CHALLENGES IN SERVICE CATALOG MANAGEMENT

AND

RECOMMENDATIONS FOR HIGHER SUCCESS

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2022

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RECOMMENDATIONS FOR HIGHER SUCCESS

Thesis submitted to the

Institute for Graduate Studies in Social Sciences

in partial fulfillment of the requirements for the degree of

Master of Arts

in

Business Information System

by

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Boğaziçi University

2022

DECLARATION OF ORIGINALITY

I, Efsun Bal, certify that

- I am the sole author of this thesis and that I have fully acknowledged and documented in my thesis all sources of ideas and words, including digital resources, which have been produced or published by another person or institution;
- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;
- this is a true copy of the thesis approved by my advisor and thesis committee at Boğaziçi University, including final revisions required by them.

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ABSTRACT

Challenges in Service Catalog Management and

Recommendations for Higher Success

The service catalog is a priceless resource, providing a single point of access to all of the services that the company provides to external and internal clients through IT and other departments. It delivers several benefits when it works effectively and is structured holistically, including clarity in pricing the services given, cost reduction, operational efficiency, successful service level management, and increased customer satisfaction. Furthermore, because it is linked to so many other processes, unsuccessful applications here have a detrimental impact on many other operations. Despite all its criticality and usefulness, many companies fail to build the service catalog structure successfully. This research aims to identify the challenges companies face while trying to implement and manage service catalogs and, based on their criticality, share some recommendations for better adoption. The stages of service catalog process implementation are grouped under four categories for service identification, service catalog implementation, maintenance, and adoption. Based on the data collected from 98 respondents, the critical challenges in providing higher success in IT service catalog management are identified and recommendations are given for higher success. Accordingly, keeping service catalog up-to-date, identifying the services and service relations, and creating ownership and adoption have been identified as the top three most important challenges for successful service catalog management. Companies that have strategic plan, assign service catalog manager and implement best practices have higher success in SCM.

ÖZET

Servis Katalog Yönetiminde Karşılaşılan Zorluklar ve Başarılı Uygulama için Öneriler

Hizmet kataloğu, şirketin BT ve diğer departmanlar tarafından iç ve dış müşterilere sağladığı tüm hizmetlere tek noktadan erişim sağlayan paha biçilmez bir kaynaktır. Etkin bir şekilde çalıştığında ve bütünsel olarak yapılandırıldığında, verilen hizmetlerin fiyatlandırılmasında netlik, maliyet düşürme, operasyonel verimlilik, başarılı hizmet düzeyi yönetimi ve artan müşteri memnuniyeti dahil olmak üzere çeşitli faydalar sağlar. Tüm bunlara ek, diğer pek çok süreçle bağlantılı olduğu için, buradaki başarısız uygulamalar, diğer birçok süreci de olumsuz etkilemektedir. Tüm kritikliğine ve faydasına rağmen, birçok şirket hizmet kataloğu yapısını başarılı bir şekilde oluşturamıyor. Bu araştırma, şirketlerin hizmet kataloğu yönetimi sürecini uygulamaya çalışırken karşılaştıkları zorlukları belirlemeyi ve bu zorlukların kritikliklerini göz önüne alarak daha iyi benimseme için neler yapılabileceğine yönelik önerileri paylaşmayı amaçlamaktadır. Servis katalog yöknetim sürecini uygulama aşamaları dört kategori altında toplanmıştır; hizmet tanımlama, hizmet kataloğu uygulaması, benimseme ve bakım. 98 katılımcıdan toplanan verilere göre, BT servis kataloğu yönetiminde karşılaşılan zorluklar belirlenmiş ve başarılı yönetim için önerilerde bulunulmuştur. Araştırma sonuçlarına göre servis katalopu güncel tutmak, servislerin ve servis ilişkilerinin tanımlanması ve şirket içinde servis kataloğu sahiplendirmek en önemli üç zorluk olarak belirlenmiştir. Strtaejik planlama yapan, kataloğu yönetmek için servis katalog yöneticisi atayan ve şirket içinde iyi pratikleri implemente eden şirketler bu zorlukları aşmada ve servis katalog yönetiminde daha başarılı bulunmuştur.

ACKNOWLEDGEMENTS

First and foremost, I'd want to express my gratitude to Prof. Aslı Sencer, my thesis advisor. I always felt her support and guidance throughout this process. She pointed me in the proper direction when I needed it and supported me with her wise words and unwavering encouragement.

I would also like to thank Prof. Bilgin Metin and Assoc. Prof. Mehmet Nafız Aydın for taking part in my thesis committee and for their valuable comments.

Additionally, I would like to thank Yalçın Gerek, Ali Durul and all the experts who were involved in the interviews and the validation of the survey for this research.

Finally, I want to express my sincere gratitude to my parents and my sister for their constant encouragement and support throughout my academic career and while writing this thesis.

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ABBREVIATIONS

AI: Artificial Intelligence

BIA: Business Impact Analysis

BRM: Business Relationship Manager

C: Challenge

CG: Challenge Group

CDPSE: Certified Data Privacy Solutions Engineer

CGEIT: Certified in the Governance of Enterprise IT

CI: Configuration Item

CISA: Certified Information Systems Auditor

CMMI: Capability Maturity Model Integration

CMS: Configuration Management System

COBIT: Control Objectives for Information and Related Technologies

CRISC: Certified in Risk and Information Systems Control

DASA: Devops Agile Skills Association

DB: Database

DevOps: Development and IT Operations

ERP: Enterprise Resource Planning

GRC: Governance, Risk and Compliance

IIBA: International Institute of Business Analysis

ISO: International Organization for Standardization

IT: Information Technology

ITIL: Information Technology Infrastructure Library

ITSC: Information Technology Service Catalog

ITSM: Information Technology Service Management

MC: Main Challenge

PMI: Project Management Institute

PSM: Professional Scrum Master

PSPO: Professional Scrum Product Owner

RFC: Request for Change

SC: Service Catalog

SCM: Service Catalog Management

SCMngr: Service Catalog Manager

SKMS: Service Knowledge Management System

SLA: Service Level Aggreement

SLM: Service Level Manager

SME: Subject Matter Expert

TOGAF: The Open Group Architecture Framework

CHAPTER 1

INTRODUCTION

The management concept has a long history dating back to the Sumerians. There were a lot of things happening that depended on trust and decency. If a service or a product did not meet expectations, there may not have been written contracts, broken or legal issues raised, but there were still unsatisfied customers. Since then, everything has evolved, but some expectations from services and management have stayed the same: innovation, quality, and customer satisfaction (Bright et al., 2019).

Managing information technology (IT) services was not a focus until the 1980s. IT organizations had not yet positioned themselves as service providers. Instead of focusing on customer needs or requirements, they were mostly focused on software, hardware, and technologies. The term IT service management (ITSM) got popular with the release of the Information Technology Infrastructure Library (ITIL). ITIL is a set of best practices for IT service management and provides a thorough explanation of IT service management processes, including purposes, activities, inputs, outputs, and roles that can be customized for any IT business (Nabiollahi, Alias & Sahibuddin, 2011) (Arcilla, Calvo-Manzano & San Feliu, 2013). To be able to manage IT services, first it is necessary to define these IT services. In many cases this becomes a challenge since companies are not very successful in distinguishing the difference between service and the elements that provide it and a coherent definition of an IT service does not exist. At this point ITIL is appears as the one that is the most extensively utilized approach to ITSM; indeed it has become a de facto standard (Mendes & da Silva, 2010). ITIL defines service as "a means of delivering value to customers by facilitating the outcomes that customers want to

achieve without the ownership of specific costs and risks." (Hunnebeck, 2013). However, even with that definition, each organization should have a policy outlining what a service is and how it should be defined and agreed upon. Frequently, a smart beginning step is to inquire about the IT services that clients use and how those services relate to and support their business operations. Customers frequently have a more precise understanding of what they think a service should be (Hunnebeck, 2013). Defining a service is like labeling commodities or products at a store. A product label contains a concise description of the item to which it refers. Prospective purchasers can use this information, along with the price, to make an informed purchasing decision. Product labeling is done for the safety and benefit of both buyers and sellers. Service definitions also serve the same purpose (Mendes & da Silva, 2010).

The COVID-19 pandemic had a huge effect on speeding up the digital transformation. The new business conditions have created new challenges and needs that have increased the demand for IT service providers. Finding service providers who can support the business in a more online world while also providing a cost advantage to manage the pandemic's new needs and ambiguity became crucial. 92% of the executives that took part in a survey about digital transformation say that improving operational efficiency is their greatest priority (IBM: Digital Transformation in Manufacturing 2021 | Manufacturing Digital). One of the main benefits of service catalog management (SCM) is to support operational efficiency for both service providers and customers (Hunnebeck, 2013). Companies that provide IT services are always required to justify and assess their services from a cost-benefit standpoint, and this is even more important in the pandemic business world (Salle, 2004, Sauve et al., 2006). SCs can help to provide a service-based cost

profit mechanism that allows companies to make better financial forecasts and business decisions and also collect indications of consumption and process efficiency (Mendes & da Silva, 2010). Because of the trend changes, managing the quality of the services and the cost profit mechanism for the service providers has become more important than ever for better service and customer retention.

Figure 1 shows that the average rate of global digital adoption increased significantly during COVID-19 period. There are several other studies that support this acceleration. 85% of executives say that their businesses have somewhat or greatly accelerated the implementation of technologies that digitally enable employee interaction and collaboration—in a matter of weeks vs. months or even years (The Postpandemic Workforce: Responses to a McKinsey Global Survey of 800 Executives | McKinsey, 2020). 97% of global IT directors say that their companies went through digital transformation due to COVID-19, with 3 out of 5 stating they saw a "large amount of change" (Digital Transformation Investment: Software AG in 2021). 89% of companies say the pandemic has shown a need for more agile and scalable IT in order to allow for contingencies. (Dell Technologies Digital Transformation Index in 2020). 67% of manufacturing decision makers say their adoption of digital technologies has been accelerated due to the coronavirus pandemic (IBM: Digital Transformation in Manufacturing 2021 | Manufacturing Digital). COVID-19 accelerated the digitalization of customer interactions by three years in North America only. (How COVID-19 Has Pushed Companies over the Technology Tipping Point and Transformed Business Forever | McKinsey). COVID-19 moved social and collaboration tools from the ‘nice-to-have’ column to the ‘must-have’ column as seen by the projected 14% increase in revenue in these areas by

2022 (Gartner Forecasts Worldwide Social Software and Collaboration Market to Grow 17% in 2021).

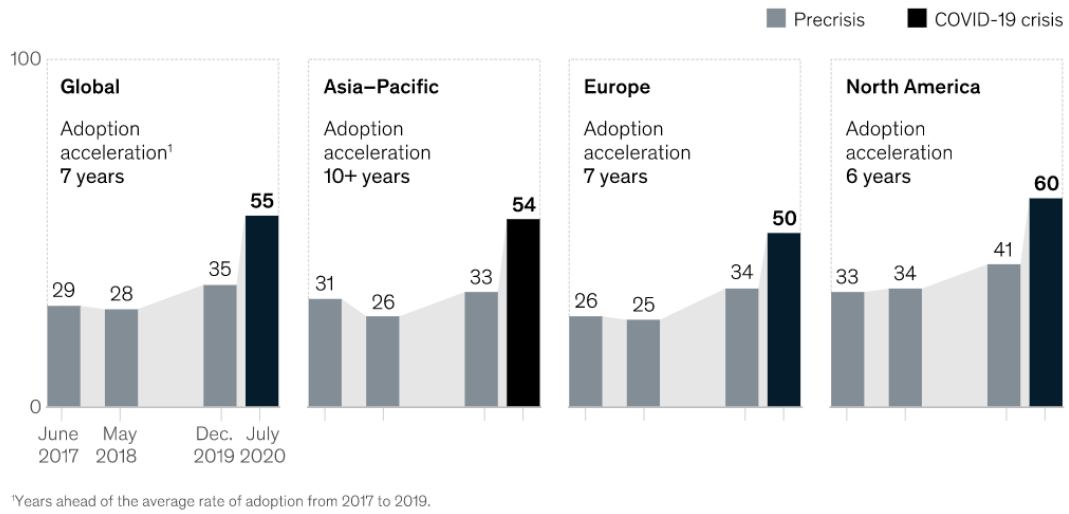


Figure 1. Average share of products and/or services that are partially or fully digitized, %
Source: McKinsey, October 2020

KPMG Global Head of Advisory, Carande, emphasizes the importance of developing a connected ecosystem of front-end and back-office technologies, which has historically been a challenge for many organizations (Digital Acceleration, 2020). The SC and related processes to manage the SC are designed and targeted to solve that challenge and create a linked ecosystem for front-end and back-office technologies and services. A SC is a database (DB) or structured document that contains information about all active IT services, including those that are ready for deployment. The SC is the only component of the service portfolio that is made available to clients, and it is used to assist in the sale and delivery of IT services (Hunnebeck, 2013). The SC is a key IT tool that includes the services themselves and also many key pieces of information related to services, such as pricing, chargebacks, availability, default capabilities, metrics, and service level agreements

(SLA). SCs enable the coordination and orchestration of IT self-service tools and conversational artificial intelligence (AI) solutions (Shetty and Andes, 2004). In a nutshell, SC indicates the value it adds to corporate processes and operations.

Due to all its importance and benefits, the implementation of the SC is still low. In a survey of over 100 businesses that attempted to adopt a SC, only 57% indicated success, while 12% reported outright failure. Additionally, 34% of those firms cited service definition as one of the "biggest risks" to successfully implementing a catalog (Cole, 2008). The goal of this study is to identify the problems that IT service providers face in various sectors while they manage their services and to make suggestions for higher success with SCM in the company.

With these motivations in this study, we aim to explore the challenges that organizations encounter while managing their SCs and identify correlations that lead to higher success. The organization of the thesis study is as follows: In Chapter 2, we provide a literature survey on SCM and identify challenges and factors that may affect its success. In Chapter 3, methodology and research design are explained. Chapter 4 includes the data preprocessing, reliability and validity tests along with the calculation of SCM success scores. In Chapter 5, we analyze the data we collected, test the related hypotheses and share the results. Chapter 6 is the final chapter that concludes this study.

CHAPTER 2

LITERATURE REVIEW

In this section, the academic literature and widely accepted best practices are used to explore and analyze the service, IT service, SC, the value of the SCM process, and challenges encountered. In the first section, definitions and important aspects of service and IT service are explained. The following sections outline the literature on the SC and explains why having and managing a SC is important. The last section explains the challenges that have been mentioned in best practices, academic literature or subject matter expert (SME) interviews.

2.1 IT Service and service types

The origins of the term "service" may be traced back to the 12th century, when it referred to a public worship celebration. In 1926, the definition of service changed to providing service, which meant performing work, and today's dictionaries describe it as useful labor that does not create a physical commodity. The primary distinction between a product and a service is based on tangible and intangible outcomes. As previously stated, the definition of service according to ITIL v3 is "a means of delivering value to customers by facilitating outcomes customers want to achieve without ownership of specific costs and risks." In addition, services are described in the preface of the ITIL v3 Service Design book as assets that give value to the company, its customers, and its assets because they are used in its business processes. The value that can be gained from service delivery and operation is determined by how well services are structured with the needs and assets of the consumers in mind. In the absence of service design, services would grow at random,

with little regard for the company's needs in the broader picture. This concept has not changed much in ITIL v4, which was released as an extension of v3. The definition in v4 is "a means of enabling value co-creation by facilitating outcomes that customers want to achieve, without the customer having to manage specific costs and risks." The fundamental components of both definitions are the same: customers, value, and outcome.

Probst (2013) shares some detailed definitions related to customers, value, and outcome. According to Probst, a customer is any recipient of a service whose value is generated, increased, or supported by the entity. When considering the IT services and IT environment, the client may be within the IT department, such as a DB team providing DB service to the engineers for development, or it may be within the company, using the HR solution developed by the internal engineering team, or it might be the company's customer who pays externally for the company's services. An external customer is an individual or business outside of the organization that purchases the goods or services, whereas an internal customer is an individual or team within the organization that uses the service provided. Value implies that a service gives a valuable benefit to the consumer for which they are willing to pay. The customer determines the value. In the discipline of service management, the focus is on the customers and what they think are vital or beneficial, depending on the services that IT can supply them. Business goals and objectives are established by organizations and organizational units. If IT can deliver or support an organizational result (through a service), functions or units will be able to accomplish their operational, tactical, or strategic objectives, which is a highly advantageous development. The consumer would view this as valuable and would be willing to pay for this service.

According to ITIL, an IT service is a service supplied by an IT service provider. An IT service is composed of IT, people, and procedures. Macias et al. (2018) define "IT service" as a collection of services offered by an IT system or an IT department to support business activities. According to Anders et al. (2005), an IT service is a comprehensive system designed to meet a specific demand but does not provide information about who has to fulfill that request or what kind of resources or capabilities are needed to accomplish it. It shows the desire to collaborate between customers and service providers.

ITIL breaks down services into three main groups: core, enabling, and enhancing. It also identifies two types of service views: customer-facing and supporting. A customer-facing IT service that directly supports one or more customers' business needs should have service level targets stated in a service level agreement. Customer facing services assist the customer's business units or business processes, directly supporting some or all of the customer's intended objectives. These types of services are visible to customers who are internal or external. The services that support or "underpin" the customer-facing services are called supporting services. These are not used by the customer itself but are needed by the service provider in order to provide customer-facing services to the customer. The relationships between customer facing services and supporting services are managed within the IT organizations.

2.2 Service catalog management and its importance

According to ITIL, a SC is a DB or structured document that provides information about all currently operating IT services, including those that are ready for deployment. The SC is the sole component of the service portfolio that is available to

clients; it is used to facilitate the sale and delivery of IT services. The SC details deliverables, pricing, contact points, and buying and request processes. The SC is a decision-making tool used to manage the service portfolio. It connects service assets, services, and business outcomes. Additionally, it establishes the need for a service and details how the service provider intends to satisfy that need. The SC demands extra care and attention as one of the most critical components of a comprehensive approach to service delivery. There are a lot of other processes that depend on the SCM process. These processes include service level management, demand management, change management, financial management, business relationship management, monitoring and service development lifecycle management processes.

Anders (2005) summarizes the SC as a system for the management and administration of IT business processes and services. He considers it as a method for standardizing the delivery of IT services. According to Nord et al. (2016) IT service catalog (ITSC) is a tool for defining, classifying, and inventorying IT services based on a set of criteria. The ITSC management procedure is intended to direct all catalog information and to ensure that data is accurate and up-to-date. Thus, service catalog manager (SCMngr) is responsible for process activities like defining, standardizing, renewing, publishing, and ensuring the quality of an ITSC. Macias and Alonso (2018) define "ITSCas a structure that includes a list of IT services given by IT departments in order to provide direct support to the organization's other departments. Since the SC is the inventory of all live and in-pipeline services, the SC also has two views, which are similar to service views: the customer-oriented (or external) catalog, which specifies the services seen by customers; and the internal catalog, which details the actions necessary to provide customer-oriented services ITIL defines those views as business or customer SC views and technical support SC

views. The reasons behind this separation are that, firstly, not all services target the same audience, and secondly, linking the internal support services to the desired business outcomes is necessary to support the delivery of the service to the customers. All those definitions highlight important aspects of the SC and SCM that are still valid in today's world.

Organizations succeed through comprehending the company, which requires the definition of services, which is accomplished via the identification of a service catalog (Macias and Alonso 2018). Various research articles have emphasized the value and usefulness of the service catalog from a variety of aspects, including financial, quality, and customer satisfaction. To address issues such as increasing commoditization and cost pressure, as well as rising individual consumer demands, IT firms create IT service catalogs (DuMoulin, Flores and Fine, 2008). Businesses demand cost-effective IT services in order to be efficient and productive with their infrastructure and IT services (Baioco 2009). Additionally, a lot of IT managers at businesses are realizing that they need to think about how IT services and business processes work together in order to meet the needs of end users and customers while also improving service quality and cutting costs (Wang et al., 2007).

A service catalog provides a solid foundation for best practice efforts and enables enterprises to comprehend their business's requirements and the technological services that support them. The SC serves as the foundation for determining the IT business's requirements (Arcilla, Calvo-Manzano, San Feliu, 2013).

The SCM process's purpose is to provide and maintain a centralized repository of consistent information about all operational services and those that are ready to be operational, as well as to ensure that this information is accessible to

those authorized to access it. The goal is to keep the information in the catalog up-to-date and accurate; make sure everyone who has permission to see the catalog can see it; and make sure other service management processes can keep up with the changing needs of the SC (Hunnebeck, 2013). According to Arcilla, Calvo-Manzano, and San Feliu, the SC management process's purpose is to guarantee that the catalog is generated and maintained in such a way that it contains correct information on all operational services as well as those that are getting ready to run in an operational capacity. Therefore, it is vital to precisely identify services, construct SCs, and manage them (2013).

