Master Thesis

Supply Chain Transparency- Benefits & Transformational Barriers

- *A case study at IKEA of Sweden AB*

LUNDS UNIVERSITET

-

Masters of Logistics and Supply Chain Management

By
Yash Shrimali
Charanya Sridharan

Acknowledgement

The thesis has been written to obtain a Master of Science degree in Logistics and Supply Chain Management from the Faculty of Engineering, Lund University. The research was conducted at the Division of Engineering Logistics at the Department of Industrial Management and Logistics. The case study was performed at IKEA of Sweden AB's Supply Chain Development function which provided empirical data and the opportunity to study the topic Supply Chain Transparency- Benefits & Transformational barriers.

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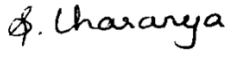

Yash Shrimali Charanya Sridharan

Abstract

Title Supply Chain Transparency - Benefits & Transformational Barriers

Background Transparency of a supply chain is the extent to which all its stakeholders have a shared understanding of, and access to, the product-related information that they request, without loss, noise, delay, and distortion. Having access to accurate and timely information is a challenging issue in global supply chains. Therefore, this research aimed at identifying barriers that could act as limiting factors towards Supply Chain Transparency (SCT) transformation. Also, the study intended to identify several benefits of SCT which could be used as enablers to spread knowledge amongst IKEA co-workers during the transformation.

Purpose The master thesis aimed to deliver a conceptual framework for IKEA's supply chain to identify the benefits and address the barriers in order to enable supply chain transparency.

Methodology The methodology of this study was divided into three phases. The first phase was to conduct a literature review that helped the authors develop the theoretical framework. In total twenty research articles were studied for identifying SCT barriers and twenty-three articles for identifying benefits of the SCT transformation. The theoretical framework provides insights on (i) SCT concepts (Network mechanisms, Conditions when transparency is strongly suggested, types, Perspectives, Degree, Direction and Distribution of transparency), (ii) numerous benefits of SCT, and (iii) barriers that could limit the SCT transformation at IKEA. The second phase was conducting interviews at the Supply Chain Development (SCD) and Supply Chain Operations (SCO) functions of IKEA. Twelve semi-structured interviews were conducted with representative people from these functions. A survey questionnaire built from the theoretical framework and insights from the interview was sent out to IKEA co-workers with an intention to reach out to as many people as possible complementing the interview. A total of thirty-four responses were obtained through the survey. In this thesis, a single case study was followed and explanation building and pattern matching analysis were performed to compare theory and empirics. A root cause analysis was performed on the identified barriers which indicated five major causes like (i) Information sharing processes, (ii) Organisational silos, (iii) Change management (iv) IT infrastructure, (v) Supply chain complexity. Later, based on critical findings from theory and empirics a final framework was developed.

Conclusions The final framework is divided into three sections. The first section "SCT concepts" reflects the current scenario of SCT at IKEA. The second section " SCT Benefits" highlights multiple benefits SCT could bring to sharing of information, IKEA co-workers, IKEA and its supply chain, and finally to its customers and society. The barriers that might come along IKEA's SCT transformation are categorised as people, organization, IT, and supply chain characteristics highlighted in the third section "SCT Barriers". IKEA can overcome these barriers by parallelly addressing the major root causes indicated in the "Causes" section of the framework. Overall, IKEA has identified the need for SCT transformation and meets all the conditions that strongly recommend SCT. Looking at the current scenario, IKEA has limited transparency across its value chain. Today it lacks track and trace capabilities and with the current ways of working in a siloed manner, IKEA does not have fully integrated IT platforms that can enable sharing explicit and relevant information at the right time.

Keywords Supply Chain Management, Supply Chain Transparency, Supply Chain Visibility, Digitalisation, Supply Chain Integration

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List of Abbreviations

SCT Supply Chain Transparency
SCD Supply Chain Development
SCO Supply Chain Operations
DC Distribution Center
CDC Customer Distribution Centre
CPC Central Parcel Unit
PBSS Plan and Balance Sales and Supply
SC Supply Chain
IT Information Technology
CP Consolidation Points
IPIM IKEA's Product Information Management
ASV Advanced Shipment Visibility
LCT Luminous Control Tower
TFP Transport Forecast Planning
DORS Define Optimal Replenishment Solutions
FRD Flow Replenishment Develop
STP Short Term Planning
MTP Mid Term Planning
NP Need Planner
CLL Category Logistics Leader
EDI Electronic data interchange
OMS Order Management System
DCG Distribution Center Group
IoS IKEA of Sweden
E2E End to End
KPI Key Performance Indicator
GDPR General Data Protection Regulation

1. Introduction

This chapter highlights the importance for supply chains to implement Supply chain Transparency to handle the ever-changing customer behavior including the potential benefits and barriers. Next, a clear description of the company is provided which is followed by the problem formulation and the purpose of this thesis that ends with the research questions. This section is followed by the focus and the delimitation of the study and finally the outline of the report.

1.1 Background

Due to ever-changing customer demands, it is essential for any organization to stay updated with the right information about the product at any point in time. To have this free flow of information within the organization and between its stakeholders, Supply Chain Transparency (SCT) is the key. "Transparency of a supply chain is the extent to which all its stakeholders have a shared understanding of, and access to, the product-related information that they request, without loss, noise, delay, and distortion" (Hofstede *et al.*, 2004, p. 290).

SCT provides multiple benefits like reduced risk, increased trust, improved operational excellence, better cooperation among the supply chain players by efficiently planning for the current conditions and addressing the delays and disruptions that can occur in the supply chain, thereby making it responsive (Hofstede *et al.*, 2004). SCT has been given importance by the researchers and industries due to the growing technological advancements and the needs of the business.

Despite significant interest in the matter, having access to accurate and timely information is a challenging issue in global supply chains (Caridi *et al.*, 2014). According to Kembro *et al.* (2017) there are quite a few barriers to information sharing through which it is difficult to implement SCT in a multi-tier supply chain. Resistance to change, the complexity of the supply chain, intellectual property rights, the confidentiality of data, transfer of power, technological capability, implementation cost, cultural difference and trust could be a few of the barriers that impede a supply chain in achieving transparency.

IKEA is a global supply chain, whose suppliers and customers are widespread across the world. There are more than 1800 suppliers in 50 countries who supply products to IKEA which delivers goods through more than 35 Distribution centers or directly to around 430 stores. The company has a product range of 10,000 different articles and constantly strives to meet the growing demands of its customers (Inter IKEA systems B.V., 2021).

With efforts towards integrated planning across the spectrum from stores to suppliers, including distribution and transportation, the company is aiming to reach targeted service levels at the lowest possible cost with high-capacity utilization and free flow of goods. A supply chain of this magnitude and complexity, identified as the ultimate supply chain by Mentzer *et al.* (2001), can benefit from the availability of key information and collaboration across organizational boundaries to achieve the long-term competitiveness of the supply chains (Bartlett *et al.* 2007).

IKEA, as a multinational company and a pioneer in Supply Chain Management, is focusing on achieving SCT through initiating a project known as SCT Control Tower. Changing customer behavior and competitive business environment has motivated IKEA to enhance their business towards a connected and customer-centric supply chain. The SCT project at IKEA is an important enabler to realise this ambition by generating end-to-end supply chain connectivity and also recording the information digitally, that can be accessible anywhere in the supply chain. Requirements like shift from traditional customer interaction to omni-channel with many interactions, from standardised product to tailored offering & service, from mass production to mass customization, from siloed functional excellence and data silos to end-to-end integrated supply chain has driven the movement towards SCT at IKEA. The objective of the project is to achieve SCT through product tracking, product traceability and supply chain visibility into planning, inventory, capacity & commitment, flow, and cost.

The following information is based on the assessment document of SCT made in 2020, provided by IKEA. The proposed SCT control tower project aims to bring several benefits to IKEA's supply chain like balance the supply chain, decrease costs and inventories, improve availability & customer satisfaction, gain speed, increase precision and accuracy. The expected quantitative benefits include improved customer service, supply chain performance, operational cost and working capital as shown in table 1. Expected qualitative benefits include prevention of silos, higher customer satisfaction & revenue, people/co-workers' satisfaction, sustainability, trust in data, improved scalability and enabler for the supply strategy.

Table 1: Potential benefits SCT can bring to IKEA. (SCT assessment document, IKEA, 2020)

	Benefits of SCT	Enablers
Quantitative benefits	Customer service	Through better product availability and improved delivery performance and customer service
	Supply Chain performance	Through supporting shorter lead times, Faster decisions, and immediate availability of information
	Operational cost	Transportation efficiencies increase by knowing where the shipments are, route optimization and less expediting personnel efficiency increase through near real time shipment status transparency and less firefighting and reduced inventory carrying cost from reduced inventories
	Working capital	Through reduction of finished goods / safety stocks by more delivery reliability/transparency, optimisation of inventories through accurate and precise lead times by route and reduced lead time variability.
Qualitative benefits	Prevention of silos	Through enabling end-to-end connectivity and visualisation of supply chain information and collaboration
	Higher customer satisfaction & revenue	Increased customer satisfaction through dynamic Estimated Time to Arrival, traceability and inventory information and shorter lead times resulting in higher revenues
	People/co-workers satisfaction	Through simplification of daily work. More attractive roles when less time is spent on manual tasks and more time on value-adding tasks.
	Sustainability	Expected CO2 reduction through transport optimisation
	Trust in data	Simultaneous access to the same information decreases the need for lengthy alignments and workarounds creating trust in data.
	Improved scalability	Increased efficiency for the daily work of co-workers leading to a lower need of additional hires

1.2 Problem formulation

Despite the benefits SCT provides, there are many difficulties implementing this new effort in a big complex organisation like IKEA. It has a franchise system that comes under different legal entities and these entities are geographically located across the world in several countries, having its own culture, governance structure, data security etc. Through initial interviews at IKEA, it was understood that the company is currently facing challenges in initiating the SCT control tower project. Some questions to ponder upon and a point of debate in implementing the project at IKEA regard who will be the driver of the project, siloed mentality of the departments who work to improve: their operational excellence, trust issues in sharing the data, problems with sharing confidential information, fear of revealing the weak areas, and fear of overload of information. As indicated by By (2005), several authors in research indicate that since the need for change often is unpredictable, it tends to be reactive, discontinuous, ad hoc and often triggered by a situation of organisational crisis.

For successful change management, IKEA would like to explore the barriers that might occur in the transformation from the old to the new through enabling SCT. IKEA has initiated the SCT control tower project to have an end-to-end integration in its supply chain that helps in making real time decisions through information transparency. It aims to measure its success in 2025 by supporting IKEA's common goals of reduced supply chain cost, increased service levels and reduced carbon footprint by 2030 through better planning and collaboration. In the literature (section 3.4), potential barriers: (i) people - trust (Kembro *et al.*, 2017), willingness to communicate (Parris *et al.*, 2016), (ii) organisational - top management commitment (Pujara, 2011), lack of common performance measures (Kembro *et al.*, 2017), (iii) technological and information quality - ownership of data (Childerhouse *et. al*, 2003), integration of systems (Kembro and Selviaridis, 2015), and (iv) supply chain characteristics - the length and complexity of supply chain (Deimel *et al.*, 2008) were discussed by several researchers limiting an organization's transformation to SCT. Upon identification of these potential barriers, it required more investigations to be addressed in a systematic or ranked way based on the theory and in connection to IKEA's benefits from SCT.

1.3 Purpose of the study & Research Questions

The master thesis aimed to deliver a conceptual framework for IKEA's supply chain to identify the benefits and address the barriers in order to enable supply chain transparency. To fulfill the purpose, the following research questions are investigated and answered during the study:

1) How can IKEA benefit from Supply chain transparency?
2) What are the existing barriers at IKEA towards implementing SCT?
3) How can IKEA overcome these barriers?

1.4 Focus and delimitations

The focus of the study is limited to two functions in Range and Supply at IKEA: (i) the Supply Chain Development (SCD) function responsible to design & secure the pre-conditions for a world class supply chain, and (ii) the Supply Chain Operations (SCO) function responsible for supplying IKEA products to the customers in a simple, affordable, sustainable, and excellent way. Considering the global context of IKEA's supply chain and the complexities involved and due to the limited time frame, SCD and SCO will represent the entire organisation in the task of identifying the barriers. As the scope of the thesis is reduced to SCD and SCO, the derived results will be subjective to IKEA's supply chain. Although the conceptual framework could be used in a generalised context for organisations adapting to SCT practices, the research is limited to studying barriers related to people, organisation, supply chain characteristics, technology, and information quality. These barriers were identified to be the key barriers impacting SCT initiative through the literature review (section 3.4) and are relevant to IKEA as an organisation. The thesis does not focus on the specific technicalities like: "IT architecture and digital solutions" used for enabling SCT.

1.5 Report Outline

The following explanations give a brief description about each of the chapters in the report. Both the authors are equally involved in contributing to the chapters.

Chapter 1: Introduction
This chapter highlights the importance for supply chains to implement Supply chain Transparency to handle the ever-changing customer behavior including the potential benefits and barriers. Next, a clear description of the company is provided which is followed by the problem formulation and the purpose of this thesis that ends with the research questions. This section is followed by the focus and the delimitation of the study and finally the outline of the report.

Chapter 2: Methodology
This chapter highlights the structured methodological approach based on theory that will be used in the thesis. The chapter will describe the different possible ways to perform the research at each step and convey why and which method is suitable for this thesis. The overview of the methodological approach followed in the thesis is shown in figure 1. The structure of this chapter begins with the scientific approach chosen for the study, followed by the explanation of the Constructive approach, which is the chosen research approach. The remainder of the chapter explains the research method that starts with literature review and covers the different steps followed in a case study methodology namely Plan, Design, Prepare, Data collection, Data analysis and at last how to improve the research quality through validity and reliability.

Chapter 3: IKEA Overview

This chapter gives a background about IKEA as an organisation followed by the organisational structure of Inter IKEA Group and Range and Supply where the SCO and SCD functions are located. The data for the thesis are primarily gathered from these functions. The chapter finally explains about the IKEA way of working to give an overview of IKEA's supply chain activities.

Chapter 4: Theoretical Framework

This chapter highlights the theoretical findings on the Supply Chain Transparency from the literature review conducted for the study. Firstly, the varying complexity of supply chains are analysed to understand IKEA's supply chain. Secondly, SCT defined in different perspectives are studied and one definition is chosen which perfectly in line with the scope and purpose of the study. Lastly, benefits and barriers of SCT and different SCT frameworks are examined.

Chapter 5: Empirical Findings

This chapter highlights the empirical data that has been gathered through the interaction with people at the company. The study uses explanation building techniques to understand IKEA's supply chain, current situation of the company in enabling SCT by identifying top management commitment through initiatives, typical information shared, tools in place to share information, current information sharing process. Later part of the chapter discusses the benefits and finally the barriers existing at IKEA in implementing SCT.

Chapter 6: Case Analysis

In this chapter the case analysis is done using pattern matching. The chapter is mainly divided into three main parts namely the Analysis of SCT at IKEA, Analysis of Benefits of SCT and Analysis of Barriers of SCT. The analysis is done by comparing to theory in developing the final framework. A root cause analysis is also performed to identify major causes including ways of overcoming the barriers identified through theory and empirics.

Chapter 7: The Final Framework

In this chapter, the final framework is developed comparing the theoretical framework and empirical evidence collected at IKEA through interviews and survey. The chapter also presents recommendations to IKEA on how to overcome the barriers, in its journey of implementing SCT.

Chapter 8: Conclusion

The thesis is concluded in this final chapter where firstly the findings are summarized, and the research questions are explicitly answered. Secondly, additional findings that could be of interest to the company are presented. Thirdly, the thesis contributions to theory are discussed. Fourthly, the limitations of the thesis are described. Lastly, ideas for areas of future research are highlighted.

2. Methodology

This chapter highlights the structured methodological approach based on theory that will be used in the thesis. The chapter will describe the different possible ways to perform the research at each step and convey why and which method is suitable for this thesis. The overview of the methodological approach followed in the thesis is shown in figure 1. The structure of this chapter begins with the scientific approach chosen for the study, followed by the explanation of the Constructive approach, which is the chosen research approach. The remainder of the chapter explains the research method that starts with literature review and covers the different steps followed in a case study methodology namely Plan, Design, Prepare, Data collection, Data analysis and at last how to improve the research quality through validity and reliability.

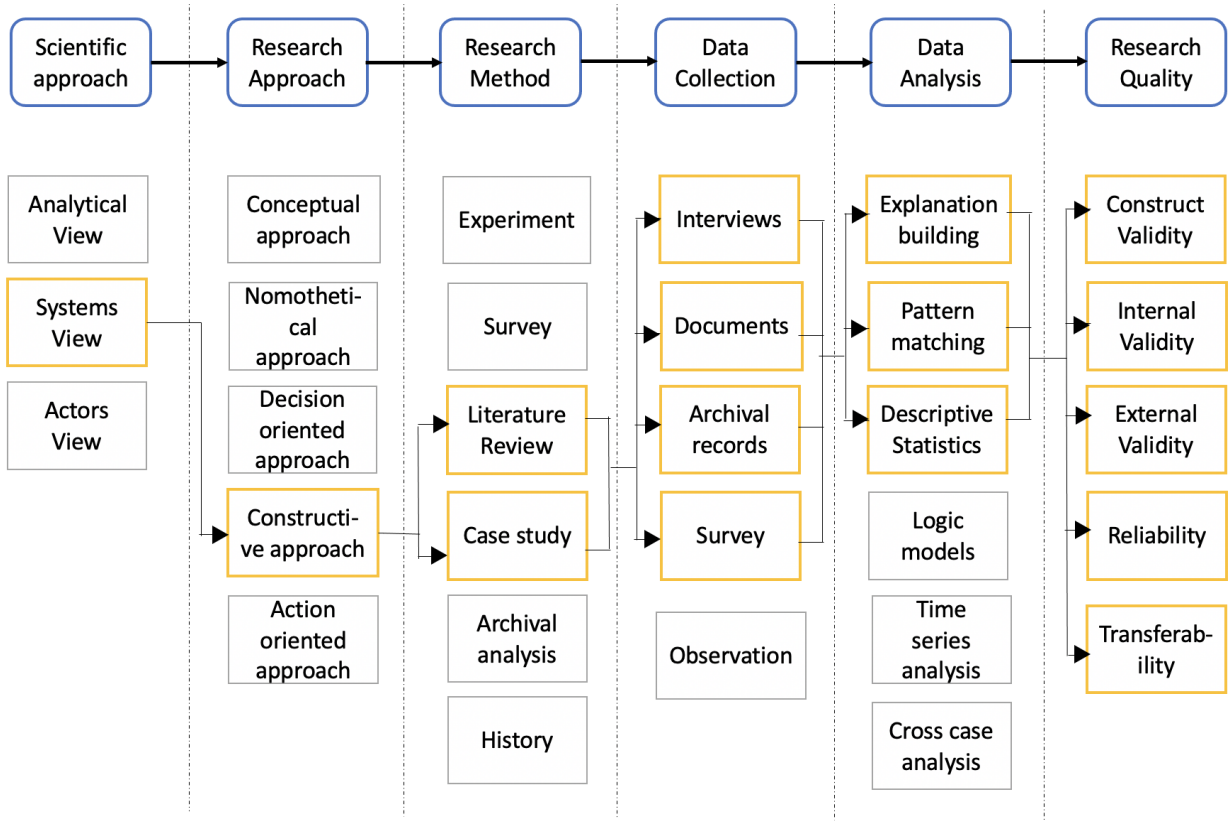

Figure 1: The methodological process used in the thesis (Based on Yin, 2009)

2.1 Methodological view - the scientific approach

Arbnor and Bjerke (2008) indicate that there are three methodological views when creating knowledge in the study area. The framework is based on the premise that the choice of research methods should not only be influenced by the nature of the research question, but also by the

researcher's view of reality. The three different views are analytical view, systems view and actor's view.

