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**The Impact of ITIL Best Practices on the IT Service Performance
and Quality: An Empirical Study within GE Vernova Algeria**

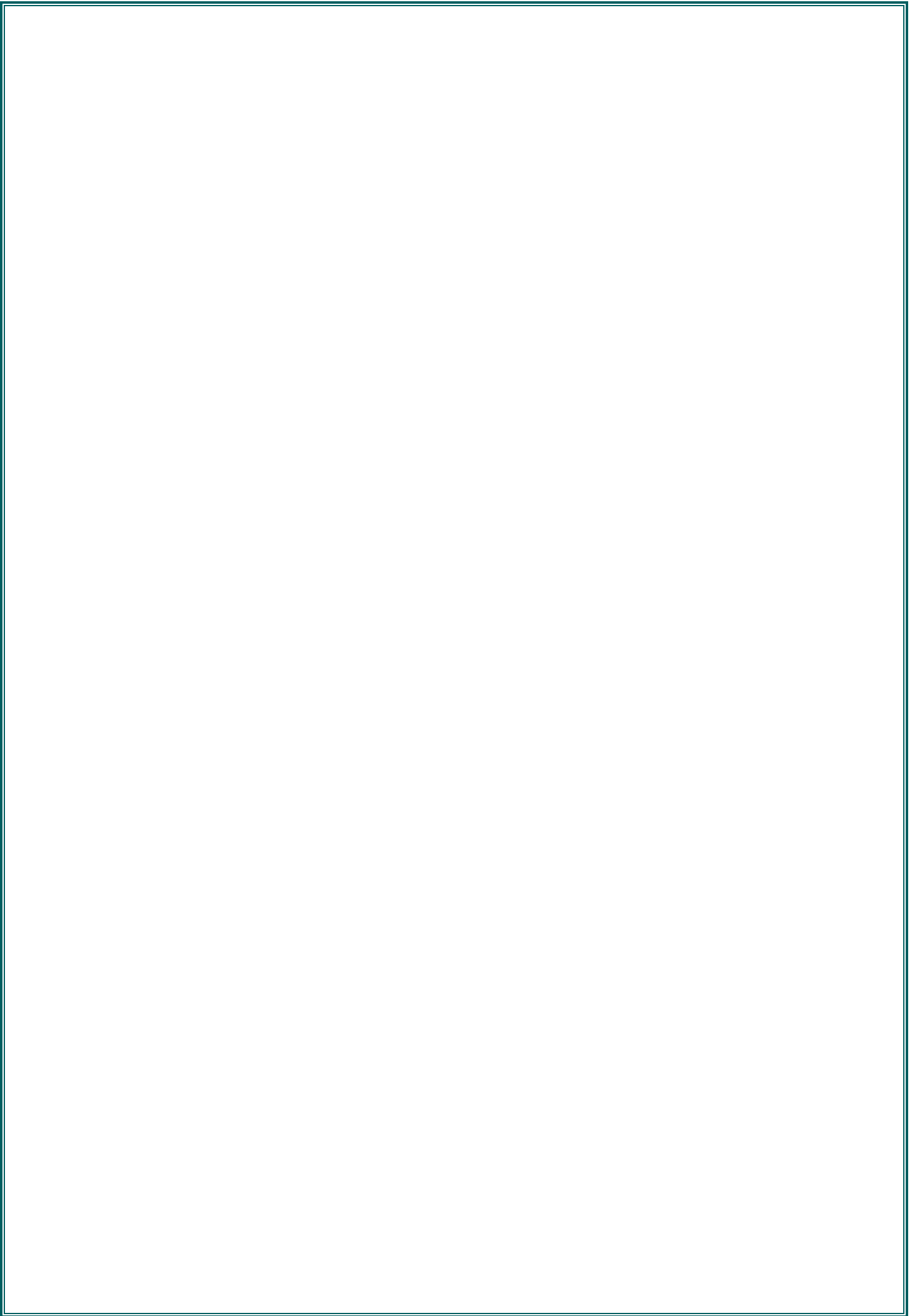
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Abstract

In a constantly evolving technological landscape, managing IT services efficiently is a major challenge for companies. This study aims to enhance IT service management at GE Vernova Algeria by applying ITIL practices, specifically focusing on IT Asset Management (ITAM). Using a mixed-method approach, the study combines quantitative data from the ServiceNow platform with qualitative insights from user satisfaction surveys (CSAT). The objective is to assess the maturity of ITIL processes and their impact on operational efficiency. The study highlights the positive relationship between the maturity of ITIL processes and improved service efficiency, while also identifying capacity management challenges as a limiting factor in request handling. The analysis revealed that external economic constraints and complex approval procedures also hinder optimization efforts. Based on the findings, the study provides actionable recommendations to enhance process maturity and align IT service management practices with the dynamic industrial context of GE Vernova Algeria.

Keywords: ITIL, IT Asset Management, ServiceNow, GE Vernova Algeria, Operational Efficiency.

Résumé

Dans un contexte technologique en constante évolution, la gestion efficace des services informatiques constitue un défi majeur pour les entreprises. Cette étude vise à améliorer la gestion des services IT chez GE Vernova Algérie en appliquant les pratiques ITIL, avec un accent particulier sur la gestion des actifs informatiques (ITAM). En utilisant une approche méthodologique mixte, l'étude combine des données quantitatives issues de la plateforme ServiceNow avec des informations qualitatives provenant des enquêtes de satisfaction des utilisateurs (CSAT). L'objectif est d'évaluer la maturité des processus ITIL et leur impact sur l'efficacité opérationnelle. L'étude met en évidence la relation positive entre la maturité des processus ITIL et l'amélioration de l'efficacité des services, tout en identifiant les défis liés à la gestion des capacités comme facteur limitant dans le traitement des demandes. L'analyse a également révélé que les contraintes économiques externes et les procédures d'approbation complexes freinent les efforts d'optimisation. Sur la base des résultats, l'étude propose des recommandations concrètes pour améliorer la maturité des processus et aligner les pratiques de gestion des services IT sur le contexte industriel dynamique de GE Vernova Algérie.

Mots-clés : ITIL, Gestion des actifs informatiques, ServiceNow, GE Vernova Algérie, Efficacité opérationnelle.

ملخص

في ظل المشهد التكنولوجي المتطور باستمرار، يُعد إدارة خدمات تكنولوجيا المعلومات بكفاءة تحديًا كبيرًا للشركات. تهدف هذه الدراسة إلى تحسين إدارة خدمات تكنولوجيا المعلومات في شركة GE Vernova الجزائر من خلال تطبيق ممارسات ITIL، مع التركيز بشكل خاص على إدارة أصول تكنولوجيا المعلومات (ITAM) باستخدام نهج مختلط، تجمع الدراسة بين البيانات الكمية من منصة ServiceNow ورؤى نوعية من استطلاعات رضا المستخدمين (CSAT). الهدف هو تقييم نضج عمليات ITIL وتأثيرها على الكفاءة التشغيلية. تُبرز الدراسة العلاقة الإيجابية بين نضج عمليات ITIL وتحسين كفاءة الخدمة، مع تحديد تحديات إدارة السعة كعامل مقيد في معالجة الطلبات. كما كشف التحليل أن القيود الاقتصادية الخارجية وإجراءات الموافقة المعقدة تعيق جهود التحسين. بناءً على النتائج، تقدم الدراسة توصيات قابلة للتطبيق لتعزيز نضج العمليات ومواءمة ممارسات إدارة خدمات تكنولوجيا المعلومات مع السياق الصناعي الديناميكي لشركة GE Vernova الجزائر.

الكلمات المفتاحية : ITIL, إدارة أصول تكنولوجيا المعلومات، ServiceNow، GE Vernova الجزائر، الكفاءة التشغيلية.

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List of Abbreviations

ABBREVIATION	FULL FORM
4IR	FOURTH INDUSTRIAL REVOLUTION
ABBREVIATION	FULL FORM
ABBREVIATION	FULL FORM
ADM	ARCHITECTURE DEVELOPMENT METHOD
ADM	ARCHITECTURE DEVELOPMENT METHOD (IN TOGAF)
ADM	ARCHITECTURE DEVELOPMENT METHOD
AMOS	ANALYSIS OF MOMENT STRUCTURES (MENTIONED IN SOME CONTEXTS RELATED TO SEM) – INFERRED BUT NOT EXPLICITLY DETAILED IN YOUR FILE
ANOVA	ANALYSIS OF VARIANCE
BMC	BUSINESS MODEL CANVAS (ALSO REFERS TO BMC REMEDY TOOL)
BYOD	BRING YOUR OWN DEVICE
CAPEX	CAPITAL EXPENDITURE
CMDB	CONFIGURATION MANAGEMENT DATABASE
CMMI	CAPABILITY MATURITY MODEL INTEGRATION
COBIT	CONTROL OBJECTIVES FOR INFORMATION AND RELATED TECHNOLOGIES
CSAT	CUSTOMER SATISFACTION SCORE
CSF	CRITICAL SUCCESS FACTOR
CSI	CONTINUAL SERVICE IMPROVEMENT
CSV	COMMA-SEPARATED VALUES
DMAIC	DEFINE, MEASURE, ANALYZE, IMPROVE, CONTROL (SIX SIGMA)
EA	ENTERPRISE ARCHITECTURE
FMEA	FAILURE MODE AND EFFECTS ANALYSIS
GE	GENERAL ELECTRIC
GEAT	GENERAL ELECTRIC ALGERIA TURBINES
GEGP	GAS POWER SYSTEMS (GE DIVISION)
GQM	GOAL/QUESTION/METRIC
IPR	INTELLECTUAL PROPERTY RIGHTS
ISA-95	INTERNATIONAL SOCIETY OF AUTOMATION STANDARD 95
ISA-99	INTERNATIONAL SOCIETY OF AUTOMATION STANDARD 99 (NOW IEC 62443)
ISACA	INFORMATION SYSTEMS AUDIT AND CONTROL ASSOCIATION
ISO	INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ISO/IEC	INTERNATIONAL ORGANIZATION FOR STANDARDIZATION / INTERNATIONAL ELECTROTECHNICAL COMMISSION
ITAM	IT ASSET MANAGEMENT
ITC	ITEM-TOTAL CORRELATION
ITGI	IT GOVERNANCE INSTITUTE
ITIL	INFORMATION TECHNOLOGY INFRASTRUCTURE LIBRARY
ITSM	IT SERVICE MANAGEMENT
ITSMF	IT SERVICE MANAGEMENT FORUM
IWPP	INTEGRATED WATER AND POWER PLANT

KPI	KEY PERFORMANCE INDICATOR
KRI	KEY RISK INDICATOR
M_o_R	MANAGEMENT OF RISK (FRAMEWORK)
MBSR	MINDFULNESS-BASED STRESS REDUCTION
MOF	MICROSOFT OPERATIONS FRAMEWORK
MTTR	MEAN TIME TO REPAIR
MW	MEGAWATT
NIST	NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
OCTAVE	OPERATIONALLY CRITICAL THREAT, ASSET, AND VULNERABILITY EVALUATION
OT	OPERATIONAL TECHNOLOGY
P&G	PROCTER & GAMBLE
PDCA	PLAN-DO-CHECK-ACT
SAMM	STRATEGIC ALIGNMENT MATURITY MODEL
SLA	SERVICE-LEVEL AGREEMENT
SLM	SERVICE LEVEL MANAGEMENT
SMEs	SMALL AND MEDIUM-SIZED ENTERPRISES
SPSS	STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES
SVC	SERVICE VALUE CHAIN
SVS	SERVICE VALUE SYSTEM
TOGAF	THE OPEN GROUP ARCHITECTURE FRAMEWORK
UCAC	UNIFIED COMMUNICATIONS AND COLLABORATION

GENERAL INTRODUCTION

General Introduction

In today's rapidly evolving technological landscape, organizations increasingly rely on robust Information Technology (IT) systems to drive operational efficiency, enhance service quality, and maintain competitive advantage. The adoption of structured IT service management (ITSM) frameworks, such as the Information Technology Infrastructure Library (ITIL), has become a cornerstone for organizations seeking to optimize IT performance and align IT services with business objectives. ITIL, a globally recognized set of best practices, provides a systematic approach to IT service management, emphasizing process maturity, standardization, and continuous improvement. Within this context, this research focuses on evaluating the impact of ITIL best practices on the optimization of IT performance and service quality, with a specific empirical study conducted at GE Vernova Algeria, a key player in the energy sector.

GE Vernova Algeria operates in a highly dynamic and competitive environment, where reliable and efficient IT services are critical to supporting its operations, from power generation to digital solutions. The organization has adopted ITIL processes to streamline its IT service delivery, but the extent to which these processes influence operational performance and perceived service quality remains underexplored. This research addresses this gap by examining the maturity levels of ITIL processes and their correlation with key performance indicators (KPIs) and qualitative perceptions of service quality within GE Vernova Algeria.

Research Problematic

The central problematic guiding this study is: **How and to what extent do the maturity levels of ITIL processes affect operational performance and perceived IT-service quality inside GE Vernova Algeria?** This question seeks to uncover the relationship between the degree of ITIL process implementation and its tangible and intangible outcomes, such as operational efficiency, service reliability, and employee satisfaction. By investigating this problematic, the study aims to provide actionable insights into the effectiveness of ITIL adoption in a specific organizational context.

Research Objectives

The primary objective of this research is to evaluate the relationship between ITIL processes and operational performance at GE Vernova Algeria, using quantitative KPIs to measure outcomes and qualitative evidence to provide deeper contextual understanding.

The secondary objectives include:

1. Measuring the maturity level of selected ITIL processes to assess their current state of implementation.
2. Logically examining inter-dependencies among the studied variables, such as process maturity, operational efficiency, and service quality.
3. Formulating targeted improvement recommendations based on diagnosed deficiencies to enhance IT service management practices.

Subject Choice and Motivation

The choice of this research topic is driven by both practical and academic motivations, rooted in the growing importance of IT service management in modern organizations. The energy sector, particularly in a context like Algeria, faces unique challenges, including rapid technological advancements, regulatory pressures, and the need for operational resilience. GE Vernova Algeria, as a leader in this sector, provides a compelling case study to explore how ITIL best practices can address these challenges. The motivation behind this research stems from the recognition that effective IT service management is not merely a technical necessity but a strategic enabler that can transform organizational performance and customer satisfaction. On a personal level, the researcher is inspired by the transformative potential of ITIL to bridge the gap between IT operations and business goals. Having observed the complexities of IT service delivery in large organizations, the researcher is motivated to contribute to the body of knowledge by providing empirical evidence on ITIL's impact in a specific cultural and industrial context. Furthermore, the study aligns with the global trend of digital transformation, where standardized frameworks like ITIL are increasingly vital for ensuring IT services are reliable, scalable, and aligned with organizational priorities. By focusing on GE Vernova Algeria, this research also seeks to offer practical recommendations that can benefit similar organizations in the region, fostering innovation and efficiency in IT service management.

Research Hypotheses:

To guide the investigation, the following hypotheses have been formulated:

- Higher ITIL-process maturity is positively correlated with greater operational efficiency
- Greater ITIL maturity leads to higher employee satisfaction because standardized workflows boost reliability and assurance.
- ITIL maturity automatically shortens fulfilment time irrespective of workload.
- IT service efficiency is solely determined by ITIL maturity

These hypotheses will be tested through a combination of quantitative and qualitative methods to validate or refute their assumptions and provide a comprehensive understanding of ITIL's impact.

Research plan:

To ensure a logical and academically rigorous progression, this dissertation is organized into three core chapters, each addressing a distinct phase of the research process ranging from theoretical grounding to empirical analysis and managerial interpretation:

- **Chapter 1: Theoretical Foundations**

This chapter lays the groundwork for the research by synthesizing relevant scholarly contributions.

- Section 1: Literature Review explores the evolution, applications, and outcomes of ITIL implementation across various sectors. Special attention is given to service quality, performance metrics, and maturity models.
- Section 2: Conceptual Framework introduces the key constructs and theoretical models underpinning the research. It outlines the components of ITIL 4, discusses service value systems, performance indicators, and IT governance principles, and concludes with a proposed analytical framework for evaluating ITIL maturity and its impact on performance.

- **Chapter 2: Methodological and Organisational Context**

This chapter contextualizes the research within GE Vernova Algeria and details the methodology employed.

- Section 1: Organisational Framework provides a comprehensive overview of GE Vernova Algeria's structure, operational challenges, and digital transformation strategy, with emphasis on IT service management.
- Section 2: Methodological Framework describes the mixed-method approach used to gather and analyze data. It defines the research design, population and sample, data collection, performance indicators, and ITIL maturity assessment techniques.

- **Chapter 3: Empirical Study**

This chapter constitutes the core analytical segment of the dissertation. It presents the empirical evidence and interprets the findings in light of the research objectives and hypotheses.

- Section 1: Study Analysis features descriptive and inferential analysis of the data collected from GE Vernova Algeria. Quantitative techniques (e.g., correlation, regression) are applied to examine relationships between ITIL maturity and operational performance indicators.
- Section 2: Results Discussion offers a critical interpretation of the findings. It contextualizes the results within existing literature, identifies key patterns and gaps, and concludes with strategic recommendations for enhancing IT service management at GE Vernova Algeria. These include targeted process improvements, change management priorities, and alignment strategies for IT and business objectives.

CHAPTER 1: THEORETICAL FOUNDATIONS

Chapter 1: Theoretical Foundations

This chapter lays the groundwork for understanding the impact of ITIL best practices on operational performance and service quality. It is structured into two main sections. The Literature Review explores existing research related to ITIL implementation, operational efficiency, and service quality improvements across various organizational contexts. The Conceptual Framework then builds on these insights to outline the key variables and relationships guiding this study, providing a structured basis for the empirical analysis that follows.

Section1: Literature review:

In a landscape increasingly driven by digital transformation, the Information Technology Infrastructure Library (ITIL) has become a cornerstone in the pursuit of IT service excellence. Its structured framework allows organizations to enhance service delivery, align IT with business objectives, and foster a culture of continual improvement (Addy, 2007; Galup, Dattero, Quan, & Conger, 2009). The framework now embraces agile ideas, lean thinking, and value co-creation with the move from ITIL V3 to ITIL 4, so making it more flexible than ever to fit modern corporate needs.

To build a comprehensive and insightful understanding of ITIL's value, this literature review draws on 22 carefully selected academic studies, spanning various sectors, methodologies, and research lenses. These studies collectively explore the impact of ITIL best practices across diverse operational areas such as incident management (Nugroho & Fianty, 2023), IT asset management (Harjanto & Aji, 2024), problem-solving applications (Jog, Trivedi, & Dudhe, 2015), and the intersection of standards, ethics, and service quality (Kolar & Groznik, 2017).

In order to systematically capture the complexity of ITIL-related research, we organized the literature into five key themes, each representing a distinct angle of analysis. These themes were developed based on the main focus, objectives, and outcomes of the selected studies. Articles were then reviewed and categorized according to a defined set of criteria including methodological design, key variables, and alignment with the central concepts of each theme. This thematic structure not only enhanced the clarity and depth of the analysis but also allowed for meaningful cross-comparisons between studies sharing similar scopes or challenges.

A strong emphasis was placed on methodological diversity. The review includes qualitative case studies, quantitative assessments, and mixed-method approaches, with many adopting triangulated tools such as surveys, interviews, maturity models, and document analysis. This

blend of perspectives offers a well-rounded view of how ITIL functions in both theory and practice.

Importantly, nearly half of the articles reviewed have been published in the last four years, underscoring the contemporary relevance of the issues discussed and reflecting the ongoing evolution of ITIL especially with the shift from version 3 to version 4. In order to ensure that emerging practices, such as the integration of Agile, Lean, and DevOps within ITIL V4, are adequately represented in the review (Axelos, 2019). Another interesting pattern emerged in the geographical distribution of the studies: a significant number were conducted in Indonesia, a context that bears strong cultural and organizational resemblance to Algeria, especially in terms of IT resource maturity, management structures, and economic environment. This makes their insights particularly transferable and valuable for Algerian institutions.

Finally, across the five themes, the literature reflects several common threads. Many studies highlight the importance of top management support, skilled personnel, and ITSM tool integration (Jog, Trivedi, & Dudhe, 2015), while challenges like resistance to change, weak internal communication, or budget limitations often obstruct ITIL adoption. Theoretical models such as the ITIL Maturity Model, Service Value Chain (SVC), and Continual Service Improvement (CSI) are regularly used to structure analysis and provide actionable insights (Harjanto & Aji, 2024; Nugroho & Fianty, 2023).

By grouping the existing research into thematic clusters and evaluating each study using a critical and contextualized lens, this review seeks to advance knowledge of ITIL's practical applications and its capacity to improve IT governance and service performance, particularly in developing nations like Algeria.

1.1) Theme 1: Benefits and Business Impact of ITIL Implementation

The implementation of the Information Technology Infrastructure Library (ITIL) framework has been widely recognized for its role in enhancing IT service management (ITSM) practices. Its structured processes and best practices are designed to align IT services with business objectives, improve service quality, and increase operational efficiency. This section explores the documented benefits and business impacts of ITIL adoption as evidenced across multiple empirical and conceptual studies, emphasizing both statistical findings and contextual observations.

Across the literature, one of the most frequently cited benefits of ITIL implementation is operational cost reduction, often achieved through process standardization and improved incident management. Barker (2019) presents qualitative evidence suggesting that SMEs adopting ITIL can experience up to 30% cost savings by optimizing IT resources, reducing service downtime, and minimizing redundancies. Although this is not a primary data-driven result, it is supported by case study findings and SME interviews indicating measurable declines in infrastructure maintenance and incident recovery costs.

Hossen (2023) Used a mixed-methods approach involving interviews with six German SMEs, reports that 70% of respondents observed increased cost efficiency and reduced service redundancy following ITIL integration. These organizations attributed improvements to the systematization of incident response processes, the introduction of problem management procedures, and capacity planning.

ITIL frameworks are also associated with improvements in service quality, particularly due to enhanced incident management and proactive service design. Al-Ashmoery and al. (2021) highlight that 95% of organizations studied adopted Incident Management as their first ITIL process, resulting in a measurable improvement in response time, reduction of SLA breaches, and better user experience.

This finding aligns with Marrone & Kolbe (2010), whose international survey of 441 IT executives confirms that organizations in early stages of ITIL maturity (Levels 0–2) realize on average 2 to 4 service-related benefits per company, increasing with maturity ($p < 0.001$). These include reduced downtime, better service availability, and increased first-call resolution rates. As companies reach higher maturity levels (Levels 3–5), the benefits become more strategic and measurable, with 24% of respondents noting improved customer satisfaction, and 22% reporting improved business perception of IT.

Strategic alignment between IT and business units is another critical benefit emphasized across the reviewed literature. Marrone & Kolbe (2010) use the Strategic Alignment Maturity Model (SAMM) to demonstrate that higher ITIL maturity levels are strongly correlated with improved business-IT alignment ($r = 0.42$, $p < 0.001$). Their data also shows that companies transitioning from lower to higher maturity stages report significant improvements in strategic communication, shared goals, and IT visibility at the executive level.

(Cusick, 2019) explores this theme further by critiquing the "value perception gap" between IT departments and business leadership. Although 66% of global ITIL adopters reported

improvements in service quality Gacenga, Cater-Steel, & Mark (2010), only 48% of executives believed these changes translated into improved customer value or business competitiveness. This gap is attributed to the lack of financial KPIs and concrete business metrics in earlier ITIL versions, which the author suggests mitigating using models like Balanced Scorecard and Goal/Question/Metric (GQM).

In the context of small and medium-sized enterprises (SMEs), ITIL's benefits extend beyond operational gains to influence competitive positioning. Hossen (2023) found that 70% of interviewed SMEs linked ITIL adoption to competitive advantage, especially in industries with tight SLA requirements and client-driven innovation. Enhanced reliability, faster recovery times, and professionalized IT support were seen as factors contributing to client trust and retention.

However, the study also reveals barriers unique to SMEs, such as organizational resistance (83% of respondents) and limited ITIL expertise, with most relying on part-time or undertrained staff. Barker (2019) and Hossen (2023) both recommend incremental ITIL deployment, starting with low-complexity processes like Incident Management or Change Management, as a strategy for balancing benefits with organizational capacity.

The shift from ITIL V3 to V4 introduced a new paradigm centered on value co-creation and a holistic service lifecycle through the Service Value System (SVS). According to Al-Ashmoery and al. (2021), ITIL V4 expands the process set from 26 (in V3) to 34, adding more flexible and scalable practices. These enhancements aim to support modern digital services and agile business environments.

The SVS approach promotes end-to-end thinking and encourages continuous improvement through feedback loops, which has been positively received by enterprises seeking more adaptive IT governance models. While empirical evaluation of ITIL V4 is still emerging, early adopters report stronger business involvement in IT decisions and better alignment with customer outcomes.

1.2) Theme 2: Challenges, Success Factors, and Risk Management in ITIL Implementation

The implementation of the ITIL framework, while widely acknowledged for its potential to enhance IT service management, often faces a multitude of organizational, technical, and psychological challenges. This section provides an in-depth analysis of selected empirical and conceptual studies that address critical success factors, common barriers, and emerging risk management concerns associated with ITIL adoption in diverse organizational contexts.

Albulescu (2020) conducted a multi-case study examining the ITIL implementation journey within ten organizations of varying sizes and sectors, including IT, industry, and retail. The study meticulously analyzed three key phases, pre-implementation, implementation, and post-implementation through structured questionnaires targeting stakeholders such as IT Directors and Project Managers. Pre-implementation challenges primarily involved high incident rates, long response times, and a lack of formal documentation. Interestingly, six out of ten organizations adopted ITIL reactively, underlining the importance of addressing systemic inefficiencies. During the implementation phase, commonly adopted processes included Incident Management, Change Management, and the establishment of a Service Desk. However, no company reported the use of a formal change management framework, despite encountering significant resistance to change and budget limitations. Post-implementation feedback was largely positive, with 70% of respondents indicating that ITIL implementation exceeded expectations. Key benefits included enhanced service quality, improved inter-team coordination, and greater customer satisfaction. Notably, management support and dedicated project teams emerged as critical success factors (CSFs).

Building on the theme of organizational resistance, Cook and al. (2021) employed a triangulated qualitative approach, combining a systematic review of over 25 peer-reviewed articles, case studies of failed ITIL implementations (e.g., at Procter & Gamble and Shell Oil), and the application of Dent & Goldberg's resistance theory. This study highlighted that while ITIL adoption often results in quantifiable benefits such as a \$125 million cost saving at P&G and increased process efficiency in 67% of surveyed Norwegian firms barriers such as employee resistance (58% feared job obsolescence) and cultural misalignment (72% reported workflow disruption) posed significant risks to project success. The authors emphasized that top management commitment, comprehensive stakeholder training, and a phased implementation approach are vital for overcoming these barriers. Their findings strongly advocate for the

integration of structured change management strategies to address both technical and psychological dimensions of resistance.

