal of Computer and Communication Engineering*, 3, 367-371. <https://doi.org/10.7763/IJCCE.2014.V3.351>
- Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM*, 53(4), 50-58. <https://doi.org/10.1145/1721654.1721672>
- Bailey, E., & Becker, J. D. (2014). A comparison of IT governance and control frameworks in cloud computing. *20th Americas Conference on Information Systems, AMCIS 2014* <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84905987476&partnerID=40&md5=d98c8430fd099e1d6f48afc588db8edb>
- Beckers, K., Hofbauer, S., Quirchmayr, G., & Wills, C. C. (2013). A method for re-using existing ITIL processes for creating an ISO 27001 ISMS process applied to a high availability video conferencing cloud scenario. In Cuzzocrea, A., Kittl, C.,

- Simos, D. E., Weippl, E., Xu, L. (Eds.), Availability, reliability, and security in information systems and HCI. CD-ARES 2013. *Lecture Notes in Computer Science*, vol 8127. https://doi.org/10.1007/978-3-642-40511-2_16
- Benavides, L. M., Tamayo Arias, J. A., Arango Sema, M. D., Branch Bedoya, J. W., & Burgos, D. (2020). Digital transformation in higher education institutions: A systematic literature review. *Sensors*, 20(11), 3291. <https://doi.org/10.3390/s20113291>
- Bounagui, Y., Mezrioui, A., & Hafiddi, H. (2019). Toward a unified framework for Cloud Computing governance: An approach for evaluating and integrating IT management and governance models. *Computer Standards and Interfaces*, 62, 98-118. <https://doi.org/10.3390/s20113291>
- Branco, T., Bianchi, I., & de Sá-Soares, F. (2019). Cloud computing adoption in the government sector in Brazil: an exploratory study with recommendations from IT managers. In R. Miani, L. Camargos, B. Zarpelão, E. Rosas, & R. Pasquini (Eds.), *Green, Pervasive, and Cloud Computing* (pp. 162,175). Springer International Publishing.
- Branco, T., de Sá-Soares, F., & Rivero, A. L. (2017). Key issues for the successful adoption of Cloud Computing. *Procedia Computer Science*, 121, 115-122. <https://doi.org/10.1016/j.procs.2017.11.016>
- Cardoso, A., Moreira, F., & Escudero, D. F. (2018). Information Technology Infrastructure Library and the migration to cloud computing. *Universal Access in the Information Society*, 17(3), 503-515. Scopus. <https://doi.org/10.1007/s10209-017-0559-3>
- Chanas, S., & Hess, T. (2016). Understanding digital transformation strategy formation: Insights from Europe's automotive industry. *Proceedings of the 20th Pacific Asia Conference on Information Systems (PACIS 2016)*, 296.
- Chou, D. C. (2015). Cloud computing: A value creation model. *Computer Standards & Interfaces*, 38, 72-77. <https://doi.org/10.1016/j.csi.2014.10.001>
- Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13(1), 3-21.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage.
- DiCicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314-321.
- Fiegler, A., Zwanziger, A., Herden, S., Dumke, R. R. (2016). Quality Measurement of ITIL Processes in Cloud Systems. *2016 Joint Conference of the International Workshop on Software Measurement and the International Conference on Software Process and Product Measurement (IWSM-MENSURA)*, 87-94. <https://doi.org/10.1109/IWSM-Mensura.2016.022>
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16(1), 15-31. <https://doi.org/10.1177/1094428112452151>
- Goyal, S. (2014). Public vs. Private vs. Hybrid vs. Community—Cloud Computing: A critical review. *International Journal of Computer Network and Information Security*, 6, 20-29. <https://doi.org/10.5815/ijcnis.2014.03.03>
- Heininger, R. (2012). IT service management in a cloud environment: A literature review. *Proceedings of 9th Workshop on Information Systems and Services Sciences 2012*. <https://doi.org/10.2139/ssrn.2119030>
- Hove, S. E., & Anda, B. (2005). Experiences from conducting semi-structured interviews in empirical software engineering research. *11th IEEE International Software Metrics Symposium (METRICS'05)*. <https://doi.org/10.1109/METRICS.2005.24>
- Iden, J., & Eikebrokk, T. R. (2014). Using the ITIL Process Reference Model for realizing IT governance: An empirical investigation. *Information Systems Management*, 31(1), 37-58. <https://doi.org/10.1080/10580530.2014.854089>