2.1.1 Analytical view

The analytical creator of knowledge is in general not very interested in philosophical matters. In this view, the researcher makes certain assumptions about the reality in which he/she is operating, or functions as if these assumptions have been made. The analytical view presupposes that reality is filled with facts and independent of individual perceivers. The scientific ambition of the analytical view is to come up with explanations from a general point of departure. This means to come up with patterns, with regularities, with representative models (Arbnor and Bjerke, 2008).

Gammelgaard (2004) explains the analytical approach by Arbnor and Bjerke (2008) as a logical consequence of the efforts to uncover patterns and relations is to find explanations, generalize the results and predict future incidents. In turn, this means that the way to approach reality methodologically is to decompose reality into the smallest possible "elements", transform the elements into concepts and finally try to reveal cause-effect-relations by hypothesis testing. A method frequently used in this approach is quantitative data analysis by means of statistical procedures (Gammelgaard, 2004). Mentzer and Flint (1997) suggest that qualitative methods can also be used to create internal validity in positivistic studies.

2.1.2 Systems view

The systems view looks at reality as consisting of fact-filled systems structures in the objective reality and of subjective opinions of such structures, which are treated as facts as well (Arbnor and Bjerke, 2008). In this approach, the resultant system is not equal to the sum of its components. From a systems perspective, decomposing reality into parts is meaningless (Gammelgaard, 2004). It is quite natural that a more comprehensive report from a systems study contains empirical results that to some extents are unique to the study (Arbnor and Bjerke, 2008). Gammelgaard (2004) also suggests that systems approach gives a holistic view. Case studies are the ideal analysis method in this approach (Churchman, 1979). Both quantitative methods, primarily simulations, and qualitative methods can be used in the systems approach (Gammelgaard, 2004).

2.1.3 Actors view

In this approach, reality is seen as a construction, and knowledge is perceived as socially constructed, i.e., knowledge creation depends on the researcher's interpretation (Gammelgaard, 2004). Reality is, according to the actor's view, a human construction in which actors are involved. "Actor" here becomes a central concept when studying the individuals of society (Arbnor and Bjerke, 2008). According to Gammelgaard (2004), qualitative data collection is the preferred data collection method in this approach to analyse reality.

Scientific approach of the project

One of the purposes of this thesis was to identify the barriers posed at IKEA in the implementation of the SCT. From the authors' point of view, one of the identified target group SCO, is considered as a system with several subsystems like supply chain operations, category area logistics service, category area transport service. Similarly, SCD also has several sub systems like sourcing, designing and planning, execution, market logistics and intralogistics that work together to create more value than the individual sub systems contribute themselves. The SCD and SCO teams by themselves are quite big and complex with several operations and interactions with multiple stakeholders across the globe. Also, SCD and SCO can be considered as layers of a bigger system called Range and Supply, which in turn can be considered as a sub system of Inter IKEA. As suggested by Checkland (1999), individual parts create systems which then also are a part of larger systems, which is a foundation of systems view that is in line with the authors' system view approach to this research.

2.2 Research approach

Lukka (2003) suggests five different methodological approaches of research inspired from Kasanen *et al.* (1993). They are conceptual approach, nomothetical approach, decision-oriented approach, Constructive approach and action-oriented approach as seen in figure 2.

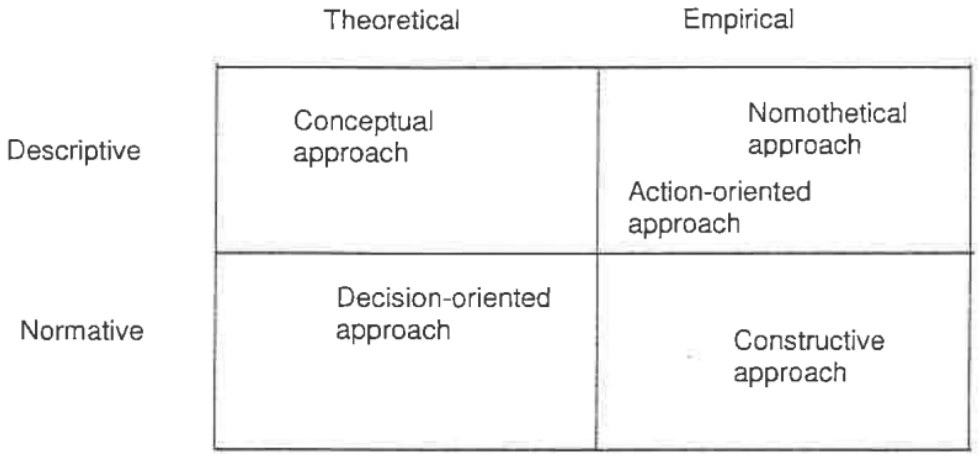

Figure 2: Research approach (Lukka, 2003, p.94)

Kasanen *et al.* (1993) differentiates the five approaches as follows. The nomothetical approach is closely linked to the modernist (positivist) research tradition. The underlying explanatory model is causal, and attempts are made to state the findings in the form of general laws. The decision-oriented approach is usually grounded on assumptions like the nomothetical one. However, there is a difference in the fundamental nature of the research, which in this case is normative; the results are meant to help management in running the firm. The action-oriented approach provides a kind of alternative to the nomothetical approach as it brings the human being into the focus of analysis. The explanatory model is often teleological, and the historical background of the phenomena

studied is examined carefully. The emphasis is usually placed on gaining a thorough understanding of the studied subjects, but the purpose may include an active participation in change processes, too. The conceptual approach again is distinguished by its a priori basic nature: it produces new knowledge primarily through the "method of reasoning". Lukka (2003) defines constructive research as the method of producing innovative constructions intended to solve the problems faced in the real world, thereby mankind's contribution to the theory of the disciple in which it is applied. Kasanen *et al.* (1993) indicate four elements of the constructive research namely Theory connection, theory contribution, practical relevance and practical functioning as seen in figure 3.

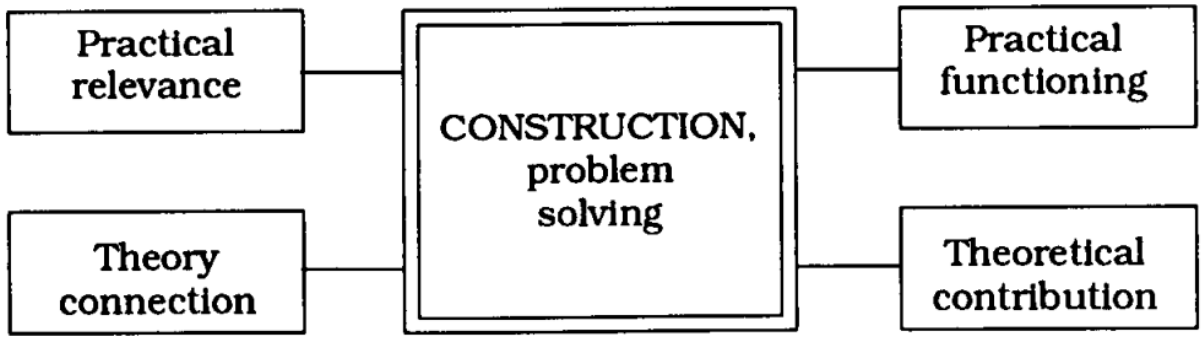

Figure 3: Elements of constructive research (Kasanen et al., 1993, p.246)

Research approach of the project

The thesis at IKEA aimed to identify the barriers that the organisation is facing in implementing SCT. A thorough literature review was undertaken to understand the theoretical relevance of the research and gain learnings. The purpose of the study was to develop a conceptual model that can be used by IKEA to overcome the barriers in the implementation of SCT. This created a practical relevance of the topic at IKEA and was one of the most important aspects of the thesis. The developed solution will be a contribution to theory in the field of SCT. Considering the limited time frame of the master thesis, it was difficult to test the practical functioning of the project. But, through feedback from the supervisors at IKEA and LTH, it was possible to validate the conceptual model, thereby addressing the practical functioning criteria of constructive approach. A virtual session with five IKEA co-workers was conducted to verify the relevancy of the final framework at IKEA. Thus, it can be said that the study followed a constructive research approach.

2.3 Research Methods

Yin (2009) identifies five major methods namely experiments, surveys, archival analysis, histories, and case studies. These are mainly determined based on three conditions like the type of research question posed, the extent of control an investigator has over actual behavioral events, and the degree of focus on contemporary as opposed to historical events as shown in figure 4. The research questions like “how” and “why” are exploratory and questions like “what”, “who” and “where” are explanatory.

METHOD	(1) Form of Research Question	(2) Requires Control of Behavioral Events?	(3) Focuses on Contemporary Events?
Experiment	how, why?	yes	yes
Survey	who, what, where, how many, how much?	no	yes
Archival Analysis	who, what, where, how many, how much?	no	yes/no
History	how, why?	no	no
Case Study	how, why?	no	yes

Figure 4: The relevant situation of research methods (Yin, 2009, p.8)

Research method of the project

As the study aimed mainly to answer the research question 'how', a case study approach was chosen as the appropriate research method of the project (Ellram, 1996; Voss *et al.*, 2002). Yin's (2009) six steps in performing a case study as shown in figure 5 was used as a base to develop the research method approach of the thesis. The first three steps namely Planning, Designing and Preparing the case study will be explained in the following subsections under 2.3.2. The remaining three steps namely Data collection, Data Analysis and Research Quality will be discussed in section 2.4, 2.5, 2.6 respectively. Also, Literature review was done prior to the case study to strengthen the authors' understanding on the concept of SCT and to collect theoretical evidence on the benefits and barriers in implementing SCT. As the research's intention was also to identify 'What' are the different barriers hindering SCT implementation at IKEA, a survey was also used in the study to further complement the data collected from a case study method through interviews, which was the main research approach of the project.

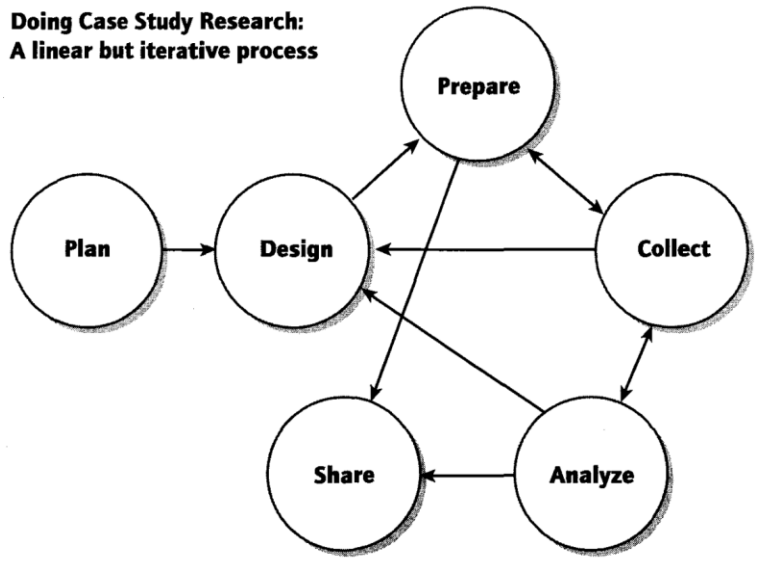

Figure 5: Steps to perform case study research (Yin, 2009, p.1)

2.3.1 Literature Review

Rowley and Slack (2004) indicate a five-step process to conduct the literature review. The same approach was followed in the thesis to identify literature that could be used as a basic reference to understand the concept of SCT and build on the benefits and barriers of SCT. Eisenhardt (1989) affirms that literature review is an important aid to build on the theory of both conflicting and similar findings that could increase the multiple perspectives and provides critical inputs to the study. The five different steps (as shown in figure 6) followed in the thesis for conducting the literature review are given below. The steps were performed iteratively and parallelly as the theoretical study kept building on.

Figure 6: Steps followed in conducting the literature review

Scanning

In this step, search engines like google scholar, Lubsearch- Lund University's search engine were used to identify articles related to the search criteria for the study. As indicated by Rowley and Slack (2004), this step involved scanning several articles to understand what can and cannot be included in the study.

The scanning of the articles was done in two stages. Initially, research work done in the field of supply chain transparency and supply chain visibility was shared by Professor Andreas Norrman, who is associated with research in areas related to Supply chain management for many years. This document served as the starting point of this thesis and helped the authors in identifying key

literatures as highlighted in table 2. The following articles were chosen as key articles as they relate closely to the nature of the research purpose of this thesis which mainly looked at the supply chain perspective of information sharing, its corresponding benefits and looking at barriers related to people, organisation, supply chain characteristics and technology and information quality.

Later by starting from a carefully chosen set of key articles, the literature collection required for the study was built on following a citation pearl technique, as suggested by Rowley and Slack (2004), this is a technique that starts with identifying a few initial articles from where new additional articles can be found using its citations. Therefore, using this technique the references in these five different articles (table 2) were carefully studied and the ones relevant to the research purpose were chosen. As the study did not focus on the technological infrastructure, sustainability practices, purchasing practices related to supply chain transparency, the articles related to these subject areas were excluded during the scanning stage of collecting relevant literature for the study.

Table 2: List of key articles

Title	**Authors**
Transparency: Perceptions, practices and promises.	Hofstede *et al*. (2004)
Transparency in food supply chains: empirical results from German pig and dairy production	Deimel *et al.* (2008)
Exploring transparency: a new framework for responsible business management	Parris *et al.* (2016)
Information sharing across multiple supply chain tiers: A Delphi study on antecedents	Kembro *et al*. (2017)
Towards a typology of transparency for marketing management research	Hultman and Axelsson (2007)

Making Notes

As the articles were read, notes were taken for each. The notes include key points mentioned in the article and highlighting key references that could be of use for further search to build the theoretical base.

Structuring the literature review

The collected literature was organised based on some common themes in this step. The literature review started with identifying the concepts and definition of supply chain management. This is followed by understanding what supply chain transparency is and how it is defined varyingly in different contexts. Then the benefits and barriers were identified from the collected literature and were organised as tables with the relevant reference to identify a pattern among the benefits and barriers of SCT in the literature. The pattern was identified with the help of check boxes in the table. The tables attached in appendix 1 and appendix 2 shows how the identified benefits and barriers are combined based on common key benefits and key barriers mentioned below.

- Benefits of SCT
    - Supply Chain
    - Planning and inventory management
    - Business
- Barriers existing in implementing SCT
    - People
    - Organisation
    - Technology and information quality
    - Supply Chain Characteristics

Writing the literature review

As indicated by Rowley and Slack (2004), it is important to connect the different sections and subsections indicating a relation between them. This is mainly done in this step where the identified literature is combined under common headings to indicate the relevance. This helped the authors build the theoretical framework for the study.

Building Bibliography

This step was performed throughout the study parallelly. As suggested by Rowley and Slack (2004), the theory was built continuously as more information was gathered while developing the literature review. The articles were saved at a common location to build on the biography.

2.3.2 Case study method

Planning the case study

Yin (2009) highlights three important points at this initial stage of research. They are (1) Identify research questions or rationale for doing a case study (2) Decide to use case study methods compared to other methods, and (3) Understanding its strengths and weaknesses. As suggested by Cooper (1984), a literature review in the field of study was undertaken to prepare for the case study by developing more insightful questions. Considering the exploratory nature of the research case study would be the most suitable approach compared to other methods shown in figure 4.

Designing the case study

The four important aspects suggested by Yin (2009) in designing the case study are

*Defining the unit of analysis and the likely case(s) to be studied***:** As suggested by Yin (2009), the unit of analysis is closely connected to the research question and helps to define what a "case" for a study will be as it states what will be investigated in the study. Yin (2009) also classifies the case studies into single and multiple and also explains the type of unit of analysis as shown in the figure 7. The unit of analysis chosen in this study is a single unit of analysis which is holistic and is "Benefits and Barriers of SCT". This unit of analysis was chosen as it covers the scope of the thesis in identifying the benefits and barriers of implementing SCT at IKEA.

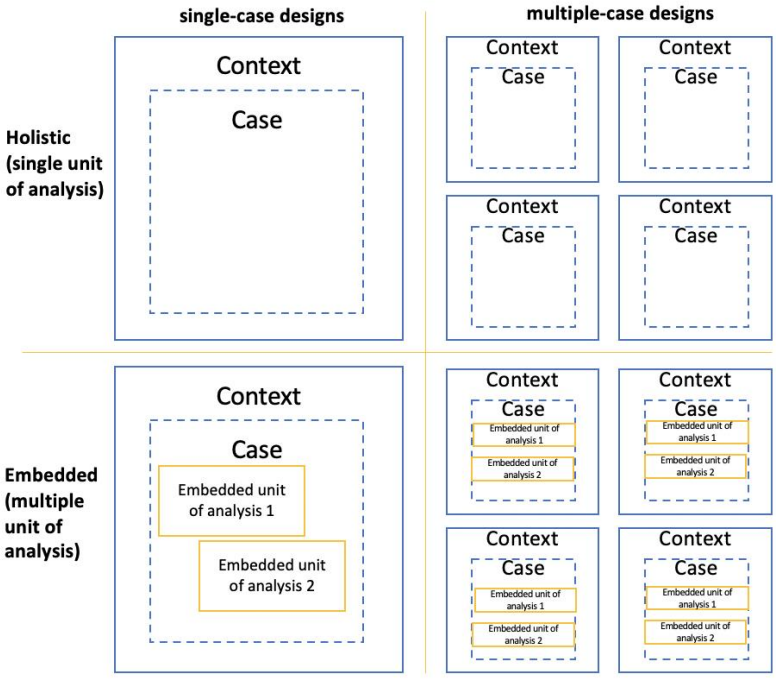

Figure 7: Classification of the case study (Yin, 2009, p.46)

Developing theory, proposition and issues underlying the anticipated study: Yin (2009) emphasizes that each proposition developed in the study directs attention to something that should be examined within the scope of the study. The research questions in this study were formulated in a way that it addresses the problem at IKEA in transformation to SCT. Corresponding theories were identified through thorough literature review presented in the theoretical framework section which provides a strong base to understand and identify possible root causes to the problem statement.

Identifying the case study design: A primary step in designing case study is the distinction between single case and multiple case study. As suggested by Ellram (1996) and Yin (2009) the goal of the research is a determinant of the type of case study. A single case study is done to get a deeper understanding of the case and multiple case studies are used to compare multiple cases under study Voss *et al.* (2002). Dyer and Wilkins (1991) support the use of single case study to produce extra and better theory. If the researcher only wants to study one single thing (for example a person from a specific group) or a single group (for example a group of people), a single case study is the best choice (Yin, 2009). Relating to these characteristics of a single case study and the requirements of this thesis to investigate benefits and barriers of SCT in IKEA, the study is planned to be performed as a single case study.

Defining procedures to maintain case study quality: Four tests are suggested by Yin (2009) to make sure that case study research is of the highest quality. They are Construct Validity, Internal validity, external validity, and reliability. More details are provided in section 2.6.

Preparing the case study

An important criterion at this stage of the case study is to acquire the abilities of a good case study investigator. Yin (2009) mentions that a good case study investigator should be able to ask good questions-and interpret the answers, should be a good "listener" and not be trapped by her or his own ideologies or preconceptions, should be adaptive and flexible, so that newly encountered situations can be seen as opportunities, not threats, must have a firm grasp of the issues being studied, should be unbiased by preconceived notions, including those derived from theory and should be sensitive and responsive to contradictory evidence.

