Journal of Global Information Management
Volume 33 • Issue 1 • January-December 2025

The Impact of DevOps in IT Service Management:
A Multi-Case Study

João Faustino
https://orcid.org/0000-0002-1743-5348
INESC-INOV, Instituto Universitário de Lisboa, Portugal

Rúben Pereira
INESC-INOV, Instituto Universitário de Lisboa, Portugal

Miguel Mira da Silva
https://orcid.org/0000-0002-0489-4465
INESC-INOV, Instituto Superior Técnico, Portugal

Daniel Adriano
Instituto Universitário de Lisboa, Portugal

Victor Camargo
Instituto Universitário de Lisboa, Portugal
Received: January 19th, 2025 | **Accepted:** October 23rd, 2025

ABSTRACT

In today's dynamic environment, IT departments are critical to organizational success, supporting business units through IT services managed with frameworks like ITIL. IT is occasionally seen as an impediment due to bureaucratic ITIL processes, causing a delay to the quick adaptation to market changes. The DevOps culture was introduced to increase the collaboration between development and operations teams, promoting high-quality software delivery while guaranteeing the system stability. This research explores integrating DevOps within an ITIL-based environment, focusing on the impact on Incident, Problem, and Change Management processes. Case studies show that DevOps improves communication, feedback, and automation, significantly enhancing Incident and Problem Management. In contrast, automation is the key to optimising Change Management, reducing errors, and boosting delivery quality.

KEYWORDS

DevOps, ITSM, ITIL, Incident Management, Problem Management, Change Management

INTRODUCTION

Over the past few decades, organizations have been changing the way they manage their businesses to overcome internal and external threats, as well as from their competitors (Kaplan et al., 2018; Wahyudin et al., 2020). Today, one of the most essential factors in an organization's ecosystem is the information technology (IT) department. The relevance of IT has been growing widely in organizations to achieve their mission and business goals due to the support of business units (Permatasari et al., 2024).

DOI: 10.4018/JGIM.392902

This article published as an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creative-commons.org/licenses/by/4.0/) which permits unrestricted use, distribution, and production in any medium, provided the author of the original work and original publication source are properly credited.

This pressure for change is mainly due digital transformation (DT), which acts as a strategic driver for modernization. DT is essential for business model innovation and enhanced enterprise performance. Moreover, an organization's capability in managing its IT ecosystem effectively is no longer seen as just a support function. It is strategic for sustaining market growth and competitive advantage (Liu et al., 2024).

To be able to support businesses in the market's fast changes and tendencies, the concept of IT services was created (Okere, 2024). Furthermore, to evaluate how the IT services are performing toward the business and organization objectives, a discipline named Information Technology Service Management (ITSM) was created (MacLean & Titah, 2023).

ITSM is implemented using frameworks, such as the Information Technology Infrastructure Library (ITIL), Control Objectives for Information and Related Technologies, and Federated IT Service Management (Widianto & Subriadi, 2022). ITIL is seen as the most implemented framework globally (Ruiz et al., 2018). ITIL has a crucial role in managing the organization's IT services landscape, from the moment of the IT service design until it decommissions, ensuring efficient and effective service delivery (Aguiar et al., 2018; Galup et al., 2020).

ITIL's newest release, ITIL 4, was introduced in 2019. This latest version can be defined as "a set of practices for ITSM that focuses on aligning IT services with the needs of business" (AXELOS Limited, 2019). The traditional ITIL implementations focused on implementing processes to manage the IT services; however, ITIL 4 is focused on practices, extending these implementations for more than processes (Hasibović et al., 2023). Moving to this practice approach enabled ITIL 4 not just to overthink the processes' performance but to combine processes, technology, and people to guarantee the best performance of the IT service, focusing on value to its customers (Reiter & Miklosik, 2020).

This approach is supported by the adoption of cultures, such as DevOps, which encourages collaboration and communication between developers and operators, and automation in the software development life cycle (SDLC) (Leite et al., 2019). However, a successful implementation of DevOps as a DT initiative depends on human and leadership factors. Managerial digital readiness is a significant factor in implementing DT (Yang et al., 2024), while the workforce's readiness to change acts as a mediator in the relationship between workforce agility and DT itself (K. Sharma et al., 2024).

However, due to the complexity of the framework, some organizations choose not to implement all ITIL processes, like small-scale organizations (Yamami et al., 2017). Therefore, those organizations usually choose to implement incident management (IM), problem management (PM), and change management (CM) (Serrano et al., 2021). These three processes are typically seen as working together to maintain stability and the regular operation of the IT services, ensuring the correct transition from a service design to its operation (Galup et al., 2020).

IM is the process where the objective is to minimize the negative impact of an unplanned service interruption or reduction in the quality of the service to restore the regular operation of the service as quickly as possible (AXELOS Limited, 2019), thereby preventing economic losses and user dissatisfaction (Lou et al., 2013).

For PM, the objective is to reduce the likelihood and impact of incidents by identifying actual and potential causes of incidents (AXELOS Limited, 2019).

Lastly, CM can be seen as the last stage where all the changes that impact the IT services are managed (AXELOS Limited, 2019). A change can be made in a system parameterization, code, or hardware. In this process, there are approvals and review activities, which can be seen as very exhaustive, causing delays to the delivery of new fixes (incoming from IM and PM) or new functionalities for the IT service (Kim et al., 2016).

However, while ITIL can bring benefits, such as more control of the IT environment and risk and cost reduction, it also has challenges (Cook et al., 2021). The framework can be seen as bulky and bureaucratic due to its focus on process performance and well-defined roles (Rabbany, 2017). This can hinder the agility and responsiveness, which may not be the best option in a market that demands quick responses to customer needs (Sarwar et al., 2023).

The main objective of DevOps is to significantly improve the software delivery through process automation and the adoption of continuous improvement (Kumar et al., 2024), offering a promising future for ITIL processes that has been pointed by Waseso et al. (2024).

The core principle of DevOps, collaboration and communication, requires a degree of knowledge sharing and trust between teams. DT has been shown to increase the collaborative innovation within organizations (Chen et al., 2024), as an outcome of developers and operators alignment. Studies exploring the impact of organizational structure with DT have highlighted a role in developing resilience and responsiveness (Cui et al., 2024). However, this culture of openness can be fragile. Research suggests that leader narcissism is negatively related to employee knowledge sharing, instead encouraging knowledge gatekeeping and manipulation (Zheng et al., 2024). Therefore, successful ITSM evolution must account for the impact of leadership behavior on the structural and cultural environment necessary for agility.

Therefore, this research aimed to investigate the relationship between DevOps and ITIL processes to understand the probable impacts of a DevOps implementation on an ITIL environment.

In addition to the operational and performance-driven motivations for integrating DevOps practices into ITIL processes, there is a growing recognition that automation in IT service management also carries the potential to embed and amplify bias in decision-making (Narne, 2023). This interest in bias arises particularly in contexts where workflows, such as incident prioritization, problem categorization, or change approval, are increasingly automated, potentially reducing human error but also risking the replication of systemic inconsistencies (Faheem et al., 2025). Shin (2025) contended that such biases are not merely technical anomalies but sociotechnical outcomes shaped by the interaction between algorithms and human stakeholders. Therefore, referencing this work is important, as it underscores that the DevOps and ITIL integration should be approached not only as a means to improve efficiency but also as an opportunity to embed fairness, transparency, and trust into the operational fabric of the organization.

The research methodology used for this work was multicase study, where the objective was to perform case studies in different organizations, in different ITIL processes, where DevOps practices had also been adopted. The ITIL processes approached in the case studies were IM, PM, and CM, as identified in Faustino et al. (2023), as candidates to be implemented with DevOps practices and due to the researchers' experience with these processes.

These case studies can be seen as empirical evidence of how these two topics can coexist in the organization's IT ecosystem, showing how they can relate, and which are the benefits and challenges of this DevOps adoption. Therefore, this research aimed to prove the relationship between DevOps and ITSM using empirical data to show which DevOps practices impact the ITSM processes and which have performance impacts, benefits, and adoption challenges. This would allow organizations to know what to expect when adopting DevOps in their ITIL ecosystem, creating the opportunity to evaluate how DevOps is impacting their process landscape.

In this study, it was also possible to observe theoretical perspectives on how to understand the transformations to fit DevOps and ITIL. Sociotechnical systems theory (Baxter & Sommerville, 2011; Orlikowski & Scott, 2008) focus is that the adoption of new technologies requires adjustments in roles, routines and interactions. Organizational changes theory (Battilana & Casciaro, 2012) shows a theoretical framing to understand change resistance. Institutional logics (Greenwood et al., 2014) helps to understand the balance between control and stability (ITIL) versus the agility (DevOps).

This research is organized as it follows: The theoretical background section describes the main concepts that frame this research and helps readers understand these concepts and the authors who contributed to them; in the related work section, we detail examination of the DevOps case studies to confirm that none or few studies exist relating IM and DevOps domains; then, the research methodology section identifies how we designed and validated the case study (CS) methodology; subsequently, in the CS protocol and conduct section, we list all the data needed to conduct the CS; next, in the analyze the CS evidences section, we explain how we transformed the collected data for analysis; lastly, we present a set of conclusions about all of the findings discovered during the analysis phase, as well as explain why this research is helpful for academics and professionals.

RESEARCH BACKGROUND

Given the objective of this research, this section will explore theoretical concepts about DevOps and ITIL processes to find how these can relate and the probable impacts that could be caused by each of them.

As stated, ITIL is overfocused on process performance and accountability. At the same time, the organization's market requires agility for fast and quality product deliveries to respond to quick market changes. Organizations must change their mindset and culture to incorporate and accept customer feedback. This is one of the main premises of the DevOps culture: adapting the IT landscape to deliver fast, quality software.

ITIL 4 has already started adapting ITIL to be more agile by switching from processes to practices, considering not only process performance but also people and tools as part of the entire practice, as well as considering DevOps as part of operating the IT services. However, ITIL is a set of guidelines for managing the organization's IT services and does not show how DevOps practices can be used together with ITIL processes. Faustino et al. (2023) provide a publication that reviews how DevOps has been seen from an ITSM perspective and how organizations can adapt the two concepts to work together.

Due to the conclusions of Faustino et al. (2023), we found that this relation is in an early stage, creating the opportunity to build new research. This underscores the importance of further exploration in this area.

To better understand DevOps and ITSM, the following sections describe these two disciplines' main concepts, practices, and processes, providing enough background to understand how they can be applied together in the same environment.

ITIL

ITSM can be seen as a comprehensive approach that is responsible for all the activities of creating, implementing, supporting, and managing IT services, ensuring the governance of the organization IT services. ITSM has been implemented through frameworks, such as Control Objectives for Information and Related Technologies, ITIL, and Federated IT Service Management (Sarwar et al., 2023). Moreover, there is a framework which stands out, in terms of implementation, regarding the other frameworks, which is ITIL (Yamami et al., 2017).

ITIL is a process-oriented approach that has processes to improve IT efficiency by measuring IT services' performance through the processes. These processes guarantee the IT services quality, transparency of the IT processes, and the IT changes delivered to its users (Lema et al., 2015), ensuring that both business and IT goals are aligned toward the organization goals (Kurkute et al., 2024).

This study focused on ITIL since it is one of the most globally implemented ITSM frameworks (Galup et al., 2020), where a recent version, ITIL 4, was released in 2019 (Guilfoos & Triplett, 2022).

ITIL 2011 had an emphasis on the IT processes with well-defined inputs, outputs, and roles, focusing on five core publications, i.e., service strategy, service design, service transition, service operation, and continuous service improvement, while ITIL 4 extends the framework to be modernized and flexible (Pratama & Umaroh, 2024). Practices are sets of organizational resources designed for performing work or accomplishing an objective, being more flexible and less prescriptive than processes. For this, ITIL 4 introduces the service value system, a holistic approach where interconnected activities create and deliver value, called a service value chain.

This service value chain is crucial for ITIL 4 since it manages the IT service from its creation until its delivery, constantly monitoring the value it creates to know when to improve.

This research focused on the ITIL processes, IM, PM, and CM, which are detailed in the next section.

IM, PM, and CM Processes

IM plays a crucial part in ITSM, being one of the fundamental processes of ITIL (Latrache et al., 2015).

An incident is an unplanned interruption or performance degradation of an IT service, which also applies to any component that supports the IT service. Since the IT services should support the business processes of the organization, it is possible to state that an incident will cause a business interruption (Bartolini et al., 2006; Richard et al., 2019). The objective of the IM process is to manage these incidents so that it minimizes the service disruptions and outages to cause less impact on the organization's business units (Steinberg, 2011).

An organization's main objective is to create profit, so if the business has an interruption on the IT services that support the business applications, it will create economic losses, which should be avoided or mitigated as soon as possible (Lou et al., 2013). These incidents can also result in a lack of confidence from the organization's customers, even internal customers, showing that the IT services are unreliable for the business.

As stated before, the objective of the IM process is to bring the IT service to its regular operation and performance so that, when a complaint or a call reaches the service desk, it will check if it is a known issue and if there is already any solution for the user issue, and a temporary fix could be implemented. If not, the service desk will try to find a workaround to solve the incident. If there is no workaround, the incident will be sent to another support group; however, if successful, the incident will be closed, and a problem will be raised to solve the root cause. From this point, PM urges to solve this root cause.

In ITIL, a problem is seen as the root cause of the incident. Therefore, the PM process objective is to solve the root cause of one or more incidents, minimizing the impacts that these incidents can have on the organization (Cannon & Wheeldon, 2007). The problem manager is responsible for thoroughly analyzing previous incidents, identifying the root cause, and implementing measures to prevent these issues from reoccurring. PM is also a proactive approach to prevent issues (Kush, 2013), which includes continuous improvement, minimizes the impact on business units, and ensures excellent operational stability. This focus on prevention is a mindset highly valued by organizations, reassuring that issues will not reoccur.

CM is not just about integrating changes in IT services but also about fostering a culture of continuous improvement within the organization (AXELOS Limited, 2019). Globally, most organizations use three CM processes: normal change, standard change, and emergency change.

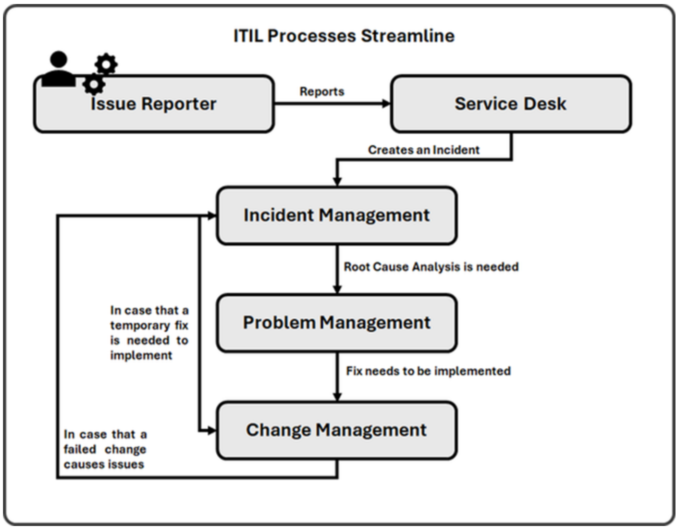
Below is a description of each type of change, adapted from Rance (2011):

- standard, which is used for preauthorized changes that have a negligible impact on the IT service and follow a well-known process;
- emergency, e.g., a change needs to be implemented immediately to solve a major incident that seriously impacts an IT service; this is usually assessed by the Emergency Change Advisory Board; and
- normal, which is a change that requires approval from the Change Advisory Board occurs when a significant change can impact an IT service, business processes, or infrastructure.

Since standard changes are preauthorized changes that are implemented by following a known procedure, it does not require as many approvals and assessments as normal changes (Kaiser, 2018); an example of a standard change could be resetting a user's password. This change needs to be made to the IT service but is low risk and low impact, so the standard change process should be followed.

It is possible to conclude that these three processes can be a streamline to guarantee the operability and stability of the IT services, and that streamline is illustrated in Figure 1.

Figure 1. Information Technology Infrastructure Library (ITIL) Processes Streamline



However, from a high-level perspective, these processes look bulky and bureaucratic, where it has a different amount of people and roles to secure different activities (Kaiser, 2018; Sharifi et al., 2008).