To begin implementing SC management, firms must first complete the activity of service identification, which the majority of enterprises conduct incorrectly. The service description, service type, policy, and SLA for all IT services that a business provides should be in the SC (Rosa, Gama & Da Silva, 2012). An ITSC is similar to a restaurant menu that highlights the IT services that may be supplied to the clients. (Macias and Alonso 2018). Clients can use the SC to determine what services the service provider can provide for them and to communicate with the service provider about those services. Employees of the service provider can utilize the SC to gain an understanding of how the service provider's services, resources, capabilities, and commercial activities are supported within the company. Users or people who use a service can use the SC to find out what services are available and how to make service requests and report incidents with those services. ITIL (Hunnebeck, 2013) defines the primary activities SCM as:

- Identify, define, and document each service with all the parties involved.
- Create and keep an accurate SC and its contents.

- Show how business processes and customer-facing IT services are linked to each other.
- Interact with support teams, vendors, and service asset management to help IT services and their supporting parts as configuration items (CIs) in the SC.
- Interface with business relationship manager (BRM) and service level manager (SLM) to ensure information is aligned with the business and its related processes.

Some of the important inputs into the SCM process are business and IT strategies, vision and plans for future requirements, service portfolio, business impact analysis (BIA), request for change (RFC), configuration management system (CMS), and feedback mechanisms. BIA is a way to figure out how important business activities are and what resources are needed to keep operations going during and after a business interruption. The importance and resources are part of SCM. Additionally, an RFC is a request for change and the predecessor to the "Change Record". It contains all of the information needed to authorize a change. It is a critical input into SCM process since keeping SC up-to-date is a main challenge. RFC and change management process set the mechanism to serve this purpose. A CMS is a collection of tools and data used for collecting, storing, managing, updating, analyzing, and displaying information about all configuration elements and their connections. A CMS may administer many physical configuration management DBs. Any SC related change in CMS feeds the SCM as an input (Hunnebeck, 2013).

The main outputs can be summarized as service definition, an up-to-date service portfolio, and updates to the RFCs.

Since each service provider process utilizes the SC, one could argue that the SCM process interfaces with all processes. These include service portfolio

management, business relationship management, service asset and configuration management, service lifecycle management, demand management, and service portfolio management (Hunnebeck, 2013).

Numerous studies have been conducted on ITSC. Some viewed it through the lens of maturity, while others viewed it through the lens of generating or maintaining it. Niessink and van Vliet began developing a maturity model for IT service capabilities in 1998 with the purpose of helping organizations be more efficient with their services by providing a framework for improvement. Walker covered SC maintenance in 2001 in his book "IT Issue Management," where he examined the process of adding and removing services. However, no data supporting the proposed techniques' efficacy was discovered. Sullivan et al. then released a review of the literature on the fundamental character of services in 2002. They talked about the SC as a catalog of services that were sorted by different classification schemes. Sallé undertook a study of the available literature in 2004 and emphasized the critical nature of service design, development, operation, and delivery as a basic part of service management. ITIL, British Standards (BS) 15000, the HP IT Service Management Reference Model, the Microsoft Operations Framework (MOF), and IBM's Systems Management Solution Lifecycle are just a few of the frameworks that outline how to accomplish this. In 2005, Anders proposed the creation of a generic ITSC that could be adjusted and utilized by an IT provider in the context of a service management project; it was distinguished as an approach based on a universal modeling language (UML). In 2008, Bartsch et al. suggested a technique for decomposing and identifying hierarchical services. They wanted to help service providers keep control of their operational service processes by setting up and following core service procedures. Lyons established an ITSC in 2009 to manage a

university's technology services; this SC is responsible for customer requests, action, and the implementation of the ITIL framework, which simplifies the process of obtaining and understanding information for customers. In 2010, Xu et al. developed a technique for expressing the ITSC, focusing on the architecture of the ITSC system DB and administration capabilities, as well as an analysis of the method's representation from both perspectives. In the same year (2010), Mendes and da Silva published the findings of an analysis recommending many strategies for mitigating the dangers associated with an ITSC deployment. Many of the studies included a definition of a service, its components, the roles and responsibilities of the people who run it, an identification process, and a life cycle process. In 2013, Mendes, Ferreira and da Silva created a method for identifying IT services, while Rosa et al. established a method for identifying services based on events from a reference ITSC (ITSRC). Gama et al. expanded on their work in 2013 by suggesting a reference ITSC to address the issue of establishing a basis for starting a SC. In the same year, Heikkinen and Jäntti conducted a study on the issues of IT service management in general and a case study on two IT service providers focusing on continuous service improvement (CSI). Similarly, Arcilla, Calvo-Manzano, San Feliu presented a financial management-focused ITSC for small enterprises. They desired to create a standardized ITSC that would assist small and medium-sized enterprises in determining how much money to spend on IT and how to track it. In 2014, McLean wrote a book that is an ITSM success story for the SC and portfolio. In the same year, Martinez reviewed existing frameworks for SC maturity in IT organizations and presented a new framework (ECAT) for measuring and evaluating an ITSC's maturity level. Nord, Dorbecker and Bohmann examined the ITSC's structure, content, usage, and implementation in 2016 and developed and iteratively evaluated

a maturity model that encompassed the four attributes described above for the ITSC. In the same year (2016), Sembiring and Surendro produced a model for ITSC implementation, the same one that was based on the integration of many frameworks to address the absence of other frameworks and be sufficiently generic to be accepted by a wide variety of organizational kinds. However, before this ITSC implementation model could be utilized to construct a catalog of services in a real organization, it needed to be checked and validated. Gartner also published numerous papers on SCs in 2016, 2017, and 2018, including how to build an ITSC, how to develop a single SC for all IT services, best practices for SC design, and templates and samples for project management SCs as a professional service. Macias, Alonso and Velez assessed the 14 proposals for developing and managing catalog information submitted in 2018 and concluded that none of them adequately addresses all aspects of SC administration. In the same year, Macias et al. conducted a survey of 45 employees from 22 public organizations in the Republic of Ecuador and discovered that the majority of organizations had not adopted the SC. Since 2020, Gartner's ITSM hype cycles have included SCM.

Mora et al. (2014) state that integrating IT services into all related processes and schemes will make IT management more effective and efficient and increase the value of the organization. This is why managing IT services is important and has become a main focus for organizations.

The focus on business processes supported and business value given is a core element of IT service management as defined by ITIL. With this lens in place, it is possible to forecast both the influence of technology on business and the impact of business transformation on technology. Creating a fully integrated SC that includes business units, processes, and services, as well as their relationships with and

dependencies on IT services, technology, and components, is important for the IT service provider to be able to better meet the needs of the business.

All components of service design are critical in sustaining and expanding the competence of the IT service provider, but notably the design of the service portfolio, SC, and individual IT services. All of these steps will also make sure that IT services are more closely linked to the business's goals and needs.

The business-oriented approach of ITIL service management (ITSM) enables a firm providing IT services to:

- Align the supply of IT services with the business's aims and objectives.
- Prioritize all IT initiatives according to their business effects and urgency, ensuring that key business processes and services receive the highest priority.
- Increase corporate productivity and profitability by optimizing IT procedures.
- Sustain compliance with corporate governance standards.
- Provide competitive advantage by improving the IT infrastructure and enhancing the quality of service, customer happiness, and user impressions.
- Guarantee compliance with regulatory and legal requirements.
- Assure that all IT and information assets are adequately protected.
- Verify that IT services remain aligned with evolving business requirements over time (Hunnebeck, 2013).

2.3 Challenges while implementing service catalog

A thorough literature review was conducted to identify the challenges in implementing and managing a SC. Through interviews with professionals with experience in SC implementations, additional challenges have been identified. Further details of the interviews are provided in Section 3.2.

In Table 1, we present 19 challenges, Ck, k=1,2,…,19 that are obtained through literature reviews and professional interviews. We summarize our findings by classifying these challenges in two hierarchical levels. The major classification is made with respect to the order of SCM processes. Accordingly, there are four Challenge Groups, CG1: identification, CG2: implementation, CG3: maintenance and CG4: adoption. Next, a minor classicification is made in each challenge group. Accordingly, there are seven Main Challenges, MGj, j=1,2,…,7.

Table 1. Challenges Identified in Academic Studies, ITIL, and Expert Interviews

Challenge Group	Main Challenge	Challenge	Source
CG1: Identification	MC1: Identifying services, service linkages and cost relations that a company has and provides	C1: Identifying the core services that a company provides	Mendes et al.
		C2: Identifying the enabling services that support core services	Interview
		C3: Linking enabling services to core services	Interview
		C4: Linking assets to services	Mendes et al.
		C5: Identifying and linking the efforts of employees to the related services	Interview
CG2: Implementation	MC2: Integrating the SCM process with other related processes	C6: Making service catalog as part of other related processes	Arcilla et al.
	MC3: Making SCM process automation (ITSM tool implementation)	C7: Stored services as a set of 'service' CIs within a CMS	ITIL
		C8: Maintain SC with change management	ITIL
		C9: Incorporating all catalog views as part of an overall CMS and SKMS	ITIL
		C10: Integrating SCM tool to other tools that are used for related processes	Interview
		C11: Time and investment that is required to implement is costly	Macias et al.
	MC4: Make it available to anyone within the organization	C12: Make it available to anyone within the organization	ITIL
CG3: Maintenance	MC5: Maintaining an accurate, up to date service catalog	C13: Every new service should be entered into the service catalog once its initial definition of requirements has been documented and agreed	ITIL & Rudolph and Krcmar
		C14: The service catalog should record the status of every service, through the stages of its defined lifecycle	ITIL
		C15: Create acceptance that SC and portfolio are essential sources of information	ITIL
CG4: Adoption	MC6: Creating ownership of SC within the organization	C16: Low involvement and ownership of senior level management	Rudolph and Krcmar
		C17: Create acceptance that SC and portfolio are essential sources of information	Interview
	MC7: Need of training and best practice knowledge	C18: Lack of knowledge of ITIL makes it harder to adopt	Rudolph and Krcmar
		C19: Most organizations fail to implement ITIL due to its complexity	Macias et al.

The first main step of SCM is CG1: identification, which requires the identifying services, service linkages, and cost relations that a company has and provides (MC1). There are five challenges identified during the academic literature survey and interviews. In the study, Macias et al. (2018) mention that companies are having challenges identifying their core services (C1) and there is a confusion between service and asset (C4). In the interviews, SMEs often mention that during the identification phase, companies also face challenges while they are trying to identify which services enable the customer-facing ones (C2), how they link to each other (C3), and how much effort is required to develop or maintain each specific service (C5).

CG2: implementation challenges are identified from three different resources. Initially, ITIL defines some important aspects and challenges associated with managing a SC, such as it should ideally be saved as a set of service CIs within a CMS (C7) and managed under a change management process (C8); there is inadequate access to and support for a proper CMS and SKMS for SC integration (C9), and anyone in the organization should be able to access it. Also, each new service should be added to the SC once the initial description of requirements has been written and agreed upon (C12) (Hunnebeck, 2013). Secondly, in the interviews, SMEs highlight that, based on their experiences, integrating the SCM tool with other tools that are used for related processes (C10) is also a challenge to overcome in the implementation phase of the SCM. Lastly, two other challenges to the implementation are mentioned in two different academic papers. The study by Arcilla et al. (2013) points out that it can be hard to link SC to related processes (C6), and the study by Macias et al. (2018) says that it can be hard for some companies to implement SC because it requires time and money (C11).

For the CG3: maintenance challenge group, there is one main challenge (MC5) and three related challenges, which are: making each service part of SC after initial definition (C13), managing statuses up-to-date through the service lifecycle (C14), and creating acceptance that SC and portfolio are essential sources of information (C15). According to ITIL, as emphasized many times earlier, the most difficult task for SCM is keeping an accurate SC (MC5) as part of a service portfolio, which encompasses all catalog views as part of an entire CMS and service knowledge management system (SKMS). The SC should keep track of the progress of each service as it moves through the stages of its life. Each service should be part of SC when it is defined (C13), and removed from SC when it is retired (C14). One method may be to create stand-alone documents or DBs before attempting to integrate the SC and service portfolio into the CMS or SKMS (Hunnebeck, 2013). To do this, the firm's culture must acknowledge that the catalog and portfolio are critical sources of information that everyone in the IT department must utilize and help maintain (C15). This will often help standardize the SC and service portfolio, which will make it easier for the company to save money and improve its performance through economies of scale (Hunnebeck, 2013).

Finally, Rudolph and Krcmar mention in their 2009 study that a lack of ownership and involvement from senior management (C16) as well as a lack of knowledge of ITIL within the company (C18) create a challenge for successfully adopting SCM. Additionally, Macias et al. (2018) mention that most organizations fail to implement ITIL due to its complexity (C19). SMEs complete the CG4: adoption challenge list with one addition, which is to create acceptance that SC and portfolio are essential sources of information. It is also required that all related parties see and use SC as a trusted source of service information (C17).

CHAPTER 3

METHODOLOGY AND RESEARCH DESIGN

This section explains the research methodology, as well as the development of the questionnaire and the data collection process.

3.1 Methodology

The thesis study starts with a literature review to explore the academic research in SCM and identify the implementation challenges mentioned in the earlier studies. Additionally, all the best practices related to SCs are studied to identify the challenges while implementing and managing SCs. Following the review of literature, interviews with SMEs have been held to identify more challenges and also confirm the overall challenge list. In Section 2.3, the challenge list has been finalized from the literature, interviews, and best practice content.

Next, an online survey has been prepared in Chapter 4 to measure the level of SC usage, significant challenges, and determine the factors that affect the success of SCM. The survey was distributed to the people who work for IT service providers that serve in different sectors. The collected data is pre-processed, and the validity and the reliability of the survey are tested.

Chapter 5 includes the development of theoretical model and the analysis of hypotheses that have been tested in the scope of this research. Finally, general recommendations are provided for successful implementations of SCM systems in accordance to the findings of the survey.

3.2 Interviews

During the review of the literature, an initial set of challenges in SCM were identified. In order to have a complete and comprehensive list before the survey, face-to-face interviews have been conducted with five different SMEs. Three of the SMEs have more than twenty-five years of experience, and two of them have fifteen years of experience in IT environments specialized as internal or external consultants for Enterprise Governance, Risk and Compliance (GRC), ITGRC, ITSM, and Development and IT Operations (DevOps). Their expertise is in the consultancy and delivery of complex GRC, IT governance, and ITSM transformation programs with processes and tool implementations for clients. Some of the certifications that the interviewed SMEs have are Certified Information Systems Auditor (CISA), Certified in Risk and Information Systems Control (CRISC), Certified in the Governance of Enterprise IT (CGEIT), Certified Data Privacy Solutions Engineer (CDPSE), Control Objectives for Information and Related Technologies (COBIT) 5 Trainer, ITIL Expert, Devops Agile Skills Association (DASA) DevOps Coach, Resilia Practioner, International Organization for Standardization (ISO) 27000LA, ISO2000 Consultant, and one of them has also worked as a skilled reviewer of RiskIT, COBIT 5, COBIT 2019, and ITIL4 DSV. The interviews were conducted in a semi-structured way as the fixed questions were asked with the flow of the conversation and the answers were noted to the questions related to the topic. The interview questions are provided in Appendix A.

In addition to the challenges found in the literature review, the following challenges are mentioned in the interviews: linking assets to services; identifying and linking the efforts of employees to related services; integrating the SCM tool with other tools that are used for related processes; the time and money needed to

implement (high cost); and explaining the process and benefits of the SCM to the executive level to get their support. The overall list of challenges is provided in Table 1 in Section 2.3.

3.3 Questionnaire development

The questionnaire was developed to measure the significance of the challenges that have already been identified, and explore the factors that can affect the success of implementations. The questionnaire is developed upon the categorization of challenges developed in Table 1 in Section 2.3. Hence, there are 19 challenges that are categorized into 7 main challenges, which are further classified into four groups: i) identification, ii) implementation, iii) maintenance, and iv) adoption. The questionnaire contains questions about each of these challenges in five sections.

There are total of 79 questions in the questionnaire, but respondents are directed to different sets of questions based on their answers during the survey, so the number of respondents for each question varies. The flow of the questions in the questionnaire is provided in Figure 2.

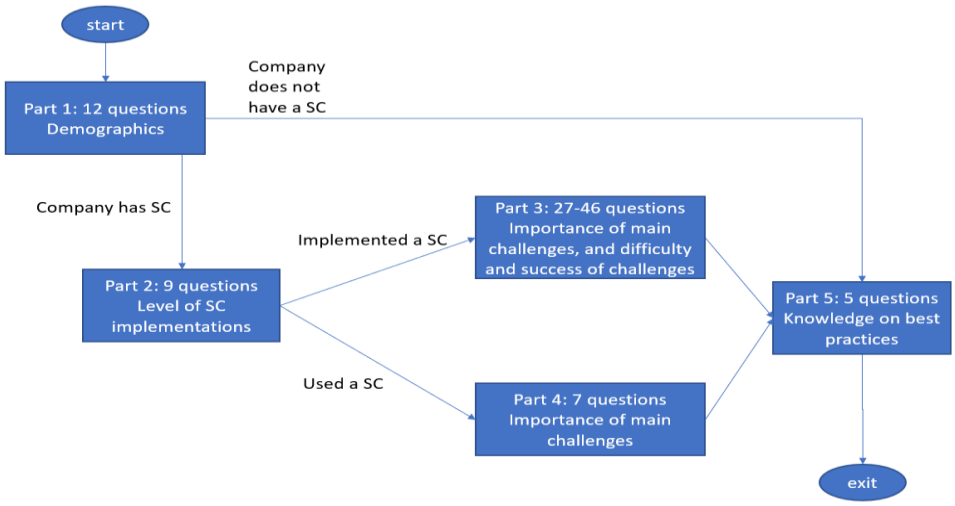


Figure 2. The flow of questions in the questionnaire

The first part of the questionnaire is composed of 12 questions, which are related to demographic questions such as education, sector, and years of experience. If the respondent's company has a SC, it moves to the second part. Part 2 has 9 general questions about the level of SC implementations. If the respondent has ever implemented a SC, it moves to the third part. There are 27 to 46 questions in Part 3 based on the respondent's answers. The aim of this part is to rate the importance of the main challenges and identify how hard each challenge is for respondents. Furthermore, the success levels in dealing with these challenges are also assessed. Part 4 has questions for SC users who have used the catalog but never implemented it. These participants answer 7 questions to identify the importance of main challenges but they do not assess their difficulty or success levels. The last Part 5 consists of five questions about the best practices they know, and/or their companies follow.

The survey is developed in Turkish. The questions of the survey can be found in Appendix B and C for English and Turkish versions. Appendix D and E show the mapping of challenges and related questions in the survey.

3.4 Survey participants

There were 108 participants that took part in the survey. They were selected by purposive sampling among IT professionals experienced in SC development and implementations.

3.5 Distribution of the survey

Google Forms is used as the online survey provider to conduct the survey. The survey was active between February 8th, 2022 and April 10th, 2022, and was

completed anonymously by the participants. Respondents were invited to participate in the survey through a link on communication platforms like WhatsApp, e-mail and LinkedIn.

CHAPTER 4

DATA PRE-PROCESSING, RELIABILITY AND VALIDITY

4.1 Data pre-processing

The survey was open for two months to and received 108 responses. During the analysis phase, ten of them were eliminated from the dataset because they had never heard of the term "service catalog".

The data set is checked for outliers by using 3-sigma limits and no further eliminiations are needed. Finally, the data is checked for missing values. Since all questions are mandatory, there are no missing values in the survey data.

4.2 Scoring

The responses for the questions are generated by using likert scales (1-5) and multiple-choice answers such as (Yes/No/I Don’t know) or Checkboxes. The response options to the survey questions are provided in Appendix B. There are 4 challenge groups, 7 main challenges and 19 challenges in the survey. The basic response variables are i) the importance levels of 7 main challenges, ii) the difficulty levels of 7 main challenges, and iii) the success levels of 5 challenge groups. The questions used to assess the importances of 7 main challenges are provided in Appendix D. The related questions to evaluate the difficulty levels and the success levels of 19 challenges are given in Appendix E.

The importance levels of the 7 main challenges are obtained directly by the assessments which are measured in Likert scales. The related questions to assess the importance levels are provided in Appendix D.

The difficulty levels of the 7 main challenges are calculated by the related questions provided in column 4 and 5 of Appendix E. If the challenge in column 4 is experienced by the respondent, then its difficulty level is assessed by the question in column 5. The assessments of the difficulty levels of challenges are made in Likert scale. The difficulty level of a main challenge is the average of the difficulty levels of the challenges related to that main challenge.

The success scores are calculated for each of the 4 challenge groups by the related questions provided in column 4 of Appendix E. The success score of a challenge is one point if the challenge stage is successfully implemented— that is, if the answer is "yes" to the challenge implementation question; the success score is 0.5 if it is partially implemented; and zero points if the challenge stage is not completed. The success scores are calculated for each of the four main challenge categories as the sum of related challenge scores as provided in Table 1. Accordingly, the maximum success scores for the main categories will be identification (5), implementation (7), maintenance (3), and adoption (4) as seen in Table 2. Next, the overall success score is calculated by adding the scores from all four groups. Higher the success score means the company is more successful in specific challenge group or overall SCM.