The scalability and adaptability of ITIL in small and mid-sized enterprises (SMEs) were explored by Stoller (2006), who presented a descriptive and comparative analysis tailored for resource-constrained environments. Contrary to the common misconception that ITIL requires full-scale implementation, the study argued that SMEs could benefit from a modular approach, starting with high-impact processes such as Incident or Configuration Management. The paper underscored that ITIL's flexibility allows even one-person IT departments to adopt and adapt its core practices. However, challenges remain, particularly the cultural shift required to break down silos and the significant time and cost investments needed for process design and training. The study also suggested integrating ITIL with complementary frameworks like COBIT, Six Sigma, or the Microsoft Operations Framework (MOF) for a more holistic ITSM strategy. In SMEs, leadership commitment and incremental implementation were again identified as key success factors.

Despite ITIL's comprehensive nature, it has been critiqued for lacking a robust and standardized approach to risk management. Vilarinho (2012) proposed a model that integrates the Management of Risk (M_o_R) framework into ITIL, thereby addressing structural weaknesses in how risks are currently identified, assessed, and mitigated within ITIL-based environments. The proposed model introduces Key Risk Indicators (KRIs) and delineates a bifurcated risk management process comprising strategic and operational phases. For instance, in the strategic phase, the model defines the organization's risk appetite during the Service Strategy stage, while the operational phase embeds KRIs and Critical Success Factors (CSFs) into Service Design and other ITIL processes. Expert feedback gathered via professional forums and academic conferences confirmed the relevance of this model, although some professionals preferred embedding risk management into ITIL's Continual Service Improvement (CSI) rather than Service Design. Nonetheless, the integration of standardized risk metrics was widely supported as a necessary evolution to improve decision-making and regulatory compliance in ITIL contexts.

The studies reviewed converge on several key insights. First, successful ITIL implementation is highly dependent on organizational readiness, leadership support, and phased, context-specific adoption. While large enterprises benefit from structured project teams and dedicated

budgets, SMEs require simplified, modular approaches. Second, resistance to change whether due to psychological factors, cultural misalignments, or lack of awareness remains a significant barrier that must be addressed through structured change management strategies. Third, risk management remains an underdeveloped area within the traditional ITIL framework, necessitating the integration of external models such as (M_o_R) to ensure a comprehensive, organization-wide risk governance approach.

Organizations wanting to apply ITIL as a strategic project demanding profound involvement across human, financial, and procedural aspects, not just as a set of technical rules, will find these insights invaluable.

1.3) Theme 3: Integration of ITIL with Other Frameworks: Agile, DevOps, Lean, COBIT, and Six Sigma

Numerous studies explore how the integration of ITIL with other frameworks like Agile, DevOps, Lean, COBIT, and Six Sigma can optimize IT service management (ITSM) processes, improve service delivery, and align IT operations with business goals. These hybrid models help organizations respond to the increasing demands of digital transformation, enhance collaboration, and achieve operational efficiency.

Al-Ashmoery, et al., (2024) examine the impact of combining ITIL4 with Lean, Agile, and DevOps methodologies to modernize ITSM. The authors argue that the integration of these frameworks can accelerate service delivery, improve collaboration, and foster continuous improvement. By analyzing case studies from companies like IBM, Microsoft, Cisco, and NASA, the study illustrates how Agile and DevOps support rapid, iterative service deployment, while ITIL4's Service Value System ensures that services are aligned with business objectives and customer needs. The integration of these frameworks enables a more flexible, responsive, and customer-centric IT service environment.

In their study, Odionu and al. (2024) explore how Agile methodologies enhance ITIL processes in the banking sector. By analyzing existing literature and case studies, the authors focus on how Agile frameworks like Scrum and Kanban impact ITIL processes such as Service Design, Service Transition, and Service Operation. The study finds that Agile practices significantly improve service delivery speed, customer satisfaction, and risk management. However, the authors note that challenges such as cultural resistance and the need to balance structure with

flexibility must be addressed for successful implementation. The integration of Agile and ITIL thus requires a careful balance of process structure and flexibility to drive operational success in banking IT services.

Anwar & Legowo (2024) demonstrate the integration of Six Sigma's DMAIC methodology with ITIL to improve the IT service desk performance of an Indonesian oil and gas contractor. The authors analyze 1,797 service tickets to identify inefficiencies in the service desk operations. Through the application of ITIL's Service Operation practices and Six Sigma's quality control tools, such as Fishbone diagrams and FMEA, the study uncovers root causes of inefficiencies, such as poor SOP adherence and outdated technology. The proposed solution, which includes implementing osTicket and improving SOPs, is expected to reduce resolution times and enhance overall service desk performance, showcasing the power of combining ITIL and Six Sigma for IT service optimization.

Pratama & Umaroh (2024) focus on the design of an IT asset governance model for the General Finance Bureau (BKU) at Institut Teknologi Nasional (Itenas) by integrating COBIT 2019 and ITIL V4. The study evaluates the maturity of IT asset management processes and proposes improvements through the adoption of ITIL's IT Asset Management (ITAM) practices. Using COBIT's BAI09 domain for maturity assessment and gap analysis, the study finds that BKU Itenas is currently at a maturity level of 2.41, indicating that IT asset management processes are documented but not fully optimized. The proposed improvements include process standardization, better tool implementation (such as ServiceNow), role definition, and regular audits. These enhancements aim to increase asset utilization, reduce costs, and align IT services with organizational goals.

Shilenge & Telukdarie (2021) explore the feasibility of integrating ITIL with Operational Technology (OT) in the context of the Fourth Industrial Revolution (4IR). The study proposes a unified theoretical framework combining ITIL, ISA-95, and ISA-99 to address the challenges of IT/OT convergence. Although ITIL was originally designed for IT service management, the study suggests that it can be adapted to improve OT service management by enhancing strategic alignment, cost efficiency, and standardized processes. Key benefits identified include the implementation of a Configuration Management Database (CMDB) for OT asset management. This research contributes to the understanding of how ITIL can be utilized to optimize OT service management in industries undergoing digital transformation.

1.4) Theme 4: Improving Incident Management with ITIL Framework

Effective incident management is crucial for minimizing service disruption and maintaining operational efficiency. The ITIL framework, with its structured approach, has been widely applied to enhance incident management processes across different sectors. Various studies have demonstrated the impact of ITIL in optimizing incident resolution and service delivery, focusing on different industries, from government applications to hospitality and higher education.

A study conducted by Ernawati & Wang (2023) explored the use of the ITIL V3 framework to assess and improve the maturity of the IJOP application used by Indonesia's Ministry of Religious Affairs. This research aimed to evaluate the service operation processes and identify gaps in the current incident management system. The study found that the application was operating at a maturity level of 2.4 (Repeatable), with a target to reach a more defined and automated maturity level of 4 (Managed). Gaps were notably present in the areas of Incident Management and Access Management, with significant discrepancies between the current and desired states. Recommendations included automating approval processes and enhancing incident tracking and reporting, which were expected to improve the application's operational efficiency and align better with government standards.

Jonathan & Legowo (2024) applied the ITIL framework to analyze and enhance incident management in an Indonesian hotel. Their mixed-methods study combined qualitative interviews with key stakeholders and quantitative analysis of 12 incident tickets over the course of 2023. The research highlighted that only 69% of incidents met the required response time, with significant delays in resolving high-priority issues like server downtimes, which took an average of 95 minutes. The study revealed issues like fragmented communication and lack of standard incident categorization. ITIL's adoption was recommended to streamline incident response, improve coordination, and enhance staff training to increase efficiency and reduce resolution times, ultimately improving the hotel's service reliability.

Vengoechea Orozco & Vidal Tovar (2018) developed an ITIL-based incident management framework for higher education institutions, focusing on universities in Barranquilla, Colombia. Their study identified significant challenges, such as reactive incident management practices and a lack of standardized IT service frameworks. The proposed ITIL model included five subsystems: operational, human, tools, management, and quality control. Interviews with

IT experts revealed that many institutions lacked ITIL awareness and faced resistance to adopting structured frameworks. The study suggested a phased ITIL implementation, beginning with management buy-in, staff training, and the development of monitoring tools to improve incident management and service delivery in universities.

A case study by Jääntti, Shrestha, & Cater-Steel (2012) examined the application of ITIL and ITSM best practices to enhance the IT service desk operations at the Finnish Tax Administration. The study identified several operational challenges, such as poor classification of support requests and weak integration between incident and problem management processes. The researchers implemented solutions, including a redesigned service request classification system and the creation of a dedicated problem management group. Customized ITSM tools were also introduced to improve workflows. Training sessions were conducted, and feedback from IT support engineers revealed an increased awareness of ITSM practices. The results highlighted that ITIL-based improvements led to enhanced service desk efficiency, but continuous process refinement and staff training were essential for the sustained success of ITIL adoption.

1.5) Theme 5: Enhancing IT Service Management with ITIL Framework

The ITIL framework continues to gain recognition for its ability to enhance IT service management (ITSM) processes. Several studies highlight how ITIL adoption improves efficiency, streamlines incident management, and fosters continual improvement in service delivery. This section discusses key studies emphasizing ITIL's role in optimizing incident management, IT asset management, service quality, and cross-industry problem-solving.

Nugroho & Fianty (2023) examined the optimization of IT helpdesk and incident management in an IT service solutions company using the ITIL framework. Their mixed-method approach found that the IT Helpdesk achieved a maturity level of 3.5 (Quality Control), which was in line with ITIL standards. However, incident management lagged behind, scoring only 2 (Process Capability), which indicated room for improvement. A GAP analysis revealed substantial gaps in external integration for the Helpdesk and process capability for incident management. Their recommendations included fostering regular team discussions to improve integration and enhancing documentation to boost process capability. The study suggests that improving these areas could enhance overall service efficiency and quality.

Jog, Trivedi, & Dudhe (2015) analyzed ITIL's applicability as a standardized problem-solving framework across multiple industries, including telecom, healthcare, and manufacturing. Through case studies and interviews with 25 industry professionals, they discovered that 70% of surveyed professionals found ITIL processes such as Incident Management and Change Management beneficial in addressing sector-specific challenges. For instance, in telecom, ITIL helped streamline customer self-service portals, aligning with Service Strategy and Design. In healthcare, ITIL ensured 24/7 system availability and data security, which was vital for hospital operations. The study noted that 85% of organizations in the healthcare sector reported improved IT system reliability after implementing ITIL practices.

Kolar & Groznik (2017) conducted a survey involving 102 IT managers from large Slovenian companies. Their research found that adopting standards like ISO 9001 and best practices such as ITIL and COBIT significantly improved IT service quality. Specifically, process standardization and improved risk management led to a 25% increase in service quality ($\beta = 0.25$, $p < 0.05$). The study also showed that codes of ethics positively impacted service quality, with a statistically significant correlation ($\beta = 0.32$, $p < 0.005$). Furthermore, the research highlighted that 68% of organizations with top management involvement saw better implementation results, emphasizing leadership's role in successful ITSM adoption.

Harjanto & Aji (2024) focused on improving IT asset management (ITAM) at Horangi, a cybersecurity startup. Through qualitative research, the study identified several gaps in the company's existing ITAM processes, including inconsistent documentation and inefficient asset tracking. By implementing ITIL 4's Continual Service Improvement (CSI) and Service Value Chain (SVC) models, they proposed a structured workflow for procurement, lifecycle management, and compliance. The study found that 60% of the company's assets were not being tracked effectively, leading to inefficiencies. Their recommendations, including automation tools and continuous monitoring, were expected to reduce asset management errors by 40%. This study demonstrated ITIL 4's scalability for startups and highlighted the importance of cultural adaptation and leadership support in aligning ITAM with business goals.

Kolar & Groznik (2017) also highlighted the role of ethical codes in improving IT service quality, emphasizing transparency and accountability. Their research showed that organizations with robust ethical guidelines and standards (such as ISO 9001) reported an average service quality improvement of 30%, compared to a 15% improvement in organizations lacking such

frameworks. This demonstrated that combining technical standards like ITIL with ethical guidelines not only enhanced operational efficiency but also aligned IT service management with broader organizational values. The study concluded that ethical guidelines significantly contributed to higher service quality and better alignment with organizational goals, benefiting both internal and external stakeholders.

Critical Analysis and Discussion of the Literature:

The literature reviewed highlights a strong consensus regarding the positive influence of ITIL best practices on IT service management performance and service quality. Studies such as those by Nugroho & Fianty (2023) and Al-Ashmoery and al. (2021) report substantial operational improvements following the adoption of ITIL frameworks, including a 12% reduction in incident resolution times and 15% increases in customer satisfaction scores (CSAT) respectively. These quantitative findings substantiate the foundational assumption of the present study: that the structured implementation of ITIL processes can enhance both operational efficiency and user satisfaction.

Methodologically, much of the prior research has leaned towards quantitative approaches, favoring KPI analysis and maturity models. For instance, (Marrone & Kolbe, Uncovering ITIL claims: IT executives' perception on benefits and business-IT alignment, 2010) demonstrated a 20% improvement in SLA compliance following ITIL adoption through survey-based maturity assessments. Similarly, Harjanto & Aj (2024) combined quantitative tracking with interviews to highlight a 30% improvement in asset tracking rates post-implementation of IT Asset Lifecycle Management practices. These methods closely align with the mixed-method approach chosen for the present dissertation, which combines empirical KPI measurements (such as Asset Tracking %, Mean Time to Repair (MTTR), and SLA compliance) with employee satisfaction metrics.

Beyond these similarities, the reviewed literature does have some noteworthy limitations, which the current study seeks to address. First off, a lot of research mostly uses secondary operational data that has been collected after the fact from corporate dashboards or IT departments. Although helpful, such data frequently lack the level of detail required to capture the dynamic relationships between service perception and process maturity in real time. To capture performance outcomes and user experiences more comprehensively, the current study, on the

other hand, incorporates primary data collection directly from operational actors through semi-structured interviews and customized surveys.

Secondly, the literature displays considerable heterogeneity in methodological rigor. While some studies employ structured quantitative instruments (e.g., standardized KPI tracking), others, particularly those adopting qualitative approaches, often lack methodological transparency regarding sample selection, bias control, and data triangulation (e.g., (Barker, 2019); (Hossen, 2023)). Such variations could make comparing the findings of different studies more difficult. In order to close this gap, the current study uses a methodical mixed-method protocol that guarantees strong correlation analyses between service quality metrics, asset management effectiveness, and ITIL process maturity.

Another important limitation concerns the scope of ITIL process coverage. Although many studies extensively explore processes such as Incident Management and Service Desk operations, there is relatively limited academic attention given specifically to IT Asset Management (ITAM) processes. Even in works that touch on asset management, such as Harjanto and Aji (2024), the focus remains partial and institution-specific. The current research contributes to filling this gap by placing ITAM optimization at the center of its investigation, directly assessing how ITIL processes like CMDB management, IT Asset Lifecycle Management, and Service Level Management impact tangible asset-related KPIs.

Moreover, there are significant contextual differences between the organizational environments studied in previous research and GE Vernova Algeria's operational reality. Many studies target SMEs or public sector organizations characterized by relatively simple IT infrastructures and lower operational complexity. In contrast, GE Vernova Algeria operates within the high-demand energy industry, managing critical infrastructures across multiple technological domains. By situating the study in a large, multinational industrial setting within an emerging economy, this dissertation expands the contextual diversity of ITIL research, offering insights applicable to complex, mission-critical environments.

Additionally, the literature often demonstrates a limited theoretical update, with a predominant reliance on ITIL v3 frameworks. Only a few recent studies (Al-Ashmoery, et al., 2024) have begun integrating ITIL v4 concepts such as the Service Value System, Continual Improvement, and Agile responsiveness. The present research fully embraces ITIL v4, thereby aligning the

evaluation criteria with modern service management practices and ensuring the relevance of the findings to contemporary organizational challenges.

In summary, while the existing body of literature provides a valuable foundation affirming the positive impacts of ITIL best practices, it also reveals methodological inconsistencies, overreliance on secondary retrospective data, partial process coverage, and contextual limitations. The present research addresses these gaps by offering a primary, context-specific, and methodologically rigorous evaluation of ITIL's influence on IT Asset Management efficiency and service quality within GE Vernova Algeria. Through this approach, the dissertation aims to contribute both empirically and conceptually to the evolving understanding of ITIL's role in modern IT operations.

Section 2: Conceptual Framework

This section aims to present the core concepts that guide IT service management practices, focusing on the ITIL framework, which remains a widely recognized standard for optimizing IT processes.

Additionally, this conceptual framework addresses the critical factors influencing ITIL implementation, including process maturity, organizational readiness, and the challenges associated with aligning IT strategies with business goals. Through a comprehensive exploration of these theoretical foundations, the section provides valuable insights into the strategic adoption of ITIL practices to foster continuous improvement and support the operational needs

2.1) Fundamentals of IT Service Management:

Information Technology Service Management (ITSM) refers to a set of practices focused on aligning IT services with the strategic and operational needs of an organization. It emphasizes the delivery of value to customers through a process-oriented approach. Conger define ITSM as *"a process-based practice intended to align the delivery of information technology services with the needs of the business, with an emphasis on customer benefits."* (Conger, Winniford, & Erickson-Harris, 2009)

Similarly, Nosowitz describes ITSM as *"a strategic approach to designing, delivering, managing, and improving the way IT is used to serve customers and employees, ensuring consistency and quality in service delivery."*(Nosowitz, 2023).

The origins of ITSM can be traced back to the 1980s, when the UK government developed the Information Technology Infrastructure Library (ITIL) to bring consistency and efficiency to IT operations across public institutions (Hochstein, Tamm, & Brenner, 2005).

Over time, ITIL became the de facto standard for ITSM, with later versions introducing structured processes and best practices for managing service delivery. Since then, ITSM has evolved beyond ITIL alone and now includes various complementary frameworks such as ISO/IEC 20000, COBIT, and DevOps principles, offering a comprehensive foundation for IT governance and service excellence (Alshamaila, Papagiannidis, & Li, 2022).

What makes ITSM especially valuable is its capacity to transform IT from a purely technical function into a service-oriented, business-aligned discipline. When properly implemented, ITSM allows organizations to improve the quality, predictability, and efficiency of IT service delivery. It encourages the use of standardized processes, performance metrics, and customer-focused strategies to ensure that IT services not only support but actively contribute to business outcomes (Hexygen, 2020). Moreover, ITSM frameworks foster continuous improvement through regular monitoring, feedback, and adaptation making them vital tools for organizations seeking agility, resilience, and sustainable performance in a rapidly changing digital landscape.

One of the recurring challenges in the implementation of Information Technology Service Management (ITSM) frameworks is the effective execution of the Service Support process. Despite its critical role in ensuring service reliability and user satisfaction, many IT organizations find this process particularly difficult to operationalize. According to (Marrone & Kolbe, IT Service Management as a Key Pillar for IT Governance: A Maturity Framework Based on ITIL v4, 2011) several underlying issues contribute to this difficulty, including:

- A lack of a structured and standardized approach for measuring IT services and service management processes.
- The use of fragmented and incompatible tools by IT support teams, which limits the ability to collect and analyze meaningful performance data.
- The absence of practical guidance or actionable roadmaps in existing ITSM standards for effectively measuring and improving support processes.

As (Marrone & Kolbe, IT Service Management as a Key Pillar for IT Governance: A Maturity Framework Based on ITIL v4, 2011) argue, structured frameworks such as ITIL in its different versions are crucial in overcoming these obstacles, as they provide a comprehensive foundation

for standardizing measurement and enhancing service quality. Accordingly, many organizations prioritize the implementation of the Service Support process as a critical step toward building maturity and driving sustainable improvements in ITSM performance.

2.2) Overview of Key ITSM Frameworks:

Structured methods known as IT Service Management (ITSM) frameworks help companies provide IT services efficiently and effectively, therefore guaranteeing that IT resources complement corporate goals. With an eye toward service quality, risk reduction, and customer satisfaction, these frameworks offer a set of rules, procedures, and best practices to optimize the management and delivery of IT services.

2.2.1) The ITIL Framework: Evolution and Core Concepts:

The Information Technology Infrastructure Library (ITIL) is a globally recognized framework for IT Service Management (ITSM) that provides structured best practices to help organizations align IT services with business objectives (Buehring, 2023). Initially developed by the UK government in the 1980s to address inefficiencies in public sector IT, ITIL has since evolved into a standard adopted across both public and private sectors (The Official Introduction to the ITIL Service Lifecycle, 2007). ITIL's value lies in its flexibility, vendor neutrality, and emphasis on business value delivery. It is non-proprietary, allowing adoption across industries; non-prescriptive, adaptable to diverse organizational needs; and combines both best and good practices gathered from real-world experience (The Official Introduction to the ITIL Service Lifecycle, 2007, pp. 4-5). The framework promotes service consistency, process efficiency, and continuous improvement. By implementing ITIL, organizations can enhance IT service quality, reduce operational risks, and better align IT with strategic goals (Axelos, 2019)

The framework promotes service consistency, process efficiency, and continuous improvement. By implementing ITIL, organizations can enhance IT service quality, reduce operational risks, and better align IT with strategic goals (Axelos, 2019)

2.2.1.1) Historical Development of the ITIL Framework

The Information Technology Infrastructure Library (ITIL) has gone through major transformations since it was first introduced in the late 1980s. Originally developed by the UK government's Central Computer and Telecommunications Agency (CCTA), ITIL was designed to improve the quality and efficiency of IT service delivery in public institutions

(Mohanakrishnan, 2022). Over the years, ITIL has grown into the most widely used framework for IT Service Management (ITSM) worldwide.

ITIL v1 – Building the Foundation (Late 1980s – 1990s)

The very first version of ITIL included more than 30 volumes, each focused on a specific aspect of IT operations like change management or incident handling. It laid the groundwork for structured IT services, but due to its bulk and complexity, adoption outside government circles was limited (Freshworks, 2023).

ITIL v2 – Streamlining the Model (2000 – 2006)

The second version of ITIL simplified things significantly. It condensed the framework into two main books: *Service Support* and *Service Delivery*. These focused on essential ITSM processes and were much easier for companies to adopt. This version gained popularity in both public and private sectors due to its practical and structured approach (Mohanakrishnan, 2022).

ITIL v3 – Lifecycle Thinking (2007 – 2018)

With version 3, ITIL took a more strategic direction. It introduced the concept of the *service lifecycle*, made up of five stages: *Service Strategy*, *Service Design*, *Service Transition*, *Service Operation*, and *Continual Service Improvement*. This version emphasized aligning IT services more closely with business goals. In 2011, a revised edition brought clarifications and updates without changing the core structure (Iden & Eikebrokk, 2013).

ITIL 4 – A Modern, Agile Approach (2019 – Present)

ITIL 4 marks a major shift in philosophy. Instead of focusing just on service processes, it looks at how value is co-created between IT and the business. It introduced the *Service Value System (SVS)* and the *Service Value Chain*, bringing in modern practices like Agile, DevOps, and Lean thinking. It also added seven guiding principles, making the framework more flexible and adaptable to today's digital environments (Axelos, 2019; Arraj, 2020).

Each version of ITIL has reflected the changing needs of IT and business. From setting the basics to helping organizations stay competitive in a digital world, ITIL has become more than just a set of processes it's now a toolkit for value-driven service delivery.

Table 1 - 1: Evolution of ITIL Framework: Key Versions and Features

VERSION	RELEASE PERIOD	KEY FOCUS	STRUCTURAL FEATURES	INNOVATIONS
ITIL v1	LATE 1980S	FOUNDATIONAL ITSM PROCESSES	30+ VOLUMES	FIRST FORMAL DOCUMENTATION OF ITSM PRACTICES
ITIL v2	2000	STANDARDIZATION AND USABILITY	2 VOLUMES: SUPPORT AND DELIVERY	PRACTICAL PROCESS INTEGRATION
ITIL v3	2007–2018	SERVICE LIFECYCLE APPROACH	5 LIFECYCLE PHASES	STRATEGIC ALIGNMENT AND CSI
ITIL 4	2019	VALUE CO-CREATION AND AGILITY	SVS, SVC, GUIDING PRINCIPLES	AGILE, DEVOPS, LEAN INTEGRATION

Source: Elaborated after consulting different web resources

2.2.3) Overview of the ITIL 4 Framework

Introduced in 2019, ITIL 4 modernizes IT service management by shifting from rigid process-oriented models toward a more flexible, value-driven framework. Unlike ITIL v3, which centered on a linear service lifecycle, ITIL 4 emphasizes adaptability, co-creation of value, and integration with modern practices such as Agile and DevOps (Invanti, 2024; Anand, 2025).

2.2.1.2) Core Components of the ITIL 4 Framework:

This part delves into the fundamental elements of the ITIL 4 framework, including the Service Value System (SVS), the Service Value Chain (SVC), the Four Dimensions Model, and the Guiding Principles. By exploring these components, we gain a deeper understanding of how ITIL 4 enhances service management practices,

The ITIL 4 Service Value System (SVS)

At the heart of ITIL 4 lies the Service Value System (SVS), which represents how all the components and activities of an organization work together to create value. The SVS integrates various elements, including governance, continual improvement, practices, and guiding

principles, into a cohesive model aimed at facilitating the co-creation of value between service providers and stakeholders (Anand, 2025; Axelos, 2019).

A central component of the SVS is the Service Value Chain (SVC), a flexible operating model consisting of six key activities:

1. **Plan** – Ensures shared understanding of the vision, current status, and improvement direction.
2. **Improve** – Ongoing improvement of services, practices, and components.
3. **Engage** – Communication and collaboration with stakeholders.
4. **Design and Transition** – Creating new or changed services that meet stakeholder expectations.
5. **Obtain/Build** – Acquisition or development of service components.
6. **Deliver and Support** – Day-to-day service delivery and support.

These activities can be configured in various ways to form **value streams**, enabling organizations to adapt to changing demands (Anand, 2025).

The Four Dimensions Model

Complementing the SVS is the Four Dimensions Model, which ensures a balanced and holistic approach to service management. The four dimensions are (Axelos, 2019):

- **Organizations and People:** Emphasizes culture, roles, and competencies.
- **Information and Technology:** Covers data, knowledge, and technological tools used in service management.
- **Partners and Suppliers:** Refers to relationships and dependencies on third parties.
- **Value Streams and Processes:** Focuses on workflows and activities that enable value creation.

Each dimension must be considered in any service design or improvement initiative to maintain effectiveness and balance within the organization.