From today's perspective, this does not look realistic due to the constant changes that the market faces. Changes and adaptations to IT services must be fast enough for organizations to adapt to the market changes to face their competition and customer demands (Soni, 2015). To face this difficulty in delivering new solutions, fixes, and adaptations to IT services, a culture named DevOps has emerged. The main premise of this culture is to deliver software quickly, with high quality, by automating manual tasks from the SDLC and by joining IT development and operations to work together to develop and maintain software (Cuppett, 2016; S. Sharma & Coyne, 2014).

DevOps

The Agile Infrastructure Conference first mentioned the DevOps culture (Lwakature, 2017). The main goal of DevOps culture is to bridge the operations and development IT teams to work together so that both teams can help each other from the starting point of software development to high product quality and stable software (Riungu-Kalliosaari et al., 2016; Silva et al., 2018). DevOps also follows the agile software development practices from the Agile Manifesto (Beck et al., 2001), focusing on individuals and their skills and embracing the change to correspond to customer feedback, even if this could impact process performance. This way, the developed product will be more valuable to the customer since it will correspond to their needs.

These two IT teams have two different points of view toward software changes (Waschke, 2015). Developers want to deliver new and improved features, while operations want to maintain the stability of IT services or IT systems; therefore, they do not want developers to deliver new features since they fear they will compromise the stability. This creates a blame game between these two roles where operators blame the developers for compromising the system stability, while the developers blame the operators for not maintaining the operability of the system to receive new features (Hussaini, 2015).

When these two IT teams collaborate to develop new features, operators can be involved from the beginning of the SDLC and help the developers deliver quality and stable software by providing the necessary infrastructure and tools to ensure the software will run with the desired performance (Hemon et al., 2020).

To be able to accomplish its objectives, DevOps employs practices, as shown in Table 1, adapted from Faustino (2018) and Jabbari et al. (2016).

Table 1. DevOps Practices

ID	Practice Name	Description
P1	Continuous planning	Continuous planning of products/features in deliveries to allow the incorporation of customer/business feedback.
P2	Feedback loops between development and operations	Frequent checkpoints between operators and developers to discuss deliveries and application pain points.
P3	Continuous monitoring	An approach where an organization constantly monitors its IT systems and networks to detect security threats, performance issues, or noncompliance problems in an automated manner.
P4	Measure performance metrics (in CI, test, and operations)	Define metrics to measure the system's performance while developing, testing, and operating.
P5	Automated feedback for performance Models and performance predictions	Creation of performance feedback reports based on models and predictions.
P6	Application monitoring	Monitoring of applications to detect performance/wrong behavior from the applications.
P7	Automated dashboards	Build dashboards to provide developers and operators with information about the applications' status and behaviors so that the correct actions can be taken.
P8	Continuous integration	It is a practice that encourages developers to check their code as much as possible, so the other developers can always work on the latest version. This practice also runs a build and tests the code to ensure the new code will not impact the existing software.
P9	Prototyping application	Build a prototype of the feature or application to perform demos for the customers or business users.
P10	Continuous deployment	Once the automatic tests pass the code or artefact, automated deployment will be performed for the following environment.
P11	Automated deployment	Practice that allows to schedule application deployments to be executed automatically.
P12	Continuous delivery	This practice ensures that the software is always ready to be deployed. If a package is created after the build and automatic testing, that package is stored as an artefact on a repository and can be deployed.
P13	Continuous testing	Automatic tests are triggered after each build of the code. It is used together with continuous integration.
P14	Automated testing	Tests that are executed automatically produce a report of the test status.
P15	Process standardization	Standardization of processes is used to unify the processes inside the organization's IT department. This will allow the same modus operandi between all the IT teams, facilitating the personal rotation between IT teams.

continued on following page

Table 1. Continued

ID	Practice Name	Description
P16	Infrastructure as code	This practice allows the coding of the infrastructure for the application and the loading of that code to create or update the existing infrastructure. This allows the quick creation of environments and the scale in/out of server resources based on demand.
P17	Stakeholder participation	Stakeholder participation requires all the key stakeholders to participate in all the software development or operations phases. This allows more engagement from the stakeholders to make decisions on the right timing for the application's developers and operators.

Note. CI = continuous integration; IT = information technology.

Organizations worldwide have reported the benefits of DevOps implementations, such as faster time to market, faster and better feedback, and increased team performance and customer satisfaction (Faustino et al., 2022).

Moreover, ITSM has its challenges (Serrano et al., 2021). One challenge is the time consumption of the process assessment and framework complexity. This shows how bureaucracy can impact the deliveries from the IT teams, as previously stated regarding the ITSM processes.

Based on the DevOps benefits and the premises of DevOps by automating manual tasks, DevOps can help improve the ITSM processes' performance. Also, in the same study by Serrano et al. (2021), ITSM opportunities were found, such as the usage of DevOps and the cloud, where new IT services and hotfixes could be implemented faster.

While the operational literature focuses on performance and efficiency improvements, the ethical dimension is increasingly relevant. Effective bias mitigation in automated systems requires a combined effort between technical safeguards and organizational governance mechanisms (Shin, 2025). This approach is applicable to ITSM environments, where DevOps automation may either mitigate or amplify biases, such as in incident categorization, problem prioritization, or change approval. Considering bias mitigation as a continuous governance activity, instead of one technical intervention, aligns with the iterative and adaptive principles underpinning DevOps practices. This suggests that DevOps could be implemented using PM and IM to develop new IT services or stabilize the existing ones and CM to accelerate the IT teams' deliveries faster.

RESEARCH METHODOLOGY

Since the research in the domain of DevOps application in the ITSM processes is in its early stages (Faustino et al., 2023), the nature of this research is exploratory due to the limited literature about the subject. Exploratory research is meant to start a study on an observed phenomenon without prior (or few) works on a specific context (Zaidah, 2007). Moreover, a CS is built around a question (Thomas, 2016), which, in this case, was: “How do DevOps impact ITSM processes?” This question provided the concept for this research, as shown in Figure 2.

Figure 2. Research Concept

The question is the final objective that the CS needs to answer, but the CS also should be defined by its purpose, approach, and process (Thomas, 2016). Moreover, the subject may lead to three different types of CSs: unique or outlier (when the researcher tries to study a phenomenon out of the norm), a key case (when the researcher is studying a phenomenon that happens a lot), and a local knowledge case (where the researcher is investigating something familiar to themselves) (Thomas, 2016). This CS is classified as a local knowledge case since the researchers are familiar with DevOps practices and ITSM.

Researchers can adopt either a single-case or a multiple-case approach. A single-case approach should be adopted when the event that is supposed to be studied is limited by a single occurrence, or the study will only target a single unit of analysis (Yin, 2009; Zaidah, 2007). Multiple case studies are used on real-life events where numerous, easy-to-replicate sources of evidence exist (Zaidah, 2007). This research's objective was to perform a study on how DevOps impacts three different processes. We decided to perform a multicase study, where these three case studies were done on three different organizations. Each case study focused on one of the three processes, which are IM, PM, and CM. The intention to perform a multicase study was to have an analysis where it was possible to see that DevOps can benefit ITSM, through the impacts that it can have on each process, thereby expanding the knowledge of how DevOps and ITSM can coexist in the same IT landscape.

The main criteria for the case study selection was the empirical evidence that the organizations could provide. Based on this, the selected organizations were those which used one of the ITIL processes (IM, PM, or CM) and would already be open to adopting some of the DevOps practices. This allowed the researchers to observe the integration between DevOps and the processes. Moreover, the organizations showed interest in participating in the research, with the goal to evaluate their employee's perception about this integration.

Since this research intended to study the possible influence of DevOps practices on the ITSM processes activities grounded on the experience of several organizations, it had to be considered a retrospective CS.

The research questions (RQs) are shown in Table 2.

Table 2. Research Questions

RQ ID	Description
RQ1	Which DevOps practices can impact each process?
RQ2	What are the benefits and challenges of implementing DevOps practices in the processes?
RQ3	How has DevOps improved the processes?

Note. RQ = research question.

Researchers should explain or explore a phenomenon that leads to the following purposes: intrinsic, instrumental, evaluative, explanatory, and exploratory (Thomas, 2016). As stated before, this research was exploratory; for this type of approach, Thomas (2016) also suggested the following: testing a theory, building a theory, drawing a picture, descriptive, interpretative, and experimental. As previously stated, no literature has investigated the relationship between DevOps and the ITIL processes; therefore, this research aimed to build a theory.

Some authors have provided insights into the structure of a CS (Tellis, 1997). Table 3 shows the approach followed in this research (Yin, 2009).

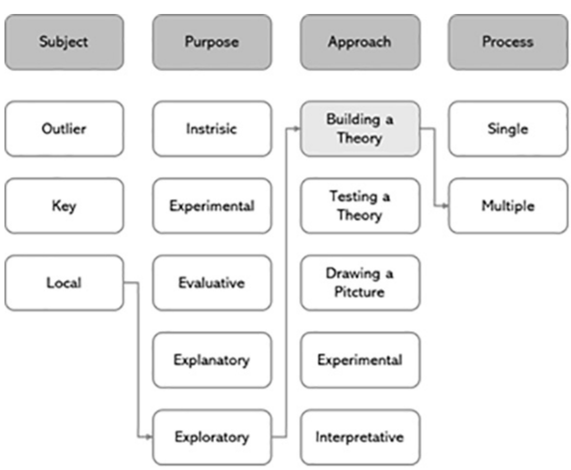
Table 3. Case Study Stages

Stage	Stage Description
Design the case study protocol	This stage comprises two minor stages: determining the required skills and developing and reviewing the protocol. The latter involves extensive reading about the topic to create draft questions. Yin (2009) suggested that the researchers should be good listeners who can interpret the responses and create draft questions.
Conduct the case study	Preparation of the data collection, distribution of the surveys, and conducting interviews.
Analyze case study evidence	An analytical strategy should be employed to evaluate the data gathered in the previous stages of the research.
Develop conclusions	Develop conclusions regarding the data analysis made in the previous stages to establish a bridge between the researcher and the user and explain the benefits or problems found during the research.

Note. Source: Adapted from Tellis (1997) and Yin (2009).

Figure 3 describes the different classifications of our research, according to Thomas' (2016) framework and guidelines, to build a CS, which helps to understand how this research maps with Thomas' framework.

Figure 3. Path for the Case Study (CS)



Note. Adapted from Thomas (2016).

Case studies are about seeing different behaviors from different angles (Baškarada, 2014). Many authors have advised the triangulation of several data collection methods (Modell, 2005; Tellis, 1997). This enriches the case study where there could be multiple other findings and provides an internal validation of the case study (Yin, 1994) by proving the findings from multiple data sources.

Since this was a retrospective CS, the primary data collection procedure was interviews of those who experienced the study phenomenon (Thomas, 2016). The interview type that was used is semi-structure interviews, which are used when one needs to gather more detailed information by giving the interviewees the liberty to express their opinions (Miles & Gilbert, 2005), allowing for the capture of deep individual perception about the topic.

Direct observation was also performed, along with a focus group exercise, with some of the interviewees. However, this was not done in the CM process due to organization limitations. Focus groups are frequently used to provide a deeper qualitative analysis of a problem (Nyumba et al., 2018), enabling the researcher to ask questions and to request clarifications of ideas due to the direct contact with the study participants where everyone could provide their opinion (Hasni et al., 2020). Focus groups promote open collective discussion and debate about different perspectives, which enriches the data provided for the research.

Observation can be seen as structured or unstructured (Thomas, 2016). Structured observation occurs when the researcher systematically looks for kinds of behaviors, while unstructured observation happens when the researcher informally observes essential details of what is happening (Thomas, 2016). Observation allows a contextual comprehension of how the practices are employed on a daily basis.

Generically, observation is used to analyze the "before and after" of the behavior of a particular phenomenon after some change (Yin, 1994). However, since the team had already implemented the practices, it was impossible to verify this behavior change in the first place.

Some of the researchers work at the organization where the case studies occurred. Therefore, the type of observation for these case studies should be considered unstructured. Combining these three data collection methods allowed for the capture of several individual, collective, and organizational dimensions regarding the DevOps and ITIL processes integration.

In the following subsections, the case studies are presented.

Case Study Design Protocol

As previously stated, this research was done by performing three case studies in three different organizations. The organizations were selected as they were using the processes and had also implemented DevOps practices. These organizations were organizations that knew about the study and offered to participate. Moreover, the organizations were interested to know the perception of their employees regarding the processes and DevOps. The selection of interview participants focused on individuals employed in IT roles across different levels of experience, where all had familiarity with DevOps practices and processes relevant to the case study. The selection of interviewees was done by the organizations, ensuring the transparency and reducing the bias from the interviewers on selecting the interviewees. To mitigate the bias, there was a request to the organizations to provide interviewees from different functions and experience years, to ensure different level of perspectives. Also, due to the triangulation, the data was analyzed until theoretic saturation was found, where the interviewees were not providing any new information previously stated (Guest et al., 2006; Saunders et al., 2018). However, in the first two case studies, it was only possible to interview members from a single team per case study. In contrast, the PM case study included participants from three distinct teams within the same organization, providing different perspectives.

The first case study regarding IM was performed over four months, from September until December 2023, in a multinational IT consultancy company in financial services based in Lisbon, Portugal. The analysis was based on an application management services team for an insurance company, focused on the corrective maintenance of a core insurance application. Even though the team was known to be bilingual, the interviews were conducted in Portuguese.

Regarding the CM case study, the research was conducted over two months (August and September 2022) at a multinational fintech company, with one team and a sample of 10 interviewees, using a qualitative approach. The team's average professional experience was 8.3 years, and experience with DevOps was about 0.8 years. It is important to note that, for the CM experience, most participants were neither fully aware of the concept nor had knowledge about the process as a whole. So, to address this knowledge gap, the interviewer explained the main ideas behind DevOps, in addition to CM and its phases, during the interviewing process. This case study was focused on the work of Camargo (2022).

The PM case study was performed in a German multinational conglomerate company. On average, participants had four years of experience in their roles, while having close to 10 years of work experience in IT. Three separate teams were represented in this exercise: a service management team responsible for overseeing the implementation of PM and other ITIL processes in the organization (participants PM-A, PM-G, and PM-J), a service delivery team managing business interactions with customers and end users (participants PM-C, PM-E, and PM-I), and a development team responsible for the maintenance and continuous improvement of service management tools utilized in the organization (participants PM-B, PM-D, PM-F, and PM-H). This case study focused on the work of Adriano (2021).

To ensure that the recorded interviews were understood correctly, each one was reviewed, and the relevant topics were transcribed for written support using the same terminology observed in the recordings, with the authorization of all participants. As the interviews were semi-structured, they contained a variety of question types, including open and closed questions, as well as rating questions where participants were asked to provide a score and justify their reasoning. The interview process was divided into three stages: the first aimed to gather information about the interviewee's professional background and experience; the second focused on getting their perspectives on DevOps practices; and the third explored the perceived impact of these practices on process-related activities. The questions used in the interviews were based on and adapted from Faustino et al. (2020).

The interviewees' structure is summarized in Table 4, detailing each interviewee's role and professional experience.

Table 4. Case Study Stages

Case Study-Interviewee	Position	Experience in IT	Experience in DevOps
IM-A	Experienced developer	3	3
IM-B	Experienced developer	3	3
IM-C	Team leader	7	6
IM-D	Team leader	8	6
IM-E	Team leader	6	6
IM-F	Team leader	6	6
IM-G	Manager	10	7
IM-H	Manager	10	7
IM-I	Manager	9	6
IM-J	Manager	15	6
Average	-	7.7	5.6
CM-A	Quality and assurance (QA) engineer	15	0

continued on following page

Table 4. Continued

Case Study-Interviewee	Position	Experience in IT	Experience in DevOps
CM-B	Quality and assurance (QA) engineer	12	2
CM-C	Software engineer	1	1
CM-D	Software engineer	10	2
CM-E	Software engineer	3	1
CM-F	Software engineer	7	1
CM-G	Software engineer	2	1
CM-H	Technical writer	7	0
CM-I	User Experience (UX) designer	6	0
CM-J	Product manager	20	2
Average	-	8.3	0.8
PM-A	Process manager	5	1
PM-B	Developer	10	9
PM-C	Service manager	14	3
PM-D	Developer	5	4
PM-E	Process manager	13	2
PM-F	Developer team lead	12	12
PM-G	Process manager	10	1
PM-H	Developer	12	4
PM-I	Process manager	10	3
PM-J	Process manager	6	6
Average	-	9.7	4

Note. IM = incident management; CM = change management; PM = problem management; IT = information technology; QA = quality and assurance; UX = user experience.