Table 2. Maximum Success Scores for Each Success Group

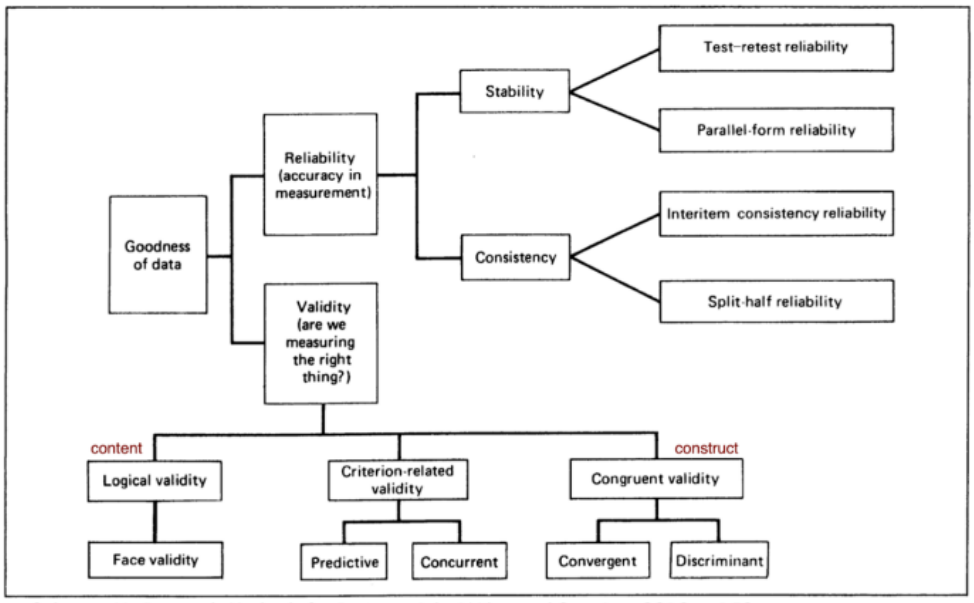
Challenge Group	Identification	Implementation	Maintenance	Adoption	Overall
Max Success Score	5	7	3	4	19

Nevertheless, each participant mentions the names of best practices implemented in their companies. Total number of implemented best practices for each company is calculated. Additionally, participants mention the names of

certificates they have, and the total number of certificates for each respondent are calculated. These factors are used to test the significance of their effect on the difficulty and success levels of challenges.

4.3 Reliability and validity analysis

Two criteria have been used to evaluate the goodness of the data in this survey: validity and reliability. The ways to evaluate the goodness of data are represented in Figure 3.



Sekaran, U., Research Methods for Business, John Wiley and Sons Inc., 2010, p.158.

Figure 3. Goodness of data measures as cited from Sekaran et al., 2010, p.158

According to Sekaran and Bougie, content validity is defined as ensuring that all measuring items are relevant to the research concept and the outcome that they are intended to evaluate (2010). After doing a comprehensive literature search and interviewing a number of SMEs in this domain with expertise such as internal consultants, external consultants, and tool implementers, we identified potential success factors, challenge groups, and associated challenge stages for each group.

Prior to conducting the survey, all identified factors and challenges are validated by a separate group of experts for content (face) validity purposes.

It is not enough to have a valid basis for an analysis; it must also be proven to be reliable based on sample data. Four challenge group scores are considered to calculate the overall success score. To establish convergent validity, the scores collected under the same dimension must correlate. Cross correlations between challenge success groups and internal consistency of group variables have been examined.

The consistency of the group variables should be re-examined due to setting groupings and challenges from various academic and professional resources. Table 3 displays the internal consistency of the questions in groups as supplied by the survey. Cronbach's alpha values must be greater than 0.70 to be considered reliable. The first two are slightly below 0.70, but we decide to tolerate them. None of them scored higher than 0.95, so we don't have concerns about redundant variables. Therefore, we conclude that our evaluations are reliable.

Table 3. Cronbach's Alpha Values for Variables

Challenge Group	Cronbach's Alpha	Question Set
Identification	0.693	Challenge Question (CQ) 1,2,3,4,5
Implementation	0.689	CQ 6,7,8,9,10,11,12
Maintenance	0.806	CQ 13,14,15
Adoption	0.702	CQ 16,17,18,19

CHAPTER 5

ANALYSIS AND FINDINGS

The results have been analyzed under six main sections. In the first section, the demographics of the respondents are analyzed. Section 5.2 explores the level of SC usage among companies. Section 5.3 focuses on the theoretical model which hypothesis tests are based on. Section 5.4 examines the statistically significant differences between the importances of the main challenges, as well as company and personal attributes. In Section 5.5, significant factors that lead to SCM success are identified and in Section 5.6, the results are summarized.

5.1 Demographics

Among 98 valid responses, 43.9% of respondents hold a bachelor's degree, while the remainder hold a master's degree (Table 4). 52% of respondents have a degree in computer engineering, industrial engineering, or mathematical engineering. Respondents from business administration, management information systems, chemical engineering, and electronics and communication engineering are each 5-10% (Table 5).

Table 4. Distribution of Respondents' Education Levels

	N	%
Master	55	56.1%
Bachelor	43	43.9%

Table 5. Distibution of the Departments That Respondents Graduated From

	N	%
Computer Engineering	19	19.4%
Industrial Engineering	19	19.4%
Mathematical Engineering	13	13.3%
Business Administration	9	9.2%
Chemical Engineering	7	7.1%
Management Information Systems	7	7.1%
Electronics and Communication Engineering	5	5.1%
Software Engineer	4	4.1%
Electrical Engineering	3	3.1%
Aircraft Engineering	2	2.0%
International Trade and Money Management	2	2.0%
Materials Science and Engineering	2	2.0%
Textile Engineering	2	2.0%
Business Administration Engineering	1	1.0%
Economics	1	1.0%
Mechanical Engineering	1	1.0%
System Engineering	1	1.0%

Almost half of the respondents work at their current companies for less than two years (49%), while 24.5% work for three to five years (Table 6). Although respondents have a short tenure with their present employers, their cumulative years of experience are fairly significant. 39.8% of them have more than 15 years of experience, 39.8% have worked for 10-15 years, and 15.3% have worked for 6-10 years. Only 5.1% of the people who attend the survey have less than five years of experience, which could mean that they have a good understanding of the business and can compare different organizations to see what is best or missing from the SCM perspective (Table 7).

Table 6. Distibution of the Years of Experience in the Current Company

	N	%
2 years or less	48	49.0%
3-5 years	24	24.5%
6-10 years	14	14.3%
More than 15 years	7	7.1%
10-15 years	5	5.1%

Table 7. Distibution of the Total Years of Experience

	N	%
More than 15 years	39	39.8%
10-15 years	39	39.8%
6-10 years	15	15.3%
3-5 years	3	3.1%
2 years or less	2	2.0%

From a personal standpoint, there are 18 distinct certifications listed. 72 respondents have at least one certification, and 18 of them have at least three certifications. 29% of respondents hold an ITIL Foundation qualification, the most popular type. Project Management Institute (PMI) is ranked 2nd on this list at 12%. 9% of respondents hold COBIT certification, ITIL Expert certification is held by 8%, and Professional Scrum Master (PSM) certification is held by the same number of people as ITIL Expert. However, only 29% of all respondents are members of platforms such as Axelos, ISACA, and itSMF.

The responders come from fifteen distinct sectors. However, three sectors account for 70% of total responses: technology (52%), banking and capital markets (13.3%), and telecommunications (9.2%) (Table 8). The vast majority of respondents (60%) work for a company headquartered in Turkey, and 23% work for a company headquartered in the United States of America. The Netherlands, Germany, the

United Kingdom, India, and Switzerland are the other countries for company origins (Table 9).

Table 8. Distribution of the Sectors

	N	%
Computer Engineering	19	19.4%
Industrial Engineering	19	19.4%
Mathematical Engineering	13	13.3%
Business Administration	9	9.2%
Chemical Engineering	7	7.1%
Management Information Systems	7	7.1%
Electronics and Communication Engineering	5	5.1%
Software Engineer	4	4.1%
Electrical Engineering	3	3.1%
Aircraft Engineering	2	2.0%
International Trade and Money Management	2	2.0%
Materials Science and Engineering	2	2.0%
Textile Engineering	2	2.0%
Business Administration Engineering	1	1.0%
Economics	1	1.0%
Mechanical Engineering	1	1.0%
System Engineering	1	1.0%

Table 9. Distribution of the IT Service Providers' Origins

	N	%
Turkey	59	60.2%
USA	23	23.5%
German	5	5.1%
Dutch	4	4.1%
United Kingdom	4	4.1%
India	2	2.0%
Switzerland	1	1.0%

Next, we explore the company demographics. Businesses provide services to both internal and external customers in 55.1% of cases. 36.7% of them serve

exclusively external clients, while the remaining 8.2% serve exclusively internal customers.

The vast majority of the companies (78.6%) have 3-5-year strategic plans that include the long-term targets for the company's future. However, 4.1% of the respondents do not know if their company had a long-term strategic plan or not, while 17.3% state that their company do not have one (Table 10).

Table 10. Distribution of Having Long-term Strategic Planning of IT Service Providers

	N	%
Yes	77	78.6%
No	17	17.3%
I do not know	4	4.1%

Twelve different best practices implemented by businesses are listed in the survey responses. Agile is the most frequently mentioned best practice among responders. 71 out of 98 respondents indicate that their organizations adopted agile methodologies. ISO 27001 is the second most frequently selected standard, and ITIL is the third most frequently selected best practice, with 53 respondents. Following that, ISO 20000, COBIT, Capability Maturity Model Integration (CMMI), and Six Sigma are also stated. 67 of the respondents state that their organizations use more than one best practice, and 49 state that they use more than three.

56 of the respondents only used the SC, whereas 42 of them both used and implemented (Table 11). A total of 98 of them ranked the importance of main challenges, and 42 of them also answered which challenge stages they implemented and how challenging they found those stages. The number of responses changes depending on the number of people who successfully overcome that specific

challenge during SC implementation. More than half of the respondents work as individual contributors. There are 23 individual contributors working in their companies, and 19 managers that are in charge of at least one team in their organizations.

Table 11. Distribution of Respondents' Service Catalog Experience

	N	%
Used	56	57.1%
Implemented	42	42.9%

Out of 42 individuals that implemented the SC, half of them have a bachelor's degree, while the other half have a master's degree (Table 12). The top departments from which they graduated are aligned with the whole list of participants (Table 13).

Table 12. Distibution of SC Implementers' Education Level

	N	%
Bachelor	21	50.0%
Master	21	50.0%

Table 13. Distribution of the Departments That SC Implementers Graduated From

	N	%
Industrial Engineering	11	26.2%
Computer Engineering	7	16.7%
Mathematical Engineering	7	16.7%
Business Administration	5	11.9%
Software Engineer	4	9.5%
Chemical Engineering	2	4.8%
Electrical Engineering	2	4.8%
Management Information Systems	2	4.8%
Materials Science and Engineering	2	4.8%

Approximately 85% of respondents have more than ten years of experience and expertise (Table 14), and approximately 70% have worked for their current employers for less than five years (Table 15).

Table 14. Distibution of the SC Implementers' Total Years of Experience

	N	%
10-15 years	20	47.6%
More than 15 years	16	38.1%
6-10 years	4	9.5%
3-5 years	2	4.8%

Table 15. Distibution of the SC Implementers' Years of Experience in Their Current Companies

	N	%
More than 15 years	6	14.3%
6-10 years	7	16.7%
3-5 years	10	23.8%
2 years or less	19	45.2%

SC implementers operate in seven distinct sectors (Table 16) and come from five distinct origins (Table 17). Around 85 percent have long-term strategic plans within their companies (Table 18), and around 65 percent serve both internal and external clients (Table 19).

Table 16. Distribution of the Sectors that SC Implementers Work

	N	%
Information Technology	22	52.4%
Banking and Capital Markets	8	19.0%
Audit and Consultancy	3	7.1%
Healthcare	3	7.1%
Defense Industry	2	4.8%
Entertainment and Media	2	4.8%
Telecommunication	2	4.8%

Table 17. Distribution of the IT Service Providers' Origins that SC Implementers Work

	N	%
Turkey	26	61.9%
USA	9	21.4%
Dutch	3	7.1%
India	2	4.8%
United Kingdom	2	4.8%

Table 18. Distribution of Having Long-term Strategic Planning of IT Service Providers that SC Implementers Work

	N	%
Yes	36	85.7%
No	6	14.3%

Table 19. Distibution of the Types of Customers That SC Implementers' Companies Serve

	N	%
We provide services to both internal and external customers	27	64.3%
We provide services to external customers	9	21.4%
We provide services to internal customers	6	14.3%

5.2 Level of service catalog usage

The level of SC and portfolio usage has been evaluated using eight questions in Part 2: keeping up-to-date ITSC (Q13); assigning a SCMngr (Q14); the visibility of retired services (Q15); the visibility of services in pipeline (Q16); the location of the SC to keep and manage (Q17); the visibility of supporting services (RFS) (Q18); the level of integration of the SC with related processes (Q19); and the level of integration of services with related customers (Q20).

This section's analysis is based on the data set obtained for 98 companies that have SCs. All SCs fully or partially reflect the up-to-date information so even if it is

partially up-to-date, which implies that it does not contain all of the accurate information, it demonstrates that in every company, some attempt is being made to keep it up-to-date. 57% of the respondents state that their company's SC is up-to-date and the rest mentioned that it is partially up-to-date. 82% of the answers mention that there are SCMngrs assigned within the company. 8% of them are not aware of whether there is an assigned SCMngr or not, and 10% mention that there is not an SCMngr role within the company (Figure 4).

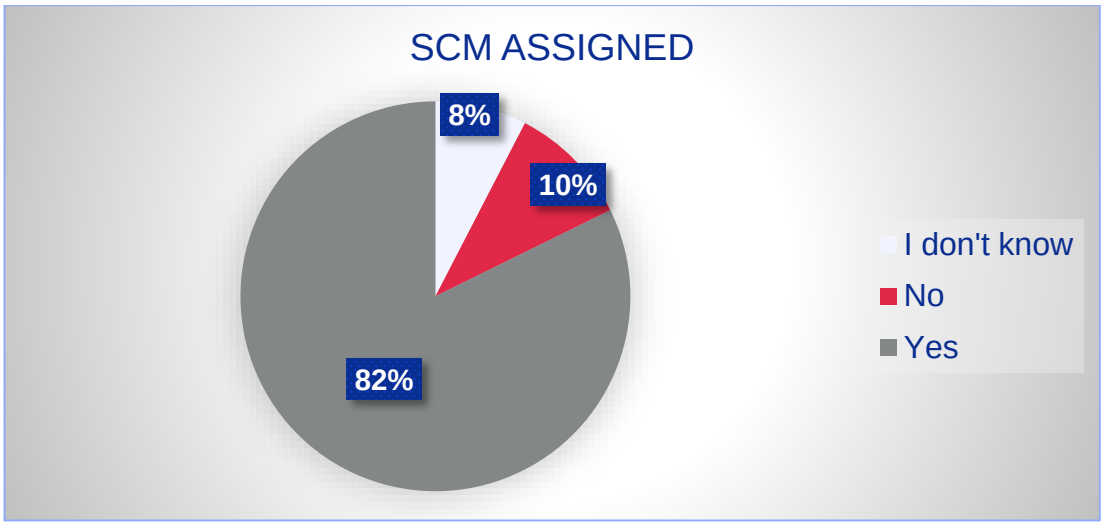


Figure 4. The number of companies that assigned service catalog manager

74% of respondents manage their SCs with the help of an ITSM or ERP application. 47% of all SCs are managed entirely within the tool, while 15% are maintained both within the tool and on the company website. Nine percent say that they keep SC in the tool and also in the documents, and 7% say they keep SC in the tool, the documents, and the company website. Only 38% of respondents maintain SC on their company website, which is an excellent location to showcase customer-facing services. Eight percent of respondents retain their SC just as a document,

which appears difficult to integrate with other processes and maintain effectively (Figure 5).

Figure 5. Locations where the service catalog is stored and managed

More than half of those surveyed can see retired services as part of their service portfolio. 11% are unsure whether they are visible, and 34% are unable to view the services that are no longer offered to clients (Figure 6). The ratio is greater for services that are not yet ready to be delivered to a client but are in the development stage; 71% of the respondents state that they generate the services in the pipeline in the SC and begin to manage them. 19% of them do not generate services until they are ready to propose to a client, and 10% do not know if they manage the services in the catalog while they are in the pipeline and preparing to propose to an end customer (Figure 7). Furthermore, 67% of respondents manage supporting services, which are not visible to customers but enable the customer-facing service to perform. Consider, as described in Section 2.1, a DB team offering DB service to engineers designing an application for an external customer. The application is a consumer-facing service, while the DB service is visible and used by internal teams rather than the customer. These services are also known as "resource-

facing services" (RFS). 19% of respondents do not see those resource-facing services in the catalog, and 14% are unsure if they are visible or not (Figure 8).

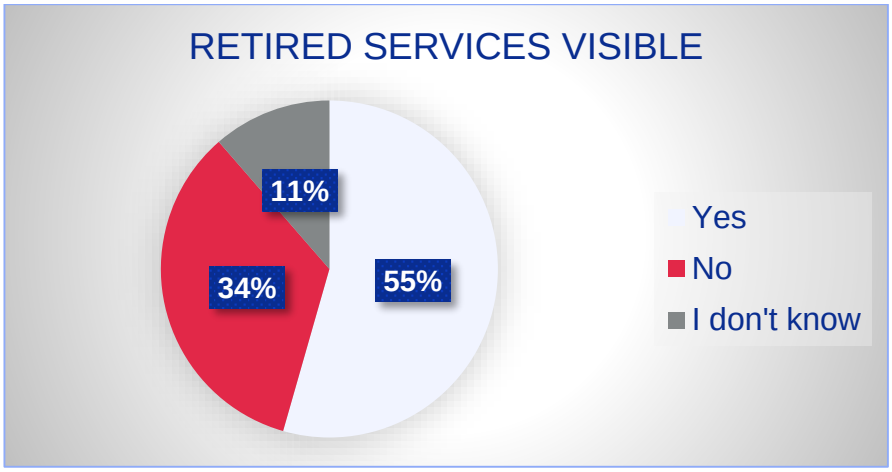


Figure 6. Distribution of managing retired services

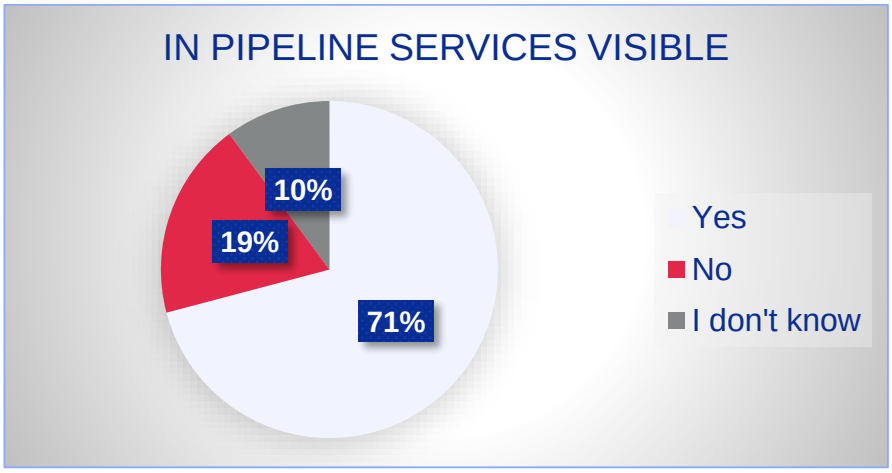


Figure 7. Distribution of managing in-progress services

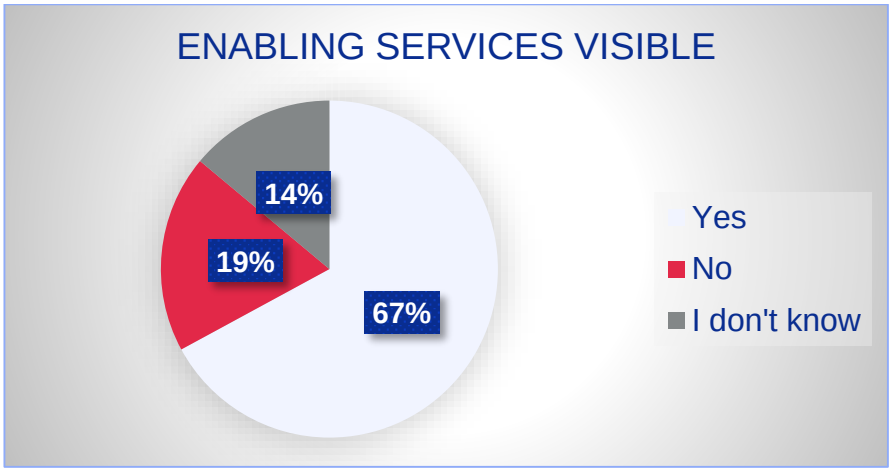


Figure 8. Distribution of managing support services

Approximately 50% of 98 respondents link their incident and request management processes to their SCs. This means that they can see their incidents and requests in relation to the service that they provide. It is very important to resolve those tickets within the defined SLA. When the service information is available, it is faster to map those tickets to the related teams and internal processes. 46 of the respondents mention that they are managing the changes for each service, and 45 of them use the service information in their SDLC processes. 41% of them perform service-based monitoring rather than only monitoring specific components like DBs or networks independently. From a cost perspective, those are the least implemented ones. The last three items selected are all related to cost-profit analysis. 38% of the respondents link their SC to their financial management processes. Additionally, main cost items in IT companies are asset investments and labor.