- Jansen, M. (2011). What does IT service management look like in the cloud?: An ITIL based approach. *Recent Advances in Computers, Communications, Applied Social Science and Mathematics. Proceedings of ICANCM'11, ICDC'11, IC-ASSSE-DC'11*. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-81755176905&partnerID=40&md5=0f908f90e91c5b12313b4974ed0ad6a9>
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, 72(12), 2954-2965. <https://doi.org/10.1111/jan.13031>
- Karkošková, S. (2018). Towards Cloud Computing Management model based on ITIL processes. *ICBIM '18: Proceedings of the 2nd International Conference on Business and Information Management*. <https://doi.org/10.1145/3278252.3278265>
- Kitchenham, B., Brereton, O. P., Budgen, D., Turner, M., Bailey, J., & Linkman, S. (2009). Systematic literature reviews in software engineering—a systematic literature review. *Information and Software Technology*, 51(1), 7-15.
- López, H. F. G., Paredes, O. G. C., & Tapia, F. M. L. (2018). Cloud computing; Design of a management model for service migration using ITIL as knowledge manager. *Proceedings of the 20th International Conference on Enterprise Information Systems*, 1, 648-656. <https://doi.org/10.5220/0006788906480656>
- Mahalle, A., Yong, J., & Tao, X. (2018). ITIL processes to control operational risk in cloud architecture infrastructure for banking and financial services industry. *2018 5th International Conference on Behavioral, Economic, and Socio-Cultural Computing (BESCC)*, pp. 197-200. <https://doi.org/10.1109/BESCC.2018.8697294>
- McIntosh, M. J., & Morse, J. M. (2015). Situating and constructing diversity in semi-structured interviews. *Global Qualitative Nursing Research*, 2. <https://doi.org/10.1177/2333393615597674>
- Mell, P., & Grance, T. (2011). *The NIST definition of cloud computing*. NIST. <https://nvlpubs.nist.gov/nistpubs/legacy/sp/nistspecialpublication800-145.pdf>
- Miller, A. C. H., Campos-Náñez, E., Fomin, P., & Wasek, J. S. (2013). An IT Infrastructure Library (ITIL) maturity strategy for private cloud sourcing models: A literature review and research methodology formation. *Information Systems International Conference (ISICO)*, 117-121.
- Myers, M. D. (2013). *Qualitative research in business and management*. Sage.
- Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization*, 17(1), 2-26.
- Rabionet, S. E. (2011). How I learned to design and conduct semi-structured interviews: An ongoing and continuous journey. *Qualitative Report*, 16, 563-566. <https://doi.org/10.46743/2160-3715/2011.1070>
- Shetty, J. P., & Panda, R. (2021). An overview of cloud computing in SMEs. *Journal of Global Entrepreneurship Research*. <https://doi.org/10.1007/s40497-021-00273-2>
- Taghavifard, M. T., & Majidian, S. (2022). Identifying cloud computing risks based on firm's ambidexterity performance using fuzzy VIKOR technique. *Global Journal of Flexible Systems Management*, 23(1), 113-133. <https://doi.org/10.1007/s40171-021-00292-8>
- Wang, D., Zhong, D., & Li, L. (2021). A comprehensive study of the role of cloud computing on the information technology infrastructure library (ITIL) processes. *Library Hi Tech*, 40(6), 1954-1975. <https://doi.org/10.1108/LHT-01-2021-0031>
- Zaman, M. T., & Rani, M. (2022). Cloud computing security challenges, analysis of security problems and cloud computing forensics issues. In *Security and Privacy Trends in Cloud Computing and Big Data* (pp. 147-164). CRC Press.

Appendix A. Mail sent to the interviewees

Dear <Guest>

I would like to invite you to participate in the realization of my master's thesis on ITSM frameworks and Cloud Computing.

The objective of the dissertation is to understand if the adoption of the Cloud Computing business model requires that ITSM frameworks (the focus will be solely on ITIL) are updated in compliance with their processes.

Your participation would be in the form of an interview with an expected duration of approximately 1 hour. This interview would be recorded, using it for academic purposes only, with the utmost secrecy, safeguarding the anonymity of the interviewees.

Due to your domain experience, it would be of great importance to be able to count on your contribution that will certainly enrich this research.

Attachment B. Interview guide

In your opinion, what relationship exists in an ITSM structure (ITIL) and the adoption of the Cloud (experiences in practice, synergies, benefits, and constraints).

Does the framework you are working with already cover the cloud characteristics?

1. If yes, where?
2. If not, where?

What benefits are there in providing IT services (those where ITIL/ITSM covers) via the Cloud? (when compared to traditional IT model)