CASE STUDY CONDUCT AND EVIDENCE ANALYSIS

The following subsections demonstrate how the interviewees were conducted and how the data collected was prepared, after which each subsection has its own conclusion about the data. Also, each subsection corresponds to the RQs that are in Table 2.

Interview Analysis on DevOps Impact on Process Activities

Table 5 shows the participants' matches between the DevOps practices and IM, CM, and PM process activities. The color legend provides the meaning for each color.

Table 5. Matches Between DevOps Practices and Process Activities

Process / Activity		Practice ID																	
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	Total of Matches
IM process	Detection and recording	-	3	4	1	-	5	1	-	-	-	-	-	1	1	2	-	2	20
	Classification and initial support	3	2	2	-	-	-	2	-	-	1	-	-	-	-	3	-	3	16
	Investigation and diagnosis	1	7	-	-	-	1	-	2	1	1	1	1	-	-	1	4	1	21
	Resolution and recovery	2	5	-	-	-	-	-	7	2	4	7	4	1	4	-	2	1	39
	Closure	1	1	-	-	-	-	-	3	-	2	3	4	-	-	2	-	-	16
	Monitor and tracking	2	1	3	3	-	6	1	-	-	-	-	-	-	-	1	-	-	17
	Total of matches	9	19	9	4	0	12	4	12	3	8	11	9	2	5	9	6	7	-
Normal change process	Create RFC	3	-	-	-	-	-	-	5	-	4	4	4	3	2	4	-	5	34
	Record RFC	1	-	-	-	-	-	-	4	-	3	3	3	2	2	3	-	2	23
	Review RFC	3	-	-	-	-	-	-	3	-	3	3	5	6	5	5	-	3	36
	Assess and evaluate change	8	-	-	-	-	-	-	3	-	3	3	4	3	2	3	-	2	31
	Authorize build and test	1	-	-	-	-	-	-	5	-	3	3	4	3	4	2	-	-	25
	Coordinate build and test	2	-	-	-	-	-	-	5	-	4	4	5	5	5	4	-	1	35
	Authorize change deployment	-	-	-	-	-	-	-	4	-	5	5	4	1	1	2	-	1	23
	Coordinate change deployment	3	-	-	-	-	-	-	4	-	7	8	6	2	2	3	-	2	37
	Review and close	1	-	-	-	-	-	-	1	-	3	3	5	2	1	4	-	4	24
	Total of matches	22	0	0	0	0	0	0	34	0	35	36	40	27	24	30	0	20	-
Standard change process	Review RFC	5	-	-	-	-	-	-	2	-	2	1	5	2	3	5	-	5	30
	Assess and evaluate RFC	5	-	-	-	-	-	-	4	-	4	3	6	5	5	4	-	5	41
	Authorize and schedule change	4	-	-	-	-	-	-	6	-	3	2	5	5	5	2	-	2	34
	Coordinate change implementation	3	-	-	-	-	-	-	5	-	4	3	5	5	5	4	-	5	39
	Review and close record	3	-	-	-	-	-	-	2	-	2	1	4	3	3	4	-	6	28
	Total of matches	20	0	0	0	0	0	0	19	0	15	10	25	20	21	19	0	23	-
Emergency change process	Record RFC	4	-	-	-	-	-	-	3		3	3	4	1	1	-	2	5	26
	Assess change	6	-	-	-	-	-	-	4		4	4	5	3	4	-	1	3	34
	Change approval	3	-	-	-	-	-	-	5		3	3	4	4	6	-	2	3	33
	Review approval	2	-	-	-	-	-	-	3		5	4	3	-	1	-	1	2	21
	Implement change	3	-	-	-	-	-	-	4		6	7	5	2	3	-	2	3	35
	Review change	3	-	-	-	-	-	-	4		6	7	5	2	3	-	2	3	35
	Total of matches	21	0	0	0	0	0	0	23	0	27	28	26	12	18	0	10	19	-

continued on following page

Table 5. Continued

Problem management	Problem detection	14	22	-	-	-	24	-	9	6	-	5	-	-	8	21	-	9	118
	Problem logging	12	16	-	-	-	12	-	10	7	-	4	-	-	7	16	-	11	95
	Problem investigation and diagnosis	16	21	-	-	-	17	-	12	8	-	4	-	-	8	14	-	13	113
	Known error management	17	17	-	-	-	12	-	12	7	-	4	-	-	6	16	-	14	105
	Problem resolution	20	19	-	-	-	13	-	16	9	-	5	-	-	9	19	-	12	122
	Problem closure	12	17	-	-	-	12	-	7	6	-	5	-	-	6	16	-	12	93
	Total of matches	91	112	0	0	0	90	0	66	43	0	27	0	0	44	102	0	71	-

Note. legend: Not Relevant (-) = 1 to 2 matches; Low Impact (L) = 3 to 4 matches; Medium Impact (M) = 5 to 6 matches; High Impact (H) = more than seven matches. IM = incident management; RFC = request for change.

DevOps practices identified in Table 1 were matched with at least one activity regarding the IM process. The DevOps practices that were seen to have the most impact were feedback loops between development and operations, application monitoring, and continuous integration. Analyzing from the point of view of the activities, the activities with more matches were resolution and recovery, investigation and diagnosis, and detection and recording. This was a good indicator for resolution and recovery and investigation and diagnosis since the IM process objective was to solve and recover as fast as possible.

Table 6 shows the interviewees' comments about each practice and match. According to the color legend in Table 5, only the activities with more matches per DevOps practice were considered. Also, only the practices with at least one grey match were considered.

Table 6. Insight on DevOps and Incident Management (IM) Process

Practice ID	IM Activity	Comment
P1	Classification and initial support	“By continuously planning, it will be possible to order the backlog correctly and know what is causing more pain in the users at the moment.”
P2	Investigation and diagnosis	“Close collaboration between development and operations will allow them to share knowledge to diagnose the incident.”
	Resolution and recovery	“The coordination between developers and operators can result in anticipating if there are issues with a build of a package due to a resolution of an incident; this could help to improve the resolution.”
P3	Detection and recording	“This practice could enable the creating of incidents, and it can attribute the priority and trigger other actions to support the application.”
	Monitor and tracking	“Monitoring the system continuously will identify strange behaviors on the application, therefore identifying incidents. This will also help to identify if a fix for an incident will be working after applying”
P4	Monitor and tracking	“We can have an overview of the application behavior of the performance to tell if the incident is solved.”
P6	Detection and recording	“This practice allows for the creation of incidents automatically as soon as a usual behavior is detected.”
	Monitor and tracking	“Allows to see the behavior after a resolution being applied to know if the incident is resolved.”

continued on following page

Table 6. Continued

Practice ID	IM Activity	Comment
P8	Resolution and recovery	"Continuous Integration allows a faster resolution by ensuring the code is being integrated more often and allowing to be sure that will follow the quality gates." "By integrating every code, we can apply the resolutions faster, hence closing the incident faster."
P10, P11	Resolution and recovery	"It will allow progressing with the resolution between the environments faster until it reaches production." "Allows faster deployment of new logging to environments to investigate and find the final solution to the issue."
P12	Resolution and recovery	"Saves time to deliver the new solution into the final environment, ensuring the code is deployable without any issue." "It could harm the investigation; since DevOps allows constant delivery and constant deployments, we can have five deployments (one per day), and an incident is created after seven days. We may need to check all the code delivered in those five deployments."
	Closure	
P14	Resolution and recovery	"Knowing the correct behavior, we know what to test to apply TDD." "Saves time to apply the correct tests after a solution is identified."
P15	Classification and initial support	"If there is a standard way to detect and record incidents, it will help the end users understand the process. The same applied to the classification, so the incidents can be classified correctly."
P16	Investigation and diagnosis	"Having the infrastructure in code files will help create new environments to help diagnose and resolve the incidents."
P17	Classification and initial support	"Depending on the stakeholder, they should be the ones interested in the application stability, so they should be able to detect and escalate incidents so that they could be fixed according to the impacts and priority."

Note. IM = incident management; TDD = Test Driven Development.

In this team's context, the IM process did not fully align with ITIL's goal of resolving incidents as quickly as possible (AXELOS Limited, 2019). Instead, the team followed an agile, sprint-based approach where stakeholders set priorities for incidents and development tasks based on business needs. As a result, the team depended on business stakeholders to determine what is most important to address.

Moreover, justifications, like "continuous integration allows a faster resolution by ensuring the code is being integrated more often…," and "it will allow progressing with the resolution between the environments faster until it reaches production," indicated the delivery practices as Continuous Integration/Continuous Delivery (CI/CD)and continuous deployment allowed a faster resolution of the incident. However, an input showed a different perspective on continuous delivery. An interviewee said that "it could harm the investigation; since DevOps allows constant delivery and constant deployments ... we may need to check all the code delivered in….," leading us to a negative impact that, with so many deliveries, would make it harder to find the code that caused an incident.

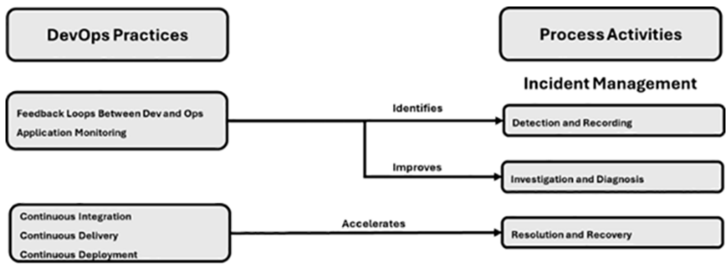
Another aspect that stood out was the detection of incidents. The interviewees claimed that incident detection is essential to the application's stability, so more monitoring and new metrics are always welcome so that incidents can be detected earlier, reducing the possible impacts on the business units, as said by the interviewees in the statements "this practice could enable the creating of incidents, and it can attribute the priority and trigger other actions to support the application," and "this practice allows for the creation of incidents automatically as soon as a usual behavior is detected."

The improvements observed in incident detection and resolution were consistent with Shin's (2025) assertion that bias mitigation benefits from proactive and transparent operational mechanisms.

Practices, such as continuous monitoring and automated dashboards, contributed to greater responsiveness and reduced dependency on individual judgement, which, as Shin (2025) warned, can introduce variability and inconsistency in decision-making.

Figure 4 shows which DevOps practices caused more impacts in the IM process activities.

Figure 4. Matches Between Incident Management (IM) and DevOps Practices



Regarding CM process, for normal changes, the top three practices that had more matches were the practices of continuous delivery, automated deployment, and continuous deployment. The practices had more impact on the final activities of the process, such as authorize change deployment, coordinate change deployment, and review and close record.

Moreover, from the point of view of the activities, the activities that matched were coordinate change deployment, review request for change (RFC), and coordinate change and build test. Regarding coordinate change deployment, it was possible to see more matches of continuous deployment, automated deployment and continuous delivery, similar to what was stated previously. Continuous delivery, continuous testing, automated testing, and process standardization were used for review RFC activity. For the coordinate change and build test, more matches were seen in continuous integration, continuous delivery, continuous testing, and automated testing.

Table 7 presents interviewees' feedback on how DevOps practices align with normal change process activities. When compared with Table 5 (standard change), the same DevOps practices, i.e., continuous delivery, stakeholder participation, and automated testing, were identified as having the most matches. The most impacted activities across both processes were assess and evaluate RFC, coordinate change implementation, and authorize and schedule change.

Table 7. Insight on DevOps and Normal Change Process

Practice ID	Normal Change Activity	Comment
P1	Assess and evaluate change	“As we continuously plan, we evaluate why the change is necessary and coordinate when it should be deployed.” “Evaluate change because it is when we can verify if it is going to bring value to our product.”
P8	Create RFC	“A change may need authorization, and coordination is needed for this change to be deployed.” “Because it cannot change the functioning without being evaluated, accepted, and reviewed. Regarding the pipeline, they must guarantee that the change's entry will not harm the system. The whole process of testing pipelines and how things are working, and there is a whole process where this change will be integrated, is important to be executed.”
	Authorize change and build test	
	Coordinate change and build test	
P10, P11	Authorize change deployment	“One of the most important processes where it was more bureaucratic, e.g., for each new deploy was extremely bureaucratic and had a set of requests and documents to be done, tests after deploy, rollback mechanisms, and had to be validated.”
	Coordinate change deployment	
P12	Review RFC	“Because it is about delivering, we need to review it as we release software. That is, review and coordinate such changes.”
	Coordinate change deployment	
	Review and close record	
P13, P14	Review RFC	“Because you must verify what exists, we need to have authorization; we just need to coordinate what needs to be deployed. You do not need something to be authorized; it just needs to be coordinated and not authorized.” “To get the requirement tested accordingly, coordinate its change deployment.”
	Coordinate change build and test	
P15	Review RFC	“Everything is a process in place and must be taken into consideration.”
P16	Create RFC	“Because it is an important component at the process's beginning and end.” “It is important to have them created and communicated. Sometimes it seems too informal and needs to be more effectively communicated.”

Note. RFC = request for change.

Stakeholders play a vital role in the change process, even for low-risk changes. They act as key approvers, understanding the potential impacts and ensuring effective communication across affected teams and systems, as said in the statement that “the stakeholders are the best people to know when to deploy these types of changes without causing any issue to the business users.” Table 8 outlines feedback on how DevOps practices align with standard change process activities.

Table 8. Insight on DevOps and Standard Change process

Practice ID	Normal Change Activity	Comment
P1	Review RFC	"As it is already part of the plan, we can review it and then coordinate when it will be deployed and ensure it is aligned with the product planning."
	Assess and evaluate RFC	"Because we can see a board and do something as a team, we can define our priority as an autonomous team."
P8	Authorize and schedule change	"Even being standard changes, they need to go through the entire process as it has the most delicate parts of the SDLC, and we need to ensure quality upon deployment."
	Coordinate change implementation	
P10, P11	Assess and evaluate RFC	
	Coordinate change implementation	"Because we do not need authorizations for something that is not urgent and should not be escalated."
P12	Assess and evaluate RFC	
P13, P14	Assess and evaluate RFC	"Because we can review the request (for a change) without needing a previous review." "Only for scenarios where we need to cover it with tests besides reviewing this change and closing it."
	Authorize and schedule change	
	Coordinate change implementation	
P15	Review RFC	"It allows standard changes not to impact the planning; if we follow the process, we will not have disturbances on development, and then we will have continuous development and will not affect our planning. Not necessary on authorization but coordination."
P17	Coordinate change implementation Review and close record	"The stakeholders are the best people to know when to deploy these types of changes without causing any issue to the business users." "They help to understand if the change had the expected impact on the business users."

Note. RFC = request for change; SLDC = software development life cycle.

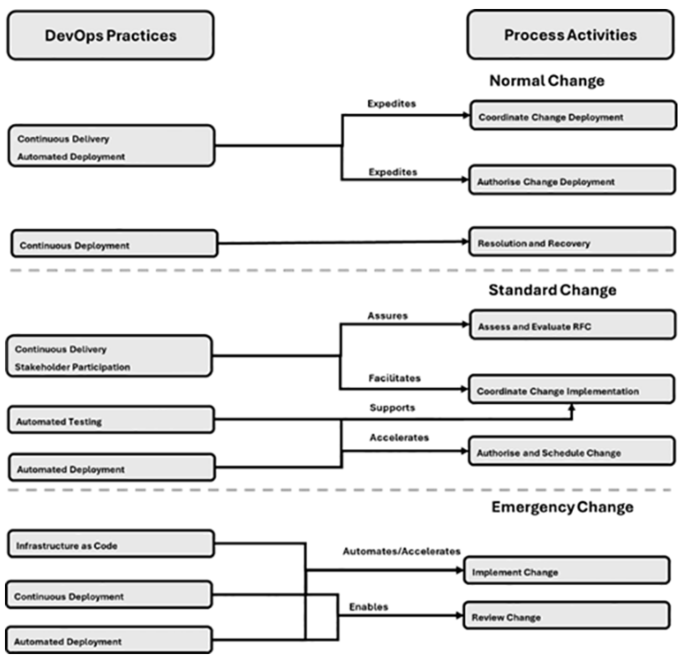
In contrast, for emergency changes, infrastructure as code (IaC) replaces process standardization, as infrastructure issues often trigger such changes. Practices, like continuous deployment and automated deployment, are crucial for speeding up the final stages of emergency change, thereby helping to restore IT services quickly.