Also, it is important to protect the human subjects and it can be done by anonymity of the collected data from people. The participants were asked for consent before recording the interviews as suggested by Yin (2009). To further increase the understanding of the case, additional documents were also collected from the participants for example function description, responsibilities, ways of working etc. Since only a few representatives from the sample population were covered through the interviews, a survey was developed to cover a larger audience and improve the reliability of the obtained results. The quantitative nature of the survey will complement the qualitative results obtained from the interview as suggested by Janes (2001) and the survey questions were designed accordingly. Also, the development of a case study protocol (Appendix 3) and survey instrument

(Appendix 4) were approved by the supervisors at IKEA and LTH. Pilot tests for the interviews were conducted in the form of unstructured interviews and for the survey pilot tests were performed to ensure the duration and working of the survey.

2.4 Data collection

Six different data collection methods are suggested by Yin (2009). They are documentation, archival records, interviews, direct observations, participant observation and physical artifacts.

Documentations, archival records, interviews were mainly used to collect qualitative data for the study. Considering the current COVID times, all the interviews are currently conducted over the communication tool Teams. As mentioned by Creswell (2009), it is important to understand the informal communication of the participants such as body language. So, all the interviews were conducted with the camera on. To reduce the misinterpretation risk, both the authors were present in all the interviews. The interviews were also recorded with the permission of the participants to reduce this risk. One of the authors took notes while the other asked questions. The other author pitched in with follow up questions if any, based on the question's relevance to the discussion. Also, the authors made sure to hide the intentions behind the question in case of open-ended questions, so that the participants' answers are unbiased as suggested by Yin (2009).

The study also utilised documents and archival records collected from interviewee like presentation of the department, links to the function's page in IKEA toolbox, ways of working, tools used etc., to have a deeper understanding and compare it with the data obtained through the interviews. This increased the reliability and credibility of the data collected.

Preparing the Interview Guide

As indicated by Voss *et al.* (2002) and Yin (2009), it is important to develop a case study protocol to increase the reliability and the validity of the study. One of the main steps at this stage is to have a well-prepared interview guide that contains questions covering most of the aspects researched in this thesis. Having a common interview guide would also ensure that the same evidence is collected from multiple people for the same questions. The interview guide (Appendix 3) contained broad questions initially explaining the purpose of the thesis and understanding the function of interviewee in IKEA. The main questions were classified into sections based on the commonality of the topic. Similar to a funnel method as suggested by Voss *et al.* (2002), the questions became more and more specific as the interview progressed.

Both unstructured and semi structured interviews were conducted as a part of this study. Unstructured interviews were used in the initial phase of the thesis to have a general understanding about the topic of the study. The unstructured interviews aid in data collection by discussion rather than the prepared questions to expand the dialogue as indicated by Creswell (2009). This made the participants speak freely and helped the authors in better understanding of the research topic.

When it came to the semi structured interviews, the authors aimed at conducting the interviews for 90 minutes, which is in line with the suggestion of Voss *et al.* (2002). The interview questions were modified and restructured based on the experience of initial interviews. Also, the number of questions asked beyond the interview guide, varied based on the participants interest and the time constraints of the interview. The interview guide can be found in the Appendix 3.

Preparing survey questionnaire

In order to cover a larger audience, which was not possible through interviews due to limited time availability of participants in IKEA, a self-administered survey was designed through google forms. The survey questions are carefully planned based on the responses obtained from the interviews, as the survey is mainly done in this thesis to complement the qualitative data. The survey questions can be found in the Appendix 4. The survey questions were a mix of open-ended, closed-ended and hybrid questions. Open-ended questions were mainly used to understand the participants' rich detailed response information about a topic in their own language. Closed-ended questions with both order response (yes/no) and unordered response were designed in the survey to suit the purpose of the different questions. These closed-ended questions with unordered responses were also combined with giving a choice for the participant to add their own answers if it is not covered in the list of choices provided. As indicated by Grove *et al.* (2013), yes/no ordered response questions can be used to measure subjective opinion of the participants such as knowledge, belief and perspectives, compared to scales like Likert's that measure attributes or dimension on a continuum.

The survey was mainly distributed to participants from SCO and SCD function at IKEA. The survey was sent out to 16 people who were interviewed (both semi-structured and unstructured interview participants) and were asked to distribute among their team members to get maximum response. A total of thirty-four responses were received from the survey. The authors combined the survey response along with primary interview data collected to achieve convergence of evidence collected through multiple methods and also maintained a chain of evidence to increase the reliability of the research, as emphasized by Yin (2009).

2.5 Data Analysis

Data analysis is an important step to address the initial proposition of the study (Yin, 2009). It consists of examining, categorizing, tabulating, testing, and combining quantitative and qualitative data to arrive at a conclusion. As suggested by Yin (2009), explanation building, and pattern matching were used in the thesis for analyzing the qualitative data obtained from the interviews and surveys. The results obtained from the survey were analysed on the frequency of a particular response to identify the extent of the responses to a question. As similar questions were earlier asked in the interviews, the responses were compared using the below techniques to fulfill the purpose of the study.

A qualitative analysis was performed on the obtained data from interviews and surveys using pattern matching technique explained below. Key identified benefits and barriers from the collected data were marked in red if it was not mentioned in the theory. This technique helped the authors to prepare a consolidated list of SCT benefits and barriers combining theory and empirics. A root cause analysis was performed on the identified barriers and major causes to the barriers were identified. Based on the theory and empirics, ways to address the barriers are suggested to IKEA. The ways of addressing the barriers are also verified by the supervisor at IKEA to check for its relevancy at the company.

Explanation building: The authors tried to understand how the ways of working, stakeholder interactions, common tools in place and several other factors influenced the way information is shared within and between departments. This helped the authors identify the current practices and potential areas of improvement in sharing information.

Pattern Matching: The analysis starts with mapping the response to the common questions mentioned in the interview guide, so that the similarities and the differences in the answers given by the participants could be identified. This is then compared with the theoretical framework to understand what barriers the theory suggests and what are the current barriers in IKEA to implement SCT. For comparing theory and empirics, the percentages of occurrence of each barrier in the categories were calculated for both theory and empirics and contrasted in the data analysis chapter 6.3 to identify how much IKEA is in line with the theory. Similarly, the benefits of SCT suggested by the participants are compared with the ones the theory suggests.

2.6 Research Quality

As the case study approach of this research follows Yin (2009)'s methodology, the research quality techniques suggested by Yin (2009) are undertaken in the study. These techniques are relevant to the nature of the study which is also similar to the ones suggested by other researchers like da Mota Pedrosa *et al.* (2012). As this research is a single case study that is exploratory in nature, it is important to justify the transferability of the research as indicated by da Mota Pedrosa *et al.* (2012). So, the study follows Yin (2009) and da Mota Pedrosa *et al.* (2012) approach in ensuring the quality of the study. The following is the explanation of the four common tests listed by Yin (2009) for ensuring the quality of the research. The case study tactic to be used for each test and phase of research in which the tactic occurs is mentioned in Table 3.

Table 3: Case study tactics for the four test designs. Yin (2009)

Tests	Explanation	Case study Tactics	Phase of research in which tactic occurs
Construct Validity	Identifying correct operational measures for the concepts being studied	-Use multiple sources of evidence -Establish chain of evidence -Have key informants review draft case study report	Data collection Data collection Composition
Internal Validity	Seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships	-Do pattern matching -Do explanation building -Address rival explanations -Use logic models	Data analysis Data analysis Data analysis Data analysis
External Validity	Defining the domain to which a study's findings can be generalized	-Use theory in single-case studies -Use replication logic in multiple-case studies	Research Design Research Design
Reliability	Demonstrating that the operations of a study-such as the data collection procedures-can be repeated, with the same results	-Use case study protocol -Develop case study database	Data collection Data collection Composition

Construct Validity

To address construct validity, as suggested by Yin (2009), multiple sources of evidence like theory gathered from literature, interview, survey, documents like SCT project background, internal presentations, financial summaries were used. A total of twelve semi-structured interviews were conducted with people from SCO and SCD at IKEA. Also, a survey through Google forms was sent out to the people at IKEA to gather quantitative data that assist in validating the results obtained from interviews. Also, this established the chain of evidence to validate the constructs. From the planning stage until the final stage of concluding the study, drafts were made to update the progress of the thesis and were shared with the supervisors at IKEA & LTH to validate the approach and findings. The progress of the research was also presented to the examiner at LTH.

The drafts were reiterated multiple times based on their feedback, so that it is satisfactory from both academic and industry perspective.

Internal validity

As mentioned in table 3, internal validity can be performed by four methods namely pattern matching, explanation building, address rival explanations and using logic models. *Pattern matching* is the most desired validity technique in case study as highlighted by Yin (2009). The empirical patterns can be compared with the predicted ones to identify the similarities as suggested by Trochim (1989). For an exploratory case study, Yin (2009) suggests that the patterns of the variable must be established before data collection. *Explanation building* is similar to pattern matching but the procedure is much more difficult. It basically analyzes a case by building explanations about it. It is important to attend rival explanations as a part of the study. *Logic models* have been used frequently in the recent past in case study evaluation. The model stipulates a complex chain of events over time. The events are staged in repeated cause and effect patterns, whereby a dependent variable at an earlier stage becomes an independent variable (Yin, 2009). Apart from the ones mentioned in table 3, Yin (2009) also mentions the use of *Time-series analysis* in which the measurements are done over a time interval.

The thesis used explanation building and pattern matching as internal validity techniques, as they seem more relevant to the context of the study. The empirical evidence obtained from interviews, surveys, and documentations (both qualitative and quantitative) were compared against the theoretical evidence developed through the framework to generate validity of the study.

External Validity and Transferability

As suggested by Yin (2009), the external validity can be done by using theory for single case study, as in the case of this thesis, to make the results more generalisable. Considering the limited time frame of the study and also the availability of people at IKEA, the thesis complemented the interviews with a survey, so that the obtained results are more transferable. Also, the conceptual framework was developed with the notion that it should be applicable to any company undergoing transformation to SCT. Similarly, being in line with views of Yin (2009) on external validity and transferability, da Mota Pedrosa *et al.* (2012) indicated that transferability refers to the extent to which a study's findings apply to other contexts. It was enforced by documenting the underlying theoretical aim, unit of analysis, justification of case selection, and number of case studies used. These aspects are clearly mentioned in the methodological approach of this thesis.

Reliability

Using a case study protocol and documenting the case study by creating a database are the best approaches to improve the reliability of the study (Yin, 2009). This is an indication that the study can be conducted by anyone, and the same results can be achieved. This study is well documented following a proper case study protocol by making notes from interviews, maintaining a list of

interviewed people, preparing an interview guide and also creating a survey questionnaire that was validated by the supervisor at IKEA and also shared in the Appendix 3 and Appendix 4.

3. IKEA Overview

This chapter gives a background about IKEA as an organisation followed by the organisational structure of Inter IKEA Group and Range and Supply where the SCO and SCD functions are located. The data for the thesis are primarily gathered from these functions. The chapter finally explains about the IKEA way of working to give an overview of IKEA's supply chain activities.

3.1 The organisation

IKEA was founded by Ingvar Kamprad in 1943. From being a tiny Swedish business, selling through a mail-order catalogue, the company has become one of the most well-known home furnishing brands in the world. The global supply chain has around 217,000 IKEA co-workers around the world and serves 60 markets through 449 IKEA stores worldwide and e-commerce solutions. The Supply chain includes approximately 1100 suppliers delivering goods through 35+ Distribution Centers or directly to 433 stores and a growing number of Customer Distribution Centers (CDCs) and Central Parcel Units (CPUs).

Inter IKEA Systems B.V. is the IKEA franchisor who continuously develops the IKEA Concept and ensures its implementation in all markets. It allows IKEA to remain entrepreneurial and enables a scalable and dynamic value chain. It enables international growth and keeps the IKEA concept strong and consistent. Inter IKEA Systems B.V. is the owner of the IKEA Concept and worldwide IKEA franchisor as shown in Figure 8. The IKEA franchisees are authorised to market and sell the IKEA product range and operate IKEA stores and other sales channels around the world. Inter IKEA Systems B.V. has assigned other IKEA companies to develop range, supply and communication. IKEA of Sweden AB sets and develops the IKEA range, IKEA Supply AG manages purchasing and distribution and IKEA Communications AB produces IKEA communication. INGKA has been assigned by Inter IKEA Systems B.V. to carry out certain assignments for the IKEA franchise system, such as development of ecommerce, IT development, IT operations, etc. This structure helps to build a strong and vital IKEA Concept that the franchisees use to market and sell the IKEA range around the world (Inter IKEA systems B.V., 2020).

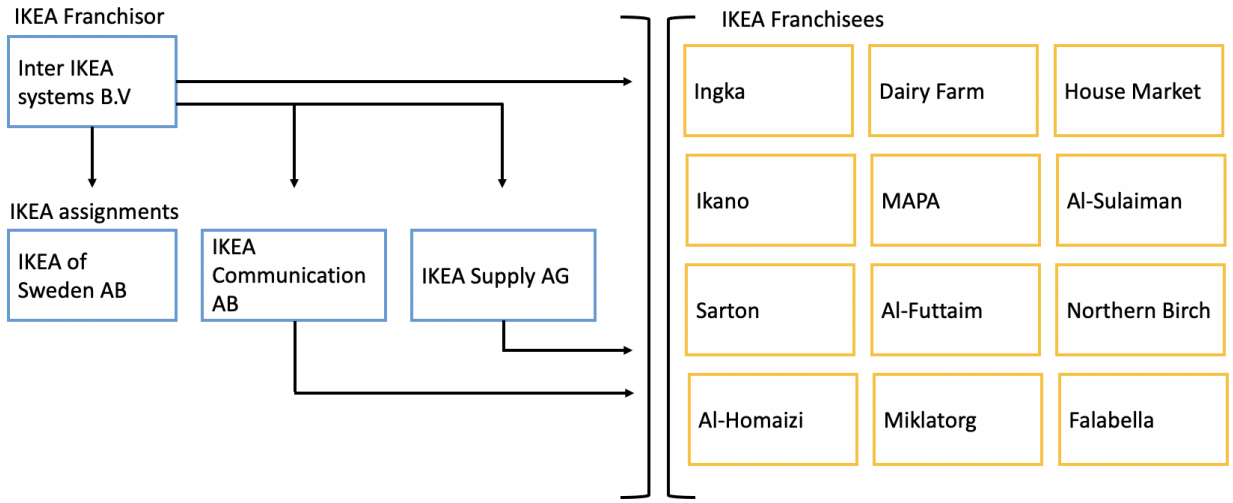

Figure 8: Organisational structure of IKEA's franchise system. Adapted from Inter IKEA group, 2020

3.2 Inter IKEA Group

The Inter IKEA Holding B.V is located in the Netherlands and is the holding company for Inter IKEA Group. It was established in 1989 and owned by Interogo Foundation. The Inter IKEA Group has 26,500 co-workers globally. Inter IKEA Group is the group of companies that connect IKEA franchisees with range development and suppliers and aligns the overall strategic direction of IKEA with a vision of creating better everyday life for the many people. As shown in Figure 9, The three core business areas of Inter IKEA group are Franchise, Range & Supply and IKEA Industry as shown in Figure 8. The main aim of Inter IKEA is to provide franchisees with best possible conditions for implementing and operating the IKEA concept and create a strong platform for future expansion and group (Inter IKEA systems B.V., 2018).

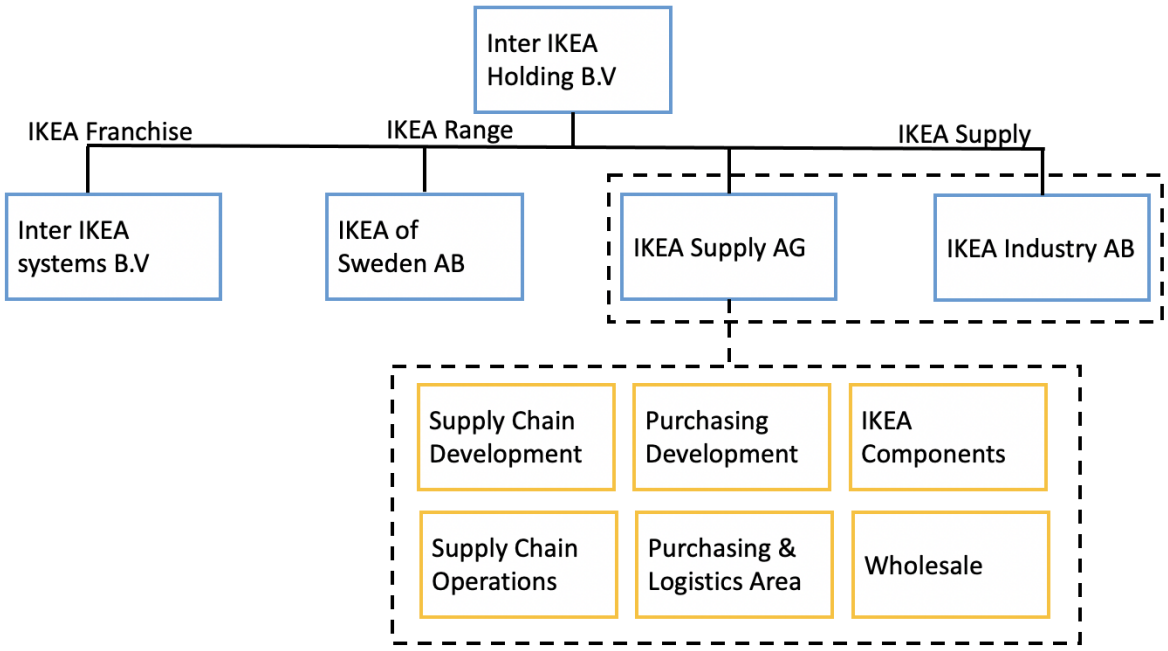

Figure 9: Organisational structure of Inter IKEA group and IKEA Supply. Adapted from Inter IKEA group, 2020

3.3 IKEA Range and Supply

The core business Range & Supply develops and supplies the global IKEA range. Range & Supply includes IKEA of Sweden AB, IKEA communication AB (who handle communications of the organisation), IKEA Supply AG, IKEA industry, related business and works throughout the whole value chain. IKEA product range including the home furnishing, food and home electronics are designed and developed by IKEA of Sweden. They are responsible for communicating to the customers and other IKEA organisations through the agency. IKEA Supply procures IKEA products and supplies them to the IKEA franchisees across the world. Range and Supply includes the six key areas (as shown in figure 9) Supply Chain Operations, Supply Chain Development, Purchasing Development, Purchasing & Logistics area, IKEA components, and Wholesale (Inter IKEA systems B.V., 2020).

3.4 Supply Chain Development (SCD)

SCD is responsible for leading the innovation and development agenda and securing end-to-end capabilities for an effective IKEA supply chain. They develop and manage all IKEA Supply core processes and related digital solutions by combining business knowledge with technology. One of their key responsibilities is to enable digital transformation throughout IKEA Supply. Take lead by keeping IKEAs Packaging and Identification agenda together. They also keep the IKEA innovation portfolio for supply chain and fulfilment together, across the IKEA ecosystem.

Identifying and describing opportunities for optimal total network, including planning and optimization of capacities in the IKEA value chain is a part of their assignment. They support implementation of SCD deliverables to the partners in the IKEA value chain and enable IKEA to have a competitive supply chain. Related to the SCD assignment, they take an active role and support continuous learning and development in all IKEA organisations. (Inter IKEA systems B.V., 2020).