29% of respondents enter their time logs to the related service for which they worked, and 24% link the assets to the services they enable, and thus know the total cost of each service they provide. For a company that has just one service they provide, this may not seem important because total profit will show the information for profitability and the financial effect of each change. However, for companies that provide multiple services, this result indicates that they are not aware of whether they are losing money or making a profit for a specific service they provide or whether they did well or badly financially when they changed something. In the business review meetings, this information has the power to assess the current situation and make decisions accordingly. From highest to lowest, the top 9 most integrated processes are: incident management, request fulfillment, change management, SDLC, demand management, monitoring, financial management, time management and asset management (Figure 9).

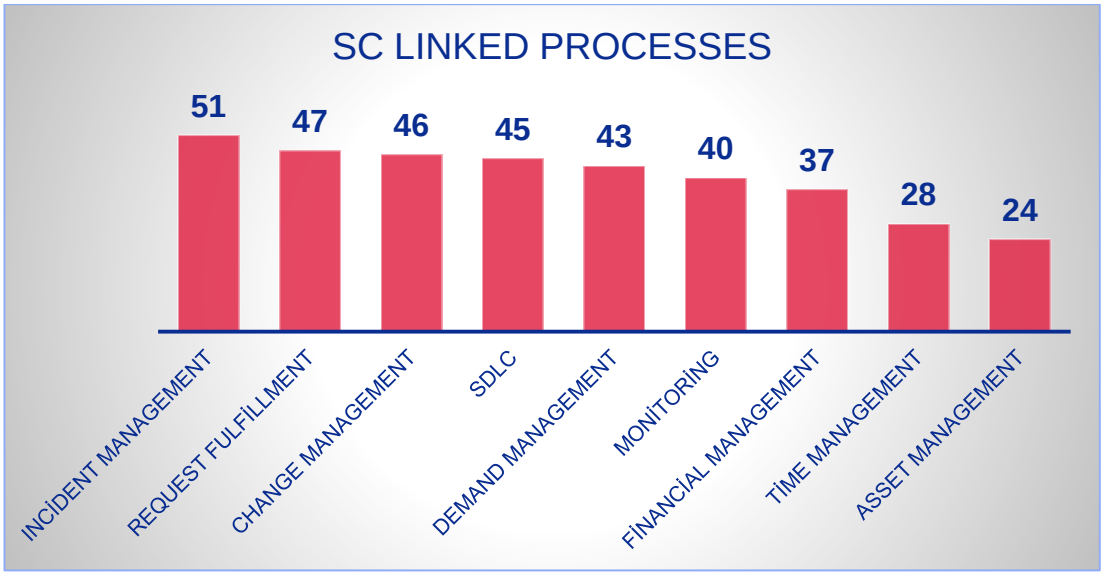


Figure 9. Number of companies that linked their SC with the processes

A question was also asked about creating a relationship between the SC and the customer portfolio. This link informs businesses about which clients are now using particular services, as well as which additional services may be possible sources of future sales. According to the responses, 52% of them have this link in their internal process tools, and 19 percent can access this information from documents in their hands, such as invoices or contracts (Figure 10).

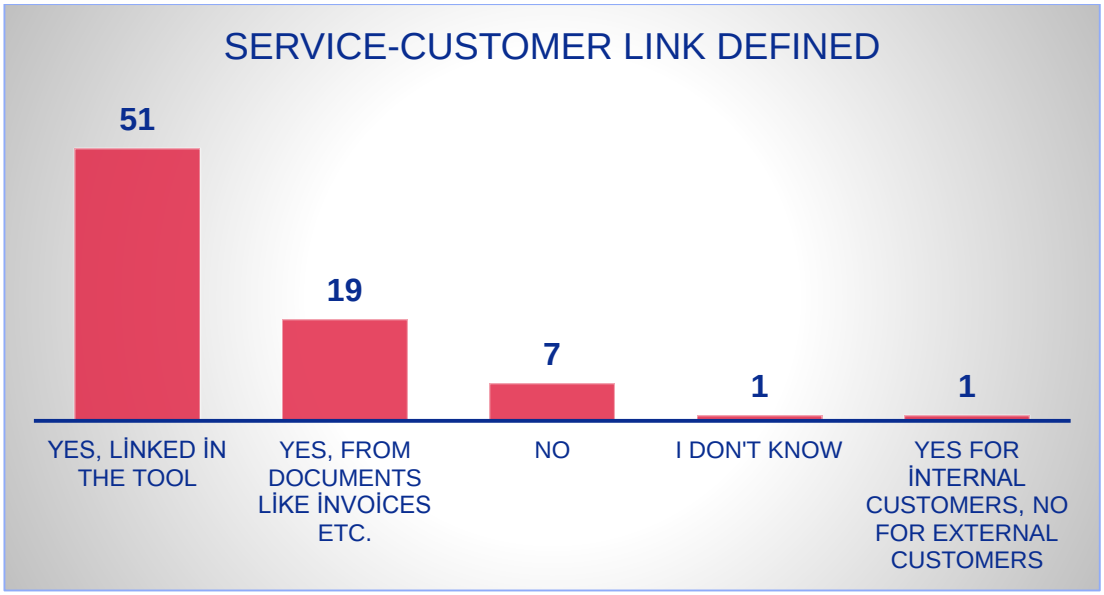


Figure 10. Number of companies that linked their services with customers

5.3 Theoretical model for hypothesis testing

Based on the literature reviews and interviews, our questionnaire includes 19 challenges that are classified in 7 MCs and 4 CGs in Table 1. In this section, we develop a theoretical model (Figure 11), where we explore the potential factors that affect the importance levels of 7 MCs, Ij, j=1,2,…,7, the success levels of 4 CGs, i.e., S1, S2, S3, S4, and the overall SCM success, S5.

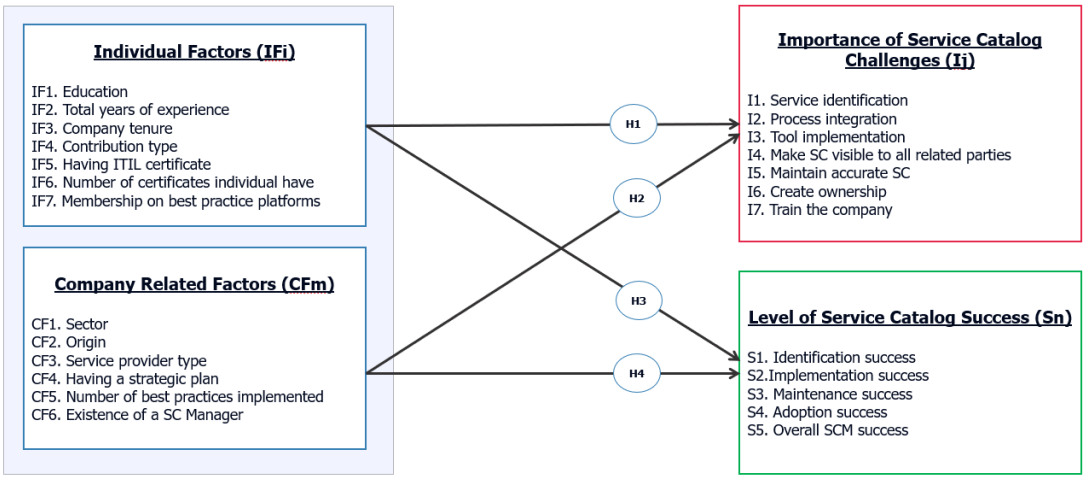


Figure 11. Theoretical model for hypothesis testing

In this theoretical model (Figure 11), affecting factors are separated into two distinct groups. In addition to the factors determined in the academic literature and ITIL, additional factors affecting the importance of main challenges and success of the SC are identified and determined in the expert interviews as shown in Table 20.

Table 20. Factors Identified in Academic Studies, ITIL, and Expert Interviews

Factor Groups	Variable Factors	Source
Individual Factors Related (IFi, i=1,2,…,7)	IF1-Education	Macias et al.
	IF2-Total years of experience	Macias et al.
	IF3-Company tenure	Interview
	IF4-Contribution type	Interview
	IF5-ITIL certificate	Macias et al.
	IF6-Number of certificates individual have	Macias et al.
	IF7-Membership on best practice platforms	Interview
Company Related Factors (CFm, m=1,2,…,6)	CF1-Sector	Interview
	CF2-Origin	Interview
	CF3-Service provider type	Interview
	CF4-Having a strategic plan	Interview
	CF5-Number of best practices implemented	Interview
	CF6-Existence of a SC Manager	ITIL

Individual factors, IFi, i=1,2,…,7 are unique to the person who implements and manages the SC. The following are 1-education level of the implementer; 2-total years of experience that the implementer has; 3-years of experience in the current company that implemented or used the SC; 4-contribution type, which shows if the respondent is an individual contributor in the team or manages a team; 5-having an ITIL certificate; 6-total number of certificates that respondent has; and 7-having membership to best practice platforms like ISACA or Axelos. In their study, Macias et al. (2018) observed that some individual factors may affect the successful implementation of SC; also, during the interviews with SMEs, the same observation was made.

The companies' attributes are identified as company related factors, CFm, m=1,2,…,6 such as 1-sector that the company performs in, 2-origin of the company, 3-whether they serve internal or external customers or both, 4-having a long-term strategic plan, 5-number of best practices implemented within the company, and 6-assigning SCMngr to be responsible from SC from end to end. Knowing the effects

of these factors on the importance and success levels of challenges provides valuable guidance for the success of SC implementations. Hence, several hypothesis tests are generated in Table 21 to explore these effects.

Table 21. Set of Hypotheses and Number of Tests

Set of Hypotheses	Number of Tests
H^1_{ij}: Individual factor i, IFi has a significant effect on the importance of main challenge j, Ij, i=1,2,..,7, j=1,2,…,7	49
H^2_{mj}: Company factor m, CFm has a significant effect on the importance of main challenge j, Ij, m=1,2,..,6, j=1,2,…,7	42
H^3_{in}: Individual factor i, IFi has a significant effect on the success level n, Sn, i=1,2,..,7, n=1,2,…,5	35
H^4_{mn}: Company factor m, CFm has a significant effect on the success level n, Sn, m=1,2,..,6, n=1,2,…,5	30

H1 set of hypotheses are used to explore the effects of individual factors, IFi on the importance of main challenges, Ij. Since there are 7 personal factors, and 7 main challenges, there are 49 hypotheses in this form. Using H2 set of hypotheses, we investigate the influence of company related factors, CFm on the importance of the main challenges, Ij. Since there are 6 company factors and 7 main challenges, H2 contains 42 hypotheses. In order to investigate the impact of individual factors, IFi on the challenge group success, as well as the overall SCM success, Sn, the H3 set of hypotheses will be used. There are total of 35 hypotheses in this form since there are 7 individual factors and 5 success groups. H4 set of hypotheses is used to explore the role of company related factors, CFm on challenge group success and the overall SCM success, Sn. Given that there are 6 company related factors and 5 success groups, n=1,2,...,5, H4 contains 30 hypotheses.

5.4 Identifying the main challenges and the affecting factors

One of the key objectives of this research is to conduct a comprehensive analysis of the impediments that lead to a lower SCM success, despite the companies' best intentions and desires. This section explores whether the main challenges are truly critical success factors for SCM, i.e., which of the seven main challenges are the most difficult and/or important to overcome for those who have implemented SCs, and which individual or company factors affect the importance of these challenges.

In order to have successful SCM, 98 individuals rated the importance of seven main challenges. All main challenges received an average importance score of more than 4.48, with a minimum individual importance score of three, and a maximum importance score of five. This demonstrates that all of the main challenges are very important for the success of SCM.

There are some differences in terms of the importance and difficulty level of the main challenges (Figure 12). According to the findings, MC6: the adoption and ownership challenge is considered as the most challenging one with a score of 3.57 and the third most important challenge with a score of 4.76. The second most difficult step is MC5: maintaining an accurate, up-to-date SC with a score of 3.40. It is also ranked as the most important challenge for SCM success. The third most challenging main challenge is MC3: tool implementation with a score of 3.34. However, MC3: implementing SC and the processes that go along with the tool are seen as the least important main challenge when it comes to managing SC well. Although it is ranked as the least important, its importance score of 4.49 out of 5 is still high. The fourth one is MC2: integrating SCM processes with other related processes with a score of 3.28, and it is also the fourth most important challenge with a 4.73 score. MC7: training the company to increase awareness and follow best

practices is the fifth most difficult tmain challenge and the challenge score of the training is 3.261. The importance score is 4.53, which makes training the fifth in challenge level and sixth in importance.

According to this survey, MC1: identifying services and service linkages is regarded as the most difficult problem by only 2% of respondents. MC1 is relatively less challenging with a score of 3.255 but indeed it is the second most important challenge to overcome to manage SC with a 4.82 score. The least challenging step is MC4: making SC visible, and the challenge score is relatively low at 2.66. It is considered as the fifth most important challenge with a score of 4.57.

In brief, all of the main challenges considered are important. MC4: making service catalog visible, MC1: identifying the services, service relations and MC7: training are considered as the least challenging ones which can be good starting points for demonstrating success and gaining the benefit.

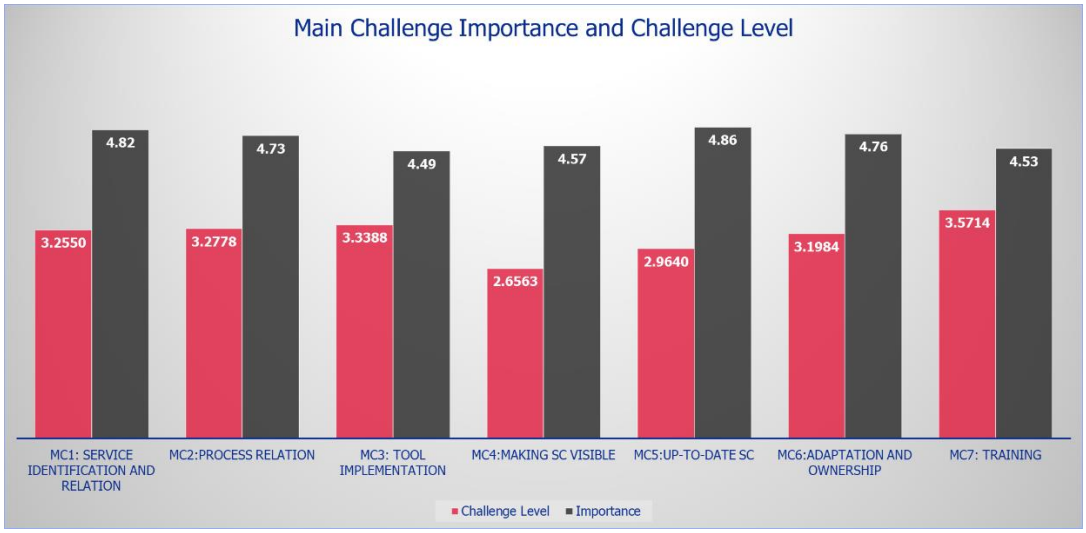


Figure 12. Comparison of the importance and difficulty level of the main challenges

Another key objective of this study is to identify which of the 19 challenges are implemented most frequently and how hard they are to accomplish. This section

delves into 19 challenges placed under the main challenges in Table 1. In Figure 13, the mean difficulty levels of 19 challenges are found to be between 2.62 to 3.76. The most difficult challenge and its mean difficulty level is C11: obtaining the required investment and time from all related stakeholders (3.76). The others are C17: positioning the SC as the central data source (3.75), C16: get managers support (3.68), C4: linking assets to the related services (3.58) and C14: Identify retired services (3.57).

The most implemented steps are C18: giving ITIL training, C1: identifying core services, C10: integrate internal tools, C16: getting C-level and C7: defining each service in the tool. C2: Indetify enabling services, C12: Making the SC visible and C4: linking assets to the services comes next (Figure 13).

We see that C16: getting C-level managers support is a critical challenge since it is implemented very frequently and it is very challenging.

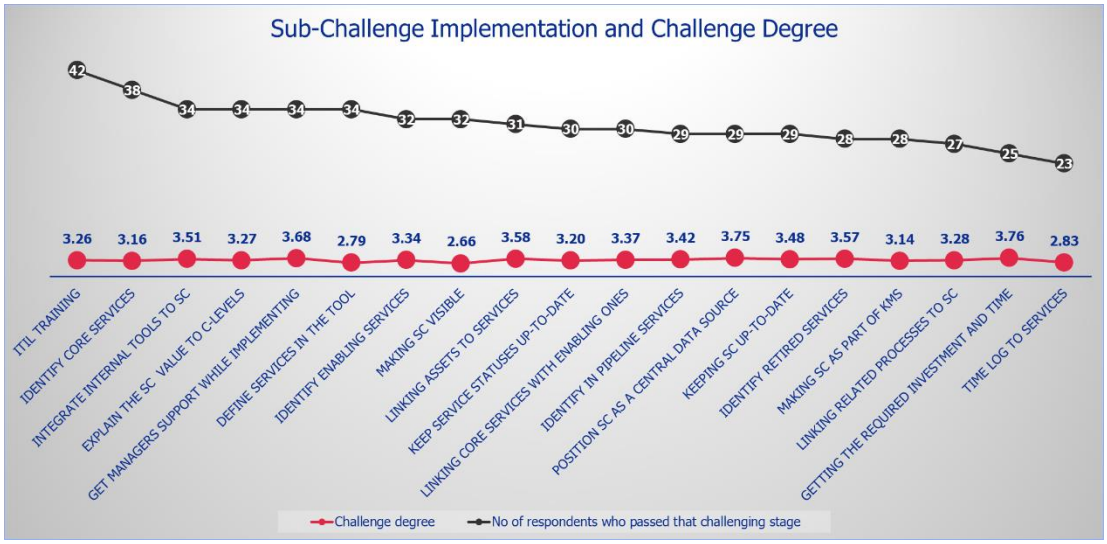


Figure 13. Number of respondents who implemented challenge and its average difficulty level

Next, we identify the factors that affect the importance of the seven main challenges, H1 and H2 sets of hypotheses tests are performed in accordance with the

theoretical model in Figure 11 and list of hypotheses in Table 21. We use the intervals for the p-values and the colours in Table 22 to evaluate the significance of our results. Hypothesis tests on the group means are conducted by ANOVA and t-tests. Results are validated further by checking the homogeneity of variances in the groups by Levene tests.

Table 22. Significance levels used in hypothesis tests

Highly significant	p-value < 1%
Significant	1% <= p-value < 5%
Weakly significant	5% <= p-value < 10%
Not significant	p-value >= 10%
Significant but failed in Levene test	**p-value < 5%**

In hypotheses set H1, the effects of 7 individual factors, IFi on the importance of 7 main challenges, Ij are tested respectively. In total there are 49 tests in H1 hypotheses tests as provided in Figure 11 and Table 20.

H^1_{1j}: IF1: Education level of the interpreter has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^1_{2j}: IF2: Total years of experience of the implementer has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^1_{3j}: IF3: Current company tenure of the implementer has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^1_{4j}: IF4: Contribution type of the implementer has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^1_{5j}: IF5: ITIL certification of the implementer has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^1_{6j}: IF6: Number of certificates of the implementer has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^1_{7j}: IF7: Membership in the best practice platform of the implementer has a significant effect on the importance of main challenge Ij, j=1,2,…,7

The results of the H^1 tests are provided in Table 23. The individual factors for IF1: education, IF2: total tenure, IF3: company tenure, IF5: ITIL certificate and IF7: membership to IT platforms are found to be the significant factors for the importance of some main challenges. However, the significance of Levenes's test for equality of variances is less than 0.05 in all these cases, so all those hypotheses are rejected. Ultimately no significant individual factors can be identified for the importance of challenge levels.

Table 23. The results of H1 hypothesis tests: Effects of individual factors on the importance of main challenges

		Importance of Main Challenges						
Tests	Factors	I1-Service Identifi-cation	I2-Process Relation	I3-Tool Implemen-tation	I4-Make SC visible	I5-Up-to-date SC	I6-Ownership	I7-Training
T-test	IF1-Education	**0.007**	0.860	0.984	0.247	0.285	0.855	0.696
Anova	IF2- Total Tenure	**0.007**	**0.024**	0.278	0.613	0.956	0.775	0.302
Anova	IF3-Company Tenure	**0.011**	0.397	0.133	0.563	0.359	0.515	0.22
T-test	IF4-Contribution Type	0.348	0.909	0.868	0.647	0.672	0.925	0.878
Anova	IF5-ITIL Certificate	0.151	0.285	0.111	**0.018**	0.102	0.649	0.497
Correlation	IF6-Certificates	0.22	0.762	0.623	0.204	0.192	0.928	0.405
t-Test	IF7-Membership BP Platforms	0.133	0.917	0.949	0.199	0.762	**0.054**	0.368

The second set of hypotheses H2 focuses on the effect of 6 company related factors, CFm on the 7 importance of main challenges, Ij. In total there are 42 tests in H2 hypotheses tests as provided in Figure 11 and Table 21.