Table 9. Insight on DevOps and Emergency Change Process

Practice ID	Normal Change Activity	Comment
P1	Assess change	"Even being an emergency, we need to ensure quality and not have the problem again as we want to ensure confidence on the part of our end users (clients) by escalating the priority. Detailed attention is to avoid errors."
P8	Change approval	"The deliverable also guarantees that will ensure the change was effective and, in an emergency, it must be validated thoroughly, and all steps are required." "Because we need authorization (only if the upper level is too much involved) for something urgent and needs to be escalated."
P10, P11, P12	Implement change	
	Review change	
P13, P14	Change approval	"Even being an emergency, we need some confidence level in the change being performed and detect regressions (even if it is not an emergency)."
P17	Record RFC	"It is important to have the stakeholder's participation in each part of the process, especially during an emergency."

Note. RFC = request for change.

Figure 5. Matches Between Change Management (CM) and DevOps Practices



The streamlining of approval workflows in CM through automation reflects Shin's (2025) view that debiasing is not solely about slowing decision-making for the sake of fairness, but about embedding fairness checks within efficient workflows. In this case, automated testing and continuous delivery not only increased speed but also enhanced confidence in decisions, thereby reducing the influence of subjective or inconsistent criteria.

The interviewees were asked to assess the relevance of DevOps practices across PM activities by having each select one of the following options for each combination: 1, meaning low relevance; 2, meaning relevant; and 3, meaning high relevance. Answers were compiled into Table 5 by adding the values entered for each cell. Opinions and justifications provided by interviewees as they responded to this assessment are found in Table 10.

Table 10. Insight on DevOps and Problem Management (PM) Process Matches

Practice ID	PM Activities	Comment
P1	Problem detection	"Having a regular forum where potential problem candidates are discussed can be helpful to the process." "With continuous planning, we can find issues and obstacles that need to be addressed via the PM process."
	Problem investigation and diagnosis	"This would be an important practice to have as it enables better task management (…) knowing where each investigation is on an ongoing manner is helpful for the process."
	Problem resolution	"Solution activities for problems have to be planned. Having [continuous planning] is very relevant as it can expedite the implementation." "Continuous planning sessions, the fact that they allow the opportunity for ongoing discussion, can be a positive element for the process." "This can also prevent problems even before they get to production."
P2	Problem detection	"Being aware of what development is to be implemented, and pointing out risks or issues, is an important contributor to the creation of problems."
	Problem investigation and diagnosis	"Performing problem root cause analysis always requires collaboration. Developers and operations need to work together to determine the cause of problems." "Regardless of who does the root cause analysis, it is important to have consistent feedback between the process teams and the tech teams. It is how we obtain necessary updates and improve communication."
	Known error management	"The validation of known errors and workarounds has to be checked and confirmed by the development side, who often have the technical awareness to approve or reject this."
	Problem resolution	"This combination is needed to clarify the requirements of a problem solution and align how that solution will be introduced properly." "It is the developers who take the lead in the working out of a resolution for a problem; however, the implementation of it already involves operations. They should be working together."
P8	Problem investigation and diagnosis	"A problem investigation is an ongoing process. It should be easy to track and simple to manage. The idea of continuous integration, with new information added to the problem piece-by-piece, makes sense."
	Problem resolution	"In implementing solutions for problems, this practice can speed things up to a higher pace."
P6	Problem detection	"This is a key practice to identify problems proactively. We need to be aware of what is happening in the environment; having automation helps." "We could link this with the event management process, working as input for PM."
	Problem logging	"There may be opportunities to automate the creation and logging of problem records based on certain monitoring triggers."
	Problem closure	"We could use some sort of automated monitoring to confirm the complete resolution of a problem investigation."
P9	Problem resolution	"The prototyping of a problem solution could be done."
P14	Problem resolution	"We could use this practice to test how effective a problem solution is before implementing it in production."

continued on following page

Table 10. Continued

Practice ID	PM Activities	Comment
P17	Problem detection	"Additional 'eyes on the field' are important to detect things as soon as something goes wrong."
	Problem logging	"The prioritization of a problem and its classification, based on urgency and impact, depends on the stakeholders' insight and participation."
	Problem resolution	"Stakeholders should be involved in confirming solutions to the problems." "They are the best suited to consider, agree, comment on, and confirm the solutions to problem issues."
P15	Problem investigation and diagnosis	"Having standard processes allows us to organize and help carry out investigations. Standardization also easily points out what may have failed during a problem."
	Known error management	"Only with a standardized process within our teams can we ensure that a good known error knowledge base is in place; it prevents wasted time where we have people investigating matters that are already known or under resolution."
	Problem closure	"In closure, everything should be documented, and everyone should be aware of and follow the same process. (…) the outputs of each activity toward closure should have a predictable outcome."

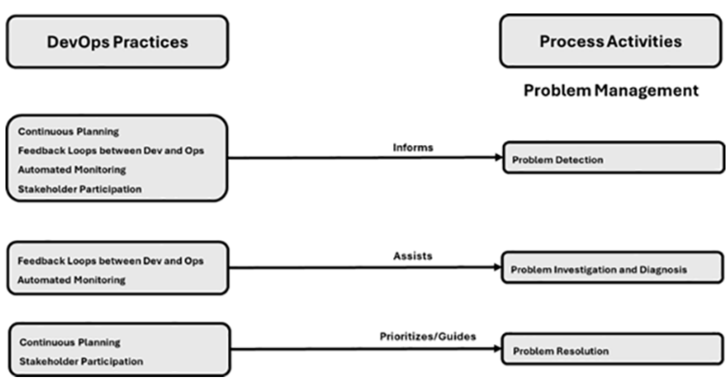
Note. PM = problem management.

Data from semi-structured interviews revealed that nine out of 17 DevOps practices significantly influence at least one stage of the PM life cycle. Practices, like continuous planning, DevOps feedback loops, automated monitoring, and stakeholder participation, were especially impactful, enhancing planning, collaboration, and early problem detection.

The most affected PM activities were problem detection, investigation and diagnosis, and resolution. Feedback loops and monitoring help identify and analyze issues, while stakeholder involvement supports early detection through real-world user insights. Continuous planning was key for early issue identification and prioritization, contributing to more resilient applications.

Some practices, like application prototyping and deployment/test automation, were seen as less significant, especially test automation, which was unknown or unused by interviewees. Table 10 and Figure 6 detail the connections between DevOps practices and PM activities.

Figure 6. Matches Between Problem Management (PM) and DevOps Practices



The emphasis placed on collaborative feedback loops in the PM process was aligned with Shin's (2025) argument that sociotechnical biases are most effectively addressed when organizational structures encourage collaboration across roles. By engaging both development and operations in root cause analysis, the process was less likely to be influenced by unilateral perspectives that could distort prioritization or resolution outcomes.

Having analyzed the three processes, one can see that DevOps could impact the ITIL processes differently, but this was always with the focus on improving collaboration between different participants and improving or accelerating manual tasks, such as assessments and approvals. In more detail, we can see that continuous planning was causing more impact on the PM and CM process, where this practice could help to plan changes and their deliverables with the correct timing, in line with the following statement: "As we continuously plan, we evaluate why the change is necessary and coordinate when it should be deployed." Likewise, the solutions for the problems existing in the IT services depended on the impact, as in the idea that "solution activities for problems have to be planned. Having [continuous planning] is very relevant as it can expedite the implementation." There was also the relationship to deliver the solutions for the existing problems; a change was required. Feedback loops between development and operations were seen as more impactful in PM and IM.

This was seen as a practice that helps operators quickly solve issues in IT services due to the collaboration between developers and operators. Likewise, application monitoring was seen as impactful in PM and IM. This practice is essential in identifying issues as early as possible, even in applying a quick fix or a workaround (like in the IM process), as reported in the statement that "this practice allows for the creation of incidents automatically as soon as a usual behavior is detected," or a solution for a root cause of several issues (like in the PM process). Nevertheless, the focus is to stop the damaging business impact.

However, three practices were identified only in the IM practice: continuous monitoring, measuring performance metrics, and automated dashboards. The interviewees did not apply these practices but recognized their potential to anticipate issues and take quick actions before they affected the business work, whereas an interviewee said: "We can have an overview of the application behavior of the performance to tell if the incident is solved."

Continuous integration and continuous delivery and automated deployment usually work together due to all the automation to have a deliverable ready to be deployed. Due to this, these practices were seen in the three processes; IM and PM were seen to have more impact on the resolution and investigation activities, while the CM process accelerated the implementation and the previous authorization and approval activities. Since the deliverable was ready right after the build, the approvers had more confidence to move on with the change and implementation when possible, per the affirmation of an interviewee: "The deliverable also guarantees that will ensure the change was effective and, in an emergency, it must be validated thoroughly, and all steps are required."

Regarding testing practices, automated testing was seen as more present than continuous testing since continuous testing was only applied to the CM case study. Nevertheless, automated testing was seen in all three processes, accelerating the resolution in the case of PM and IM, and it was used in the approval stages of the changes by bringing more confidence in the tests of the new changes, as in the statement: "We could use this practice to test how effective a problem solution is before implementing it in production."

The IaC practice was only identified in the IM and emergency change process. This practice enforces the relationship between the two processes since emergency changes are usually used to correct higher incidents. This practice enables the infrastructure to be taken care of, such as code, enabling versioning of the infrastructure and fast changes. This helps to fix the incidents since the infrastructure can be easily rolled back or updated on demand, returning the IT service to normal operation.

Finally, the last practice from the group of DevOps practices, stakeholder participation, was also seen as impactful in the three processes. In the three processes, there was a consensus that the stakeholders are the key to the best management of backlogs, approvals, and authorizations and the main point of contact for knowing how the application should behave. So, they should always be informed about any issues or changes to the applications so that they can provide the best inputs. This could be seen in the affirmations "they are the best suited to consider, agree, comment on, and confirm the solutions to problem issues," and "they help to understand if the change had the expected impact on the business users."

To summarize, it was possible to conclude that, in the opinion of these professionals, DevOps practices can potentially improve the ITIL processes, using automation to accelerate the resolution of issues and to reduce human error, providing more confidence to the process owners, hence accelerating the authorization and approval activities.

In this section, it is possible to answer to RQ1. The IM process is being impacted by feedback loops between development and operations, continuous and application monitoring, measuring performance metrics, automated dashboards, continuous integration, continuous delivery, automated deployment, automated testing, process standardization, and IaC, resulting in a total of 10 practices impacting this process.

In the PM process, it is possible to see the impact from continuous planning, feedback loop between development and operations, application monitoring, continuous integration, continuous delivery, automated deployment, automated testing, process standardization, and stakeholder participation, resulting in a total of nine practices impacting this process.

Lastly, in the CM process, it is possible to see the impact from continuous planning, continuous integration, continuous delivery, continuous and automated deployment, continuous and automated testing, process standardization, IaC, and stakeholder participation, resulting in a total of 10 practices impacting this process.

Interview Analysis on DevOps Benefits and Challenges

This section analyzes the benefits and challenges of adopting DevOps practices in the three referred processes. The interviewers asked what in each practice would benefit the interviewees. After performing a qualitative analysis of the answers, Table 11 shows the responses. We performed an analysis of the keywords said by the interviewees to describe what would be the benefit regarding each practice. Figure 7 describes the benefits found from the analysis of the keywords.

Table 11. DevOps Benefits

ID	IM Process	CM Process	PM Process
P1	Good planning helps us respond to business needs at the right time. This creates a more collaborative environment between business and IT and improves customer satisfaction.	Employing good planning contributes to the product vision, i.e., where the team is heading in terms of what needs to be delivered. The quality results from how the requirements were aligned and incorporated into the process. Also, it empowers the team to react to changes and new requirements that either come from the stakeholders or during the development cycle, creating this effective communication-oriented practice.	Ensure that we are all constantly on the same page. This allows us to be lean, constantly thinking about the next steps and priorities and allows flexibility.
P2	It contributes to collaboration between the two IT teams and is an opportunity to fix issues before they reach production, improving delivery quality. The teams will also share experiences, maximizing their knowledge.	It contributes to continuous improvement among team members. It assesses the questions: “what went wrong?” and “what went right?” It is also a means to facilitate communication of the lessons learned for each iteration.	There is a gap between operations and development. Having this in place requires an investment from both ends, where we help each other. In a utopia, we are doubling teams.
P3	It will help to identify issues in several layers to identify issues earlier.	It helps to understand the system performance in production and provides information so that the team can react sooner rather than later. This way, the system achieves stability, and the team can profit from the information to make an action plan whenever an incident arises.	-
P4	It helps to evaluate the application's performance so that action can be taken before it impacts the business.	It identifies the current application state in production and verifies performance bottlenecks. It complements other metrics, such as key performance indicators (KPIs) and operational and delivery flow, and is quite helpful in reacting to changes when they arise. This is why, just like continuous monitoring, it is advantageous to be reactive to such metrics.	-
P6	Find issues at an early stage to act on the issues.	Just like continuous monitoring, it bears valuable information to the team so that it can be proactive instead of reactive when handling incidents. This way, the team can work on a strategy to tackle an issue before it affects the end users.	“We can see the status of things without human intervention.”
P7	Identifies the current behavior and performance indicators of the application, providing a clear picture of where to act.	It summarizes the information graphically instead of tabularly and checks the system performance. By adopting such monitoring tools, the team can react swiftly based on graphical information and combine it with other key performance indicators (KPIs).	-

continued on following page

Table 11. Continued

ID	IM Process	CM Process	PM Process
P8	The main practice for the quality of the team delivery is to integrate the code with other deliveries, which will help us find any issues in the code so we can correct them.	It draws on two beneficial aspects: product delivery and developer experience. The first enables fast, reliable, and predictable software that is deliverable in development. The second suggests improving the focus on development tasks, making the concerns about software integration agnostic to the developers.	Developers work to improve our ITSM tool through continuous integration, which involves constantly Implementing small changes and features. This allows us to implement quick corrections in a few hours/ minutes.
P9	It shows the new behavior of a correction or a new functionality for the business to approve before it goes to production, helping to satisfy the customer's needs.	It introduces the product vision and strategy to the team and stakeholders earlier, which helps to evaluate the concepts of the new end product. Further contributing to product improvement, it may impact product planning based on findings from the prototype as potential issues are unveiled at earlier stages in product development.	We benefited from the development side. However, it is very important that expectations of what the prototype should be are clearly defined.
P10	It will help the code to reach production or higher environments quickly.	Given its continuous nature, it provides fast deployment to the end users as soon as they meet the quality requirements.	-
P11	This will ensure the code is deployed correctly and automatically, mitigating human error and ensuring delivery quality.	As a process ensured by automation, it promotes predictable and deterministic deployments. Manual interventions may be error-prone, and the risk of failure is reduced when adopting an automated approach.	Our ITSM tool helps with bulk changes, reducing some manual work, but the effort is never entirely automated.
P12	This makes sure the package is ready to be deployed anytime it is needed. Even if a rollback is needed, we can install previous versions of the packages, helping to resolve issues faster.	It reduces time and effort when delivering software, whether improvements/new features or fixing bugs.	-
P13	Continuous testing will give more confidence in the code that is being delivered since it is being passed between different environments and ensuring the same behavior.	Considering that any new change will be tested, it is a way to minimize the impact on existing production implementation by changing/adding new code. It functions as a quality gate, ensuring the system consistently functions. This is backed by tests, which provide a certain confidence level based on the robustness and certainty given by this quality gate.	-
P14	Automated testing will guarantee the quality of the code by checking whether it changes the behavior of something that was previously correct.	It serves as a quality guarantee on the deliverable, as for each new change introduced, given the tests' deterministic nature, it increases the odds of shipping nonbreaking features, which creates a robust and safe deliverable.	These "sanity checks" have been applied successfully, and a dedicated team is in place for them specifically.
P15	This practice will help new people to join the teams since the processes will be the same across the organization.	It facilitates the process for different team members, ensuring deterministic outcomes, because the process will be followed thoroughly and, as a result, it reduces cognitive load as it is something well-known among team members.	There is a standard scrum process in place, but it can change depending on how day to day activities is done. Some flexibility is still needed for motivation, however.

continued on following page

Table 11. Continued

ID	IM Process	CM Process	PM Process
P16	This practice will help to solve issues quickly, if we have a change on the infrastructure, we can just roll back to the previous version and quickly solve the issue.	-	-
P17	The stakeholders of the application should always be informed and participate when needed because they will be the main player affected by the issues. This will ensure that everyone is on the same pace about the issues and their impacts and helps to reprioritize based on business inputs.	By keeping different stakeholders "in the loop," they can contribute to the vision of what is expected and foment knowledge sharing between different parties. Additionally, it supports the decisions made during planning. Therefore, it enables a collaborative and communicative environment between everyone in the team, including product and engineering stakeholders.	Having visibility and participation in the work adds to the reputation of the team, which can improve performance.