Figure 10 gives an overview of the different areas in the SCD function. SCD Area Sourcing Manages and develops the sourcing of IKEA's range of process and related digital solutions. They deal with Sourcing and Price management, Supplier information, Supplier Lifecycle management, Quality deviation management. SCD Area Design & Planning aims at securing a supply chain design and planning to deliver agreed service levels at lowest total cost. They strive to secure optimal network design and are accountable to reach agreed Service Level by leading the inventory management agenda. The area develops and embeds solutions and processes related to planning. They are also leading the work within Supply Chain Design, Logistics Capacity Planning and S&OP, and Inventory Management through the Need Planning Function. This makes the four focus areas of SCD Area Design & Planning to be Sales & Demand Planning, Need Planning & Balancing, Capacity Planning and Network Design (Inter IKEA systems B.V., 2020)

SCD Area Execution manages and develops the processes and digital solutions related to order management, planning and management of deliveries, import and export of goods. They mainly deal with order, delivery & settlement, replenishment optimization, customs, IKEA lead time concept. SCD Execution also works to ensure that IKEA products are ordered and delivered with the right quality, accuracy and efficiency, in a compliant way, with the lowest possible environmental impact at lowest total logistics cost. They also work with freight settlement and close connection with the Order and Finance (Inter IKEA systems B.V., 2020)

SCD Area Intralogistics is responsible to establish, optimise, integrate, automate, and conceptualise logistical flows for any (IKEA) unit that has a logistic or fulfilment component. Services provided by the SCD Area Intralogistics include drive disruption, innovation & development, perform intralogistics reviews, lead and/or consult in intralogistics projects, provide an intralogistics learning offer, develop, run and maintain digital, and physical intralogistics components. Development and Innovation network, Technology, Packaging, and Identification are enabling functions of SCD. (Inter IKEA systems B.V., 2020)

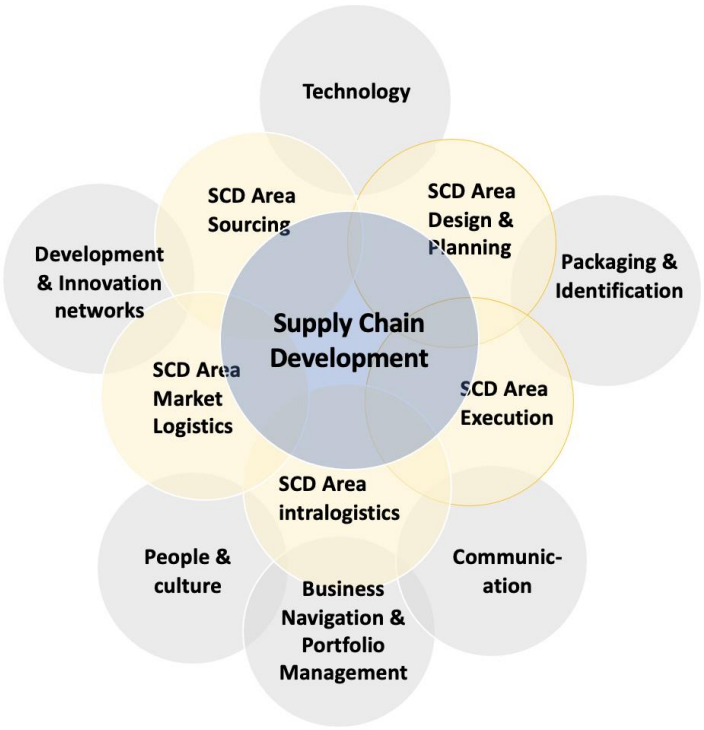

Figure 10: Organisation structure of Supply Chain Development. Adapted from Inter IKEA group

3.5 Supply Chain Operations (SCO)

SCO supplies products to their customers in a simple, affordable, sustainable, and excellent way. The main assignment of SCO is optimising replenishment solutions, defining physical goods flow capacity needs, managing the goods flow, leading, and securing supply quality, sourcing and developing transport & logistics capacities. SCO has 20 locations worldwide with more than 730 co-workers and dealing with more than 320 service providers. The team secures excellence in supply operational performance, and its further continuous development, in close cooperation and alignment with all relevant supply chain stakeholders. SCO operates in more than 30 Market operations forums with more than 300 co-workers. As shown in Figure 11, the four different areas are the supply operations team, flow capacity planning, flow performance and flow replenishment (Inter IKEA systems B.V., 2019).

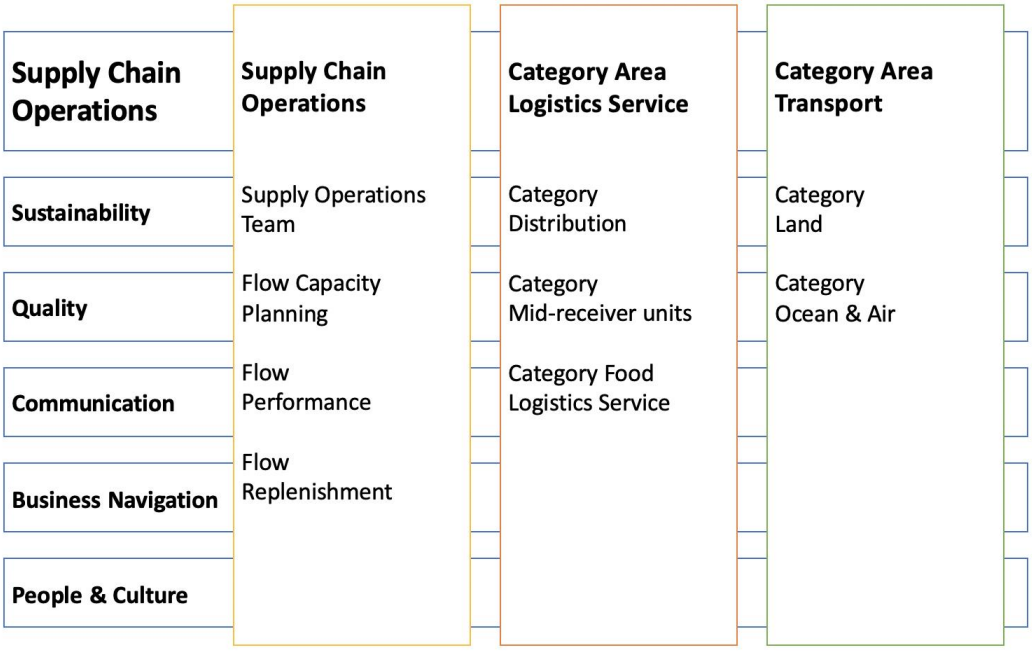

Figure 11: Organisation structure of Supply Chain Operations. Adapted from Inter IKEA group

The category area logistics service establishes, develops, and operates logistics service units owned or leased by Inter IKEA. The DSP agreements, under which INGKA operate their DCs, are managed by them. They also lead the cold chain transportation, warehousing, and logistics services for IKEA Food. Category area logistics interacts with 100 logistic units & Service providers and are around 110 co-workers. The three different areas under the prospect of this department are Category distribution, Category mid-receiver units (consolidation points, direct delivery points) and Category food logistics services (Inter IKEA B.V, 2019).

Category Area Transport procure the transport capacities and develop business together with Service Providers in all dimensions. They interact with 206 service providers and have around 145 co-workers. They mainly look at the flow responsibility of ocean main carriage, Carrier haulage for ocean flows and air shipments. The supporting functions of SCO are Sustainability, Quality, Communication, Business Navigation, People & Culture (Inter IKEA B.V, 2019).

3.6 IKEA Way of working

IKEA's way of working (figure 12) begins with identifying the needs for a better everyday life for the many and achieves its goal of a better everyday life for the many people. This is achieved through eight core processes like converting the needs into business plans, developing the product offer, developing products and service capabilities, plan and balance sales and supply, amplify IKEA's value, produce according to plans and requirements, provide products to the customers and finally convert visitors to happy customers. (Inter IKEA system B.V., 2019). The main

functional areas used in the study to collect data are SCD and SCO which represent two of the core processes namely “the plan and balance sales and supply (PBSS)” and “produce according to plan and requirement” respectively.

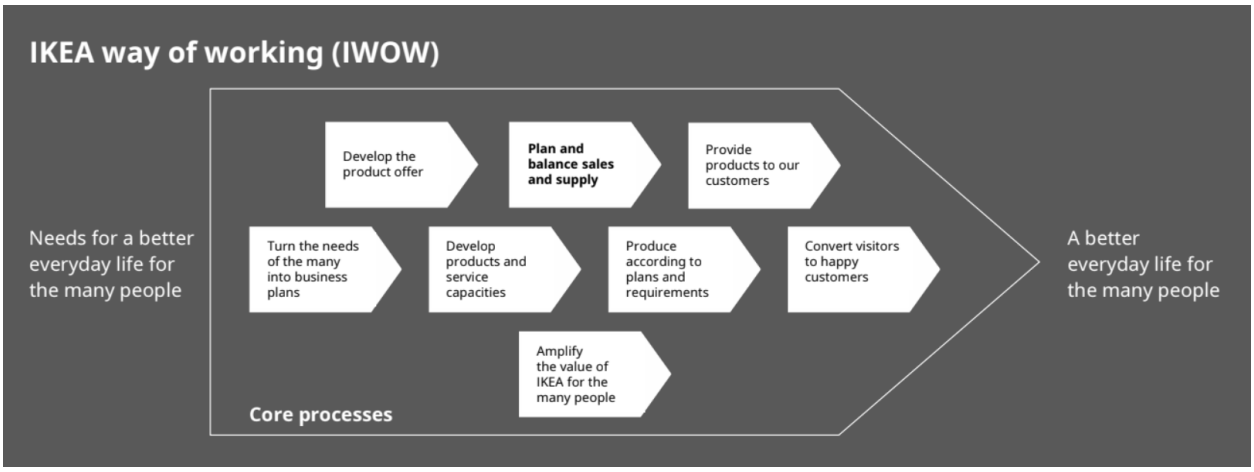

Figure 12: IKEA way of working. Inter IKEA systems B.V., 2019

The sub processes in PBSS are sales planning, demand planning, need planning, capacity planning and balancing of plans. The sales planning decides on what commercial actions to take, when and where in order to reach the sales goals. The demand planning process then quantifies what, where and when IKEA plans to sell to reach the sales goals. Quantifying what, where and when we plan to buy, store and replenish in order to reach sales goals and availability goals at lowest cost is ensured by the need planning team. The required capacity to achieve this is managed by the capacity planning process. Finally, the balancing of plans process finds the most efficient way to balance the supply plans and capacity plans to reach sales goals and availability goals at lowest cost. (Inter IKEA systems B.V., 2019)

The four core areas of SCO are plan, source, make and deliver. Four different plans are generated to execute the “produce according to plan” core process. They are (1) the S&OP and master planning to plan the activities in the supply chain. At this stage the supply chain requirements are calculated, then the supply chain resources are identified. The supply chain requirements and resources are balanced and finally the supply plan is established and communicated. This similar process is carried out in the rest of the planning areas namely (2) source planning, (3) production planning and (4) delivery planning (Inter IKEA systems B.V., 2019).

Then the sourcing of the products is done by scheduling product deliveries, receiving the product, verifying the product, transferring it and authorizing the payment to the supplier. Once the products are sourced, it is produced by scheduling production activities and issuing material. The product is then produced and tested, sometimes it is outsourced. Then comes the packaging and the release of the product. The final step in this plan, source, make process in SCO is the delivery. The steps

in the delivery process are Receiving and confirming order, receiving product from source and make, consolidating orders and building loads, picking, and packing the product, loading the vehicle and generating the shipping document and at last invoicing the product. (Inter IKEA systems B.V., 2019)

SCD plans all the activities starting from sales plan to delivering the product and SCO executes these plans through different activities and delivers the product to the retailers, who sell and manage the product at the IKEA stores. This way SCD and SCO are closely connected and communicate and share information on a regular basis for the execution of their works.

4 Theoretical Framework

This chapter highlights the theoretical findings on the Supply Chain Transparency from the literature review conducted for the study. Firstly, the varying complexity of supply chains are analysed to understand IKEA's supply chain. Secondly, SCT defined in different perspectives are studied and one definition is chosen which perfectly in line with the scope and purpose of the study. Lastly, benefits and barriers of SCT and different SCT frameworks are examined.

4.1 Supply Chain

Mentzer *et al.* (2001) defined supply chain as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finance and/or information from a source to a customer. Based upon this definition, three degrees of supply chain complexities were identified: 1) direct supply chains, (2) extended supply chains and (3) ultimate supply chains as shown in figure 13.

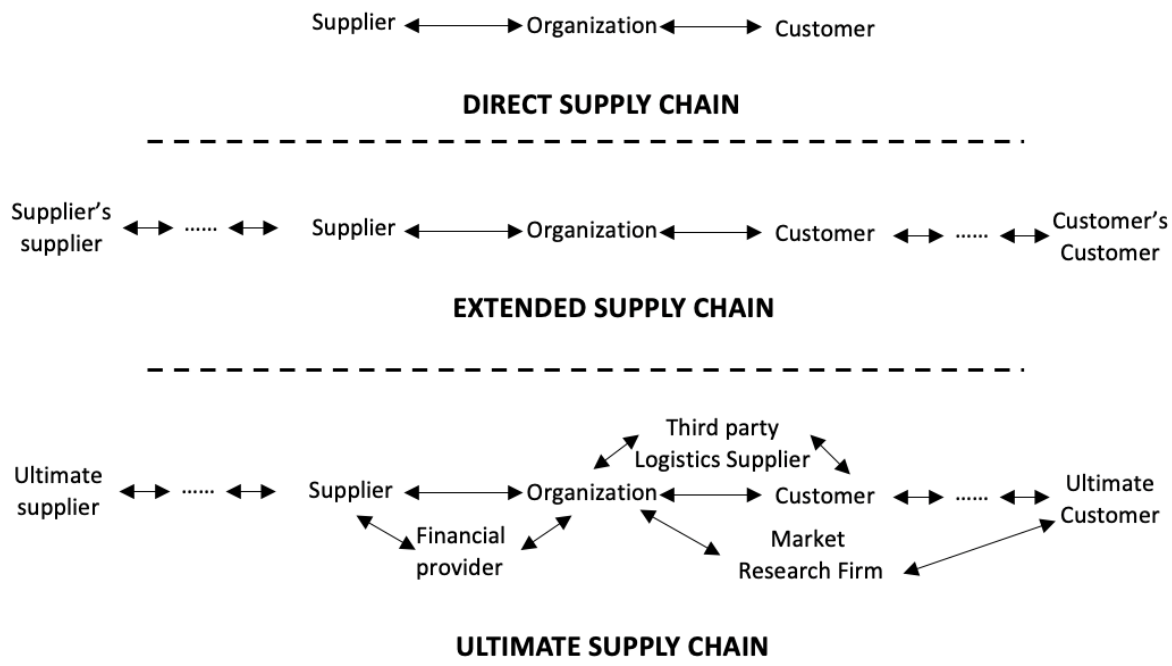

Figure 13: Types of channel relationships (Mentzer et al., 2001)

Firstly, a direct supply chain consists of a company, a supplier, and a customer involved in the upstream and/or downstream flows of products, services, finances, and/or information. Secondly, an extended supply chain includes suppliers of the immediate supplier and customers of the immediate customer, all involved in the upstream and/or downstream flows of products, services,

finances, and/or information. Finally, an ultimate supply chain, includes all the organizations involved in all the upstream and downstream flows of products, services, finances, and information from the ultimate supplier to the ultimate customer.

IKEA's supply chain is a perfect example of the ultimate supply chain involving multiple stakeholders performing their functions along the supply chain. Mentzer *et al.* (2001) identified the ultimate supply chains as the most complex in nature highlighting various functions which can be performed in the supply chain.

Mentzer *et al.* (2001) identified Supply Chain Management as a management philosophy and Cooper *et al.* (1997) defined SCM as a set of beliefs that each firm in the supply chain directly and indirectly affects the performance of all the other supply chain members, as well as ultimate, overall supply chain performance (Cooper *et al.*, 1997)

Mentzer *et al.* (2001) suggested various activities necessary to implement a SCM philosophy as shown in table 4. Out of the seven different SCM activities suggested by the authors to implement the SCM philosophy, mutually sharing information among supply chain members has been identified as an important requirement to implement a SCM philosophy, especially for planning and monitoring processes. The Global Logistics Research Team at Michigan State University (1995) defines information sharing as the willingness to make strategic and tactical data available to other members of the supply chain.

Therefore, IKEA's initiative of implementing Supply Chain Transparency will help them provide value to their customers, enable real time decision making, achieve better coordination and will result in reduced uncertainty between supply chain partners and enhanced performance.

Table 4: SCM activities (Mentzer et al., 2001)

SCM Activities
1. Integrated Behavior
2. Mutually sharing information
3. Mutually sharing risks and rewards
4. Cooperation
5. The same goal and the same focus on serving customers
6. Integration of processes
7. Partners to build and maintain long-term relationships

4.2 Supply Chain Transparency

This section gives insights on definitions of SCT and different SCT concepts, for example, (i) types of transparency, (ii) dimensions of transparency, (iii) facets of transparency, (iv) conceptualization of transparency, (v) antecedents of transparency and (vi) network mechanisms of information sharing. Finally, a chosen definition has been explained which aligns with the purpose of the study.

4.2.1 Definitions of SCT

Supply chain transparency has been defined in literature taking into consideration the different dimensions and perspectives as can be seen in Table 5. Therefore, all the definitions were carefully studied and compared to select one final definition which is in line with the research purpose and fits the research interest.

For example, Lamming *et al.* (2001 p. 4) defines transparency from a supplier relationship perspective. Eggert & Helm (2003 p. 101) laid their explanation from a relationship point of view to define transparency. Van Dijk et al. (2003) on the other hand took a systems perspective and defined transparency to identify the common aspects and elements of transparency. Hofstede *et al.* (2004) defined transparency from a net chains perspective and highlighted the importance of having access to the information requested by the supply chains stakeholders without loss, delay, noise and distortion.

Van Dijk *et al.* (2003) took a system perspective and identified different dimensions and characteristics of supply chain transparency from an observer's point of view. As per the authors, if the observer has the information required, accordingly the system could be declared transparent as per its views. Although the system also controls the level of transparency, the SCT totally depends on the ability and willingness of the system to share information. The following characteristics, entailed in the SCT definition defined by them, are:

1) Transparency refers to a system, a net chain, a relationship and a partner.
2) Transparency is objective and interpreted by the observer of the system, related to the understanding and access of stakeholders and to an individual's subjective perception.
3) The level of transparency can be affected by the observed system and stakeholders are granted access to information and the actual level of transparency is determined by the observer of a system.

Table 5: Defining Supply Chain Transparency

Definitions of Supply Chain Transparency	Authors
The ability to 'see through' and to share information that is usually not shared between two business partners	Lamming *et al.* (2001 p. 4)
An individual's subjective perception of being informed about the relevant actions and properties of the other party in the interaction	Eggert & Helm (2003 p. 101)
Transparency is dynamically constructed in the interaction between system and observer" and the level of transparency continuously changes depending on the observer's preferences, the ability and willingness of the system to share information.	Van Dijk *et al.* (2003)
Disclosure of information about supplier names, sustainability conditions at suppliers, and buyers purchasing practices	Egels-Zandén *et al.* (2015)
Supply chain transparency can be a way to make voluntary corporate supply chain commitments (e.g., codes of conduct and ethical sourcing standards) more meaningful	Doorey (2011)
A part of the process of recognition of responsibility on the part of the organisation for the external effects of its actions and equally part of the process of transferring power to external stakeholders.	Martinez and Crowther (2008)
A way to transfer power from the firm to its stakeholders by reducing the information asymmetry between these actors and allowing stakeholders to make informed evaluations of the firms' products.	Martinez and Crowther (2008) Chapman (1995) Egels-Zandén *et al.* (2015)
Transparency of a netchain is the extent to which all the netchain's stakeholders have a shared understanding of, and access to, the product-related information that they request, without loss, noise, delay and distortion.	Hofstede *et al.* (2004)
A complete and detailed overview of all market conditions that is available to all market partners at the same time and that provides buyers and customers with information about products and prices	Deimel *et al.* (2008)
The extent to which a stakeholder perceives an organization provides learning opportunities about itself.	Parris *et al.* (2016)

4.2.2 SCT Concepts

This section describes the types of transparency, dimensions of transparency, facets of transparency, conceptualisation of SCT, Antecedents of transparency and Network mechanism of information sharing.

