# MOVING TOWARD PULL-DRIVEN RESOURCE PLANNING IN KNOWLEDGE-INTENSIVE SERVICE SOLUTION PROVIDERS

The Ideal Pull-driven Resource Planning Process

Lappeenranta–Lahti University of Technology LUT

Industrial Engineering and Management, Master's thesis

2025

Max Kuula

Examiners: Docent Jouni Koivuniemi and Docent Petri Niemi

ABSTRACT

Lappeenranta–Lahti University of Technology LUT

LUT School of Engineering Sciences

Industrial Engineering and Management

Max Kuula

**Moving toward pull-driven resource planning in knowledge-intensive service solution providers: The ideal pull-driven resource planning process**

Master's thesis

2025

99 pages, 14 figures, 14 tables and 3 appendices

Examiners: Docent Jouni Koivuniemi and Docent Petri Niemi

Keywords: Lean, Pull Systems, KIBS, Resourcing, Resource Planning, Service Solutions

Knowledge-intensive business services (KIBS) are characterized by heterogeneity and unpredictability. However, traditional resource planning practices are typically rigid and rely on top-down planning, making them poorly suited for dynamic KIBS environments. This master's thesis explores how KIBS providers can transition from traditional, push-based resource planning models toward a pull-driven approach that better supports the complexity and variability of knowledge work. The objective is to create a roadmap for organizations undertaking this transition. The research was conducted in collaboration with an IT consultancy specializing in data and artificial intelligence.

The study applies gap analysis to define the current and ideal states of the resource planning process. The initial state is established through a theoretical framework combining traditional service literature, Service-Dominant Logic (SDL), Lean thinking, and resource planning theory. The ideal end state is constructed from empirical data gathered through structured interviews with key personnel involved in resourcing and delivery. The differences between the two states are then analyzed to identify the steps required for transformation.

The findings define the ideal pull-driven process as one that emphasizes transparency, formalized data, automation, and employee involvement. The resulting roadmap consists of four development areas: (1) formalization of information inputs, (2) transition to skill-based resourcing logic, (3) redefinition of allocation triggers, and (4) automation of routine planning tasks. Together, these enable more responsive, scalable, and efficient resource planning in knowledge-intensive service environments.

TIIVISTELMÄ

Lappeenrannan–Lahden teknillinen yliopisto LUT

LUTin insinööritieteiden tiedekunta

Tuotantotalous

Max Kuula

**Siirtyminen asiakaslähtöiseen resurssisuunnitteluun tietointensiivisissä palveluratkaisuyrityksissä: Ihanteellinen resurssisuunnitteluprosessi**

Tuotantotalouden diplomityö

2025

99 sivua, 14 kuvaa, 14 taulukkoa ja 3 liitettä

Tarkastajat: Dosentti Jouni Koivuniemi ja Dosentti Petri Niemi

Avainsanat: Lean, resurssien suunnittelu, resursointi, pull-järjestelmät, tietointensiiviset yrityspalvelut, palveluratkaisut

Tietointensiiviset yrityspalvelut (KIBS) ovat luonteeltaan dynaamisia ja vaikeasti ennustettavia. Perinteiset resurssisuunnittelun menetelmät eivät kuitenkaan vastaa näitä ominaisuuksia, vaan perustuvat usein jäykkään, ylhäältä johdettuun suunnitteluun. Tämä diplomityö analysoi, kuinka KIBS-yritykset voivat siirtyä perinteisistä, resurssisuunnittelun malleista kohti asiakasvetoista (pull-driven) suunnittelua, joka tukee paremmin asiantuntijatyön monimuotoisuutta ja muuttuvuutta. Tavoitteena on luoda suunnitelma organisaatioille, jotka haluavat toteuttaa tämän muutoksen. Tutkimus toteutettiin yhteistyössä dataan ja tekoälyyn keskittyvän IT-konsultointiyrityksen kanssa.

Tutkimuksessa hyödynnetään gap-analyysiä, jonka avulla määritellään resurssisuunnittelun nykytila ja tavoitetila. Nykytila pohjautuu teoreettiseen viitekehykseen, joka yhdistää palvelukirjallisuutta, palvelulogiikkaa (Service-Dominant Logic, SDL), Lean-ajattelua sekä perinteisiä resurssisuunnittelun teorioita. Tavoitetila puolestaan muodostetaan empiirisen aineiston perusteella, mikä kerättiin strukturoiduilla haastatteluilla yrityksen avainhenkilöiltä.

Tulosten mukaan vetopohjainen resurssisuunnittelu rakentuu läpinäkyvyyden, tiedon formalisoimisen, automaation ja työntekijöiden osallistamisen varaan. Gap-analyysin pohjalta muodostettu etenemissuunnitelma koostuu neljästä kehitysalueesta: (1) tiedon formalisoiminen, (2) siirtyminen osaamispohjaiseen resursointilogikkaan, (3) allokoinnin laukaisijoiden uudelleenmäärittely sekä (4) resurssisuunnittelun automaatio. Nämä mahdollistavat joustavamman, skaalautuvamman ja tehokkaamman resurssisuunnittelun tietointensiivisissä palveluympäristöissä.

ABBREVIATIONS

KIBS – Knowledge-Intensive Business Services

CMS – Competence Management System

SDL – Service-Dominant Logic

GDL – Goods-Dominant Logic

JIT – Just-In-Time

TPS – Toyota Production System

IT – Information Technology

B2B – Business to Business

CSF – Critical Success Factor

COO – Chief Operating Officer

## Table of contents

Abstract

Abbreviations

*1 Introduction ..... 1*

**1.1 Background ..... 1**

**1.2 Case and Scope ..... 2**

**1.3 Objective and Research Questions ..... 3**

**1.4 Research Process ..... 4**

**1.5 Structure of the Report ..... 7**

*2 Theoretical Framework ..... 10*

**2.1 Service Literature Forms the Base for Services ..... 13**

2.1.1 Service Solutions ..... 13

2.1.2 Service Attributes ..... 14

**2.2 SDL Extends Traditional Service Literature ..... 18**

**2.3 Knowledge-Intensive Business Services ..... 21**

2.3.1 Core Characteristics of KIBS ..... 22

**2.4 Lean Defines Waste and Pull ..... 26**

2.4.1 Waste ..... 27

2.4.2 Pull Systems ..... 28

**2.5 Traditional Resource Planning ..... 30**

2.5.1 What is a Resource? ..... 30

2.5.2 Resourcing vs. Resource Planning ..... 31

2.5.3 Traditional Resource Planning Practices in KIBS ..... 32

2.5.4 KIBS Resource Planning Processes and Tools ..... 34

**2.6 Synthesis on Theoretical Framework ..... 35**

*3 Pull-driven Resource Planning ..... 40*

**3.1 Initial Definition for Pull-Driven Resource Planning ..... 40**

**3.2 Why Pull-Driven Resource Planning? ..... 42**

3.2.1 Top-down planning ..... 42

3.2.2 Role and availability-based assignments ..... 43

3.2.3 Rigid planning cycle ..... 44

3.2.4 Synthesis of Traditional Resource Planning Problems ..... 45

*4 Empirical Insights on Pull-driven Resource Planning ..... 47*

**4.1 Interviews ..... 47**

**4.2 Problems With Current Resource Planning Process ..... 49**
**4.3 Information Used in Resource Planning ..... 52**
**4.4 Future Improvement Possibilities ..... 54**
**4.5 Synthesis of the Interviews ..... 56**
***5 The Ideal Pull-driven Resource Planning Process ..... 58***
**5.1 Current Resource Planning Problems ..... 58**
5.1.1 Problems From Theory ..... 59
5.1.2 Problems From Empirical Research ..... 61
**5.2 Future Development Requirements ..... 63**
**5.3 The Ideal End Result ..... 65**
5.3.1 Adaptive & Responds to Actual Demand ..... 65
5.3.2 Skill-based & Co-creational ..... 66
5.3.3 Scalable & Transparent ..... 67
5.3.4 Automated ..... 68
5.3.5 The Final Process ..... 68
***6 Bridging the Gap ..... 70***
**6.1 Current State ..... 70**
**6.2 End State ..... 71**
**6.3 Requirements to Move from Current State to Ideal State ..... 71**
6.3.1 Information Inputs ..... 73
6.3.2 Resourcing Logic ..... 75
6.3.3 Allocation Trigger ..... 76
6.3.4 Automation ..... 77
**6.4 The Processes of Moving to Pull-driven Resource Planning ..... 78**
***7 Conclusions ..... 80***
**7.1 Research Questions ..... 80**
**7.2 Generalizability and Limitations of the Research ..... 81**
**7.3 Future Research Possibilities ..... 82**
**7.4 Final Remarks ..... 82**
***References ..... 83***

Appendices

Figures

Figure 1: Structure of The Research

Figure 2: Structure of The Theoretical Framework

Figure 3: Input/Output Diagram

Figure 4: Focusing on The KIBS Environment

Figure 5: General IT Consultancy vs. Solution Provider

Figure 6: Ownership of Service Aspects

Figure 7: SDL Links to IHIP

Figure 8: Push vs. Pull

Figure 9: Traditional Resource Planning Process

Figure 10: Research Environment

Figure 11: Push-based Process vs. Pull-based Process

Figure 12: Example of Resource Planning Automation (AI Agent)

Figure 13: Pull-driven Resource Planning

Figure 14: Dual Processes of Moving to Pull-driven Resource Planning

Tables

Table 1: Theories and Search Terms

Table 2: IHIP Attributes

Table 3: IHIP in KIBS

Table 4: Waste in Lean

Table 5: Waste in Services and KIBS

Table 6: The Main Content of The Theoretical Framework

Table 7: Theories and Their Impact on The Theoretical Framework

Table 8: Problems of Traditional Resource Planning in KIBS Based on Theory

Table 9: Simplified Interview Responses to Current Sources of Waste

Table 10: Simplified Interview Responses to Current Biggest Resource Planning Problems

Table 11: Information Inputs for Resource Planning in Commissioning Company

Table 12: Information Inputs for Selecting Between Employees in Commissioning Company

Table 13: Problems From Literature, Condensed

Table 14: Traditional Resource Planning vs. Ideal Pull-driven Resource Planning

# 1 Introduction

Knowledge-intensive business services (KIBS) are, by definition, unpredictable, agile, and diverse, characterized by every delivery being different from the last. However, the traditional resource planning processes in use do not reflect these attributes, and sometimes actively go against them, as they were created for more predictable and stable business environments. With rigid systems in place, it is impossible to create an optimal process free of waste for allocating the right knowledge in the right quantities at the right time in ever-shifting environments and expectations. This thesis aims to introduce the concept of **pull-driven resource planning** as a substitute for traditional resource planning in KIBS with the goal of solving the problems mentioned. The hypothesis is that by introducing Lean thinking principles and a pull-driven approach to resource planning, a significant amount of waste can be eliminated from this process. The goal is to define both the traditional resource planning process and the ideal pull-driven resource planning process and then bridge the gap between the two by defining the steps necessary to move from the prior to the latter.

## 1.1 Background

Knowledge-intensive business services are a growing sector of business along with services in general (Statista, 2025a). Technology and digitalization are transforming the services sector as a whole by introducing new opportunities for service delivery and value creation (Statista, 2025a). These opportunities include, for example, web platforms and systems, as well as mobile devices. In addition, markets shift from being manufacturing-based to service-based as markets mature and develop (Kuula et al., 2018). The market size of consulting services has shot up in the last ten years, from 750 billion USD in 2014 to over a trillion USD in 2024 (33% growth), and the annual revenue growth for management consultancies is at 9 % (Statista, 2025b). This incredible growth proves that companies are in need of these types of services with strategic knowledge about their business and the industry they operate in.

As services, business services, and KIBS markets are growing internationally, research related to them is becoming increasingly relevant and important. However, not much research has been done on the unique needs of resource planning in these types of businesses. KIBS resources differ from other industries since the core resource is knowledge, which is inherently intangible (Aarikka-Stenroos and Jaakkola, 2012; Kuula et al., 2018). Additionally, knowledge is embedded in employees, meaning that the workforce of a company as well as human resource management become more integral to operations than in other companies (Jorgensen et al., 2024). These factors make resourcing and resource planning in KIBS different from other industries, but this has not been taken into consideration in research. There is a definite gap in knowledge of knowledge-intensive business services.

This thesis will attempt to bridge the knowledge gap mentioned above by utilizing the ideas and theories of Lean thinking. At a high level, Lean thinking splits activities of firms into two separate categories: value-adding activities and waste (Kuula et al., 2018; Ohno, 1988). By following the Lean principle of minimizing waste, an optimized process of resource planning can be developed for Lean. This begins with another Lean thinking principle, moving to a pull system, where the triggers for processes begin from the end (customer) and move one process at a time to the beginning of the value creation process. This is as opposed to the traditional resource planning process where processes are triggered by the previous process and begin with internal triggers, such as forecasts or predictions.

## 1.2 Case and Scope

This thesis was created on behalf of an IT consultancy firm providing solutions for data and AI. The commissioning company is in the midst of improving resourcing and resource planning processes to reduce inefficiencies in employee allocations and utilization rates. This improvement project includes updating resourcing processes, defining roles and competences of the company, and optimizing resource allocation. This thesis is based on the idea that the optimal solution for the commissioning company and KIBS businesses in general is “pull-driven resource planning”. The goal of the commissioning company for this thesis is to define the ideal outcome of pull-driven resourcing, where the correct people are

assigned to the correct projects at the correct times, as well as to clarify the next steps in moving to true pull-driven resourcing. At the beginning of this thesis, the commissioning company had begun the process of transitioning to pull-driven resourcing by introducing a competence management system (CMS) to improve the visibility of individual skills and willingness and create a basis for the transition from role-based to skill-based resource planning.

The main issues the commissioning company had that necessitated this shift in resource planning were overall unclarity of the skills, competences, and knowledge that they had within the company, overworked key personnel while others sat on the bench, undefined roles, and an undefined process of finding the right skills and knowledge for projects. These problems are common within KIBS and consulting firms.

The scope of this thesis is then limited to the attributes of the commissioning company, which is a knowledge-intensive business service provider that focuses on IT solutions in data and AI. The scope is knowledge intensive, IT centered service solution providers. Due to the heterogenous nature of KIBS, the results of this research will not be easily generalized to a wider range of organizations. Essentially, they will be focused on IT consulting and service solution providers.

## 1.3 Objective and Research Questions

This thesis is focused on the creation of pull-driven resource planning, with the objective of creating actionable steps for shifting traditional to pull-driven resource planning in KIBS. The main research question, thus, is the following:

> *How can a knowledge-intensive service solutions provider move from traditional to pull-driven resource planning?*

This question will be answered by defining the start and end situations and then bridging the gap between them. This type of analysis is called a gap analysis. To do this effectively, the current situation (traditional resource planning) and the final situation (ideal end result of pull-driven resource planning) need to be defined. This leads to the following sub-questions for this research:

- *What is the traditional resource planning process of KIBS businesses, and what problems does it create?*
- *What is the ideal end result of pull-driven resource planning for the commissioning company?*
- *What needs to be done to move from traditional to pull-driven resource planning?*

This approach ensures that the structure of the research will stay clear and concise. By creating a start point and an end point, the analysis section will have clear boundaries that it will follow.

## 1.4 Research Process

This thesis will include several different scientific methods of research. It will take a traditional path from research questions to conclusions. This research will follow three steps as seen in figure 1: first, a literature review stage, forming the theoretical framework and the traditional resource planning process, then an empirical research section focusing on qualitative research conducted with interviews, and finally, an analysis section deriving the answers to the third research question from the answers of the first two using gap analysis to find the differences between the two different resource planning processes. The result of the report will be a roadmap with steps for knowledge-intensive service solution providers, especially consulting firms, to make the shift from traditional resourcing to pull-based resourcing following the principles of Lean thinking and pull systems.

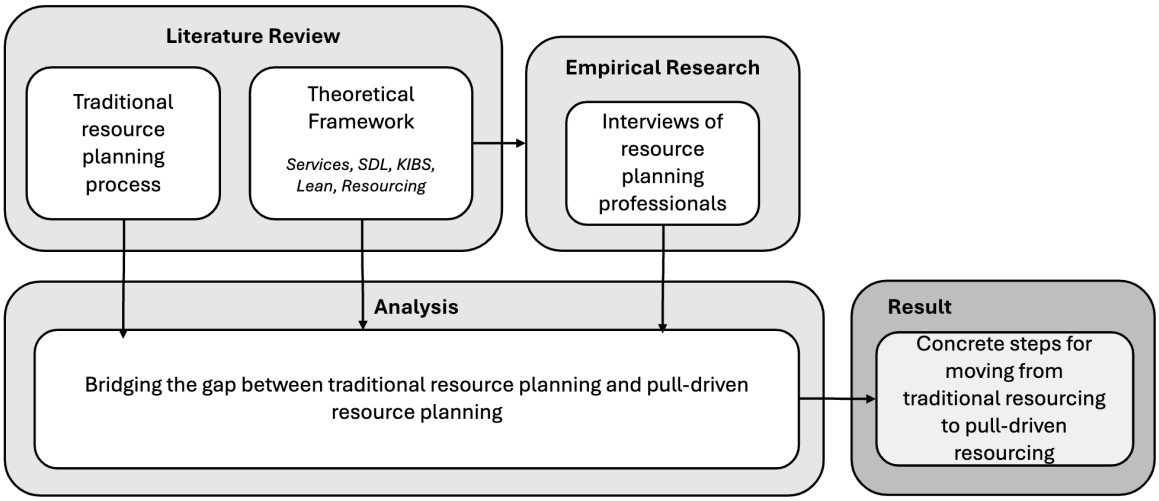


*Figure 1: Structure of the Research*

The goal of the literature review stage is twofold: create a theoretical basis for this research and define the traditional resource planning process in KIBS. The theoretical framework is a critical part of this research and can be seen in figure 2. It is necessary to understand the theoretical environment this thesis is a part of. It will be used when formulating the questions for the empirical part of the thesis as well as the basis of the analysis at the end of the research. As for the traditional resource planning process, it will be used to find the base problems of traditional resource planning in KIBS. The literature review was completed with Fink's model (Salminen, 2011), and resulted in a systematic literature review focused on the literature surrounding KIBS and resourcing.

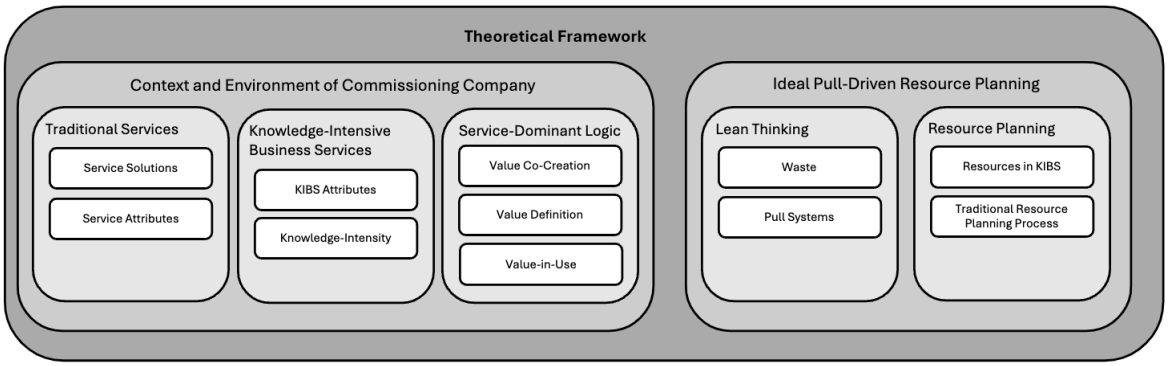


*Figure 2: Structure of Theoretical Framework*

As mentioned above, the empirical stage is based on the theoretical framework created in the literature review. The interviews conducted will have their questions based on mostly the theories of services, SDL, KIBS, Lean, and Resource Planning literature. The results of the interviews will give insights into both the current resource planning process and the ideal

process of the commissioning company. Some questions were selected to support the problems of traditional resource planning found in the literature review and some were selected to assist in defining the ideal end result directly.

The analysis stage acts as the connection between the literature review and the empirical research. It contains the answer to the main research question of this research. The analysis is done as a form of gap analysis. Gap analysis suits this type of research, as it consists of stating the current state and end state, making an action plan for getting from one to the other (Hayes, 2025). Gap analysis normally has five steps, defining the current state, clarifying goals, identifying the gaps, preparing an action plan, and implementing change (Hayes, 2025). This thesis will end with preparing an action plan and will not include the implementation of the change. The goal of gap analysis for this thesis is to find the gaps between traditional resource planning (from literature) and ideal pull-driven resource planning (from empirical research and Lean thinking) and create an action plan for moving to pull-driven resource planning in knowledge-intensive environments. The end result of the analysis is an action plan, or roadmap for transitioning to pull-driven resource planning for the commissioning company.