Note. IM = incident management; CM = change management; PM = problem management; IT = information technology; KPIs = key performance indicators; ITSM = Information Technology Service Management.

Figure 7. DevOps Benefits

Regarding challenges, Table 12 shows the interviewees' responses about the challenges found in the processes. There are only comments for the practices where the weighted average was below three since the interviewees classified the adoption from DevOps practices from 1 to 5, with 3 being the neutral value. The same approach of a keyword analysis was performed based on the comments in Table 12, where is possible to see the DevOps challenges in Figure 8.

Table 12. DevOps Adoption Challenges

Practices	IM Process					Average	CM Process					Average	PM Process					Average
	1	2	3	4	5		1	2	3	4	5		1	2	3	4	5	
P1	-	2	1	3	-	3.2	-	3	1	4	2	3.5	-	3	1	2	2	3.4
Comments: -																		
P2	-	1	3	1	-	3.0	-	-	3	5	2	3.9	1	2	3	1	2	3.1
Comments: -																		

continued on following page

Table 12. Continued

Practices	IM Process					Average	CM Process					Average	PM Process					Average
	1	2	3	4	5		1	2	3	4	5		1	2	3	4	5	
P3	-	-	1	1	-	3.5	-	2	4	3	1	3.3	-	-	-	-	-	-
Comments: -																		
P4	-	1	2	-	-	2.7	1	4	3	2	-	2.6	-	-	-	-	-	-
Comments: CM: "It is hard, given the complexity of its implementation and in-depth systems knowledge. Furthermore, it cannot confer results promptly, as the time needed to collect relevant and useful data can be long." IM: "It is hard to keep the monitors up with the new functionalities and also what to monitor over time."																		
P5	-	-	-	-	-	-	1	1	8	-	-	2.7	-	-	-	-	-	-
Comments: CM: "It is hard, given the complexity of its implementation and in-depth systems knowledge. Furthermore, it cannot confer results promptly, as the time needed to collect relevant and useful data can be long."																		
P6	1	-	1	2	-	3.0	-	2	4	2	2	3.4	3	1	1	-	1	2.2
Comments: PM: "The difficulty is in defining the ideal state perfectly and then using automated monitoring to spot deviation. It is tough to implement."																		
P7	-	1	-	1	-	3.0	-	1	5	2	2	3.5	-	-	-	-	-	-
Comments: -																		
P8	-	1	5	2	1	3.3	1	3	3	3	-	2.8	1	2	1	3	-	2.9
Comments: PM: "A perfect design of how things are done needs to be in place."																		
P9	1	-	-	1	-	2.5	-	1	5	3	1	3.4	-	-	2	2	1	3.8
Comments: IM: "In our context, it is quite hard to have environments where we can build these prototypes; however, when we can, we can benefit so we can have the correct feedback about the application behavior."																		
P10	-	1	-	1	1	3.7	2	5	1	2	-	2.3	-	-	-	-	-	-
Comments: CM: "It is hard, as it is complex to attain and inspect, e.g., a "black box," and during the deployment phase, there are nuances that make it hard to implement."																		
P11	-	2	3	-	2	3.3	2	7	1	-	-	1.9	-	-		1	1	4.5
Comments: CM: "It is hard because it relies on nuances in the process, the technical effort, and the potential to introduce new changes to the code base that might not be ready."																		
P12	-	1	2	1	1	3.4	-	6	2	2	-	2.6	-	-	-	-	-	-
Comments: CM: "It is hard, similar to continuous and automated deployment because the team must ensure the system will work when new changes are delivered, for instance, backward compatibility."																		
P13	-	1	-	-	1	3.5	1	2	2	5	-	3.1	-	-	2	-	1	3.7
Comments: -																		
P14	1	3	-	-	-	1.8	-	1	5	4	-	3.3	-	-	-	-	-	-
Comments: IM: "This practice can bring many benefits in regression tests; however, we cannot develop all the missing tests."																		
P15	-	2	1	1	-	2.8	-	2	5	3	-	3.1	1	3	2	-	1	2.6

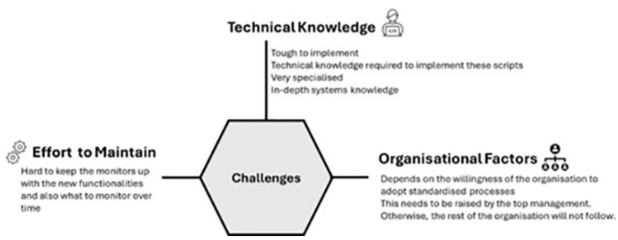
continued on following page

Table 12. Continued

Practices	IM Process					Average	CM Process					Average	PM Process					Average
	1	2	3	4	5		1	2	3	4	5		1	2	3	4	5	
Comments: PM: "Depends on the willingness of the organization to adopt standardized processes." IM: "This needs to be raised by the top management. Otherwise, the rest of the organization will not follow."																		
P16	-	-	-	-	-	-	1	2	6	1	-	2.7	-	-	-	-	-	-
Comments: CM: "It is hard due to the technical knowledge required to implement these scripts. They are very specialized." IM: "Even though the interviewees recognize the benefits, they do not know what needs to be implemented."																		
P17	-	-	3	1	-	3.3	1	2	1	3	3	3.5	2	1	3	3	-	2.8
Comments: PM: "Stakeholders want to be involved in what is being done. Participation on its own is not challenging. It is required to determine what forums to use."																		

Note. IM = incident management; CM = change management; PM = problem management; IT = information technology; KPIs = key performance indicators; ITSM = Information Technology Service Management.

Figure 8. DevOps Challenges



The challenge regarding monitoring practices is keeping up with application changes and what to monitor, as it was said that: "It is hard to keep the monitors up with the new functionalities and also what to monitor over time." Here, a DevOps culture mindset could be in place so that the developers and operators can improve the monitors together due to the new developments and functionalities being delivered.

Regarding other delivery practices, such as deployment and delivery practices, the interviewees stand out in the different deployment processes through the different applications that could be difficult to operate and maintain. Also, there could be a lack of technical knowledge in implementing these practices.

Furthermore, even though it does not stand out in Table 12, we would like to comment on continuous delivery in the IM process, specifically that: "It could harm the investigation; since DevOps allows constant delivery and constant deployments, we can have five deployments (one per day), and an incident is created after seven days. We may need to check all the code delivered in those five deployments." Here is a comment where the practice could negatively impact the process. A good organization of the code and functionalities would be needed to ensure that the code can be easily traced back. This will help to identify which code could cause the issue, facilitating the resolution of the incident.

Regarding the additional challenges identified, particularly those related to technical knowledge, these are primarily associated with the level of expertise required to implement specific DevOps practices, such as IaC. Addressing this gap in technical proficiency can be achieved through organizational mechanisms aimed at enhancing competencies, such as job rotation and structured training programs (Almeida et al., 2013). Encouraging cross-functional collaboration, where operators engage in development tasks and developers take on operational responsibilities, can not only bridge the skills gap between teams but also foster mutual understanding and professional growth.

In terms of effort required for maintenance challenge, it is understandable that application monitoring can become increasingly complex as new functionalities are introduced. One practical solution would be to allocate dedicated personnel with expertise in dashboards and metrics to continuously evolve and refine monitoring systems. Their early involvement during the design and implementation phases would enable the definition of relevant metrics from the outset, thereby contributing to the reliability and stability of the application throughout its life cycle.

Moreover, resistance to the adoption of new practices, processes, or working models is a common organizational barrier. To mitigate this, leadership must cultivate a forward-looking vision and actively change. When management demonstrates a commitment to change, employees are more likely to align with and adopt this mindset. Investing in training on agile methodologies can further support both leaders and team members in embracing a culture of continuous improvement and adaptability, thereby facilitating the successful integration of DevOps practices (Suvvari, 2024).

Thinking from an actual state of the art about the technologic advances, artificial intelligence (AI) is being adopted from organizations worldwide. In IT, AI can be seen as an intelligent agent that can evaluate the IT environment and suggest improvements based on historical data (Ertel, 2024). Based on the statements from the interviewees and the performed analysis, DevOps automation practices have been playing a major role to enhance the ITSM processes. This leaves enough space for AI to work together with DevOps to improve the software delivery and enhance the operations tasks (Barredo Arrieta et al., 2020). Studies show that DevOps can be improved by AI in providing bug detection and improving code traceability. With AI there is also possible to use predictive analytics for resource provisioning to optimize resource provisioning and optimize costs. Automatic code review can also be used to prevent security issues and anomaly detection, which can improve IM process (Alenezi et al., 2022; Ali & Puri, 2024). Based on these statements AI can improve process analysis ensuring optimization, where both DevOps and ITSM could benefit where AI can be used to analyze bottlenecks and suggest improvements (Boussaïd et al., 2017). However, there are some challenges to the AI adoption; AI is based on historical data, so it is necessary for the data to be accurate, with consideration for integration complexity, which can also be tied to skill gaps requiring training (Barredo Arrieta et al., 2020).

Based on these statements and Figures 7 and 8, it was possible to answer to RQ2: What are the DevOps adoption benefits and challenges?

Interview Analysis on Process Performance

For RQ3 of this research, the researchers aimed to conclude whether, in the interviewee's opinion, the practices impacted process performance. Table 13 describes the comments from the interviewees about the DevOps practices regarding ITIL process performance.

Table 13. Comments About DevOps Practices and Information Technology Infrastructure Library (ITIL) Processes Performance

ID	IM Process	PM Process
P1	If we consider the performance of the IM process in terms of SLAs, this practice may not help the process performance since continuous planning may change the priority of the team backlog several times. However, it will be able to reprioritize the backlog based on what is best for the business.	Some investigations are very long (…). They involve complex actions that need to be consistently monitored. If planning for these problems is not continuous, we will lose track of what has been done, what is being done, and what still needs to be completed.
P2	Feedback loops can help find resolutions faster and identify new issues that have yet to be reported. So, they contribute to the stability of the system and to process performance.	We could imagine a DevOpsProb team, where the process knowledge is combined with technical expertise to resolve problems (…) quickly. Specialization can still exist, but all are working toward the same purpose. Communication between problem managers and those developing solutions is needed to ensure things are done in an organized way and at the right time.
P8, P10, P11, P12	Due to the automation behind continuous integration, delivery, and deployment, a package can be quickly available and deployed to several environments, ensuring that the resolution will be deployed faster.	
P14	Automated testing will help determine whether the new solution causes no failures in the existing software, accelerating the tests and, therefore, the resolution.	-
P15	If the processes are standardized across the organization, everyone will know the process and the activity responsible. There will be no leak times between activities.	
P15	If the processes are standardized across the organization, everyone will know the process and the activity responsible. There will be no leak times between activities.	
P17	Stakeholders are the key between the business and the IT teams. So, their participation is crucial to any IT process since IT is there to support the organization's business. They can help to identify the issues and the expected behavior faster so that the IT teams can solve the issues faster.	Other processes may need to be more customer-facing, but having more participation from the business in PM makes it possible to know where to focus effort and where to make priorities. If stakeholders understand the process, they can be essential allies over the time it takes to resolve investigations.

Note. IM = incident management; PM = problem management; SLA = service level agreement; IT = information technology.

For the CM case study, the interviewees did not have an opinion for each practice, so they considered DevOps globally and how it could impact the process. However, by interpreting the answers from the interviewees, it was possible to verify across each contribution just how substantial DevOps is when a team faces a change that needs to be addressed. This is supported by how automated processes promote faster deliveries, meaning rapid delivery to the end users because of this continuous approach. Automation ensures both quality gate and traceability. Finally, it promotes autonomy and readiness to implement those changes and collaboration among all stakeholders and the team itself.

These conclusions are supported by Table 13 when seen from the perspective of the IM and PM case study, namely by the quickness to identify the root cause of an issue and deliver the fix or workaround to diminish the business impact. All of this will impact the main activities of the processes, accelerating the process instances and improving the process performance.

Direct Observation

Since organizations usually adapt their processes to fit their ways of working, a mapping between the organization's process activities and the ITIL standard process activities was created for better comprehension.

Table 14 shows the mapping between the ITIL IM process and the organization for the first case study IM process activities, provided by the organization.

Table 14. Mapping of Information Technology Infrastructure Library (ITIL) and Organizations' Incident Management (IM) Life Cycle

Standard ITIL IM Activities	Organization IM Activities	Activity Objectives From the Organization
Detection and recording	Logging	Incident is being recorded, and the details are being filled.
Classification and initial support	Categorization	The incident was assigned to the responsible team and is waiting to be resolved.
Investigation and diagnosis	Investigation	The incident started to be analyzed, and work to find the issue is started.
Resolution and recovery	Recovery	A solution has been found and is waiting to be applied.
closure	Resolve	The incident is resolved, marking the service disruption or performance degradation as solved.
Monitor and tracking	Closure	The incident is monitored for five days. If the issue recurs, it will be moved to recovery activity again.

Note. ITIL = Information Technology Infrastructure Library; IM = incident management.

Table 15 shows the observed evidence of the impact of the DevOps practices on the organization's IM process activities. Thus, it was possible to conclude that the practices had a positive impact on the process activities.

Table 15. DevOps Practices in Organization Incident Management (IM) Process Activities

	Logging	Categorization	Investigation	Recovery	Closure
P1	(not observed)	During the planning of the teams' work, incident backlog is checked, reprioritized, and more detail added.	(not observed)	(not observed)	(not observed)
P2	Dialogs between the developers and operators raised technical incidents.	(not observed)	There has been collaboration between developers and operators to find solutions.	(not observed)	(not observed)

continued on following page

Table 15. Continued

	Logging	Categorization	Investigation	Recovery	Closure
P6	There are monitors performed by the teams where some incidents can be logged from there.	(not observed)	(not observed)	(not observed)	Due to the monitors being applied, some incidents were being reopened since the solution did not work as supposed.
P8 / P12	(not observed)	(not observed)	(not observed)	CI/CD processes have been seen accelerating the code validation and package build to move the solution between environments.	(not observed)
P11	(not observed)	(not observed)	(not observed)	By automatically deploying the solutions, a solution could be moved between environments quite quickly to be tested and then moved to production.	(not observed)
P14	(not observed)	(not observed)	(not observed)	The automated tests helped verify the quality of the developments and whether none of the application's existing functionalities had been negatively impacted.	(not observed)

Note. CI/CD = Continuos Integration/Continuous Delivery.

The practices that caused more impact were P2 (19 matches), P6 (12 matches), P8 (12 matches), and P11 (11 matches), and the activities that had more impact were resolution and recovery (39 matches), investigation and diagnosis (21 matches), and detection and recording (20).

Looking at Table 15, it is possible to see that the recovery and logging activities were the most impacted by the DevOps practices, therefore confirming the findings from the interviews.

Table 16 shows the mapping between the ITIL standard PM activities, and the organization PM activities provided by the organization.

Table 16. Mapping of Information Technology Infrastructure Library (ITIL) and Organizations' Problem Management (PM) Life Cycle

Standard ITIL PM Activities	Organization IM Activities	Activity Objectives From the Organization
Problem detection	Problem creation and validation	Problems are raised following either major incidents or based on monitoring patterns, incident analysis, and service management insight. Each candidate is reviewed, ensuring it has the proper categorization, prioritization, and estimated business benefits before an actual investigation is initiated.
Problem logging, categorization, and prioritization		

continued on following page

Table 16. Continued

Standard ITIL PM Activities	Organization IM Activities	Activity Objectives From the Organization
Problem investigation and diagnosis	RCA creation and RCA review	Providers review the issues reported in the problem record and provide both root cause analysis (RCA) and proposals for solution activities that may be completed toward resolving the problem. A known error may be generated upon delivery of the RCA. Service management reviews the information delivered and provides an approval or rejection.
known error management		
Problem resolution	Problem resolution	Each solution item is documented and tracked to completion. Teams that own problem-resolution items provide evidence of the status and outcome of each activity.
Problem closure and major problem review, if applicable	Resolution review and problem closure	A summary of all RCA findings and all problem resolution activities completed are delivered. Service management reviews the delivered summary and provides approval or rejection. If approval is granted, the problem record is closed.

Note. ITIL = Information Technology Infrastructure Library; PM = problem management; IM = incident management; RCA = root cause analysis.

Evidence of using DevOps practices in the organization current PM process can be found in Table 17, extracted from the observation performed.