(i) Types of transparency

Hultman and Axelsson (2007) presented a typology and derived an outline of four types of transparency namely cost transparency, supply transparency, organizational transparency and technological transparency and extended these by adding three additional facets being degree of transparency, direction of transparency and distribution of transparency, as shown in figure 14.

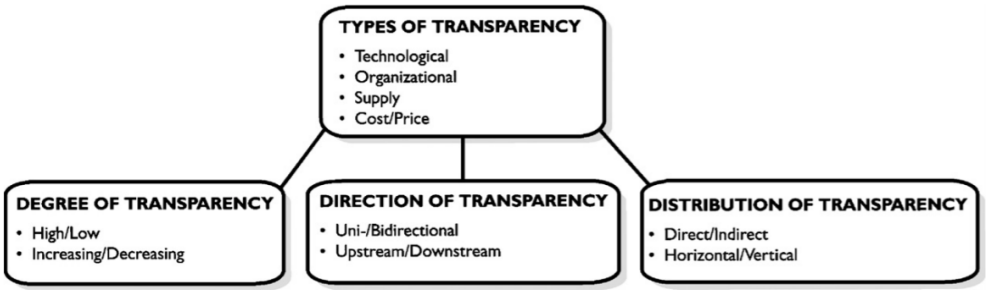

Figure 14: Typology of transparency (Hultman and Axelsson, 2007, p.629)

Through digitalisation and exploitation of new technologies organizations can increase transparency in different dimensions. The four types of transparency as highlighted by Hultman and Axelsson (2007) are explained further in figure 15 below, describing the importance and relevance of different transparency.

Cost Transparency	Supply Transparency
• Enables firm's ability to achieve effective sourcing, leading to increased transparency with respect to price. • Information on costs as well as prices and their flows becomes transparent.	• Enables firm's ability to create transparency in various flows of products and materials between the buying firm and the supplying firm. • Supply transparency enables track and trace service of logistics firms, which allowing customer a higher degree of visibility.
Organisational Transparency	**Technological Transparency**
• Enables firm's ability to expand the relational horizons in a business relationship. • Organisational transparency enables the flow of information concerning who-does-or-can-do-what and who-knows-or-might-know-what proving line of visibility.	• Enables firm's ability to understand how it may extend technological horizons and using technology with other business partners.

Figure 15: Four types of transparency (Hultman and Axelsson, 2007)

(ii) Dimensions of transparency

Egels-Zandén *et al*. (2015) defined transparency taking into consideration three dimensions of transparency: (i) traceability dimension, (ii) sustainability dimension and (iii) purchasing practice dimension and analysed how three underlying trade-offs, i.e., threat vs. collaboration, standardization vs. differentiation, and means vs. ends, shape a firm's transparency outcomes.

(iii) Facets of Transparency

The following are the facets of transparency:

(1) **Degree of transparency**- The first facet of transparency is degrees of transparency. As defined by Lamming *et al.* (2001), there are different degrees of transparency like: transparent, translucent and opaque. In most of the scenarios, despite being completely transparent, relationships may be translucent in some respects, information may be only partially shared or opaque, or information may not be shared at all.

(2) **Direction of transparency**- Hultman and Axelsson (2007) identified direction of transparency as an important facet and highlighted that the flow of information is either bidirectional or unidirectional between stakeholders. They argued that in many scenarios even when the information flow is bidirectional the sharing of information need not be reciprocal, and many relationships have a stronger and more powerful party that demands visibility without any reciprocity. This in turn affects information sharing and also could impact collaboration between different stakeholders.

(3) **Distribution of transparency**- As suggested by Barratt (2004) there are two dimensions of supply chain collaboration i) vertical collaboration which includes collaboration between suppliers and customers, ii) horizontal collaboration which includes collaboration with competitors and other supply chain actors, e.g. in sharing manufacturing capacity. Vertical collaboration is more common and easier to implement than horizontal collaboration, but they are not exclusive ones. Supply chains that achieve both vertical and horizontal collaboration would gain significant business benefit. This aspect of collaboration can also be related to SCT (Hultman and Axelsson, 2007) where information exchange can happen vertically and horizontally. This concept can be applied within an organisation where information exchange within a function and between functions can be considered horizontal and vertical breaking the silos.

(iv) Conceptualisation of SCT

Parris *et al.* (2016) highlighted that transparency is majorly discussed in terms of an organization's "openness" relative to sharing information and identified how transparency is conceptualized. They derived a definition of supply chain transparency conceptualizing transparency in terms of stakeholder perceptions. A conceptual framework was developed describing when transparency is

especially important, what organizations can do to be more transparent, and the potential benefits of transparency (figure 16). The identified framework by Parris et al. (2016) served as an inspiration for the thesis and the benefits could be derived from the framework. They also conceptualised transparency as:

1. Openly and freely sharing information
2. An ability of consumers to see through a deception
3. Understanding of others' intentions and goals
4. Openness within organizations
5. Sharing what is not usually shared
6. Being informed
7. Having a shared understanding
8. Being open to giving and receiving feedback
9. Being forthright, especially regarding motives and reasons behind decisions
10. Freely volunteering information

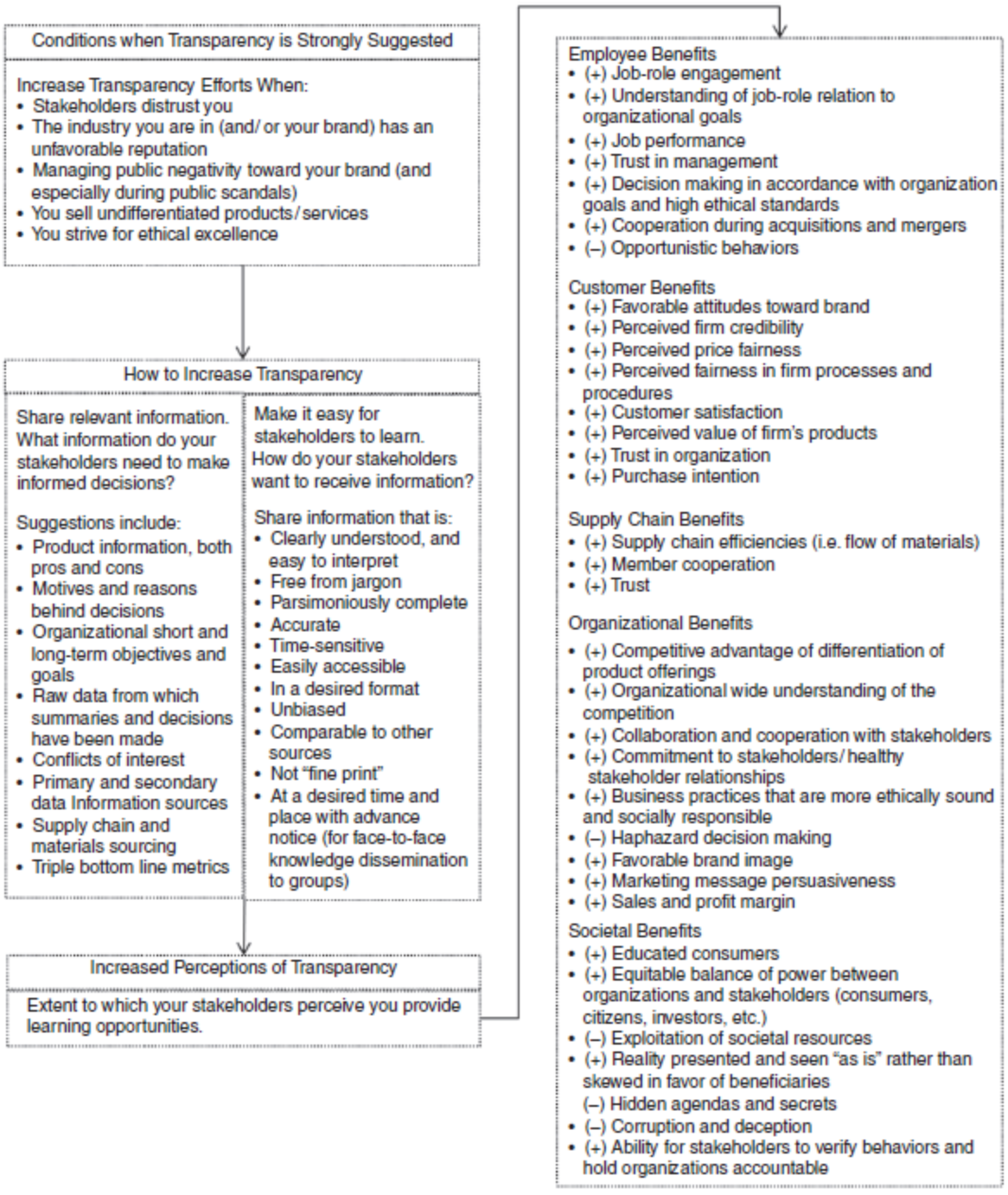

Figure 16: The transparency framework proposed by Parris et al. (2016, p.238)

(v) Antecedents of Transparency

Deimel *et al.* (2008) suggested that degrees of transparency vary remarkably between different supply chains and explained that while measuring these differences in supply chains the transparency is a latent variable that cannot be observed and measured directly. They used two approaches to specify latent constructs, namely, a reflective specification in which the construct is the cause of the indicators (observable variables) and in contrast, a formative specification in which

the observable indicators cause the latent construct. Then the important antecedents were identified, and authors argued that the barriers to transparency arise due to structural and behavioral factors in supply chains. Structural determinants of transparency reflect supply chain, product and transaction characteristics, whereas behavioral determinants include cultural aspects. To measure the observable effects the authors looked at performance indicators and the perceived transparency as shown in figure 17.

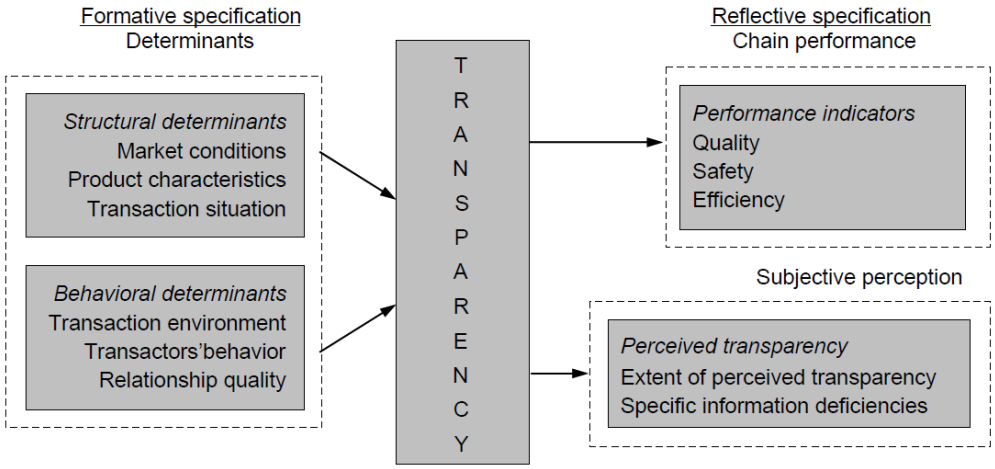

Figure 17: Formative and reflective speculation of transparency- A theoretical framework by Deimel et al. (2008, p.22)

(vi) Network mechanisms of information sharing

Hofstede *et al.* (2003) highlights that transparency affects many stakeholders and as it implies information exchange between various stakeholders, these different perspectives should be addressed and reconciled. They suggested transparency should enable connectivity or being able to react to one another's processes - as e.g., in collaborative planning. According to Hofstede (2003), the concept of transparency pertains to only the information aspect of a netchain (defined in table 6 below) and therefore the information flow in a netchain is dependent on the organisation of that netchain as a whole. Furthermore, three network mechanisms having different information exchange patterns associated with them were presented as shown in figure 18.

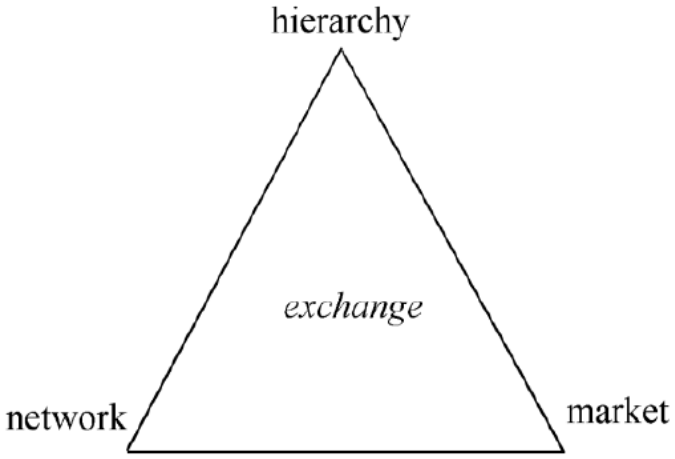

Figure 18: The different network mechanisms (Hofstede, 2003, p.24)

1) In a market, the actors have no obligations to each other apart from exchanging things against an agreed price. Information has its price and withholding it can be made to have its price. According to economic theory, withholding information is detrimental to a market because it inhibits pricing.
2) In a hierarchy, the boss and inferior, in economic parlance the principal and agent, have asymmetric relationships. The principal pays the agent to provide some service but may want to check on him if he does not trust his ability or willingness to perform the task. The principal then needs to know about the agent's behaviour, but the agent needs not know about the principal.
3) Fully embedded networks contain only embedded ties. In a fully embedded network, norms about how friends behave to one another regulate behaviour, not economics alone. Actors will provide one another with goods or information, anticipating one another's needs, knowing that some time they will receive something in return if they need it. Fully embedded networks have low transaction costs because no checking is needed. Implicit trust takes the place of checking. This implies that it takes a lot of investment to create them, though not in the financial sense. It takes common understanding of the practices in the network, and this in turn may take a lot of time. And such networks are high-trust systems, and building trust takes years.

4.2.3 Chosen definition of SCT

The definition of transparency by Hofstede *et al.* (2003) is a perfect fit for the purpose of the study. The definition is as follows: "Transparency of a netchain is the extent to which all the netchain's stakeholders have a shared understanding of, and access to, the product-related Information that they request, without loss, noise, delay and distortion" Hofstede *et al.* (2003). Hofstede *et al.* (2003) introduced a term netchain defined as "A directed network of actors who co-operate to bring a product to customers" and Mentzer *et al.* (2001) defined supply chain as a set of three or

more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finance and/or information from a source to a customer. Therefore, comparing the two definitions it is clear that Hostefe *et al.* (2003) introduced the term netchain which is an alternate term for supply chain.

Hofstede *et al.* (2003) have also defined the keywords of the definition that will be included in the study for clarity as shown in table 6.

Table 6: Explanation of keywords as defined by Hofstede et al. (2003, pp.18-19)

Keywords	Explanation
Netchain	A directed network of actors who co-operate to bring a product to customers
Netchain actor	An organization, usually a producer, distributor, processor or retailer
Stakeholder	A netchain actor, or an institutional actor with some stake in the netchain, or a customer;
A shared understanding	A precondition for transparency that involves sharing or seamless translation of language, meaning and standards at many levels like shared language, shared interpretation of key concepts, shared standards for product quality, shared reference information models and shared technological infrastructure
Product	A product, possibly an information product, or a service
Product-related information	It includes 'technical' attributes such as information about raw materials used and production process attributes. It also includes 'value-related' attributes such as labour circumstances or environmental impacts
Loss	An actor does not transmit information. It affects completeness.
Noise	An actor adds non-relevant data to the information. It affects relevancy. This is a subjective notion. Noise can point to lack of agreement among actors as to what information is relevant
Delay	An actor delays information. It affects timeliness.
Distortion	An actor changes the information either by accident or on purpose, or fails to update it if the product changes, so that the information no longer actually describes the product. It affects validity.

4.3 Supply Chain Transparency Benefits

Several researchers have identified benefits of supply chain transparency from their perspective of the research. Lotfi *et al.* (2013) in their study investigated the effectiveness of information sharing in supply chain management, in order to increase the efficiency of the organizational performance and highlighted the following benefits of information sharing:

- Inventory reduction and efficient inventory management
- Cost reduction
- Increasing visibility (significant reduction of uncertainties)
- Significant reduction or complete reduction of bullwhip effect
- Improved resource utilization
- Increased productivity, organisational efficiency, and improved services
- Building and strengthening social bonds
- Early problem detection
- Quick response
- Reduced cycle time from order to delivery
- Better tracking and tracing
- Earlier time to market
- Expanded network
- Optimized capacity utilization

Fawcett *et al.* (2009) examined the development and competitive influence of a supply chain (SC) information-sharing capability over time. According to their analysis, establishing both (i) the connectivity that enables rapid, low-cost information exchange and (ii) the willingness to share sensitive decision-making information is necessary, to achieve high levels of SC coordination and collaboration. This will deliver substantial competitive benefits as listed below:

- Unique Products & Services
- Faster R&D Cycle Times
- Superior Quality of products and services
- Cost Competitiveness
- Shorter Order Cycles
- Flexible Customer Response
- Enhanced Delivery Performance
- Better Asset Management
- Increased Cash-to-Cash Velocity
- Superior Channel Relationships

SCT could bring multiple benefits to the supply chain. To begin with, it could enable better decision making with supply chain information (Auramo *et al.*, 2005, Barratt, 2003, Barratt &

Oke, 2007, Handfield & Nichols, 2002, Parris *et al.*, 2015, Maskey *et al.*, 2019, Kembro and Selviaridis, 2015) and reduce/eliminate bullwhip effect (Barratt & Oke, 2007, Kaipia and Hartiala, 2006, Yu *et al.*, 2001, Maskey *et al.*, 2019, Kembro and Selviaridis, 2015). As explained by Kembro and Selviaridis (2015), generally supply chains are susceptible to the bullwhip effect which increases uncertainty in the order fulfilment processes. This decreases the efficiency for all supply chain partners especially when companies allocate sub-optimum capacities and carry excessive inventory levels. Information sharing across several supply chain tiers can address this issue, eliminating the bullwhip effect through reducing demand uncertainties. This results in well-informed business decisions for the members of the extended supply chain. Parris *et al.* (2015) also highlighted that SCT efforts drive less haphazard decision making and enables more ethically sound and socially responsible decision making which would in turn help in improved responsiveness, supply chain performance and competitiveness (Barratt & Oke, 2007, Deimel *et al.*, 2008, Hofstede *et al.*, 2004, Fawcett *et al.*, 2009, Caridi *et al.*, 2014).

SCT enables collaboration within supply chain partners (Auramo *et al.*, 2005, Deimel *et al.*, 2008, Parris *et al.*, 2015, Hultman and Axelsson, 2006, Maskey *et al.*, 2019) and triggers immediate corrective actions relating to flow of products and materials firm (Hellström, 2006, Min *et al.*, 2005, Hultman and Axelsson, 2006). As per Min *et al.* (2005) shared information is an essential ingredient of day-to-day operations as well as more strategic collaborative activities. Information covering a wide range of activities is shared among various partners. Shared information provides a common base for partners and triggers the flows of products, services, funds, and feedback between the partners.