ITIL 4 Guiding Principles

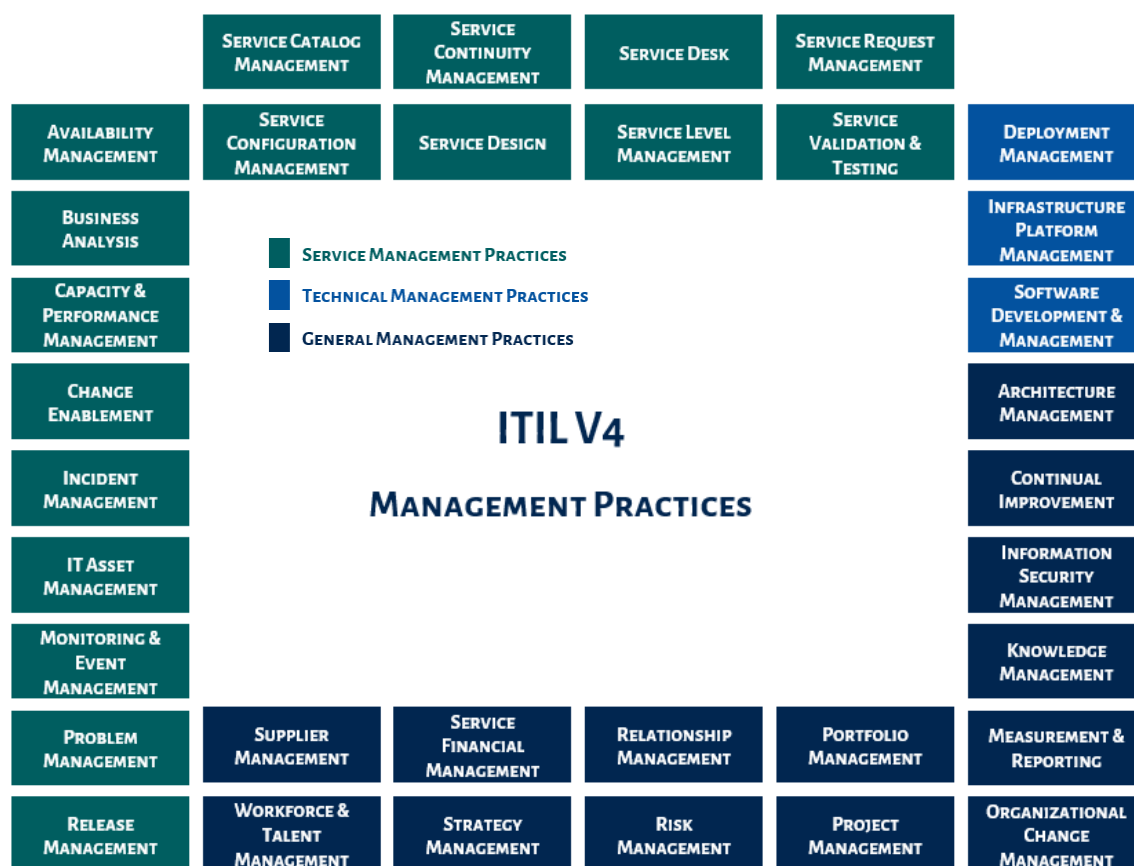
Derived in part from earlier versions and the ITIL Practitioner Guidance, ITIL 4 formalizes seven guiding principles that offer strategic direction and encourage flexibility in application (Axelos, 2019; Anand, 2025):

1. Focus on value
2. Start where you are
3. Progress iteratively with feedback
4. Collaborate and promote visibility

5. Think and work holistically
6. Keep it simple and practical
7. Optimize and automate

The following figure presents all of the 34 ITIL management practices based on the fourth version of the framework:

Figure 1 - 1: ITIL 4 Management Practices Overview



Source: Elaborated by the Author after consulting ITIL 4 Documentation

2.2.1.3) Rationale Behind the Update

The transition from ITIL v3 to ITIL 4 was prompted by several limitations observed in the former. While ITIL v3 offered a structured, lifecycle-based view of IT services organized into five core stages: service strategy, design, transition, operation, and continual improvement it was increasingly seen as too rigid, prescriptive, and lacking in strategic flexibility (Invanti, 2024). The absence of overarching guiding principles, limited focus on value creation, and

difficulties in adapting to fast-changing digital contexts underscored the need for a more adaptive model (Global Edulink, 2023).

2.2.1.4) Key Differences: ITIL v3 vs. ITIL 4

Whereas ITIL v3 was primarily process-oriented, ITIL 4 introduces a practice-based approach. The previous 26 ITSM processes have been restructured into 34 management practices, reflecting a broader range of organizational capabilities (Global Edulink, 2023). More importantly, ITIL 4 moves beyond the linear service lifecycle model and introduces a non-linear operational structure through the Service Value System (SVS) and the Service Value Chain, offering greater flexibility and adaptability in value creation (Anand, 2025; BMC, 2020).

Table 1 - 2: Comparative Analysis of ITIL v3 and ITIL 4 Frameworks

ITIL v3	ITIL v4
26 PROCESSES (ORGANIZED BY ITSM LIFECYCLE PHASES)	34 PRACTICES (EACH MAY INCLUDE MULTIPLE PROCESSES, GROUPED INTO THREE PRACTICE TYPES)
ITIL SERVICE MANAGEMENT LIFECYCLE: - SERVICE STRATEGY - SERVICE DESIGN - SERVICE TRANSITION - SERVICE OPERATION - CONTINUAL SERVICE IMPROVEMENT	SERVICE VALUE SYSTEM (SVS): - GUIDING PRINCIPLES - GOVERNANCE - SERVICE VALUE CHAIN (SVC) - PRACTICES - CONTINUAL IMPROVEMENT
4 Ps OF SERVICE DESIGN: 1. PEOPLE 2. PROCESSES 3. PARTNERS 4. PRODUCTS	4 DIMENSIONS OF SERVICE MANAGEMENT: 1. ORGANIZATIONS AND PEOPLE 2. VALUE STREAMS AND PROCESSES 3. PARTNERS AND SUPPLIERS 4. INFORMATION AND TECHNOLOGY

Source: Elaborated by the Author based on (Savereux, 2021)

2.2.1.5) Integration with Modern Practices

Unlike its predecessors, ITIL 4 is explicitly designed to integrate with modern digital methodologies, including Agile project management, DevOps engineering practices, and cloud-native technologies (BMC, 2020; Invanti, 2024). This makes the framework highly suitable for organizations undergoing digital transformation or operating in fast-paced, technology-driven environments.

Moreover, ITIL 4 recognizes that ITSM does not exist in isolation. It promotes the notion of ecosystem-based service delivery, where value is created not just internally but also through collaboration with external partners, customers, and other stakeholders (Anand, 2025).

2.2.1.6) Relationship with Other Frameworks

ITIL 4 coexists with and complements other ITSM and governance frameworks such as COBIT, Lean IT, TOGAF, and ISO/IEC 20000. While these may focus on governance, architecture, or compliance, ITIL 4 provides a service-centric view that can be harmonized with them for a comprehensive management approach (Invanti, 2024).

2.2) COBI and IT Governance:

Information Technology (IT) governance refers to the comprehensive management system comprising processes, structures, and mechanisms that ensures the alignment of IT strategies with overall business objectives. As a subset of corporate governance, IT governance ensures that IT investments generate value while mitigating associated risks. Over the years, various frameworks have emerged to address specific aspects of IT management such as security, quality, service delivery, audits, and project development. The existence of multiple frameworks stems from the diverse concerns and responsibilities within IT departments; each stakeholder needs to see their specific needs and practices reflected. (Moisand & Garnier de Labareyre, 2009)

Amidst this fragmented landscape, the need for a unified and comprehensive framework became evident. **COBIT** (Control Objectives for Information and Related Technologies) stands out as one such framework that bridges the gap between governance and management by offering a holistic view of IT processes aligned with business goals.

2.2.1) COBIT: Origins and Objectives

Originally developed by ISACA and the IT Governance Institute (ITGI) in 1992, COBIT was initially conceived as a tool to support IT audits. Over time, it evolved into a globally recognized governance framework that supports IT managers, auditors, and decision-makers in controlling and optimizing IT performance (Bentley & Davis, 2010, p. 52). Its primary mission is to provide

an authoritative, current, and internationally accepted set of IT control objectives that assist in both operational excellence and governance compliance.

According to (Bentley & Davis, 2010, pp. 52-53), COBIT helps organizations:

- Develop and evaluate IT strategies
- Align IT initiatives with enterprise goals
- Manage risks and ensure regulatory compliance
- Define architecture, acquire resources, and monitor performance
- Ensure effective and secure service delivery to IT customers

This multipurpose functionality is what enables COBIT to serve as both a governance and an audit tool, benefiting various stakeholders across the organization.

2.2.2) Core Structure and Principles of COBIT

COBIT is built upon four primary domains:

1. **Plan and Organize**
2. **Acquire and Implement**
3. **Deliver and Support**
4. **Monitor and Evaluate**

These domains include 34 high-level control objectives, each supported by over 200 detailed processes and practices. The framework emphasizes seven core information criteria **effectiveness, efficiency, confidentiality, integrity, availability, compliance, and reliability** to guide IT processes and ensure they support organizational objectives (Bentley & Davis, 2010, pp. 53-54).

Evolution of COBIT: Key Milestones

COBIT has evolved through successive iterations, each meticulously designed to address the dynamic complexities of modern IT governance. Drawing upon established industry sources (ISACA, 2018; ITGI, 2007; Forrester Research, 2013; Gartner, 2019), the table below delineates its pivotal developmental milestones:

Table 1 - 3: Historical Development of COBIT Framework Versions

YEAR	VERSION	KEY FEATURES	SIGNIFICANCE
1996	COBIT 1ST ED.	FOCUSED ON AUDIT CONTROLS; ALIGNED WITH COSO	ESTABLISHED FOUNDATIONAL IT GOVERNANCE PRINCIPLES
2005	COBIT 4.0	PROCESS ORIENTATION. RACI CHARTS. MATURITY MODELS. SOX COMPLIANCE.	SHIFTED FOCUS FROM PURE AUDIT TO GOVERNANCE
2012	COBIT 5	INTEGRATED VAL IT AND RISK IT INTRODUCED 5 GOVERNANCE PRINCIPLES	UNIFIED IT GOVERNANCE, RISK, AND VALUE REALIZATION
2018	COBIT 2019	DESIGN FACTORS FOCUS AREAS (E.G., DEVOPS, CLOUD), MODULAR AND ADAPTIVE MODEL	ADAPTED TO DIGITAL TRANSFORMATION AND HYBRID IT ENVIRONMENTS

Source: Elaborated By the Author based on COBIT Documentation

2.2.3) Improvements in COBIT 2019

As explained by (Lanter , 2018, p. 18), COBIT 2019 introduced several enhancements that reflect modern IT governance challenges:

1. **Flexibility and Openness** – COBIT 2019 introduced *design factors* that allow customization based on organizational size, regulatory environment, risk appetite, and IT maturity level. It also supports modular updates and new focus areas.
2. **Currency and Relevance** – The framework is built to remain aligned with the latest international standards and compliance needs.
3. **Prescriptive Application** – While conceptual in nature, COBIT's components serve as a guideline for designing tailored governance systems.
4. **Performance Management** – COBIT 2019 integrates performance management concepts, including maturity and capability models compatible with frameworks such as CMMI.

These changes turn COBIT 2019 into a thorough, contemporary, scalable framework appropriate for agile, cloud-native, and digitally transforming companies.

2.3) The TOGAF framework:

TOGAF, which stands for *The Open Group Architecture Framework*, is a comprehensive and adaptable enterprise architecture (EA) framework developed and maintained by The Open Group. It provides a detailed methodology and a set of supporting tools to guide the creation, implementation, and governance of an enterprise architecture. TOGAF's core aim is to ensure that IT aligns with business goals, facilitating effective transformation and value creation within organizations (The Open Group, 2009, p. 9).

At its core, TOGAF is built around best practices and a reusable architecture framework. It offers a structured and iterative approach to developing enterprise architectures that help organizations manage complexity, reduce costs, and achieve better alignment between IT and business functions.

2.3.1) What is an Architecture Framework?

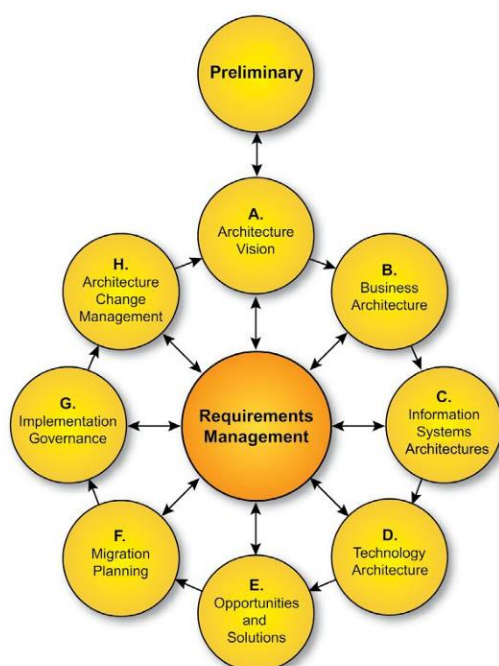
An architecture framework is defined as a foundational structure or set of structures used for developing a wide variety of architectures. It outlines a method for designing the target state of an enterprise through the use of modular building blocks and demonstrates how those building blocks interconnect. Furthermore, an architecture framework typically includes a toolkit of reusable methods and a shared vocabulary to ensure consistency across projects. It also recommends standards and lists compatible products to guide implementation efforts. (The Open Group, 2009, p. 9)

By offering this structured approach, TOGAF helps organizations to systematically plan, design, implement, and manage their IT landscape in a way that aligns with strategic business needs.

2.3.2) The Architecture Development Method (ADM)

The ADM is considered as a methodical, iterative process for creating and managing enterprise architecture, is a key component of TOGAF. From the original vision through architecture definition, planning, and implementation to continual governance, the ADM cycle helps architects navigate these crucial stages.

Figure 1 - 2: TOGAF ADM Cycle Diagram



Preliminary Phase	Prepare the organization for successful TOGAF architecture projects. Undertake the preparation and initiation activities required to create an Architecture Capability, including the customization of the TOGAF framework, selection of tools, and the definition of Architecture Principles.
Requirements Management	Ensure that every stage of a TOGAF project is based on and validates business requirements. Requirements are identified, stored, and fed into and out of the relevant ADM phases, which dispose of, address, and prioritize requirements.
Phase A: Architecture Vision	Set the scope, constraints, and expectations for a TOGAF project. Create the Architecture Vision. Identify stakeholders. Validate the business context and create the Statement of Architecture Work. Obtain approvals.
Phase B: Business Architecture Phase C: Information Systems Architectures Phase D: Technology Architecture	Develop architectures in four domains: 1. Business 2. Information Systems – Application 3. Information Systems – Data 4. Technology In each case, develop the Baseline and Target Architecture and analyze gaps.
Phase E: Opportunities and Solutions	Perform initial implementation planning and the identification of delivery vehicles for the building blocks identified in the previous phases. Determine whether an incremental approach is required, and if so identify Transition Architectures.
Phase F: Migration Planning	Develop detailed Implementation and Migration Plan that addresses how to move from the Baseline to the Target Architecture.
Phase G: Implementation Governance	Provide architectural oversight for the implementation. Prepare and issue Architecture Contracts. Ensure that the implementation project conforms to the architecture.
Phase H: Architecture Change Management	Provide continual monitoring and a change management process to ensure that the architecture responds to the needs of the enterprise, and maximizes the business value.

Source: (The Open Group, 2018, pp. 4-5)

The ADM promotes repeatability and consistency in architecture development, ensuring a traceable and well-governed lifecycle for enterprise transformation.

2.3.3) Who Can Benefit from Using TOGAF?

Organizations undergoing or planning enterprise-wide modernization or transformation will find the TOGAF Standard particularly beneficial. Based on (The Open Group, 2022), TOGAF is a crucial tool for any organization looking to improve or develop its enterprise architecture for digital transformation projects. The following entities stand to gain particular advantages:

- **Organizations pursuing business transformation** can use TOGAF to support strategic changes through well-structured enterprise architecture.
- **Enterprises seeking Boundaryless Information Flow™** the seamless integration of systems across organizational boundaries can leverage TOGAF to enable unified access to information within and between entities.

- **Organizations requiring open systems architecture** benefit from TOGAF's standard-based methodology, which promotes vendor neutrality and system interoperability, reducing lock-in risks and enhancing scalability.
- **Businesses facing evolving market conditions and digital challenges** can use TOGAF to realign their IT strategy and improve customer value propositions during digital transformation initiatives (The Open Group, 2022, p. 32).

Adopting TOGAF helps companies provide a blueprint for managing enterprise complexity, boosting agility, and making sure their IT investments support long-term corporate goals.

2.3) IT Infrastructure Risk: Overview and Types

Risk is defined as the combination of the likelihood of an event and its impact (ISACA, 2020, p. 9). In IT infrastructure, risk represents uncertainties that can negatively affect information systems and, by extension, organizational operations. Enterprises must engage in opportunity-driven activities to deliver value to stakeholders, and every such activity inherently carries a level of risk that must be understood, assessed, and managed (ISACA, 2020, pp. 9-10).

Information is a strategic asset, and its protection is governed by the CIA triad Confidentiality, Integrity, and Availability. Confidentiality ensures data is accessible only to authorized parties, integrity guarantees its accuracy and completeness, and availability ensures information is retrievable when required (ISO/IEC 27001, 2022). These three pillars form the foundation of information security.

According to (Calder, 2016, p. 15), information security is about implementing proportionate controls for identified risks. It's not about eliminating all threats, but about assessing each one based on its likelihood and potential impact, and deciding, based on risk appetite, whether to mitigate, transfer, accept, or avoid it.

The ISO/IEC 27001 standard is considered the core reference framework for IT risk management in this research. It emphasizes the importance of identifying threats and vulnerabilities specific to the organization's context. Importantly, the standard acknowledges that the threat landscape is dynamic new vulnerabilities and risks emerge continually, and risk identification must be an ongoing effort tailored to each organization's needs and environment (ISO/IEC 27001, 2022).

2.3.1) Common Types of IT Infrastructure Risks

1. **Operational Risks:** Failures in processes, systems, or technologies such as hardware breakdowns or poor change management can disrupt service continuity.
2. **Cybersecurity Risks:** Include malware, phishing, denial-of-service (DoS) attacks, and unauthorized access. These can compromise data confidentiality, integrity, and availability (NIST, 2018, pp. 4-8).
3. **Compliance Risks:** Arise when IT systems fail to comply with regulatory frameworks (e.g., GDPR, HIPAA), resulting in legal and financial repercussions (ENSIA, 2022).
4. **Third-Party and Supply Chain Risks:** Dependencies on vendors and service providers introduce external risks beyond internal control, particularly in cloud and outsourced environments (Gartner, 2023).
5. **Human Risks:** Result from user error, lack of awareness, or insider threats. Human behavior remains a critical factor in most security incidents.
6. **Physical and Environmental Risks:** Natural disasters, power failures, and physical theft can impact data centers and IT assets, threatening system availability (ISO/IEC 27005, 2018).

Given the ever-changing threat landscape, organizations must adopt a dynamic, context-specific approach to risk assessment and treatment, aligned with best practices such as those described in ISO/IEC 27001.

2.3.2) Risk Assessment Methodologies:

Risk assessment in the context of IT infrastructure calls for systematic methods that assist businesses in locating, evaluating, and reducing possible risks and weaknesses. To aid in this process, a number of standardized approaches have been developed, each tailored to particular organizational scales and contexts. The general purpose and process structure of three well-known frameworks OCTAVE Allegro, ISO 27005, and NIST SP 800-30 are presented and contrasted in the following table:

Table 1 - 4: Risk Assessment frameworks comparison

FRAMEWORK	GENERAL OVERVIEW	PROCESS STEPS
OCTAVE ALLEGRO	DESIGNED FOR LARGE ORGANIZATIONS (300+ EMPLOYEES); ALSO ADAPTED (OCTAVE-S) FOR SMALL ORGS (≤ 100). FOCUSES ON INFORMATION ASSET USAGE WITH MINIMAL ORG-WIDE INVOLVEMENT.	<ol style="list-style-type: none"> 1. DEFINE RISK CRITERIA 2. PROFILE ASSETS 3. IDENTIFY ASSET CONTAINERS 4. DEFINE AREAS OF CONCERN 5. DEVELOP THREAT SCENARIOS 6. IDENTIFY RISKS 7. ANALYZE RISKS 8. SELECT MITIGATION
ISO 27005	PART OF THE ISO 27000 FAMILY, TAILORED TO ISMS. SUPPORTS SYSTEMATIC RISK MANAGEMENT ALIGNED WITH ISO/IEC 27001. ADAPTABLE TO VARIOUS ORGANIZATIONS AND EVOLVING THREATS.	<ol style="list-style-type: none"> 1. ESTABLISH CONTEXT 2. ASSESS RISK (IDENTIFY, ANALYZE, EVALUATE) 3. TREAT RISK 4. ACCEPT RISK 5. COMMUNICATE AND CONSULT 6. MONITOR AND REVIEW
NIST SP 800-30	U.S. FEDERAL GUIDELINE FOR RISK ASSESSMENTS. PROVIDES A STRUCTURED RISK METHODOLOGY WITHIN BROADER RISK MANAGEMENT. ALIGNED CLOSELY WITH ISO 27005.	<ol style="list-style-type: none"> 1. PREPARE ASSESSMENT 2. CONDUCT ASSESSMENT (IDENTIFY SOURCES/EVENTS, THREATS, VULNERABILITIES; ESTIMATE IMPACT AND LIKELIHOOD) 3. COMMUNICATE RESULTS 4. MAINTAIN ASSESSMENT

Source: Elaborated By the Author Based on (Planet 9, 2025)

2.4) IT Asset Management (ITAM): Concepts and Strategic Role:

IT Asset Management (ITAM) refers to a comprehensive set of services and processes that support the tracking, control, and optimization of an organization's IT assets across their entire life cycle (Sefke, 2003, p. 2). These assets include both hardware and software resources used internally or delivered as part of contracted services. ITAM encompasses technical, financial, and commercial data to ensure assets are effectively inventoried, managed, and aligned with organizational objectives. In a corporate environment, ITAM is also regarded as a managerial function supported by technology, embedded through defined roles, policies, and responsibilities that integrate into the wider organizational structure.

2.4.1) Stakeholders and Organizational Involvement

For ITAM to deliver its intended value, it must involve diverse stakeholders across the enterprise (Oberg, 2020, p. 16). These include business leaders, IT and legal departments, procurement, finance, and end-users, each playing a role in the planning, governance, and operationalization of ITAM. As shown in Table below stakeholder responsibilities span from regulatory compliance (society, legal) and strategic alignment (board, management), to operational efficiency (IT department, end-users, vendors). This cross-functional involvement ensures IT assets are strategically managed and continuously optimized in support of business goals.

Table 1 - 5: Stakeholders in IT Asset Management

STAKEHOLDER	FOCUS AREAS
SOCIETY	LEGISLATION, REGULATIONS, DIRECTIVES, ENVIRONMENT
BOARD OF DIRECTORS / CORPORATE GOVERNANCE	OWNERS/SHAREHOLDERS, STRATEGY/MISSION/VISION, LONG TERM BUSINESS PLANNING, BUSINESS VALUE, FINANCIAL, CORPORATE GOVERNANCE
MANAGEMENT	BUDGETS/SPECIFIC FINANCIAL GOALS, IMPLEMENTATION OF STRATEGY, PROCESS GOVERNANCE
FINANCE/PURCHASE	PLANNING AND CONTROLS OF COSTS, BUDGETS, FINANCIAL FORECASTS, DAY-TO-DAY FINANCIAL PROCESSES, CONTACTS NEGOTIATIONS AND AGREEMENTS
LEGAL	LEGAL MANAGEMENT OF CONTRACTS, ENSURING ADHERENCE TO REGULATIONS AND DIRECTIVES, MANAGEMENT OF IPR
END-USERS	USERS OF IT AND OTHER BUSINESS RESOURCES WHO WISH TO REALIZE BUSINESS GOALS AND VALUE. THESE STAKEHOLDERS DEMAND MORE FROM IT THAN IN THE PAST; E.G. UNIFIED COMMUNICATIONS AND COLLABORATION (UCAC) AND BRING YOUR OWN DEVICE (BYOD)
IT DEPARTMENT	IT STRATEGY AND PLANNING, IT PROCESS MANAGEMENT, IT SERVICE PORTFOLIO
CUSTOMERS	REQUIREMENTS: PRIVACY AND DATA PROTECTION, USER FRIENDLY SOLUTIONS, VALUE-FOR-MONEY, SERVICE SUPPORT
PARTNERS	DATA SHARING, INFORMATION SECURITY
VENDORS/DISTRIBUTORS	SALES OF (SUPPORTING) SOLUTIONS

Sources: Obtained from (Oberg, 2020, pp. 16-17)

2.4.2) Strategic Value and Business Impact

A central question in IT governance is: *What are we getting out of the IT investment?* ITAM provides the structure to answer this, ensuring financial efficiency, compliance, and alignment between IT and business objectives (McLachlan, 2018, p. 8). By managing IT assets holistically across their life cycle, organizations can avoid overspending, improve asset utilization, and support informed decision-making. Moreover, ITAM is not solely an IT concern it requires enterprise-wide participation and ownership.

2.4.3) Quantifiable Benefits of ITAM

(McLachlan, 2018, pp. 8-9) cites empirical data from Gartner that demonstrates the observable advantages of well-established ITAM practices. These consist of:

- 5–8% reduction in asset acquisition costs through more strategic purchasing.
- 6–10% savings in software costs via accurate license allocation.
- 3–15% reduction in warranty expenses due to improved coverage.
- 3–7% improvement in uptime from increased component standardization.
- 5–12% boost in help desk efficiency through reduced IT complexity.
- 20% better contractor performance through improved vendor selection.
- 50% reduction in compliance risks via improved contract governance.
- 80–90% decrease in noncompliance risk due to enhanced tracking and auditing.

These numbers highlight ITAM's dual operational and financial worth, highlighting its vital function in facilitating both business performance and service quality.

2.5) Service Performance Measurement and Management:

Service Level Management (SLM) is the ITIL process responsible for negotiating, agreeing upon, documenting, and monitoring SLAs and Service Level Requirements (SLRs) with stakeholders. As noted in *The Service Level Agreement Guide*, SLM is “a vital process for every IT service provider organization as it is responsible for agreeing and documenting service level targets and responsibilities” (The Art of Service, 2008, p. 12).

Efficient SLM guarantees that service levels properly match company needs and client expectations. When correctly applied, it guarantees that service delivery satisfies or surpasses specified criteria. On the other hand, SLM that does not accurately represent company needs causes mismatched service performance, which causes operational problems and unhappiness.