H^2_{1j}: CF1: The sector that company operates in has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^2_{2j}: CF2: The origin of the company has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^2_{3j}: CF3: The service provider type of the company has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^2_{4j}: CF4: Having a long-term strategic plan has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^2_{5j}: CF5: Number of best practices implemented within the company has a significant effect on the importance of main challenge Ij, j=1,2,…,7

H^2_{6j}: CF6: Assigning SCMngr has a significant effect on the importance of main challenge Ij, j=1,2,…,7

The results of the H^2 tests are provided in Table 24. The company related factors for CF1: sector, CF3: service provider type and CF4: having long-term strategic plan are found to be the significant factors for the importance of some main challenges. However, the significance of Levenes's test for equality of variances is less than 0.05, so $H^2_{1j,}$ H^2_{3j} and H^2_{4j} are not justified. H^2_{5j} are not justified due to insignificant p-values while $H^2_{22,}$ H^2_{25} and H^2_{61} are validated which means CF2: origin and CF6: existence of SCMngr can be identified as significant factors for the importance of some challenge levels.

Table 24. The results of H2 hypothesis tests: Effects of company related factors on the importance of main challenges

		Importance of Main Challenges						
Tests	Factors	I1-Service Identification	I2-Process Relation	I3-Tool Implementation	I4-Make SC visible	I5-Up-to-date SC	I6-Ownership	I7-Training
Anova	CF1-Sector	0.44	0.819	**0.002**	0.904	0.216	0.49	0.377
Anova	CF2-Origin	**<0.001**	0.042	**<0.001**	**0.015**	<0.001	0.119	0.401
Anova	CF3-SPType	0.353	0.12	0.46	0.632	0.248	**0.076**	0.674
Anova	CF4-StrPlan	**0.002**	0.507	0.164	0.969	0.207	0.531	0.672
Correlation	CF5-BestPractice	0.101	0.705	0.462	0.436	0.205	0.843	0.771
Anova	CF6-SCMngr	0.003	**0.007**	0.542	0.718	0.561	0.249	0.776

In $H^2_{22,}$ we find that CF2: The origin of the company has a significant effect on I2: the importance of linking SC with related processes for successful SCM ($F(6, 91) = 2.286$, p-value = 0.042). Based on the post hoc Tukey test significance, a difference occurs between the UK and the rest of the origins. The mean score of the UK for the I2: importance of linking SC with related processes for successful SCM is 4.00 while the rest of the countries have mean I2 scores between 4.5 and 5.0 (Figure 14).

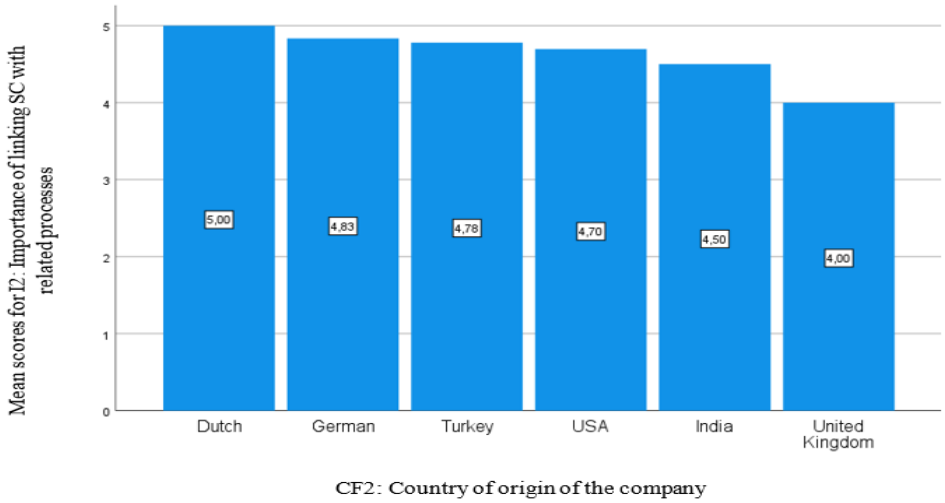


Figure 14. Mean scores for I2: Importance of linking SC with related processes for successful SCM versus CF2: Country of origin

In H^2_{25}, we find that CF2: the origin of the company has a significant effect on the I5: the importance of keeping SC up-to-date for successful SCM ($F(6, 91) = 12.594$, p-value <0.001). There is a significant difference between the UK and the other origins. The Tukey HSD test p-values between the UK and the other origins are less than 0.001. The mean importance score of UK for keeping SC up-to-date is 4.0. The rest of the origins' means are scored between 4.86 and 5.0. The companies whose origins are India, Germany, and the Netherlands give full score to the importance of maintaining accurate SC to be able to manage SC successfully (Figure15)

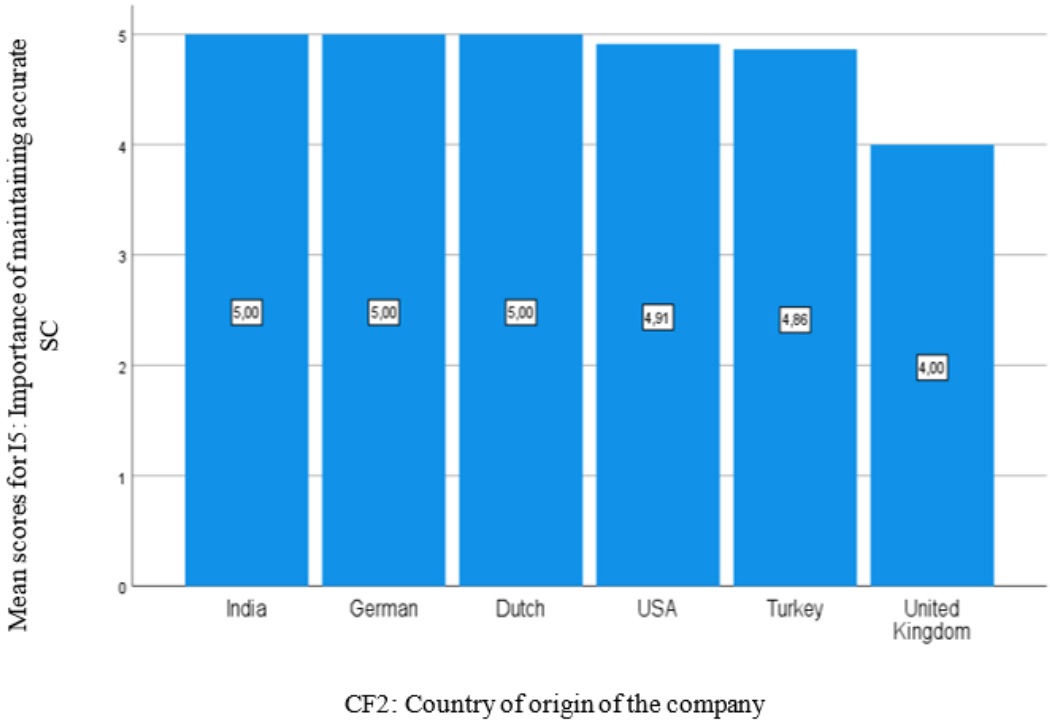


Figure 15. Mean scores for I5: Importance of maintaining accurate SC for successful SCM versus CF2: Country of origin

In H^2_{61}, we find that CF6: assigning SCMngr has a highly significant effect on I1: the importance of identifying services and linking them together ($F(2, 76) = 6.230$, p-value = 0.003). The mean score of CF6: The importance of service identification and relationships in order to manage SC successfully is higher (4.86) when there is an assigned SCMngr within the company. The mean importance score decreases to 4.38 when there is no SCMngr within the company (Figure 16).

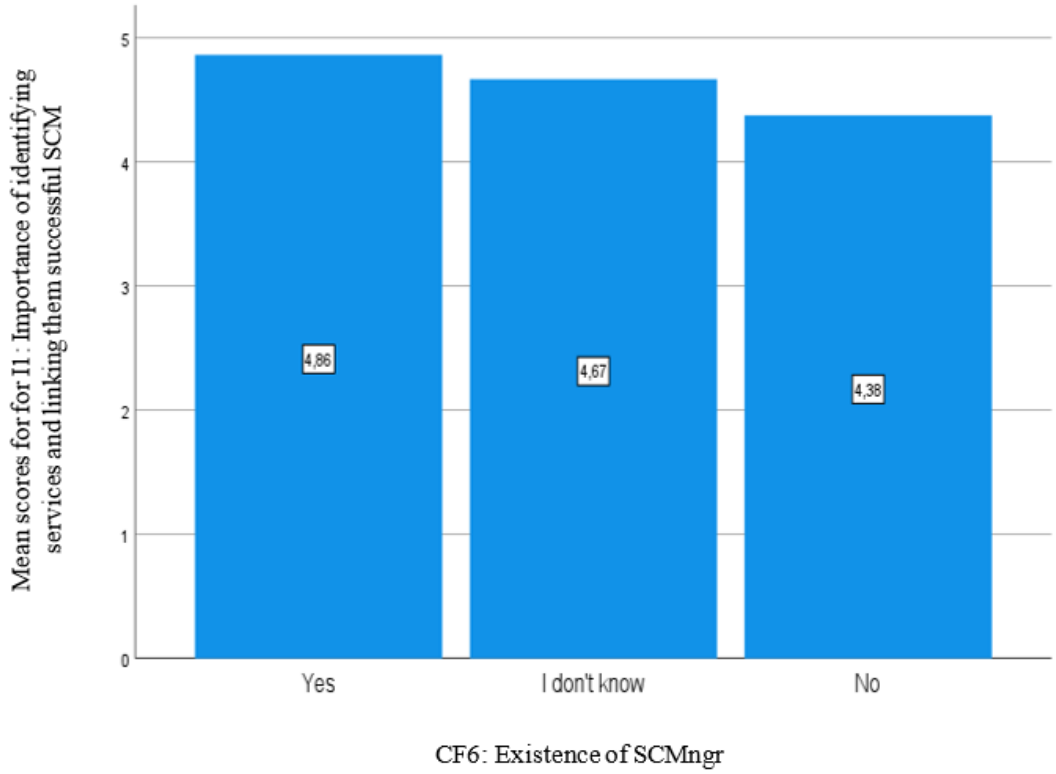


Figure 16. Mean scores for I1: Importance of identifying services and linking them for successful SCM versus CF6: Existence of SCMngr

5.5 Identifying the factors that influence the level of service catalog success

The other major objective is to do statistical analysis to determine which factors and SC success groups are related. This will help us in determining which elements contribute to the success of SCM.

In hypotheses set H3, the effects of 7 individual factors, IFi on the levels of 5 SC success groups, Sn are tested respectively. In total there are 35 tests in H3 hypotheses tests as provided in Figure 11 and Table 20.

H^3_{1n}: IF1: Education level of the interpreter has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^3_{2n}: IF2: Total years of experience of the implementer has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^3_{3n}: IF3: Current company tenure of the implementer has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^3_{4n}: IF4: Contribution type of the implementer has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^3_{5n}: IF5: ITIL certification of the implementer has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^3_{6n}: IF6: Number of certificates of the implementer has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^3_{7n}: IF7: Membership in the best practice platform of the implementer has a significant effect on the level of SC success group Sn, n=1,2,…,5

The results of the H^3 tests are provided in Table 25. The individual factors for IF1: education, IF3: company tenure, IF4: contribution type and IF7: membership in the best practice platforms are found to be the significant factors for the level of SC success groups. However, the significance of Levenes's test for equality of variances is less than 0.05 in all these cases, so hypotheses H^3_{11}, H^3_{12}, H^3_{13}, H^3_{15}, H^3_{33}, H^3_{44}, H^3_{71} are not justified. Ultimately, no significant individual factors can be identified for the SC success groups.

Table 25. The results of H3 hypothesis tests: Effects of individual factors on the level of SC success groups

		Level of SC Success Groups				
Tests	Factors	S1-Identification Success	S2-Implementation Success	S3-Maintenance Success	S4-Adoption Success	S5- Overall SCM Success
t-Test	IF1-Education	**0.053**	**0.004**	**0.083**	0.171	**0.011**
Anova	IF2-Total Tenure	0.869	0.662	0.642	0.666	0.768
Anova	IF3-Company Tenure	0.525	0.164	**0.049**	0.191	0.186
t-Test	IF4-Contribution Type	0.95	0.327	0.925	**0.061**	0.514
Anova	IF5-ITIL Certificate	0.931	0.453	0.796	0.131	0.439
Correlation	IF6-Certificates	0.725	0.167	0.657	0.111	0.307
t-Test	IF7-Membership BP Platforms	**0.007**	0.751	0.257	0.965	0.165

Lastly, in hypotheses set H4, the effects of 6 company-related factors, CFm on level of 5 SC success groups, Sn are tested respectively. In total there are 30 tests in H4 hypotheses tests as provided in Figure 11 and Table 20.

H^4_{1n}: CF1: The sector that company operates in has a significant effect on level of SC success group Sn, n=1,2,…,5

H^4_{2n}: CF2: The origin of the company has a significant effect on level of SC success group Sn, n=1,2,…,5

H^4_{3n}: CF3: The service provider type of the company has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^4_{4n}: CF4: Having a long-term strategic plan has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^4_{5n}: CF5: Number of best practices implemented within the company has a significant effect on the level of SC success group Sn, n=1,2,…,5

H^4_{6n}: CF6: Assigning SCMngr has a significant effect on the level of SC success group Sn, n=1,2,…,5

The results of the H^4 tests are provided in Table 26. Accordingly, the company related factors for CF4: having long-term strategic plan, CF5: number of best pactices implemented within the company and CF6: existence of SCMngr are found to be the significant factors for some of the SC success groups.

H^4_{43} and H^4_{45} tests indicate that CF4: company having a strategic plan has a significant effect on S3: maintenance, and it has weakly significant effect on S5: overall SCM success. Furthermore, H^4_{51}, H^4_{52}, H^4_{53}, H^4_{55} tests show that CF5: number of best practices implemented has a significant effect on S1: identification and S2: implementation, and it has highly significant effects on S3: maintenance and S5: overall SCM success. Lastly, by H^4_{61}, H^4_{62}, H^4_{63}, H^4_{65} tests we see that CF6: assigning SCMngr has a significant effect on S1: identification, and it has highly significant effects on S2: implementation, S3: maintenance and S5: overall success groups.

Table 26. The results of H4 hypothesis tests: Effects of company related factors on the level of SC success groups

		Level of SC Success Groups				
Tests	Factors	S1-Identification Success	S2-Implementation Success	S3-Maintenance Success	S4-Adoption Success	S5-Overall SCM Success
Anova	CF1-Sector	0.484	0.852	0.638	0.701	0.646
Anova	CF2-Origin	0.812	0.975	0.571	0.907	0.915
Anova	CF3-SPType	0.491	0.754	0.755	0.651	0.921
Anova	CF4-StrPlan	0.172	0.214	0.012	0.927	0.099
Correlation	CF5-BestPractice	0.012	0.014	<0.001	0.221	0.004
t-Test	CF6-SCMngr	0.023	0.002	0.003	0.735	0.003

Now we further explore the significant factors for S1: identification success. CF5: number of best practices has a significant effect on the identification success ($r = 0.383$, $n = 42$, p-value = 0.012). In Figure 17, we see that the mean score for S1: Identification success is tend to increase when CF5: the number of implemented best practices increases.

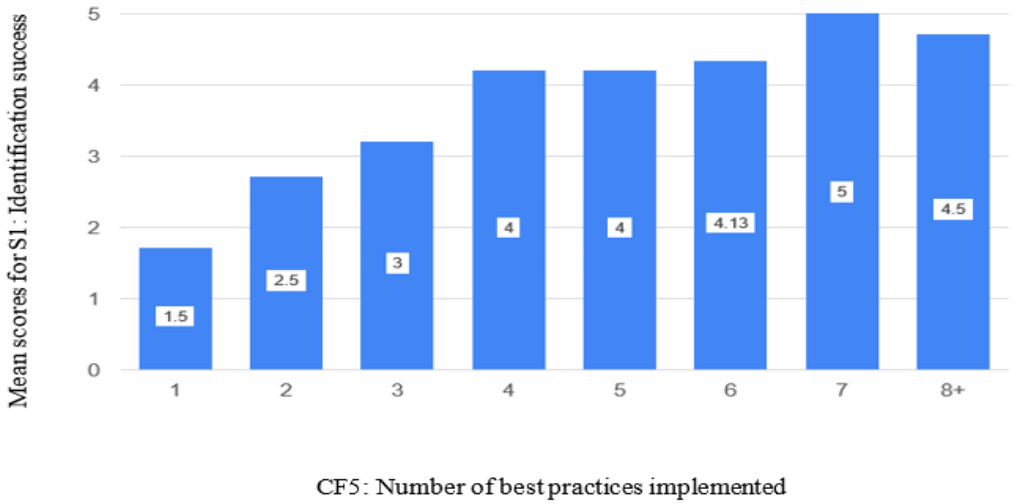


Figure 17. Mean scores for S1: identification success versus CF5: number of best practices implemented

Additionally, CF6: existing of SCMngr has a significant effect on S1: identification success (t(34) = 2.380, p-value = 0.023). In Figure 18, the mean score of the S1: identification success is 4.1 for the companies that assign SCMngr. The mean success score decreases to 2.6 when there is no SCMngr within the company.

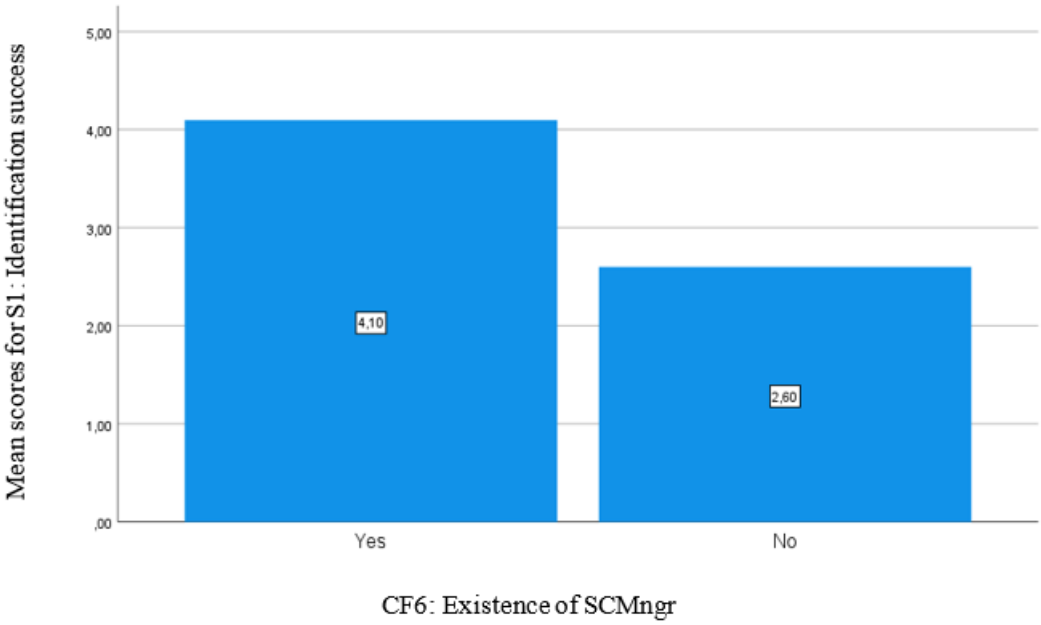


Figure 18. Mean scores for S1: identification success versus CF6: existence of SCMngr

There are two significant company related factors for S2: success of implementation. CF5: the number of best practices implemented within the company has a significant effect on the S2: implementation success (r = 0.376, n = 42, p-value = 0.014). In Figure 19, the mean score for S2: Implementation success tend to increase when the number of implemented best practices increases.

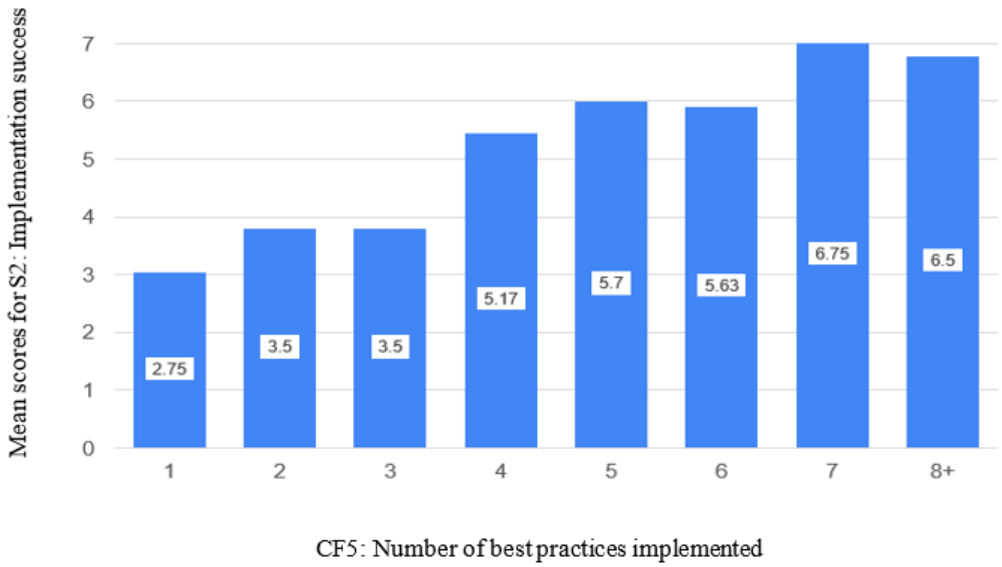


Figure 19. Mean scores for S2: implementation success versus CF5: number of best practices implemented

Nevertheless, CF6: existence of SCMngr has a highly significant effect on S3: implementation success ($t(34) = 3.330$ p-value = 0.002). In Figure 20, the mean score of S2: implementation success is 5.23 for the companies that assign a SCMngr. The mean S3: implementation success score decreases to 2.7 when there is no SCMngr within the company.