According to Hofstede *et al.* (2004), SCT takes a wider stance than just tracking and tracing. It connotes honesty: anybody can see through what is produced and how it is done. Transparency is aimed not only at businesses in the net chain but also at other stakeholders, for instance government bodies or firms' shareholders. The public at large, both as customers and as citizens, also comes into focus here. Parris *et al.* (2015) also emphasized that transparency implies that organizations will go the "extra mile" to ensure stakeholders are well-informed (by providing relevant, effortless learning opportunities), and research suggests that an organization's extra effort is rewarded. Transparency has the potential to benefit an organization's employees, customers, and partners, as well as entire societies. Therefore, it not only enables better coordination of physical movements within the supply chain through real time tracking and tracing (Barratt and Oke, 2007, Hellström, 2006, McFarlane and Sheffi, 2003, Hofstede *et al.*, 2004, Fawcett, Wallin and Allred, 2009, Hultman and Axelsson, 2006, Kembro and Selviaridis, 2015) but also improves customer service elements and customer satisfaction (Auramo *et al.*, 2005, Eggert & Helm, 2001, Ross *et al.*, 2004, Hofstede *et al.*, 2004).

Kembro and Selviaridis (2015) emphasized that information sharing is critical for improving the performance of supply chains and identified numerous suggested benefits range from relatively

immediate and concrete aspects, such as improved forecasts and reduced inventory levels, to more long-term potential benefits, such as coordinated processes and enhanced planning in the supply chain. They argued that sharing information across several supply chain tiers could result in well-informed business decisions for the members of the extended supply chain and pinpointed several benefits of information sharing at three organizational levels namely tactical, operational and strategic as shown in table 7 below.

Table 7: Benefits of sharing information at three organisational levels: tactical, operational and strategic (Kembro and Selviaridis, 2015)

Operational	Supporting the daily physical flow of products through the flow of products through the supply chain
	Optimised utilisation of assigned capacity
Tactical	Attempt to predict and match supply with demand in distribution to better synchronise production and logistics capacities
	Improved planning of production, reserved capacity, and scheduling of labour
	Improved production plans resulting in reduced inventory levels, reduced tied up capital and a mitigated risk of depleted products
Strategic	Strengthened relationship and increased trust between partners
	Shared view of the future and potential growth to ensure that sufficient production capacity is available
	Minimised risk of facing a stock-out in any market
	Increased productivity by minimising risk of breakdowns
	Shared view of the future and potential growth to ensure that sufficient production capacity is available

According to Parris *et al.* (2015), organizations that are internally and externally transparent are said to have a greater competitive advantage and new business opportunities. Transparency enhances organization-wide understanding of the competition, which allows organizations to improve differentiation of their product offerings to targeted consumers. This benefit is further facilitated by greater collaboration and cooperation with stakeholders. Transparent organizations are also generally more committed to stakeholders compared to non-transparent organizations, thereby leading to healthier stakeholder relationships. Deimel *et al.* (2008) highlights that transparency means clearness and lucidity and implies honesty and openness and elaborated on

various aspects of transparency like such as consumer trust due to improved access to information, quality assurance, market orientation, and product and process innovations.

4.3.1 The key benefits of SCT

Several researchers have identified multiple benefits of SCT from their perspective. Therefore, to capture all the benefits of SCT, twenty-three different research articles were studied, and the mentioned benefits were listed and mapped to their specific authors using excel checklist (Appendix 1). Table 8 below summarizes the key benefits of SCT.

Table 8: Benefits of SCT

Category	Benefits	Authors
Organisation	Better decision making with total supply chain information	Auramo *et al.*, 2005, Barratt, 2003, Barratt and Oke, 2007, Handfield & Nichols, 2002, Parris *et al.*, 2016, Maskey *et al.*, 2019, Kembro and Selviaridis, 2015
	Increasing visibility (significant reduction of uncertainties)	Lofti *et al.*, 2013
	Trigger immediate, corrective actions relating to flow of products and materials firm	Hellström, 2006, Min *et al.*, 2005, Hultman and Axelsson, 2006
	Reduce transportation costs	Ross *et al.*, 2004
	Eliminate bullwhip effect	Barratt and Oke, 2007, Kaipia and Hartiala, 2006, Yu et al., 2001, Maskey et al., 2019, Kembro and Selviaridis, 2015
	Reduce forecast error	Karkkainen, 2003
	Improves agility of the supply network	Auramo *et al.*, 2005
	Improves customer service elements and customer satisfaction	Auramo *et al.*, 2005, Eggert and Helm, 2001, Ross *et al.*, 2004, Parris *et al.*, 2016, Hofstede *et al.*, 2004
	Better coordination of physical movements within the supply chain through real time tracking	Barratt and Oke, 2007, Hellström, 2006, McFarlane and Sheffi, 2003, Parris *et al.*, 2016, Hofstede *et al.*, 2004, Fawcett *et al.*, 2009, Hultman and Axelsson, 2006, Kembro and Selviaridis, 2015, Lofti *et al.*, 2013
	Improved responsiveness	Barratt and Oke, 2007, Caridi *et al.*, 2014, Hofstede *et al.*, 2004,
	Improved performance and competitiveness in supply chain	Parris *et al.*, 2016, Deimel *et al.*, 2008, Fawcett *et al.*, 2009
	Improved resource utilization	Lofti *et al.*, 2013
	Optimized capacity utilization	Lofti *et al.*, 2013
	Shorter lead-times	Lofti *et al.*, 2013, Fawcett *et al.*, 2009, Caridi *et al.*, 2014, Handfield and Nicholas, 2002
	Improve inventory management	Lofti et al., 2013, Karkkainen, 2003, Kaipia and Hartiala, 2006, Hellström, 2006, McFarlane and Sheffi, 2003, Ross *et al.*, 2004, Fawcett *et al.*, 2009, Caridi *et al.*, 2014, Kembro and Selviaridis, 2015, Lofti *et al.*, 2013
	Improved planning and replenishment capabilities/ order fulfillment	Barratt, 2003, Barratt and Oke, 2007, Kembro and Selviaridis, 2015, Hofstede *et al.*, 2004, Fawcett *et al.*, 2009
	Create competitive advantage and new business opportunities	Parris et al., 2016
	Increased productivity, organisational efficiency and improved services	Lofti *et al.*, 2013
	Increased stakeholder value through revenue growth, asset utilization and cost reduction	Karkkainen, 2003, Handfield and Nicholas, 2002, Hultman and Axelsson, 2006, Caridi et al., 2014, Maskey et al., 2019, Kembro and Selviaridis, 2015
	Break organizational barriers	Handfield and Nicholas, 2002
	Enable detection of potential problems early-on	Montgomery *et al.*, 2002, Lofti *et al.*, 2013
	Create joint alignments improving customer value delivery process/expand the relational horizons in a business relationship.	Min *et al.*, 2005, Hultman and Axelsson, 2006, Lofti *et al.*, 2013
	Faster R&D cycle times	Fawcett *et al.*, 2009
	Improved quality of products	Barratt and Oke, 2007, Parris *et al.*, 2016, Deimel *et al.*, 2008
	Earlier time to market	Lofti *et al.*, 2013
	Better asset management	Fawcett *et al.*, 2009
	Increased cash-to-cash velocity	Fawcett *et al.*, 2009
	Consumer trust	Deimel *et al.*, 2008
	Product and process innovation	Barratt, 2003, Deimel *et al.*, 2008, Fawcett *et al.*, 2009
	Openness and Communication	Deimel *et al.,* 2008, Trienekens *et al.,* 2011, Parris *et al.,* 2016
People	Enable collaboration with supply chain partners	Auramo *et al.*, 2005, Hultman and Axelsson, 2006, Parris *et al.*, 2016, Deimel *et al.*, 2008, Maskey *et al.*, 2019
	Job-role engagement	Parris *et al.*, 2016
	Understanding of job-role relation to organisational goals	Parris *et al.*, 2016
	Job performance	Parris *et al.*, 2016
	Trust in management	Parris *et al.*, 2016, Deimel *et al.*, 2008
	Decision making in accordance with organisation goals and high ethical standards	Parris *et al.*, 2016, Maskey *et al.*, 2019, Kembro and Selviaridis, 2015

4.4 Supply Chain Transparency Barriers

Despite the numerous benefits of SCT, several researchers have highlighted organisational barriers, people specific barriers, barriers due to supply chain characteristics and technological barriers that can impede the SCT implementation in an organisation. Kembro *et al.* (2017) through the Delphi study identified the barriers in enabling information sharing due to the information utilization, technology, the power structure, business processes, legal aspects and organisational culture as shown in figure 19.

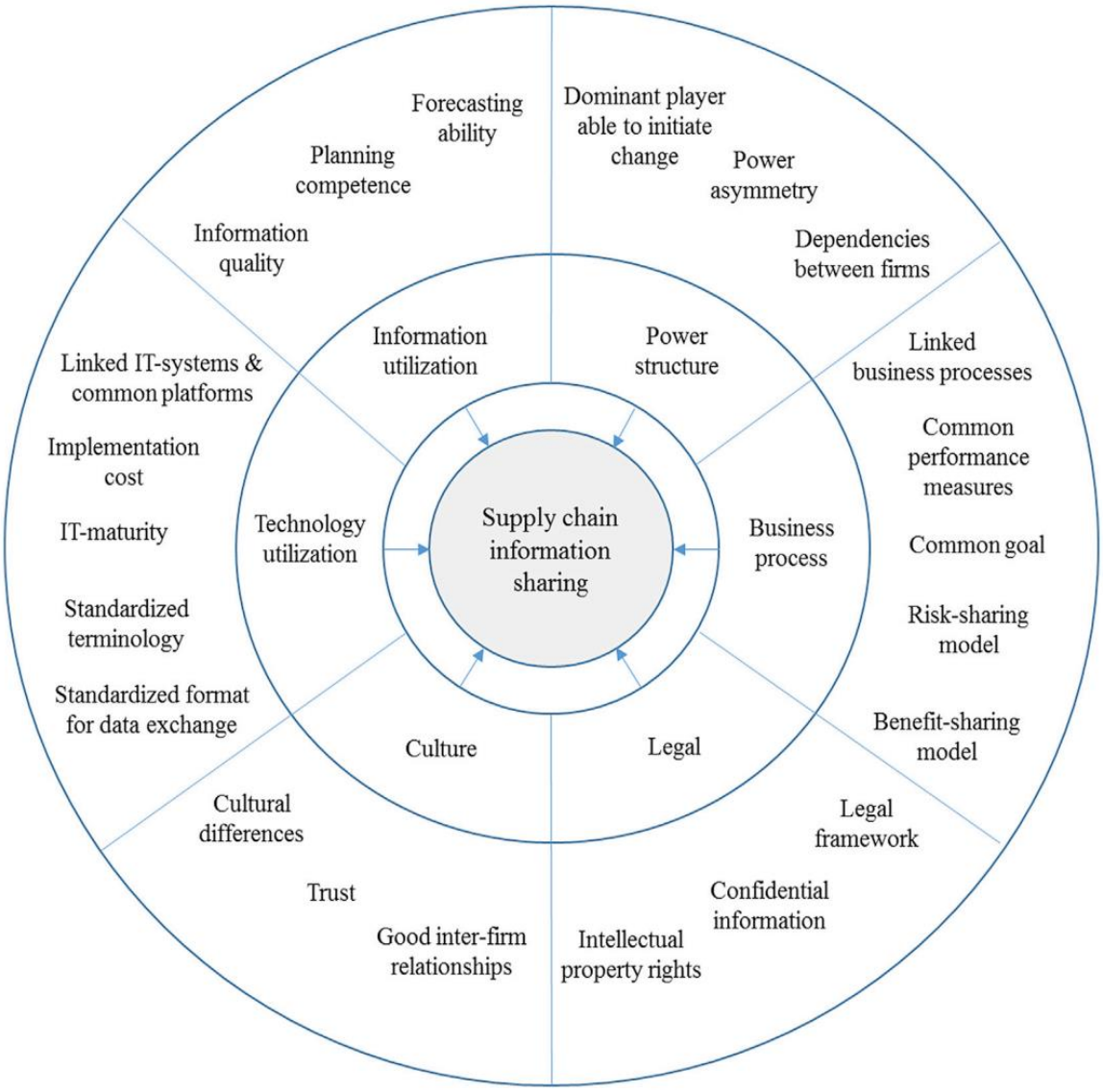

Figure 19: Identified barriers to information sharing in the multi-tier supply chains (Kembro et al., 2017, p.81)

Pujara *et al.* (2011) identified information sharing barriers impeding the information sharing within the supply chains. The identified barriers are due to the organisation structure, technology, supply

chain integration, lack of trust and organisational culture. The authors identified top management commitment and vision as one of the most important information sharing barriers and listed following barriers to information sharing:

- Lack of top management commitment & vision
- Lack of strategic planning
- Lack of information flow
- Lack of organization structure
- Lack of culture
- Lack of trust
- Lack of understanding of cost sharing benefits
- Lack of SC measure
- Lack of SC integration guidelines
- Poor understanding of SCM concepts
- Lack of IS/IT deficiencies

According to the authors, information sharing refers to activities that share helpful information among multiple entities, namely individuals, systems, or organizational units in an unbolt environment. The resistance to information sharing comes from the environment of the organization itself and the individuals that compose the organization. The information sharing enabled supply chain needs closer relationships among its partners. It requires a level of trust, commitment, co-operation, coordination and collaboration between SC members for its success. Pujara *et al.* (2011) proposed the following model (figure 20) to identify information sharing barriers and their interdependencies in the supply chain.

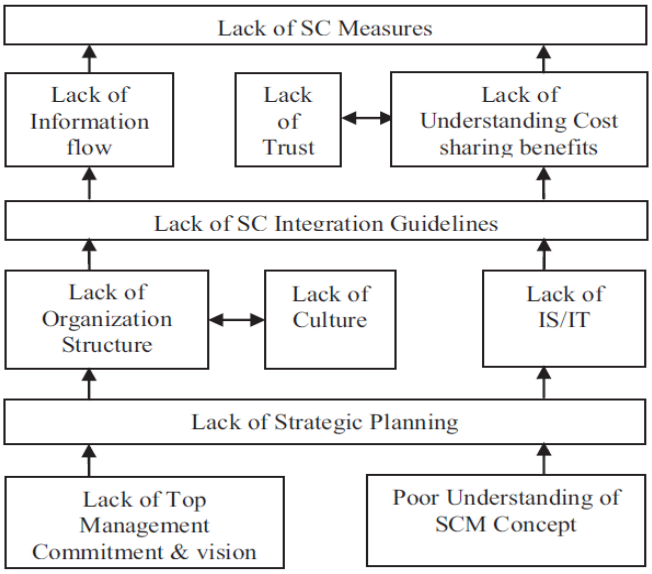

Figure 20: Information sharing barriers (Pujara et al., 2011, p.921)

Childerhouse *et al.* (2003) identified increasing customer demand uncertainty, increasing geographical scope of supply chains, reluctance to reveal proprietary information, financial and technical barriers to implementing IT solutions as the key barriers towards effective information sharing and therefore enabling supply chain transparency (figure 21).

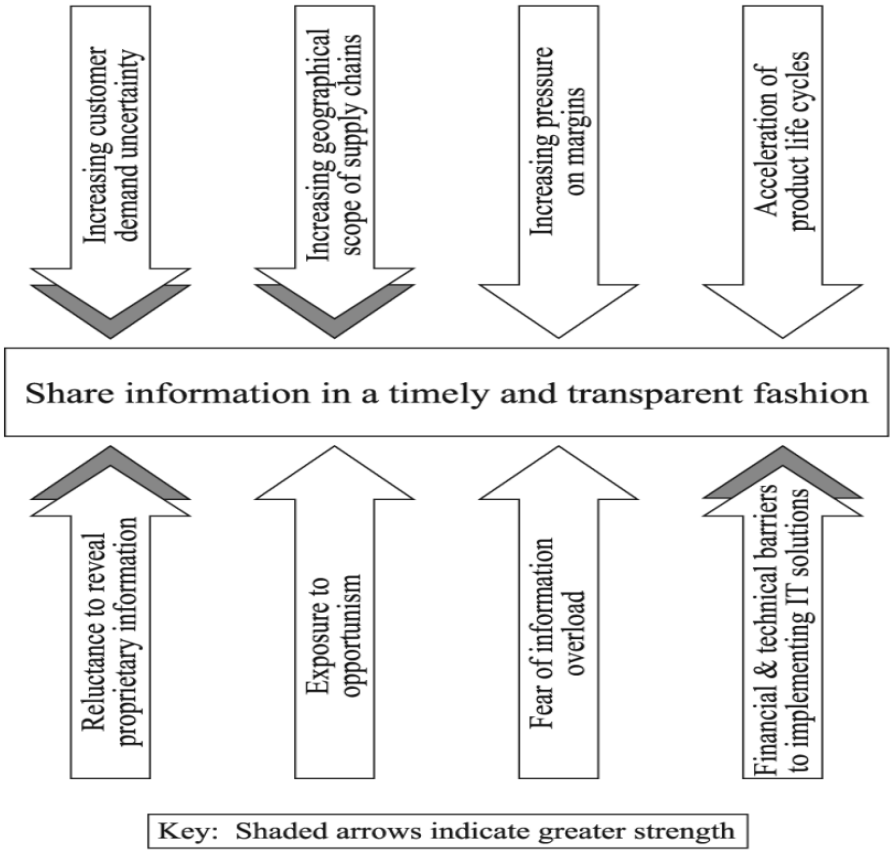

Figure 21: Key barriers identified by Childerhouse et al. (2003, p.498)

Lotfi *et al.* (2013) identified confidentiality of the information shared, incentive issues, reliability and cost of the information technology, antitrust regulations, the timeliness and accuracy of shared information, and development of capabilities that allow companies to utilize the shared information in an effective way as some of the key barriers towards information sharing within the supply chains.

Deimel *et al.* (2008) identified the key barriers towards transparency are due to supply chain characteristics, transaction process, transactors behavior and relationship quality. The key factors under these categorisations are listed as shown in figure 22.

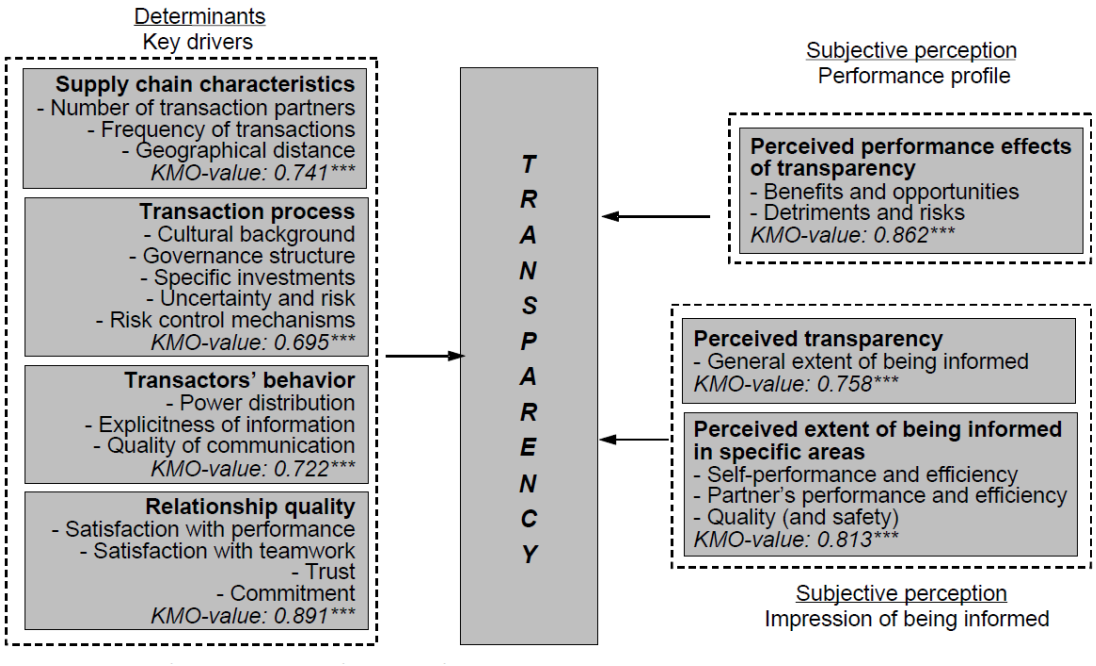

Figure 22: Barriers to SCT (Deimel et al. ,2008, p.28)

Moberg *et al.* (2002) identified six variables as potential antecedents of information exchange: information technology commitment, information quality, organisational size, commitment to SCM, trust and relationship commitment. They linked the information characteristic, organisational characteristic and relationship characteristic to two types of information exchange i.e., operational information exchange and strategic information exchange as shown in figure 23 below.