2.5.1) Service level Agreement:

A Service Level Agreement (SLA) is a formalized contract or internal agreement that defines the expected service standards, including scope, quality, availability, and responsiveness of services delivered by a service provider to its users. As defined by (Hiles, 2016, p. 4), “A Service Level Agreement is simply: *“An agreement between the computing service provider and the user quantifying the minimum acceptable service to the user”*”.

A compliant SLA has six fundamental elements guaranteeing clarity, mutual agreement, and efficient service delivery between the provider and the customer, as outlined in the table below:

Table 1 - 6: Key Elements of a Service Level Agreement (SLA)

COMPONENT	DESCRIPTION
1. AGREEMENT OVERVIEW	OUTLINES THE SCOPE OF THE SLA, INCLUDING INVOLVED PARTIES, EFFECTIVE AND EXPIRY DATES, AND A GENERAL STATEMENT ON THE SERVICES COVERED BY THE AGREEMENT.
2. GOALS AND OBJECTIVES	DEFINES THE PURPOSE OF THE SLA, FOCUSING ON ACHIEVING MUTUAL UNDERSTANDING AND AGREEMENT ON SERVICE EXPECTATIONS AND PERFORMANCE STANDARDS.
3. STAKEHOLDERS	IDENTIFIES ALL PARTIES INVOLVED IN THE SLA, SUCH AS THE IT SERVICE PROVIDER AND THE BUSINESS UNIT OR CUSTOMER RECEIVING THE SERVICE.
4. PERIODIC REVIEW	SPECIFIES THE VALIDITY PERIOD OF THE SLA AND OUTLINES THE SCHEDULE AND CRITERIA FOR REVIEWING AND UPDATING THE AGREEMENT TO ENSURE CONTINUED RELEVANCE AND ALIGNMENT WITH NEEDS.
5. SERVICE AGREEMENT	THE CORE OF THE SLA, DETAILING: <ul style="list-style-type: none"> · SERVICE SCOPE – SERVICES COVERED (E.G., TELEPHONE SUPPORT) · CUSTOMER REQUIREMENTS – E.G., PAYMENT OBLIGATIONS · PROVIDER REQUIREMENTS – INCLUDING RESPONSE TIMES AND SERVICE RESPONSIBILITIES · SERVICE ASSUMPTIONS – CONDITIONS FOR SERVICE CHANGES AND COMMUNICATION PROTOCOLS.
6. SERVICE MANAGEMENT	DESCRIBES HOW THE SERVICE WILL BE MANAGED, INCLUDING: <ul style="list-style-type: none"> · AVAILABILITY OF SUPPORT SERVICES · RESPONSE TIMES FOR SERVICE REQUESTS · REMOTE ASSISTANCE PROVISIONS.

Source: Obtained from (Avigon, 2017)

SLAs are essential in clarifying mutual expectations and responsibilities between service providers and consumers. In many organizations, the absence of clear service definitions leads to ambiguity, inefficiencies, or disputes. (Hiles, 2016) emphasizes that SLAs resolve this by specifying services and associated quality parameters in “unambiguous terms”, thereby supporting resource justification and budgetary planning for internal service providers. Moreover, when multiple departments are involved in delivering a service, internal SLAs can be established between them to support an overarching SLA with the end customer.

2.5.2) Categories and Types of SLAs:

ITIL dictates three kinds of SLAs. This organized table below summarizes the kinds of SLAs and their application setting:

Table 1 - 7: Categories of Service Level Agreements (SLAs) and Their Use Cases

TYPE OF SLA	DESCRIPTION	CONTEXTE OF USE
SERVICE-BASED SLA	APPLIES TO SPECIFIC SERVICES (E.G., PREMIUM VS. STANDARD TIERS, INCIDENT TYPES, OR REQUEST CATEGORIES).	- WHEN DIFFERENT SERVICES REQUIRE DISTINCT PERFORMANCE GUARANTEES (E.G., FASTER RESPONSE FOR PAID TIERS). - EXAMPLE: A CLOUD PROVIDER OFFERING 24/7 SUPPORT FOR "PREMIUM" BUT BUSINESS-HOURS-ONLY FOR "STANDARD."
CUSTOMER-BASED SLA	TAILORED TO SPECIFIC CUSTOMERS OR DEPARTMENTS (E.G., PRIORITIZING FINANCE OVER OTHER TEAMS).	- WHEN CERTAIN CUSTOMERS/DEPARTMENTS NEED HIGHER PRIORITY DUE TO BUSINESS IMPACT. - EXAMPLE: GUARANTEEING 1-HOUR RESOLUTION FOR FINANCE DEPARTMENT INCIDENTS BUT 4 HOURS FOR OTHERS.
MULTILEVEL SLA	COMBINES MULTIPLE SLA TIERS (E.G., DEPARTMENT-WIDE STANDARDS + STRICTER RULES FOR SPECIFIC ROLES/SERVICES).	- FOR COMPLEX ORGANIZATIONS WITH HIERARCHICAL NEEDS. - EXAMPLE: A COMMERCIAL DIRECTOR'S TICKETS FOLLOW A DEFAULT DEPARTMENT SLA, BUT "SUPPLIER"-RELATED REQUESTS TRIGGER A FASTER RESOLUTION TARGET.

Source: Obtained from (ServiceTonic, 2021)

2.5.3) Service Level Agreements (SLAs) and Key Performance Indicators (KPIs)

As defined in the previous subsection, an SLA is a formal contract that specifies the scope, quality, and timelines of service delivery that have been agreed upon between a client and a service provider. When combined with Key Performance Indicators (KPIs), SLAs become powerful tools that support mutual transparency, quality assurance, and accountability. SLAs and KPIs are typically established through mutual consultation between both parties. This collaborative process fosters a “win-win” relationship: the provider gains a clear understanding of client expectations, while the client obtains measurable and transparent insights into service delivery. (Multimasters, 2021)

To ensure the effectiveness of these agreements, the SMART criteria are commonly applied during the development of SLAs and KPIs:

Figure to recreate:

Table 1 - 8: SMART Framework for Defining SLAs and KPIs

SMART CRITERIA	EXPLANATION
SPECIFIC	TO ASSESS THE IMPACT OF A MINDFULNESS-BASED STRESS REDUCTION (MBSR) PROGRAM ON REDUCING SELF-REPORTED STRESS LEVELS AMONG EMPLOYEES.
MEASURABLE	TO MEASURE CHANGES IN SELF-REPORTED STRESS LEVELS USING STANDARDIZED STRESS ASSESSMENT SCALES BEFORE AND AFTER PARTICIPATION IN THE MBSR PROGRAM.
ACHIEVABLE	TO RECRUIT 50 EMPLOYEES FROM THE ORGANIZATION TO PARTICIPATE IN THE MBSR PROGRAM OVER A THREE-MONTH PERIOD.
RELEVANT	TO EVALUATE THE RELEVANCE OF THE MBSR PROGRAM TO EMPLOYEE WELL-BEING AND JOB SATISFACTION WITHIN THE ORGANIZATIONAL CONTEXT.
TIME-BOUND	TO COMPLETE DATA COLLECTION AND ANALYSIS WITHIN SIX MONTHS OF PROGRAM INITIATION TO ASSESS THE EFFECTIVENESS OF THE MBSR PROGRAM IN REDUCING STRESS LEVELS.

Source: Obtained from (Prime, 2024)

The facilities services sector is using SLAs and KPIs more and more. Such tools ensure that service providers meet standards for quality and responsiveness and that customers can routinely monitor performance, the table below offers some useful references on how SLAs and KPIs are used:

Table 1 - 9: Examples of SLA and KPI Applications in Facility Services

SLA	CORRESPONDING KPI
FREQUENT CONSULTATION BETWEEN THE SERVICE PROVIDER AND THE CLIENT	MINIMUM OF ONE MONTHLY MEETING BETWEEN BOTH PARTIES
TRAINING OF FACILITY SERVICE PERSONNEL	TRAINING CERTIFICATES AVAILABLE VIA THE MULTIDESK DIGITAL TRACKING AND COMMUNICATION PLATFORM
24/7 EMERGENCY RESPONSE AT THE CLIENT'S PREMISES	100% OF INCIDENTS RESPONDED TO WITHIN ONE HOUR BY A RESPONSIBLE SERVICE REPRESENTATIVE
DEFINED QUALITY STANDARDS FOR CLEANING SERVICES	MINIMUM SCORE PER QUALITY CONTROL INSPECTION (E.G., 85%) AND BY ZONE TYPE (E.G., SANITARY ZONE: 90%, ADMINISTRATIVE ZONE: 85%)

Source: Obtained from (Multimasters, 2021)

2.6) Continual Improvement and Process Optimization:

A fundamental element of the ITIL framework, Continual Service Improvement (CSI) is meant to methodically raise the quality and performance of IT services and processes. CSI's main goals are to boost service efficiency, maximize effectiveness, and cost optimization throughout the whole service lifecycle (ITIL, 2011, p. 23). Improvements possibilities have to be constantly found and assessed not only inside particular IT processes but also across more general service management operations if one is to reach this.

A distinguishing characteristic of CSI is its close integration with business objectives. Improvement initiatives should not be driven solely by internal IT priorities but must reflect the strategic interests of the business. This alignment ensures that the improvements deliver tangible value and directly support organizational goals. According to (ITIL, 2011, pp. 23-24), business stakeholders must be actively involved in deciding which CSI initiatives to pursue, as they are best positioned to assess their potential value and long-term impact.

2.6.1) Integration of the PDCA Cycle with CSI

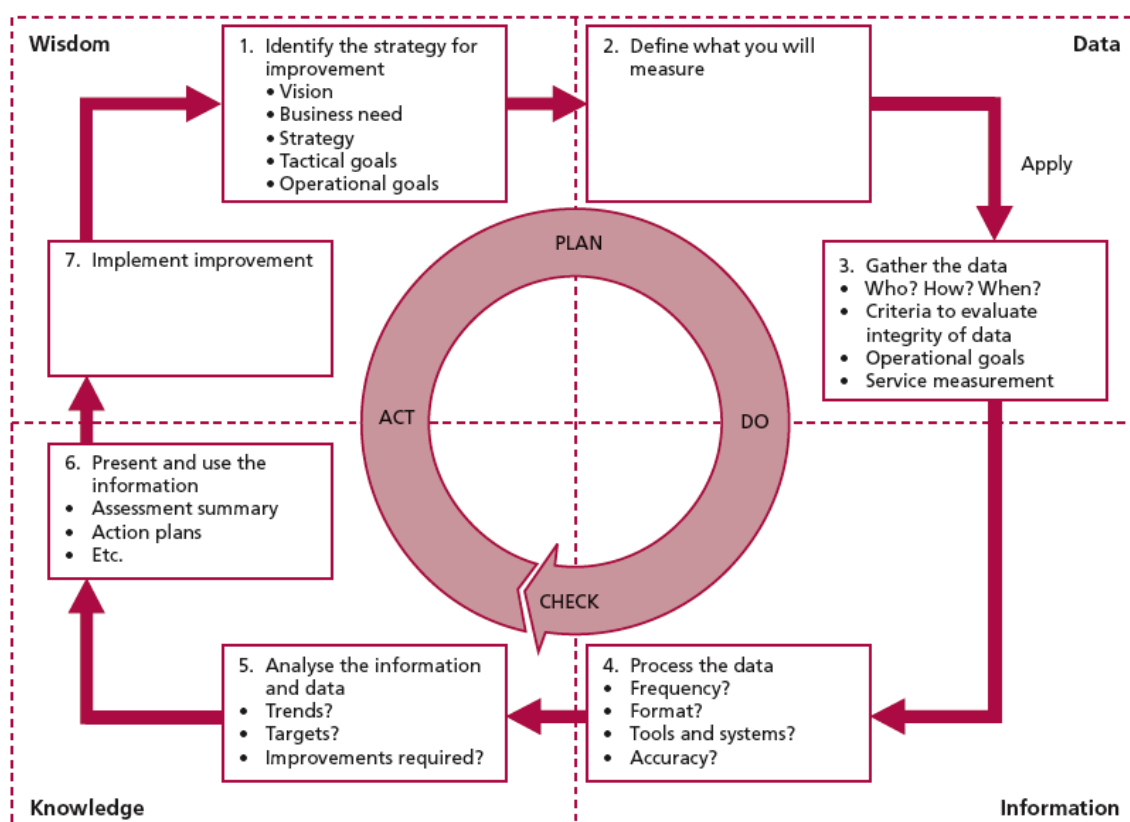
The Plan-Do-Check-Act (PDCA) cycle, developed by W. Edwards Deming, serves as a foundational quality improvement model that underpins the CSI philosophy. The PDCA methodology is deeply embedded in ITIL's 7-step process, ensuring a cyclical, repeatable approach to service enhancement (CIO Wiki, n.d.).

The integration between PDCA and CSI can be mapped as follows:

- **Plan:**
Steps 1–2 of the CSI process involves defining strategy and metrics, aligning closely with the planning phase of PDCA.
- **Do:**
Steps 3–4 correspond to data collection and processing translating strategy into action.
- **Check:**
Steps 5–6 involve analyzing results and presenting insights to assess performance and detect gaps.
- **Act:**
Step 7 embodies the action phase by implementing changes based on validated insights.

This visual representation below outlines a structured framework for strategic improvement, blending elements with Deming's PDCA cycle:

Figure 1 - 3: Continual Service Improvement (CSI) Model



Source: Obtained from (Irfandhi & Indrawati, 2016)

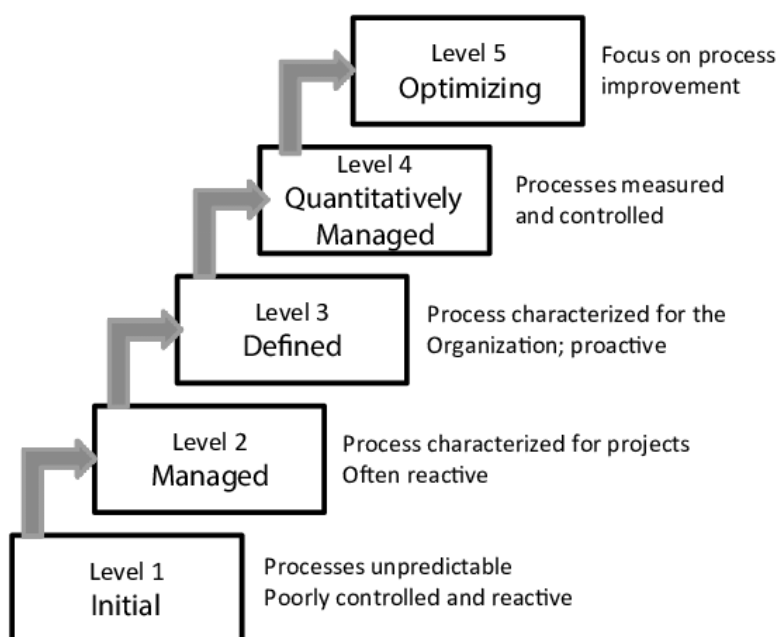
This alignment supports consistent, continuous development, so strengthening CSI's iterative quality. The PDCA cycle is not a one-time event; rather, it is meant to be repeated several times to encourage a culture of continuous refinement, which is quite important. Effective CSI also requires focus on organizational culture, so guaranteeing that change is not only procedural but also welcomed by individuals at all levels. (CIO Wiki, 2023)

2.7) Assessing ITSM Maturity and Capability:

A basic first step toward organized service improvement and strategic alignment is evaluating the maturity of IT Service Management (ITSM) processes. A diagnostic tool called an ITSM assessment helps to gauge how well an organization's IT service processes are defined, run, and optimized. Although no one assessment model is universally accepted, many companies use frameworks motivated by the Capability Maturity Model Integration (CMMI) to create a defined baseline and monitor progress over time (Elina, 2021)

Usually consisting of organized surveys and seminars, ITSM assessments seek to assess present practices, highlight deficiencies, and define a "desired future state". By allowing IT leaders to chart a sensible transformation path, this comparative strategy facilitates executive buy-in, project prioritization, and efficient resource allocation.

Figure 1 - 4: ITIL Maturity Levels for ITSM Assessment



Source: Obtained from (Al-Sai, et al., 2019)

Organizations wishing to improve their IT service delivery, align IT processes with corporate goals, and promote a culture of continual improvement must first do an IT Service Management (ITSM) assessment, which is a vital first step. Such evaluations offer a systematic way to assess present ITSM practices, spot improvement opportunities, and create a road map for next development.

(DNS stuff, 2024) claims that an ITSM assessment's main goals are:

- **Baseline Establishment:** Assessments help organizations determine their current ITSM maturity level, serving as a reference point for measuring progress over time.
- **Identification of Improvement Areas:** By analyzing existing processes, assessments uncover inefficiencies and gaps that hinder optimal service delivery.
- **Strategic Alignment:** Evaluating ITSM practices ensures they are in harmony with overarching business goals, facilitating better decision-making and resource allocation.
- **Enhanced Service Quality:** Through continuous evaluation and refinement, organizations can improve the quality and reliability of their IT services.

2.8) Technology Enablement: ITSM Tools in Practice:

IT operations teams use IT Service Management (ITSM) tools to control and automate the provision of IT services. These tools assist important tasks including change management, service requests, and incident handling. (Gartner, 2024) points out that while ITSM tools range in complexity from simple ticketing systems to sophisticated platforms interacting with IT Operations Management (ITOM) solutions, they are absolutely necessary for enhancing service quality and efficiency.

2.8.1) ServiceNow:

ServiceNow is a leading cloud-based IT Service Management (ITSM) platform designed to streamline and automate IT operations across enterprises. Initially focused on ITSM and helpdesk workflows, it has evolved into a comprehensive solution encompassing IT operations management, IT business management, and enterprise-wide process automation. (Awati & Fittzgibbons, 2025)

Fundamentally, ServiceNow provides a collection of programs developed on a single platform that makes asset tracking, change management, incident management, and problem solving

easier. Through these capabilities, organizations can guarantee adherence to industry standards, improve operational efficiency, and improve service delivery (ServiceNow, 2025).

(ServiceNow, 2025) lists the following as important features:

- **Incident and Problem Management:** Reduces downtime by streamlining the detection and fixing of IT problems.
- **Change Management:** Lowers the chance of interruptions by enabling controlled changes to IT systems.
- **Asset and Configuration Management:** Facilitates well-informed decision-making by offering insight into IT assets and their connections.
- **Knowledge management:** centralizes data to empower users and cut down on pointless questions.
- **Self-Service Portal:** Increases user satisfaction by empowering users to independently request services and find solutions.

2.8.2) BMC Remedy:

Designed to assist both IT and non-IT activities across large-scale companies, BMC Remedy is an enterprise-grade IT Service Management (ITSM) tool. With workflows usually connected to service level agreements (SLAs) to guarantee timely resolution and compliance, it is commonly used for managing fundamental ITIL processes including incident management, change management, problem management, and knowledge management. Renowned for its scalability and process automation features, BMC Remedy is especially useful in organized, process-driven settings where steady service delivery is vital (BMC Remedy, 2025).

The table below offers a thorough comparison between the two previously identified ITSM tools, BMC Remedy and ServiceNow:

Table 1 - 10: ITSM Tools Comparison (ServiceNow vs. BMC Remedy)

FEATURE	BMC REMEDY (HELIX ITSM SUITE)	SERVICENOW ITSM
DEPLOYMENT OPTIONS	CLOUD (VIA BMC HELIX), ON-PREMISES, HYBRID	CLOUD (SAAS), HYBRID
DELIVERY MODEL	SOFTWARE-AS-A-SERVICE (SAAS)	PLATFORM-AS-A-SERVICE (PAAS)
PRICING	STARTING AT \$60-\$67.90 PER USER/MONTH	STARTING AT \$25-\$100 PER USER/MONTH, DEPENDING ON PACKAGE
IMPLEMENTATION COSTS	\$10,000-\$100,000+, DEPENDING ON COMPLEXITY	\$20,000-\$500,000+, DEPENDING ON ORGANIZATION SIZE
CUSTOMIZATION	HIGHLY CUSTOMIZABLE; MAY REQUIRE BMC CHANGE ADVISORY BOARD APPROVAL FOR CHANGES	USER-FRIENDLY CUSTOMIZATION WITH LOW-CODE/NO-CODE OPTIONS
WORKFLOW AUTOMATION	STRONG IN IT WORKFLOWS; LESS SEAMLESS FOR NON-IT FUNCTIONS	ROBUST AUTOMATION ACROSS IT AND NON-IT DEPARTMENTS
INTEGRATION CAPABILITIES	SOLID WITHIN BMC ECOSYSTEM; THIRD-PARTY INTEGRATIONS MAY REQUIRE ADDITIONAL EFFORT	EXTENSIVE OUT-OF-THE-BOX INTEGRATIONS WITH PLATFORMS LIKE SALESFORCE, MICROSOFT, AWS
USER EXPERIENCE	COMPLEX INTERFACE; BETTER SUITED FOR IT PROFESSIONALS	INTUITIVE INTERFACE; ACCESSIBLE TO NON-TECHNICAL USERS
REPORTING AND ANALYTICS	BASIC REPORTING FEATURES; LESS ADVANCED	ADVANCED REPORTING AND ANALYTICS CAPABILITIES
CUSTOMER SUPPORT	24x7 SUPPORT VIA MULTIPLE CHANNELS; INCLUDES SELF-HELP RESOURCES	24x7 SUPPORT WITH DEDICATED CUSTOMER SUCCESS MANAGEMENT TEAM
SCALABILITY	HIGHLY SCALABLE; MAY INVOLVE LICENSING AND DOWNTIME CHALLENGES FOR ON-PREMISE SCALING	SCALABLE CLOUD-BASED SOLUTION; SUPPORTS LARGE ENTERPRISES WITH EASY EXPANSION
COMMUNITY AND ECOSYSTEM	SMALLER USER COMMUNITY; FEWER PRE-BUILT APPLICATIONS	LARGE USER COMMUNITY; EXTENSIVE MARKETPLACE FOR PRE-BUILT APPLICATIONS AND INTEGRATIONS

Source: Elaborated by The Author based on various sources (Apty, 2023; Comparesto, 2023; ERP Information, 2023; ITQlick, 2023; PeerSpot, 2023; Velocity Consulting, 2023)

**CHAPTER 2: ORGANIZATIONAL
CONTEXT AND METHODOLOGICAL
FRAMEWORK**

Chapter 2: Organizational context and methodological framework

In this chapter, we explore the organizational context and the methodological framework that form the foundation of this study. We begin by examining GE Vernova Algeria's background, including its role in the energy sector and its organizational structure. Understanding the company's context is essential to grasp the challenges and opportunities related to IT service management within a complex industrial environment.

Next, we outline the methodological approach used to assess the impact of ITIL practices on IT asset management and service quality. By employing a combination of qualitative and quantitative methods, this chapter provides a structured framework for evaluating process maturity and operational efficiency. This comprehensive approach ensures that the analysis aligns with the specific needs and operational realities of GE Vernova Algeria.

Section 1: Organizational context

In this section, we focus on the organizational context of GE Vernova Algeria. We provide an overview of the company's history, its evolution within the energy sector, and its strategic positioning in the Algerian market. Understanding the organizational structure and operational dynamics of GE Vernova Algeria is essential for contextualizing the challenges related to IT service management.

1.1) The Origins of General Electric: A Century of Innovation:

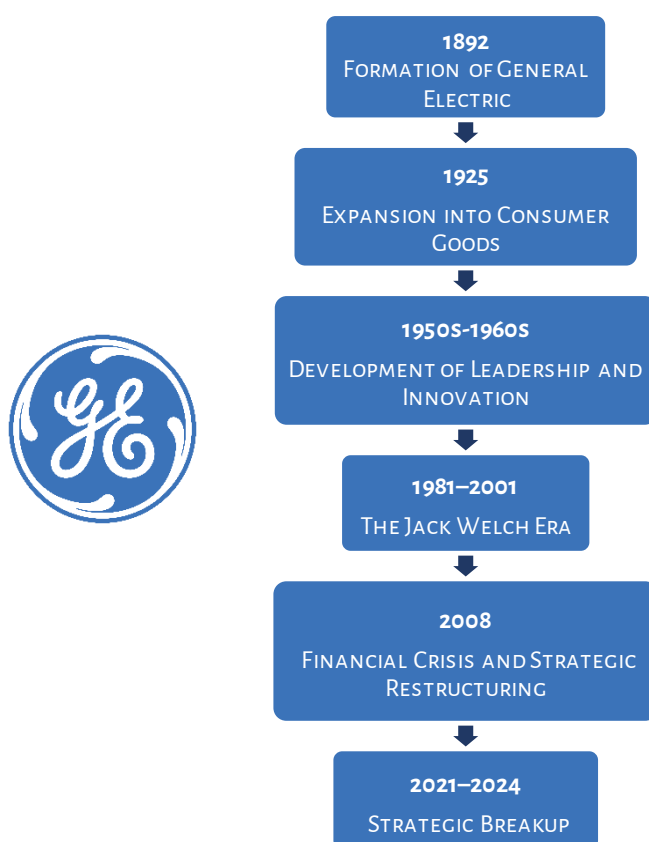
General Electric (GE), a multinational conglomerate with a legacy spanning over 130 years, stands today as a key player in the global energy sector. Its origins trace back to 1876, when Thomas Edison and his father, Samuel Ogden Edison, established a modest laboratory in Menlo Park, New Jersey. Widely celebrated for inventing the practical electric light bulb. (Markeplace, 2024) Edison was also the mind behind the phonograph – the first device capable of both recording and replaying sound. The earliest known audio recording, made by Edison himself, featured the nursery rhyme “Mary had a little lamb.” (National Museum of American History, 2022)

Despite Edison's extraordinary contributions to science and technology, the formation of General Electric as a formal entity in 1892 was largely orchestrated by financier J. P. Morgan. At the time, Edison's collection of companies was struggling financially. Morgan facilitated a merger between Edison General Electric and its main competitor, the Thomson-Houston

Company, creating a consolidated and powerful industrial corporation: the General Electric Company. Although Edison served briefly on GE's inaugural board of directors, his influence quickly diminished. He sold his remaining shares a few years later to fund unsuccessful mining ventures, thereby relinquishing any long-term role in the company's operations or governance. (Gryta & Mann, 2020)

Over the past century, General Electric has undergone a remarkable transformation, expanding far beyond its original role as an electricity provider to become a major force in global industry. This evolution has been shaped by a series of technological innovations, strategic decisions, and responses to shifting market dynamics. Rather than following a linear path, the company's growth has unfolded through distinct phases of expansion, consolidation, and reinvention. To better understand this historical progression, the following timeline presents the key milestones that have defined General Electric's development over time.

Figure 2 - 1: Timeline of GE's Historical Events



Source: Elaborated by the Author after Consulting GE's website.