This thesis includes literature from LUT's scientific library as well as Google Scholar and other online sources. Literature on KIBS consists of traditional service literature as well as more focused KIBS literature, and literature on resourcing and resource planning consists of smaller, more niche literature discussing human resource management and knowledge management. The most impactful search terms for literature outside resourcing include "Knowledge-Intensive Business Services", "Service Characteristics", "Lean Thinking", "Service Solutions", and "Service-Dominant Logic". For KIBS resource planning, much less sources were found. Instead, this thesis bases more on traditional resourcing literature and resourcing in services in general with search terms such as "Resourcing", "Resource Planning", and "Human Resource Management" providing the most relevant information. KIBS definitions in this thesis were heavily influenced by Ritala et al. "Key capabilities in knowledge-intensive service business" (2011), service characteristics used Fitzsimmons' "Service management: operations, strategy, information technology" (2011) definitions, service solutions' characterization was influenced most by Storbacka & Pennanen's book "Solution Business: Building a Platform for Organic Growth" (2014), Lean thinking was based on the original analysis of the Toyota production system by Ohno in his book "Toyota

Production System: Beyond Large-Scale Production" (1988) as well as Womack's "The machine that changed the world" (1991), and finally, SDL was defined with the original work of its creators Vargo & Lusch (2004). Resourcing and resource planning in KIBS did not have similar single impactful sources of literature due to the lack of research on the topic.

The theoretical framework created from the systematic review includes service literature to form the basis for services, SDL to extend on the traditional service literature, KIBS to pinpoint the core attributes of companies like the case company, and Lean to form the basis for waste and pull systems. Existing literature was also used to define a traditional resourcing process for services and KIBS. The theoretical framework is used in this thesis with the goal of aiding in the creation of the ideal end result of pull-driven resourcing for the commissioning company and the bridging of traditional resourcing to the ideal end result. After the literature review, an empirical analysis is conducted to answer the question: "what is the ideal end result of pull-driven resourcing?". The empirical analysis is done with interviews of delivery and operations professionals in the commissioning company. Then, finally, the information generated from the literature review and the empirical research will be used in a gap analysis to form an answer to the final sub-question: "How can the current process and ideal end result be bridged?", with the goal of generating actionable guidelines and steps to improve the resourcing process of the commissioning company.

## 1.5 Structure of the Report

This report moves step-by-step through the research questions posed using five chapters (not including the introduction and conclusions chapters). These chapters are 1) theoretical framework, 2) pull-driven resource planning, 3) empirical insights on pull-driven resource planning, 4) the ideal pull-driven resource planning process, and 5) bridging the gap. The input/output diagram (figure 3) shows what goes into each chapter and what the end result of that chapter is.

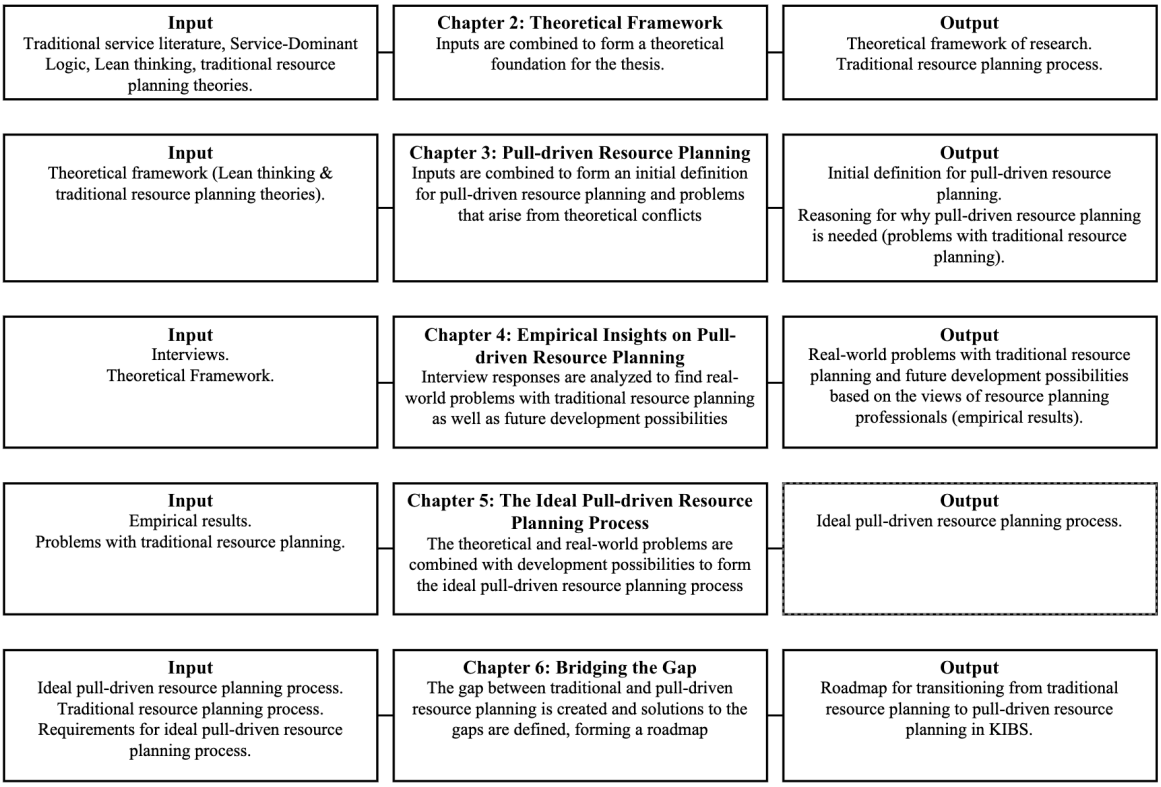


*Figure 3: Input/Output Diagram*

The theoretical framework takes in the different theoretical sources and texts and combines them to form a cohesive foundation for this thesis. It also answers the first research sub question by defining the traditional resource planning process from literature. This theoretical framework is then used in the following chapter to form the initial definition of pull-driven resource planning.

There were not many theoretical sources combining Lean thinking pull systems and resource planning, so pull-driven resource planning needed to be defined based on other theoretical sources. These sources included most heavily Lean thinking literature as well as traditional resource planning theories and the traditional resource planning process defined in the theoretical framework. The output of this chapter is used later when developing the ideal pull-driven resource planning process for KIBS.

The empirical chapter takes in interviews held at the commissioning company as well as the theoretical framework. It then combines these to find real-world problems in resource planning as well as potential future development opportunities in these processes.

The ideal pull-driven resource planning chapter takes in the outputs of the previous chapter as well as the problems with traditional resource planning as created in chapter 3. It then synthesizes these two inputs into one single output which is the ideal pull-driven resource planning process for KIBS.

The final chapter (not counting conclusions) will then conduct a gap analysis with the traditional resource planning process (from chapter 2) and the ideal pull-driven resource planning process (from chapter 5) as inputs. The output will then finally be the roadmap for transitioning from traditional resource planning to pull-driven resource planning, which is the goal of this research.

# 2 Theoretical Framework

This chapter comprises the theoretical framework for this thesis. It will act as the backbone for the research. Since this thesis focuses on the commissioning company, their business must be defined in a theoretically sound way. In essence, they are a knowledge-intensive service solutions provider. In short, a consulting company. This combination requires that multiple theories are brought together to fully understand this context and environment. For this theoretical framework, traditional service literature, SDL, and KIBS literature are combined to form the core characteristics of the type of business the commissioning company operates in. Resource planning literature is used to define a traditional process for resource planning in this type of knowledge-intensive environment. Lean forms the basis of this entire research and will be used later in the research in combination with all of the previous theories to form the ideal end-result of pull-driven planning.

The theoretical foundation of this thesis is built upon five key areas as shown in Table 1: general service literature, Service-Dominant Logic (SDL), Knowledge-Intensive Business Services (KIBS), Lean thinking, and traditional resource planning literature. General service literature provides the basis for understanding what services are and their defining characteristics (Fitzsimmons, 2011; Grönroos, 2008; Ritala et al., 2011). It also introduces the main offering of the commissioning company, service solutions. Service solutions are types of offerings that integrate processes, knowledge, and tangible elements to solve entire customer problems (Storbacka and Pennanen, 2014; Windahl and Lakemond, 2010).

*Table 1: Theories and Search Terms*

| Theory | Relevant Aspects | Search Terms |
|---|---|---|
| **Services** | Service Definition<br>Service Solutions<br>Service Characteristics | *Service Solutions*<br>*Solution Business*<br>*Service Characteristics*<br>*Service Management* |
| **SDL** | Service Philosophy<br>Services as Basis for Value<br>Service Characteristics | *Vargo & Lusch*<br>*Service-Dominant Logic*<br>*SDL*<br>*Service Logic* |
| **KIBS** | KIBS Characteristics<br>Knowledge-Intensity | *KIBS*<br>*Knowledge-Intensive Business Services*<br>*Knowledge-Intensive Business* |
| **Lean** | Pull Systems<br>Value vs. Waste<br>Types of Waste<br>Lean in Services | *Toyota Production System*<br>*Just-In-Time*<br>*Lean Thinking*<br>*JIT Systems*<br>*Lean Thinking*<br>*Lean Manufacturing*<br>*Lean Services* |
| **Resourcing** | KIBS Resourcing<br>Resource Management<br>KIBS Resource Planning<br>Human Resources | *KIBS/Service Resourcing*<br>*KIBS/Service Resource Planning*<br>*KIBS/ Service Resource Management*<br>*Human Resource Management*<br>*HRM*<br>*Knowledge Management* |

Building on the foundation created by traditional service literature, SDL offers a more recent view of services, particularly in the domain of value creation. It emphasizes value co-creation, value-in-use, and the central role of the customer in defining value (Vargo and Lusch, 2004). These principles provide a bridge between traditional service thinking and the nature of modern service delivery.

KIBS literature helps focus these service and SDL concepts on the knowledge-intensive business services. It brings in the unique characteristics of knowledge-intensive work and works as the final focusing lens for the environment of the commissioning company. Together, these three first domains establish the theoretical environment in which KIBS operate (figure 4). Service literature gives the initial definition of services, SDL creates more defined boundaries for what services are and what they are not, and KIBS defines the area inside the broad service category in which this research takes place.

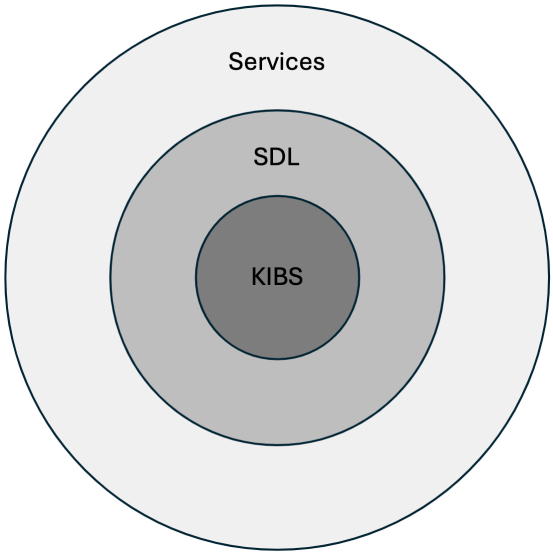


*Figure 4: Focusing on the KIBS environment*

Complementing the three first domains, Lean thinking is adapted from its manufacturing-based origins to a service-based context. It offers tools for identifying waste and designing efficient processes through the concept of pull systems (Ohno, 1988; Womack, 1996, 1991). Lean is particularly relevant to this thesis as it acts as the core for the second and third research questions: defining the ideal outcome of pull-driven resourcing and exploring how the current process can evolve to meet that goal. Because Lean was originally developed for manufacturing, it must be carefully interpreted to fit the unique characteristics of services and KIBS.

Finally, traditional resource planning literature is used to outline the conventional resourcing process. This will later be contrasted with the specific needs and attributes of KIBS to identify its limitations in this context and to justify the need for a pull-driven approach.

## 2.1 Service Literature Forms the Base for Services

The service business is a complex industry with its own characteristics and challenges. A "service" is traditionally defined as an activity or, more commonly, a *process* that consists of chains of activities (or other processes and subprocesses) (Davenport, 2007; Grönroos, 2008), and they are created within interactive processes between the seller and the buyer (Grönroos, 2008; Kuula et al., 2018; Vargo and Lusch, 2004). This is the "service as an activity" view (Grönroos, 2008). Another view of a service is "service as a perspective" rather than a category of business offerings (Edvardsson, 2005; Grönroos, 2008). One example of service as a perspective is SDL, which will be expanded upon in its own chapter. In essence, service as a perspective provides a framework for value creation for businesses and consumption for customers (Grönroos, 2008; Kuula et al., 2018; Vargo and Lusch, 2004). Both views are important for this thesis, as the service as an activity view provides insight into the base characteristics of services and defines them, whereas the service as a perspective view heavily influences the strategies of service companies and KIBS. This chapter will focus on services as activities and the chapter on SDL will include a deeper theoretical definition for services as a perspective.

Due to this thesis focusing on the commissioning company, which provides exclusively service solutions as its offering, this chapter will begin with a definition of a service solution in order to gain a better understanding of how solutions differ from traditional services. It will lay the foundation for focusing later theories on the commissioning company and the environment of this research. After service solutions, service literature will be used to gain a deeper understanding of the core attributes of services.

### 2.1.1 Service Solutions

Service solutions, or more plainly just solutions, as their name suggests, solve an entire problem from start to finish (Windahl and Lakemond, 2010). They are large processes that, in addition to solving a problem, include the identification and definition of problems or value creation opportunities (Kuula et al., 2018; Storbacka and Pennanen, 2014). A solution is the **process** of solving a problem, not just the end result or product (Kuula et al., 2018;

Storbacka and Pennanen, 2014). This is an important distinction for solutions to fit into the bounds of services. Solutions have become the next step in services, taking a step beyond providing knowledge for the customer to use as they see fit. Solutions provide knowledge necessary to create a solution for problem, but they also provide the knowledge necessary to define what the solution is for that problem, and in some cases, what the problem itself is (Kuula et al., 2018; Storbacka and Pennanen, 2014; Windahl and Lakemond, 2010).

Figure 5 visualizes the differences between a traditional IT consultancy that works as a "CV shop" and a solutions provider. It clearly shows the differences between ownership in the process of moving from a problem to a solution

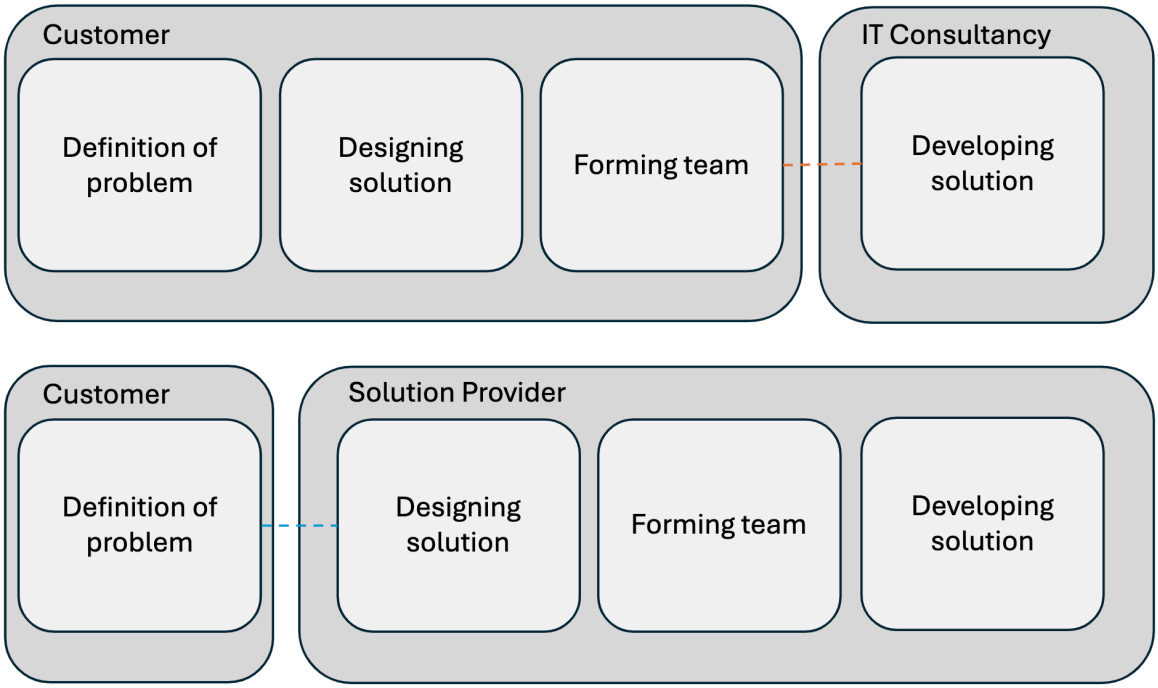


*Figure 5: General IT Consultancy vs. Solution Provider*

### 2.1.2 Service Attributes

As this thesis deals with Knowledge-Intensive Business Services (KIBS), it is important to address the unique characteristics of services in general, as KIBS are a form of services and inherit their attributes and characteristics. This chapter is focused on the traditional idea of services as an offering or activity and will discuss the commonly accepted core attributes of

services. These core attributes of services, often called IHIP attributes help define what the term “service” means at its core. The term “IHIP attributes” comes from the initials of the words that comprise it: intangibility, heterogeneity, inseparability of production and consumption, and perishability (Fitzsimmons, 2011; Kuula et al., 2018; Ritala et al., 2011). They help in distinguishing between what is meant by a service and what is meant by goods or products. Table 2 presents the list of IHIP attributes with condensed descriptions.

*Table 2: IHIP attributes*

| Attribute | Description |
|---|---|
| Intangibility | Services cannot be seen or touched |
| Heterogeneity | Every service delivery is different |
| Inseparability of production and consumption | Services are consumed at the same time as they are produced |
| Perishability | Services cannot be stored |

*Intangibility* in services refers to the fact that services cannot be seen, touched, or sensed in any other physical way (Grönroos, 2000; Ritala et al., 2011; Vargo and Lusch, 2004). A service has traditionally been characterized as an act or performance, rather than an object (Vargo and Lusch, 2004). However, modern services can also involve tangible elements that support the service experience, such as stated in the solutions chapter (Storbacka and Pennanen, 2014). In such cases, the service is better understood as a system or bundle of tangible and intangible components delivered through interaction and collaboration. The modern service is characterized by intangibility, yes, but it is not always completely intangible and can contain tangible assets (Storbacka and Pennanen, 2014). The intangibility of services leads to a few challenges. First, customers might find it difficult to evaluate the quality and value of the service before purchasing it (Vargo and Lusch, 2004). Second, it makes services more difficult to market and promote (Vargo and Lusch, 2004). Third, it makes customer relationships much more impactful and important than in a product-based business (Vargo and Lusch, 2004). This is due to customers associating value with the service firm rather than the service they are buying.

Intangibility is not black-and-white, it is a spectrum (Ritala et al., 2011). As stated above, some services can have tangible elements. A traditional example of tangibility in services is hotels, where tangible elements include a room, bed, and shower. It is generally considered that even though hotels do have tangible elements, they are a service. In the KIBS industry, an example of a level of tangibility is a solution, which can include a significant amount of tangible elements (Windahl and Lakemond, 2010). As stated earlier, solutions can end with a system, product, or other tangible outcome, but the solution itself is not the end result. Rather, it is the process of getting there (Kuula et al., 2018; Storbacka and Pennanen, 2014; Windahl and Lakemond, 2010). This means that they include creating and utilizing tangible elements such as software systems, integrations, or products as a whole, but the service itself is intangible and limited to a certain timeframe (Kuula et al., 2018; Storbacka and Pennanen, 2014). In addition, a solution nor its end result exist, and rarely even can exist, at the moment they are purchased by the customer, which is also proof of its intangibility.

Another viewpoint in tangibility and intangibility is the idea that all value is provided by services, and products are only vessels for the provision of services, and thus, intangible value (Vargo and Lusch, 2004). This supports the theory that services do not differ from goods in any meaningful way when it comes to value delivery (Grönroos, 2008; Gummesson, 1995). This is effectively stated with the example of a laptop. The value of a laptop does not come from purely owning it, it comes from the laptop allowing the owner to complete certain tasks and access the internet.