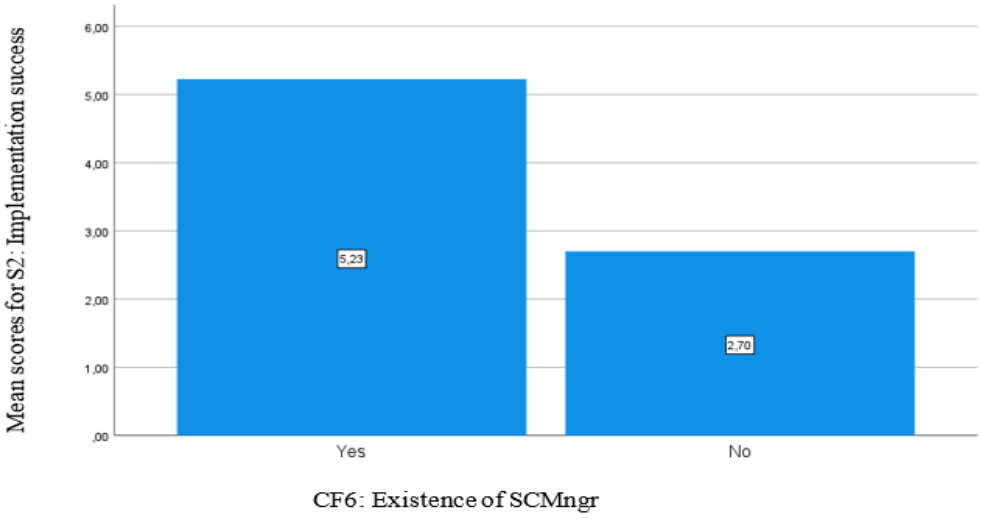


Figure 20. Mean scores for S2: implementation success versus CF6: existence of SCMngr

There are three significant company related factors that affect S3: success of the maintenance.

CF4: having a long-term strategic plan in the company has a significant effect on the S3: maintenance success (F(1, 40) = 1.595, p-value = 0.012). In Figure 21, the mean score of the S3: maintenance success score is 2.25 for the companies that have a long-term strategic plan and it decreases to 1.0 when there is no long-term strategic plan in the company.

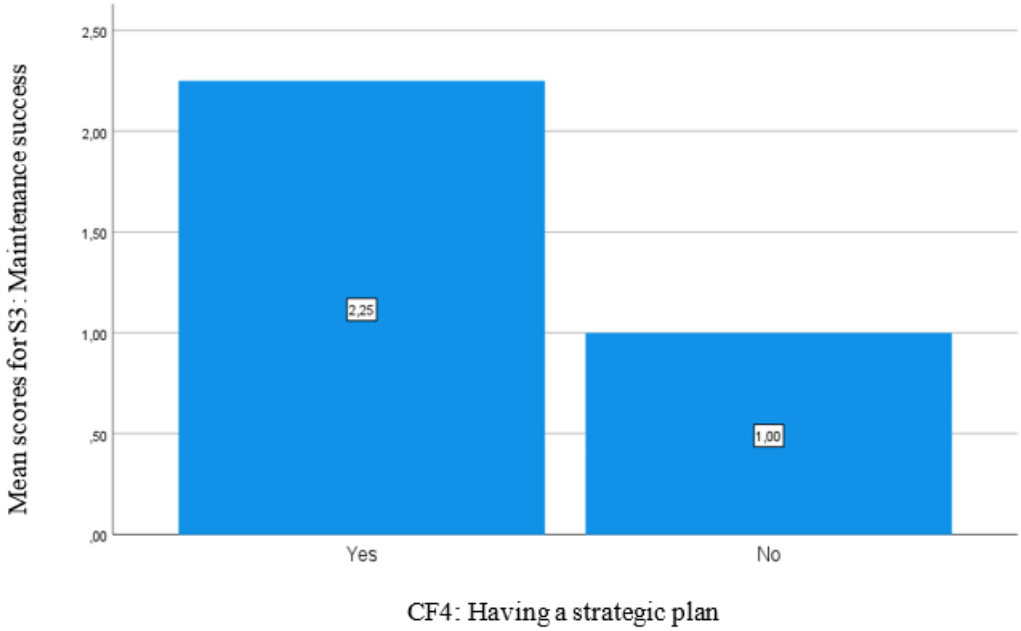


Figure 21. Mean scores for S3: maintenance success versus CF4: having a strategic plan

CF5: the number of best practices implemented has a highly significant effect on the S3: maintenance success (r = 0.516, n = 42, p-value < 0.001). In Figure 22, the mean score for S3: Maintenance success is tend to increase when the number of implemented best practices increases.

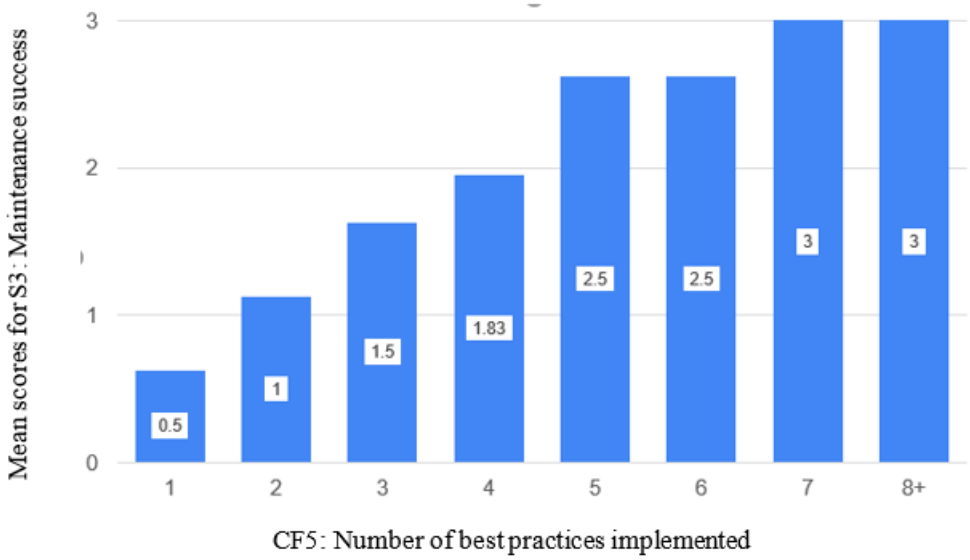


Figure 22. Mean scores for S3: maintenance success versus CF5: number of best practices implemented

The effect of CF6: existence of a SCMngr is highly significant on S3: maintenance successt ($t(34) = 3.179$, p-value = 0.003). In Figure 23, the mean of the S3: maintenance success is 2.32 for the companies that assign a SCMngr. The mean success score decreases to 0.8 when there is no SCMngr within the company.

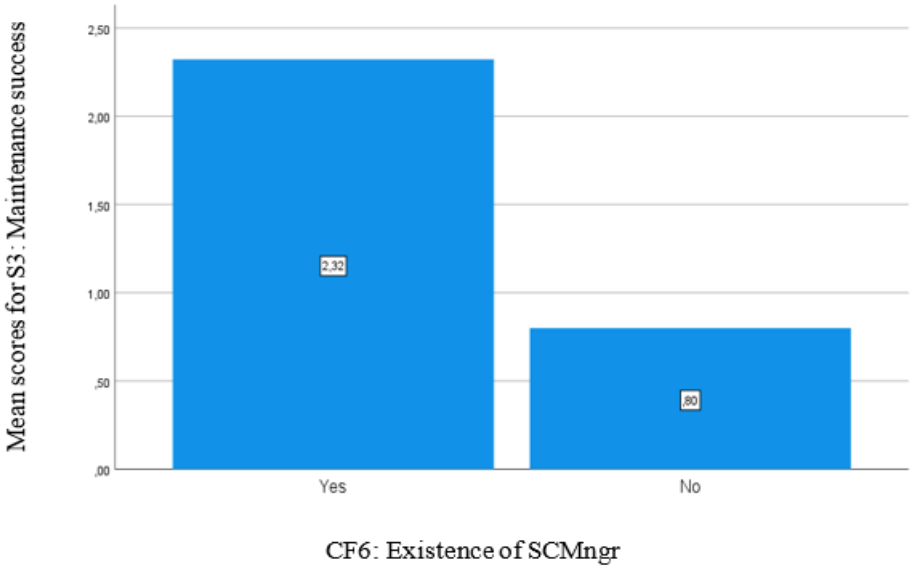


Figure 23. Mean scores for S3: maintenance success versus CF6: existence of SCMngr

For S4: adoption success, none of the company related factors are found to have a significant effect.

Lastly, there are three company related factors that affect S5: overall SCM success.

CF4: having a long-term strategic plan in the company has a significant effect on S5: overall SCM success ($F(1, 40) = 2.851$, p-value = 0.099). In Figure 24, the mean score of the S5: overall SCM success is 13.5 out of 19 for the companies that have a strategic plan. The mean success score decreases to 10.25 for the ones that do not have a long-term strategic plan within the company.

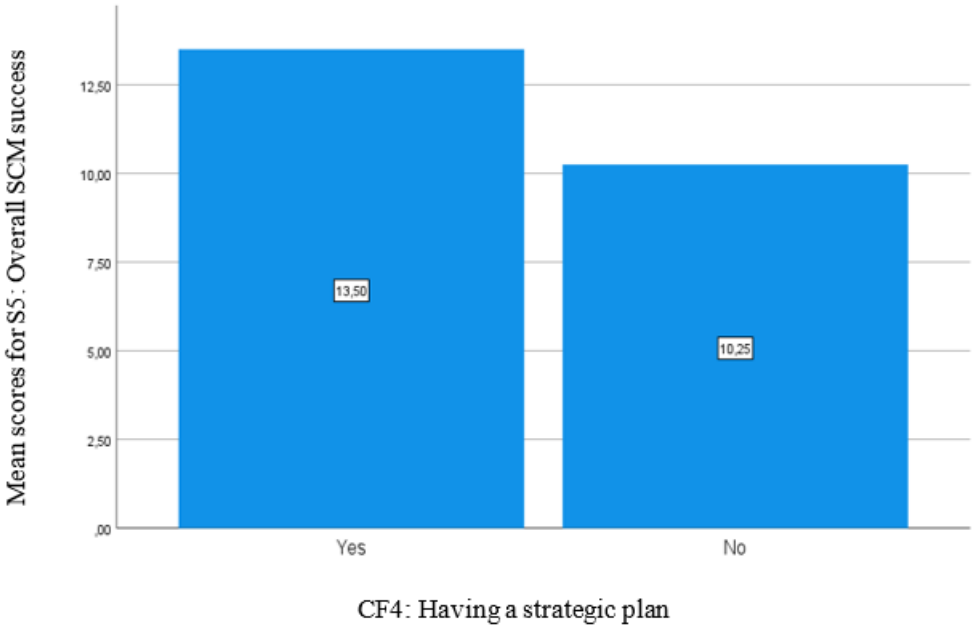


Figure 24. Mean scores for S5: overall SCM success versus CF4: having a strategic plan

CF5: the number of best practices implemented has a highly significant effect on S5: overall SCM success ($r = 0.442$, $n = 42$, p-value = 0.004). In Figure 25, SCM success tend to increase when the number of implemented best practices increases.

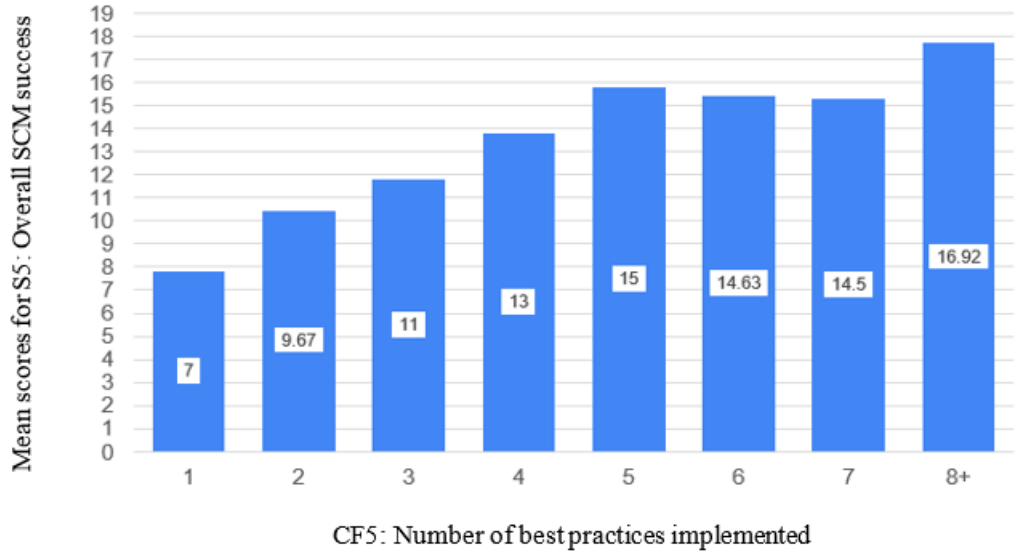


Figure 25. Mean scores for S5: overall SCM success versus CF5: number of best practices implemented

Also, CF6: existing of SCMngr has a highly significant effect on S5: overall SCM success ($t(34) = 3.185$, p-value = 0.003). In Figure 26, the mean score of the S5: overall SCM success is 14.19 out of 19 for the companies that assigned SCMngr. The mean success score decreases to 8.5 when there is no SCMngr within the company.

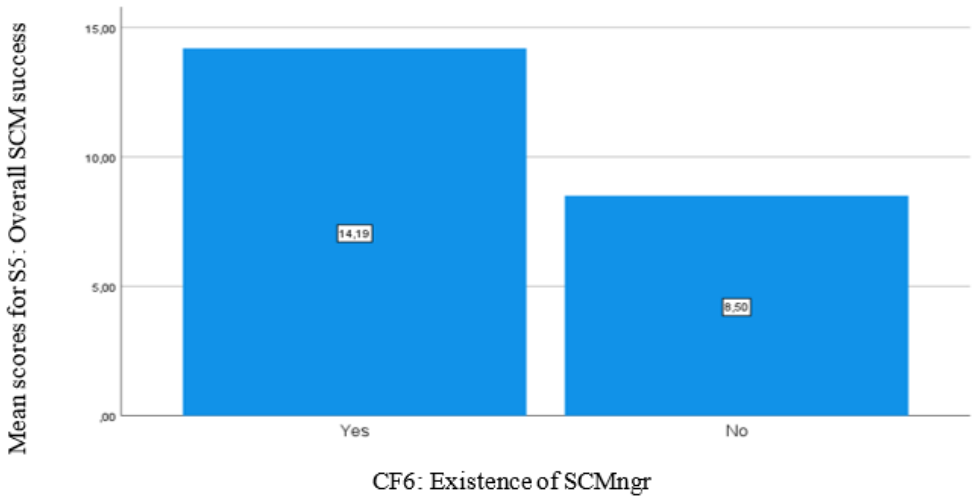


Figure 26. Mean scores for S5: overall SCM success versus CF6: existence of SCMngr

5.6 Results

This research examines 98 replies from twelve sectors and companies originating from eight countries. 56 of the respondents only used the SC, while the remaining 42 also implemented it. 156 hypotheses are tested during this study. Figure 27 demonstrates the 13 hypotheses that are validated.

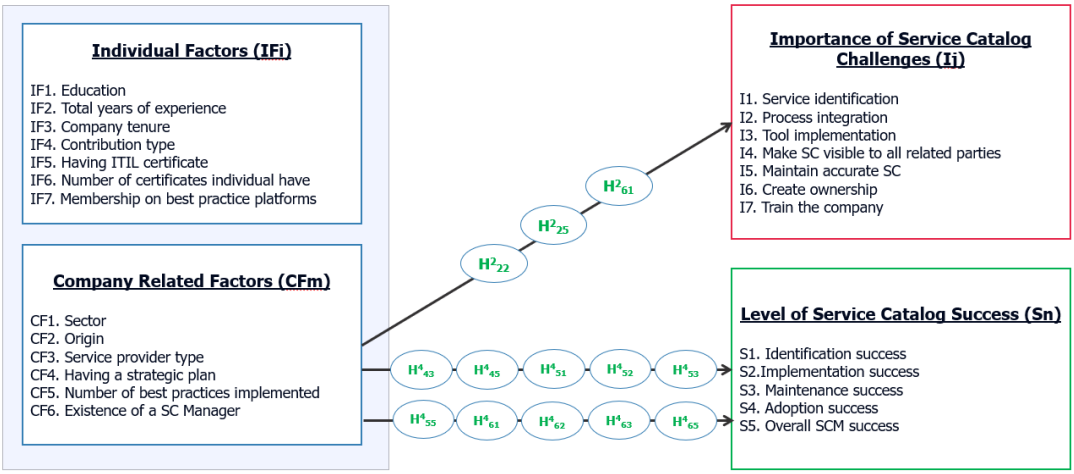


Figure 27. Hypothesis tests that are validated

We show in our hypothesis tests that company related factors have significant impacts on the level of SC success (Figure 27). Companies that have assigned SCMngrs (CF6) and have implemented best practices in the company (CF5) have higher successes in identification (S1), implementation (S2), and maintenance (S3) phases of SCM that further leads to higher overall success of SCM (S5). Additionally, companies that have strategic plans (CF4) tend to have higher success in maintaining SC (S3) which results in higher overall success in SCM (S5).

Surprisingly, we fail to show any significant effect of individual factors on the issues related to SCM. Although in Section 5.4 education (IF1), total years of experience (IF2), current company tenure (IF3), having ITIL certificate (IF5) and membership on best practice platforms (IF7) are found to be significant individual

factors, they fail in homogeneity tests. We note these potential factors and leave the exploration of their significances for further research.

In our study, there are seven main challenges in SCM that belong to four challenge groups (Table 1). We assess and compare the importance and the difficulty of these main challenges (Figure 12). Finally, we explore the company related factors that affect the success of the challenge groups (Figure 27). Now we summarize our findings for each challenge group respectively, in the order of their importances.

Maintaining SC accuracy (MC5) main challenge is ranked top in terms of importance and ranked second in terms of challenge level (Figure 12). It is the only main challenge that belongs to the maintenance (CG3) challenge group (Table 1). We explore that the importance of this main challenge (I5) differs in accordance to the country origin of the company (Figure 27). In UK originated companies maintaining SC accuracy (MC5) seem to be less important (Figure 15). At this point we find that company related factors such as having a strategic plan (CF4), implementing best practices (CF5) and assigning SCMngr (CF6) lead to higher success in Maintaining an accurate, up to date service catalog (S3) (Figure 27).

Identifying services and service linkages (MC1) is ranked as the second important main challenge (Figure 12). It is the only main challenge that belongs to the Identification challenge group (CG1) (Table 1). It is crucial and one of the initial steps that need to be taken in order to have a catalog. Without defining the services and linking them together, it is not possible to have a service catalog that will be shown to the customers. We find that existence of a SCMngr (CF6) is critical in coping with this important challenge (Figure 27). Importance of identifying services and service linkages (I1) is less in companies with an assigned SCMngr (CF6)

(Figure 16). Nevertheless, the number of best practices (CF5) and existence of an assigned SCMngr (CF6) are significant company related factors in the success of identification stage in SCM (S1) (Figure 27).

Tool implementation (MC3) is the third most challenging step (Figure 12), and it is one of the three main challenges that belong to the implementation (CG2) challenge group (Table 1). None of the individual or company related factors are found to have a significant effect on the importance of tool implementation (MC3). However, in addition to tool implementation (MC3), there are two other main challenges under implementation (CG2) challenge group, i.e., process integration (MC2) and making SC visible to all related parties (MC4) (Table 1). We explore that the importance of the process integration (I2) main challenge differs in accordance to the country of origin of the company (CF2) (Figure 27). In UK-originating companies, integrating related processes with the SC (I2) seems to be less important (Figure 14). Nevertheless, making SC visible (MC4) is considered as the least challenging of the seven main challenges (Figure 12). Finally, we find that company-related factors such as implementing best practices (CF5) and assigning SCMngr (CF6) have significant effects on achieving higher implementation success (S2) (Figure 27).