- **1892 – Formation of General Electric**

The merger of Edison General Electric and Thomson-Houston, driven by financier J.P. Morgan, laid the foundation for GE's management structure. Edison, a genius inventor, had limited control over the new company, as Morgan's team emphasized financial strategy and operational efficiency. This shift marked a transition from an inventor-driven company to a corporate-managed entity, setting the stage for GE's future as a diversified industrial giant. (Britannica Money, 2025)

- **1925 – Expansion into Consumer Goods**

Under Charles A. Coffin, GE expanded its portfolio to include consumer products, such as refrigerators, to reduce dependency on the energy sector. This diversification showcased a shift in management strategy, with GE's leadership recognizing the potential of consumer markets for sustainable growth. The company's ability to adapt to changing economic conditions reflected strategic foresight and operational adaptability. (General Electric Company, 2025)

- **1950s-1960s – Development of Leadership and Innovation**

During the leadership of Ralph Cordiner, GE introduced its renowned "Management Development Institute" to nurture future leaders within the company. This forward-thinking management initiative not only strengthened internal leadership but also solidified GE's reputation for fostering innovation. The emphasis on continuous leadership development helped GE maintain a competitive edge in an increasingly globalized market. (General Electric Company, 2025)

- **1981–2001 – The Jack Welch Era**

Under Jack Welch, GE experienced a remarkable transformation. Known for his management philosophy, Welch implemented rigorous performance management processes, famously applying the "*rank-and-yank*" system. His focus on cutting unprofitable businesses and expanding profitable ones reshaped GE's portfolio, turning it into the world's most valuable company by the late 1990s. Welch's aggressive strategies, including acquisitions and operational streamlining, significantly impacted GE's market position and management culture. (Investopedia, 2024)

- **2008 – Financial Crisis and Strategic Restructuring**

GE's heavy reliance on GE Capital exposed the company to severe financial strain during the 2008 global financial crisis. CEO Jeff Immelt's response involved a fundamental restructuring to focus more on industrial operations. Immelt's decision to scale down GE Capital and divest non-core assets reflected a shift in management priorities toward long-term stability. This reorientation was crucial in navigating the company through turbulent times, emphasizing sustainable, industrial growth. (Yahoo finance, 2019)

- **2021–2024 – Strategic Breakup**

Under Larry Culp's leadership, GE began its breakup into three independent entities focused on aviation, healthcare, and energy. Culp's decision aimed to simplify GE's complex corporate structure, allowing each unit to operate with greater agility and targeted investment. This restructuring marked a major management shift, with a focus on value creation for shareholders and streamlining operations to ensure competitive advantage in key markets. Culp's strategy emphasized focus and specialization, rather than diversification. (General Electric Company, 2025)

1.2) General Electric: Mission, Scope, and Core Values

General Electric (GE), one of the world's most iconic industrial corporations, has successfully navigated major technological and economic shifts since its founding in 1892. Today, following its major 2024 reorganization, GE is strategically positioned around three core business areas: energy, aviation, and healthcare. This restructuring reflects the company's ambition to focus its resources on high-growth, high-impact sectors essential to modern global infrastructure. (Investopedia, 2024)

GE's strategic identity today can be summarized as follows:

- **Mission**

- Invent the next industrial era by building, moving, powering, and curing the world.
- Deliver technologies that meet essential global needs across critical industries. (DCF Modeling, 2024)

• Vision

- Create a world that works, by enabling a more connected, sustainable, and innovative future.
- Lead in aviation, healthcare, and energy sectors, focusing on operational excellence and global impact. (General Electric Company, 2025)

The core values of the firm are:

- **Integrity:** Conducting business transparently and ethically.
- **Customer Success:** Delivering solutions that meet and anticipate customers' evolving needs.
- **Innovation:** Investing heavily in research and development “GE spent approximately **\$4.6 billion** on R&D in 2023” to drive technological advancement. (GE Annual Report, 2023)
- **Operational Excellence:** Applying lean management principles across all business units to improve quality, reduce waste, and enhance competitiveness.
- **Sustainability:** Committing to environmental responsibility, including a goal for GE Vernova to help customers achieve **net-zero emissions** by 2050. (GE Sustainability Report, 2023)

Table 2 - 1: Post-2024 GE Spin-Off Entities: Focus Areas and Key Figures

DIVISION	FOCUS AREAS	KEY FIGURES AND FACTS
GE VERNOVA	- RENEWABLE ENERGY (WIND, HYDRO, SOLAR) - ELECTRIFICATION AND GRID MODERNIZATION	- POSITIONED TO SUPPORT GLOBAL ENERGY TRANSITION - GLOBAL ENERGY TRANSITION MARKET PROJECTED AT \$5 TRILLION BY 2030
GE AEROSPACE	- JET ENGINES - AIRCRAFT SYSTEMS - AVIATION SERVICES	- POWERS APPROXIMATELY TWO-THIRDS OF THE WORLD'S COMMERCIAL AIRCRAFT - STRONG PRESENCE IN MILITARY AVIATION
GE HEALTHCARE	- MEDICAL IMAGING - DIAGNOSTICS - MONITORING TECHNOLOGIES	- ACTIVE IN OVER 160 COUNTRIES - REVENUE OF APPROXIMATELY \$19.6 BILLION IN 2023

Sources: Elaborated after gathering resources from (General Electric Company, 2025; Investopedia, 2024; GE Healthcare, 2025)

1.3) Corporate Restructuring

On April 1, 2024, General Electric (GE) underwent a significant transformation by splitting its business into three independent publicly traded entities: GE Vernova, GE Aerospace, and GE HealthCare. This strategic reorganization marks the end of over a century as a diversified conglomerate, following the announcement of the spin-off in 2021. (Kumar Singh & Ganapavaram, 2024)

1.3.1) GE Vernova

GE Vernova is a global leader in the energy sector, formed from the merger of GE Power, GE Renewable Energy, and GE Digital. This new entity focuses on advancing the energy transition, including electrification and decarbonization efforts. On April 2, 2024, GE Vernova began trading on the New York Stock Exchange under the ticker symbol "GEV." The spin-off allows GE Vernova to fully concentrate on energy technologies, providing shareholders with direct exposure to this growing sector, which is essential in the context of the global push toward sustainable energy solutions. GE Vernova's offerings include advanced solutions in both renewable energy and the energy infrastructure necessary for a low-carbon future. (GE Vernova, 2025)

1.3.2) GE Aerospace

GE Aerospace, previously known as GE Aviation, is now an independent entity focused on the aerospace sector, including the design, manufacturing, and service of aircraft engines. The company continues to be a dominant player in the aviation industry, providing engines for a majority of civil aircraft. Following the spin-off, GE Aerospace retained the ticker symbol "GE" and remains a publicly traded company. This move allows GE Aerospace to sharpen its focus on its key areas, such as engine innovation and aerospace technologies, which are critical to the future of global air travel and the aviation industry. (GE Aerospace, 2025)

1.3.3) GE HealthCare

GE HealthCare, the leader in medical technologies and health diagnostics, became the first of GE's entities to spin off, doing so in January 2023. The company specializes in producing diagnostic imaging technologies, including MRI, ultrasound, and CT machines. The separation of GE HealthCare from General Electric allows the medical technology company to focus on innovation in healthcare, improving patient outcomes through advanced medical imaging and other diagnostic tools. This move also provides GE shareholders with direct access to a rapidly

growing healthcare sector, where the company remains a key player in medical diagnostics. (GE Healthcare, 2025)

These spin-offs reflect GE's strategy to streamline its operations, allowing each company to operate more nimbly and focus on its core business areas. The restructuring also aims to unlock greater shareholder value by enhancing the focus on specialized industries, enabling each entity to pursue independent growth and innovation.

1.4) GE Power Services in Algeria

GE Power Services has been present in Algeria for over 40 years, with a primary focus on the maintenance and monitoring of turbines over both the short and long term. Its activities are mainly concentrated in the following areas:

- The supply and management of both capital and non-capital spare parts.
- The maintenance and servicing of installed turbines.
- Technical assistance and services related to the maintenance of installations.

GE offers its clients various types of contracts, adapted to their specific needs and demands. There are three main types of maintenance contracts:

- **Transactional Contract (TX):** This is a one-time service contract that responds to a specific need from the client, such as the supply of a spare part or the performance of a particular service. It is activated upon the client's request and is characterized by a short-term engagement.
- **Multi-Year Maintenance Program (MMP):** This is a long-term commitment in which the service provider agrees to fixed pricing and lead times for parts and services over the duration of the contract. In return, the client commits to a minimum volume of orders. This type of contract helps reduce administrative workload and facilitates easier planning.
- **Contractual Service Agreement (CSA):** Also a long-term agreement, the CSA covers both planned and unplanned maintenance services. Under this model, the service provider assumes responsibility for managing the operational aspects of maintenance. Moreover, it shares the client's commercial risks and supports the achievement of

operational objectives. These contracts are typically extended over a long period, often up to 20 years.

1.4.1) GE's Key partners in Algeria:

Given the wide range of General Electric's operations across multiple sectors in Algeria, the company serves a broad client base. However, this section focuses specifically on GE's clients within the energy sector:

- **SONELGAZ:**

Sonelgaz, short for "*Société Nationale de l'Électricité et du Gaz*", is Algeria's national energy company specialized in the production, distribution, and commercialization of electricity. It is the country's leading producer and supplier of electricity and the main distributor of natural gas. Sonelgaz supplies electricity to approximately 11.4 million customers and natural gas to around 7.3 million consumers.

- **Kahrama:**

Kahrama SPA is the company in charge of the IWPP (Integrated Water and Power Plant) project, a combined seawater desalination and power generation facility located in Arzew, in the wilaya of Oran. The company is owned by the Algerian Energy Company, a joint venture between Sonelgaz and Sonatrach.

The Kahrama unit, which was the first in the country to combine the production of electricity and water desalination, was inaugurated in September 2005. With a daily capacity of 90,000 cubic meters of water, it provides drinking water to the city of Oran and industrial complexes in Arzew.

General Electric is active in more than thirteen power plants across the national territory. As previously mentioned, it supplies gas turbines and steam turbines to local clients, with Sonelgaz being the primary one. GE also offers both simple-cycle and combined-cycle turbine systems, a topic that will be explored in greater detail later.

1.4.2) GE Power's Contribution in Algeria

In 2015, Sonelgaz and General Electric (GE) established a long-term partnership aimed at developing a new power generation complex that integrates gas turbines, steam turbines, alternators, and control systems. As part of this agreement, the two entities founded a joint venture responsible for the construction and operation of the industrial facility dedicated to manufacturing power generation modules. This new entity is majority-owned by Sonelgaz (51%) and partially owned by GE Industrial France (49%).

The project is designed to meet Algeria's increasing demand for electricity, with an expected annual output of approximately 2,000 megawatts (MW). The agreement covers the procurement of 24 gas turbines (GT), 12 steam turbines (ST), 36 alternators, and their associated control systems.

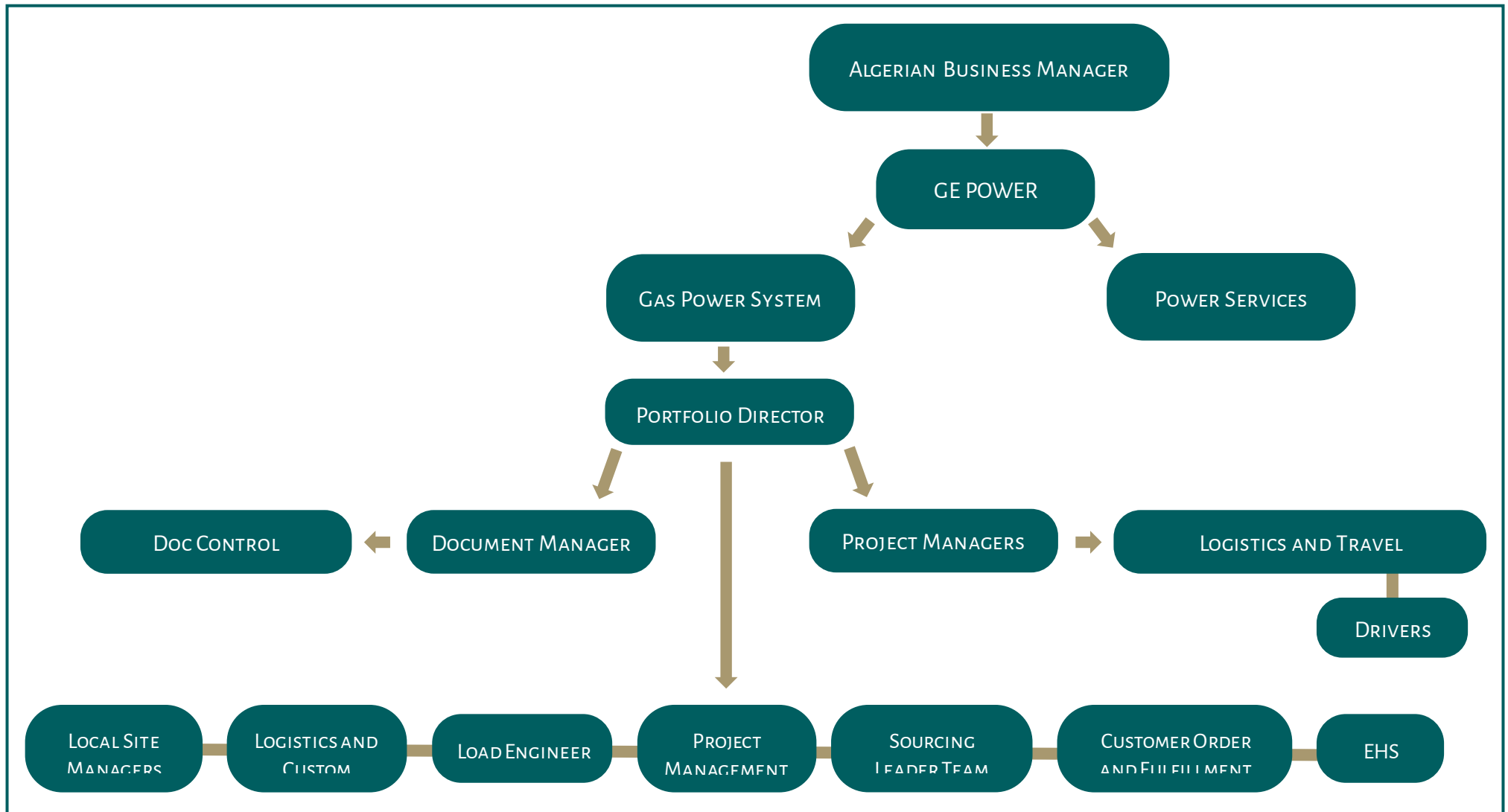
The GEAT (General Electric Algeria Turbines) complex consists of four specialized manufacturing plants:

- **Plant 1** focuses on the production of gas turbines with capacities ranging from 100 to 300 MW;
- **Plant 2** produces steam turbines with outputs between 50 and 160 MW.
- **Plant 3** manufactures alternators, which convert mechanical energy into electrical energy;
- **Plant 4** is dedicated to the production of control systems that are integrated into the turbines built in Plants 1 and 2.

This industrial initiative has significantly contributed to the development of the local supply chain, generating nearly 1,000 new jobs including 400 direct skilled positions and more than 600 indirect jobs.

GE Power Algeria is structured into two sub-divisions: Gas Power Systems (GEGP) and Power Services, each providing distinct types of services. The organizational chart below illustrates the structure of GE Vernova in Algeria.

Figure 2 - 2: GE Vernova Algeria Organizational Chart



Source: Obtained from Organizational Document

Section 2: Research Design

This section outlines the research design developed to address the central problem of this dissertation: assessing the impact of ITIL best practices on the optimization of IT asset management and the enhancement of IT service quality. The design serves as the methodological backbone of the study, ensuring coherence between the research objectives, data collection procedures, analytical techniques, and interpretative frameworks.

The research is guided by two principal objectives. First, it seeks to evaluate the maturity level of selected ITIL management processes implemented within the organization. Second, it aims to investigate the relationship between IT process performance metrics (KPIs) and the general satisfaction of employees with the IT services provided. These dual goals reflect a need to capture both the internal efficiency of IT operations and the external perceptions of service effectiveness across the organization.

Given that the study attempts to uncover a cause-effect relationship specifically, how ITIL process maturity influences service performance perception methodological clarity and internal consistency are critical. Without a rigorous design, such relationships could be misinterpreted or overstated. Accordingly, this research adopts a multi-level and mixed-method approach, combining quantitative performance data with qualitative perception-based inputs. This design allows for a complementary interpretation of empirical findings, while reducing the risk of relying on a single data source.

The integration of quantitative and qualitative insights necessitates transparent methodological procedures, consistent data collection protocols, and robust analysis strategies. In addition, the triangulation of diverse data types enhances the validity of the results, allowing for cross-verification and a deeper understanding of the phenomena under investigation.

Furthermore, the research design must guarantee a high level of credibility, reproducibility, and practical relevance because the findings are meant to guide strategic decisions about the enhancement of IT services and asset management procedures. A well-structured design supports the findings' applicability in actual organizational contexts while also enhancing their reliability.

2.1) Research perspective:

This work takes a pragmatic approach to research, stressing the application of the most appropriate techniques to solve the research issue regardless of rigorous following to a single philosophical paradigm. The study combines aspects of positivism in examining objective internal KPIs and maturity levels and interpretivism, in understanding employees' perceptions

of IT service quality, given the dual emphasis on measurable ITIL process performance and subjective employee satisfaction. This flexible, problem-centered approach guarantees a more thorough and context-sensitive assessment of IT service management practices by allowing the researcher to extract significant insights from both quantitative and qualitative data.

2.2) Research methods:

Researchers usually participate in one or both of two essential activities in any kind of study: measuring observable data or collecting human insights. These activities provide the foundation for the two broad categories of research methods: qualitative methods, which investigate subjective experiences and perceptions using language-based data, and quantitative methods, which emphasize numerical measurement and statistical analysis. Every approach generates various kinds of data and has different analytical goals.

2.2.1) Qualitative Approach

Qualitative research focuses on exploring how individuals interpret and give meaning to their experiences. It often uses flexible and open-ended data collection methods, such as interviews or observations, to study phenomena in their natural context. This approach values depth and nuance over generalization, aiming to capture the complexity of human behavior (Denzin & Lincoln, 1994; Lim, 2024).

This method of research is descriptive in nature, focusing on interpretations, lived experiences, and the meanings people assign to them.

Data collection in qualitative studies is typically based on two main techniques:

- Observations
- Interviews

The data gathered are non-statistical and cannot be measured numerically. Instead, they require subjective interpretation by the researcher.

The outcomes of a qualitative study are centered on interpretations and their significance, and they are usually expressed through words rather than numbers.

2.2.2) Quantitative Approach

Quantitative research relies on numerical data and structured methods like surveys or experiments to examine relationships between variables. It uses statistical tools to test hypotheses and generate findings that can often be generalized to larger populations. This approach emphasizes objectivity, measurement, and replicability (Malau-Aduli & Alele, 2023; University of Texas at Arlington).

This research method is commonly conducted using tools such as:

- Surveys
- Questionnaires

Presented as measurable data, the results of a quantitative study let researchers compute averages, identify the frequency of particular responses, and analyse data into percentages among other things.

Most often, the outcomes are shown in statistical tables or graphical formats, such as charts or graphs, to enable interpretation and comparison.

2.2.3) Triangulation:

Research triangulation refers to the use of multiple methods or data sources to strengthen the validity and credibility of findings (Noble & Heale, 2019). While it is often used alongside mixed-methods approaches, triangulation is distinct in that it emphasizes how different forms of data are strategically combined and cross-verified to ensure consistency and depth in the analysis (Social Sciences Research Laboratories, 2018). In this study, triangulation supports a more comprehensive understanding by integrating both internal performance metrics and user perceptions.

Primary Data Sources

Primary data is information the researcher directly gathers, examines, and interprets for the particular goal of addressing a stated research question. This kind of data has many benefits: it lets the researcher gather precisely the required variables, guarantees complete control over the data collecting process, and lets the evaluation of instrument dependability. Primary data is usually more accurate and more in line with the particular goals of the study since the researcher controls every stage.

2.3) Secondary Data Sources

Existing information first gathered for another goal but later used to answer fresh research inquiries is called secondary data. This kind of data is beneficial since it usually comes from big samples that can support population-level analysis and is typically less time-consuming and less costly to acquire. Secondary data, on the other hand, might be less suited to the present study and could need more validation since the researcher did not regulate how it was collected.

2.3.1) Research Strategy:

To rigorously assess the impact of ITIL best practices on IT performance and service quality at GE Vernova Algeria, this research adopts a sequential, mixed-methods strategy designed to integrate both process-level performance data and user perceptions. This comprehensive approach enables a multifaceted understanding of how structured ITSM frameworks translate into tangible outcomes within the organization.

The first phase of the strategy involved the assessment of maturity levels across five key ITIL management processes implemented within the company.

This evaluation was conducted through semi-structured interviews with the two key IT staff members:

Table 2 - 2: Interviewee Roles and Responsibilities

INTERVIEWEE	FUNCTION
AHMED, B	IT ASSET LIFECYCLE ENGINEER
SALEH, M	IT HELP DESK TECHNICIAN

Source: Elaborated by the Author.

These interviews served a dual purpose. On one hand, they supported a checkbox-based evaluation of each process's maturity, grounded in the ITIL maturity model. On the other, their flexible and interactive format allowed the capture of rich qualitative insights that provide contextual depth and will later aid in interpreting any emerging trends or anomalies within the empirical results.

Following this diagnostic phase, the second step involved the collection of quantitative operational data from the organization's ServiceNow ITSM platform. These datasets extracted

and structured with the assistance of the IT department form the basis of the first analytical block, which focuses on measuring process-level performance through relevant Key Performance Indicators (KPIs). This block enables an in-depth statistical analysis of operational efficiency across the selected ITIL practices.

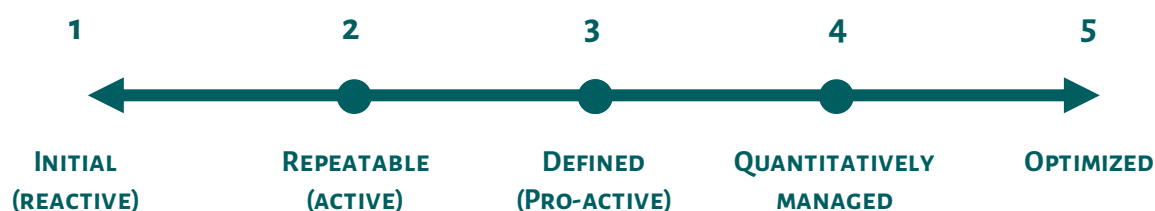
The third and final component of the strategy introduces a user-centered perspective, captured through a structured Customer Satisfaction (CSAT) survey administered across the company. This second analytical block is designed to evaluate how employees perceive the quality of IT services, based on widely recognized service dimensions. While CSAT data is not mapped directly to individual ITIL processes, it serves as an important perceptual counterpoint to operational data, enabling a user-centric lens of evaluation.

By integrating empirical performance data (Block 1), user perception metrics (Block 2), and qualitative insights from interviews and field observations, this triangulated approach enhances the robustness of the analysis. It not only reduces the limitations associated with relying on a single method but also enables a more nuanced validation of both supportive and critical research assumptions.

2.3.1.1) Maturity Assessment Method for ITIL Processes

To evaluate the maturity of ITIL processes implemented at GE Vernova, a structured and collaborative assessment method based on a checkboxes system was employed during semi-structured interviews with the IT staff. For each process under evaluation, a maturity assessment table was prepared in advance, outlining the process's core practices. Each practice was aligned with a five-level maturity scale, inspired by ITIL best practices, ranging from Level 1 (initial or ad hoc implementation) to Level 5 (fully optimized and automated performance) as explained in the following figure:

Figure 2 - 3: ITIL Maturity Assessment Scale



Source: Elaborated by the Author after consulting ITIL4 Documentation.

Within the table, each level was represented by a dedicated checkbox, allowing respondents to easily indicate the level that most accurately described the current state of each practice.

During the interviews, only the assessment tables relevant to the interviewee's responsibilities were presented. Each respondent was asked to check the box corresponding to the maturity level they believed had been reached for each practice. Based on these responses, a numerical score was assigned to each practice, corresponding directly to the selected level (e.g., Level 1 = score of 1, Level 5 = score of 5).

Table 2 - 3: Maturity Assessment Example with Scores

PRACTICE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	SCORE
PRACTICE 1				✓		4
PRACTICE 2			✓			3
PRACTICE 3					✓	5
PRACTICE 4				✓		4
MATURITY SCORE						4.00

Source: Elaborated by the Author

To determine the overall maturity score of a given ITIL process, the scores of all individual practices were aggregated and averaged using the following formula:

Equation 2 - 1: Maturity Score Calculation

$$\text{Maturity Score} = \frac{\sum \text{Practice Scores}}{\text{Number of Practices}}$$

Source: Elaborated by the Author.

For example, if a process includes four practices, and the interviewee selects maturity levels 4, 3, 5, and 4 respectively, the final maturity score would be calculated as follows:

$$\text{Maturity Score} = \frac{4 + 3 + 5 + 4}{4} = 4.00$$

This result reflects the average maturity level of the process as determined by expert judgment. The maturity scores derived from this checkbox-based method are incorporated into the first analytical block of the study, where they are analyzed alongside relevant Key Performance Indicators (KPIs). These KPIs are categorized into efficiency-based, time-based, and volume-based metrics. The combination of maturity levels and operational performance indicators provides a robust foundation for examining the relationship between process maturity and IT service outcomes.

Following this diagnostic phase, the second step involved the collection of quantitative operational data from the organization's ServiceNow ITSM platform. These datasets extracted and structured with the assistance of the IT department form the basis of the first analytical block, which focuses on measuring process-level performance through relevant Key Performance Indicators (KPIs). This block enables an in-depth statistical analysis of operational efficiency across the selected ITIL practices.

The third and final component of the strategy introduces a user-centered perspective, captured through a structured Customer Satisfaction (CSAT) survey administered across the company. This second analytical block is designed to evaluate how employees perceive the quality of IT services, based on widely recognized service dimensions. While CSAT data is not mapped directly to individual ITIL processes, it serves as an important perceptual counterpoint to operational data, enabling a user-centric lens of evaluation.

By integrating empirical performance data (Block 1), user perception metrics (Block 2), and qualitative insights from interviews and field observations, this triangulated approach enhances the robustness of the analysis. It not only reduces the limitations associated with relying on a single method but also enables a more nuanced validation of both supportive and critical research assumptions.

2.3.1.2) Analytical Block 1: Internal IT Performance and Asset Management Data

The first analytical block focuses on the quantitative assessment of internal IT processes presented in (Table 2 – 4) and asset management performance, based on data extracted from ServiceNow, the IT Service Management (ITSM) platform used by GE Vernova. This dataset was compiled through collaboration with IT personnel and serves as a key foundation for evaluating the maturity and operational efficiency of selected ITIL-aligned processes.