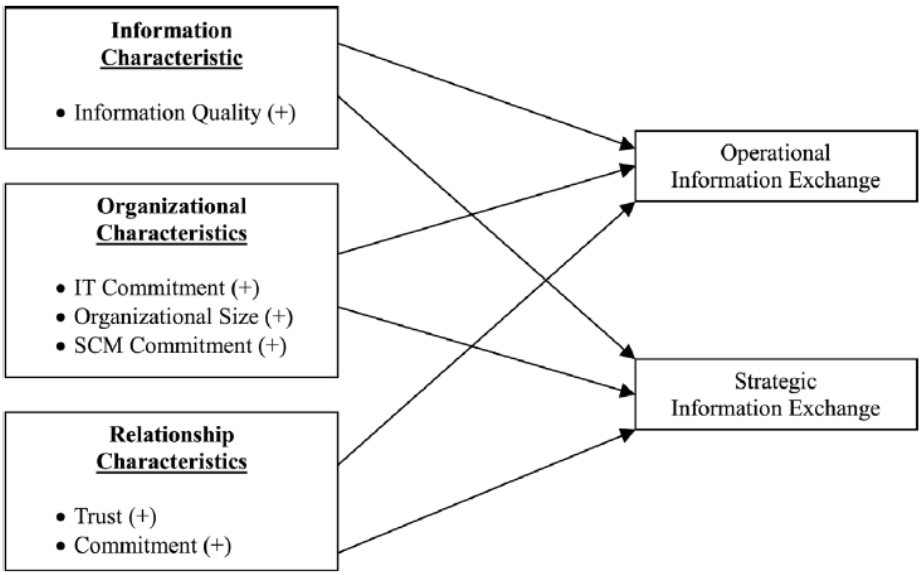

Figure 23: Antecedents of information exchange as identified by Moberg et al. (2002, p.757)

Maskey *et al.* (2019) examined a comprehensive list of factors that are anticipated to affect information sharing in supply chains. They identified twenty-one factors and then grouped them into four categories namely relationship, inter-organisational, intra-organisational and environmental factors as shown in figure 24. Through their findings they suggest that interaction routines and personal connection influenced both operational and strategic information sharing while organisational compatibility, incentives, project payoffs, commitment (inter-organisational), top management commitment and supply network configuration affected operational information.

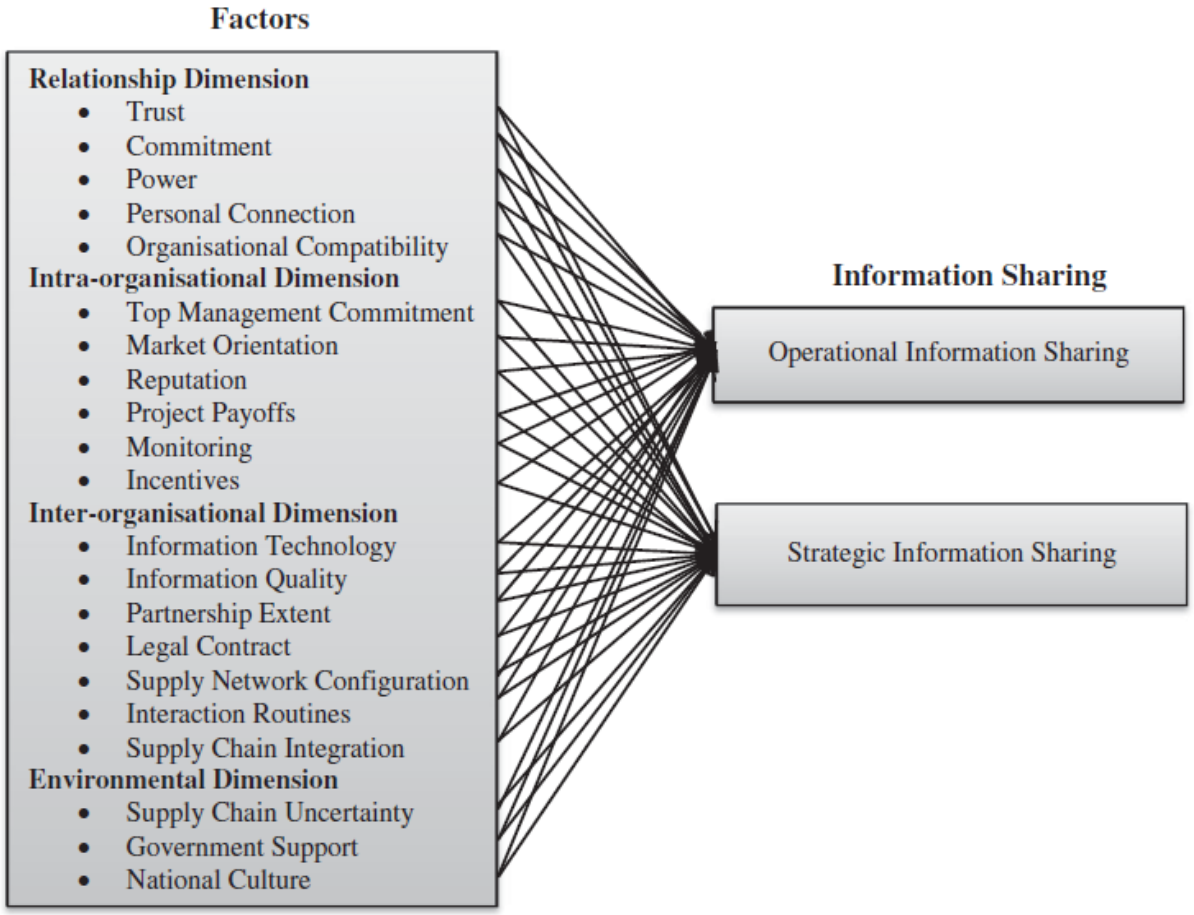

Figure 24: Factors affecting operational and strategic information sharing as identified by Maskey et al. (2019, p.564)

Fawcett *et al.* (2009) identified several driving forces (as shown in figure 25) that impact the information sharing capability and argued that firms must develop both aspects of information sharing namely connectivity that enables rapid, low-cost information exchange and the willingness to share sensitive decision-making information. These factors are necessary to achieve high levels of SC coordination and collaboration needed to deliver substantial competitive benefits.

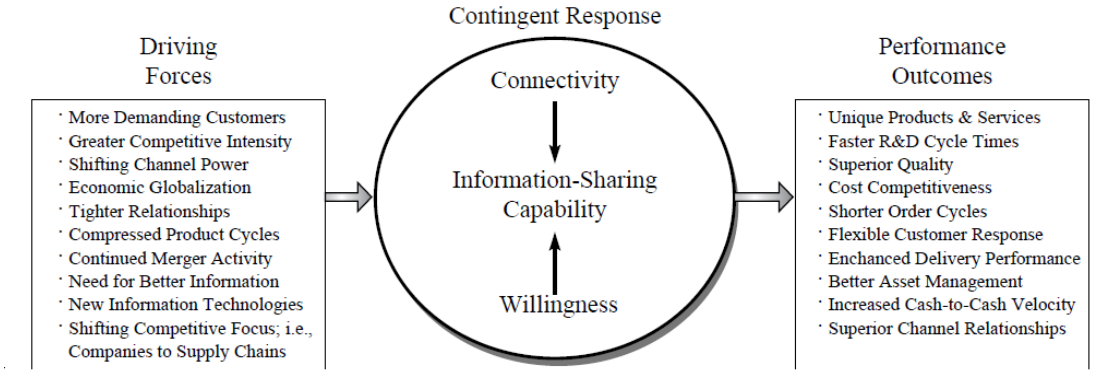

Figure 25: Driving forces/ barriers to achieving required information sharing capabilities (Fawcett et al., 2009, p.224)

4.4.1 Categorisation of barriers

As can be clearly seen, several barriers could be a limiting barrier in achieving SCT. Therefore, twenty different research articles were carefully studied to identify potential barriers that can impede SCT implementation in organisations. These barriers were later categorised into several categories, like barriers due to the (i) people, (ii) organisational capability, (iii) technology and information quality and (iv) supply chain characteristics (table 9).

The category "people" constitutes the barriers due to relational dimensions. According to Maskey *et al.* (2019), the existence of strong relationships between supply chain partners is an important attribute that assists firms to implement successful supply chain management programs. While physical infrastructure such as information technology can be dominating, its use can be diminished if there is no good inter-organisational relationship in the supply chain. Equal attention should be paid to the people's willingness to share information which largely depends on relationships characterised by a higher level of trust, commitment, power and dependence, personal connection, and organisational compatibility.

The category "Organisation" consists of those barriers that arise due to organisational culture, set performance measures and ways of working which the personnel from different functions perform with a view to achieve the business goals.

"Technology and Information Quality" is defined as the electronic linkages between trading partners (Maskey *et al.*, 2019) and the extent to which information shared is accurate, timely, adequate, credible and complete (Li and Lin 2006; Zhou and Benton 2007). Therefore, this category consists of barriers related to IT infrastructure and quality of shared information.

"Supply chain characteristics" represents the nature of supply chain that is determined by characteristics of products, process and resource relationship, length of supply chain, number of transaction partners, relationship quality and geographical spread.

Table 9: Key barriers impeding SCT initiative

Key Categories	Barriers	Authors
People	Trust	Eggert and Helm, 2001, Kwon and Suh, 2005, Van Dijk *et al.*, 2003, Trienekens *et al.,* 2012, Pujara, 2011, Kembro *et al.,* 2017, Lotfi *et al.,* 2013, Hofstede, 2003, Handfield and Nicholas, 2002, Maskey *et al.*, 2019, Hultman and Axelsson, 2006, Kembro and Selviaridis, 2015
	Organisation culture's influence on closeness	Eggert and Helm, 2001, Kwon and Suh, 2005, Deimel *et al*., 2008, Childerhouse *et al*., 2003, Pujara, 2011, Kembro *et al.*, 2017, Hofstede, 2003, Moberg *et al.*, 2002
	Internal resistance to change	Kembro *et al.*, 2017, Handfield and Nicholas, 2002, Moberg *et al.*, 2002
	Social embeddedness	Kwon and Suh, 2005, Deimel *et al*., 2008, Van Dijk *et al.*, 2003, Kembro *et al*., 2017, Moberg *et al.*, 2002
	Willingness to communiate or share	Parris *et al.*, 2016, Martinez and Crowther, 2008, Deimel *et al.,* 2008, Maskey *et al.*, 2019, Hultman and Axelsson, 2006, Kembro and Selviaridis, 2015, Moberg *et al.*, 2002, Fawcett *et al.*, 2009
Organisation	Top management commitment	Pujara, 2011, Handfield and Nicholas, 2002, Maskey *et al*., 2019, Moberg *et al*., 2002
	Lack of strategic planning	Pujara, 2011
	Lack of common language in planning, format and priority(existing siloes)	Hofstede, 2003, Handfield and Nicholas, 2002
	Lack of formalisation with explicit rules and procedures	Kembro *et al*., 2017, Deimel *et al*., 2008, Maskey *et al.*, 2019
	Sharing confidential/sensitive information	Eggert and Helm, 2001, Kembro *et al.*, 2017, Lotfi *et al*., 2013, Granados and Gupta, 2013), Kembro and Selviaridis, 2015
	Fear of losing competitive advantage by managers	Martinez and Crowther, 2008, Maskey *et al.*, 2019
	Lack of common performance measures	Pujara, 2011, Kembro *et al*., 2017,
Technology & Information Quality	Right data captured the right way at the right time	Eggert and Helm, 2001, Lotfi *et al*., 2013, Parris *et al.,* 2016
	Ownership of data	Trienekens *et al*., 2012, Childerhouse *et al.*, 2003,
	Data standardisation with same format across the organisation	Parris *et al.*, 2016, Kembro and Selviaridis, 2015, Moberg *et al.*, 2002
	Integration of systems	Childerhouse *et al*., 2003, Trienekens *et al*., 2012, Pujara, 2011, Kembro and Selviaridis, 2015
	Shared information is withheld, masked, distorted or just plainly missing, limiting the level of information needed for decision-making/ Quality of information shared	Childerhouse *et al*., 2003, Hofstede, 2003, Maskey et al., 2019, Hultman and Axelsson, 2006, Kembro and Selviaridis, 2015
	Sharing too much information/facts that are not central to one's own problem solving /explicitness of information that needs to be shared	Eggert and Helm, 2001, Kwon and Suh, 2005, Van Dijk *et al*., 2003, Deimel *et al*., 2008, Childerhouse *et al.*, 2003, Hofstede, 2003, Parris *et al.,* 2016, Maskey et al., 2019
Supply Chain characteristics	Characteristics of products, processes and resource relationships	Eggert and Helm, 2001, Trienekens *et al.*, 2012, Hofstede, 2003, Parris *et al.*, 2016
	The length and complexity of the supply chain	Trienekens et al., 2012, Deimel *et al*., 2008, Maskey et al., 2019
	The number of potential transaction partners	Deimel *et al*., 2008
	Frequency of transactions	Deimel *et al*., 2008
	Extent of transactions	Deimel *et al*., 2008, Trienekens *et al*., 2012
	Transactions complexity and uncertainity	Deimel *et al*., 2008, Parris *et al.,* 2016
	Structural embeddedness of transaction/Relationship quality	Deimel et al., 2008, Pujara, 2011, Kembro et al., 2017, Hultman and Axelsson, 2006, Moberg *et al*., 2002
	The geographical distance	Deimel *et al*., 2008, Childerhouse *et al.*, 2003
	Increased risk & interdependencies by sharing strategic information	Kwon and Suh, 2005, Kembro *et al.*, 2017
	Partner's opportunistic behaviour (Abuse of power)	Eggert and Helm, 2001, Kwon and Suh, 2005, Deimel et al., 2008, Childerhouse et al., 2003, Kembro et al., 2017, Hofstede, 2003, Parris et al., 2016, Maskey et al., 2019, Hultman and Axelsson, 2006, Kembro and Selviaridis, 2015, Fawcett et al., 2009

The sections below explain how different barriers in each category limit the SCT transformation or can negatively impact information sharing.

(i) People specific barriers

Van Dijk *et al.* (2003) highlighted trust between business partners, works as a governance mechanism that has positive effects on information exchange behavior and on transparency. According to Palanski *et al.* (2011), one will be more willing to be transparent when there is trust that others will not abuse the power gained from increased knowledge. An organization must trust its constituents to share information and therefore has direct influence on information sharing between stakeholders.

Van Dijk *et al.* (2003) identified cultural (and physical) closeness as important factors that influence transparency in a positive way as 'a shared understanding of information'- a precondition for transparency (Hofstede, 2003) is more likely to occur when people share the same language and same horizon of experience. According to Deimel *et al.* (2008), the 'social fabric' (expressed by masculinity/femininity, individualism/ collectivism, uncertainty avoidance, power distance and long-term/short-term orientation) is often more important for a successful business relationship than technology.

Similarly, willingness to communicate or share information is another important aspect. Maskey *et al*. (2019) stated to augment connectivity via available information, physical infrastructure such as IT is not sufficient. Firms should have a willingness to share the information that they possess. In addition to this, Deimel *et al.* (2008) also highlighted the frequency and quality of communication between business partners is strongly dependent on their willingness to communicate in general. High willingness to communicate in a cooperative, reciprocal manner favors an intensive and mutual information exchange, impacting transparency in a positive way.

Most of the researchers also expressed resistance to change as a barrier with organisations to any new change or transformation. As per Moberg *et al.* (2002), to combat any resistance to change or allocating resources to new technologies, it is critical that the top level of management demonstrate commitment to newer information technologies. Mckinsey & Company in their white paper "How to beat the transformation odds" suggest 24 specific actions (appendix 6) that companies can take to beat the transformational odds. According to them, the more actions the company takes by focussing on communicating effectively, leading actively, empowering employees, and creating an environment of continuous improvement, the more they will be successful in the transformation.

(ii) Organisational barriers

Pujara *et al.* (2011) identified top management commitment and vision as one of the most important information sharing barriers. In line with this Moberg *et al.* (2002), emphasized support by top management is necessary to generate support through the organisation, which should lead to increased information exchange. Through their proposed hypothesis they proved that "there is

a positive relationship between top management commitment to supply chain management and both operational and strategic information exchange. Along with having top management commitment, it is also important for the managers to first understand the importance of information sharing before they provide their support. Martinez and Crowther (2008) stated often there is a resistance by corporate managers as they might believe transparency might erode their competitive advantage and therefore fear of losing competitive advantage by managers could act as a potential limiting factor of SCT.

With main focus on top management commission and vision, Pujara *et al.* (2011) also laid focus on how absence of effective strategic planning hinders the information sharing in supply chains. The authors revealed strategic planning helps in successful implementation of information sharing and it involves the deployment of an organization's capabilities and a resource to achieve sharing of information within supply chains.

Considering other barriers of SCT, Hofstede (2003) elaborates that to enable transparency there must be seamless translation of language, meaning and standards. Therefore, lack of common language in planning, format and priority can be a delimiter impacting SCT. Similarly, Min *et al.*, 2005 proposed formalization is necessary for successful collaboration execution. They stated formalization an essential part of the collaboration process and suggested different areas of formalisation which an organisation must look into, like (i) co-developing performance metrics – key performance index, scorecard, product/service deliverables – and the resulting incentive; (ii) prior agreements on collaboration goals or objectives; (iii) determining roles and responsibilities of each partner as well as reporting mechanisms in the relationship; (iv) laying out collaborative implementation plans; (v) standardizing information technology; (vi) specifying information to be shared; and (vii) aligning collaboration schedules.

Many researchers like Kembro *et al.* (2017) highlighted fear of sharing confidential and sensitive information acts as a potential barrier limiting SCT transformation. As the multitude of companies makes it difficult to control exactly what information is shared with whom as information flows both horizontally and vertically in a multi-tier setting. Therefore, sharing information across multiple supply chain tiers expose companies to having confidential information spread, which could decrease competitiveness in future negotiations. Companies may also fear leaking others' confidential information and thus being regarded as a less trustworthy partner. Based on this critical aspect of sharing information in a global setting, Kembro *et al.* (2017) also emphasized on the need to formalize the information sharing through a legal framework, include for example: (i) what information can be shared, (ii) how to interpret the information, (iii) how to use the information for decision making in production or similar, (iv) how to store and treat the information, and (v) with whom information can be shared within and outside the company.