*Heterogeneity* in services refers to the variability and unique nature of them, which is caused by the differences in customers, service providers, and contexts in which services are delivered as well as the different expectations and needs that come from these differences (Ritala et al., 2011; Vargo and Lusch, 2004). Because services are human-centered and somewhat knowledge-intensive in nature, they are inherently diverse and very difficult to standardize (Vargo and Lusch, 2004). They do not have a standard outcome and the delivered service is often completely dependent on the customer and context of service delivery (Ritala et al., 2011). In service solutions, heterogeneity is pronounced further due to solutions requiring in-depth knowledge of customers and their problems (Kuula et al., 2018; Storbacka and Pennanen, 2014). This increases the variability caused by the different contexts and characteristics of customers. The heterogeneity of services, further pronounced in KIBS, is the main reason for this research.

*Inseparability of production and consumption* means that services are produced and consumed simultaneously (Ritala et al., 2011; Vargo and Lusch, 2004). Goods are produced, taken to wherever they are sold or stored, sold, and after the sale, they are consumed. Unlike goods, services cannot be separated from their point of delivery (Ritala et al., 2011; Vargo and Lusch, 2004). They cannot be taken to a different place or stored for later, and thus, they are "consumed" while they are being produced. This leads to value being defined by the customer at the same time as the service is delivered (Kuula et al., 2018; Vargo and Lusch, 2004). Inseparability of production and consumption is a consequence of intangibility. Since a service cannot be seen or touched and does not physically exist, it cannot be saved for later or stored (perishability) (Fitzsimmons, 2011).

For service firms, the simultaneous production and consumption of services means that for each customer, the company needs more production capacity (competences), but that also, there is little to no gap between producing the service and being paid for the delivery. There are both pros and cons to this for the firm. The major pro is that resource utilization (production) is directly linked to sales. The con is that, for each new customer, a service firm needs more production through hiring new employees and gaining new or more of existing knowledge. This means that economies of scale are heavily lessened in the service business and some sources even state that they do not exist in services.

*Perishability* refers to the fact that services cannot be stored (Grönroos, 2000; Ritala et al., 2011). It is linked to the previous attribute in the fact that services are consumed while they are produced. A customer of a hotel cannot save the experience of staying at the hotel for later. Once a service has been performed, traditionally its value cannot be retained or reused (Grönroos, 2000; Ritala et al., 2011).

Perishability needs more defining in the case of service solutions. It could be argued that solutions, or at least their end results, can be stored. A solution can result in a product, system, or other somewhat tangible outcome that can be reused or stored by the customer (Storbacka and Pennanen, 2014; Windahl and Lakemond, 2010). However, as stated earlier, solutions are not the end result, but the process of solving a problem for the customer (Kuula et al., 2018; Storbacka and Pennanen, 2014). When delivering solutions, knowledge and expertise provided to the customer must be applied during the service interaction, which is the creation of the solution (Storbacka and Pennanen, 2014). The knowledge provided cannot be stored and the opportunity to deliver value is limited to the moment. Simplified,

the knowledge used to create the solution's end result is only available in the time period of service delivery.

## 2.2 SDL Extends Traditional Service Literature

This thesis uses Service-Dominant Logic (SDL or S-D Logic) as an extension of traditional service literature. SDL is a service as a perspective framework, which aids in defining what a service is and how value is created in a service context (Vargo and Lusch, 2004). Traditional Goods-Dominant Logic (GDL) does not fully translate to service delivery and thus is significantly lacking when describing services and by extension, KIBS.

SDL, introduced by Vargo and Lusch (2004), shifts the focus of value delivery as well as value and exchange from goods to services. SDL also defines the "application of knowledge and skills for the benefit of another" as the fundamental basis of all economic exchange (Vargo and Lusch, 2004). This all contributes to the definition of a service from an SDL point of view:

> *"The application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself"* (Vargo and Lusch, 2004).

Essentially, this boils services down to three aspects: 1) the competences and knowledge within a company, 2) the value creation process, and 3) the customers themselves (Kuula et al., 2018; Vargo and Lusch, 2004). Furthermore, a service company only has ownership of the first two aspects and has little influence on the customer and what they want (figure 6). They can only affect their own competences and the value creation process. And, on the other side, the customer can affect themselves and, if adhering to value co-creation, also affect the value creation process but cannot influence the competences of the service company (figure 6).

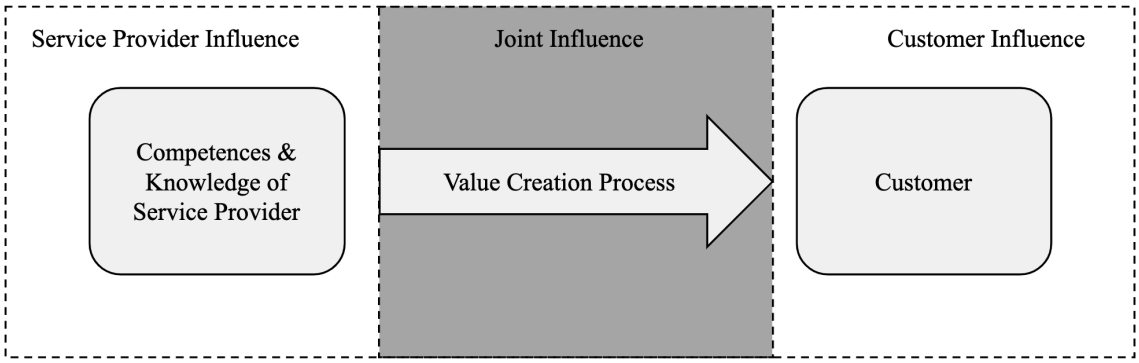


*Figure 6: Ownership of Service Aspects*

SDL includes several key attributes, called foundational premises. For this thesis, three of these attributes are relevant: 1) value co-creation, 2) value defined by the customer, and 3) value-in-use (Kuula et al., 2018; Vargo and Lusch, 2004). Their definitions are as follows:

- Value co-creation: Value is always created together with the customer, not just for them. The customer needs to be involved in the value creation process and holds important knowledge.
- Value defined by customer: Value is not objective, but subjective to the customer. The same result can be valuable to one customer and not to another.
- Value-in-use: Value is determined by the customer during use, not at the point of sale.

These three foundational premises aid in defining and characterizing services. They assist in creating a basic framework on which a resource planning process can be built.

Value co-creation is linked to traditional services' heterogeneity principle (Fitzsimmons, 2011). Value co-creation states that customers are (or at least should be) a part of the value creation process (Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2004). This leads to the different characteristics, values, and attributes of customers mattering more than in traditional Goods-Dominant Logic. If value was mostly objective, such as thought in traditional product literature and GDL (Vargo and Lusch, 2004), services could be standardized, and heterogeneity would not exist in service deliveries because every service delivery would be exactly like the previous one with maximal objective value.

Value being defined by the customer is directly tied to value co-creation and the heterogeneity attribute of services. Value being defined by the customer creates an explanation for why heterogeneity is so pronounced in services. It is also the attribute that creates the necessity for value co-creation. If the customer defines value, and every customer is unique, all service deliveries will be different from each other. This means that, since customers define value, they need to be involved in the value creation process from the beginning (Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2004). In other words, to create a service that is valuable, the service provider must consult with the customer to know what valuable means for them.

Value-in-use is an extension of the intangibility and inseparability of production and consumption characteristics of services (Fitzsimmons, 2011; Vargo and Lusch, 2004). It defines value as being experienced during the service interaction, not at the point-of-sale (Vargo and Lusch, 2004). Essentially, customers buy offerings, which can be either goods or services, which render services, which provide value (Grönroos, 2008; Gummesson, 1995). Purely owning something does not generate value. It is in the use of a product or service that value arises. In the context of KIBS, this means that purely owning knowledge and skills does not provide value in itself, it is the use of this knowledge in the value creation process in the correct way that creates value.

Figure 7 shows how SDL links into the basic IHIP attributes of services. Customer as the definer of value shows up as the most important, since it creates an explanation for the heterogeneity attribute of services. It is also the cause for value co-creation since it requires that the customer is at the center of value creation (Vargo and Lusch, 2004). Value-in-use comes from intangibility and inseparability, which itself arises from the perishability characteristic. Since service deliverables are intangible and cannot be stored for later, they are produced and consumed simultaneously, and thus, value is only available in the “use” of the service. Many times, in service deliveries, the service does not exist at all during the point of purchase and only take form during the service provision process.

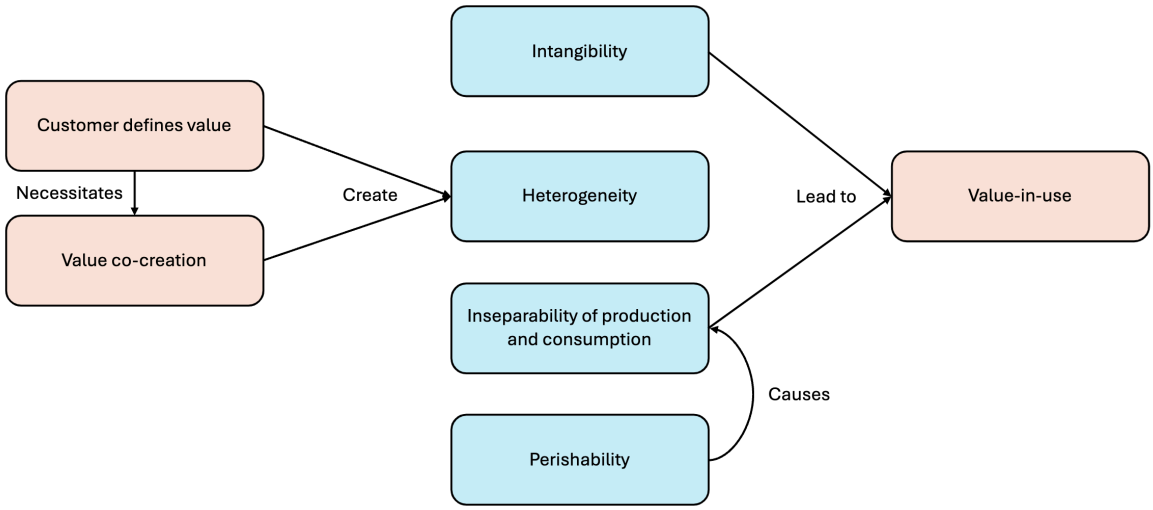


*Figure 7: SDL links to IHIP*

## 2.3 Knowledge-Intensive Business Services

Knowledge-Intensive Business Services (KIBS) are a subcategory of services that rely on deep expert knowledge to address the needs of customers. The definition of KIBS is "a service that helps organizations solve problems for which internal knowledge is not enough, and external sources of knowledge are needed" (Miles, 2005). This definition originates from the book "The Effective Executive" (Drucker, 1966), where the knowledge economy as a whole is described as relying on intellectual and knowledge-based capabilities more than on physical activities or natural resources (Kuula et al., 2018). KIBS are mostly business-to-business services, providing services such as consulting, information technology (IT) solutions, management services, and professional advice (Kuula et al., 2018; Miles, 2005; Mustak, 2019). They foster innovation, support core business functions, and enhance productivity across all industries (Miles, 2005). KIBS have been increasing in number for years and have become one of the main staples of the modern service business and business in general (Kuula et al., 2018).

One core characteristic of KIBS is that they are, as their name indicates, services. This means that KIBS share attributes with other services. As discussed in the traditional service literature chapter, these attributes are the IHIP attributes (Fitzsimmons, 2011; Ritala et al.,

2011). However, there are also other attributes that define KIBS. The next chapter will take a look at the core characteristics of KIBS, including how IHIP attributes fit into the picture.

### 2.3.1 Core Characteristics of KIBS

KIBS have their own defining characteristics that build upon the base characteristics of services as defined in traditional service literature and SDL (figure 4, p. 12). The defining characteristic of KIBS is their reliance on the knowledge and skills of workers who use those skills and knowledge to solve problems for customers (Aarikka-Stenroos and Jaakkola, 2012; Kuula et al., 2018). This attribute is referred to as **knowledge-intensity**, and is the basis of the term knowledge-intensive business services (Ritala et al., 2011). The knowledge referred to here can be skills of employees or, as will be discussed more later in the thesis, knowledge on specific contexts, environments, or even knowledge on a specific customer. In addition to knowledge-intensity, KIBS inherit the basic attributes of services. These attributes, defined in the service literature chapter, are referred to as IHIP attributes after their initials: intangibility, heterogeneity, inseparability of production and consumption, and perishability (Fitzsimmons, 2011; Kuula et al., 2018; Ritala et al., 2011). In addition to the basic IHIP attributes, Service-Dominant Logic (SDL) adds a fifth attribute, value co-creation, which states that the customer defines what value is and thus needs to be involved in the value creation process from the beginning (Vargo and Lusch, 2004).

*Knowledge intensity* stems from the fact that KIBS depend on specialized knowledge as the foundation for solving problems customers themselves do not have the knowledge to solve (Aarikka-Stenroos and Jaakkola, 2012; Kuula et al., 2018; Miles, 2005; Ritala et al., 2011). This specialized knowledge, in practice, equates to a skilled workforce and employees (Kuula et al., 2018; Ritala et al., 2011). Knowledge intensity leads to new requirements for business, the most important and impactful being knowledge management (Ritala et al., 2011). Knowledge management is essentially all the activities within an organization that improve the effectiveness and efficiency of organizational knowledge resources (Andreeva and Kianto, 2012; Inkinen et al., 2015). In the most basic of cases, this includes keeping track of the different roles inside an organization and holding small training sessions to develop the skills and knowledge that the employees hold. In addition to knowledge held by

the employees of the service provider, knowledge on the customer is also exceedingly important for KIBS. To provide a valuable solution for a problem, the service provider must understand the problem and what value means to the customer (Vargo and Lusch, 2004). This leads directly to value co-creation, since without including the customer, it is almost impossible for a service firm to gain any significant knowledge on the customer.

*Value co-creation* is the process of working together with the customer to generate value (Kuula et al., 2018; Vargo and Lusch, 2004). According to SDL, value is not delivered but co-created through interacting and exchanging knowledge between the service provider and customer (Vargo and Lusch, 2004). Value itself is not objective but instead completely defined by the customer (Vargo and Lusch, 2004). In KIBS, value co-creation occurs through solving problems together with the customer, where both the provider and customer contribute to achieve a solution that meets the client's needs (Aarikka-Stenroos and Jaakkola, 2012). In KIBS, knowledge lies in the service provider, but also in the customer. The customer holds knowledge about what the problem is as well as what value is (Vargo and Lusch, 2004). Both these aspects need to be combined to create a solution that fills the criteria for value creation from the perspective of the customer.

The base *IHIP attributes* of services also play a role in KIBS. As stated above, KIBS are defined by the basic IHIP attributes of services due to them being a sub-category of services. Mostly, IHIP principles apply as in any service business, but KIBS does have some unique considerations for them.

**Intangibility in KIBS**

Intangibility is universal in KIBS due to the main offering, knowledge, being inherently intangible. The service provided is rooted in the knowledge of the service provider, with significant knowledge coming from the customer also (Miles, 2005; Ritala et al., 2011). This knowledge is difficult to judge for potential customers before service provision. In practice, the only indicator of value before purchase is the track record of the providing firm. This shifts the focus of value assessment from deliverable to relationships and past performance. Relationships between customer and provider become exceedingly important, since there is no other way for the customer to assess value in any accurate way.

Another consideration concerning intangibility is that KIBS offerings are often solutions. As stated before, solutions have their own considerations in intangibility (Storbacka and Pennanen, 2014). KIBS providers often provide the entire process of solving a problem, instead of providing just the knowledge needed to create the solution (Storbacka and Pennanen, 2014). This means that the process will often contain tangible elements such as products, tools, etc. Solutions can also have somewhat tangible outcomes, but it is important to remember that solutions are not their end result, but the process of getting there (Storbacka and Pennanen, 2014; Windahl and Lakemond, 2010).

**Heterogeneity in KIBS**

KIBS and services in general are often tailored to the specific needs of individual clients (Mustak, 2019). Two deliveries are very rarely the same. Since value is defined by the customer (Vargo and Lusch, 2004), it needs to be co-created with the customer (Kuula et al., 2018; Vargo and Lusch, 2004). This leads to each delivery being different and unique, tailored to that specific customer and environment (Mustak, 2019; Ritala et al., 2011; Vargo and Lusch, 2004). In the context of KIBS, heterogeneity means that every service delivery is unique, influenced by the client's requirements, the service provider's approach, and the complexity of the problem being solved. It is pronounced in KIBS due to the fact that the knowledge provided is context-specific and often unique, contained in key individuals and organizational processes and information (Ritala et al., 2011). This is even further pronounced with the fact mentioned in the previous chapter that relevant knowledge is also held by the customer themselves (Storbacka and Pennanen, 2014).

**Inseparability of production and consumption in KIBS**

In KIBS, inseparability of production and consumption means that clients are often directly involved in the service process (Vargo and Lusch, 2004). For example, in consulting, knowledge is exchanged, and solutions are developed through workshops and meetings between the service provider and customer. The knowledge provided is limited to that moment in time and cannot be reused or consumed after the service period is over. Even if the service provided produces some end result that has a level of tangibility (e.g., a solution), the knowledge to solve the problem and create the solution to that problem is limited to the timeframe of the service delivery (Ritala et al., 2011; Storbacka and Pennanen, 2014).

**Perishability in KIBS**

Perishability in KIBS and solutions providers is somewhat different than in a more traditional service delivery. Since KIBS and solutions often lead to a more tangible outcome than traditional services, such as hotels, their outcomes can be stored (Fitzsimmons, 2011; Storbacka and Pennanen, 2014; Windahl and Lakemond, 2010). However, as stated before, the service is not the outcome, but the process of creating the solution, and that process cannot be stored for later (Storbacka and Pennanen, 2014). It is limited to the timeframe of service delivery.

IHIP attributes are somewhat affected by the unique nature of knowledge-intensive work. Table 3 gives an overview of what changes happen in IHIP attributes when shifting to KIBS. Intangibility is affected due to the inclusion of tangible elements in solutions, which KIBS often have as their deliverable. Heterogeneity is pronounced since the environment and context of the customer hold increased importance, as well as the fact that the customer holds knowledge necessary for value creation. Inseparability needs to be clarified, because of the inclusion of tangible elements and the results of service solutions often being somewhat tangible. Perishability needs the same clarification as inseparability.

*Table 3: IHIP in KIBS*

| Attribute | Description | KIBS Notes |
|---|---|---|
| Intangibility | Cannot be seen or touched | KIBS often contain some tangible elements |
| Heterogeneity | Every delivery is different | Heterogeneity is pronounced in KIBS |
| Inseparability of Production and Consumption | Consumed at the same time as they are produced | Knowledge provided is limited to delivery timeframe, even if there is a tangible outcome |
| Perishability | Cannot be stored | Process limited to timeframe of service delivery |

## 2.4 Lean Defines Waste and Pull

Lean Thinking originated in Japan after the second world-war, in the Toyota Production System (TPS). It was originally formed as a methodology for manufacturing with the ultimate goals of reducing waste and inefficiencies and increasing profit margins (Bhamu and Sangwan, 2014; Hines et al., 2004; Kuula et al., 2018; Ohno, 1988). Lean, however, took on a different form in the late 20th and early 21st century, as a philosophy for management (Gupta et al., 2016; Kuula et al., 2018). It evolved beyond manufacturing and gained traction as a framework for start-ups and services in addition to industry and manufacturing. At the core of Lean thinking are two sides of the same coin, value and waste (Kuula et al., 2018; Ohno, 1988; Womack, 1991). Waste is everything that is not value and value is dependent on the context, business, and customer. All business activities can be categorized into one or the other.

To maximize value-adding activities and minimize waste, Lean offers five core principles: 1) defining value, 2) mapping the value stream, 3) creating flow (minimizing non value-added activities), 4) **using a pull system**, and 5) pursuing perfection (Araújo et al., 2021; Doanh, 2017; Womack, 1991). These five principles have different meanings in each company Lean is implemented in. Some similarities can be found in companies in similar industries, such as service firms. In the case of service firms, the value stream is very company-specific due to the heterogenous nature of services (Ritala et al., 2011), and the role of the customer as definer of value (Kuula et al., 2018; Vargo and Lusch, 2004). These attributes complete the first and second principles (define value and map the value stream). This leaves the second and third principles to be defined in more detail. As the fifth principle of pursuing perfection is more of a mindset than a process with concrete steps, it is also outside the scope of this thesis. Creating flow is heavily linked to waste. It is essentially the process of minimizing non value-added activities or reducing waste (Araújo et al., 2021). Using a pull system requires the definition of a pull system, in the case of this thesis, in KIBS. This will be created in the following chapters. These two principles lead to the two sides of the Lean coin, waste and value.