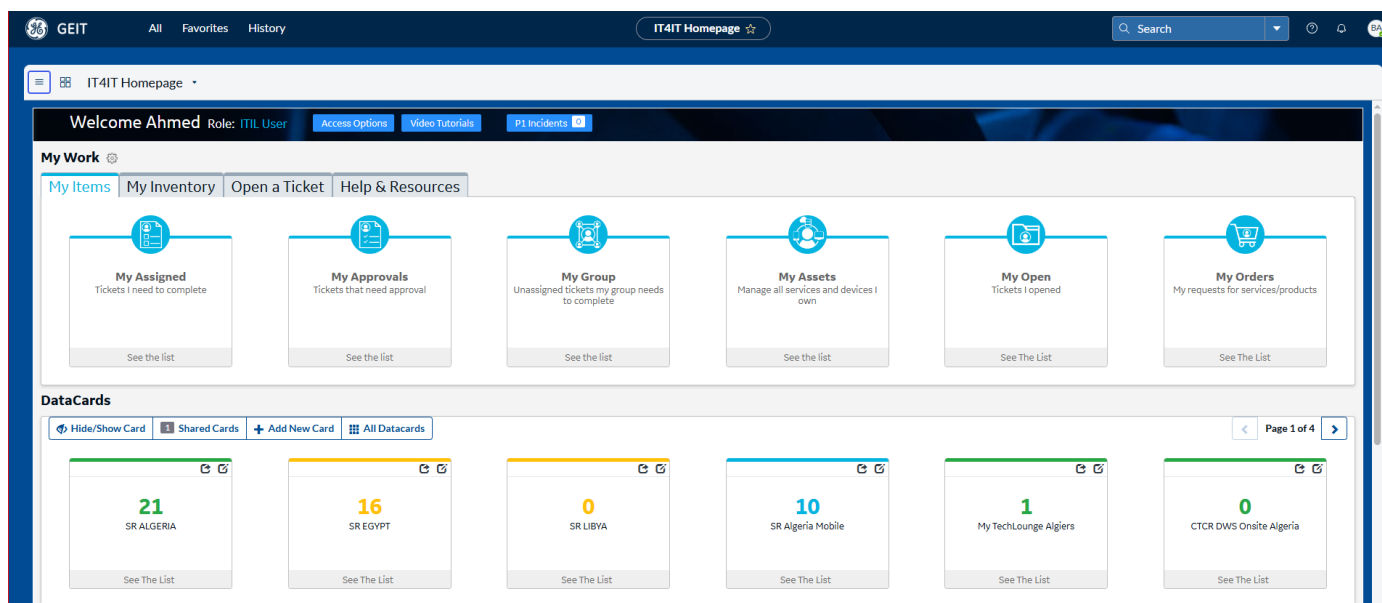
Table 2 - 4: ITIL Management Processes Under Study

ITIL PROCESS	DESCRIPTION
INCIDENT MANAGEMENT	HANDLES UNPLANNED INTERRUPTIONS TO RESTORE SERVICE OPERATION SWIFTLY
REQUEST MANAGEMENT	MANAGES SERVICE REQUESTS FROM USERS (ACCESS, INFO, STANDARD CHANGES)
CONFIGURATION MANAGEMENT (CMDB)	MAINTAINS ACCURATE RECORDS OF IT ASSETS, RELATIONSHIPS, AND CONFIGURATIONS
SERVICE LEVEL MANAGEMENT	ENSURES IT SERVICES MEET AGREED SERVICE LEVELS AND MONITOR SLAs
IT ASSET LIFECYCLE MANAGEMENT	OVERSEES IT ASSETS FROM ACQUISITION TO RETIREMENT

Source: *Elaborated by the Author.*

Two primary data sources were used for this analysis. The first was provided by Ahmed, the engineer responsible for the IT asset lifecycle, who exported a structured dataset in CSV format directly from his personal ServiceNow dashboard. This dataset includes performance metrics linked to his day-to-day responsibilities, such as PC request handling, CMDB (Configuration Management Database) updates, accessory management, and broader asset lifecycle operations. These indicators offer critical insights into the practical application and operational maturity of asset-related ITIL processes. A screenshot of Ahmed’s ServiceNow interface is provided to visually support the context and structure of the data extracted.

Figure 2 - 4: ServiceNow User Interface Screenshot



Source: Obtained from Ahmed's ServiceNow.

The second dataset was shared by Saleh, a frontline IT helpdesk technician, whose role centers on managing employee interactions through both incident management and service request fulfillment. His dataset, also exported in CSV format from ServiceNow, captures quantitative information on user interactions, including the number and types of incidents and requests assigned to him, particularly those received via the “My Tech Lounge”, an on-site IT support desk operating from Sunday to Thursday, 9:00 AM to 5:00 PM. This unit acts as a critical interface between end-users and the IT department, enabling efficient problem resolution. Saleh’s data reflects a diverse range of tasks, including mobility requests, hardware troubleshooting, and general IT service support. A screenshot of his ServiceNow workspace is included to provide a clearer view of the data source environment.

All collected data were systematically cleaned, labeled, and formatted to ensure compatibility with SPSS for quantitative analysis. Specific procedures related to data preparation such as variable structuring, normalization, and transformation are discussed in detail in the next chapter.

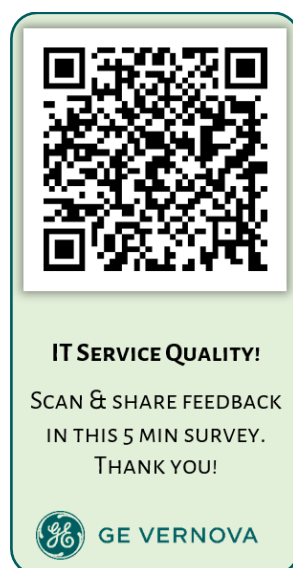
Forming a vital component of the empirical study, this analytical block ultimately allows for the investigation of process maturity levels and their connection with operational KPIs.

2.3.1.3) Analytical block 2: Customer satisfaction survey

To assess employee perceptions of IT service quality within the organization, a structured, self-administered questionnaire was developed and deployed as a central instrument of this research. The survey was designed following a user-centered approach, combining both quantitative and qualitative items to capture a comprehensive view of satisfaction with IT services. It was created and hosted on YouForm, a platform known for its clean and interactive user interface, which helped enhance the overall response experience and engagement.

To maximize visibility and participation, small physical cards containing QR codes (*Check figure 2 – 5*) linked to the survey were printed and strategically distributed across open-space office areas within the company. This method allowed employees to easily access the survey using their mobile devices at their convenience, ensuring both accessibility and minimal disruption to their work routine.

Figure 2 - 5: Survey QR code cards



Source: Elaborated by the Author.

2.3.1.4) Survey Design

The survey was presented in both English and French to accommodate the linguistic diversity of the workforce. A brief introduction was included at the beginning of the questionnaire to explain the purpose of the study, guarantee respondent anonymity, and reinforce that all

collected data would be treated as strictly confidential and used solely for academic and service improvement purposes.

Section 1: General Information

The first section of the survey was designed to collect **contextual and demographic information** about the respondents. Although all questions in this section were **optional**, the data gathered plays a crucial role in the analysis, as it allows for a more nuanced interpretation of satisfaction levels based on user profiles. Understanding the respondent's departmental affiliation, job role, length of service, and interaction frequency with IT support helps identify whether certain groups experience IT services differently. These insights can guide more targeted improvement strategies and resource allocation within the IT function.

Participants were asked to respond to the following items:

Table 2 - 5: Demographic Survey Questions

QUESTION	DESCRIPTION
DEPARTMENT/TEAM	TO DETERMINE WHICH FUNCTIONAL UNITS ARE REPRESENTED IN THE SAMPLE
JOB TITLE/FUNCTION	TO CONTEXTUALIZE THE RESPONDENT'S ROLE IN RELATION TO IT NEEDS AND DEPENDENCIES.
LENGTH OF EMPLOYMENT	CATEGORIZED INTO FOUR-TIME RANGES: <input type="checkbox"/> LESS THAN 6 MONTHS <input type="checkbox"/> 6–12 MONTHS <input type="checkbox"/> 1–3 YEARS <input type="checkbox"/> MORE THAN 3 YEARS
FREQUENCY OF IT SUPPORT USAGE	TO ASSESS HOW OFTEN USERS RELY ON IT SERVICES, WITH OPTIONS: <input type="checkbox"/> RARELY <input type="checkbox"/> OCCASIONALLY <input type="checkbox"/> MONTHLY <input type="checkbox"/> WEEKLY <input type="checkbox"/> DAILY
MAIN DEVICES AND TOOLS USED	MULTIPLE SELECTION ALLOWED, INCLUDING: <input type="checkbox"/> DESKTOP <input type="checkbox"/> LAPTOP <input type="checkbox"/> MOBILE <input type="checkbox"/> SPECIALIZED SOFTWARE <input type="checkbox"/> SHARED IT EQUIPMENT <input type="checkbox"/> OTHER (WITH SPACE TO SPECIFY)

Source: Elaborated by the Author.

Table 2 - 6: Dimensions for IT Service Quality

DIMENSION	DESCRIPTION	NUMBER OF ITEMS	MAX SCORE
RELIABILITY	CONSISTENCY AND DEPENDABILITY OF IT SYSTEMS AND EQUIPMENT	3	15
RESPONSIVENESS	SPEED AND QUALITY OF SUPPORT PROVIDED BY THE IT TEAM	3	15
ASSURANCE	COMPETENCE, PROFESSIONALISM, AND CONFIDENCE INSPIRED BY IT PERSONNEL	2	10
EMPATHY	ABILITY OF THE IT TEAM TO SHOW PERSONALIZED ATTENTION AND UNDERSTANDING	2	10
TANGIBLES	QUALITY AND MODERNITY OF IT TOOLS AND PHYSICAL ASSETS PROVIDED TO USERS	2	10
TOTAL		12	60

Source: Elaborated by the Author.

The scores from the 12 items across all dimensions are first summed to produce a raw total score out of 60. To make the results more interpretable and aligned with the original rating scale, the total score is then normalized back to a 5-point scale using the formula:

Equation 2 - 2: Satisfaction Score Calculation

$$\text{Average Score (out of 5)} = \frac{\text{Total Score}}{12}$$

Source: Elaborated by the Author.

This method maintains consistency with the response scale used in the questionnaire and makes it easier to communicate results. For example, if a respondent achieves a total score of 50 out of 60, their final service quality score would be:

$$\frac{50}{12} = 4.17 \text{ out of 5}$$

This average score provides a precise indication of the user's overall satisfaction and perception of IT service quality, and it enables easier comparison between groups or over time.

Section 4: Open Questions

This final section of the survey includes three open-ended questions aimed at collecting qualitative data that can enrich and support the interpretation of the quantitative results. While earlier sections measured satisfaction levels through structured Likert-scale statements, this section gives respondents the opportunity to share their personal experiences, observations, and suggestions in their own words.

The primary purpose of including open questions is to gain deeper insight into the perceptions of users regarding IT services beyond what numerical scores can capture. This qualitative input can reveal underlying issues, highlight positive aspects, and most importantly, identify areas for improvement that might not emerge from closed-ended responses alone.

Furthermore, these narrative responses are expected to contextualize satisfaction ratings and help explain certain trends or outliers observed in the quantitative analysis. They also allow participants to voice specific concerns or commendations that are valuable for practical and user-centered service enhancements.

CHAPTER 3: EMPIRICAL STUDY

Chapter 3: Empirical Study

In this chapter, we present the empirical study conducted to assess the impact of ITIL practices on IT asset management and service quality at GE Vernova Algeria. This study aims to evaluate the practical implementation of ITIL within the company, focusing on how process maturity influences operational efficiency and service delivery.

Section 1: Study Analysis

Using a mixed-method approach, **this section** combines quantitative data from the ServiceNow platform with qualitative insights gathered from user satisfaction surveys (CSAT). This comprehensive analysis allows us to identify the strengths and challenges associated with ITIL adoption, as well as the key factors that affect its success within the industrial context of GE Vernova Algeria. Through this empirical investigation, we aim to draw actionable conclusions to support the continuous improvement of IT service management practices.

1.1) Data preparation:

When we first reviewed the ServiceNow dashboards and KPI summaries provided by the IT staff, it became evident that the pre-calculated indicators lacked the granularity required for a rigorous, research-oriented analysis. To capture subtler variations and to link performance directly to ITIL maturity we therefore reverted to the raw data exports rather than relying on the dashboards' aggregate views.

Working primarily in Microsoft Excel, we undertook a systematic cleansing and transformation process, redundant or inconsistent and confidential fields were removed, time stamps were normalized, and task identifiers were harmonized so that every record could be mapped unambiguously to five analytical components: (1) the relevant ITIL process, (2) its maturity score from the checkbox assessment, and three KPI classes (3) efficiency ratios (percentages), (4) fulfilment time in hours, and (5) monthly transaction volume.

The outcome of this staging exercise is a consolidated dataset that forms the backbone of the first Analytical Block, its structure allows us to examine, with precision, how variations in ITIL maturity relate to operational effectiveness across efficiency, speed, and workload dimensions. Detailed formulae and computational steps used to derive each KPI will be documented later in this chapter to ensure full methodological transparency and reproducibility.






1.2) Maturity assessment:

In the preceding chapter's methodological framework, we offered only a brief overview of the maturity-assessment approach. The present section expands on that foundation by delivering a detailed, process-by-process evaluation of maturity levels for every ITIL practice investigated in this research.

1.2.1) Incident Management

Our diagnostic reveals Incident Management operates at an advanced maturity level (Score: 4.0), demonstrating exceptional logging standardization and trend analysis capabilities. While categorization and reporting show strong statistical measurement (Level 4), escalation procedures remain a development area (Level 3), indicating opportunities to streamline critical incident workflows.

Figure 3 - 1: Incident Management Maturity Assessment

PRACTICE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	SCORE
INCIDENT LOGGING	NOT CONSISTENTLY DONE	LOGGED SYSTEMATICALLY	STANDARDIZED LOGGING WITH TEMPLATES	INCIDENT VOLUME STATISTICALLY ANALYZED	LOGGING REFINED TO REDUCE NOISE/IMPROVE QUALITY 	5
CATEGORIZATION	NO CLEAR RULES	BASIC PRIORITY LEVELS USED	FULL CATEGORIZATION/PRIORITIZATION TAXONOMY	METRICS ON PRIORITIZATION ACCURACY 	DYNAMIC CATEGORIZATION IMPROVEMENTS	4
RESOLUTION AND ESCALATION	UNCLEAR, AD-HOC	BASIC ESCALATION PATHS	FORMAL ESCALATION PROCEDURES EXIST 	ESCALATION TIME METRICS ANALYZED	ESCALATION PATHS OPTIMIZED OVER TIME	3
MONITORING AND REPORTING	NO MONITORING	BASIC REPORTING MONTHLY	REAL-TIME DASHBOARDS ESTABLISHED	METRICS LIKE FCR ANALYZED STATISTICALLY 	REPORTING LEADS TO PREDICTIVE ACTIONS	4
CONTINUOUS IMPROVEMENT	NO IMPROVEMENT LOOP	INFORMAL LESSONS LEARNED	FORMAL POST-INCIDENT REVIEWS	STATISTICAL TREND ANALYSIS 	PROACTIVE PROCESS IMPROVEMENT FROM INCIDENT PATTERNS	4
MATURITY SCORE						4

Source: Elaborated by the Author.

1.2.2) CMDB Management

With the highest maturity score among assessed processes (4.25), CMDB Management excels in automated CI discovery and real-time health monitoring (Level 5). The assessment identifies relationship modeling (Level 3) as the primary constraint improving predictive impact analysis could significantly enhance change management efficacy.

Figure 3 - 2: CMDB Management Maturity Assessment

PRACTICE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	SCORE
CI IDENTIFICATION	AD-HOC/PARTIAL	BASIC MANUAL UPDATES	STRUCTURED CI CLASSES DEFINED	CMDB COMPLETENESS METRICS MONITORED	AUTOMATED DISCOVERY AND DYNAMIC ADJUSTMENTS ✓	5
CI RELATIONSHIPS	POOR OR ABSENT	BASIC LINKAGES	FULL RELATIONSHIP MODELS ✓	DATA INTEGRITY AUDITS STATISTICALLY MEASURED	RELATIONSHIP MODELS USED FOR PREDICTIVE IMPACT ANALYSIS	3
CHANGE INTEGRATION	NO IMPACT ON CMDB	CMDB UPDATED MANUALLY POST-CHANGE	CMDB AUTO-UPDATED VIA CHANGE PROCESS	CHANGE-TO-CMDB SYNC MEASURED QUANTITATIVELY ✓	INTEGRATED CHANGE PREDICTION AND MODELING	4
MONITORING CMDB HEALTH	NO CHECKS	ANNUAL MANUAL AUDITS	PERIODIC AUTOMATIC CHECKS	AUDIT ERROR RATES ANALYZED STATISTICALLY	NEAR-REAL-TIME CMDB HEALTH MONITORING ✓	5
Maturity Score						4.25

Source: Elaborated by the Author.

1.2.3) Request Management

Scoring 4.0, Request Management shows mature approval automation (Level 5) and data-driven fulfillment (Level 4), but measurement practices (Level 3) lag behind. The gap between automated approvals and manual KPI tracking suggests immediate ROI potential from implementing unified analytics.

Figure 3 - 3: Request Management Maturity Assessment






PRACTICE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	SCORE
REQUEST LOGGING	SPORADIC	SYSTEMATIC BASIC LOGGING	STANDARD REQUEST TEMPLATES	REQUEST VOLUMES/TIME TO FULFILL MEASURED ✓	REQUEST PATTERNS LEAD TO PROACTIVE SERVICE OFFERINGS	4
APPROVAL HANDLING	INFORMAL/VERBAL	BASIC APPROVALS RECORDED	WORKFLOW-BASED APPROVALS	APPROVAL SPEED AND CONSISTENCY STATISTICALLY TRACKED	AUTO-TUNED APPROVAL CHAINS ✓	5
FULFILLMENT CONSISTENCY	VARIES CASE-BY-CASE	SOME STANDARD PROCEDURES	PREDEFINED FULFILLMENT WORKFLOWS	FULFILLMENT TIMES/QUALITY STATISTICALLY OPTIMIZED ✓	SELF-SERVICE AND FULFILLMENT PREDICTION MODELS	4
MEASUREMENT	NO DATA	MANUAL KPI TRACKING	AUTOMATED KPI TRACKING ✓	STATISTICAL PROCESS CONTROL CHARTS USED	CONTINUOUS TUNING BASED ON FULFILLMENT PERFORMANCE	3
PROCESS IMPROVEMENT	NONE	REACTIVE IMPROVEMENTS	REGULAR ANALYSIS MEETINGS	KPIS USED FOR PREDICTIVE BOTTLENECK DETECTION ✓	DYNAMIC WORKFLOW ADJUSTMENTS BASED ON TRENDS	4
Maturity Score						4

Source: Elaborated by the Author.

1.2.4) Service Level Management

At 3.8 maturity, SLA processes combine strong definitional rigor (Level 5) with inconsistent monitoring (Level 3). The 1.2-point variance between SLA documentation and compliance tracking underscores the need to align contractual commitments with operational measurement systems.

Figure 3 - 4: Service Level Management Maturity Assessment

PRACTICE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	SCORE
SLA DEFINITION	No SLAs	BASIC INFORMAL AGREEMENTS	FORMAL WRITTEN SLAs	SLA COMPLIANCE METRICS MONITORED STATISTICALLY	SLA RENEGOTIATION PROACTIVELY BASED ON TRENDS 	5
MONITORING COMPLIANCE	SPORADIC CHECKS	MANUAL SLA REPORTS	AUTOMATED SLA TRACKING IN REAL TIME 	COMPLIANCE VARIATION STATISTICALLY TRACKED	SLA PREDICTIVE MONITORING	3
CUSTOMER REPORTING	AD HOC	STANDARD MONTHLY REPORTS	DASHBOARDS AVAILABLE TO STAKEHOLDERS	STATISTICAL SLA REPORTING AND ROOT CAUSE ANALYSIS 	PREDICTIVE CUSTOMER REPORTING	4
SERVICE REVIEWS	RARE OR ABSENT	ANNUAL REVIEWS	QUARTERLY, FORMAL SERVICE REVIEWS 	TREND ANALYSIS ON SERVICE PERFORMANCE	PREDICTIVE SERVICE REDESIGNS	3
IMPROVEMENT PROCESS	NO ACTIONS ON BREACHES	BREACHES FIXED AD HOC	SYSTEMATIC IMPROVEMENT PLANS	BREACH ROOT CAUSES STATISTICALLY MODELED 	SLA DESIGNS UPDATED DYNAMICALLY BASED ON SERVICE EVOLUTION	4
MATURITY SCORE						3.8

Source: Elaborated by the Author.

1.2.5) IT Asset Management

Scoring 3.4, Asset Management displays polarized maturity - while inventory tracking reaches predictive planning (Level 5), improvement processes remain ad-hoc (Level 2). This 3-level gap between asset tracking and lifecycle optimization represents the largest improvement opportunity across all assessed processes.

Figure 3 - 5: IT Asset Management Maturity Assessment

PRACTICE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	SCORE
ASSET INVENTORY	INCOMPLETE	MANUAL ASSET REGISTRY	AUTOMATED TRACKING INITIATED	INVENTORY COMPLETENESS MEASURED STATISTICALLY	PREDICTIVE ASSET REFRESH PLANNING ✓	5
PROCUREMENT TO DISPOSAL TRACKING	GAPS IN TRACKING	PARTIAL LIFECYCLE TRACKING	FULL LIFECYCLE COVERAGE	TIME METRICS BETWEEN STAGES STATISTICALLY ANALYZED ✓	OPTIMIZATION OF ASSET LIFECYCLE TIMEFRAMES	4
COMPLIANCE WITH DISPOSAL POLICIES	INFORMAL DISPOSAL	DISPOSAL DOCUMENTED MANUALLY	STANDARDIZED DISPOSAL WORKFLOW ✓	COMPLIANCE RATES STATISTICALLY ANALYZED	PREDICTIVE DISPOSAL SCHEDULING	3
MEASUREMENT OF ASSET KPIs	NO TRACKING	BASIC KPIs (AGE, NUMBER)	ADVANCED KPIs (TCO, USAGE RATES) ✓	STATISTICAL MODELING OF ASSET PERFORMANCE	PREDICTIVE ASSET REPLACEMENT AND INVESTMENT PLANNING	3
CONTINUOUS IMPROVEMENT	NONE	AD HOC PROCESS TWEAKS ✓	STRUCTURED IMPROVEMENT PROJECTS	METRICS-BASED LIFECYCLE IMPROVEMENTS	DYNAMIC LIFECYCLE STRATEGY BASED ON TRENDS	2
MATURITY SCORE						3.4

Source: Elaborated by the Author.

1.3) Staging the Key-Performance Indicators

To render the raw ServiceNow exports analytically usable in SPSS, three distinct classes of KPIs were derived efficiency-based, time-based, and volume-based, using a structured data-preparation workflow.

1.4) Data Scoping and Filtering

Because the study targets the organization's current-year performance, both datasets were first filtered to include only the most recent five months. All time-stamp fields were normalized to a uniform YYYY-MM-DD hh:mm format.

1.4.1) Separating Incident and Request Streams

The CSV file supplied by Saleh (Help Desk) listed all frontline interactions, each with an interaction ID, opening and closing time-stamps, a short textual description, and a final state (open, closed, or abandoned). Keyword filters applied to the description field (e.g., "INC", "password reset", "mobility") allowed the data to be partitioned into two streams:

- Incidents – unplanned interruptions or degradations of service.
- Service Requests / MyTech Lounge tickets, standardized tasks such as mobility provisioning or roaming activation.

The file provided by Ahmed (Asset-Lifecycle Engineer) contained analogous records for CMDB updates, asset moves, and accessory requests. These entries required only minor label standardization so that process names matched the ITIL taxonomy used elsewhere in the study.

Table 3 - 1: Overview of efficiency-based, time-based, and volume-based KPIs, including formulas and rationales

KPI CLASS	FORMULA (PERTICKET OR MONTHLY AGGREGATION)	RATIONALE
EFFICIENCY-BASED KPIs	$\text{Closure Rate} = \frac{\text{Closed Interactions Within respective SLA}}{\text{Closed} + \text{Open} + \text{Abandoned}} \times 100\%$	PROPORTION OF INTERACTIONS SUCCESSFULLY RESOLVED.
	$\text{First Contact Resolution} = \frac{\text{Tickets Closed at First Touch}}{\text{Total Tickets}} \times 100\%$	MEASURES IMMEDIATE EFFECTIVENESS.
TIME-BASED KPIs	$\text{Mean Time to Resolve} = \frac{\sum(\text{Close Date} - \text{Open Date})}{\text{Closed tickets}} \times 100\%$	GAUGES SPEED OF INCIDENT/REQUEST FULFILMENT.
	MEAN FULFILMENT TIME FOR ASSET OR ACCESSORY REQUESTS, CALCULATED ANALOGOUSLY.	
VOLUME-BASED KPIs	MONTHLY COUNT OF PER PROCESS (INCIDENTS, REQUESTS, CMDB CONFIGS, ASSETS MANAGEMENT AND SERVICE LEVEL AGREEMENTS MET).	REFLECTS WORKLOAD AND DEMAND TRENDS.

Source: Elaborated by the Author.

To clarify the operation of these formulas, the tables below present and explain the primary SLAs associated with each process.

Table 3 - 2: Service-Level Agreements (SLAs) by ITIL Process

ITIL PROCESS	ACTIVITY / TICKET TYPE	SERVICE-LEVEL TARGET (SLA)
INCIDENT MANAGEMENT	ALL INCIDENTS	≥ 80 % FIRST-CONTACT RESOLUTION
REQUEST MANAGEMENT	MTL + MOBILITY REQUESTS	FULFIL WITHIN 24 H OF REQUEST
	ACCESSORIES REQUESTS	NO FORMAL SLA DEFINED
CONFIGURATION MANAGEMENT (CMDB)	CI ENTRY/UPDATE ON DEPLOYMENT DAY	RECORD CI IN CMDB SAME CALENDAR DAY AS DEPLOYMENT
ASSET MANAGEMENT	PC REFRESH / BROKEN DEVICE	FULFIL WITHIN 3 DAYS (≤ 72 H)
	NEW-HIRE (PRIMARY) PC REQUEST	FULFIL WITHIN 24 H OF START REQUEST
SERVICE-LEVEL MANAGEMENT	CONSOLIDATED VIEW	AGGREGATES AND MONITORS ALL SLA COMMITMENTS ABOVE

Source: Elaborated by the Author.