Finally, creating ownership inside the organization (MC6) is the most difficult main challenge to overcome for one-third of the responders (Figure 12). It is one of the two main challenges of the Adoption (CG4) challenge group; the other one is the need for training and best practice knowledge (MC7) (Table 1), which is fifth in terms of importance (Figure 12). We find that the importances of these main challenges are not affected by any individual or company-related factor. Although in Section 5.4 membership on best practice platforms (IF7) and service provider type

(CF3) are found to be significant factors for the importance of creating ownership within the organization (MC6), they fail in homogeneity tests. Also, in our analysis, we fail to show any significant effect of an individual or company-related factor on adoption success (S4). In Section 5.5, contribution type (IF4) is found to be a significant individual factor for adoption success (S4), but it fails in the homogeneity test. Further research can be carried out on these factors.

CHAPTER 6

CONCLUSION

The SC is the only client-facing component of the service portfolio and is used to deliver and sell IT services. It includes many important components related to services. SC also establishes the need for a service and how the provider intends to meet it. A comprehensive approach to service delivery necessitates extra attention and care for the SC. The SCM process, which has been on Gartner's hype-cycle lists for the last three years, is important to many important business-wide processes.

The primary goal of this research is to uncover the challenges that businesses face when trying to manage their SCs and to discover the factors that contribute to greater success. Success is classified into five categories: identification, implementation, maintenance, adoption, and overall success. A questionnaire is developed where 98 participants shared their perspectives on the perceived importance of challenges in achieving more success and key factors associated with SCs. 42 participants with experience of implementing SCs ranked the challenges associated with each step they implemented. Five SMEs in this field were interviewed face-to-face during the challenge identification phase and also for the purpose of content validation. The 19 SCM challenges were classified into seven main categories. The importance of identified challenges and variable factors that contribute to greater success in SCM was demonstrated through analyses.

This study makes significant academic contributions and gives valuable industry insights. The dissertation analyzes a variety of hypotheses in order to comprehensively examine the challenging factors affecting the successful management of a SC.

There are certain limitations to this research. To begin with, due to the fact that the questions need highly specialized expertise and knowledge, the studied sample has only 98 responses. A considerably larger sample size may be more appropriate in order to obtain more accurate and demographically reflective results. Some of our tests have failed due to homogeneity of variances; so, we couldn't see the results mainly on individual factor or sector level analysis. More and more evenly distributed data would aid in delving deeper into these factors. Even though site visits would be better for collecting data, they haven't been done because of the COVID-19 outbreak. Instead, only electronic methods of communication and data collection have been used.

All success factors are determined through analysis of current SCM applications by the IT service providers. Additional research can be done focusing on the challenges and success factors of a specific group like adoption to find new ways to set up SC ownership in a company as well as ways to create a company culture that acknowledges the catalog and portfolio as critical sources of information or create guidance for the best ways to link assets to the services in a fast-paced multi technology IT environment. Additionally, we have strategic planning as one challenge. However, having a long-term strategic plan and having an IT plan that is aligned with the strategic plan would be an improvement for further research.

APPENDIX A

INTERVIEW QUESTIONS

Q1: What are the challenges of implementing the SCM process within a company?

Q2: What are the phases of SCM process implementation that you can group the challenges under?

Q3: In which challenge do companies most often fail?

Q4: In which phase companies mostly face the challenges?

Q5: Which factors affect the service catalog management success?

APPENDIX B

QUESTIONNAIRE

Dear Attendee,

The aim of this survey is to identify the challenges that IT service providers face while implementing or managing service catalogs.

This survey has been prepared by Efsun Bal, under the supervision of Assoc. Prof. Dr. Aslı Sencer for the aim of a M.A. study at Boğaziçi University (Business Information Systems).

According to our preliminary research, the difficulties that companies face while adapting to the service catalog process can be categorized into four main groups. The questionnaire below contains questions about these challenges in five sections. Your data will be kept completely confidential and will be used for academic purposes only. It takes 3 to 10 minutes to complete this survey, depending on your answers.

Thank you for your time and interest.

Part 1: Demographic Questions There are 12 questions in this section.	
Questions	Answers
1. Which sector do you work in?*	(Multiple Choice) o Banking and Capital Markets o Entertainment and Media o Electricity and Infrastructure o Industrial Production o Real Estate o Pharmaceuticals and Life Sciences o Construction and Engineering o Public Services o Chemical Industry o Mining and Metals o Automotive o Private Equity o Retail and Consumer Products o Oil and Gas o Health o Insurance and Private Pension o Transportation and Logistics o Information Technology o Telecommunications o Asset and Wealth Management o Other:
2. Which department do you work in?*	(Text)
3. What is your job title?*	(Text)
4. What is your job description?*	(Text)
5. What is your education level?*	(Multiple Choice) o High School o Associate Degree o Bachelor o Master o Ph.D. o Other:
6. What department did you graduate from at the university?*	(Text)

7. How many years of work experience do you have?*	(Dropdown) • 2 years or less • 3-5 years • 6-10 years • 10-15 years • More than 15 years
8. How long you have been working for your current company?*	(Dropdown) • 2 years or less • 3-5 years • 6-10 years • 10-15 years • More than 15 years
9.What is the origin of your company?*	(Multiple Choice) o Turkey o Other:
10. Does your company have long-term (3-5 years) strategic planning?*	(Multiple Choice) o Yes o No o I do not know
11. What type of service provider is your company?*	(Multiple Choice) o We provide services to internal customers o We provide services to external customers o We provide services for internal and external customers
12. Does your company have a service catalog (List of services offered by your company)?*	(Multiple Choice) o Yes (If selected, proceeds to the part 2) o No (If selected, proceeds to the part 3) o I do not know (If selected, proceeds to the part 3)

Part 2: There is service catalog in the company There are 9 questions in this section.	
13. Does the Service Catalog reflects up to date information?*	(Multiple Choice) o Yes o Partially o No o I do not know
14. Do you have a service catalog manager within the company?*	(Multiple Choice) o Yes o No o I do not know
15. Do you able to see the retired services of your company (used to provide but not anymore)?*	(Multiple Choice) o Yes o No o I do not know
16. Do you create your services which are in the pipeline (not ready to provide to the customers -in development) in your service catalog?*	(Multiple Choice) o Yes o No o I do not know
17. Do you keep your service catalog as a document or in the tool?*	(Checkbox) □ Document □ Tool (ITSM, ERP vb.) □ Web site of the company
18. Do you have enabler services in the catalog (not seen by the customer but enable the business/customer facing services like network service, firewall service etc.)?*	(Multiple Choice) o Yes o No o I do not know

19. Which of your processes are linked with the service catalog?*	(Checkbox) ☐ Customer request tickets are associated with service information. ☐ Customer incident tickets are associated with service information. ☐ We keep the service information while developing new services. ☐ We have service-based monitoring. ☐ We know the total costs of each services we provide. ☐ Our current or potential customers see the list of services we provide. ☐ We manage change for each service. ☐ We log the time to the services we provide or develop. ☐ All asset investments are linked to the services they will enable. ☐ Other:
20. Do you know which clients gets which services from your company?*	(Multiple Choice) ○ Yes, we can have this information from documents like invoices etc. ○ Yes, we keep customers and services they use linked in the tool ○ No ○ Other:
21. Did you implemented a service catalog process or only used the service catalog within your company?*	(Multiple Choice) ○ Implemented (If selected, proceeds to the part 3) ○ Used (If selected, proceeds to the part 4) ○ I have never heard this term (If selected, proceeds to the part 5)

Part 3: Implemented service catalog There are 27 to 46 questions in this section based on your answers.	
22. What is the importance of identifying services and link the related ones for a successful service catalog management (Service relation)?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
23. What is the importance of linking service catalog with related internal processes for a successful service catalog management (Process relation)?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
24. What is the importance of creating and managing service catalog in the tool for a successful service catalog management (Tool implementation)?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
25. What is the importance of making service catalog visible to all related people for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
26. What is the importance of keeping service catalog up to date for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
27. What is the importance of adapting service catalog within the company and make people own it for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
28. What is the importance of training employees for service catalog and best practices for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important

29. Which stage was the hardest while implementing the service catalog?*	(Multiple Choice) ○ Identifying services and service linkages that company has and provides ○ Integrating SCM process with other related processes ○ Maintaining an accurate, up tp date service catalog ○ Making SCM process automation (ITSM tool implementation) ○ Creating ownership of SCM within company ○ Getting executive level support ○ Awareness and best practice knowledge of the company
30. Have you identified the core services your company provides?*	(Multiple Choice) ○ Yes (If selected, proceeds to the question 30) ○ No (If selected, proceeds to the question 31) ○ Tried but could not succeed (If selected, proceeds to the question 31)
31. How challenging was the identifying core services?	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
32. Have you identified enabling services (resource facing services)?*	(Multiple Choice) ○ Yes (If selected, proceeds to the question 33) ○ No (If selected, proceeds to the question 36) ○ Tried but could not succeed (If selected, proceeds to the question 36)
33. How challenging was the identifying enabling services?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
34. Have you linked the enabling services to the core services?*	(Multiple Choice) ○ Yes (If selected, proceeds to the question 35) ○ No (If selected, proceeds to the question 36) ○ Tried but could not succeed (If selected, proceeds to the question 36)

35. How challenging was the linking enabling services to the core services?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
36. Have you linked the services to the assets that are used to enable them?	(Multiple Choice) o Yes (If selected, proceeds to the question 37) o No (If selected, proceeds to the question 38) o Tried but could not succeed (If selected, proceeds to the question 38)
37. How challenging was the linking services to the assets that are used to enable them?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
38. Do you enter your time logs linked with the services?*	(Multiple Choice) o Yes (If selected, proceeds to the question 39) o No (If selected, proceeds to the question 40) o Tried but could not succeed (If selected, proceeds to the question 40)
39. How challenging was the designing a process that allows people to log their times related with the services they worked for?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
40. Did you link the internal processes with the service catalog?*	(Multiple Choice) o Yes (If selected, proceeds to the question 41) o No (If selected, proceeds to the question 42) o Tried but could not succeed (If selected, proceeds to the question 42)
41. Which processes did you link with the service catalog and how challenging was to integrate each process with the service catalog (1: It was not challenging, 5:It was very challenging)?*	(Text)

42. Have you defined each service as a configuration item (ci) within the tool you use internally (like ITSM, ERP, CRM etc.)?*	(Multiple Choice) o Yes (If selected, proceeds to the question 43) o Partially (If selected, proceeds to the question 43) o No (If selected, proceeds to the question 44) o Tried but could not succeed (If selected, proceeds to the question 44)
43. How challenging was to define each service as configuration item?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
44. Do you manage the change in your service catalog?*	(Multiple Choice) o Yes (If selected, proceeds to the question 45) o No (If selected, proceeds to the question 46) o Tried but could not succeed (If selected, proceeds to the question 46)
45. How challenging was to manage every change in the service catalog and keep it always up to date?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
46. Do you manage the service catalog as part of knowledge management system?*	(Multiple Choice) o Yes (If selected, proceeds to the question 47) o No (If selected, proceeds to the question 48) o Tried but could not succeed (If selected, proceeds to the question 48)
47. How challenging was to manage service catalog as part of knowledge management system?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
48. If you manage your service catalog in the ITSM tool, have you integrated that tool with other internal tools (like CRM)?*	(Multiple Choice) o Yes (If selected, proceeds to the question 49) o No (If selected, proceeds to the question 50) o Tried but could not succeed (If selected, proceeds to the question 50)

49. How challenging was to integrate all internal tools that is related to service catalog?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
50. Do you think there is high amount of investment and time needed to implement service catalog successfully in the company?*	(Multiple Choice) o Yes (If selected, proceeds to the question 51) o No (If selected, proceeds to the question 52)
51. How challenging was to get the required investment and time?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
52. Is service catalog visible to every related parties?*	(Multiple Choice) o Yes (If selected, proceeds to the question 53) o No (If selected, proceeds to the question 54) o Tried but could not succeed (If selected, proceeds to the question 54)
53. How challenging was to make service catalog visible to all related parties?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
54. Does each service added to service catalog while they are in pipeline (in development – not ready to provide to customers)?*	(Multiple Choice) o Yes (If selected, proceeds to the question 55) o No (If selected, proceeds to the question 56) o Tried but could not succeed (If selected, proceeds to the question 56)
55. How challenging was it to identify each service in the pipeline from the start and make them part of service catalog?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging

56. Do you keep the status of the services up to date (active, retired, in pipeline etc.)?*	(Multiple Choice) o Yes (If selected, proceeds to the question 57) o No (If selected, proceeds to the question 58) o Tried but could not succeed (If selected, proceeds to the question 58)
57. How challenging was to keep up to date statuses of each service in the service catalog?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
58. Do you always identify the services that the company no longer provides to the customers (retired services)?*	(Multiple Choice) o Yes (If selected, proceeds to the question 59) o No (If selected, proceeds to the question 60) o Tried but could not succeed (If selected, proceeds to the question 60)
59. How challenging was to identify retired services?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
60. Have you ever started or be part of the first service catalog implementation initiative for that company?*	(Multiple Choice) o Yes (If selected, proceeds to the question 61) o No (If selected, proceeds to the question 63)
61. How challenging was it to explain the service catalog and the value it creates to the C-levels?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
62. How challenging was it to get managers support while implementing?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
63. Were you able to position the service catalog as a central and important data source within the company?*	(Multiple Choice) o Yes (If selected, proceeds to the question 64) o No (If selected, proceeds to the question 65) o Tried but could not succeed (If selected, proceeds to the question 65)

64. How challenging was to position service catalog as a central and important data source?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
65. How does the level of ITIL knowledge affects the success of service catalog implementation?*	(Likert Scale) 1: Does not affect 2 3 4 5: Affects a lot
66. How challenging is to explain and train employees for ITIL?*	(Likert Scale) 1: It was not challenging 2 3 4 5: It was very challenging
67. Is there any more challenges that you would like to add that are not mentioned in this survey?	(Text) (When part 3 completed, proceeds to part 5)

Part 4: Service catalog user There are 7 questions in this section.	
68. What is the importance of identifying services and link the related ones for a successful service catalog management (Service relation)?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
69. What is the importance of linking service catalog with related internal processes for a successful service catalog management (Process relation)?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
70. What is the importance of creating and managing service catalog in the tool for a successful service catalog management (Tool implementation)?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
71. What is the importance of making service catalog visible to all related people for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
72. What is the importance of keeping service catalog up to date for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
73. What is the importance of adapting service catalog within the company and make people own it for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important
74. What is the importance of training employees for service catalog and best practices for a successful service catalog management?*	(Likert Scale) 1: Not important 2 3 4 5: Very important (When this part completed, proceeds to part 5)

Part 5: Best practices There are 5 questions in this section.	
75. What are the process maturity scores for each process and overall for your company if any process maturity assessment held before?	(Text)
76. Have you ever heard ITIL before?*	(Multiple Choice) o Yes, I heard o No, I never heard
77. Which practices are applied in your company?*	(Checkbox) □ Agile Methodologies □ ITIL □ COBIT □ CMMI □ ISO 20000 □ ISO 27001 □ Lean □ Six Sigma □ TOGAF □ None of them □ Other:
78. Do you have any membership to the platforms like Axelos, ISACA, itsmf?*	(Multiple Choice) o Yes o No o Other:
79. Which certifications do you have?	(Checkbox) □ ITIL Foundation □ ITIL Expert □ COBIT □ CMMI □ CISA □ CGEIT □ CRISC □ 6 Sigma □ Prince 2 □ PMI □ PSM □ PSPO □ IIBA □ Other:

APPENDIX C

QUESTIONNAIRE (TURKISH)

Değerli Katılımcı,

Bu anket bilgi teknolojileri servis sağlayıcılarının Servis Katalog Yönetim sürecini uygularken ya da yönetirken karşılaştıkları zorlukları belirlemek amacıyla oluşturulmuştur.

Çalışma akademik bir araştırma olup, Boğaziçi Üniversitesi İşletme Bilişim Sistemleri Bölümü Yüksek Lisans Programı öğrencisi Efsun Bal'ın, Prof. Dr. Aslı Sencer danışmanlığında yürüttüğü tezi kapsamında gerçekleştirilmektedir.

Yaptığımız ön araştırmaya göre servis katalog sürecini kurumlara uyarlarken karşılaşılan zorluklar 4 ana başlıkta toplanmıştır. Aşağıdaki ankette 5 bölümde bu zorluklar ile ilgili sorular bulunmaktadır. Verileriniz tamamen gizli tutulacaktır ve akademik amaçlı kullanılacaktır. Anketi tamamlamak cevaplarınıza göre 3 ile 10 dk arasında sürmektedir.

Vakit ayırdığınız ve ilginiz için teşekkür ederiz.

Bölüm 1: Demografik sorular Bu bölüm 12 sorudan oluşmaktadır.	
Soru	Cevaplar
1. Hangi sektörde çalışıyorsunuz?*	(Multiple Choice) o Bankacılık ve Sermaye Piyasaları o Eğlence ve Medya o Elektrik ve Altyapı o Endüstriyel Üretim o Gayrimenkul o İlaç ve Yaşam Bilimleri o İnşaat ve Mühendislik o Kamu Hizmetleri o Kimya Endüstrisi o Madencilik ve Metaller o Otomotiv o Özel Sermaye o Perakende ve Tüketici Ürünleri o Petrol ve Gaz o Sağlık o Sigortacılık ve Bireysel Emeklilik o Taşımacılık ve Lojistik o Teknoloji o Telekomünikasyon o Varlık ve Servet Yönetimi o Diğer:
2. Hangi departmanda çalışıyorsunuz?*	(Text)
3. İş unvanınız nedir?*	(Text)
4. İş tanımınız nedir?*	(Text)
5. Eğitim seviyeniz nedir?*	(Multiple Choice) o Lise o Ön Lisans o Üniversite o Yüksek Lisans o Doktora o Diğer:
6. Üniversitede mezun olduğunuz bölümün adı nedir?*	(Text)

7. Kaç yıllık bir iş tecrübesine sahipsiniz?*	(Dropdown) • 2 yıl veya daha az • 3-5 yıl • 6-10 yıl • 10-15 yıl • 15 yıldan fazla
8. Şu anki şirketinizde kaç yıldır çalışıyorsunuz?*	(Dropdown) • 2 yıl veya daha az • 3-5 yıl • 6-10 yıl • 10-15 yıl • 15 yıldan fazla
9.Şirketinizin menşei?*	(Multiple Choice) o Türk o Diğer:
10. Şirketinizde uzun vadeli (3-5 yıl) stratejik planlama yapılıyor mu?*	(Multiple Choice) o Evet o Hayır o Bilmiyorum
11. Şirketiniz ne tür bir servis sağlayıcısı?*	(Multiple Choice) o İç müşterilere servis sağlıyoruz o Başka şirketlere servis sağlıyoruz o İç ve dış müşteriler için servis sağlıyoruz
12. Şirketinizde servis katalog var mı (Şirketinizin sunmuş olduğu hizmetlerin listesi)?*	(Multiple Choice) o Evet (Seçildiğinde 2. bölüme ilerlenir) o Hayır (Seçildiğinde 3. bölüme ilerlenir) o Bilmiyorum (Seçildiğinde 3. bölüme ilerlenir)

Bölüm 2: Kurumda servis katalog var Bu bölüm 9 sorudan oluşmaktadır.	
13. Servis Katalog güncel bilgileri yansıtıyor mu?*	(Multiple Choice) o Evet o Kısmen o Hayır o Bilmiyorum
14. Kurum içinde servis kataloğunun bir yöneticisi /sahibi var mı?*	(Multiple Choice) o Evet o Hayır o Bilmiyorum
15. Şirketinizin daha önce sunduğu ama artık müşterilere vermediği hizmetleri de (retired) görebiliyor musunuz?*	(Multiple Choice) o Evet o Hayır o Bilmiyorum
16. Yeni geliştirilmekte olan servisler de müşteriye gösterilmeyen bir statü ile kurum içinde tanımlanıp yönetilmeye başlanıyor mu?*	(Multiple Choice) o Evet o Hayır o Bilmiyorum
17. Servis katalog bir dokümanda mı yoksa sistemde mi (tool) tutulmakta?*	(Checkbox) □ Doküman □ Sistem (ITSM, ERP vb.) □ Şirketin web sitesi
18. Şirketinizin sunduğu servisleri mümkün kılan, müşterinin görmediği ama yönettiğiniz hizmetler tanımlı mı (network, firewall, yazılım servisleri vb.)?*	(Multiple Choice) o Evet o Hayır o Bilmiyorum