### 2.4.1 Waste

Waste in Lean was originally defined as transport, inventory, motion, waiting, overproduction, overprocessing, and defects (Ohno, 1988). Later, in lean thinking literature, an additional source of waste was added: unused talent (Womack, 1996). The descriptions of these categories of waste can be found in table 4.

*Table 4: Waste in Lean*

| **Waste Source** | **Description** |
|---|---|
| Transport | Unnecessary movement of materials or people |
| Inventory | Excess stock or unfinished work |
| Motion | Unnecessary movement by employees |
| Waiting | Delays in processes |
| Overproduction | Producing more than needed |
| Overprocessing | Unnecessary steps or complex workflows |
| Defects | Errors requiring rework |
| Unused Talent | Not utilizing employees' skills effectively |

In the context of modern services and KIBS, this list needs to be somewhat modified, as these original sources of waste relate to industrial firms and manufacturing. The perishability of services nullifies inventory and the inseparability of production and consumption nullifies overproduction (Fitzsimmons, 2011; Ritala et al., 2011). It could be argued however, that since knowledge is the core offering of KIBS, inventory and overproduction could equate to an excess of knowledge or employees (= production capacity) within a company. This is basically the same as unused talent, which takes a larger role in services and KIBS. Similarly, since the key resource of KIBS is knowledge, which is held employees, transport and motion are effectively the same thing (Miles, 2005; Ritala et al., 2011). Motion is also significantly less impactful in modern KIBS companies due to the rise in off-site and hybrid work. The main sources of waste for KIBS, and the ones that will be considered in this thesis, then, are the ones found in the following table (table 5):

*Table 5: Waste in Services and KIBS*

| **Waste Source** | **In the Context of KIBS** |
|---|---|
| Unused Talent | Not utilizing employee's skills effectively |
| Waiting | Delays in processes |
| Overprocessing | Overly complex processes |
| Defects | Poor quality work |

### 2.4.2 Pull Systems

The original Toyota Production System (TPS) was built upon the Just-In-Time (JIT) manufacturing philosophy, which is a core concept in Lean thinking (Araújo et al., 2021; Ohno, 1988; Womack, 1991). In short, the core principle of JIT is to stock "only necessary items in necessary quantities at the necessary time" (Araújo et al., 2021; Kim, 1985). To fully adhere to this principle, a company must identify:

- Necessary Items: What resources (e.g., knowledge) are required?
- Necessary Quantities: How much of the necessary resource is needed to meet demand without overcommitment?
- Necessary Times: When is the latest possible moment that a resource must be allocated before a bottleneck or inefficiency emerges?

Pull systems are an effective solution to answer the questions above. They ensure that goods are produced, or services are provided only when a demand arises downstream in the value creation process (Araújo et al., 2021). Here, "downstream" refers to the latter stages of the value creation process, which are closer to the final delivery to the customer and "upstream" means further from the customer and closer to the beginning of the value creation process, e.g., resourcing or recruiting (Araújo et al., 2021). What "pull" refers to, then, is essentially the demand from customers, the furthest actor downstream in the value creation process. When this demand arises and it is fully understood, a business knows exactly what items are needed, at what quantities, and when.

The main difference between push and pull systems is essentially the source of the trigger of a process. As shown in figure 8, the trigger in push systems comes from the previous step

in the process, and in pull systems from the next step in the process. In pull systems, if demand arises, each process needed is called from the process after it in the larger value creation process. This process minimizes processes backing up due to them no longer being triggered before the following process requires it. If a process has everything it needs, it won't call the previous process, speeding up delivery and eliminating waste.

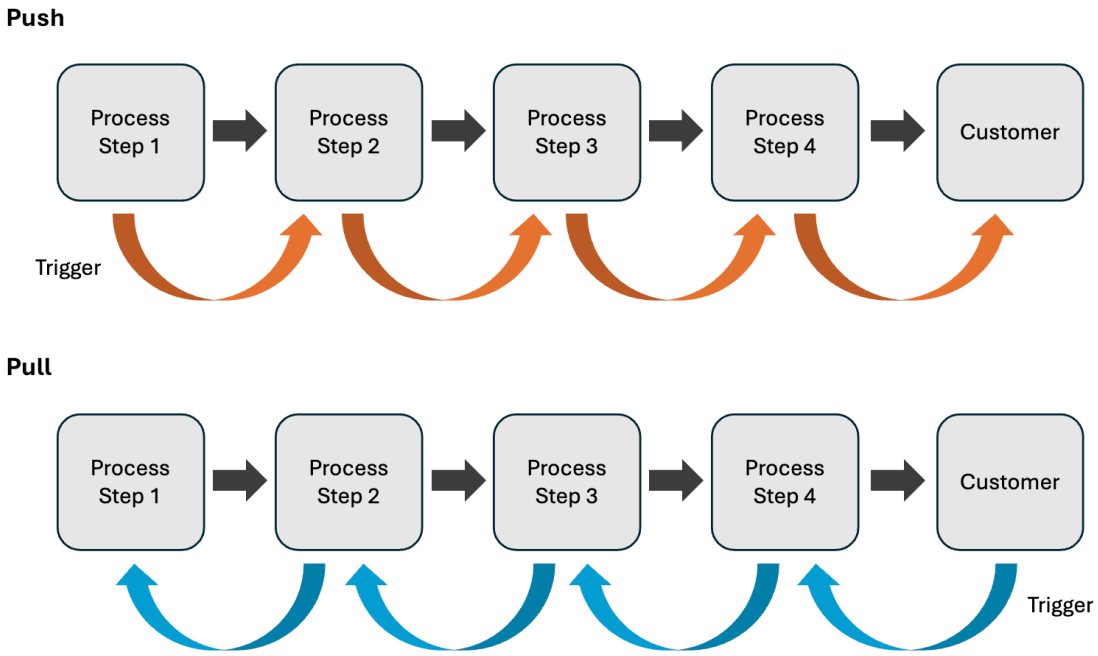


*Figure 8: Push vs. Pull*

According to pull, without customer demand, there is no need for production or resource allocation, as any activity without a confirmed need generates waste, for example, in the form of inventory (Araújo et al., 2021; Kim, 1985; Ohno, 1988). Taiichi Ohno (1988), the creator of the Toyota Production System, emphasized that excess inventory is a primary source of waste in manufacturing, as it leads to overproduction and unnecessary storage costs. As stated in the previous chapter, service-oriented businesses do not have inventory in the traditional sense, but instead hold service production capacity, meaning talent or competences. This means that idle consultants, often called consultants "on the bench", and overstaffed projects are major contributors of waste in a KIBS business.

## 2.5 Traditional Resource Planning

Resource planning refers to the strategic process of acquiring the right resources and allocating them at the right time to the activities that require them (Kartamycheva, 2024). It is a core activity in all businesses. A “resource”, however, can mean different things to different businesses and industries. A manufacturing company uses materials in machines with human employees. This means that a traditional manufacturing company’s resources include the materials, machines, and people as well as its financial resources. Services include different resources due to their distinct characteristics (IHIP attributes) (Fitzsimmons, 2011). Due to the intangibility and perishability of services, significantly less tangible materials are included in the value creation process (Fitzsimmons, 2011; Ritala et al., 2011). Since there are often little to no materials, there are also less machines in use.

This chapter will focus in on resource planning in KIBS. It will include the definitions of resources and resource planning in KIBS as well as the processes and tools traditionally used for resource planning. Understanding this foundation is essential before introducing alternative, pull-driven approaches that may offer improved alignment with today’s increasingly dynamic and uncertain business landscape.

### 2.5.1 What is a Resource?

To understand resource planning, the definition for a “resource” must be stated. A “resource”, as related to this thesis, can be defined as “a source of supply or support” or “a source of information or expertise” (Merriam-Webster, 2025). Other definitions could include natural sources of wealth, like minerals, (Merriam-Webster, 2025) but as this thesis relates to resource management in a business and service context, these other definitions provide little to no value. In the context of business and service industries, then, resources are the assets, capabilities, and knowledge that organizations use to deliver value (Merriam-Webster, 2025). These resources can be tangible or intangible, but their value depends on how they are used to gain an advantage (Kianto et al., 2017). Traditionally, the main difference between services and products is thought to be the level of intangibility. Products are very tangible and services very intangible (Fitzsimmons, 2011). In addition to the level

of intangibility in the output, the level of intangibility is also relevant in the input (resource) of services. This input is often knowledge, skill, competence, or some other intangible feature. The main separating feature of tangible and intangible resources is that intangible resources are usually embedded within individuals. This means that the service business is very reliant on its workers and human resources. Knowledge-intensive businesses take the human resource intensity of traditional services a step further by making knowledge the base of the service they provide (Bolisani et al., 2023). This means that knowledge is also the main resource that is used to provide this service (Kuula et al., 2018). Knowledge is embedded in individual employees, integrating the human element into both the resources as well as the output of service delivery (Jorgensen et al., 2024; Kianto et al., 2017).

### 2.5.2 Resourcing vs. Resource Planning

While the terms resourcing and resource planning are closely related and often used interchangeably, they are slightly different processes with different meanings. Resourcing is a broader process that encompasses the identification, acquisition, and allocation of all necessary resources to fulfill strategic and operational needs (Chakraborty & Biswas, 2020). It is an ongoing and often strategic activity focused on ensuring that the right mix of capabilities is available to the organization.

Resource planning, on the other hand, is a more structured, often operational process. It involves forecasting demand, mapping availability, and matching people to roles or projects based on predefined criteria such as availability, seniority, or billable potential (Hargaden & Ryan, 2015). While resourcing may span recruitment, talent development, and strategic workforce management, resource planning is typically focused on short- to mid-term capacity alignment and allocations (Hargaden and Ryan, 2015).

For this thesis, resource planning is more integral, since including the entire resourcing process would increase the scope significantly. Also, resource planning tends to be the focus of the operational layer of project delivery in KIBS.

### 2.5.3 Traditional Resource Planning Practices in KIBS

Since the core resource (and deliverable) of KIBS is knowledge, which is embedded in individuals (employees) (Bolisani et al., 2023; Kuula et al., 2018), these types of businesses have an increased reliance on managing human resources. Human resource management (HRM), then, takes the center stage in these businesses. HRM is an aspect of resource management in all companies with human employees (Jorgensen et al., 2024), but it is especially important in KIBS due to the factors stated above. Broadly, HRM includes all the activities in an organization that deal with the relationships between the organization itself and its employees (Jorgensen et al., 2024). A more specific definition is "a system of operational functions such as staffing, selection, job design, training and career development, performance appraisal and compensation" (Jorgensen et al., 2024). Another form of resource management used in KIBS is knowledge management, which, as stated earlier, covers the management and development of an organization's knowledge resources. HRM and knowledge management differ slightly, even though the knowledge of a company is possessed by its human resources (Bolisani et al., 2023; Kianto et al., 2017). Knowledge management activities can include, for example, documentation and formalization of information, which falls outside the bounds of HRM.

The focus of KIBS resource planning is typically on assigning employees to projects based on their job roles or levels of seniority rather than skill profiles (Berk et al., 2019). This approach often relies on historical data and sales forecasts, with the objective of maximizing billable hours (Jorgensen et al., 2024).

Three defining characteristics of traditional resource planning in services and KIBS arise from literature. The first is that this type of resource planning is usually done by dedicated managers or teams (Hargaden and Ryan, 2015). These teams then coordinate with sales, HR, and delivery to assign human resources to projects. The second is that assignments are often made based on role titles (e.g., senior consultant, data engineer) and seniority rather than individual skills and competences (Knies et al., 2024). The objective is typically to maximize utilization (billable-%) which is often used as an indicator of individual and organizational productivity. And finally, the third is a set planning cycle (Berk et al., 2019). In many firms, planning is carried out on a quarterly or even annual basis, with limited flexibility to adjust allocations once decisions have been made.

In short, resource planning in the context of KIBS refers to the process through which human resources (e.g., consultants, data analysts, engineers) are allocated to ongoing and upcoming projects. It involves forecasting demand, assessing availability, and matching people to roles in a way that supports business objectives and client satisfaction (Chakraborty and Biswas, 2020). This type of resource planning is often referred to as a “push-driven” model, where decisions are based on expected project pipelines and historical data. These decisions are typically made centrally, often weeks or months in advance, and tend to rely on static categorizations of employees by role and seniority (Berk et al., 2019).

A common resource planning process might look like this:

1. The sales pipeline is reviewed to anticipate upcoming project demand (predicting future based on the past).
2. Delivery managers provide estimates of required roles (e.g., “Senior Data Engineer, Data Architect”).
3. A resource manager assigns individuals based on role fit and availability.
4. Informal consultations ("Do we have anyone available who knows AWS?") fill any gaps (Hargaden and Ryan, 2015).
5. Once assigned, reallocation is avoided due to planning rigidity and the risk of disrupting client expectations.

This process is often supported by static tools, such as Excel spreadsheets or inflexible ERP systems that lack dynamic skill-matching functionality (Al-Mashari et al., 2003; Shaul and Tauber, 2013). In many firms, the personal memory and judgment of the resource planner become increasingly important since large amounts of information about employees is held solely within the resource planner.

This type of traditional resource planning remains common because of its simplicity and predictability. However, in knowledge-intensive contexts, where project scopes are often dynamic and the workforce is both the product and the producer, this approach is increasingly seen as insufficient (Bolisani et al., 2023; Hargaden and Ryan, 2015). The rigid, utilization-focused model may yield short-term efficiency, but it often lacks the flexibility and responsiveness needed to support long-term value creation. As KIBS firms look to scale,

diversify, and adapt to rapidly evolving client needs, more agile, data-informed, and employee-centric planning models are likely to become a strategic necessity.

### 2.5.4 KIBS Resource Planning Processes and Tools

The traditional resource planning process in KIBS can be seen in figure 9. It typically begins with the overarching strategic goals of the business, as with most other business processes. What is the strategy the company is pursuing? A company focused on data analysis will rarely hire HTML experts for customer projects. Next, current resources are defined and future forecasts are made and analyzed to see what resources are needed and where (Jorgensen et al., 2024). These forecasts can be based on, for example, headcount or the knowledge of the sales team. The sales team estimates the likelihood of winning new projects and their value, and the delivery team attempts to predict what kinds of roles and capacities will be needed. These forecasts are then converted into staffing plans that allocate individuals to projects (Shaul and Tauber, 2013). Next, a gap estimation is done to find the gaps with current resources and forecasted needs. Finally, a resource plan is created, implemented, and monitored.

*Figure 9: Traditional Resource Planning Process*

In many cases, the tools used to support this process are not well-equipped to handle these kinds of forecasts. Although some firms use software designed for this, many rely on manual processes or fragmented systems (Al-Mashari et al., 2003). Resource discussions often remain informal—"Do we have someone who knows X?" or "Is person Y available next month?" This creates a high dependency on individual memory and knowledge (Hargaden and Ryan, 2015).

## 2.6 Synthesis on Theoretical Framework

This thesis builds upon five key theoretical pillars (table 6): service literature, Service-Dominant Logic, Knowledge-Intensive Business Services, Lean thinking, and resource planning theory. These elements together form the foundation for understanding pull-driven resource planning in KIBS.

*Table 6: The main content of the theoretical framework*

| Theory | Main content |
|---|---|
| Service Literature | Service Definition<br>Service solutions<br>Service attributes (IHIP) |
| SDL | Value co-creation<br>Value-In-Use<br>Customer as Definer of Value |
| KIBS | Knowledge as main resource<br>Unique KIBS attributes |
| Lean | Waste<br>Pull Systems |
| Resource Planning | Definition of resource (in KIBS)<br>Traditional Resource Planning |

Service literature provides a foundation for services, and as an extension, for KIBS. It defines services as processes or series of processes and states the base attributes of services

(Grönroos, 2008). These IHIP attributes of intangibility, heterogeneity, inseparability of production and consumption, and perishability create the foundation for understanding all services, including KIBS (Fitzsimmons, 2011). In addition, traditional service literature defines solutions and justifies them as services even with their tangible elements.

Service-Dominant Logic expands on traditional service literature and shifts the focus of value creation from goods to service interactions (Vargo and Lusch, 2004). Three foundational principles are important for this thesis:

- Value co-creation: The customer is involved in the value creation process from the beginning.
- Value is customer-defined: Customers and users define what value is.
- Value-in-use: Value emerges during use, not at the point of sale.

These three principles extend the traditional service literature as shown in figure 7 (p. 21). Customer as the definer of value is especially important since it acts as an explanation for the heterogeneity attribute in the traditional IHIP attributes of services. These SDL principles also reinforce the dynamic, customized, and heterogenous nature of KIBS, where service providers and customers collaborate to solve the problems of the customer (Aarikka-Stenroos and Jaakkola, 2012). In KIBS solution deliveries, both parties have knowledge that the other does not.

KIBS are services but they also have their own characteristics and attributes. KIBS rely on expertise and knowledge-based problem-solving (Miles, 2005). They are typically B2B services, such as consulting or IT solutions, where knowledge is the primary resource (Kuula et al., 2018). KIBS inherit IHIP characteristics from services but also add on knowledge intensity and emphasize value co-creation (Aarikka-Stenroos and Jaakkola, 2012; Kuula et al., 2018; Vargo and Lusch, 2004). Since knowledge is intangible and highly context-dependent, KIBS offerings are even more heterogenous than traditional services and require close collaboration with customers and users. The IHIP framework still applies, but perishability and inseparability become more pronounced as knowledge must be applied in real-time.

Traditional service literature, SDL, and KIBS theory form the environment for this research (figure 10). As this thesis is made on behalf of the commissioning company, their

environment must be considered when analyzing and innovating on resource planning. Essentially, the environment is a combination of the theories mentioned above, which is at the cross-section of solutions and KIBS within a service context. The commissioning company, then, can be called a knowledge-intensive service solution provider.

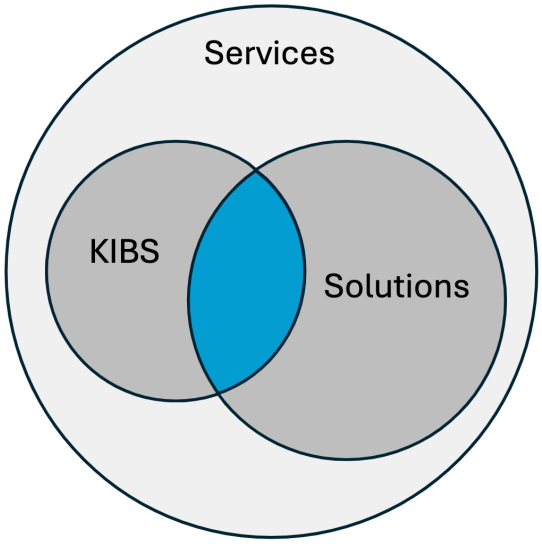


*Figure 10: Research Environment*

The research environment of this thesis inherits characteristics from the different theories that form this environment (table 7). As this environment is at the cross-section of KIBS and solutions, it inherits characteristics from both. And as both exist within a service context, the operating environment also inherits the base characteristics of services. The research environment existing within KIBS means that the main resource is knowledge (Kuula et al., 2018; Miles, 2005). Additionally, the knowledge-intensity of the business overall increases. From solutions, the environment gains tangible elements, and the ownership structure of the value chain changes, as shown in figure 5 (p. 14) (Storbacka and Pennanen, 2014). Essentially, the service provider takes ownership of the solution design and team building stages of the value chain. From services, IHIP attributes define the base characteristics of services (Fitzsimmons, 2011; Ritala et al., 2011), and for the purposes of this research, SDL is used to add onto them with customer as value definer, value co-creation, and value-in-use (Vargo and Lusch, 2004).

*Table 7: Theories and Their Impact on the Research Environment*

| Theory | Impact on Environment |
|---|---|
| Services | Intangibility, heterogeneity, inseparability of production and consumption, and perishability of offering |
| SDL (as extension of services) | Customer defines value<br>Value must be co-created with customer<br>Value arises in use, not purchase |
| Solutions | Value chain ownership structure changes<br>Tangible elements become more prevalent |
| KIBS | Changes deliverable and main resource to knowledge<br>Increases knowledge-intensity |

In addition to the above theories impacting the environment of the research, Lean thinking and resource planning literature form the basis for analyzing the current and ideal resource planning processes. Lean thinking, originating from the Toyota Production System, helps optimize resource allocation by reducing waste (Kuula et al., 2018; Ohno, 1988; Womack, 1991). Traditional lean categories of waste, such as inventory, waiting, and defects, are adapted to KIBS, where unused talent, inefficiencies, and overprocessing are key concerns (Table 5, p. 28). A Lean thinking -based pull-driven system ensures that resources are allocated only in response to actual customer demand (pull). This minimizes inefficiencies like idle consultants ("on the bench") or overstaffed projects. By shifting from a push-based model (where capacity is pre-allocated) to a pull-based approach, KIBS can optimize their workforce utilization while maintaining flexibility in service delivery and reducing inefficiencies.