Table 17. DevOps Practices in Organization Problem Management

	Problem Creation and Validation	RCA Creation and Review	Problem Resolution	Resolution Review and Problem Closure
P1	The organization relies on daily PM meetings with providers and weekly forums with service management to discuss the validation and progress of investigations and respective solution activities, ensuring they are completed according to agreed-upon timelines or adapting timelines if required.			
P2	The development and operations community works closely to identify candidates for problem investigations (often proactively, based on insight from ongoing deployments).	The development and operations community collaborates iteratively on root cause analysis (RCA). Both parties are required to collect information from production environments, analyze it to identify the cause, and propose adequate solutions.	The development and operations community works together to plan, implement, and monitor each identified solution activity (this would include developing bug fixes, implementation planning, and ongoing monitoring to measure success rates).	(not observed)

continued on following page

Table 17. Continued

	Problem Creation and Validation	RCA Creation and Review	Problem Resolution	Resolution Review and Problem Closure
P6	The organization uses monitoring tools to identify common error trends and uses this information to initiate proactive PM.	(not observed)	Automated monitoring tools are utilized to measure the success of implemented resolution activities and as an indicator of a problem being resolved.	(not observed)
P17	Stakeholders impacted by incidents are encouraged to request the creation of a problem record aimed at addressing their cause.	(not observed)	(not observed)	Confirmation from impacted stakeholders that a problem has been fully resolved is actively sought after in the resolution review stage of the PM life cycle.

Note. RCA = root cause analysis; PM = problem management.

Based on these observations, it was possible to see some of the findings from the interviews, such as the DevOps practices that are impacting the processes activities.

Focus Group Exercise

There were two different focus group exercises, one for each case study. Both exercises had a group of five participants. The participants were chosen due to their experience in providing more information. The identified participants for the case study in the IM process were IM-C, IM-D, IM-G, IM-H, and IM-J. However, for the PM process, the identified participants were PM-B, PM-D, PM-F, PM-I, and PM-J.

In the IM case study group, opinions varied on the impact of practice P17. IM-J emphasized the importance of stakeholder involvement during incidents, as they are most invested in resolution. Others agreed in principle but noted that involvement depends on the squad, with some stakeholders preferring regular updates and others trusting the developers to handle the issue independently.

Participants also felt that practice P14 could have a greater impact if supported by a stronger testing framework, though they acknowledged that expanding testing is challenging when aligning with a challenge, as listed in Table 12.

While the group agreed on the impact of most practices, there was a discussion around improving P6 by automating incident creation instead of doing it manually.

Regarding P12, one interviewee raised a concern about its potential negative impact on investigations, as stated in Table 12. With continuous deployments, multiple releases might occur before an incident is reported, making it difficult to trace the cause. IM-H saw this as an opportunity for reflection, suggesting it might be useful to explore solutions for better tracking of code within deployment packages to make it easier to identify the source of issues.

Regarding the PM case study group, interviewee PM-D commented that there was an expectation that the P14 practice “should have ranked higher in value” as clear benefits were observed based on experience; interviewee PM-B commented that this was not too surprising “as the test automation is currently too challenging to implement fully.”

Only a comment was made on the PM section's outcomes regarding known error management. Interviewee IM-J interpreted this practice’s low application by stating that “it rates lower due to frequently lacking formal integration with the knowledge management process” in utilized ITSM tools.

Interviewee PM-F questioned the high significance of continuous planning in problem resolution activity. An explanation was provided by interviewee PM-J, stating that "if we are implementing a solution as part of a problem investigation, it makes sense to check continuously how its deployment is being done," and that would fall in the purview of the continuous planning practice.

An insight presented by interviewee PM-B received broad consensus in the group when he noted that there seemed to be a pattern in that "the ones that are rated highest are those focused with either communication or with planning"; that is, the combinations with highest significance tend to be those in which communication or planning is done.

We also asked the groups about RQ1 and RQ3. RQ2 could be considered redundant due to the findings of the practices.

In Tables 18 and 19, it was possible to see the comments of the interviewees regarding the RQs and the DevOps practices. It was possible to see that the justifications that the participants gave to justify the impact and process performance improvement are similar between the two processes. Practice P15 comments showed that this practice could have an impact, but it seemed that processes were not being followed entirely. IM-C said that "this would be good if the process gets standardized by everyone and there are no exceptions," and PM-I said that "organizational culture might not be leaning toward having a lot of standardization in the process, but it is needed in order for it be predictable and consistent." It seemed that, in PM-I, there could be exceptions to the process when the organization culture is not leaning to have standardization, and IM-C stated as much. In IM, P1 was not seen as helpful to improve the process. However, in PM, there was a contradictory opinion where it helps to track the problems so that they can be solved. In PM, the delivery practices were not seen to be as impactful as in PM, due to the comment made by PB-B that the planning practices and communication are the most rated.

Table 18. Focus Group—Impact of DevOps in Incident Management (IM) Process

RQ1		RQ3	
P1	IM-D: "This allows a good prioritization of our backlog. This gives us an expectation of our work and where to improve." IM-J: "Allows us to know the roadmap of what is supposed to deliver, manage good expectations, and know where we should allocate more effort."	P1	IM-J: "Yes, it has a good impact, but not SLA-wise. If we need to wait for the incidents to get into the backlog and be prioritized, we will not be able to fulfill the SLA. So, the SLA needs to be adjusted or removed, like it was. However, by having business representatives when it comes to planning, we are sure that we will fix the big pains before other items, which will cause an increase in customer satisfaction."
P2	IM-H: "No doubt there is one of the most impactful practices. Having all the experts collaborate to solve an issue saves much time."	P2	IM-C: "Yes, it saves much time investigating the issues." IM-G: "This collaboration will save time and promote quality and confidence between the teams. They will feel secure by having someone on board to solve an issue."
P6	IM-C: "The issues are found earlier. It feels good to find an issue, report it to the business, and have a solution in mind. The business will feel comfortable and happy without work."	P6	IM-H: "This is like P1. It can find the issues earlier but will not close the process instance faster. Only if we can see this from a perspective where the monitor's output hints at the issue."
P8 / P11 / P12	IM-G: "All the fixes are implemented smoothly and easily. This brings much security and ensures that everything is going fine and will be implemented correctly."	P8 / P11 / P12	IM-J: "Compared with the old times when we had to do everything manually, the time to implement a solution has decreased. Also, there is a better usage of resources."

continued on following page

Table 18. Continued

RQ1		RQ3	
P15	IM-C: "This would be good if everyone standardized the process and there were no exceptions."	P17	IM-J: "The stakeholders are a key component to moving the process. Even if they can resolve impediments, they also have the business knowledge to help investigate the issue."
P17	IM-J: "Having the stakeholders involved from end to end in the process is the best way to know who can help if help is needed." IM-H: "They can also unlock several impediments."		

Note. IM = incident management; RQ = research question; SLA = service level agreement.

Table 19. Focus Group—Impact of DevOps in Problem Management (PM) Process

RQ1		RQ3	
P2	PM-J: "The automated monitoring practice can easily be applied to gather problem candidates from our systems (…) proactively. This is currently one of our main sources for new investigations."	P1	PM-J: "Some investigations are very long (…) they have complex actions that must be consistently monitored. If planning for these problems is not done continuously, we will lose track of what has been done, what is being done, and what still needs to be completed."
P6	PM-D: "We need to know the results of a new deployment, and having a bridge with operations helps us respond more quickly." PM-J: "This is the most important practice that can be applied (…) the improved communication this and the continuous planning practice provide brings a lot of benefit and structure to the work of PM."	P2	PM-D: "We could imagine a DevOpsProb team, where the knowledge of the process is joined with technical expertise to resolve problems quickly (…) there can still be specialization, but all are working toward the same purpose." PM-B: "Communication between problem managers and those actually developing solutions is needed to ensure things are done in an organized way and at the right time." Participant I: "Root causes need to be found quickly, and data can be lost (…) feedback is important to ensure people are on the right track to conclude."
P15	PM-I: "Organizational culture might not be leaning toward having a lot of standardization in the process, but it is needed to be predictable and consistent."	P17	PM-I: "Other processes may need to be more customer facing, but having more participation from the business in PM makes it possible to know where to focus effort and where to make priorities." Participant J: "If stakeholders understand the process, they can be important allies over the time it takes to resolve investigations."
P17	PM-B: "We need to define stakeholders, including those passively observing and those actively involved (…) for detecting problems. Everyone is a valid stakeholder." PM-J: "All stakeholders can contribute to PM (…); their participation is valuable to us."		

Note. RQ = research question; PM = problem management.

In the general opinion of the participants, they would agree that all the practices would have an impact, but they have narrowed it down to the practices that they could see as having a more meaningful impact. There can be seen more practices impacting the IM process than PM process, even though the ones that are impacting PM are also impacting the IM. These were also the practices seen with more impact in the interviews and in the observation sections, thus validating the data collection method triangulation.

SYNTHETIZATION AND DISCUSSION OF RESULTS

This section presents a synthesis of the results obtained from the analysis of the case studies, highlighting how DevOps practices influence ITIL processes, particularly IM, PM, and CM.

From the analysis of the IM case study, as illustrated in Table 5 and Figures 4, 5, and 6, one can see the significant impact of the DevOps practices. Continuous integration, delivery, and deployment were used to accelerate several stages of the incident life cycle. Furthermore, although not directly integrated into the IM process, practices, such as application monitoring and feedback loops, were seen as key to early detection of issues to create new incidents. While these did not directly enhance IM performance, they contributed to overall application stability by enabling the proactive identification of issues.

Considering the interdependencies between ITIL processes, as depicted in Figure 1, the acceleration of incident resolution can support more efficient root cause analysis within the PM process. The analysis revealed common practices, particularly feedback loops and application monitoring, that strengthened this synergy. By enabling the early detection of incidents, these practices facilitated the identification and classification of problems, ultimately improving the effectiveness of root cause resolution.

Additionally, DevOps practices related to automated builds and deployments contributed to fixing incidents and problems faster. Thus, there were impacts to the CM process by supporting automated approvals by the deployment pipeline. As previously discussed, the usage of repeatable and reliable deployment scripts increased the confidence of change managers that a given change would not negatively affect the application. This suggested a potential adaptation of the CM process, where changes could be automatically approved and scheduled, thereby improving process efficiency while ensuring proper auditability.

Moreover, DevOps automation has the potential to fully automate the handling of standard changes. These types of changes, characterized as low-risk, preapproved, and repetitive, can be executed via predefined pipelines in response to service requests. This ensures that the standard change is created, implemented, and reviewed with minimal manual intervention.

In the CM case study, it was observed that several interviewees had limited experience with DevOps, which may have initially led to some misunderstanding of specific practices. To mitigate this, clarifications were provided to ensure an understanding of the practices. After this, interviewees demonstrated a reasonable knowledge of the concepts and engaged discussions regarding the relationship between DevOps practices and CM. It is acknowledged that a partial understanding of the topic may have limited the depth of some responses, possibly omitting frictions usually find in practice. Nevertheless, the interconnection between the processes enabled a verification of the discussed impacts.

Some frictions could be seen between the DevOps adoption in a ITIL environment.

Organizational resistance seemed to be a common tension. In the CM case, many participants had limited knowledge about DevOps practices, which required additional explanations and created barriers to adoption. Also observed was the difficulty of maintaining monitoring systems up to date in IM, as reflected in the statement that “it is hard to keep the monitors up with the new functionalities and also what to monitor over time,” where teams could not keep pace with frequent functional changes. These examples show how the lack of technical skills and cultural adaptation can slow the effective integration of DevOps practices and ITIL. Organizations need to give visibility of new ways of working and how the processes work, showing the benefits, making people to be part of the change, and also providing trainings for their employees for each new skillset.

Some trade-offs resulting from automation and accelerated delivery were also observed. In IM, continuous delivery enabled faster resolutions; it also complicated root cause analysis when multiple deployments occurred in short range of time, making it harder to identify which change caused the incident, as possible to see in this comment: “It could harm the investigation; since DevOps allows constant delivery and constant deployments, we can have five deployments (one per day), and an incident is created after seven days. We may need to check all the code delivered in those five deployments." For PM, while process standardization supported more structured investigations, it sometimes reduced the flexibility required to explore complex or ambiguous problems, as stated in the comment: "Only with a standardized process within our teams can we ensure that a good known error knowledge base is in place; it prevents wasted time where we have people investigating matters that are already known or under resolution." These trade-offs illustrate the need to balance speed with traceability and adaptability.

Some failure points were also seen when automation practices conflicted with ITIL control mechanisms. In IM, automated monitoring occasionally generated too many incident tickets, creating noise and additional workload for teams, rather than reducing it, as demonstrated in the following statement: "This practice allows for the creation of incidents automatically as soon as unusual behavior is detected." ITIL uses SLAs as a control mechanism to ensure the disruption will be minimized to a time window. DevOps agility enables the teams to reprioritize their work according to the business needs and impact. Due to the living backlog of a team, the incident's SLA could expire due to the constant change of priorities of the backlog. This leads to an adaption of the IM process where organizations need to assess if the incidents really need an SLA, since the incidents backlog will be controlled by the product owners and business. In CM, the dependency on stakeholder approvals, even when automated pipelines were in place, produced bottlenecks that limited the intended acceleration, as seen in the comment: "The stakeholders are the best people to know when to deploy these types of changes without causing any issue to the business users." Such examples show that the integration of DevOps practices does not automatically solve the structural frictions inherent to ITIL but, rather, shifts where those frictions occur.

Together, these findings reinforce that the coexistence of DevOps and ITIL is not a straightforward path of efficiency gains. Instead, it requires organizations to acknowledge and actively manage the tension between agility and control, developing governance mechanisms that maintain reliability without restricting the agility that DevOps promises to provide.

The results show that the DevOps and ITIL integration can be extended as sociotechnical phenomenon (Baxter & Sommerville, 2011). In the IM case study, the automation from continuous integration and application monitoring accelerates the incident resolution. But, this acceleration could be complemented by collaborative practices, as it was said that "close collaboration between development and operations will allow them to share knowledge to diagnose the incident," regarding feedback loops.

For PM, it was possible to see a cultural change. The interviewees referred to this in saying that "solution activities for problems have to be planned … having [continuous planning] is very relevant as it can expedite the implementation," showing that collaboration and planning are essential for success. These results are aligned with the organizational change theory (Battilana & Casciaro, 2012), which highlighted agents to overcome resistance.

The tension was more evident in CM, where the process was described as bureaucratic and not compatible with DevOps, since DevOps requires and provides agility while the process requires more control to ensure system stability (Greenwood et al., 2014). Moreover, it was possible to see that having the automation from some practices aid the process via the repetitive steps and scripts allowed the change managers to ease up on the approvals facilitating the process and also adjusting the role for the change managers.

Furthermore, the integration of DevOps with AI technologies presents additional opportunities for ITSM improvement. AI-powered workflow optimization leveraging machine learning and natural language processing can automate repetitive tasks, thereby enhancing process efficiency (Ravichandran et al., 2020). Predictive analytics can anticipate potential service disruptions, allowing proactive measures to be taken before incidents occur (Sharon Christa & Suma, 2022). Additionally, the use of chatbots has been shown to improve the quality of incident data and reduce the workload on service desk staff, contributing to more efficient resource utilization (Pradhan et al., 2022).

Also, there are future insights of ITSM and DevOps which targets to increase automation and adoption of AI for IT operations. Technologies, like generative AI, are showing a positive impact on organization performance and managerial relationships (Ye et al., 2024). Furthermore, generative AI shows potential for operational improvement of processes and the resolution of complex IT situations, as highlighted by practitioners and academia (Tokkozhina et al., 2025). Moreover, the adoption of AI systems demands robust governance; thus, research on designing ethical AI systems based on frameworks is essential for future systems (Oberoi et al., 2025). Organizations must focus on a robust strategy for technology integration to ensure that new IT practices effectively create competitive value (Jayawardena et al., 2024).

Overall, this section has discussed how DevOps practices influence ITIL processes, drawing on empirical data from the case studies. The analysis of tensions between DevOps agility and ITIL control suggests that traditional ITIL processes may need to evolve to accommodate more agile approaches, ensuring that they align with business needs while preserving service quality and stability. The findings support the conclusion that DevOps and ITIL are not mutually exclusive frameworks; rather, they should be integrated and coexist within the same organizational environment.

CASE STUDY VALIDITY

To ensure the quality and rigor of the case study design, the four validity tests proposed by Yin (2009) were carefully considered: construct validity, internal validity, external validity, and reliability.