Each KPI was computed in Excel using pivot tables and formulae, then exported as a clean, flat CSV with fields: *Month*, *ITIL Process*, *Maturity Score*, *Efficiency %*, *Mean Time (hours)*, *Volume*. This layout conforms to SPSS wide format, enabling seamless import and facilitating correlation, regression, and cross-tab analyses in Analytical Block 1. Detailed Excel formulas and transformation steps are documented in Appendixes to ensure full transparency and reproducibility. In order to get a better overview of the data staging step, we highly recommend to check the spreadsheet.

This preliminary and essential step produced the table that now constitutes the study's first analytical block:

Table 3 - 3: ITIL Process Maturity and Performance Metrics

ITIL PROCESS	MATURITY LEVEL	EFFICIENCY METRIC "IN PERCENTAGES" (KPI1)	RAW TIME METRIC "IN HOURS" (KPI2)	VOLUME METRIC "PER MONTH" (KPI3)
CMDB	4,25	95,000%	42,000	8,0
INCIDENT MGMT	4	89,655%	43,385	5,2
REQUEST MGMT	4	94,063%	173,975	64,0
SERVICE LEVEL MANAGEMENT	3,8	90,698%	152,255	77,4
ASSETS MANAGEMENT	3,4	63,158%	44,978	8,0

Source: Excel Sheet provided by the Author (Check Appendixes)

1.4) Block 1 descriptive statistics

The descriptive statistics reveal key trends in ITIL process maturity and associated KPIs. Maturity levels range from 3.4 (Assets Management) to 4.25 (CMDB), with a mean of 3.89 and low variability (SD=0.32), indicating generally consistent maturity across processes. Efficiency metrics show a wider spread (63.16%-95%, mean=86.51%, SD=13.25%), where CMDB excels (95%) while Assets Management underperforms (63.16%).

Table 3 - 4: Descriptive Statistics for Block 1

STATISTIQUES DESCRIPTIVES						
	N	MINIMUM	MAXIMUM	MOYENNE	ECART TYPE	VARIANCE
MATURITYLVL	5	3,40	4,25	3,8900	,31702	,100
EFFICIENCY	5	,63158	,95000	,8651480	,13246453	,018
RAWTIME	5	42,000	173,975	91,31860	65,997596	4355,683
VOLUMEPERMONTH	5	5,20	77,40	32,5200	35,19250	1238,512
N VALIDE (LISTE)	5					

Source: Elaborated by the Author using SPSS.

Time requirements vary significantly (42-173.98 hours, mean=91.32, SD=66), with Request Management being most time-intensive (173.98 hours) and CMDB most efficient (42 hours). Volume metrics display extreme variation (5.2-77.4 requests/month, mean=32.52, SD=35.19), where Service Level Management handles the highest volume (77.4) and Incident Management the lowest (5.2).

These results highlight process-specific performance patterns, with CMDB demonstrating strong maturity and efficiency, while Assets Management emerges as a key area for improvement. The substantial differences in time and volume metrics reflect varying operational demands across ITIL processes. This analysis provides a foundation for deeper investigation into maturity-KPI relationships and targeted process enhancements.

1.4.1) Correlation Analysis:

The correlation analysis provides valuable insights into the relationships between ITIL process maturity and operational performance metrics. The most significant finding is the strong positive correlation ($r = 0.911$, $p = 0.032$) between ITIL maturity levels and efficiency metrics, suggesting that more mature ITIL processes are consistently associated with higher operational efficiency. This robust relationship (accounting for approximately 83% of shared variance)

strongly supports the theoretical foundation of ITIL frameworks, demonstrating that process standardization and optimization directly translate to measurable performance improvements.

Table 3 - 5: Correlation Matrix of ITIL Process Metrics

		CORRÉLATIONS			
		MATURITYLVL	EFFICIENCY	RAWTIME	VOLUMEPERMONTH
MATURITYLVL	CORRÉLATION DE PEARSON	1	,911*	,039	-,009
	SIG. (BILATÉRALE)		,032	,950	,989
	N	5	5	5	5
EFFICIENCY	CORRÉLATION DE PEARSON	,911*	1	,398	,378
	SIG. (BILATÉRALE)	,032		,507	,531
	N	5	5	5	5
RAWTIME	CORRÉLATION DE PEARSON	,039	,398	1	,968**
	SIG. (BILATÉRALE)	,950	,507		,007
	N	5	5	5	5
VOLUMEPERMONTH	CORRÉLATION DE PEARSON	-,009	,378	,968**	1
	SIG. (BILATÉRALE)	,989	,531	,007	
	N	5	5	5	5

*. LA CORRÉLATION EST SIGNIFICATIVE AU NIVEAU 0.05 (BILATÉRAL).

** . LA CORRÉLATION EST SIGNIFICATIVE AU NIVEAU 0.01 (BILATÉRAL).

Source: Elaborated by the Author using SPSS.

The analysis reveals another particularly strong association between processing time and request volume ($r = 0.966$, $p = 0.007$), indicating an almost perfect linear relationship where increased service requests proportionally extend resolution times. This finding has important practical implications, suggesting that current IT service management systems may lack the scalability to handle volume increases without corresponding time penalties. The strength of this correlation (explaining about 93% of the variance) highlights a potential bottleneck in service delivery that warrants further investigation into capacity planning and resource allocation strategies.

Notably, the results show no significant correlation between maturity levels and either processing time ($r = 0.039$) or request volume ($r = -0.009$), revealing an important nuance in ITIL implementation. While maturity enhances efficiency, it doesn't necessarily reduce either the volume of requests or the time required to address them. This suggests that factors influencing workload volume and processing time may operate independently of process maturity, possibly relating more to organizational size, user behavior, or system architecture.

The absence of significant correlations between efficiency and either processing time ($r = 0.398$) or volume ($r = 0.378$) further reinforces this distinction, indicating that efficiency gains may stem from quality improvements rather than throughput acceleration. These findings collectively paint a picture where process maturity drives quality and effectiveness, while volume and time constraints follow different operational dynamics.

From a methodological perspective, while these correlations are statistically significant, the small sample size ($N=5$) necessitates cautious interpretation. The effect sizes are substantial enough to suggest meaningful patterns, but the analysis would benefit from verification with a larger dataset. These results provide a strong foundation for further research into the mechanisms by which ITIL maturity influences different dimensions of operational performance, particularly the intriguing disconnect between efficiency gains and time/volume metrics.

1.4.1.1) Insignificant Relationships and Their Implications

The correlation analysis revealed several statistically insignificant relationships that critically inform the interpretation of ITIL maturity's operational impact. First, the near-zero correlation between *MaturityLVL* and *RawTime* ($r = 0.039$, $p = 0.950$) demonstrates that process maturity does not inherently reduce processing times, which are likely governed by exogenous factors like request complexity or resource availability. This decoupling suggests that organizations pursuing ITIL improvements must address time efficiency separately for example, through workforce training or workflow automation rather than assuming maturity gains will mechanically accelerate resolutions. Second, the trivial correlation between *MaturityLVL* and *VolumeperMonth* ($r = -0.009$, $p = 0.989$) underscores that maturity frameworks do not influence demand volume, which is instead driven by external variables (e.g., organizational growth or seasonal peaks). This finding challenges the notion that process optimization alone can mitigate workload pressures, emphasizing the need for complementary strategies like demand forecasting or self-service tools.

Similarly, the absence of significant links between Efficiency and *RawTime* ($r = 0.398$, $p = 0.507$) or *VolumeperMonth* ($r = 0.378$, $p = 0.531$) further isolates maturity as the primary driver of efficiency. The moderate but non-significant correlations imply that efficiency gains are neither inherently tied to faster resolutions nor scalable across higher volumes, reinforcing the centrality of maturity (e.g., standardized procedures, measurement rigor) in achieving

performance improvements. These null results collectively highlight the bounded influence of ITIL maturity: while it robustly enhances process quality (as evidenced by the significant maturity-efficiency relationship), its benefits do not extend to workload management or time reduction.

These statistically insignificant correlations underscore the necessity of restricting further analysis to only those relationships demonstrating robust significance, as will be examined in the subsequent regression analysis of significant relationships.

1.4.2) Regression Analysis:

While correlation revealed intriguing connections between ITIL maturity and performance metrics, we now take a critical next step: regression analysis. This powerful statistical tool transforms our understanding from "these variables move together" to "exactly how much and in what way." By applying regression to our ITIL dataset, we can answer pressing questions that matter to IT leaders: If we invest in raising our CMDB maturity from 4.25 to 5, what efficiency gains can we realistically expect? How many additional service requests can we handle before response times become unmanageable?

The true value of regression in this study lies in its ability to:

- Isolate the unique impact of maturity improvements while accounting for other factors
- Create predictive models that help anticipate the ROI of ITIL initiatives
- Identify thresholds where process improvements yield diminishing returns

For practitioners, these aren't just statistical outputs, they're actionable intelligence. The regression coefficients will essentially become a "maturity impact calculator" for IT service management. Whether prioritizing which processes to enhance first or setting realistic performance targets, these models turn theoretical relationships into concrete decision-making tools.

The dataset, with its carefully assessed maturity levels and operational KPIs, presents an ideal opportunity to move beyond descriptive statistics. The regression analysis will reveal not just

whether higher maturity matters, but precisely how much it matters across different operational contexts. In an era where IT leaders must justify every improvement initiative, these evidence-based insights could mean the difference between guesswork and strategic investment.

1.4.2.1) Confidence Interval Justification

In this study, 90% confidence intervals (CIs) were employed to balance statistical rigor with practical interpretability, given the exploratory nature of the research and the limited sample size ($N=5$). While conventional studies often adopt 95% CIs, the stricter threshold would have produced excessively wide intervals in this small dataset, potentially obscuring meaningful relationships between ITIL maturity and efficiency. The 90% CI provides a more focused estimate of effects while maintaining reasonable confidence in the results, making it particularly suitable for applied IT service management research where actionable insights are prioritized over ultra-conservative statistical thresholds. This approach aligns with common practice in operational and business decision-making contexts, where a 10% margin of error is often deemed acceptable for guiding improvement initiatives. The choice reflects the study's objective of identifying preliminary yet practically significant patterns that can inform ITIL process optimization, while transparently acknowledging that future validation with larger samples may warrant stricter confidence levels. By using 90% CIs, the analysis achieves an optimal balance between detection power and reliability for this stage of investigation.

1.4.2.2) Simple Linear Regression: Maturity Level Predicting Efficiency

The regression analysis reveals a statistically significant and practically meaningful relationship between ITIL maturity levels and operational efficiency. The coefficient table shows that for each one-point increase in ITIL maturity, there is an associated 38.1% improvement in efficiency ($\beta = 0.381$, $p = 0.032$). This strong positive relationship indicates that process maturity is a key driver of performance, with higher maturity levels consistently linked to greater efficiency. The intercept term of -0.615 , while statistically insignificant ($p = 0.211$), serves mainly as a mathematical anchor for the model and lacks practical interpretation since negative efficiency values are impossible. This suggests the model should only be applied within the observed maturity range of 3.4 to 4.25.

Table 3 - 6: Maturity Impact on Efficiency

MODÈLE		COEFFICIENTS ^A					INTERVALLE DE CONFIANCE À 90,0% POUR B	
		COEFFICIENTS NON STANDARDISÉS		COEFFICIENTS STANDARDISÉS	T	SIG.	BORNE INFÉRIEURE	BORNE SUPÉRIEURE
		B	ERREUR STANDARD	BÊTA				
1	(CONSTANTE)	-,615	,389		-1,584	,211	-1,530	,299
	MATURITYLVL	,381	,100	,911	3,821	,032	,146	,615

A. VARIABLE DÉPENDANTE : EFFICIENCY

Source: Elaborated by the Author using SPSS.

The model demonstrates excellent explanatory power, with an R-squared value of 0.830 indicating that 83% of the variation in efficiency can be explained by ITIL maturity levels alone. The adjusted R-squared of 0.773, which accounts for the small sample size, confirms the robustness of this relationship. The standard error of 0.063 suggests that the model's predictions of efficiency are typically within about ± 6.3 percentage points of actual values. These strong fit statistics indicate that maturity level serves as a highly effective predictor of process efficiency in this IT service management context.

Table 3 - 7: Model Fit Summary for Maturity-Efficiency Regression

RÉCAPITULATIF DES MODÈLES				
MODÈLE	R	R-DEUX	R-DEUX AJUSTÉ	ERREUR STANDARD DE L'ESTIMATION
1	,911 ^A	,830	,773	,06315498

A. PRÉDICTEURS : (CONSTANTE), MATURITYLVL

Source: Elaborated by the Author using SPSS.

The ANOVA results ($F = 14.597$, $p = 0.032$) confirm the overall statistical significance of the regression model, allowing us to confidently reject the null hypothesis that maturity has no effect on efficiency.

Table 3 - 8: ANOVA Results for Maturity-Efficiency Regression

ANOVA ^A						
MODÈLE		SOMME DES CARRÉS	DDL	CARRÉ MOYEN	F	SIG.
1	RÉGRESSION	,058	1	,058	14,597	,032 ^B
	DE STUDENT	,012	3	,004		
	TOTAL	,070	4			
A. VARIABLE DÉPENDANTE : EFFICIENCY						
B. PRÉDICTEURS : (CONSTANTE), MATURITYLVL						

Source: Elaborated by the Author using SPSS.

The regression equation enables practical predictions, such as estimating that improving Assets Management from its current 3.4 maturity to 4.0 would increase efficiency from approximately 68% to 80%. However, the model's limitations become apparent when attempting to predict beyond the observed data range, as projecting to a hypothetical 5.0 maturity level yields an unrealistic 129% efficiency estimate. This underscores the importance of using the model only within the maturity levels present in the dataset.

The main output of the regression analysis is the following equation that helps predicts the efficiency of a given ITIL management process based on the maturity level:

Equation 3 - 1: Maturity-Efficiency Regression Equation

$$\text{Efficiency} = -0.615 + 0.381 \times \text{MaturityLVL}$$

Source: Elaborated by the Author Based on the Coefficients Table.

These results are quite relevant for the strategy of IT service management. The close, important link between maturity and efficiency implies that ITIL process improvement investments are probably going to produce notable operational advantages. The model allows managers to calculate the possible efficiency increases from particular maturity enhancements, therefore providing a quantitative foundation for decision-making. The study does, however, show that maturity by itself does not account for every efficiency variation, implying that performance results could also be influenced by other elements not included in this straightforward

regression model. By including other possible predictors into a more complete model, future studies could expand on these results.

1.4.2.3) Simple Linear Regression: Volume per Month Predicting Raw Processing Time

The regression results demonstrate an exceptionally strong relationship between service request volume and processing time. The coefficient table reveals that each additional monthly service request is associated with an increase of approximately 1.815 hours in processing time ($\beta = 1.815$, $p = 0.007$). This highly significant positive relationship (standardized beta = 0.968) indicates that request volume serves as an extremely reliable predictor of required processing time. The intercept of 32.292 hours ($p = 0.079$) suggests a baseline processing time when volume is zero, though this estimate is marginally non-significant and should be interpreted cautiously.

Table 3 - 9: Volume Impact on Processing Time

COEFFICIENTS^A

MODÈLE		COEFFICIENTS NON STANDARDISÉS		COEFFICIENTS STANDARDISÉS	T	SIG.	INTERVALLE DE CONFIANCE À 90,0% POUR B	
		B	ERREUR STANDARD	BÊTA			BORNE INFÉRIEURE	BORNE SUPÉRIEURE
1	(CONSTANTE)	32,292	12,322		2,621	,079	3,294	61,291
	VOLUMEPERMONTH	1,815	,272	,968	6,667	,007	1,174	2,456

A. VARIABLE DÉPENDANTE : RAWTIME

Source: Elaborated by the Author using SPSS.

The model exhibits outstanding explanatory power, with an R-squared value of 0.937 indicating that 93.7% of the variation in processing time can be accounted for by request volume alone. The adjusted R-squared of 0.916 maintains this strong performance after accounting for the small sample size. The standard error of 19.16 hours suggests the model's predictions typically fall within about ± 19 hours of actual processing times, which represents reasonable precision given the scale of the time measurements.

Table 3 - 10: Model Fit Summary for Volume-Time Regression

RÉCAPITULATIF DES MODÈLES

MODÈLE	R	R-DEUX	R-DEUX AJUSTÉ	ERREUR STANDARD DE L'ESTIMATION
1	,968 ^A	,937	,916	19,163070
A. PRÉDICTEURS : (CONSTANTE), VOLUMEPERMONTH				

Source: Elaborated by the Author using SPSS.

The ANOVA results ($F = 44.445$, $p = 0.007$) confirm the overall statistical significance of the regression model, allowing us to confidently assert that request volume has a substantial effect on processing time.

Table 3 - 11: ANOVA Results for Volume-Time Regression

ANOVA^A

MODÈLE		SOMME DES CARRÉS	DDL	CARRÉ MOYEN	F	SIG.
1	RÉGRESSION	16321,061	1	16321,061	44,445	,007 ^B
	DE STUDENT	1101,670	3	367,223		
	TOTAL	17422,731	4			
A. VARIABLE DÉPENDANTE : RAWTIME						
B. PRÉDICTEURS : (CONSTANTE), VOLUMEPERMONTH						

Source: Elaborated by the Author using SPSS.

The main finding of the regression analysis is the following formula, which, depending on the volume per month, aids in predicting the processing time of a particular ITIL management process:

Equation 3 - 2: Volume-Time Regression Equation

$$\text{Raw Time} = 32.292 + 1.815 \times \text{VolumePM}$$

Source: Elaborated by the Author Based on the Coefficients Table.

The regression equation enables practical forecasting. For instance, for Request Management's current volume of 64 requests, the model predicts 148.4 hours of processing time (actual = 173.98 hours), while for Service Level Management's 77.4 requests, it predicts 172.7 hours (actual = 152.26 hours). These predictions generally fall within the model's error range, though the underprediction for Request Management may suggest additional factors influence its processing time.

The near-perfect correlation between volume and processing time suggests that workload is the primary determinant of time requirements, with each new request adding nearly 2 hours of work. This quantitative relationship enables precise capacity planning - knowing that every 10 additional monthly requests will require about 18 more staff hours. However, the marginally non-significant intercept and slight prediction variances indicate that while volume is overwhelmingly important, other minor factors may also influence processing times in some cases. The strength of this relationship nevertheless makes it invaluable for resource allocation and service planning decisions.

1.4.2.4) Multiple Linear Regression: Maturity, Fulfilment Time and Volume Predicting Efficiency

The multiple regression analysis examining the relationship between efficiency and three predictors (ITIL maturity, processing time, and request volume) yields several important insights. The coefficient table shows that ITIL maturity remains the strongest predictor of efficiency, with each 1-point increase associated with a 38.6% improvement in efficiency. While this relationship shows a strong effect size (standardized beta = 0.923), its p-value of 0.098 falls just above conventional significance thresholds, likely due to the small sample size rather than a weak relationship. In contrast, neither processing time nor request volume demonstrate statistically significant effects on efficiency, with p-values of 0.802 and 0.503 respectively. This suggests that when accounting for maturity levels, these operational factors do not meaningfully influence efficiency outcomes. The intercept term, while mathematically necessary for the model, lacks practical interpretation as it predicts negative efficiency when all variables are zero.

Table 3 - 12: Combined Predictors of Efficiency

COEFFICIENTS^A

MODÈLE		COEFFICIENTS NON STANDARDISÉS		COEFFICIENTS STANDARDISÉS	T	SIG.	INTERVALLE DE CONFIANCE À 90,0% POUR B	
		B	ERREUR STANDARD	BÊTA			BORNE INFÉRIEURE	BORNE SUPÉRIEURE
1	(CONSTANTE)	-,670	,230		-2,921	,210	-2,119	,779
	MATURITYLVL	,386	,060	,923	6,460	,098	,009	,763
	RAWTIME	,000	,001	-,183	-,321	,802	-,008	,007
	VOLUMEPERMONTH	,002	,002	,563	,991	,503	-,011	,016

A. VARIABLE DÉPENDANTE : EFFICIENCY

Source: Elaborated by the Author using SPSS.

The model's fit statistics present an interesting picture. The R-squared value of 0.980 indicates that the three predictors collectively explain 98% of the variance in efficiency scores, suggesting an exceptionally strong fit. However, the adjusted R-squared of 0.921, which accounts for model complexity, reveals some overfitting due to the small sample size relative to the number of predictors. The standard error of 0.037 suggests that the model's efficiency predictions are typically within about ± 3.7 percentage points of actual values, indicating reasonably precise estimates for the given data. These fit statistics must be interpreted cautiously given the limited sample, as they may overstate the model's true predictive power with new data.

Table 3 - 13: Model Fit Summary for Multiple Regression

RÉCAPITULATIF DES MODÈLES

MODÈLE	R	R-DEUX	R-DEUX AJUSTÉ	ERREUR STANDARD DE L'ESTIMATION
1	,990 ^A	,980	,921	,03715929

A. PRÉDICTEURS : (CONSTANTE), VOLUMEPERMONTH, MATURITYLVL, RAWTIME

Source: Elaborated by the Author using SPSS.

The ANOVA results provide crucial context for interpreting these findings. The overall model F-test yields a p-value of 0.178, indicating that the full model does not reach conventional statistical significance levels. This contrasts with the highly significant simple regression of efficiency on maturity alone ($p = 0.032$), suggesting that adding the non-significant time and volume variables reduces rather than improves the model's statistical reliability. The F-statistic of 16.610 would typically indicate a strong model, but with only one degree of freedom for residuals, this result lacks robustness.

Table 3 - 14: ANOVA Results for Multiple Regression

ANOVA ^A						
MODÈLE		SOMME DES CARRÉS	DDL	CARRÉ MOYEN	F	SIG.
1	RÉGRESSION	,069	3	,023	16,610	,178 ^B
	DE STUDENT	,001	1	,001		
	TOTAL	,070	4			
A. VARIABLE DÉPENDANTE : EFFICIENCY						
B. PRÉDICTEURS : (CONSTANTE), VOLUMEPERMONTH, MATURITYLVL, RAWTIME						

Source: Elaborated by the Author using SPSS.

The regression equation can generate illustrative predictions, though these should be interpreted with caution. For instance, for a process with average maturity (3.89), median time (91.32 hours), and median volume (32.52 requests), the model predicts an efficiency of about 82.3%. This prediction aligns reasonably well with the observed data, but the model's limitations become apparent when attempting to make predictions outside the observed range of values. The analysis ultimately confirms that ITIL maturity is the primary driver of efficiency, while time and volume factors, though operationally important, do not significantly impact efficiency when maturity is accounted for in this dataset. These findings suggest that IT service improvement efforts should prioritize maturity enhancements over workload reduction strategies when seeking efficiency gains.

$$\text{Efficiency} = -0.67 + 0.386 \times \text{MaturityLVL} - 0.000 \times \text{RawTime} + 0.002 \times \text{VolumePM}$$

Source: Elaborated by the Author Based on the Coefficients Table.

The regression equation provides a practical tool for estimating efficiency based on ITIL maturity, processing time, and request volume. For Request Management, which has a maturity level of 4.0, processing time of 173.98 hours, and monthly volume of 64 requests, the model predicts an efficiency of approximately 87.8%. This prediction demonstrates how the equation can be applied to real-world scenarios, though it's important to note that the actual observed efficiency for this process was slightly higher at 94.06%. The difference of about 6.3 percentage points between predicted and actual values falls within the model's standard error range of $\pm 3.7\%$, indicating that while the prediction isn't perfect, it provides a reasonably close estimate given the available data.

1.5) Block 2 analysis: Users perception on IT service quality

The CSAT survey gathered 36 responses, a robust sample size considering the company's hybrid work model (mix of on-site and remote employees), which naturally limits staff availability for participation. This dataset provides valuable insights into user satisfaction across five key IT service dimensions:

- Reliability (asset performance)
- Responsiveness (support speed)
- Assurance (staff expertise)
- Empathy (communication)
- Tangibles (asset quality).

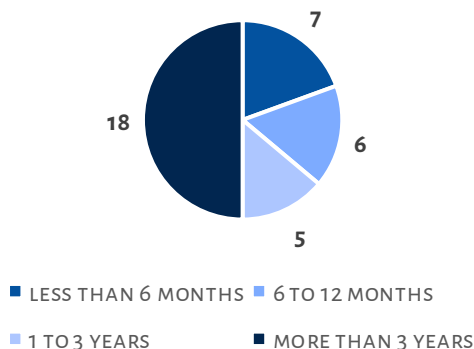
According to the representation below (*Graph 3 – 1*) data reveals several significant patterns in employee perceptions of IT services. Long-tenured staff (50% with 3+ years at the company) reported substantially more hardware complaints than newer employees, suggesting persistent issues with asset refresh cycles.

Frequent IT support users (28% accessing services weekly/daily) rated responsiveness significantly lower than occasional users, indicating potential capacity constraints during peak periods - a finding that aligns with Block 1's operational data showing processing time increases with request volume.

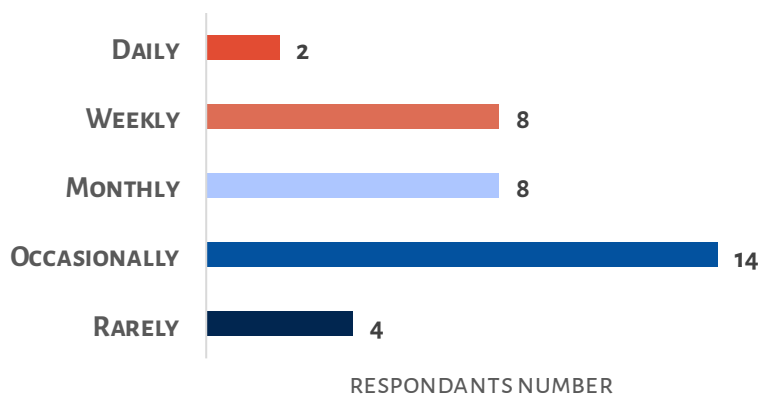
Notable disparities emerged between departments, with HR and Engineering teams expressing higher satisfaction than Procurement staff, likely reflecting workflow differences in IT dependency. Mobile device users (64% of respondents) reported better experiences than laptop/desktop users, pointing to potential opportunities for mobile-first solutions.