Finally, traditional resource planning literature defines the characteristics of resource planning processes in business and services in general, and KIBS in specific. The traditional resource planning process includes top-down decision-making, role and availability-based allocations, and set planning cycles (Berk et al., 2019; Hargaden and Ryan, 2015; Knies et al., 2024). These characteristics will be analyzed later in the thesis together with the core attributes of KIBS to define the limitations that these processes have in a KIBS environment.

Additionally, when combined with Lean, these limitations can be solved through a pull-driven approach to minimize waste and maximize value.

By integrating these frameworks, this thesis explores how pull-driven resource planning can optimize resource allocation in solution providing KIBS. Traditional resource planning struggles with the dynamic, knowledge-intensive nature of KIBS, making pull-driven approaches more relevant. The combination of service characteristics, SDL's customer-driven value creation, KIBS-specific challenges, and lean's efficiency principles creates a strong theoretical foundation for designing more adaptive and efficient resourcing strategies in knowledge-based consulting environments, and Lean thinking and resource planning literature assist in the creation of these strategies.

# 3 Pull-driven Resource Planning

This chapter defines the concept of pull-driven resource planning and outlines its significance in the field of KIBS. These topics have been mentioned in the theoretical framework but have not been explicitly defined. This chapter is not part of the theoretical framework since pull-driven resource planning as a concept was not found in any theoretical sources. This chapter, then, synthesizes a pull-driven resource planning concept from the theories of traditional resource planning and Lean thinking from the theoretical framework.

This chapter will begin with defining pull-driven resource planning. After a definition for pull-driven resource planning is created, another chapter will explain the necessity of pull-driven resource planning based on the theoretical framework. It will expand upon the different bottlenecks and inefficiencies that traditional resource planning generates in a KIBS and solution-centered environment.

## 3.1 Initial Definition for Pull-Driven Resource Planning

The theoretical definition for pull-driven resource planning comes from the combination of pull systems (Lean) and basic resource planning theories, both of which are included in the theoretical framework of this thesis. In this research, pull-driven resource planning refers to:

*"A resource allocation and scheduling approach in which planning decisions are triggered by actual customer demand, rather than by internal forecasts or predefined schedules"*

The important difference between this process and traditional resource planning is the trigger for planning decisions. Figure 8 (p. 29) explains the basic processes and differences of pull and push, which boil down to the trigger for processes being different in the two different systems. In pull systems, each sub-process is activated by demand from the subsequent process, with the initial trigger coming from the end-customer, as opposed to being pushed forward by preceding stages (Araújo et al., 2024). When applied to resource planning, this means that staffing, scheduling, and allocation decisions are initiated by concrete project or

client needs, enabling greater responsiveness and reducing inefficiencies inherent in forecast-driven planning, which are defined in the following chapter.

Figure 11 presents an actual resource planning process containing allocations, staffing, scheduling, project, and customer. This process is first shown in a push-based model, where forecasts are used to start the process. This means that allocations are triggered by forecasts. Staffing is triggered by joint triggers from the customer and allocations made beforehand. That then leads to scheduling and project delivery. In a pull-driven resource planning model, the customer is the initial trigger and each step in the process triggers the previous step. Customer needs a project, which needs a schedule, which needs staff to be selected, which requires allocating the correct professionals. This is the initial pull-driven resource planning process that will be considered in this thesis.

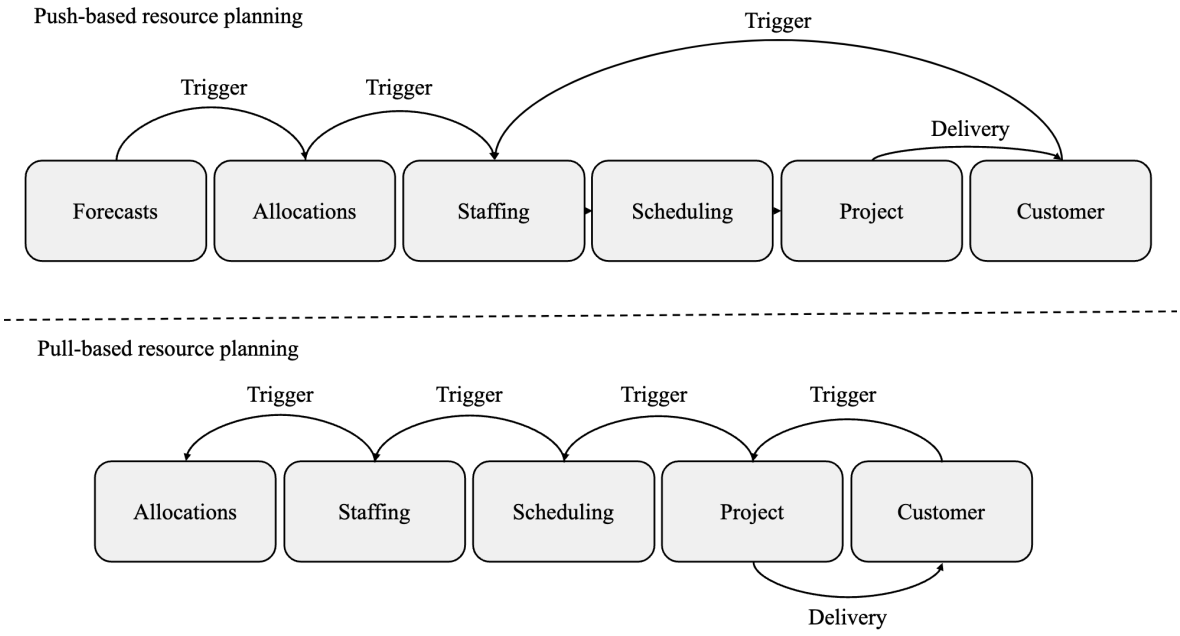


*Figure 11: Push-based Process vs. Pull-based Process*

## 3.2 Why Pull-Driven Resource Planning?

The problems of traditional resource planning in knowledge-intensive business services arise from attempting to merge the agile and shifting nature and characteristics of KIBS with the static methods and processes of traditional resource planning. This chapter will follow the main characteristics of traditional resource planning in KIBS defined in the theoretical framework. These are top-down planning, role and availability-based assignments, and rigid planning cycles. While this type of resource planning model offers some control and stability, it presents several limitations in the context of KIBS, such as limited skill visibility, rigidity, siloed decision-making, and lack of transparency. These limitations become especially problematic as KIBS grow. In dynamic environments, where skill demand fluctuates heavily and employee expectations around meaningful work are increasing, the traditional resource planning model struggles to remain responsive and scalable.

### 3.2.1 Top-down planning

Traditional resource planning was defined in the theoretical framework as being mostly done by dedicated managers or teams (Hargaden and Ryan, 2015). This is a consequence of the forecast-intensity of traditional resource planning (Jorgensen et al., 2024). These forecasts are made by managers, who have the benefit of knowledge asymmetry. Employees do not have the same access to knowledge and information as higher-level managers and directors, which rules them out of the resource planning process entirely. The problem that this creates is processes that tend to be slow and siloed. Siloed decision-making refers to the phenomenon where decisions are made without cross-functional cooperation, and decisions are made solely within one department (Chakraborty and Biswas, 2020). This happens in resource planning when this function is detached from other functions, making it difficult to align workforce planning with, for example, talent development or financial forecasting (Chakraborty and Biswas, 2020).

Traditional resource allocation decisions are also often made in isolation from broader, less concrete strategic considerations such as individual career development, skill-building, or employee well-being (Jorgensen et al., 2024), that have a strong reliance on informal

communication channels. Resource managers often base decisions on their personal knowledge of consultants', which can introduce bias and limit the scalability of the process (Hargaden and Ryan, 2015). One resourcing manager only has a set amount of capacity, so the scalability of the processes is reliant on them sharing the informal knowledge that they have. In addition, traditional KPIs tend to focus on utilization, revenue per consultant, or bench time (Shaul and Tauber, 2013). These metrics are useful for measuring efficiency but do not necessarily capture the effectiveness or long-term sustainability of resource planning practices.

From the employee's perspective, the top-down nature of traditional planning can make the process feel opaque and transactional. Without visibility into how assignments are made or opportunities to influence planning decisions, consultants may feel disengaged or misaligned with their work (Knies et al., 2024). Lack of transparency also leads to employees lacking understanding of operations and allocations. They don’t understand why they are allocated to particular projects. This reduces engagement of employees and limits opportunities for meaningful projects as well as neglects focus on the career development of individual employees (Jorgensen et al., 2024).

### 3.2.2 Role and availability-based assignments

The second characteristic defined for traditional resource planning in KIBS was that assignments are often made based on role titles and seniority rather than individual skills and competences (Knies et al., 2024). The main problem with this is that it leads to limited skill visibility. Employees are grouped together into arbitrary roles, for example, data engineer or infrastructure architect, which can house a significant number of different skills. For example, two data engineers can have completely different skillsets but the same role title. This focus on roles and seniority instead of competences leads to skill mismatches and underutilization of employees (Berk et al., 2019; Kianto et al., 2017).

Limited skill visibility also leads to the personal memory of individual resource planners becoming extremely important. This is because the knowledge of individual employees, their skills, and their competences is held within the memory of that resource planner, and

nowhere else. Even in role-based organizations, the individual skills and competences are needed, they are just not formalized and documented properly, leading to inefficiencies and difficulties in matching skills and projects.

Another issue that arises from role-based resource planning is that it becomes increasingly difficult to respond to customer demand when individual skills and competences are not visible. This is due to the heterogenous customer projects requiring specific competences for completion, which is directly in conflict with the role-based view of traditional resource planning and can cause issues with project quality (Jorgensen et al., 2024).

Role-based assignments also affect employee well-being (Jorgensen et al., 2024). Employees don't get to work on projects that they want or use skills they are passionate about. Over time, this risks negatively affecting employee development, as individuals may not be exposed to diverse or growth-oriented assignments. This leads to reduced competence development, employee satisfaction, and adaptability to the heterogenous nature of project deliveries in KIBS (Knies et al., 2024). In addition to negatively affecting employees, this can also lead to reduced quality of project deliveries due to the high specialization of employees and them having less experience with skills outside their direct role.

### 3.2.3 Rigid planning cycle

The third and final characteristic of traditional resource planning was defined as a rigid planning cycle (Berk et al., 2019). In many firms, planning is carried out on a monthly, quarterly, or sometimes even annual basis. This rigidity can become problematic in situations where project scopes shift, client demands evolve, or unexpected employee absences occur. Some service companies have taken to a more agile resource planning cycle, taking place weekly instead of monthly, quarterly, or yearly (Berk et al., 2019).

In traditional resource planning, once resources are assigned, there is typically little room for iterative adjustment, even if client requirements shift or new opportunities emerge (Hargaden and Ryan, 2015). This can lead to inefficient use of internal talent, a clear type of waste (Ohno, 1988; Womack, 1991). Additionally, the limited integration between planning and strategic functions such as finance or HR can reduce the organization's agility. For

example, a planner may not be aware of an employee's upcoming training or internal mobility plans, leading to friction and missed opportunities (Berk et al., 2019; Chakraborty and Biswas, 2020).

### 3.2.4 Synthesis of Traditional Resource Planning Problems

The problems of traditional resource planning practices in KIBS arise from three main sources: top-down planning, role and availability-based allocations, and rigid planning cycles (table 8). These attributes are in direct conflict with the heterogenous and unpredictable nature of KIBS.

*Table 8: Problems of Traditional Resource Planning in KIBS Based on Theory*

| Source | Arising problems |
|---|---|
| Top-down planning | Slow and siloed decision-making<br>Little consideration for less concrete strategic goals<br>Reliance on informal knowledge of resource planners<br>Lacking understanding and engagement of employees |
| Role-based allocations | Limited skill visibility<br>Mismatches and underutilization of employees<br>Reliance on informal knowledge of resource planners<br>Customers require specific competences<br>Reduced competence development<br>Increased rigidity |
| Rigid planning cycle | Increased rigidity<br>Little room for iterative adjustment<br>Inefficient use of talent<br>Reduced agility |

Top-down planning, role-based allocations, and a rigid planning cycle all increase rigidity and reduce agility. This reduces the capability of responding to changes, which are common in this environment. Additionally, many of the problems that arise are based on the

knowledge-intensity of KIBS. Top-down planning and role-based allocations often neglect competence and skill development in favor of ease and predictability.

Lack of transparency is also a significant issue in traditional resource planning. The asymmetry of knowledge leads to managers possessing all knowledge on the resource planning process and other employees knowing close to nothing. This causes issues by increasing reliance on individual resource planners and their informal (undocumented) knowledge, which leads to less scalable and clear processes.

The problems above will be addressed in the “Ideal Pull-driven Resource Planning Process” chapter.

# 4 Empirical Insights on Pull-driven Resource Planning

To deepen the understanding of traditional resource planning and form a basis for the ideal end result of the resource planning process, this empirical section aims to gather insights from resource planning professionals from the commissioning company and consolidate these findings with the theoretical sources that comprise the theoretical framework of the research. This chapter presents findings from a series of structured interviews of professionals involved in resourcing, competence management, and project delivery. While earlier chapters have discussed the theoretical concepts, sources and conceptual gaps of traditional resource planning, this empirical research focuses on revealing real-world insights that could not be captured through literature alone.

The first chapter will discuss the structure and design of the conducted empirical research. The following three chapters will include the results of the empirical research, split into three separate categories arising from the interviews conducted (general/problems, information inputs, future development). Finally, the last chapter will consolidate the previous chapters and form a synthesis of the empirical research section of this thesis. This synthesis includes current major problem areas, the current information inputs for resource planning, and future improvement possibilities that would take the process into a more responsive, pull-driven direction.

## 4.1 Interviews

The empirical research for this interview was conducted with structured interviews of a few resource planning professionals with significant experience in the KIBS field. These interviews were held with the primary objectives being twofold.

- *Gather information about real-world problems and inefficiencies associated with traditional resource planning methods.*
- *Gain insights into the priorities of resource planning professionals when considering future improvements and development of the resource planning process.*

When combined, the objectives form a base for the ideal end result of pull-driven resource planning. The first objective of gathering information on real-world problems defines problems that need to be fixed, and the second objective creates a north star to follow when creating the ideal end result. These objectives were achieved through splitting the interview into three distinct sections:

(1) general questions about the current process (questions 1-3),

(2) questions about the information used in resourcing decisions (questions 4 & 5), and

(3) questions about the future and innovation (question 6).

The first section included questions about current issues and the current state of the resource planning process in the commissioning company. This included current significant problems as well as sources of waste as defined by Lean thinking in the theoretical framework. The second section held questions about the information that goes into the resource planning process. The questions in the second section of the interviews were selected with the goal of comparing the current inputs of the resource planning process to those mentioned in resource planning literature. The third and final section included only one question, which was focused on the future improvements that could be made to the resource planning process. It focused on automation and the requirements that needed to be achieved for automation to be possible. Importantly, the question posed also asked what aspects of resource planning *cannot* be automated and the reasoning behind it.

The interviews were designed to be open-ended enough to allow respondents to answer the questions in their own words without significant limitations. This approach allowed the research to move beyond a simple problem-solution framing and instead capture a more detailed view of how pull-driven principles might improve, rather than completely replace, existing resource planning practices. The findings from these interviews form the empirical foundation of this thesis, providing practical grounding for the development of a more adaptive and agile resource planning process. The structured format of the interviews allowed each participant to answer the same set of clearly defined questions, which ensured consistency across interviews, reduced the time requirements, and enabled efficient analysis (Denny, 2022; Tegan, 2022). This was especially important due to the time constraints present as well as the desire for comparability between the interview results.

As the interviews were open-ended, the answers gained had significant variance in wording and length. This meant that similar answers needed to be grouped together to gain more understanding in the importance of specific aspects. In the first interview section, the answers had the most overlap, in the second section less, and in the third section the answers were almost identical, ignoring some word choices or different examples given.

The interviewees were selected based on their roles in the resource planning process of the commissioning company. Each interviewed person is or has at some point been directly involved in assigning resources, managing projects, and/or balancing supply and demand for expertise. The participants all have several years of experience in operational resourcing decisions within a knowledge-intensive consulting context.

## 4.2 Problems With Current Resource Planning Process

The first three questions of the interview included general questions about resource planning. These questions focused on the current state of the resource planning process in the commissioning company. Two of the three questions were especially impactful: 1) “What are the main sources of waste in your resource planning process” and 2) "What is the current biggest challenge in your resource planning process?”.

For the first question, sources of waste were identified based on the Lean definitions of waste. The answers were deemed significant based on whether they caused one of these types of waste, which can be found in table 5 (p. 28). The biggest and most impactful source of waste according to the interview results (table 9) was excess allocations. Interviewees had slightly different ways of expressing it, but they all mentioned overly high allocations of employees, leading to less work than expected. All interviewees agreed that this was among the biggest sources of waste, as they all mentioned it first or solely. Excess allocations ultimately lead to idle consultants, which falls into the waiting or unused talent categories of waste (Ohno, 1988; Womack, 1991). There were two causes mentioned for these excess allocations, which were overly optimistic resource allocation and overestimated speed of project ramp-up. Another significant source of waste mentioned in the interviews was an overreliance on senior professionals, leaving juniors underutilized (table 9). This is a perfect

example of the unused talent category of waste, as junior talent is left on the bench (Ohno, 1988; Womack, 1991). The third and final source of waste mentioned in the interview responses was delays and reworking of projects. This leads to waste due to allocations being shifted and timelines moved, making previous allocations inaccurate. This third source of waste is somewhat difficult to categorize but waiting is the most fitting category (Ohno, 1988; Womack, 1991). This is due to the reworking of plans increasing the time it takes to begin the project, leaving allocated consultants idle during this time. It could also lead to unused talent due to changes in staffing.

*Table 9: Simplified Interview Responses to Current Sources of Waste*

| # | Response | Perceived Importance |
|---|---|---|
| 1 | Excess allocations | Very High |
| 2 | Overreliance on top professionals | High |
| 3 | Reworking & delays | Mediocre |

The second question was more subjective than the first. The first question was based on Lean waste whereas the second question was based on problems in general. This meant that the answers were also somewhat vaguer. However, the responses to the questions were shorter and included usually only one answer as opposed to the first one, where responses could include two or three different answers. The question was more focused on the subjective opinions of the resource planning professionals rather than theoretical sources. The answers to the second question regarding the current biggest challenges in the resource planning process heavily linked to the first question and they had some overlap as well (table 10). The answers heavily included one of the main sources of waste from the first question: overutilization of seniors and underutilized juniors. All but one interviewee mentioned this in their answer. Other problems that arose in the answers were matching the right skills to the right customer projects, fragmented ownership of internal processes, and competing priorities among customers. Fragmented ownership of activities leads to wait time for employees as well as managers waiting for the next step in a process to be completed, difficulty matching right skills to projects leads to over or underproduction depending on whether too much or too little talent is allocated, and competing priorities among customers leads to a game of “Tetris”, where resource planners attempt to fit all employees into the slots of project openings without sacrificing quality or efficiency.

*Table 10: Simplified Interview Responses to Current Biggest Resource Planning Problems*

| # | Response | Perceived Importance |
|---|---|---|
| 1 | Overreliance on top professionals | Very High |
| 2 | Matching right skills to projects | Mediocre |
| 3 | Competing priorities among customers | Mediocre |
| 4 | Fragmented ownership in weekly activities | Low |

The final question in the first segment of the interviews was related to push and pull. The interviewees were asked their personal view on whether the resource planning process is based on push or pull. The interviewees stated that they believed the process was mostly based on pull, not push. However, when analyzing their reasoning, the process turned out to be more based on push. This conflict between their answers and reasoning came from the subtle differences between resource planning and resourcing. The difference is covered more deeply in chapter 2.5.2, but the main difference is that resourcing covers the meeting of demand (which is basically always pull) after a delivery is ordered, and resource planning is more focused on allocating resources and scheduling. The reasoning behind the answers of the interviewees were mostly that customer relationship management (CRM) gathers information from the customers and that information is used in sales and staffing activities. However, this does not fully cover resource planning. Resource planning in the commissioning company is heavily dependent on forecasts and predictions. One interviewee stated that “predictable cases are pushed, and new cases are pulled”. The meaning of this was that “predictable” cases that had not yet been agreed upon were forecasted and allocations were made based on this forecast, not based on a trigger from the customer. As mentioned in chapter 3, in pull-driven resource planning, allocations are triggered directly by demand from a customer, not by forecasts.