19. Şirketinizin sunduğu servis bilgisi hangi süreçler ile ilişkili?*	(Checkbox) ☐ Müşterilerimizin istekleri servislerimiz ile ilişkili geliyor. ☐ Müşterilerimiz sorunlarını almış oldukları servisler ile ilişkili iletiyor. ☐ Yazılım geliştirirken hangi servis için geliştirme yaptığımız bilgisi tutulmaktadır. ☐ Sunduğumuz hizmetleri servis bazlı monitor ediyoruz. ☐ Sunduğumuz hizmetlerin şirketimize maliyetini hizmet bazlı biliyoruz. ☐ Müşterilerimiz bizden satın alabilecekleri hizmetleri görebiliyorlar. ☐ Değişiklikleri servis bazlı yönetiyoruz. ☐ Eforlarımızı çalıştığımız hizmeti seçerek giriyoruz. ☐ Varlık alımları yatırımlar, sunduğumuz hizmetler ile ilişkilendirilerek yapılıyor. ☐ Diğer:
20. Her bir müşterinizin hangi servislerinizi kullandıklarını biliyor musunuz?*	(Multiple Choice) o Evet, elimizdeki dokümanlardan (fatura vb.) çıkarabiliriz. o Evet, sistemde bu bilgiler ilişkili bir biçimde tutulmaktadır. o Hayır o Diğer:
21. Şirketinizde servis katalog sürecini kurguladınız /uyguladınız mı yoksa sadece kullanıcısı mı oldunuz?	(Multiple Choice) o Kurguladım (Seçildiğinde 3. bölüme ilerlenir) o Kullandım (Seçildiğinde 4. bölüme ilerlenir) o Bu kavramı daha önce hiç duymadım (Seçildiğinde 5. bölüme ilerlenir)

Bölüm 3: Servis katalog süreci kurgulayıcısı Bu bölüm verilen cevaplara göre 27 ile 46 arası sorudan oluşmaktadır.	
22. Servislerin belirlenmesi ve birbirleri ile ilişkilendirilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir (Service relation)?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
23. Servis kataloğun ilgili süreçlerle ilişkilendirilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir (Process relation)?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
24. Servis kataloğun sistemde uyarlanması/geliştirilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir (Tool implementation)?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
25. Servis katalog kurumda ilgili herkesin erişebildiği ve görebildiği bir yapıda tutabilmek başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
26. Servis kataloğun güncel tutulması başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
27. Kurumun servis katalog sürecine adaptasyonu ve kurum içinde sahiplenilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
28. Kurumun servis katalog süreci konusunda eğitimler ve iyi pratiklerin kuruma anlatılması başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli

29. Servis katalog yönetiminde en zorlandığınız aşama hangisi?*	(Multiple Choice) ○ Servislerin belirlenmesi ○ Servis kataloğun ilgili süreçlerle ilişkilendirilmesi ○ Servis kataloğun güncel tutulması için gerekli süreçlerin tasarlanması ○ Servis yönetim sürecinin otomasyonu (ITSM implementation) ○ Kurumun sahiplenmesi ve süreci işletmesi ○ Üst yönetimin sahiplenmesi ○ Kurumun farkındalık ve eğitim düzeyi
30. Kurumun sunduğu ana servisleri belirlediniz mi?*	(Multiple Choice) ○ Evet (Seçildiğinde 31. soruya ilerlenir) ○ Hayır (Seçildiğinde 32. soruya ilerlenir) ○ Denedik ama başaramadık (Seçildiğinde 32. soruya ilerlenir)
31. Ana servisleri belirlerken ne kadar zorlandınız?	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
32. Etkinleştiren servisleri (enabling services) belirlediniz mi?*	(Multiple Choice) ○ Evet (Seçildiğinde 33. soruya ilerlenir) ○ Hayır (Seçildiğinde 36. soruya ilerlenir) ○ Denedik ama başaramadık (Seçildiğinde 36. soruya ilerlenir)
33. Etkinleştiren servisleri (enabling services) belirlerken ne kadar zorlandınız? *	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
34. Ana servisler ile etkinleştiren servisleri (enabling services) ilişkilendirdiniz mi?*	(Multiple Choice) ○ Evet (Seçildiğinde 35. soruya ilerlenir) ○ Hayır (Seçildiğinde 36. soruya ilerlenir) ○ Denedik ama başaramadık (Seçildiğinde 36. soruya ilerlenir)
35. Ana servisler ile etkinleştiren servisleri (enabling services) ilişkilendirirken ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım

36. Servisler ile servisler için kullanılan varlıkları (asset) ilişkilendirdiniz mi?	(Multiple Choice) o Evet (Seçildiğinde 37. soruya ilerlenir) o Hayır (Seçildiğinde 38. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 38. soruya ilerlenir)
37. Servisler ile servisler için kullanılan varlıkları (asset) ilişkilendirirken ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
38. Servisler ile servisler için çalışılan zamanı (time log) ilişkilendirdiniz mi?*	(Multiple Choice) o Evet (Seçildiğinde 39. soruya ilerlenir) o Hayır (Seçildiğinde 40. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 40. soruya ilerlenir)
39. Servisler ile servisler için çalışılan zamanı (time log) ilişkilendirirken ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
40. Servis kataloğu başka süreçler ile ilişkilendirdiniz mi?*	(Multiple Choice) o Evet (Seçildiğinde 41. soruya ilerlenir) o Hayır (Seçildiğinde 42. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 42. soruya ilerlenir)
41. Servis kataloğu hangi süreçlerle ilişkilendirmeyi denediniz ve ne her bir süreci ilişkilendirirken ne kadar zorlandınız (1: Hiç zorlanmadım, 5:Çok zorlandım)?*	(Text)
42. Servisleri, servis kataloğu yönettiğiniz araca (ITSM vb.) ayrı öğeler olarak tanımladınız mı?*	(Multiple Choice) o Evet (Seçildiğinde 43. soruya ilerlenir) o Kısmen (Seçildiğinde 43. soruya ilerlenir) o Hayır (Seçildiğinde 44. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 44. soruya ilerlenir)
43. Servisleri ayrı öğeler olarak sistemde tanımlarken ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım

44. Servislerin güncelliğini değişiklik yönetimi ile yönetiyor musunuz?*	(Multiple Choice) o Evet (Seçildiğinde 45. soruya ilerlenir) o Hayır (Seçildiğinde 46. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 46. soruya ilerlenir)
45. Servislerin güncelliğini değişiklik yönetimi ile yönetmekte ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
46. Servis kataloğu, servislerle ilişkili tüm bilgileri ile bilgi yönetim sisteminin bir parçası olarak yönetiyor musunuz?*	(Multiple Choice) o Evet (Seçildiğinde 47. soruya ilerlenir) o Hayır (Seçildiğinde 48. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 48. soruya ilerlenir)
47. Servis kataloğu bilgi yönetim sisteminin bir parçası yapmakta ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
48. Eğer servis kataloğu sistemde yönetiyorsanız, yönettiğiniz otomasyon aracını kurumda kullanılan diğer araçlar ile entegre ettiniz mi (CRM gibi)?	(Multiple Choice) o Evet (Seçildiğinde 49. soruya ilerlenir) o Kısmen (Seçildiğinde 49. soruya ilerlenir) o Hayır (Seçildiğinde 50. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 50. soruya ilerlenir)
49. Servis kataloğu yönettiğiniz otomasyon aracını kurumda kullanılan diğer araçlar ile entegre etmekte ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
50. Servis katalog sürecini başarılı kurgulamak için çok fazla zaman ve yatırım gerektiğini düşünüyor musunuz?*	(Multiple Choice) o Evet (Seçildiğinde 51. soruya ilerlenir) o Hayır (Seçildiğinde 52. soruya ilerlenir)
51. Servis katalog sürecini başarılı kurgulamak için gerekli zaman ve para yatırımını karşılamakta ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım

52. Servis katalog kurumda ilgili herkesin erişebildiği ve görebildiği bir yapıda mı?*	(Multiple Choice) o Evet (Seçildiğinde 53. soruya ilerlenir) o Hayır (Seçildiğinde 54. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 54. soruya ilerlenir)
53. Servis kataloğu kurumda ilgili herkesin erişebildiği ve görebildiği bir yapıya getirmekte ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
54. Kurumda geliştirilen her yeni servis kataloğa ekleniyor mu?*	(Multiple Choice) o Evet (Seçildiğinde 55. soruya ilerlenir) o Hayır (Seçildiğinde 56. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 56. soruya ilerlenir)
55. Kurumda geliştirilen her yeni servisi kataloğa eklemekte ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
56. Servislerin statüleri servis katalogda güncel tutuluyor mu (aktif, pasif, geliştiriliyor vb.)?*	(Multiple Choice) o Evet (Seçildiğinde 57. soruya ilerlenir) o Hayır (Seçildiğinde 58. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 58. soruya ilerlenir)
57. Servislerin statülerini güncel tutmakta (aktif, pasif, geliştiriliyor vb.) ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
58. Artık şirketiniz tarafından müşteriye verilmeyen servisler sürekli tespit edilip katalogdan çıkarılıyor mu?*	(Multiple Choice) o Evet (Seçildiğinde 59. soruya ilerlenir) o Hayır (Seçildiğinde 60. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 60. soruya ilerlenir)
59. Artık şirketiniz tarafından müşteriye verilmeyen servislerin sürekli tespit edilip katalogdan çıkarılması sürecinde ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
60. Servis katalog sürecini uyarlamak için bir inisiyatif başlattınız mı ya da mevcut bir inisiyatifin parçası oldunuz mu?*	(Multiple Choice) o Evet (Seçildiğinde 61. soruya ilerlenir) o Hayır (Seçildiğinde 63. soruya ilerlenir)

61. Servis katalog sürecinin faydasını ve gerekliliğini üst yönetime anlatmakta ve sponsorluk almakta (C-level) ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
62. Orta yönetim seviyesinin desteğini servis katalog sürecini uyarlarken almakta ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
63. Servis kataloğu merkezi ve önemli bir veri kaynağı olarak kurum içinde konumlayabildiniz mi?*	(Multiple Choice) o Evet (Seçildiğinde 64. soruya ilerlenir) o Hayır (Seçildiğinde 65. soruya ilerlenir) o Denedik ama başaramadık (Seçildiğinde 65. soruya ilerlenir)
64. Servis kataloğu merkezi ve gerekli veri kaynağı olarak konumlandırmakta ne kadar zorlandınız?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
65. ITIL bilgisinin kurumda düşük olması servis katalog sürecini başarılı bir şekilde uyarlamayı ne kadar etkiliyor?*	(Likert Scale) 1: Hiç etkilemiyor 2 3 4 5: Çok etkiliyor
66. Servis kataloğu süreci için ITIL'daki iyi pratik uygulamasını kuruma anlatılmasında ne kadar zorlanıldı?*	(Likert Scale) 1: Hiç zorlanmadım 2 3 4 5: Çok zorlandım
67. Yukarıdaki sorularda belirtilmemiş, sizin eklemek istediğiniz başka bir zorluk var mı?	(Text) (3. bölümün sonunda 5. bölüme geçilir.)

Bölüm 4: Servis katalog kullanıcısı Bu bölüm 7 sorudan oluşmaktadır.	
68. Servislerin belirlenmesi ve birbirleri ile ilişkilendirilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir (Service relation)?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
69. Servis kataloğun ilgili süreçlerle ilişkilendirilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir (Process relation)?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
70. Servis kataloğun sistemde uyarlanması/geliştirilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir (Tool implementation)?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
71. Servis katalog kurumda ilgili herkesin erişebildiği ve görebildiği bir yapıda tutabilmek başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
72. Servis kataloğun güncel tutulması başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
73. Kurumun servis katalog sürecine adaptasyonu ve kurum içinde sahiplenilmesi başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli
74. Kurumun servis katalog süreci konusunda eğitimler ve iyi pratiklerin kuruma anlatılması başarılı bir servis katalog süreci kurmak için ne kadar önemlidir?*	(Likert Scale) 1: Hiç önemli değil 2 3 4 5: Çok önemli (4. bölümün sonunda 5. bölüme geçilir.)

Bölüm 5: İyi pratikler Bu bölüm 5 sorudan oluşmaktadır.	
75. Şirketinizde süreç olgunluk değerlendirmesi yapıldıysa genel olgunluk notu ve süreç bazlı sonuçları (score) nelerdir?	(Text)
76. ITIL kavramini daha önce duydunuz mu?*	(Multiple Choice) o Evet, duydum o Hayır, hiç duymadım
77. Şirketinizde iyi pratiklerden hangileri kullanılmaktadır?*	(Checkbox) ☐ Agile Metodolojileri ☐ ITIL ☐ COBIT ☐ CMMI ☐ ISO 20000 ☐ ISO 27001 ☐ Lean ☐ Six Sigma ☐ TOGAF ☐ Hiçbiri ☐ Diğer:
78. Axelos, ISACA, itsmf ve benzeri platformlara üyeliğiniz bulunuyor mu?*	(Multiple Choice) o Evet o Hayır o Diğer:
79. Sahip olduğunuz sertifikalar nelerdir?	(Checkbox) ☐ ITIL Foundation ☐ ITIL Expert ☐ COBIT ☐ CMMI ☐ CISA ☐ CGEIT ☐ CRISC ☐ 6 Sigma ☐ Prince 2 ☐ PMI ☐ PSM ☐ PSPO ☐ IIBA ☐ Diğer:

APPENDIX D

MAPPING OF IMPORTANCE OF MAIN CHALLENGES AND QUESTIONS

Challenge Group	Main Challenge	Questions for Importance Levels
SC Identification	Identifying services and service linkages that company has and provides	Q22 or Q68 What is the importance of identifying services and link the related ones for a successful service catalog management (Service relation)?
SC Implementation	Integrating SCM process with other related processes	Q23 or Q69 What is the importance of linking service catalog with related internal processes for a successful service catalog management (Process relation)?
	Making SCM process automation (ITSM tool implementation)	Q24 or Q70 What is the importance of creating and managing service catalog in the tool for a successful service catalog management (Tool implementation)?
	Make it available to anyone within the organization	Q25 or Q71 What is the importance of making service catalog visible to all related people for a successful service catalog management?
SC Maintenance	Maintaining an accurate, up tp date service catalog	Q26 or Q72 What is the importance of keeping service catalog up to date for a successful service catalog management?
SC Adoption	Creating an ownership of SC within organization	Q27 or Q73 What is the importance of adapting service catalog within the company and make people own it for a successful service catalog management?
	Need of training and best practice knowledge	Q28 or Q74 What is the importance of training employees for service catalog and best practices for a successful service catalog management?

APPENDIX E

MAPPING OF THE DIFFICULTY LEVELS AND THE SUCCESS LEVELS OF CHALLENGES AND QUESTIONS

Group	Main Challenge	Challenge	Questions for Success Levels	Questions for Difficulty Levels
Identification	Identifying services and service linkages that company has and provides	C1: Identifying the core services that company provides	Q30: Have you identified the core services your company provides?	If Yes; Q31: How challenging was the identifying core services? If No; Q32: Have you identified enabling services (resource facing services)? If Tried but failed; Q32: Have you identified enabling services (resource facing services)?
		C2: Identifying the enabling services that support core services	Q32: Have you identified enabling services (resource facing services)?	If Yes; Q33: How challenging was the identifying enabling services? If No; Q36: Have you linked the services to the assets that are used to enable them? If Tried but failed; Q36: Have you linked the services to the assets that are used to enable them?
		C3: Linking enabling services to core services	Q34: Have you linked the enabling services to the core services?	If Yes; Q33: How challenging was the identifying enabling services? If No; Q36: Have you linked the services to the assets that are used to enable them? If Tried but failed;

				Q36: Have you linked the services to the assets that are used to enable them?
		C4: Linking assets to services	Q36: Have you linked the services to the assets that are used to enable them?	If Yes; Q37: How challenging was the linking services to the assets that are used to enable them? If No; Q38: Do you enter your time logs linked with the services? If Tried but failed; Q38: Do you enter your time logs linked with the services?
		C5: Identifying and linking the efforts of employees to related services	Q38: Do you enter your time logs linked with the services?	If Yes; Q39: How challenging was the designing a process that allows people to log their times related with the services they worked for? If No; Q40: Did you link the internal processes with the service catalog? If Tried but failed; Q40: Did you link the internal processes with the service catalog?
SC Implementation	Integrating SCM process with other related processes	C6a: Making service catalog as part of a service portfolio	Q40: Did you link the internal processes with the service catalog?	If Yes; Q41: Which processes did you link with the service catalog and how challenging was to integrate each process with the service catalog (1: It was not challenging, 5:It was very challenging)? If No; Q42: Have you defined each
		C6b: Making service catalog as part of demand management		
		C6c: Making service catalog as part of financial		

		management - service based cost and profit model		service as a configuration item (ci) within the tool you use internally (like ITSM, ERP, CRM etc.)? If Tried but failed; Q42: Have you defined each service as a configuration item (ci) within the tool you use internally (like ITSM, ERP, CRM etc.)?
		C6d: Making service catalog as part of request and incident management		
		C6e: Making service catalog as part of service monitoring		
		C6f: Making service catalog as part of SDLC and monitoring		
	Making SCM process automation (ITSM tool implementation)	C7: Stored services as a set of 'service' CIs within a CMS	Q42: Have you defined each service as a configuration item (ci) within the tool you use internally (like ITSM, ERP, CRM etc.)?	If Yes; Q43: How challenging was to define each service as configuration item? If No; Q44: Do you manage the change in your service catalog? If Tried but failed; Q44: Do you manage the change in your service catalog?
		C8: Maintain SC under change management	Q44: Do you manage the change in your service catalog?	If Yes; Q45: How challenging was to manage every change in the service catalog and keep it always up to date? If No; Q46: Do you manage the service catalog as part of knowledge management system? If Tried but failed; Q46: Do you manage the service catalog as part of knowledge

				management system?
		C9: Incorporating all catalog views as part of an overall CMS and SKMS	Q46: Do you manage the service catalog as part of knowledge management system?	If Yes; Q47: How challenging was to manage service catalog as part of knowledge management system? If No; Q48: If you manage your service catalog in the ITSM tool, have you integrated that tool with other internal tools (like CRM)? If Tried but failed; Q48: If you manage your service catalog in the ITSM tool, have you integrated that tool with other internal tools (like CRM)?
		C10: Integrating SCM tool to other tools that are used for related processes (i.e. ERP for financial mng.)	Q48: If you manage your service catalog in the ITSM tool, have you integrated that tool with other internal tools (like CRM)?	If Yes; Q49: How challenging was to integrate all internal tools that is related to service catalog? If No; Q50: Do you think there is high amount of investment and time needed to implement service catalog successfully in the company? If Tried but failed; Q50: Do you think there is high amount of investment and time needed to implement service catalog successfully in the company?
		C11: Time and investment that is required to implement - costly	Q50: Do you think there is high amount of investment and time needed to	If Yes; Q51: How challenging was to get the required investment and time?

			implement service catalog successfully in the company?	If No; Q52: Is service catalog visible to every related parties? If Tried but failed; Q52: Is service catalog visible to every related parties?
	Make it available to anyone within the organization	C12: Make it available to anyone within the organization	Q52: Is service catalog visible to every related parties?	If Yes; Q53: How challenging was to make service catalog visible to all related parties? If No; Q54: Does each service added to service catalog while they are in pipeline (in development – not ready to provide to customers)? If Tried but failed; Q54: Does each service added to service catalog while they are in pipeline (in development – not ready to provide to customers)?

SC Maintenance	Maintaining an accurate, up to date service catalog	C13: Every new service should be entered into the Service catalog once its initial definition of requirements has been documented and agreed.	Q54: Does each service added to service catalog while they are in pipeline (in development – not ready to provide to customers)?	If Yes; Q55: How challenging was it to identify each service in the pipeline from the start and make them part of service catalog? If No; Q56: Do you keep the status of the services up to date (active, retired, in pipeline etc.)? If Tried but failed; Q56: Do you keep the status of the services up to date (active, retired, in pipeline etc.)?
		C14: The Service catalog should record the status of every service, through the stages of its defined lifecycle.	Q56: Do you keep the status of the services up to date (active, retired, in pipeline etc.)?	If Yes; Q57: How challenging was to keep up to date statuses of each service in the service catalog? If No; Q58: Do you always identify the services that the company no longer provides to the customers (retired services)? If Tried but failed; Q58: Do you always identify the services that the company no longer provides to the customers (retired services)?
		C15: There are difficulties in identifying the processes for the retired services.	Q58: Do you always identify the services that the company no longer provides to the customers (retired services)?	If Yes; Q59: How challenging was to identify retired services? If No; Q60: Have you ever started or be part of the first service catalog implementation

				initiative for that company? If Tried but failed; Q60: Have you ever started or be part of the first service catalog implementation initiative for that company?
		C16: Low involvement and ownership of senior level management	Q60: Have you ever started or be part of the first service catalog implementation initiative for that company?	If Yes; Q61: How challenging was it to explain the service catalog and the value it creates to the C-levels? Q62: How challenging was it to get managers support while implementing? If No; Q63: Were you able to position the service catalog as a central and important data source within the company?
		C17: Create acceptance that SC and portfolio are essential sources of information	Q63: Were you able to position the service catalog as a central and important data source within the company?	If Yes; Q64: How challenging was to position service catalog as a central and important data source? If No; Q65: How does the level of ITIL knowledge affects the success of service catalog implementation? If Tried but failed; Q65: How does the level of ITIL knowledge affects the success of service catalog implementation?

	Need of training and best practice knowledge	C18: Lack of knowledge of ITIL makes it harder to adopt	Q65: How does the level of ITIL knowledge affects the success of service catalog implementation?	Move to next question: Q66: How challenging is to explain and train employees for ITIL?
		C19: Most organizations fail to implement ITIL due to their complexity	Q66: How challenging is to explain and train employees for ITIL?	Move to next question: Q67: Is there any more challenges that you would like to add that are not mentioned in this survey?

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