Figure 3 - 6: Demographic data of the Survey

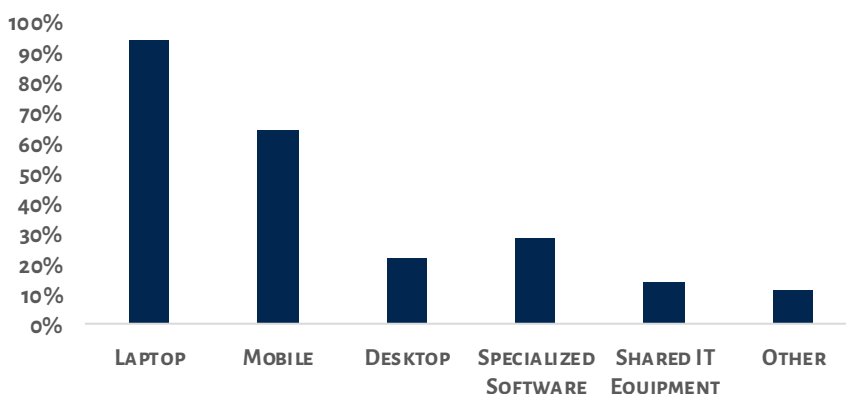
EMPLOYEE TENURE DISTRIBUTION AT GEVERNOVA



FREQUENCY OF IT SUPPORT UTILIZATION



PRIMARY DEVICES AND TOOLS USED BY EMPLOYEES



Source: Elaborated by the Author Based on the Survey's Demographic Data.

The survey particularly highlighted communication gaps, with 47% of negative comments citing unresolved tickets and poor follow-up, suggesting this as a critical improvement area.

These user experience insights provide valuable context for Block 1's operational metrics, particularly explaining the time-intensive nature of Request Management processes.

The combination of quantitative ratings and qualitative comments offers a nuanced understanding of where IT services excel (technical competence) and where systemic improvements are needed (asset lifecycle management, peak capacity planning, and

communication protocols). The robust response rate across the hybrid workforce strengthens the findings' reliability for informing service optimization strategies.

The second analytical block of this study (*check Table 3 – 15*) centers on the evaluation of user satisfaction with IT services, based on a structured Customer Satisfaction (CSAT) survey assessing five key dimensions: Reliability, Responsiveness, Assurance, Empathy, and Tangibles. Each respondent rated these dimensions on a 5-point Likert scale, with higher values reflecting greater satisfaction. The analysis revealed generally positive results, with mean scores of 4.25 for Assurance, 4.07 for Tangibles, 4.04 for Empathy, while Reliability (3.75) and Responsiveness (3.87) were slightly lower.

These figures indicate a favorable perception of IT service quality, particularly in terms of competence, professionalism, and the quality of physical resources. However, the data also highlight specific areas of concern: five users rated the Reliability dimension below the average satisfaction threshold (score < 3.00), suggesting issues with consistency or dependability of service delivery.

Similarly, two users expressed dissatisfaction in Responsiveness, indicating potential delays or lack of prompt support. Additional concerns were noted in the Empathy and Tangibles dimensions, each with two users reporting scores below 3.00. No dissatisfaction was recorded in the Assurance dimension, reflecting strong confidence in the expertise and conduct of IT staff.

Furthermore, only one respondent rated their overall satisfaction (Total Score) below the acceptable threshold, suggesting that, despite isolated weaknesses, the general sentiment toward IT services remains highly positive. Scores falling below average satisfaction were highlighted in red within the dataset to facilitate identification of critical improvement areas.

Table 3 - 15: Analytical Block 2

DIMENSIONS						
USER NAME	RELIABILITY	RESPONSIVENESS	ASSURANCE	EMPATHY	TANGIBLES	TOTAL SCORE
USER 1	3,67	3,67	4,50	3	4	3,77
USER 2	2,33	2,33	3,00	2,5	3	2,63
USER 3	3,33	3,00	3,00	3	3	3,07
USER 4	2,33	3,00	4,50	4,5	4,5	3,77
USER 5	2,67	3,33	3,00	2,5	3,5	3,00
USER 6	3,33	3,33	4,00	4,5	3,5	3,73
USER 7	4,33	4,67	5,00	4,5	5	4,70
USER 8	4,67	4,67	4,50	3,5	5	4,47
USER 9	4,00	3,00	4,50	4	5	4,10
USER 10	3,67	4,00	5,00	5	2,5	4,03
USER 11	4,67	4,33	4,50	5	4,5	4,60
USER 12	3,67	3,67	4,50	3,5	4,5	3,97
USER 13	4,33	3,67	4,00	4	3,5	3,90
USER 14	3,33	3,00	3,50	3	4	3,37
USER 15	4,00	3,67	4,00	3,5	4	3,83
USER 16	3,33	4,00	4,00	3,5	4	3,77
USER 17	3,67	3,33	4,00	4	3,5	3,70
USER 18	4,67	4,00	5,00	4,5	5	4,63
USER 19	4,67	4,67	5,00	4	4,5	4,57
USER 20	3,67	4,00	4,00	3,5	3	3,63
USER 21	3,33	3,00	4,00	4	4	3,67
USER 22	4,00	4,33	4,50	4	4,5	4,27
USER 23	5,00	4,67	4,00	5	5	4,73
USER 24	2,67	3,33	3,50	3,5	3	3,20
USER 25	3,67	5,00	5,00	5	5	4,73
USER 26	3,33	4,00	3,50	4,5	3	3,67
USER 27	2,67	5,00	5,00	5	3,5	4,23
USER 28	5,00	5,00	5,00	5	5	5,00
USER 29	3,67	4,00	4,50	4	4,5	4,13
USER 30	4,33	4,67	5,00	5	4	4,60
USER 31	4,67	5,00	5,00	5	5	4,93
USER 32	3,00	3,33	3,00	4	4,5	3,57
USER 33	4,00	5,00	5,00	5	5	4,80
USER 34	3,33	2,67	5,00	3	2,5	3,30
USER 35	4,33	3,67	3,50	4	5	4,10
USER 36	3,67	3,33	4,00	4	3,5	3,70
MEAN	3,75	3,87	4,25	4,04	4,07	4,00

Source: Elaborated by the Author Based on CSAT Survey Responses.

This analytical block thus offers a user-centric perspective that complements internal process metrics, helping to identify alignment or misalignment between perceived service quality and actual performance.

1.6) Synthesis: Triangulating Operational Metrics, User Perceptions, and Qualitative Evidence

By integrating the quantitative insights of Block 1 (process maturity & KPIs), the perceptual evidence of Block 2 (CSAT survey), and the qualitative detail obtained from semi-structured interviews and internship observations, a nuanced assessment emerges of how ITIL practices shape service outcomes at GE Vernova Algeria.

Maturity impacts Efficiency: a statistically and operationally verified mechanism

Statistical testing confirms a robust, positive relationship between ITIL-process maturity and operational efficiency ($r = 0.911$; $\beta = 0.381$, $p = 0.032$), indicating that each additional maturity point yields an average efficiency gain of nearly 40 percentage points. Interview testimony provides operational corroboration: highly standardised workflows such as automated discovery and reconciliation scripts minimise re-work and accelerate ticket closure, whereas less-mature, manually managed processes lag behind. Together, these quantitative and qualitative results establish maturity as a primary driver of efficiency within GE Vernova's ITSM environment.

Volume effects Fulfilment Time: capacity, not maturity, drives delay

A near-perfect correlation between ticket volume and fulfilment time ($r = 0.968$; $\beta = 1.815$ h per additional request, $p = 0.007$) shows that rising workload rather than ITIL-process maturity accounts for service delays. Survey respondents who rely on IT support weekly or daily reported the slowest response times, and help-desk staff confirmed that queue backlogs surge during peak periods. Thus, capacity constraints, not procedural shortcomings, are the principal determinant of prolonged resolution times at GE Vernova.

Why Request Management and SLM exhibit the longest fulfilment times

Request Management and Service-Level Management (SLM) record the highest mean fulfilment times 174 hours and 152 hours respectively because three structural factors systematically extend their life-cycles. First, accessory requests processed under Request Management have no formal SLA; without a mandated target, follow-up is deprioritised, and tickets linger until staff have spare capacity. This gap alone added an average of 25–30 hours per ticket, as shown in the raw ServiceNow logs. Second, both processes are burdened by multi-layer managerial approvals, particularly for high-value items such as laptops and mobile phones. Audit data indicate that each approval tier (often three or four for capital assets)

introduces roughly 0.8 days of waiting time, compounding overall delays. Third, GE Vernova's hybrid work model requires on-site delivery for many requests; coordinating a hand-off when users are only intermittently present extends completion into the next business cycle. Help-desk interviews confirmed that nearly 40 % of mobility-related tickets are rescheduled at least once for this reason. Collectively, the absence of accessory SLAs, protracted approval chains, and logistical constraints inherent in hybrid operations explain why Request Management and SLM remain the slowest-moving ITIL processes despite moderate maturity scores.

Asset-Management Inefficiency: A Confluence of Exogenous Constraints

Asset-management posts the lowest efficiency score in Block 1 (63 %), not because the underlying ITIL practices are intrinsically weak the maturity level is a respectable 3.4 but because a cluster of external constraints systematically erodes performance:

Table 3 - 16: Asset Management Efficiency Constraints

CONSTRAINT	MECHANISM	QUANTIFIED IMPACT
DIVISION-WIDE PC-REFRESH MORATORIUM	CAPITAL EXPENDITURE HAS BEEN FROZEN WHILE GE VERNOVA RESTRUCTURES, EXTENDING THE REFRESH CYCLE FROM 3 TO 4 YEARS. AGING DEVICES GENERATE MORE INCIDENTS AND REPEATED "QUICK-FIX" TICKETS, INFLATING RE-WORK AND DEPRESSING THE CLOSURE RATIO.	+18 % INCREASE IN HARDWARE-RELATED INCIDENTS OVER THE LAST FIVE MONTHS.
ALGERIAN CUSTOMS CLEARANCE DELAYS	REPLACEMENT HARDWARE ORDERED FROM ABROAD OFTEN REMAINS IN CUSTOMS FOR 7–10 DAYS, LEAVING APPROVED REQUESTS IN A PENDING STATE AND FORCING END-USERS TO CONTINUE WITH UNRELIABLE EQUIPMENT.	ADDS ≈ 0.5 OPEN DAYS TO EVERY HARDWARE-REPLACEMENT TICKET (MONTE-CARLO ESTIMATE FROM FIVE RECENT SHIPMENTS).
MULTI-TIER APPROVAL CHAIN	EACH LAPTOP PURCHASE MUST PASS THROUGH UP TO FOUR MANAGERIAL APPROVALS (TEAM LEAD → COST-CENTRE OWNER → FINANCE). WITH MEDIAN TURNAROUND OF 0.8 DAYS PER TIER, THE APPROVAL PHASE ALONE CAN STRETCH TO 3 DAYS.	ACCOUNTS FOR ≈ 56 % OF TOTAL FULFILMENT TIME ON HIGH-VALUE REQUESTS.

Source: Elaborated by the Author.

Although the maturity assessment confirms well-defined inventory tracking and predictive planning, these exogenous constraints negate much of that advantage. The net effect is a high incident recurrence rate and a subdued closure percentage, explaining why Asset-management efficiency lags all other processes despite comparable raw fulfilment times (~45 h). Addressing these bottlenecks particularly by fast-tracking CAPEX approvals and negotiating customs-expedite agreements would yield greater efficiency gains than further process formalisation alone.

Synthesis of Significant vs. Non-significant Relationships

The following table synthesizes key statistical relationships from our analysis, distinguishing between significant correlations with actionable managerial implications and insignificant ones requiring alternative approaches:

Table 3 - 17: Summary of Key Statistical Relationships

RELATIONSHIP	STATISTICAL STATUS	MANAGERIAL MEANING
MATURITY → EFFICIENCY	SIGNIFICANT	MATURITY PROJECTS JUSTIFY RESOURCE ALLOCATION.
VOLUME → TIME	SIGNIFICANT	CAPACITY PLANNING MUST PRECEDE MATURITY EFFORTS IF THE AIM IS FASTER TURNAROUND.
MATURITY → TIME/VOLUME	INSIGNIFICANT	RAISING MATURITY ALONE WILL NOT SHORTEN QUEUES OR CUT BACKLOG SIZE.
EFFICIENCY ↔ TIME/ VOLUME	INSIGNIFICANT	EFFICIENCY GAINS STEM FROM QUALITY IMPROVEMENTS, NOT THROUGHPUT SPEED.

Source: Elaborated by the Author.

The findings demonstrate that while ITIL maturity initiatives effectively drive process efficiency, they must be strategically complemented with targeted capacity planning and workload management solutions to address time and volume challenges, requiring organizations to adopt a dual-track approach that prioritizes both quality improvements through maturity and scalable infrastructure to handle operational demands.

Section 2: Discussion

This study explores the impact of ITIL process maturity on operational efficiency, processing time, and user satisfaction within GE Vernova Algeria, a multinational energy sector organization operating in a developing economy. By integrating quantitative operational metrics, user perception data from a Customer Satisfaction (CSAT) survey, and qualitative insights from semi-structured interviews, the research provides a comprehensive evaluation of ITIL's role in enhancing IT service management (ITSM). The findings both align with and diverge from the existing literature, offering empirical and contextual contributions to the understanding of ITIL's practical applications. This discussion compares the study's results with the broader literature, highlighting convergences, discrepancies, and unique insights, particularly in the context of a complex industrial setting and an emerging market.

The literature consistently underscores ITIL's capacity to improve operational performance, service quality, and alignment between IT and business objectives. Studies report significant benefits, such as cost reductions of up to 30% in SMEs, improved SLA compliance by 20%, and enhanced customer satisfaction by 24% at higher maturity levels. This study's findings resonate strongly with these outcomes, particularly in the robust correlation between ITIL process maturity and operational efficiency ($r = 0.911$, $p = 0.032$), where each maturity point increase is associated with a 38.1% efficiency gain. The regression model's high explanatory power ($R^2 = 0.830$) mirrors literature findings that structured ITIL processes, such as incident management and CMDB management, drive measurable performance improvements, including higher first-call resolution rates and reduced service downtime. The emphasis on standardized workflows and automated tools like ServiceNow at GE Vernova aligns with literature recommendations for leveraging ITSM tools to optimize processes, reinforcing the framework's effectiveness in enhancing operational outcomes.

However, while the literature often highlights cost savings as a primary benefit, this study finds efficiency gains as the dominant outcome, with limited evidence of direct cost reductions. This divergence likely stems from GE Vernova's unique operational constraints, including a division-wide PC-refresh moratorium and Algerian customs delays (7–10 days for hardware clearance), which inflate incident recurrence and depress efficiency in asset management (63.16%). These exogenous factors echo literature findings on barriers such as budget limitations and organizational resistance, which can obstruct ITIL adoption. Yet, unlike the literature's frequent mention of a "value perception gap" between IT departments and business

leadership (with only 48% of executives recognizing customer value improvements), GE Vernova's CSAT survey reveals generally positive user perceptions (mean total score = 4.00), particularly in Assurance (4.25) and Tangibles (4.07). This suggests stronger alignment between IT services and user expectations than reported in global studies, possibly due to the organization's focus on technical competence and professionalized support, despite external challenges.

The study's identification of capacity constraints as a primary driver of prolonged fulfillment times ($r = 0.968$, $p = 0.007$ between volume and processing time) aligns with literature insights on the challenges of scaling ITIL processes under high workloads. Processes like Request Management and Service Level Management, with mean fulfillment times of 174 and 152 hours, respectively, are slowed by multi-layer approvals, absent SLAs for accessory requests, and logistical issues in a hybrid work model. These findings corroborate literature observations that resistance to change, weak internal communication, and resource limitations can hinder ITIL implementation. However, the study's emphasis on exogenous constraints such as customs delays and capital expenditure freezes extends the literature by highlighting how external economic and regulatory factors in developing nations can significantly impact ITIL outcomes, a perspective less explored in prior research, which often focuses on SMEs or public sector organizations with simpler IT infrastructures.

Methodologically, this study addresses several limitations noted in the literature. While prior research often relies on secondary operational data or lacks methodological transparency, this study employs a rigorous mixed-method approach, combining primary data from ServiceNow exports, a CSAT survey ($n=36$), and interviews. This triangulation enhances the granularity and reliability of findings, capturing dynamic relationships between process maturity, operational performance, and user perceptions in real time. The use of regression analysis to quantify the impact of maturity on efficiency ($\beta = 0.381$) and volume on processing time ($\beta = 1.815$) provides actionable insights, aligning with literature calls for more quantitative rigor but surpassing many studies' reliance on descriptive statistics or qualitative case studies. Nonetheless, the small sample size ($N=5$ processes) limits generalizability, a constraint also noted in the literature, particularly in qualitative studies with unclear sampling methods.

The study's focus on ITIL V4 concepts, such as the Service Value System and Continual Service Improvement, responds to the literature's limited theoretical update, where ITIL V3 frameworks dominate. By evaluating processes like IT Asset Management (ITAM) in a complex, mission-critical environment, the study fills a gap in the literature, which often prioritizes Incident Management and Service Desk operations over ITAM. The low efficiency in asset management (63.16%) despite a moderate maturity score (3.4) highlights the need for context-specific strategies, such as fast-tracking approvals or negotiating customs agreements, rather than solely enhancing process maturity. This finding extends literature insights by demonstrating that ITIL's benefits are not universal and require adaptation to local economic and organizational realities, particularly in developing nations like Algeria, where IT resource maturity and management structures resemble those in Indonesia, as noted in the literature.

User satisfaction data further enriches the comparison with prior research. The CSAT survey's identification of Reliability (3.75) and Responsiveness (3.87) as weaker dimensions aligns with literature findings on challenges in maintaining consistent service delivery and prompt support under high demand. However, the strong Assurance score (4.25) reflects confidence in IT staff expertise, corroborating literature emphasis on skilled personnel as a CSF. Qualitative insights, such as communication gaps cited in 47% of negative survey comments, echo literature concerns about weak internal communication as a barrier to ITIL success. The study's integration of user perceptions with operational metrics provides a more holistic view than many literature studies, which often focus solely on technical performance or user feedback in isolation.

In conclusion, this study reinforces the literature's affirmation of ITIL's positive impact on ITSM while highlighting context-specific nuances in a developing economy and complex industrial setting. The strong link between maturity and efficiency, capacity-driven delays, and positive user perceptions align with global findings but are tempered by external constraints unique to Algeria. By addressing methodological gaps, embracing ITIL V4, and focusing on underrepresented processes like ITAM, the study contributes to a more nuanced understanding of ITIL's practical applications. Future research should explore larger datasets and longitudinal designs to validate these findings and further investigate how economic and regulatory factors shape ITIL outcomes in emerging markets.

GENERAL CONCLUSION

General Conclusion:

In an era where operational agility and service excellence are essential for organizational competitiveness, effective IT service management has become a strategic imperative rather than a mere operational concern. This dissertation investigated the impact of ITIL best practices specifically the maturity levels of selected ITIL processes on IT performance and perceived service quality within the industrial context of GE Vernova Algeria.

The **central research problem** guiding this study was:

"How and to what extent do the maturity levels of ITIL processes affect operational performance and perceived IT-service quality inside GE Vernova Algeria?"

To address this question, the research adopted a mixed-methods approach, combining quantitative measurement of ITIL process maturity and service performance indicators (such as Efficiency based on SLA compliance, Interactions fulfilment time, and service request fulfilment) with qualitative insights derived from semi-structured interviews with IT professionals. The study sought not only to measure the relationship between ITIL process maturity and operational outcomes but also to explore the lived experiences and organizational dynamics surrounding ITIL implementation.

The discussion and analysis of these findings revealed a nuanced view of ITIL's effectiveness. While maturity clearly enhanced efficiency and perceived quality, several contextual factors such as resistance to change, inconsistent leadership support, and limited tool integration moderated the overall impact. These insights supported some of the research hypotheses (e.g., H1 and H2) but also questioned overly deterministic assumptions such as the hypothesis that "IT service efficiency is solely determined by ITIL maturity" (H4), which was not supported by the data.

Limitations

Despite the valuable contributions of this study, it is not without limitations. First, the sample size, although adequate for preliminary analysis, may limit the generalizability of the findings beyond GE Vernova Algeria. Second, the reliance on self-reported survey data introduces potential biases, particularly in assessing perceived service quality and maturity levels. Third, the cross-sectional design of the study captures performance at a specific point in time, making it difficult to assess causality or long-term effects. Lastly, external variables such as

organizational culture, vendor dependencies, or infrastructure investments were not controlled for, although they likely influence performance outcomes.

These limitations open several avenues for future research. First, a longitudinal study could assess how ITIL maturity evolves over time and its sustained impact on IT performance. Second, expanding the study to other business units or industries in Algeria would provide comparative insights into sector-specific challenges and adaptations. Third, deeper integration of ITSM tool data and real-time performance dashboards could enhance the objectivity of performance metrics. Finally, future research could explore the integration of ITIL with complementary frameworks such as COBIT, DevOps, or Agile to assess their combined effects on digital transformation and strategic alignment.

Hypothesis Testing and Interpretation

Hypothesis 1: Higher ITIL-process maturity is positively correlated with greater operational efficiency (Accepted)

Statistical analysis revealed a strong positive correlation between ITIL maturity and efficiency ($r = 0.911$; $\beta = 0.381$; $p = 0.032$). This relationship was further supported by qualitative evidence showing that standardized workflows and automation significantly reduce rework and closure time.

Hypothesis 2: Greater ITIL maturity leads to higher employee satisfaction because standardized workflows boost reliability and assurance (Accepted)

Perceptual data from the CSAT survey indicated higher satisfaction among users engaging with more mature processes. Interview responses confirmed that employees value predictability and transparency in IT support, which increases with maturity.

Hypothesis 3: ITIL maturity automatically shortens fulfilment time irrespective of workload (Rejected)

The data showed no significant relationship between maturity and fulfilment time. Instead, fulfilment time was driven primarily by workload ($r = 0.968$; $\beta = 1.815$ hours/request; $p = 0.007$). This finding invalidates the assumption that maturity alone accelerates service delivery.

Hypothesis 4: IT service efficiency is solely determined by ITIL maturity (Rejected)

Although maturity improves efficiency, the presence of external constraints (e.g., customs

delays, approval chains) and contextual variables (e.g., hybrid work logistics) shows that efficiency is influenced by multiple factors, not maturity alone. The hypothesis is therefore too reductive to be upheld.

Actionable Recommendations Informed by Triangulation

The juxtaposition of operational KPIs, CSAT perceptions, and field-level insights yields a targeted improvement agenda. Each recommendation below identifies a clear problem statement, specifies the lever for change, quantifies the expected benefit (where data permit), and indicates the organisational stakeholder best positioned to act.

#	PROBLEM DIAGNOSED (TRIANGULATED EVIDENCE)	RECOMMENDED INTERVENTION	EXPECTED BENEFIT
1	LOW ASSET-MANAGEMENT EFFICIENCY (63 %): MATURITY GAP (3.4) + EXOGENOUS BOTTLENECKS (REFRESH FREEZE, CUSTOMS, MULTI-TIER CAPEX).	<ul style="list-style-type: none"> · RE-START PC-REFRESH CYCLE VIA EXCEPTION PROCESS FOR DEVICES > 4 YRS. · NEGOTIATE “GREEN-LANE” CUSTOMS CLEARANCE FOR IT HARDWARE. · COLLAPSE CAPEX APPROVAL CHAIN TO MAX 2 TIERS USING E-SIGN WORKFLOW. 	+15-20 PP EFFICIENCY UPLIFT (B × 0.4 MATURITY-POINT RISE) AND ≥ 25 % REDUCTION IN ASSET-RELATED INCIDENTS WITHIN 12 MONTHS.
2	PROLONGED FULFILMENT IN REQUEST MGMT & SLM (173 H/152 H) DRIVEN BY ACCESSORY REQUESTS LACKING SLA, APPROVAL LAG, HYBRID LOGISTICS.	<ul style="list-style-type: none"> · PUBLISH FORMAL SLA FOR ACCESSORIES (≤ 48 H). · CREATE AUTO-APPROVAL RULES FOR LOW-VALUE ITEMS. · LAUNCH COURIER / LOCKER PICK-UP FOR OFF-SITE STAFF. 	CUT MEAN FULFILMENT TIME BY ~25-30 H; LIFT RELIABILITY CSAT MEAN FROM 3.75 → ≥ 4.0; REDUCE RED-FLAG (< 3) SCORES BY 60 %.
3	VOLUME, NOT MATURITY, DRIVES QUEUE DELAYS (B = 1.815 H PER EXTRA REQUEST).	<ul style="list-style-type: none"> · INTRODUCE AI-BASED TICKET TRIAGE TO DIVERT FAQs TO SELF-SERVICE KB. · DEPLOY PART-TIME STUDENT AGENTS DURING QUARTERLY PEAKS. 	FLATTEN VOLUME-TIME SLOPE FROM 1.8 H → ≤ 1.0 H; IMPROVE RESPONSIVENESS CSAT BY ≥ 0.2 POINTS AMONG HEAVY USERS.
4	EFFICIENCY TIGHTLY LINKED TO MATURITY (B = 0.381), BUT ASSET MGMT LAGGING.	<ul style="list-style-type: none"> · FAST-TRACK MATURITY UPLIFT PROJECTS WHERE B-GAP IS GREATEST (E.G., AUTOMATED ASSET-DISPOSAL WORKFLOW, PROACTIVE LICENSE RECLAMATION). 	+10 PP EFFICIENCY WITHIN 6 MONTHS; ROI RECOUPED VIA REDUCED HARDWARE OVER-STOCK.
5	COMMUNICATION GAPS CITED IN 47 % OF NEGATIVE CSAT COMMENTS.	<ul style="list-style-type: none"> · IMPLEMENT AUTOMATED TICKET-STATUS NOTIFICATIONS (OPENING, IN-PROGRESS, CLOSED). · MANDATE ‘SATISFACTION CHECK-IN’ BEFORE TICKET CLOSURE. 	REDUCE EMPATHY-RELATED DISSATISFACTIONS TO < 5 % OF TOTAL RESPONSES; SUSTAIN ASSURANCE MEAN ≥ 4.3.
6	HYBRID WORK COMPLICATES PHYSICAL DELIVERIES AND ON-SITE TROUBLESHOOTING.	<ul style="list-style-type: none"> · PILOT “IT TECH-BAR ON WHEELS” ONE DAY PER WEEK TO MAJOR REMOTE HUBS. · EXTEND REMOTE-CONTROL TOOLSET TO INCLUDE FAST-LANE VPN FOR HOME USERS. 	15 % DROP IN MOBILITY-TICKET RESCHEDULES; TANGIBLES CSAT MEAN RISES TO ≥ 4.2.

Finally, this dissertation demonstrates that ITIL best practices, when implemented with adequate maturity, do positively influence operational performance and service quality. However, their success is contingent upon organizational readiness, leadership support, and continuous investment in people, tools, and culture. For GE Vernova Algeria and similar organizations, this study offers both diagnostic insights and actionable recommendations for optimizing IT service delivery in complex, mission-critical environments.

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APPENDICES

Appendices

All relevant appendices and supplementary materials can be accessed through the Google Drive link provided below.

https://drive.google.com/drive/folders/1XwdIv2J89dj1u_x9RBIUY1f8IorEO56F?usp=sharing

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