The answers from the first section of the interviews confirms the assumption that this research is based on. That assumption was that the resource planning process in the commissioning company is more based on push than pull. This basis on push most likely is the cause to the overallocation of employees and an overreliance on top senior professionals, as well as reworking and delays presenting a larger problem than necessary.

## 4.3 Information Used in Resource Planning

The second part of the interviews included questions about the information inputs that go into the resource planning process. The main purpose of these questions was to gauge the level of **informal knowledge** that goes into the resource planning process. Informal knowledge meaning knowledge held by individuals that is not documented or collected. A common problem in resource planning is that informal knowledge of resource planners becomes too important, reducing the scalability and transparency of the process (Hargaden and Ryan, 2015; Kartamycheva, 2024). The relevant answers in this section were ones that mentioned concrete inputs that could be documented or defined to a high level of detail. A condensed list of the different information inputs and their types (formal/informal) are listed below in table 11:

*Table 11: Information Inputs for Resource Planning in Commissioning Company*

| # | Input | Type (formal/informal) |
|---|---|---|
| 1 | Skill Information | Formal |
| 2 | Team Lead & Management Information | **Informal** |
| 3 | Employee Willingness | Formal |
| 4 | Availability | Formal |
| 5 | Customer & Project Information | **Informal** |

The consensus of the interviewees was that the most important input of the process is skill information. This includes the individual skills of employees as well as information of what skills are needed for customer projects. As a competence management system (CMS) has been introduced in the commissioning company, this information has become formal knowledge. However, in role-based companies with no CMS in use, this information tends to be informal, only being held within a few individual resource planners.

The second important input according to the interviewees is team lead and management information. This means the informal knowledge held by the managers and leaders of the organization. They hold knowledge on things such as employee chemistry, culture fit, or domain knowledge. Interestingly, this input was usually the second in importance, even though it is still intangible information held by individuals. This shows that informal

information is still very prevalent in the commissioning company's resource planning process.

Other inputs mentioned were employee's willingness for skills and domains, availability of employees, and customer and project information. Willingness falls into the same category as skill information in the commissioning company. After the implementation of the CMS, it has become formal knowledge, available to employees within the company, but before that, it was held almost solely by team leaders and resource planners. As for customer and project information, it is still mostly informal at the time of this research. The CMS of the commissioning company makes it possible to document this information within projects, but the commitment of project managers and delivery professionals to formalizing this knowledge for each project is low. Availability is the only one of the inputs that is initially mostly formal. This is due to the availability of employees being more concrete than the other inputs. Analyzing the inputs mentioned in the interviews, a pattern emerges. Almost all the information that goes into the resource planning process has initially been informal, held only by few people in the organization. With the introduction of the competence management system, a majority of the inputs have been formalized, but without it, most inputs would still be informal, as is the case in many smaller role-based knowledge-intensive companies.

The second question for this section was focused on situations where two employees could fill the same role. In these cases, problems arise when attempting to choose between these employees. In the interviews, it became clear that there is not a concrete, tangible process for this in the commissioning company. The variance of inputs mentioned, and their perceived weights was very high (table 12). The most concrete of the selection criteria were willingness, soft skills, and the preference of allocating employees to the same customers as their other projects, where a 50/50 or 40/60 split is deemed ideal. This is due to the access rights and customer specific knowledge needed that requires onboarding etc. When allocating one employee to the same customer, they need very little onboarding, saving time and money for both the provider and the customer. Other answers used more informal knowledge, such as domain knowledge, team chemistry, or plainly, the decision being made subjectively by the resource planning team or COO. These criteria help in determining which employee will be selected, but they still leave some cases unclear. They also include significant informal knowledge, leading to automation and process descriptions becoming

very difficult. The most important of these cases is a decision between seniors and juniors. The best talent within the organization could skill-wise fill every position, but that would leave them burnt out and the juniors sitting on the bench. In an ideal situation, there would be guidelines for when to allocate the leading professionals within the organization and when to allocate other, more junior professionals. As juniors are less expensive, they should be prioritized for tasks and allocations that do not require in-depth knowledge.

*Table 12: Information Inputs for Selecting Between Employees in Commissioning Company*

| # | Information Input | Type (formal/informal) |
|---|---|---|
| 1 | Willingness | Formal |
| 2 | Soft Skills | Formal |
| 3 | Existing Customer Allocations | Formal |
| 4 | Team Lead & Management Knowledge | **Informal** |
| 5 | Domain Expertise | Formal |

## 4.4 Future Improvement Possibilities

The final section of the interviews focused on the future instead of the present. It included only one question but left the answers open for different directions. The question posed asked the interviewees what functions in resource planning could or should be automated, and why. The overwhelming majority of answers stated that everything could, and should, be automated *except* for leadership-related tasks. The examples of these types of leadership-related tasks included the curation of teams to maximize chemistry and cultural fit, as well as to prioritize people with specific domain expertise. Essentially, this equates to the "Team leads and management knowledge" mentioned in the prior chapter. One concrete aspect for automation and future development arose in the interview responses, which was quality follow-up. This would increase the speed and agility of quality-assurance, making it faster and easier to change allocations and plans.

Another aspect of the final section was the necessities that the automation possibilities had in order for them to be possible. In the interviews, most of the interviewees referenced AI as

a method for automation. This is most likely due to the knowledge-intensive nature of the organization. AI would provide significant automation possibilities in this area. This is why this thesis will use AI as the source of automation for resource planning even though things like workflows could also be used. However, this thesis is not focused on AI in general so the analysis of AI itself will be limited.

For automation with AI, data is imperative. This data is the information inputs defined in chapter 4.3. As stated in the previous chapter, a large portion of this data has been and still is informal knowledge, which is not documented. In other role-based companies, almost all this data is informal. The requirement for automation, then, is the formalization and documentation of this information, making it available to be used outside of the individual resource planners. As the respondents mentioned, not all informal knowledge can be documented. This type of knowledge is, for example, team chemistry considerations. However, skill information, employee willingness, availability, domain knowledge, and customer and project knowledge can be formalized and documented. Automation regarding this information will be possible.

Figure 12 shows the resource planning process automated to its limit according to the resource planning professionals interviewed. For this automation, an AI agent is used, which can take information as an input and return suggestions for resource planning. All knowledge that can be formalized will act as the input for the AI resource planner, which will output an initial resource plan. This plan will then be filtered through management and team leads who will modify it with the informal knowledge that they hold of the employees and customers. The end result will be a resource plan containing allocations of employees as well as financial forecasts regarding the resource plan.

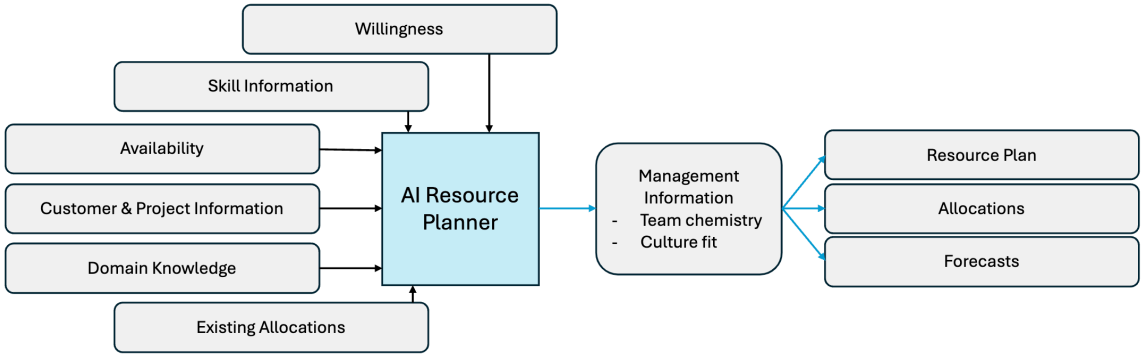


*Figure 12: Example of Resource Planning Automation (AI Agent)*

In order for this process to work, however, all inputs to the process must be available, meaning formalized. Currently, in the commissioning company, all but one of the inputs in figure 12 are formalized. This one being customer and project information. As mentioned before, this information can be formalized through the CMS of the commissioning company, but currently the commitment of project managers and delivery are lacking in this department. In other companies, most of these inputs can be informal. Especially in role-based organizations, the skill information, willingness domain knowledge, as well as customer and project information can be informal. The commissioning company is then already moving toward the automation of resource planning.

## 4.5 Synthesis of the Interviews

The interviews conducted for this thesis provided a comprehensive view into the practical challenges, information inputs and requirements, as well as future development opportunities related to the resource planning process in the commissioning company. The responses highlight three core themes that are critical for understanding the limitations of current practices and identifying pathways toward a more adaptive, pull-driven planning approach.

First, the current state of resource planning is characterized by inefficiencies associated with push-based principles. Despite interviewees expressing that the process is perceived as pull-driven, their descriptions reveal a dependence on forecasts and internal triggers rather than, or in addition to, actual customer demand. This results in excess allocations, underutilization of junior consultants, and overreliance on senior professionals. These inefficiencies confirm the hypothesis that current practices lean more toward push than pull, leading to misalignment between demand signals and allocation decisions.

Second, the role of information emerged as a central issue in the interviews. Although competence-related data such as skills and willingness are becoming more formalized through the commissioning company's competence management system, some other inputs remain informal and siloed, such as customer and project information and team dynamics. Other, more role-oriented organizations most likely struggle even more with this. The information inputs defined from the interview results are the following:

From tables 11 and 12, it is apparent that the information inputs within the commissioning company are mostly formal, with a few informal inputs that come from managers and team leads. However, many of these information inputs were informal very recently, up until the roll-out of the CMS of the company. The heavy reliance on informal and undocumented knowledge poses a significant obstacle to transparency, repeatability, and scalability of the resource planning process.

Finally, future development opportunities included heavy automation of the resource planning process. Interviewees were largely in agreement of automating routine and data-driven aspects of the planning process. While leadership tasks involving culture fits and team chemistry were seen as less automatable, most other tasks, such as matching skills, tracking availability, and managing workflows, were viewed as achievable targets for automation. However, reaching this level of automation requires the formalization of the defined knowledge inputs of the resource planning process, as current information is still somewhat informal.

The interviews underline the disconnect between push-based planning processes and the ideals of pull-driven resource planning. They also emphasize the importance of data formalization and skill visibility as mandatory for both automation and improved scalability. These findings serve as the empirical grounding for identifying the steps necessary to transition toward a pull-driven resource planning model in knowledge-intensive business services.

# 5 The Ideal Pull-driven Resource Planning Process

This chapter will provide a comprehensive vision for a fully realized pull-driven resource planning process in the context of KIBS, and more specifically, knowledge-intensive service solutions providers. Building on the limitations identified in traditional resourcing models and the empirical insights gathered from the commissioning company, this chapter defines the ideal resource planning process for the commissioning company.

This chapter is split into three separate sections. First, it defines the problems that need to be addressed. These problems are a combination of problems arising from the theoretical framework as well as those problems stated in the responses to the empirical research part of the thesis. These problems make traditional resource planning ill-suited for modern, dynamic KIBS environments. Second, future development directions are formulated based on the empirical research done for the thesis. In addition to the development directions, the requirements for these developments are defined. These requirements can be infrastructural, technological, or organizational conditions that are needed to enable pull-driven resource planning. Finally, the chapter combines the current problems in the resource planning process and the future development opportunities not related to problems to form an ideal pull-driven resource planning process for the commissioning company. This ideal state is characterized by demand-driven decision-making, real-time visibility into competences, and flexible, collaborative planning.

Together, these three chapters create a blueprint for developing a pull-based resource planning process that better suits the defining features of KIBS. Namely, heterogeneity, unpredictability, and knowledge-intensity. This process will then support a more sustainable, scalable, and value-oriented approach to operations.

## 5.1 Current Resource Planning Problems

The need for an ideal pull-driven resource planning process in knowledge-intensive business services arises from a fundamental mismatch between the dynamic, heterogeneous nature of

KIBS and the limitations of traditional planning approaches. While the previous chapters outlined these limitations both in theory (Chapter 3) and practice (Chapter 4), this section consolidates them into one set of problems to be solved.

### 5.1.1 Problems From Theory

The problems based on the theoretical framework arise from the different conflicts between the agile, shifting nature of KIBS and the static, rigid methods of traditional resource planning. Simplified, the sources of these conflicts are three aspects of traditional resource planning: top-down planning, role and availability-based assignments, and rigid planning cycles.

Traditional resource planning systems in KIBS often follow rigid, top-down allocation models tied to fixed planning cycles and forecast-based project assumptions (Berk et al., 2019; Hargaden and Ryan, 2015; Knies et al., 2024). The planning process is often locked into quarterly or monthly cycles, where allocations made early in the cycle become difficult to change, even when customer needs or project scopes evolve (Berk et al., 2019). Top-down planning, by nature, is siloed. A few dedicated resource planners make plans without considerations from other departments or less concrete strategic goals, such as individual career development, skill building, or employee well-being. This also leads to the informal knowledge of a few resource planners becoming vital in the resource planning process. While such knowledge (e.g., regarding employee chemistry or culture fit) can be valuable, its opacity creates problems for transparency, scalability, and automation (Hargaden and Ryan, 2015). They are the only ones that hold all key knowledge on employees, such as skill information, team chemistry considerations, or culture fits of different individuals. This informal knowledge becomes a problem as the organization and processes attempt to scale. One resource planner only has a set amount of capacity, which acts as a limit for the entire process, if it is too reliant on that resource planner's personal knowledge. In addition to affecting the processes themselves negatively, the top-down nature of traditional resource planning leads to problems with employees. From the employees' perspective, the resource planning process can feel opaque, like a black box that takes information as an input and produces a resource plan as its output. This also leads to employees not understanding

resource planning. They don't understand why they are allocated to projects they are allocated to. This heavily reduces the feeling of involvement and sense of meaningful work.

One of the most critical shortcomings of traditional resource planning in KIBS is its limited visibility into individual skills and competences (Knies et al., 2024). In many organizations, including the commissioning company up until very recently, planning is primarily done based on high-level roles such as "data engineer" or "infrastructure architect," rather than on a detailed understanding of each employee's unique skillset, competences, and a personal development plan. Role and availability-based assignments mainly lead to limited skill visibility, which leads to more issues. In KIBS, where knowledge is the primary resource, this simplification of competences into roles often leads to poor matches between consultants and project needs, reducing both efficiency and quality of service delivery (Jorgensen et al., 2024). Without skill visibility, it is difficult to match employees to projects, leading to overutilization of some employees and underutilization of others. It also increases the reliance on informal knowledge, similarly to top-down planning. Since resourcing is based on roles and seniority, skill information is held within the personal knowledge of resource planners, leading to the same problems as mentioned above. Limited skill visibility also reduces the ability to respond quickly to customer demand. When a customer requires a certain solution, which requires certain skills to complete, a role-based organization must first figure out who possesses those skills. This, again, leads to the personal judgement and informal knowledge of resource planners to form the base for the selections, which makes the process less transparent and more like a black box to the employees. Finally, role-based assignments limit the growth and development of employees. They can get boxed in to certain roles which have specific skills. They will have limited opportunities to develop skills outside the scope of that role, leading to a very highly specialized skillset. This, in turn, reduces the involvement of the employees as well as the responsiveness of the organization.

Lastly, the rigid planning cycle, as the term suggests, increases the rigidity and reduces the agility of the organization using traditional resource planning methods. This leads to a difficulty in adjusting created plans as well as little room for iterative adjustments. In shifting environments such as that of KIBS, plans change constantly, leading to this being a major problem of traditional resource planning. The rigid planning cycle combined with the common changes of plans in a KIBS environment leads to an inefficient use of competences. This is a consequence of making plans and not changing them to fit the ultimate goals and

needs of projects. Some employees may have different skillsets than required, others may be over or underqualified for their assignments.

Condensed, the problems of traditional resource planning from literature are those in table 13. Top-down planning and role-based allocations cause significant problems relating to the transparency and visibility of the entire process, including the skills and competences of employees. This leads to reduced understanding of the process and lacking clear documentation and set sub processes. Overreliance on individual resource planners adds on to this problem by locking important information behind key individuals. Rigidity is built into the system, reducing the capability of responding quickly and accurately to demand signals.

*Table 13: Problems From Literature, Condensed*

| # | Source | Problems |
|---|---|---|
| 1 | Top-down planning | - Slow, siloed decision-making<br>- Low transparency and visibility<br>- Limited employee understanding of process<br>- Overreliance on individual resource planners and their memory (informal knowledge) |
| 2 | Role-based allocations | - Limited visibility into skills and competences<br>- Limited growth and development of employees<br>- Highly specialized competences within organization |
| 3 | Rigid planning cycle | - Reduced agility<br>- Increased cost of reworking and delays |

### 5.1.2 Problems From Empirical Research

From the empirical research, problems arose in two different categories: sources of waste and general problems, with waste being based on Lean thinking principles and categories of waste. The current main sources of waste in the commissioning company, according to their

resource planning professionals, are excess allocations, overreliance on top professionals, and reworking and delays. These problems lead to waiting, underutilized talent, and overproduction (Kuula et al., 2018; Ohno, 1988; Womack, 1991). Excess allocations were the most prominent of these problems. They are being manifested through two sources: overly optimistic allocations and overestimated speed of project ramp-up, leading to allocated employees having less work in the beginning of a project than estimated.

As for the largest general problems of the commissioning company, four were mentioned in the interviews. These were overreliance on top professionals, fragmented ownership of activities, matching right skills to projects, and competing priorities among customers.

In the case of the commissioning company, interviews revealed that resource planning often operates on a push-based model, with allocations locked in place before actual project confirmations. Consultants can be pre-booked based on tentative or "predictable" customer opportunities or sales forecasts, leading to situations where planned allocations do not turn into billable work or where the allocations are not accurate to the actual project needs. This results in what Lean theory would describe as both overproduction and waiting, which compromise flow and reduce system efficiency (Kuula et al., 2018; Ohno, 1988). Moreover, the current process of the commissioning company struggles with responsiveness when project scopes or timelines shift after allocations have already been made. Reallocations are often slow and rely on manual coordination between multiple stakeholders. This challenge aligns with findings in the literature that highlight the systemic fragility of push-based systems in volatile environments (Berk et al., 2019; Womack, 1996). Ultimately, the rigidity of current planning practices undermines the ability to respond to short-term changes in demand, creating both operational inefficiencies and frustration among employees. The need to shift toward a more flexible, responsive, and demand-driven process is therefore clear, not only from a theoretical standpoint but also based on concrete practitioner experiences.

The empirical findings also confirm that much of the planning process at the commissioning company still hinges on human memory and interpersonal relationships. Although with the introduction of their CMS, more resource planning information has been formalized, some information is still held only by a few resource planners. This mode of operation makes the process dependent on individuals' availability and memory, introducing bottlenecks and increasing the risk of biased or suboptimal decisions, particularly when planners change roles or leave the organization. From the perspective of pull-driven resource planning, this

reliance on informal knowledge is especially problematic. Pull systems require transparent and structured information flows to enable decentralized, just-in-time decisions. When critical information is not formalized, it cannot be accessed by automated systems or used to support proactive, competence-based matching. Thus, the persistence of informal knowledge dependencies represents not only an operational bottleneck but also a major structural barrier to implementing more intelligent, scalable planning solutions.

## 5.2 Future Development Requirements

Transitioning from a traditional, push-based resource planning model to a pull-driven resource planning process in KIBS requires more than process redesign. It also requires investments into infrastructure, organizational practices, tool integration, and cultural transformation. This section outlines the key development areas that must be addressed to enable a functioning pull-based resource planning model in a KIBS environment, drawing on both theoretical insights and empirical findings. This chapter will not, however, cover the meeting of those requirements. That will be covered in chapter 6, where the path from traditional resource planning to pull-driven resource planning will be mapped.

The future development requirements for pull-driven resource planning stem from the empirical research conducted for this thesis. In the interviews conducted, the final section covered the automation and development possibilities of resource planning. The respondents from the commissioning company were united in the opinion that most of the resource planning process could and should be automated. Only the interpersonal, managerial considerations should be left to human resource planners. These considerations include team chemistry considerations as well as culture fit of employees. This leaves other information to be used as inputs to an automated resource planning process. This information is covered in figure 12 (p. 55). In short, the information types that can be understood well enough by an AI resource planner are the following:

- Skill Information
- Employee Willingness
- Availability

- Existing Allocations to Customers
- Domain Knowledge
- Customer and Project Information

However, to be able to use this information for an automated resource planning process, it must all be available for an AI resource planner. In other words, it needs to be formal, documented information. As mentioned in the previous chapters, much of the information within traditional resource planning processes are still informal knowledge held by a few individual resource planners. Essentially, only availability is a “born-formal” information type for resource planning. All other information types listed are still informal in many companies. Even in the commissioning company, these information types were formalized only recently with the introduction of their CMS.