Construct validity was addressed by collecting data from multiple sources, enabling triangulation across different types of evidence. In addition, key constructs, such as the impact of DevOps practices on ITSM processes, were operationally defined prior to data collection to minimize interpretive bias. Nonetheless, despite triangulation efforts, variations in data interpretation across sources represent a limitation that should be acknowledged.

Internal validity, typically relevant for explanatory case studies, was considered even though this research is exploratory in nature. While no formal causal inferences were made, logical consistency and pattern matching were used during data analysis to strengthen the internal coherence of findings, in line with Yin's (2009) recommendations.

External validity concerns the generalizability of findings beyond the immediate case context. Although the study’s novelty, specifically the lack of prior research on the intersection of DevOps and ITSM processes, limits straightforward generalization, theoretical propositions developed during the study aimed to support analytical generalization to similar organizational contexts (Yin, 2009). Nevertheless, the absence of direct replication studies warrants caution in overextending the findings.

Finally, reliability was enhanced by thoroughly documenting all procedures, developing a detailed case study protocol, and maintaining a case study database. However, as with all qualitative research, complete replication may be constrained by contextual factors unique to the studied organization.

CONCLUSION

The aim of this research was to explore the relationship and the possible impact that DevOps practices could have on three ITIL processes, namely IM, PM, and CM.

Due to the lack of insights about this topic on the existing literature, the researchers opted to use multiple CS as the research methodology, where the case study objects were IT teams from different organizations that use both DevOps practices and one of the ITIL processes. CS as a research methodology was the selected option since it aimed to explore the experience of these IT teams regarding the experience of working with both DevOps and the ITIL processes.

It is possible to conclude from the previous analysis, based on the interviewees' experience, that each practice could impact at least one of the processes, except automated feedback for performance models and performance predictions. Mostly, this is because the interviewees did not know nor implement this practice.

Regarding the DevOps practices impact on the ITIL processes, it is possible to see that, for the CM process, the practices related with automation, like automated deployment, continuous delivery, and continuous deployment, were seen as more impactful; due to the reduction of human error, the change managers could approve or automatically approve the changes improving the process performance.

Related with IM and PM, similar practices were seen to cause more impact, such as automated monitoring and continuous integration. First is to identify the issues earlier so that the resolution could be applied faster, bringing more stability for the business operation, and, for continuous integration, to accelerate the delivery of a development or a fix. Also, for both processes, feedback loops between development and operations were seen as quite impactful. This practice requires a cultural change of mindset to enable the collaboration between these two roles to accelerate the resolution of issues and to stabilize the application.

Moreover, this research still had some limitations, even though the study converges toward a higher level where DevOps can be applied in a ITIL environment, and having an analysis from different perspectives, there could be more case studies regarding the same process but with different organizations to verify if the same challenges and benefits were found. Another limitation would be the lack of quantitative data provided by the organizations to analyze the processes performance. Having these metrics, it would be possible to confirm all the findings from the interviews creating a data collection method triangulation and not only having one source of data.

From a global information management perspective, the findings of this study extend the body of knowledge. Practices, such as continuous monitoring, automated dashboards, and feedback loops, which were seen to enhance ITSM processes, may not have the same impact as in other regions. Research shows that national culture, regulatory environments, and infrastructure maturity enforce how ITSM and DevOps practices are adopted and operationalized. Baker et al. (2010) showed that cultural constructs shape technology acceptance in developing contexts, while Marrone et al. (2014) found that awareness of ITSM benefits and process measurement are different across countries.

Moreover, research underlines the importance of trust, culture, and knowledge processes being key factors for a better performance across borders (Du et al., 2011). Some of the DevOps practices identified in this study, such as dashboards, continuous monitoring, and feedback loops, can indirectly support these social and organizational conditions. Automated dashboards enable operational data to be available for all the stakeholders, ensuring transparency; continuous monitoring shows, in real-time, IT services' health status, creating accountability to ensure the correct operation of the IT services; and feedback loops create a regular communication protocol that improves shared understanding. These mechanisms by themselves do not create trust but provide the tools to enhance relationships and organization transparency that allow trust and collaboration within an organization's departments. However, a lack of globally aligned definitions of incidents, problems, and changes can create contradictory information across regions. This creates the need for organizations to adopt DevOps and ITIL within governance structures that secure consistency, comparability, and reliability of information globally.

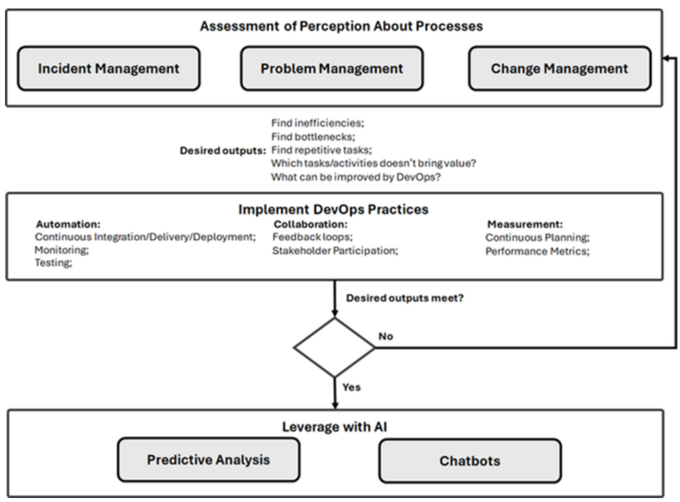
Thus, the integration of DevOps in an ITIL environment should not be seen as an operational improvement but be considered as a global information management strategy. Organizations should balance standardization, essential for governance and compliance, with flexibility to adapt to regulations and cultures.

This research offers a valuable contribution for organizations seeking to assess the extent to which DevOps practices are being adopted and whether these practices are yielding measurable benefits for their ITSM processes. Organizations may replicate a similar internal study, such as conducting interviews with employees to gather insights into how DevOps can support those involved in ITSM activities. The implementation of DevOps practices has the potential to automate several tasks within ITSM processes, thereby enhancing operational efficiency, reducing costs, and enabling more effective allocation of human resources to higher-value activities.

In this study, it was also possible to see that several common practices have a direct impact on the three processes, such as, continuous planning, feedback loops, CI/CD, test automation, IaC, and stakeholder participation, promoting agility and collaboration but also technical, cultural, and organization challenges.

Based on this evidence, this research proposes a conceptual model for the DevOps-ITIL integration, shown in Figure 9. This framework synthesizes the relations between the DevOps practices and key activities from the ITIL processes, highlighting benefits and challenges, consolidating empirical results, and showing how the practices impact the processes. Moreover, this model offers contributions for both academia and practitioners. For academia, it shows a theoretical structure that unifies fragmented evidence on how to tackle ITIL processes challenges and what would need to be changed to overcome these challenges. For practitioners, it can be seen as guide to support decisions on how to adopt DevOps in a ITIL environment. Therefore, Figure 9 should be understood not just as a synthesis of results but as a unifying framework that combines the agility of DevOps with the governance and stability of ITIL.

Figure 9. Leverage Information Technology Service Management (ITSM) With DevOps Proposal



Thus, future research could be done to explore how these two topics can be implemented together in different industries. Also, some research can also be done in other ITIL processes identified in the review publication (Faustino et al., 2023), such as release management, event management, service request, and service catalog management. Adding to this, AI was also seen as a potential supporter for DevOps practices to have more benefits, where it would be interesting to research how the implementation of DevOps with AI could impact the processes with metrics, as well as what would be the challenges of this adoption, not only from an analytical and technical point of view but also the impact on organization and employees. AI was also seen as beneficial to DevOps in terms of security testing, which also leaves some space for studies about AI and development, security, and operations (also known as DevSecOps). Future research could build upon this study by adopting formal bias detection and mitigation frameworks, such as those proposed by Shin (2025). This would allow organizations not only to evaluate improvements in performance but also to monitor the equity and inclusiveness of operational decision-making over time.

The authors acknowledge that, due to the automation offered by DevOps, these processes could be simplified and automated, improving the organization IT services performance.

COMPETING INTERESTS

The authors of this publication declare that there are no competing interests.

FUNDING STATEMENT

This research was supported by national funds through Foundation for Science and Technology [Fundação para a Ciência e a Tecnologia] (FCT), I.P., under projects/supports [number UID/6486/2025 and UID/PRR/6486/2025].

CORRESPONDING AUTHOR

Correspondence should be addressed to João Faustino: jpcfo11@iscte-iul.pt

REFERENCES

Adriano, D. M. (2021). *DevOps and information technology service management: A problem management case study* [Master's thesis, ISCTE - Lisbon University Institute]. ISCTE Repository. http://hdl.handle.net/10071/23735

Aguiar, J., Pereira, R., Vasconcelos, J. B., & Bianchi, I. (2018). An overlapless incident management maturity model for multi-framework assessment (ITIL, COBIT, CMMI-SVC). *Interdisciplinary Journal of Information Knowledge and Management*, *13*, 137–163. DOI: 10.28945/4083

Alenezi, M., Zarour, M., & Akour, M. (2022). Can artificial intelligence transform DevOps? *arXiv [Cs.SE]*. https://doi.org//arxiv.2206.00225DOI: 10.48550

Ali, M. S., & Puri, D. (2024). Optimizing DevOps methodologies with the integration of artificial intelligence. *2024 3rd International Conference for Innovation in Technology (INOCON)* (pp. 1–5). DOI: 10.1109/INOCON60754.2024.10511490

Almeida, R., Pereira, R., & Da Silva, M. M. (2013). IT governance mechanisms: A literature review. In J. Falcão e Cunha, M. Snene, & H. Nóvoa (Eds.), *Lecture notes in business information processing: Vol. 143. Exploring services science (IESS 2013)* (pp. 186–199). Springer. DOI: 10.1007/978-3-642-36356-6_14

AXELOS Limited. (2019). *ITIL® foundation* (4th ed.). Stationery Office.

Baker, E. W., Al-Gahtani, S. S., & Hubona, G. S. (2010). Cultural impacts on acceptance and adoption of information technology in a developing country. *Journal of Global Information Management*, *18*(3), 35–58. DOI: 10.4018/jgim.2010070102

Barredo Arrieta, A., Díaz-Rodríguez, N., Del Ser, J., Bennetot, A., Tabik, S., Barbado, A., Garcia, S., Gil-Lopez, S., Molina, D., Benjamins, R., Chatila, R., & Herrera, F. (2020). Explainable artificial intelligence (XAI): Concepts, taxonomies, opportunities and challenges toward responsible AI. *Information Fusion*, *58*, 82–115. DOI: 10.1016/j.inffus.2019.12.012

Bartolini, C., Salle, M., & Trastour, D. (2006). IT service management driven by business objectives An application to incident management. *2006 IEEE/IFIP Network Operations and Management Symposium NOMS 2006* (pp. 45–55). DOI: 10.1109/NOMS.2006.1687537

Baškarada, S. (2014). Qualitative case study guidelines. *The Qualitative Report*, *19*(40), 1–18. DOI: 10.46743/2160-3715/2014.1008

Battilana, J., & Casciaro, T. (2012). Change agents, networks, and institutions: A contingency theory of organizational change. *Academy of Management Journal*, *55*(2), 381–398. DOI: 10.5465/amj.2009.0891

Baxter, G., & Sommerville, I. (2011). Socio-technical systems: From design methods to systems engineering. *Interacting with Computers*, *23*(1), 4–17. DOI: 10.1016/j.intcom.2010.07.003

Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J., Marick, B., Martin, R. C., Mellor, S., Schwaber, K., Sutherland, J., & Thomas, D. (2001). *Manifesto for agile software development*. Agile Manifesto. https://agilemanifesto.org/

Boussaïd, I., Siarry, P., & Ahmed-Nacer, M. (2017). A survey on search-based model-driven engineering. *Automated Software Engineering*, *24*(2), 233–294. DOI: 10.1007/s10515-017-0215-4

Camargo, V. A. (2022). *DevOps applied in change management process* [Master's thesis, ISCTE - Lisbon University Institute]. ISCTE Repository. http://hdl.handle.net/10071/26994

Cannon, D., & Wheeldon, D. (2007). *ITIL Version 3 service operation* (1st ed.). Stationery Office.

Chen, R., Zhang, B., & Chen, Y. (2024). How does digital transformation influence collaborative green innovation? *Journal of Global Information Management*, *32*(1), 1–21. DOI: 10.4018/JGIM.357728

Cook, A., Gann, A., Ray, D., & Zhang, X. (2021). Advantages, challenges, and success factors in implementing information technology infrastructure library. *Issues in Information Systems*, *22*(2), 187–198. DOI: 10.48009/2_iis_2021_196-208

Cui, Y., Tang, J., Lu, S., Wu, J., Xue, X., Wu, C., & Tsai, S. (2024). Global digital transformation and new venture resilience. *Journal of Global Information Management*, *32*(1), 1–27. DOI: 10.4018/JGIM.360652

Cuppett, M. S. (2016). Optimizing application performance with change management improvements. In *DevOps, DBAs, and DBaaS* (pp. 73–85). Apress. DOI: 10.1007/978-1-4842-2208-9_6

Du, R., Ai, S., Abbott, P., & Zheng, Y. (2011). Contextual factors, knowledge processes and performance in global sourcing of IT services. *Journal of Global Information Management*, *19*(2), 1–26. DOI: 10.4018/jgim.2011040101

El Yamami, A., Mansouri, K., Qbadou, M., & Illousamen, E. H. (2017). *Multi-criteria decision making approach for ITIL processes performance evaluation: Application to a Moroccan SME. 2017 Intelligent Systems and Computer Vision*. ISCV. DOI: 10.1109/ISACV.2017.8054937

Ertel, W. (2024). Introduction to artificial intelligence. In Mackie, I. (Ed.), *Undergraduate topics in computer science*. Springer., DOI: 10.1007/978-3-658-43102-0

Faheem, M., Awais, M., Iqbal, A., & Zia, H. (2025). Enhancing IT incident management with natural language processing and predictive analytics. *International Journal of Science and Research Archive*, *15*(3), 224–237. DOI: 10.30574/ijsra.2025.15.3.1718

Faustino, J. (2018). *DevOps practices in incident management process* [Master's thesis, ISCTE - Lisbon University Institute]. ISCTE Repository. http://hdl.handle.net/10071/18294

Faustino, J., Adriano, D., Amaro, R., Pereira, R., & Da Silva, M. M. (2022). DevOps benefits: A systematic literature review. *Software, Practice & Experience*, *52*(9), 1905–1926. DOI: 10.1002/spe.3096

Faustino, J., Pereira, R., Alturas, B., & da Silva, M. M. (2020). Agile information technology service management with DevOps: An incident management case study. *International Journal of Agile Systems and Management*, *13*(4), 339–389. DOI: 10.1504/IJASM.2020.112331

Faustino, J., Pereira, R., & Mira de Silva, M. (2023). The influence of DevOps practices in ITSM processes. *International Journal of Services and Operations Management*, *44*(3), 390–407. DOI: 10.1504/IJSOM.2023.129464

Galup, S., Dattero, R., & Quan, J. (2020). What do agile, lean, and ITIL mean to DevOps? *Communications of the ACM*, *63*(10), 48–53. DOI: 10.1145/3372114

Greenwood, R., Hinings, C. R., & Whetten, D. (2014). Rethinking institutions and organizations. *Journal of Management Studies*, *51*(7), 1206–1220. DOI: 10.1111/joms.12070

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? *Field Methods*, *18*(1), 59–82. DOI: 10.1177/1525822X05279903

Guilfoos, B., & Triplett, J. (2022). ITSM in supercomputing improving service delivery, reliability, and user satisfaction. *Practice and Experience in Advanced Research Computing 2022: Revolutionary: Computing, Connections*. *You*, *6*, 1–4. DOI: 10.1145/3491418.3535151

Hasibović, A. Ć., Tanović, A., & Granulo, A. (2023). The importance of ITIL4 adoption for IT service management in insurance companies. *2023 46th MIPRO ICT and Electronics Convention (MIPRO)* (pp. 1341–1346). DOI: 10.23919/MIPRO57284.2023.10159950

Hasni, D. I. M., Sarlan, A., & Ahmad, R. (2020). Collaborative visualization framework for cross-field working group: A qualitative focus group study. *2020 International Conference on Computational Intelligence (ICCI)* (pp. 256–260). DOI: 10.1109/ICCI51257.2020.9247663

Hemon, A., Lyonnet, B., Rowe, F., & Fitzgerald, B. (2020). From agile to DevOps: Smart skills and collaborations. *Information Systems Frontiers*, *22*(4), 927–945. DOI: 10.1007/s10796-019-09905-1

Hussaini, S. W. (2015). A systemic approach to re-inforce development and operations functions in delivering an organizational program. *Procedia Computer Science*, *61*, 261–266. DOI: 10.1016/j.procs.2015.09.209

Jabbari, R., bin Ali, N., Petersen, K., & Tanveer, B. (2016). What is DevOps? A systematic mapping study on definitions and practices. *Proceedings of the Scientific Workshop Proceedings of XP2016* (pp. 1–11). DOI: 10.1145/2962695.2962707

Jayawardena, N. S., Behl, A., Nedungadi, P., Jones, P., & Raman, R. (2024). Integration of technology and marketing activities among service SMEs in emerging economies. *Journal of Global Information Management*, *32*(1), 1–27. DOI: 10.4018/JGIM.356380

Kaiser, A. K. (2018). *Reinventing ITIL® in the age of DevOps*. Apress. DOI: 10.1007/978-1-4842-3976-6

Kaplan, A., Busch, K., Koziolek, A., & Heinrich, R. (2018). Categories of change triggers in business processes. *2018 44th Euromicro Conference on Software Engineering and Advanced Applications (SEAA)* (pp. 252–259). DOI: 10.1109/SEAA.2018.00049

Kim, G., Debois, P., Willis, J., & Humble, J. (2016). *The DevOps handbook: How to create world-class agility, reliability, and security in technology organizations*. IT Revolution Press.

Kumar, A., Nadeem, M., & Shameem, M. (2024). Assessment of DevOps lifecycle phases and their role in DevOps implementation using best–worst MCDM. *International Journal of Information Technology : an Official Journal of Bharati Vidyapeeth's Institute of Computer Applications and Management*, *16*(4), 2139–2147. DOI: 10.1007/s41870-023-01566-3

Kurkute, M. V., Parida, P. R., & Kondaveeti, D. (2024). Automating IT service management in manufacturing: A deep learning approach to predict incident resolution time and optimize workflow. *Journal of Artificial Intelligence Research and Applications*, *4*(1), 690–731. https://jairajournal.org/index.php/publication/article/view/2

Kush, P. (2013). Difficulties in implementing effective problem management. *International Journal of Scientific and Engineering Research*, *4*(8), 98–100. https://ijser.org/researchpaper/Difficulties-in-Implementing-Effective-Problem-Management.pdf

Latrache, A., Habib Nfaoui, E., & Boumhidi, J. (2015). *Multi agent based incident management system according to ITIL. 2015 Intelligent Systems and Computer Vision*. ISCV. DOI: 10.1109/ISACV.2015.7105552

Leite, L., Rocha, C., Kon, F., Milojicic, D., & Meirelles, P. (2019). A survey of DevOps concepts and challenges. *ACM Computing Surveys*, *52*(6), 1–35. DOI: 10.1145/3359981

Lema, L., Calvo-Manzano, J., Colomo-Palacios, R., & Arcilla, M. (2015). ITIL in small to medium-sized enterprises software companies: Towards an implementation sequence. *Journal of Software (Malden, MA)*, *27*(8), 528–538. DOI: 10.1002/smr.1727

Liu, K. P., Chung, K. W., Chiu, W., & Chen, G. (2024). Digital transformation driving SME business model innovation. *Journal of Global Information Management*, *32*(1), 1–23. DOI: 10.4018/JGIM.350191

Lou, J.-G., Lin, Q., Ding, R., Fu, Q., Zhang, D., & Xie, T. (2013). Software analytics for incident management of online services: An experience report. *2021 36th IEEE/ACM International Conference on Automated Software Engineering (ASE)* (pp. 475–485). DOI: 10.1109/ASE.2013.6693105

Lwakature, L. E. (2017). *DevOps adoption and implementation in software development practice: Concept, practices, benefits and challenges* [Doctoral dissertation, University of Oulu]. OuluREPO – University of Oulu Repository.

MacLean, D., & Titah, R. (2023). Implementation and impacts of IT service management in the IT function. *International Journal of Information Management*, *70*, 102628. DOI: 10.1016/j.ijinfomgt.2023.102628

Marrone, M., Gacenga, F., Cater-Steel, A., & Kolbe, L. (2014). IT service management: A cross-national study of ITIL adoption. *Communications of the Association for Information Systems*, *34*. Advance online publication. DOI: 10.17705/1CAIS.03449

Miles, J., & Gilbert, P. (2005). *A handbook of research methods for clinical and health psychology* (1st ed.). Oxford University Press. DOI: 10.1093/med:psych/9780198527565.001.0001

Modell, S. (2005). Triangulation between case study and survey methods in management accounting research: An assessment of validity implications. *Management Accounting Research*, *16*(2), 231–254. DOI: 10.1016/j.mar.2005.03.001

Narne, H. (2023). Revolutionizing IT operations: AI- driven service management for efficiency and scalability. *International Journal of Research and Analytical Reviews*, *10*, 78–83. https://www.researchgate.net/publication/386382748

Nyumba, T., Wilson, K., Derrick, C., & Mukherjee, N. (2018). The use of focus group discussion methodology: Insights from two decades of application in conservation. *Methods in Ecology and Evolution*, *9*(1), 20–32. DOI: 10.1111/2041-210X.12860

Oberoi, S. S., Singh, A. N., & Chakraborty, D. (2025). Designing ethical AI systems: An exploration of deontological, virtue, utilitarian, and rights-based ethical frameworks. *Journal of Global Information Management*, *33*(1), 1–25. DOI: 10.4018/JGIM.388742

Okere, L. (2024). *IT service governance adoption challenges and opportunities in US-based managed IT services industries* [Doctoral dissertation, Middle Georgia State University]. https://comp.mga.edu/static/media/doctoralpapers/2024_Okere_0909151213.pdf

Orlikowski, W. J., & Scott, S. V. (2008). 10 Sociomateriality: Challenging the separation of technology, work and organization. *The Academy of Management Annals*, *2*(1), 433–474. DOI: 10.5465/19416520802211644

Permatasari, A. R., Sulistyo, S., & Santosa, P. I. (2024). Optimizing IT services quality: Implementing ITIL for enhanced IT service management. *2024 11th International Conference on Information Technology, Computer, and Electrical Engineering (ICITACEE)* (pp. 296–301). DOI: 10.1109/ICITACEE62763.2024.10762782

Pradhan, D., Bagbande, A., Khan, A., Majid, A. A. A., & Chandekar, U. (2022). ITSM Using AI Chat-Bot and Data Visualizers. *International Journal for Research in Applied Science and Engineering Technology*, *10*(5), 704–708. DOI: 10.22214/ijraset.2022.42293

Pratama, R. Y., & Umaroh, S. (2024). An IT asset governance model design using COBIT 2019 and ITIL V4 framework at BKU Itenas. *E3S Web of Conferences, 484*. DOI: 10.1051/e3sconf/202448402006

Rabbany, G. (2017). *Challenges in implementation of ISO 20000 in IT service management organizations—A case study* [Master's thesis, Bangladesh University of Engineering and Technology]. BUET Institutional Repository. http://lib.buet.ac.bd:8080/xmlui/handle/123456789/4782

Rance, S. (2011). *ITIL® service transition* (1st ed.). Stationery Office.

Ravichandran, N., Chowdary Inaganti, A., Muppalaneni, R., Rama, S., & Nersu, K. (2020). AI-Powered Workflow Optimization in IT Service Management: Enhancing Efficiency and Security. *Artificial Inteligence and Machine Learning Review*, *1*(3). Advance online publication. DOI: 10.69987/AIMLR.2020.10302

Reiter, M., & Miklosik, A. (2020). Digital transformation of organisations in the context of ITIL® 4. In Z. Kvetanová, Z. Bezáková, & A. Madleňák (Eds.), *Proceedings from the Annual International Scientific Conference Marketing Identity: COVID-2.0* (pp. 522–536). https://manuals.plus/m/597dcc042265d947e8abfb540663856054fd8be57aa459132604b9a59458dc24.pdf

Richard, G., F. L., Warnars, H. L. H. S., Abdurachman, E., & Soewito, B. (2019). Development of web application based on ITIL—Incident management framework in computer laboratory. *2019 International Conference on Information Management and Technology (ICIMTech)* (pp. 120–125). DOI: 10.1109/ICIMTech.2019.8843799

Riungu-Kalliosaari, L., Mäkinen, S., Lwakatare, L. E., Tiihonen, J., & Männistö, T. (2016). DevOps adoption benefits and challenges in practice: A case study. In Abrahamsson, P., Jedlitschka, A., Nguyen Duc, A., Felderer, M., Amasaki, S., & Mikkonen, T. (Eds.), Lecture notes in computer science: *Vol. 10027. Product- focused software process improvement (PROFES 2016)* (pp. 590–597). Springer. DOI: 10.1007/978-3-319-49094-6_44

Ruiz, M., Moreno, J., Dorronsoro, B., & Rodriguez, D. (2018). Using simulation-based optimization in the context of IT service management change process. *Decision Support Systems*, *112*, 35–47. DOI: 10.1016/j.dss.2018.06.004

Sarwar, M. I., Abbas, Q., Alyas, T., Alzahrani, A., Alghamdi, T., & Alsaawy, Y. (2023). Digital transformation of public sector governance with IT service management—A pilot study. *IEEE Access : Practical Innovations, Open Solutions*, *11*, 6490–6512. DOI: 10.1109/ACCESS.2023.3237550

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality & Quantity*, *52*(4), 1893–1907. DOI: 10.1007/s11135-017-0574-8

Serrano, J., Faustino, J., Adriano, D., Pereira, R., & da Silva, M. (2021). An IT service management literature review: Challenges, benefits, opportunities and implementation practices. *Information (Basel)*, *12*(3), 111. DOI: 10.3390/info12030111

Sharifi, M., Ayat, M., Rahman, A. A., & Sahibudin, S. (2008). Lessons learned in ITIL implementation failure. *2008 International Symposium on Information Technology* (pp. 1–4). DOI: 10.1109/ITSIM.2008.4631627

Sharma, K., Nigam, N., Jha, J. K., & Xu, X. (2024). Role of readiness to change in the relationship between workforce agility and digital transformation: A two-timeframe study. *Journal of Global Information Management*, *32*(1), 1–22. DOI: 10.4018/JGIM.345241

Sharma, S., & Coyne, B. (2014). *DevOps for dummies: IBM limited edition* (2nd ed.). John Wiley & Sons, Inc.

Sharon Christa, I. L., & Suma, V. (2022). Predictive analytics in IT Service Management (ITSM). In *Data Mining and Machine Learning Applications* (pp. 175–193). Wiley. DOI: 10.1002/9781119792529.ch7

Shin, D. (2025). *Debiasing AI: Rethinking the intersection of innovation and sustainability* (1st ed.). Routledge., DOI: 10.1201/9781003530244

Silva, M. A., Faustino, J. P., Pereira, R., & da Silva, M. M. (2018). Productivity gains of DevOps adoption in an IT team: A case study. In B. Andersson, B. Johansson, C. Barry, M. Lang, H. Linger, & C. Schneider (Eds.), *Designing Digitalization (ISD2018 Proceedings)*. https://aisel.aisnet.org/isd2014/proceedings2018/ISDevelopment/8

Soni, M. (2015). End to end automation on cloud with build pipeline: The case for DevOps in insurance industry, continuous integration, continuous testing, and continuous delivery. *2015 IEEE International Conference on Cloud Computing in Emerging Markets (CCEM)* (pp. 85–89). DOI: 10.1109/CCEM.2015.29

Steinberg, R. (2011). *ITIL® service operation* (1st ed.). Stationery Office.

Suvvari, S. K. (2024). The role of leadership in agile transformation: A case study. *Journal of Advanced Management Studies*, *1*(2), 31–41. DOI: 10.36676/jams.v1.i2.12

Tellis, W. (1997). Information technology in a university: A case study. *Campus-Wide Information Systems*, *14*(3), 78–91. DOI: 10.1108/10650749710187617

Thomas, G. (2016). *How to do your case study* (2nd ed.). Sage.

Tokkozhina, U., Martins, A. L., Ferreira, J. C., Mascarenhas, M., & Correia, R. (2025). Unlocking the potential of gen-AI in business context: Prospects through the eyes of academia and industry players. *Journal of Global Information Management*, *33*(1), 1–17. DOI: 10.4018/JGIM.375388

Wahyudin, A. Widodo, Nasuha, A. F., & Junaeti, E. (2020). Strategic alignment maturity level model using drivers of change in a business environment. *2020 6th International Conference on Science in Information Technology (ICSITech)* (pp. 150–154). DOI: 10.1109/ICSITech49800.2020.9392036

Waschke, M. (2015). *How clouds hold IT together*. Apress. DOI: 10.1007/978-1-4302-6167-4

Waseso, B., Meiyanti, R., Mubarak, R., Sopandi, A., Haryanto, T., & Rahman, A. A. (2024). From theory to practice: Agile methodologies in IT service management. *2024 12th International Conference on Cyber and IT Service Management (CITSM)* (pp. 1–5). DOI: 10.1109/CITSM64103.2024.10775478

Widianto, A., & Subriadi, A. P. (2022). IT service management evaluation method based on content, context, and process approach: A literature review. *Procedia Computer Science*, *197*, 410–419. DOI: 10.1016/j.procs.2021.12.157

Yang, Y., Chen, G., Hu, Z., & Zheng, J. (2024). Driving digital success. *Journal of Global Information Management*, *32*(1), 1–25. DOI: 10.4018/JGIM.365204

Ye, J., Wang, S., & Tsai, S. (2024). Impact of generative AI on enterprise performance in China. *Journal of Global Information Management*, *32*(1), 1–20. DOI: 10.4018/JGIM.347501

Yin, R. K. (1994). *Case study research: Design and methods* (2nd ed.). Sage.

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Sage.

Zaidah, Z. (2007). Case study as a research method. *Jurnal Kemanusiaan, 9*, 1–6. http://psyking.net/htmlobj-3837/case_study_as_a_research_method.pdf

Zheng, R., Chen, G., & Li, J. (2024). Leader narcissism and employee knowledge management behavior. *Journal of Global Information Management*, *32*(1), 1–15. DOI: 10.4018/JGIM.351158

João Faustino is an IT consultant. He graduated and received an MSc in Computer Engineering and a PhD in Information Science and Technology at the ISCTE-IUL. Most of his career, he has worked as a consultant on the financial services industry, on application management teams for both corrective and enhancement maintenance of core systems for insurance companies. Besides his professional work, which is mainly related with Oracle technologies, he is very enthusiastic about open-source technologies, data science, mobile development, and process optimisation. Most of his research is about IT service management and DevOps.

Rúben Filipe de Sousa Pereira is an Assistant Professor at ISCTE – University Institute of Lisbon, in the Department of Information Science and Technology, and an integrated researcher at the Instituto de Telecomunicações. He holds a PhD in Information Systems from Instituto Superior Técnico, where he also completed his MSc in Computer Engineering. His research interests include IT governance, IT service management, IT risk management, business process management, process automation, and innovation. He has also worked as a consultant in sectors such as services, banking, telecommunications, and e-commerce, and is the co-founder of three entrepreneurial projects, one of which won the Fábrica de Startups program and was a finalist in EDP Inovação.

Miguel Mira da Silva is a full professor of information systems at the Instituto Superior Técnico (University of Lisbon, Portugal) and the coordinator of the Digital Transformation group at the INOV research institute. Miguel also coordinates an online master's degree in enterprise information systems, as well as several training programs and courses. He graduated and received an MSc degree in computer engineering from the Instituto Superior Técnico, a PhD in computing science from University of Glasgow, a Sloan Fellowship master's degree in management from the London Business School, and more recently a habilitation in information systems from Instituto Superior Técnico.

Daniel Adriano is a manager of IT Process Optimization and holds a MSc in Management of Information Systems from ISCTE-IUL. Professionally, he has been working as a process manager on several industries such as manufactoring and retail. The main topics of research as IT Service Management and DevOps

Victor Camargo is a software engineer who holds an MSc in Computer Science and Business Management from ISCTE–IUL and a background in Computer Science and Engineering from the Instituto Superior de Engenharia de Lisboa. He has worked in the banking and financial services industries where he focused in developing high-performance back-end systems. Distributed systems, software architecture, agile methodologies, and knowledge management are among his primary areas of interest. DevOps and IT service management are the main topics of his research.