A foundational requirement, then, for pull-driven resource planning is the structured formalization of employee competence and willingness data, existing allocation information, employee domain expertise, and customer and project-level information. As identified in the interviews, much of the current knowledge about people and projects exists in informal formats, which hinders systematization and automation. In companies still relying on role-based models, this problem is highlighted, since even more knowledge and information is informal, only being held by a few individuals within the organization.

Once relevant data is formalized and integrated, the next development step is introducing decision support through automation and intelligent matching. Rather than planners manually scanning through CVs or checking availability calendars, the system should offer ranked suggestions based on competence fit, availability, development goals, and cost considerations. This requires algorithmic support, which in turn depends on high-quality, structured data. This step is also completed already in the commissioning company through their CMS. The competence management system ranks candidates based on skills, willingness, and availability. It is still somewhat unreliable and needs improving, but it does exist to some level.

Beyond technical requirements, a shift toward pull-driven planning demands cultural change. This includes greater transparency in both planning and performance metrics. Employees must be empowered to maintain their competence profiles, express resourcing preferences, and understand how they are matched to projects. Likewise, sales and delivery

units must be willing to share up-to-date demand information and accept input from shared planning tools.

## 5.3 The Ideal End Result

The envisioned end state of a pull-driven resource planning process in KIBS represents a fundamental departure from traditional, push-based models. Instead of allocating resources based on role-based forecasts or centralized top-down plans, as was defined for traditional resource planning, the ideal process operates dynamically, responsively, and collaboratively, and is driven by real customer needs and enabled by transparent, formal, and structured data. It takes into consideration the employees of the company as well as their individual career development and job satisfaction.

The ideal end state envisioned here will be created by solving the problems of traditional resource planning as mentioned previously and combining them with the future development suggestions and automation considerations from the conducted interviews in the empirical section.

### 5.3.1 Adaptive & Responds to Actual Demand

At the heart of the pull-driven resource planning process is the principle of responding to actual demand rather than speculative forecasts. This comes from the core pull-systems, which is that the trigger for comes from the following process, not the previous one, initiating from the customer. The actual resource planning process is initially triggered by concrete project confirmations by the customer, minimizing overproduction and reducing the need for rescheduling. The triggers then move backward from this initial trigger to the first process that is needed, as visualized in figures 11 (p. 54) and 8 (p. 42). This is the core of pull in the process.

The trigger coming from the customer means that the process also needs to be more integrated between different functions. As projects enter the pipeline in sales, their

requirements, such as needed competences, timeline constraints, and client-specific considerations, are captured systematically in customer relationship management (CRM), and flow directly into the planning process, where delivery and project KPIs form a feedback loop. Essentially, cross functional collaboration is prevalent in all phases of resource planning. This enables a more agile, adaptive, just-in-time approach where consultants are matched with assignments shortly before project start, based on real-time availability and up-to-date competence data. The lag between confirmed demand and resource allocation is minimized, improving responsiveness and utilization while reducing idle time and last-minute changes to set plans. This will create solutions to the problems mentioned in the interviews by minimizing the appearance of excess allocations within an organization and by shifting the point of allocation as close to project start as possible. In addition, it will help with allocating the right people to a project. By leaving the allocations to the latest possible moment, the requirements of a project are allowed to fully form before the allocation process is started. This also reduces the impact of reworking and delays, since this agile approach leaves all employees free of allocations before a clear signal from the customer arises.

### 5.3.2 Skill-based & Co-creational

In order to meet the customers' needs, a company needs to know the customer's needs. The problem with the traditional resource planning process was that resource planning is done based on high level roles, which do not include granular information on the customers. That granular information is locked within the memories of resource planners. In the ideal resource planning process, then, more granular information needs to be used as the basis of resource planning. The most granular information is individual skill information. In the ideal state, human resources are no longer be planned based solely on titles or roles, but on granular, verified competences that are logged in a centralized and structured system. This competence data includes both technical and soft skills, preferred industries, past project experience, certifications, and development goals. Using this data, the planning system provides automated, ranked suggestions of candidates for each project, allowing planners to evaluate fit based on availability, skill match, location, and financial impact. Employees can also proactively express interest in opportunities, creating a communication channel between

resource planning and employees. This is among the first steps a company must take to move into a pull-driven model of resource planning. The commissioning company has already achieved a somewhat skill-based resource planning process by integrating a CMS and creating a skill hierarchy for the organization. They still use roles as indicators of employee skills, but the reliance on them is significantly less than in many other companies.

The next problem that arises when resource planning information is granular and detailed is that the needs of the customer are very difficult to pinpoint. Only the customer themselves truly knows what their needs are. To gain a meaningful insight into the skills needed for projects, then, the customer needs to be involved in the resource planning process. An SDL based value co-creation approach needs to be implemented. This means that the customer provides the information they hold, which is required skills or position descriptions for the projects that are being planned.

### 5.3.3 Scalable & Transparent

The ideal pull-driven model of resource planning also needs to solve the problem of informal knowledge, which leads to the memories of individual resource planners becoming too important to the process, which limits scalability and induces inefficiencies in the process. In other words, the process needs to be built to be scalable. This means that the process is built to be scalable. It does not rely on the memory or informal knowledge of a few individuals but is embedded in systems and shared processes that can grow with the organization. This means that new people in the process can be quickly onboarded and there are less cases where undocumented knowledge is needed.

Transparency is partly a consequence of the formalized knowledge required for scalability and partly included because of the positive effects that are gained when employees are integrated into processes. Information is tracked and needs to be available to all departments. This includes the employees, who can see not only their own and other's skills but can also see what skills are used to select employees for certain positions and projects. Employees can see how and why they are selected or overlooked, while planners, sales, and delivery stakeholders all have access to consistent information through integrated tools. This removes

the “black box” feeling and fosters trust in the planning process. This transparency leads to the empowerment of employees. They take an active role in shaping their resourcing paths, updating their profiles, setting development goals, and engaging with opportunities that align with their interests. This creates a more engaged and motivated workforce, while enabling better alignment between organizational capacity and external demand.

### 5.3.4 Automated

As stated in the interviews, the process is also heavily automated. Based on the empirical research, all but the use of intangible, interpersonal knowledge can and **should be** automated in the resource planning process. Only other, more niche and intangible information, such as culture fit, and team dynamics require human input. This level of automation also means that all knowledge is documented and formal, available to all employees in addition to the automated process, as mentioned in chapter 5.3.3. Based on the empirical research, quality follow-up is also automated to gain real-time information on delivery quality and customer sentiment. This creates a loop where allocations are constantly improved upon and competence development updates and adds on to existing employee skills and competences, creating a diverse and “wide” skill base for the organization. This allows for less rigid allocation requirements and increases the skill development of employees, leading to higher employee satisfaction and sense of meaningful work.

In short, decision-making is supported by automation but not replaced by it. Intelligent systems assist planners by surfacing relevant matches and highlighting potential issues (e.g., overallocations, mismatched skills, or budget risks), while human stakeholders retain the ability to override or adjust based on intangible and contextual understanding.

### 5.3.5 The Final Process

The ideal pull-driven resource planning process offers a cohesive, responsive, and intelligent model tailored for the unique needs of knowledge-intensive environments. By reducing

waste, improving visibility, and enabling proactive, data-driven decisions, it aligns the core functions of the business around the shared goal of maximizing value for both clients and employees.

This process is based entirely on external triggers coming from customers, leading to increasingly accurate allocations and agility. Instead of allocations forming based on the forecasts made by estimating the future, allocations are only made when a need arises, meaning a project is confirmed with a set start date and a concrete scope (figure 13). Estimates and forecasts can still be made for use in financial analysis, for example, but actual allocations of employees are made only based on pull. This solves the problem of excess allocations and rigid planning cycles.

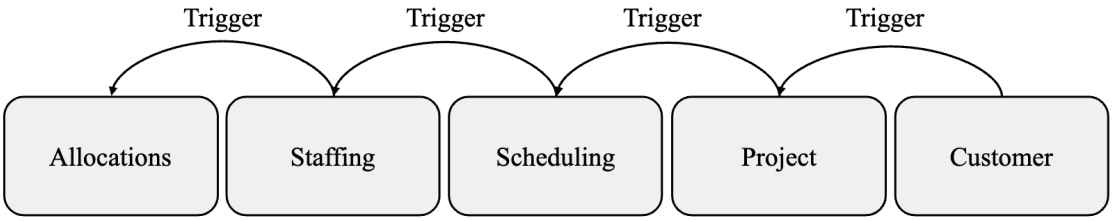


*Figure 13: Pull-driven Resource Planning*

In addition to being based on external triggers, the ideal resource planning process is data driven and transparent. To be able to respond accurately and quickly to the arising external triggers, granular information must be collected and stored so that all employees have access to it. Information such as employee skills and willingness are tracked, and customer and project information are made available to employees. This allows for the matching of individual skills and competences needed for projects quickly and efficiently, without informal consultations from resource planners, team leads, and managers. The only information possessed solely within individual resource planners will be interpersonal, intangible information such as culture fit. All possible information going into the process is formalized and documented, available to all employees. This transparency fosters trust in the process and lets employees influence allocation decisions that impact them personally. In addition, the formalized knowledge allows for the use of AI to automate the resource planning process significantly.

# 6 Bridging the Gap

As explored throughout this research, the transformation from traditional push-driven resource planning to a pull-driven, skill-based model presents both significant opportunities and challenges to be overcome for knowledge-intensive business services. First, this final chapter shortly restates the initial traditional resource planning process (start point), and the ideal end state (end point) created. Then the gaps between the two states are defined and analyzed, and finally, the steps and actions necessary to move from the start point to the end point are defined, forming an action plan for the commissioning company as well as other knowledge-intensive service solution providers. The aim is to provide actionable insights for organizations seeking to make this transition a reality.

## 6.1 Current State

Many KIBS organizations today operate with a traditional push-driven resource planning logic. These processes are based on forecasts and estimates made weeks or even months in advance, lacking accuracy and increasing rigidity. The resource allocation process is typically conducted by a few resource planners who hold significant amounts of informal knowledge on employees, projects, and customers, leaving employees confused about how resource planning and allocations are actually done. This leads to lacking commitment to the process by employees and rising frustration when they don’t get the projects they want and are passionate about. The information inputs of the process are often not granular enough, being usually role-based. If competence data is available, it is often generic, outdated, or housed in disconnected systems, such as a CV bank in the company’s intranet. This heavily limits its use in day-to-day decision-making. This limits the capability to respond to customer demand quickly and efficiently, often requiring informal discussions with resource planners to find the employees with the correct skillsets and competences, with domain expertise, and who fit the culture and team.

## 6.2 End State

In contrast to the start point of traditional resource planning, pull-driven resource planning is fully based on external triggers from customers as opposed to forecasts and estimates. This means that employees are "available" unless a trigger from a customer has arisen, and that employee has been allocated based on that trigger. This does not mean that forecasts do not still have a place in this process. However, instead of being used to allocate employees to projects, their role will be limited to estimating business revenue and costs, as these things are far more predictable than knowledge-intensive customer projects. This leads to reduced uncertainty within the process and increased trust in the process.

In order to be able to respond quickly and accurately to the customer triggers as they arise, all possible information inputs to the resource planning process are formal and documented into a single competence management system. This system houses real-time information about employees, competences, projects, willingness, availability, and customers. This information is used in the resource planning process in various steps. The formal and documented data also leads to increased visibility and transparency of the process. This means that employees will actively impact the process and the roles that they are given. Employees take ownership of their profiles, updating them as they gain skills or wish to learn new competences. This is supported by active competence development, which proactively develops employees with skills and competences they are interested in.

Finally, the process is automated to the highest possible level. This means that everything except for interpersonal, intangible information is utilized by AI and the information that the AI cannot comprehend is held by resource planners. The structure of the process can be seen in figure 12 (p. 55).

## 6.3 Requirements to Move from Current State to Ideal State

Now that the beginning state and end state of the resource planning process have been defined and stated, a gap analysis can be conducted to find the differences between the two

processes. Four core areas of difference are evident when comparing the two different process states (table 14):

*Table 14: Traditional Resource Planning vs. Ideal Pull-driven Resource Planning*

| Area | Traditional | Ideal |
|---|---|---|
| Allocation Trigger | Forecasts and estimates (internal trigger) | Customer demand (external trigger) |
| Resourcing Logic | Generic role and availability-based | Skill-based (higher granularity) |
| Information Inputs | Held by a few individual resource planners | Formal and documented information available to all |
| Automation | Most of the process conducted by people | Most of the process automated, conducted by AI |

In essence, then, the move from traditional resource planning to push-driven resource planning is complete when all four areas are transitioned. However, transitioning in all four areas requires changes in processes, technology, or culture. The first three areas are heavily linked. Changing the allocation trigger requires more in-depth knowledge of the customer and case than traditional resource planning allows for with its role-based logic. This means that in order to change the allocation trigger, resourcing logic needs to be changed first. However, to change resourcing logic, on the other hand, requires the changing and improving of information inputs. To move from a role and availability-based resource planning process to a skill-based one, skill and competence information including willingness and availability need to be formal and documented. This chapter will then move up from information inputs to resourcing logic to allocation trigger, stating the operational, technological, and leadership changes required for each. Then it will look at the automation area and its requirements.

### 6.3.1 Information Inputs

At the foundation of pull-driven resourcing lies the availability of accurate, detailed, and up-to-date information. It creates a base for using more granular data to address opportunities, leading to a more accurate response to demand. This, in turn, allows for organizations to shift the latest possible moment for allocations further due to the increased speed and efficiency of resource planning. In *traditional resource planning systems*, information inputs are typically limited to role-based data and high-level availability estimates. In addition, informal and undocumented knowledge is prevalent through individual resource planners who use their personal knowledge of employees to create allocations and resource plans. However, this level of abstraction is insufficient for a system that aims to match individuals to specific project needs at the latest possible moment, based on their unique skills, preferences, and capacities.

Improving information inputs begins with the formalization of all information that goes into the resource planning process. These information inputs are defined in figure 12 (p. 55), and include skill information, employee willingness, availability, project and customer information, domain expertise, and existing allocations. This information must be systematically collected and maintained, rather than existing informally within individuals or being manually updated at long intervals.

In essence, this means that competence management and competence development need to be introduced into the organization. Competence management is a form of human resource management (HRM) and knowledge management. Competence, in this case, referring to a human trait or characteristic, or a group's ability to combine their resources to reach a desired outcome (Santos et al., 2023; Soderquist et al., 2010). Competence management, then, includes the management of traits, in this case skills, and the organization's ability to combine its resources to respond to a demand from customers (Santos et al., 2023; Soderquist et al., 2010). In the case of KIBS, competence management also covers knowledge management, since the competences used for projects are essentially knowledge possessed by individuals. Competence management includes competence development. As its name suggests, competence development includes developing employees and enhancing their skillsets. It works as a supplement to recruiting within the resourcing process to increase the competence pool of the organization.

In practice, competence management begins the shift from role-based operations to skill-based operations. By creating a skill hierarchy and documenting the competences of an organization, it makes it possible to start using this data as a basis for resource planning. The mentioned skill hierarchy must be created, however, for this to have value. This hierarchy stems from the fact that skills have different levels. One skill can house several skills within it. For example, data engineering is a higher-level skill that contains more technical, lower-level skills within it, such as Databricks. A skill hierarchy is also important due to the fact that organizations don't use an unlimited number of skills and competences. The hierarchy defines what skills and competences are relevant for the organization and, in turn, what are not.

Technological support is essential for enabling this shift. Competence management tools must be introduced or enhanced to support detailed profiling of skills, and these tools should be integrated with existing systems, such as time reporting, HR platforms, and project databases. Such integration allows for the creation of a more holistic and dynamic view of each individual in the organization. A competence management system (CMS) is almost necessary for this shift. It integrates different systems into one. For example, in the commissioning company, the CMS houses projects, customers, time reporting, and all employee data, including skills, willingness, project history, and allocations. This system integrates competence management into the daily activities of the organization, solidifying its position in the processes of the organization.

From a leadership perspective, creating a culture of transparency and data ownership is key. Employees hold responsibility for their own competence data and should be encouraged and supported in maintaining accurate competence profiles. Leaders must take responsibility for ensuring the quality of the data of employees as well as all the other information inputs mentioned. The value of competence visibility should be clearly communicated, not only as a means of enabling more accurate resource planning decisions, but also as a tool for supporting individual growth and long-term competence building.

### 6.3.2 Resourcing Logic

Once the necessary information inputs are in place and data has been formalized and documented, the next step is to redesign the logic through which resources are matched to project needs. Traditional resourcing logic is often limited, relying on availability and known role titles. In contrast, pull-driven logic requires a more nuanced approach that actively matches project requirements to individual skillsets, experience, and development aspirations.

Operationally, this means resource planning decisions must be made based on concrete and verified competence data rather than informal networks or personal familiarity. The organization must shift from allocating based on job titles or organizational roles to a model where competence-based resource planning determines suitability for each assignment. This is done in the first phase of formalizing information inputs.

This transition is supported by technology that can automate and improve the quality of matching decisions. Algorithms and search functions that consider both technical and contextual factors, such as skills, preferences, project history, and availability, can significantly reduce the manual effort in resource planning decisions. Integration with sales pipelines and delivery roadmaps ensures that the system holds all relevant information and data as soon as it becomes available. Within the commissioning company, the CMS already houses the capability for some automation in this area, since it has intelligent features and is integrated with the sales pipeline. The intelligent system, although still somewhat limited, suggests employees for openings based on their individual skills and competences, willingness, and availability. In theory, this reduces the work of the resource planner by reducing the difficulty of matching employees to projects. In one glance, the resource planners can see how an employee's skills, willingness, and availability suit an opening. However, this does require that the skills and other information of the opening are defined on a detailed level.

Leadership plays a central role in enabling this logic shift. It requires the most changing to implement the shift in resourcing logic. Managers and resource planners must be trained to understand and use competence data, moving away from intuition-based decisions. They must also understand the process to prioritize optimal utilization of skills across the organization, not merely high utilization rates. This means that employee willingness needs

to become a more important indicator for the suitability of a specific employee for an opening. Organizational leaders need to promote resourcing and staffing as a strategic function that supports both project success and employee development, rather than viewing it as a purely administrative task attempting to maximize the utilization of employees. As mentioned, this shift also requires more detailed descriptions of projects and opportunities from resource planners. It is not enough that just employee skills and competences are tracked, the same must be done with customers and projects, at the same level of detail. However, there is one significant difference, employees own their own data and profiles, but customers won't do the same, so it is left upon the resource planners. They must document the descriptions and skills needed for specific projects and roles. This requires more effort in the planning phase, but ultimately leads to a more efficient process, matching correct skills to projects faster and more accurately.

### 6.3.3 Allocation Trigger

The final step in the transition sequence involves rethinking when and how resource allocation decisions are made. In traditional models, allocations are often made too early, based on forecasts and estimates. This leads to problems such as excess allocations and increased rigidity. Allocations, here, referring to the point where an employee is "locked in" to an opening, showing in their perceived availability in the future.

In traditional models, allocations are sometimes made after an agreement, but more often made based on forecasts and imaginary project extensions or contracts. In a pull-driven model, resource allocation is activated solely by actual demand rather than forecasted demand. It is important to note that allocations do not refer to the resource plan directly. Plans are still made separately of allocations and are used for, for example, financial estimates. Allocating employees only when need arises perfectly fits the Lean thinking definition of pull. It also suits SDLs value co-creation due to it allowing for more collaboration with the customer in the resourcing process. If allocations are made too early, the customer will have less influence on the resourcing decisions, but if allocations are made only when a customer signs a contract, they can fully influence who is allocated and staffed onto the project.

Achieving this requires some changes in operational workflows. Allocation responsibility must become more collaborative, involving sales, delivery, and resourcing functions in shared processes. Information must flow freely between departments. Forecasts can be used to make predictions and an indicator called “forecasted allocations” can be made, which would be based on forecasts, but the actual allocations in the CMS will reflect the actual, realized demand of customers. This way, it is more clearly visible who has enough allocations at the moment and who do not. However, if forecasted allocations are taken into use, the organization must be careful not to over rely on them. Actual allocations must be used primarily, and major decisions must be based on them instead of forecasts and predictions.

From a leadership standpoint, this shift requires a redefinition of responsibility and accountability across departments. Leaders must break down functional silos and ensure that all relevant stakeholders are involved in resourcing decisions. Processes will have to change to allow for this evolution of allocating employees to projects. This also requires rethinking planning cycles to move away from fixed cycles toward more continuous processes that adjust as new information becomes available and are locked in only when an agreement is signed with a customer. The activity of allocating employees to projects long into the future needs to be eliminated completely. However, to aid in making old processes reusable in the new pull-driven system, allocations can be split into two: actual allocations and forecasted allocations, as stated before. This allows for the use of old processes without allocations in the CMS reflecting imaginary projects or extensions.

### 6.3.4 Automation

Automation is mentioned separately here, since it is a parallel process to the other three changes. Automation itself is not required for the other changes in information inputs, resourcing logic, and allocation triggers, and some level of automation can be reached without changing the other three areas. However, formalizing information inputs is required for any significant automation to be able to take place.

Once information inputs are formalized, automation can be ramped up significantly. Essentially the formalization of this information creates data for an AI to use. The AI can use the data to match employees to projects, find areas of improvement, or find projects for employees that help develop specific skills and competences. In the end, AI can be used to make most of the resource planning process free of manual work, only relying on human resource planners to solve difficult problems relating to interpersonal issues such as culture fit or team dynamics. Maybe in the future, AI can even learn to take these into consideration when making resource planning decisions.

Automation requires support from management and employees in addition to data to become a valuable part of the process. Resource planners must trust the AI enough to use it to make resource planning decisions. This means that the data used must be of high quality. Employees must be committed to the process of updating and improving their profiles within the CMS and resource planners must ensure that the quality of customer and project data is accurate.

## 6.4 The Processes of Moving to Pull-driven Resource Planning

In the previous chapter (6.3), the necessary changes in processes, operations, and technology to move to pull-driven resource planning were stated. It led to the formation of two distinct processes of bridging the gap between the two states. These to processes will be called process development and automation development. In reality, they will move hand-in-hand, but they take somewhat distinct paths. The one real similarity is that both processes begin with the formalization and documentation of information. Addressing customer needs requires granular, detailed information and creating automation with AI requires high-quality, available data to train it and for it to make decisions.

Figure 14 shows the steps necessary to move to the ideal version of pull-driven resource planning. As mentioned, the process splits into two distinct processes after the first step of the operational side of the change.

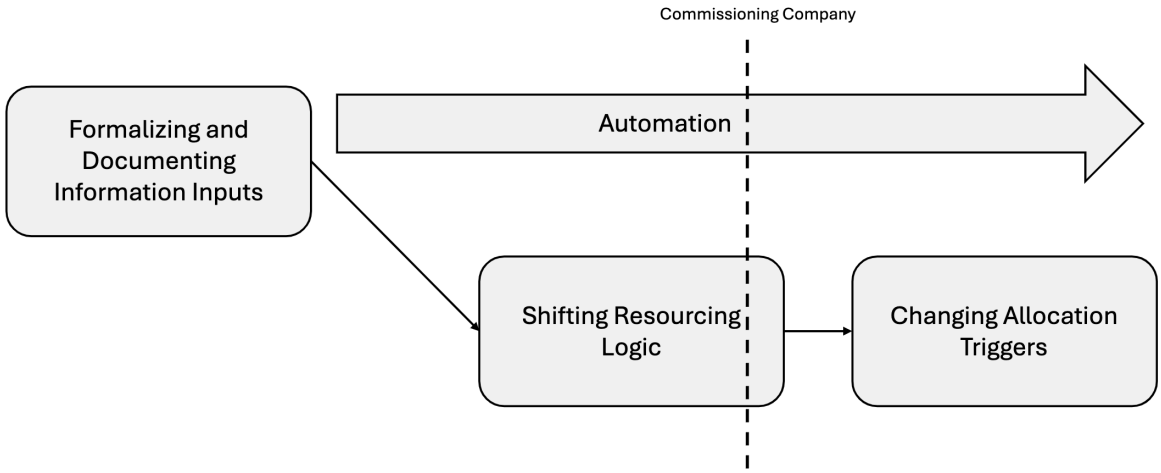


*Figure 14: Dual Processes of Moving to Pull-driven Resource Planning*

Automation is a more general process than the operational side of the change. It can be done quickly or slowly somewhat disconnected from the operational process. As long as the data used to train and use the AI is available and of high quality, different automation opportunities are available for the organization. The operational process advances through three steps in order, each required to start the following step, ending with the core of pull-driven resource planning, which is changing the trigger of the resource planning process. The commissioning company's stage is indicated by the dashed line. With their CMS and its adoption in the organization, they are almost complete with the shift in resourcing logic, moving to skill-based resourcing from role-based resourcing. Automation is also already included, and it has somewhat followed the operational side of the process. However, the usage of the automation features seems to still be somewhat low, indicating that there are problems with the accuracy of the information the AI applications generate for resource planning. The commissioning company does still, however, apply push principles when allocating employees to projects. "Predictable" cases are still forecasted well into the future and allocations are made even though no real customer trigger has arisen.

# 7 Conclusions

This thesis set out to explore how knowledge-intensive service solution providers can transition from traditional, push-based and forecast-driven resource planning toward a pull-based model that responds more accurately to actual customer demand. The goal was to define the characteristics of an ideal pull-driven resource planning process and outline a roadmap for moving from the current state to this envisioned end state.

The research combined a comprehensive theoretical framework, which includes traditional service literature, Service-Dominant Logic (SDL), Lean thinking, and traditional resourcing theories, with empirical insights from the commissioning company of the thesis, which operates in the IT consultancy sector in Finland. Through this combination, the study addressed the main research question: *How can a knowledge-intensive service solutions provider move from traditional to pull-driven resource planning?".*

## 7.1 Answers to Research Questions

The first research question in this thesis was "*What is the traditional resource planning process of KIBS businesses, and what problems does it create*?". This question was answered with the theoretical framework of this thesis. The traditional resource planning process was defined as having the following steps in this order: forecasts, allocations, staffing, and scheduling. The findings confirm that traditional resourcing approaches, which are typically characterized by top-down planning, role-based allocations, and rigid planning cycles, are misaligned with the dynamic, heterogeneous, and knowledge-intensive nature of KIBS. The traditional approach results in overallocations, inefficiencies, and limited transparency of the resource planning process, as mentioned in both chapter 3 and the empirical research conducted. As for the commissioning company, while they had taken important steps toward a pull-based model, such as adopting a competence management system (CMS), the interviews revealed that the process still relied heavily on forecasts and informal knowledge, which point toward a push-based process.

The next research question was "*What is the ideal end result of pull-driven resource planning for the commissioning company*?". By applying Lean principles in a service context, this thesis offers a conceptual extension to existing resource planning literature. It adapts the idea of "pull" of Lean thinking from manufacturing to services, where the key resource is intangible, perishable, and context dependent. The ideal state was defined based on empirical research conducted at the commissioning company. Resource planning professionals were interviewed to define problems, information inputs, and future development possibilities in their resource planning process, which contains both aspects from pull and push. The ideal state described in the thesis is a skill-based, data-driven, and mostly automated process that responds to confirmed demand signals rather than internal projections. It enables more accurate, scalable, and employee empowering resourcing while minimizing waste and increasing the agility of the organization. The basic pull-driven resource planning process is visualized in figure 13 (p. 69).

The third and final question was "*What needs to be done to move from traditional to pull-driven resource planning*?". In practical terms, the study provides a step-by-step roadmap that outlines how companies can move toward this ideal state. The roadmap is based on gap analysis and focuses on four core development areas: formalizing information inputs, shifting to skill-based logic, redefining the allocation trigger to reflect customer demand, and increasing automation. These areas are based on the perceived differences between traditional and pull-driven resource planning. The findings suggest that the transition is not purely technological but also requires organizational and cultural change. These organizational and cultural changes are transparency, ownership of data, and collaboration across different functions. The roadmap generated for this research question (figure 14, p. 79) provides the answer for the initial main research question: "*How can a knowledge-intensive service solutions provider move from traditional to pull-driven resource planning?".*

## 7.2 Generalizability and Limitations of the Research

This thesis has certain limitations in regard to the generalizability of the results. The main limitation is that it is based on a single case company in the IT consulting sector, which

narrows the generalizability of the findings. This problem is made significant because the KIBS industry is heavily heterogenous and different companies in different contexts might have very different needs. The empirical data relies on qualitative interviews, which provided rich insights but did not allow for quantitative validation of the roadmap's effectiveness. Additionally, the thesis stops short of implementation, meaning the roadmap remains conceptual.

## 7.3 Future Research Possibilities

The limitations of this research present excellent opportunities for future research. A quantitative study of knowledge-intensive companies in different industries could present more generalizable insights and help identify whether the ideal pull-driven resource planning process and roadmap for reaching it identified in this study are universal or context dependent. Another study based on the implementation of the steps mentioned in this thesis could present findings on the best practices in implementation of pull-driven resource planning processes. It would also be valuable to study how automation can evolve to handle more complex resourcing decisions, including cultural fit or team dynamics and if there are more valuable automation possibilities outside of AI.

## 7.4 Final Remarks

This thesis contributes to the growing body of knowledge on resource planning and resourcing in knowledge-intensive business services. It highlights the need for a shift from rigid, top-down practices toward more responsive, competence-based planning that aligns people with work in a way that is timely, efficient, and human-centered. In doing so, it offers both theoretical insight and practical guidance for companies navigating the increasing complexity of workforce management in the digital age.

# References

Aarikka-Stenroos, L., Jaakkola, E., 2012. Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem solving process. Ind. Mark. Manag., Value in Business and Industrial Marketing 41, 15–26. https://doi.org/10.1016/j.indmarman.2011.11.008

Al-Mashari, M., Al-Mudimigh, A., Zairi, M., 2003. Enterprise resource planning: A taxonomy of critical factors. Eur. J. Oper. Res. 146, 352–364. https://doi.org/10.1016/S0377-2217(02)00554-4

Andreeva, T., Kianto, A., 2012. Does knowledge management really matter? Linking knowledge management practices, competitiveness and economic performance. J. Knowl. Manag. 16, 617–636. https://doi.org/10.1108/13673271211246185

Araújo, A., Alves, A.C., Romero, F., 2024. A conceptual model for pull implementation based on the dimensions leadership, organization, operation and people. Int. J. Lean Six Sigma 15, 295–325. https://doi.org/10.1108/IJLSS-12-2022-0253

Araújo, A., Alves, A.C., Romero, F., 2021. Barriers to Lean and Pull System implementation: a case study. IOP Conf. Ser. Mater. Sci. Eng. 1193. https://doi.org/10.1088/1757-899X/1193/1/012048

Berk, L., Bertsimas, D., Weinstein, A.M., Yan, J., 2019. Prescriptive analytics for human resource planning in the professional services industry. Eur. J. Oper. Res. 272, 636–641. https://doi.org/10.1016/j.ejor.2018.06.035

Bhamu, J., Sangwan, K.S., 2014. Lean manufacturing: literature review and research issues. Int. J. Oper. Prod. Manag. 34, 876–940. https://doi.org/10.1108/IJOPM-08-2012-0315

Bolisani, E., Scarso, E., Ceccato, R., Zieba, M., 2023. Knowledge management implementation in small and micro KIBS: A categorization. Knowl. Process Manag. 30, 241–253. https://doi.org/10.1002/kpm.1723

Chakraborty, D., Biswas, W., 2020. Articulating the value of human resource planning (HRP) activities in augmenting organizational performance toward a sustained competitive firm. J. Asia Bus. Stud. 14, 62–90. https://doi.org/10.1108/JABS-01-2019-0025

Davenport, T.H., 2007. Analysoi ja voita: kilpailun uusi tiede. Talentum, Helsinki.

Doanh, D., 2017. The Five Principles of Lean [WWW Document]. Lean Way. URL https://theleanway.net/The-Five-Principles-of-Lean (accessed 3.1.25).

Drucker, P., 1966. The Effective Executive. Harper and Row, New York.

Edvardsson, B., 2005. Service quality: beyond cognitive assessment. Manag. Serv. Qual. 15, 127–131. https://doi.org/10.1108/09604520510585316

Fitzsimmons, J.A., 2011. Service management: operations, strategy, information technology, 7th ed. ed. McGraw-Hill, New York.

Grönroos, C., 2008. Service logic revisited: who creates value? And who co-creates? Eur. Bus. Rev. 20, 298–314. https://doi.org/10.1108/09555340810886585

Grönroos, C., 2000. Service management and marketing: a customer relationship management approach, 2nd ed. ed. Wiley, Chichester.

Gummesson, E., 1995. Relationship Marketing: its role in the service economy. Glynn, W.J. and Barnes, J.G. (Eds), New York.

Gupta, S., Sharma, M., Vijaya, S.M., 2016. Lean services: a systematic review. Int. J. Product. Perform. Manag. 65, 1025–1056. https://doi.org/10.1108/IJPPM-02-2015-0032

Hargaden, V., Ryan, J.K., 2015. Resource Planning in Engineering Services Firms. IEEE Trans. Eng. Manag. 62, 578–590. https://doi.org/10.1109/TEM.2015.2457675

Hayes, A., 2025. What Is a Gap Analysis? [WWW Document]. Investopedia. URL https://www.investopedia.com/terms/g/gap-analysis.asp (accessed 5.5.25).

Hines, P., Holwe, M., Rich, N., 2004. Learning to evolve: A review of contemporary lean thinking. Int. J. Oper. Prod. Manag. 24, 994–1011. https://doi.org/10.1108/01443570410558049

Inkinen, H., Kianto, A., Vanhala, M., 2015. Knowledge management practices and innovation performance in Finland. Balt. J. Manag. 10, 432–455. https://doi.org/10.1108/BJM-10-2014-0178

Jorgensen, F., Becker, K., Mathews, J., 2024. The HRM practices of innovative knowledge-intensive firms. ResearchGate 56, 123–137. https://doi.org/10.1504/IJTM.2011.042978

Kartamycheva, K., 2024. Professional Services Resource Management - Ultimate Guide [WWW Document]. Proj. Manag. Blog Tips Tricks Birdview. URL https://birdviewpsa.com/blog/mastering-resource-planning-and-scheduling/ (accessed 3.19.25).

Kianto, A., Sáenz, J., Nekane, A., 2017. Knowledge-based human resource management practices, intellectual capital and innovation. J. Bus. Res. 81, 11–20. https://doi.org/10.1016/j.jbusres.2017.07.018

Kim, T.-M., 1985. Just-in-time manufacturing system: a periodic pull system. Int. J. Prod. Res. 23, 553. https://doi.org/10.1080/00207548508904728

Knies, E., Boselie, P., Gould-Williams, J., Vandenabeele, W., 2024. Strategic human resource management and public sector performance: context matters. Int. J. Hum. Resour. Manag. 35, 2432–2444. https://doi.org/10.1080/09585192.2017.1407088

Kuula, S., Haapasalo, H., Tolonen, A., 2018. Cost-efficient co-creation of knowledge intensive business services. Serv. Bus. 12, 779–808. https://doi.org/10.1007/s11628-018-0380-y

Merriam-Webster, 2025. Definition of RESOURCE [WWW Document]. URL https://www.merriam-webster.com/dictionary/resource (accessed 3.29.25).

Miles, I., 2005. Knowledge intensive business services: prospects and policies. Foresight J. Futur. Stud. Strateg. Think. Policy 7, 39–63. https://doi.org/10.1108/14636680510630939

Mustak, M., 2019. Customer participation in knowledge intensive business services: Perceived value outcomes from a dyadic perspective. Ind. Mark. Manag. 78, 76–87. https://doi.org/10.1016/j.indmarman.2017.09.017

Ohno, T., 1988. Toyota Production System: Beyond Large-Scale Production. CRC Press.

Prahalad, C.K., Ramaswamy, V., 2004. Co-creating unique value with customers. Strategy Leadersh. 32, 4–9. https://doi.org/10.1108/10878570410699249

Ritala, P., Hyötylä, M., Blomqvist, K., Kosonen, M., 2011. Key capabilities in knowledge-intensive service business. Serv. Ind. J. 33, 486–500. https://doi.org/10.1080/02642069.2011.623774

Salminen, A., 2011. Mikä kirjallisuuskatsaus? : johdatus kirjallisuuskatsauksen tyyppeihin ja hallintotieteellisiin sovelluksiin. Vaasan Yliop.

Santos, J.V.B. dos, Sigahi, T.F.A.C., Rampasso, I.S., Moraes, G.H.S.M. de, Ávila, L.V., Filho, W.L., Anholon, R., 2023. Adoption of competence management practices by

industries in an emerging country: an analysis via fuzzy TOPSIS. Pers. Rev. 53, 1459–1478. https://doi.org/10.1108/PR-05-2023-0399

Shaul, L., Tauber, D., 2013. Critical success factors in enterprise resource planning systems: Review of the last decade. ACM Comput Surv 45, 1–55. https://doi.org/10.1145/2501654.2501669

Soderquist, K.E., Papalexandris, A., Ioannou, G., Prastacos, G., 2010. From task-based to competency-based. Pers. Rev. 39, 325–346. https://doi.org/10.1108/00483481011030520

Statista, 2025a. Business Services [WWW Document]. Statista. URL https://www.statista.com/markets/406/topic/430/business-services/ (accessed 3.26.25).

Statista, 2025b. Consulting industry worldwide [WWW Document]. Statista. URL https://www.statista.com/topics/8112/global-consulting-services-industry/ (accessed 3.26.25).

Storbacka, K., Pennanen, R., 2014. Solution Business: Building a Platform for Organic Growth, Management for Professionals. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-319-03976-3

Vargo, S.L., Lusch, R., 2004. Evolving to a New Dominant Logic. J. Mark. 68, 1–17. https://doi.org/10.1509/jmkg.68.1.1.24036

Windahl, C., Lakemond, N., 2010. Integrated solutions from a service-centered perspective: Applicability and limitations in the capital goods industry. Ind. Mark. Manag., Building, Implementing, and Managing Brand Equity in Business Markets 39, 1278–1290. https://doi.org/10.1016/j.indmarman.2010.03.001

Womack, J.P., 1996. Lean thinking: banish waste and create wealth in your corporation. Simon & Schuster, London.

Womack, J.P., 1991. The machine that changed the world. HarperPerennial, New York.

# Appendices

Appendix 1. Resource planning professional interview themes and questions

| # | Question | Theme |
|---|---|---|
| 1 | What are the main sources of waste (time, money, unnecessary processes, etc.) in your resource planning process? | General Questions |
| 2 | What is the current biggest challenge in your resource planning process? | General Questions |
| 3 | Would you describe your current resource allocation approach as more push-based (starts from internal trigger) or pull-based (Lean; starts from external trigger)? Why? | General Questions |
| 4 | What information is currently used when assigning someone to a project? | Information Inputs |
| 5 | How do you handle situations where multiple consultants could fill the same role? What drives the final choice? | Information Inputs |
| 6 | Do you believe that parts of the resource planning process could or should be automated? Why or why not? What needs to be done to make this automation possible (changes in processes, tools, etc.)? | Future Improvements |

Appendix 2. Condensed Answers to Interviews

| # | Question | Answers |
|---|---|---|
| 1 | What are the main sources of waste in your resource planning process? | - Excess allocations<br>- Overreliance on top professionals<br>- Reworking and delays |
| 2 | What is the current biggest challenge in your resource planning process? | - Overreliance on top professionals<br>- Fragmented ownership of activities<br>- Matching right skills to projects<br>- Competing priorities across customers |
| 3 | Would you describe your current resource allocation approach as more push-based or pull-based? Why? | - Pull<br>- Both |
| 4 | What information is currently used when assigning someone to a project? | - Skill information (formal)<br>- Employee willingness (formal)<br>- Management info (informal)<br>- Availability (formal)<br>- Customer & project info (formal/informal) |
| 5 | How are situations handled where multiple consultants could fill the same role? What drives the final choice? | - Management decision<br>- Team chemistry<br>- Culture fit<br>- Soft skills<br>- Willingness<br>- Existing allocations<br>- Best-fit principle<br>- Customer decision |
| 6 | Do you believe that parts of the resource planning process could or should be automated? Why or why not? What needs to be done to make this automation possible (changes in processes, tools, etc.)? | - Everything but leadership activities (culture fit, team dynamics)<br>- Quality follow-up |

Appendix 3. Interviewee Profiles and Interview Information.

| | INTERVIEWEE #1 | INTERVIEWEE #2 | INTERVIEWEE #3 | INTERVIEWEE #4 |
|---|---|---|---|---|
| **Date** | 17 Apr 2025 | 21 Apr 2025 | 21 Apr 2025 | 22 Apr 2025 |
| **Interview Length** | 11 Minutes | 11 Minutes | 10 Minutes | 28 Minutes |
| **INTERVIEWEE PROFILES** | | | | |
| **Department** | Management | Operations | Finance | Delivery |
| **Experience*** | 25 Years | 12 Years | 26 Years | 17 Years |
| **Academic Background** | Technology | Economics | Economics | Technology |

*In KIBS