(iii) Technology and Information Quality barriers

Parris *et al.* (2016) suggested two antecedents that drive stakeholder perceptions of organization transparency. First, organizations should provide relevant information to stakeholders to enable decision making. Second, organizations should share information in such a way as to make learning easy for stakeholders and the information must be perceived as valuable to stakeholders, and thus relevant.

Kembro and Selviaridis (2015) also identified lack of information quality as a potential barrier to SCT. According to them, information quality can be determined by accuracy, timeliness, credibility and proper formatting of the information (sharing explicit information) and stated that without reliability or validity, information has no value for the receiving partner. Low information quality relates to (i) delayed information and (ii) misinterpreted information (Kembro et al., 2017).

Firstly, delayed information has little or no value for decision making in the supply chain. It can in fact be detrimental for upstream partners because decisions are made on "old" and potentially incorrect information. Parris *et al.* (2016) also highlighted simply disclosing information is not enough to warrant perceptions of transparency with stakeholders; rather explicit information should be available at the right time and in the right way. Secondly, the receiver cannot use the information without understanding how the information was generated and what aspects were considered by the sender. Making correct interpretations and identifying discrepancies in the data can be difficult for upstream partners (Kembro *et al*., 2017).

Linking of inter-organisational exchange processes and information technology (IT) systems is also identified as an issue limiting SCT (Kembro and Selviaridis, 2015). As per the researchers, not all members in the supply chain are connected and have the capability to exchange data using technological systems. Hence, the process of implementing new systems can be negatively perceived because of high capital investments and lack of cost-sharing agreements (Fawcett *et al*., 2007).

(iv) Supply Chain Characteristics Barriers

Supply chains are characterized by a division of labor resulting in input-output relationships between different companies (Deimel *et al.*, 2008). The authors identified these input-output relationships (called interdependencies) as the main source of coordination problems in supply chains. Interdependence represents the point where information is exchanged between supply chain partners, creating a high number of process interdependencies (and intense division of labor) has a negative impact on information transfer and transparency (Deimel *et al.*, 2008). According to Theuvesen (2004), the number of process interdependencies depend on the following supply chain characteristics:

(i) Length of supply chain influenced by the degree of specialisation and degree of vertical (dis-)integration in the supply chain,
(ii) The number of potential transaction partners, i.e., the number of suppliers and customers present in the supply chain, and the number of actual transaction partners a firm has,
(iii) The frequency of transactions, describing how often transaction partners have exchange relationships (Williamson, 1985),
(iv) The geographical distance, which influences the complexity of coordination and the extent of information transfer.

Furthermore, information exchange very much depends on characteristics of products, processes and resource relationships (Trienekens *et al.*, 2012). As in a global supply chain context, same products could be supplied by different suppliers, it creates complexities and transparency problems (Deimel *et al.*, 2008). Therefore, another important aspect is relationship quality (defined as the overall assessment of the strength of a business relationship by Schulze *et al.*, 2006, p. 57) directly impacts transparency. It affects the willingness of transaction partners to cooperate more closely with each other and determine their information exchange behavior. According to Deimel *et al.* (2008), the higher the relationship quality the higher the transparency of supply chains.

Coming to transaction behavior, abuse of power limits transparency (Deimel *et al.*, 2008). According to Kembro *et al.* (2017), power structure relates to inter-dependencies between firms and a company's power (or ability) to influence its business partners' behaviors and includes three factors: dominant players able to initiate change, power asymmetry, and dependencies between firms. Due to power asymmetries, companies might fear unbalanced dependencies and the risk of being forced into information sharing arrangements. They might regard information sharing as a loss of power, which could reduce their competitiveness in the marketplace. This directly impacts their willingness to share information and could become reluctant to invest resources to help others (Maskey *et al.*, 2019, Kembro *et al.*, 2017, Deimel *et al.*, 2008, Childerhouse *et al.*, 2003).

4.4.2. Change Management

Sabri and Verma (2015) based on their analysis of the most common transformation failures suggested a practical framework to leverage some of the best practices in change management. Based on their relevant research and professional experience, they grouped the main cause for the low success rates for business transformation initiatives into two categories: (i) the lack of preparation and familiarity with the transformation life cycle and process optimisation, and (ii) people-related aspects that are poorly managed or altogether neglected.

The practical framework (figure 26) by Sabri and Verma (2015) ensures smooth and successful supply chain transformation programs. It includes eight phases required to implement the change in the culture of the organisation, and five success factors for companies to maintain throughout the lifecycle of change.

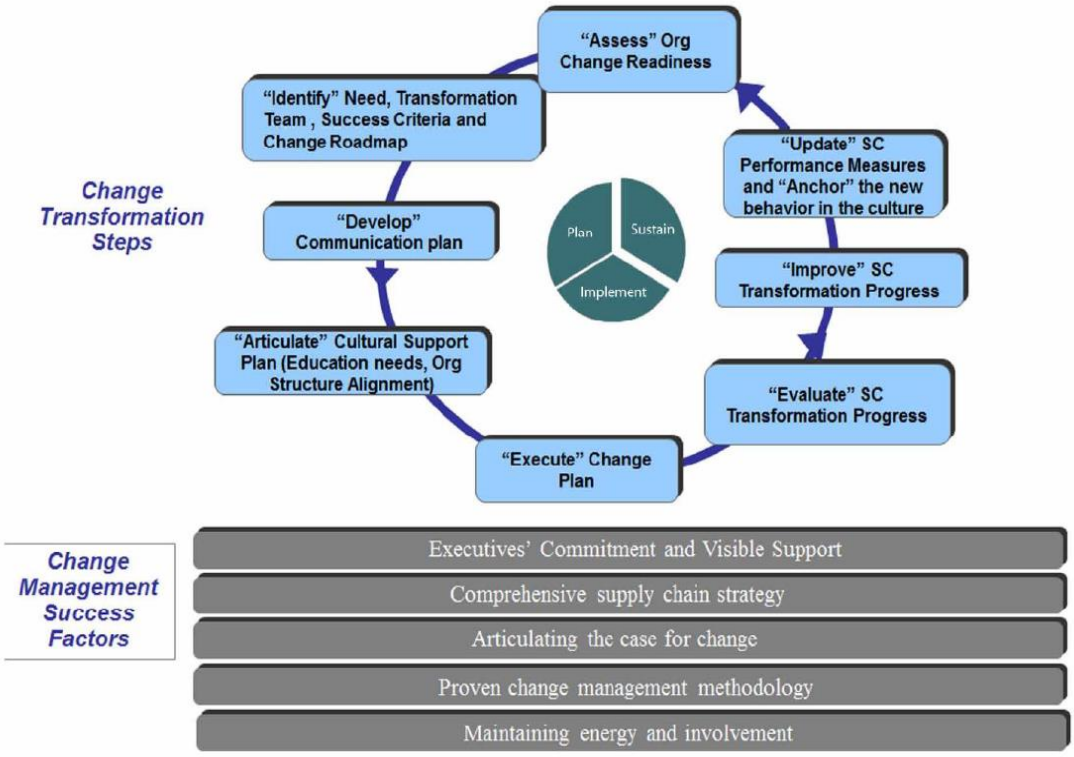

Figure 26: Supply chain change management framework by Sabri and Verma (2015, p.133)

Sabri and Verma (2015) summarized the above eight steps (figure 26) as: (i) Assess, (ii) Identify, (iii) Develop, (iv) Articulate, (v) Execute, (vi) Evaluate, (vii) Improve, and (viii) Update & Anchor, and grouped them under three phases: (i) Plan phase (steps 1 to 4), (ii) Implement phase (steps 5 & 6), Sustain phase (steps 7 & 8). Brief description for each phase and explanation of change management success factors is provided in Appendix 8.

Similarly, Jacquemont *et al.* (2015) *highlighted wit*h a focus on communicating, leading by example, engaging employees, and continuously improving will triple the odds of success. They suggested twenty-four specific actions in order of their impact (from greatest to least) on the likelihood of a transformation's success as highlighted in Appendix 6.

4.4.3 Process Management

Rumler and Brache (1991) in their article indicate the importance of managing the white spaces through a horizontal view of the organisation to overcome the silos. They identify eleven process improvement steps that creates a cross functional team to address the business needs to create an effective and efficient process. They are (i) Identify a critical business issue, (ii) Select critical business processes, (iii) Select a leader and members for a process improvement team, (iv) Train the team, (v) Develop 'is' map, (vi) Find the 'disconnects', (vii) Analyse 'disconnects', (viii) Develop a 'should' map, (ix) Establish measures, (x) Recommend changes and, (xi) Implement changes.

4.5 The Conceptual Framework

The conceptual framework (Figure 27) was developed based on the insights gained from the literature review and the theoretical analysis (appendix 1 and appendix 2) conducted for identifying benefits and barriers of SCT. The framework helps in identifying SCT concepts and highlights the benefits transparency can bring to the ultimate supply chain by overcoming the barriers limiting this transformation.

The framework is divided into two halves. The first half comprises SCT concepts and definition of SCT from a supply chain perspective which provides theoretical understanding to the organisations aiming for SCT transformation. The SCT concept highlights (i) three network mechanisms having different information exchange patterns, (ii) conditions when transparency is strongly suggested, (iii) different types of transparency, (iv) various perspectives of research defining transparency, (v) degrees of transparency, (vi) direction of transparency and (vii) distribution of transparency. These concepts are used to identify and correlate IKEA's current scenario and practices with developed theoretical foundations related to SCT (refer section 5.1.1).

The second half of the framework lists the multiple benefits transparency can bring to the ultimate supply chain. Few of these benefits could act as barriers limiting SCT. For example, SCT gives people access to a lot of information. However, it might make people think that there is an overload of information which can act as a barrier. Similarly free flow of information through SCT increases the risks and interdependencies between the stakeholders, which could be perceived as a barrier. Therefore, the barriers due to people, supply chain characteristics, organisational and technology and information quality are ranked from low to high to identify the importance of the barriers highlighted in theory.

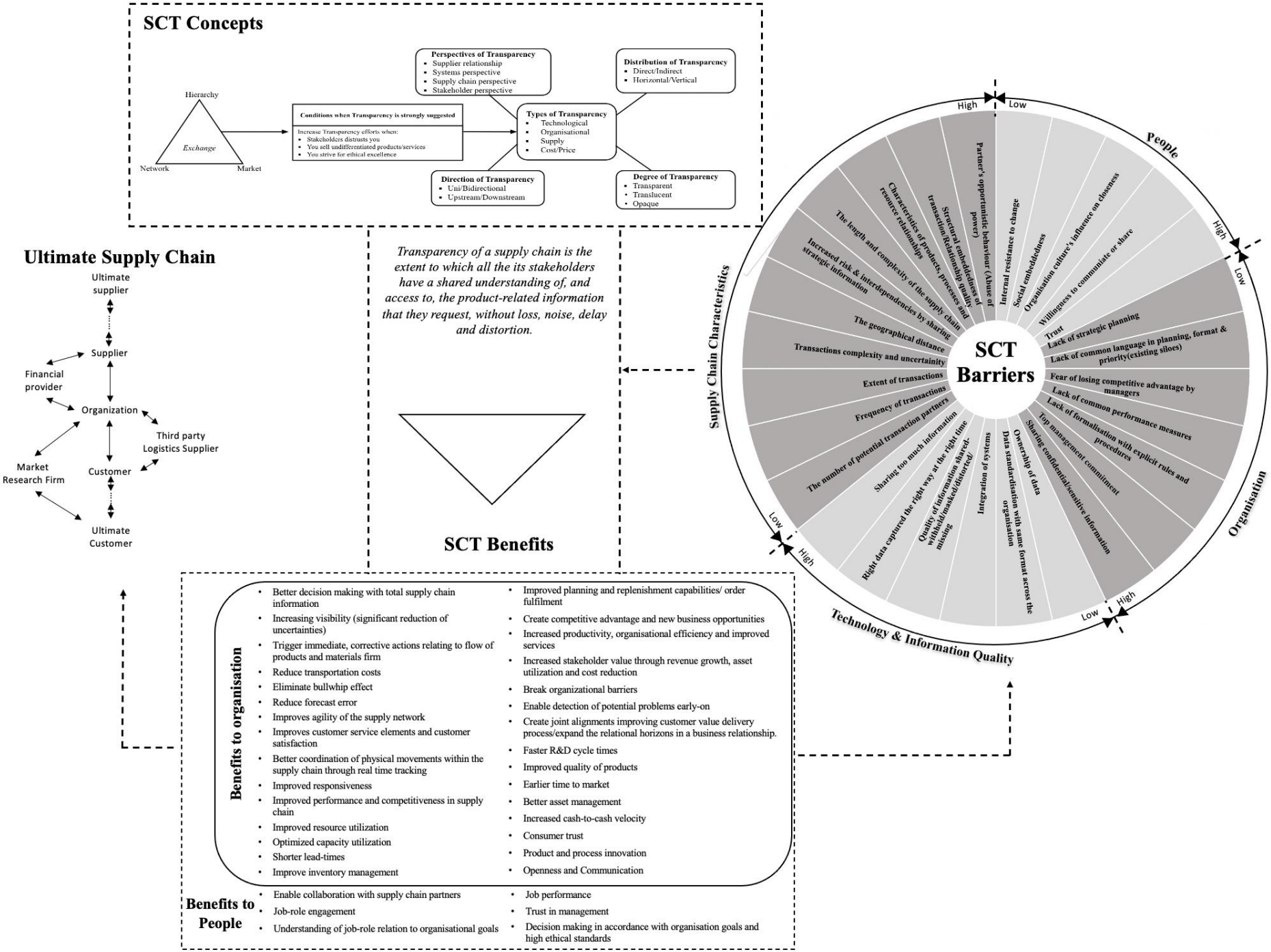

Figure 27: Theoretical Framework

To ease the understanding and readability the logical order could be followed while studying the conceptual framework:

(i) Starting from the top left corner will help the reader understand the different SCT concepts (figure 28) followed by understanding the definition of SCT from a supply chain perspective. This section of the framework will provide theoretical knowledge related to transparency to the reader.

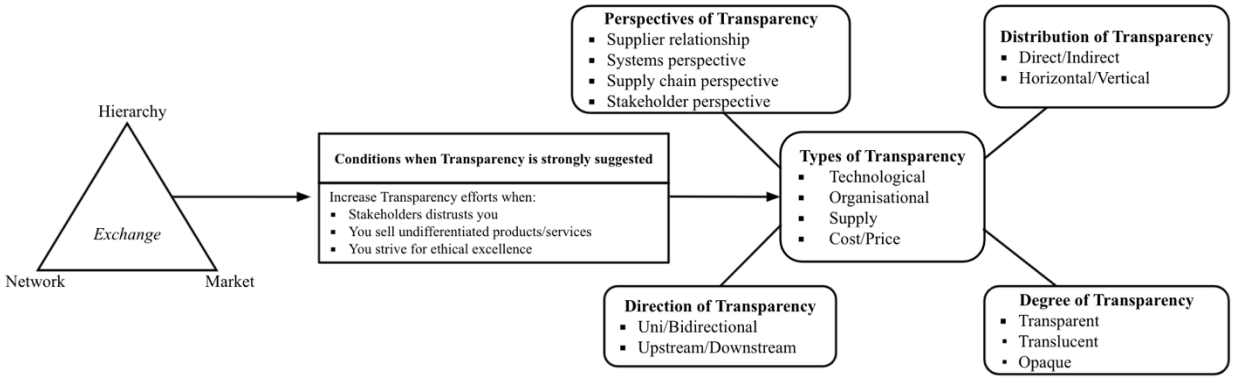

Figure 28: Zoomed in view of SCT concepts included in the framework

(ii) Upon understanding the SCT concepts the reader can get insights on the multiple benefits (figure 29) of SCT and how it benefits the organisation and its employees. The benefits section could be used as an enabler by a supply chain aiming at transparency transformation. It can be utilized to deliver the outcomes and advantages of the change to the people associated with implementing the transformation (like top management and IKEA co-workers that will be associated with the change).

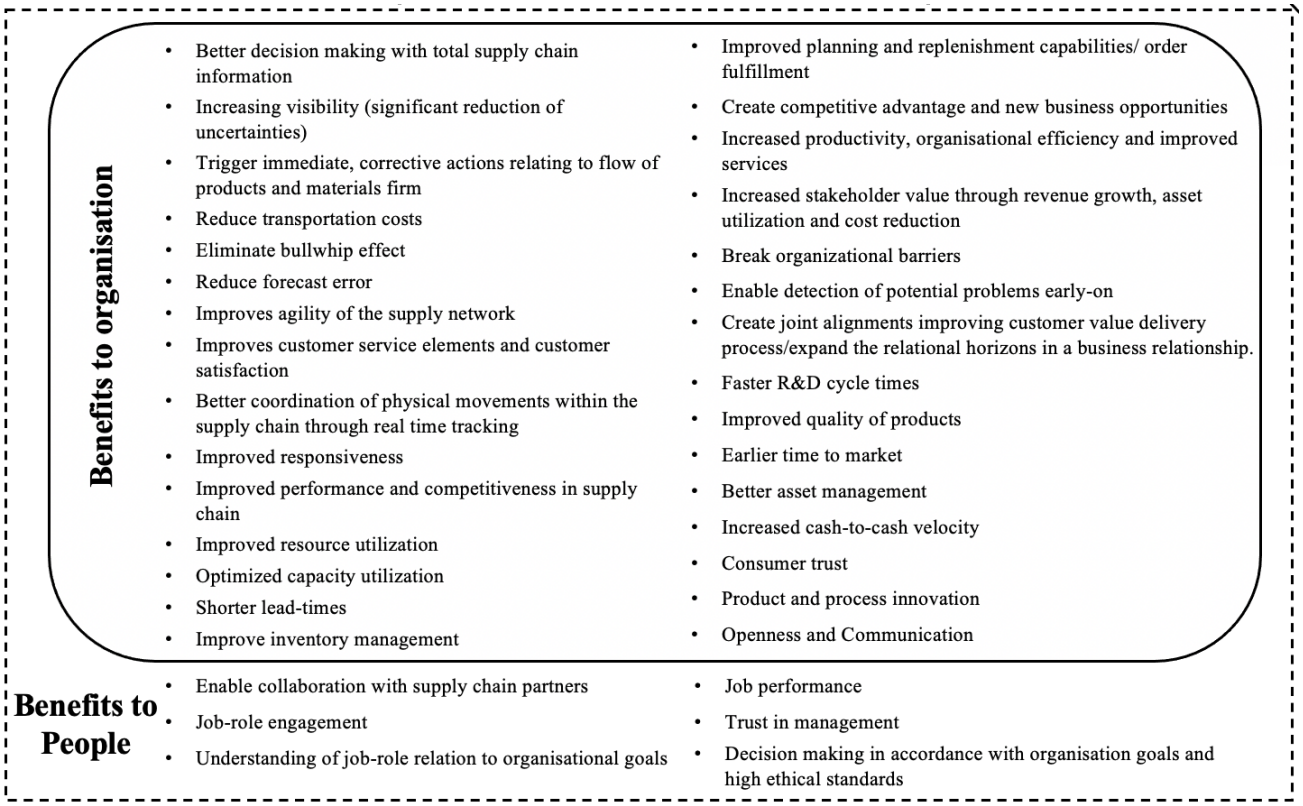

Figure 29: Zoomed in view of SCT benefits included in the framework

(iii) The next step, SCT barriers (figure 30) will provide an understanding of various factors limiting the SCT transformation. Even though SCT can bring numerous benefits to the organisation, its functions and employees there exists barriers due to different categories like people, organisation, technology, and supply chain characteristics.

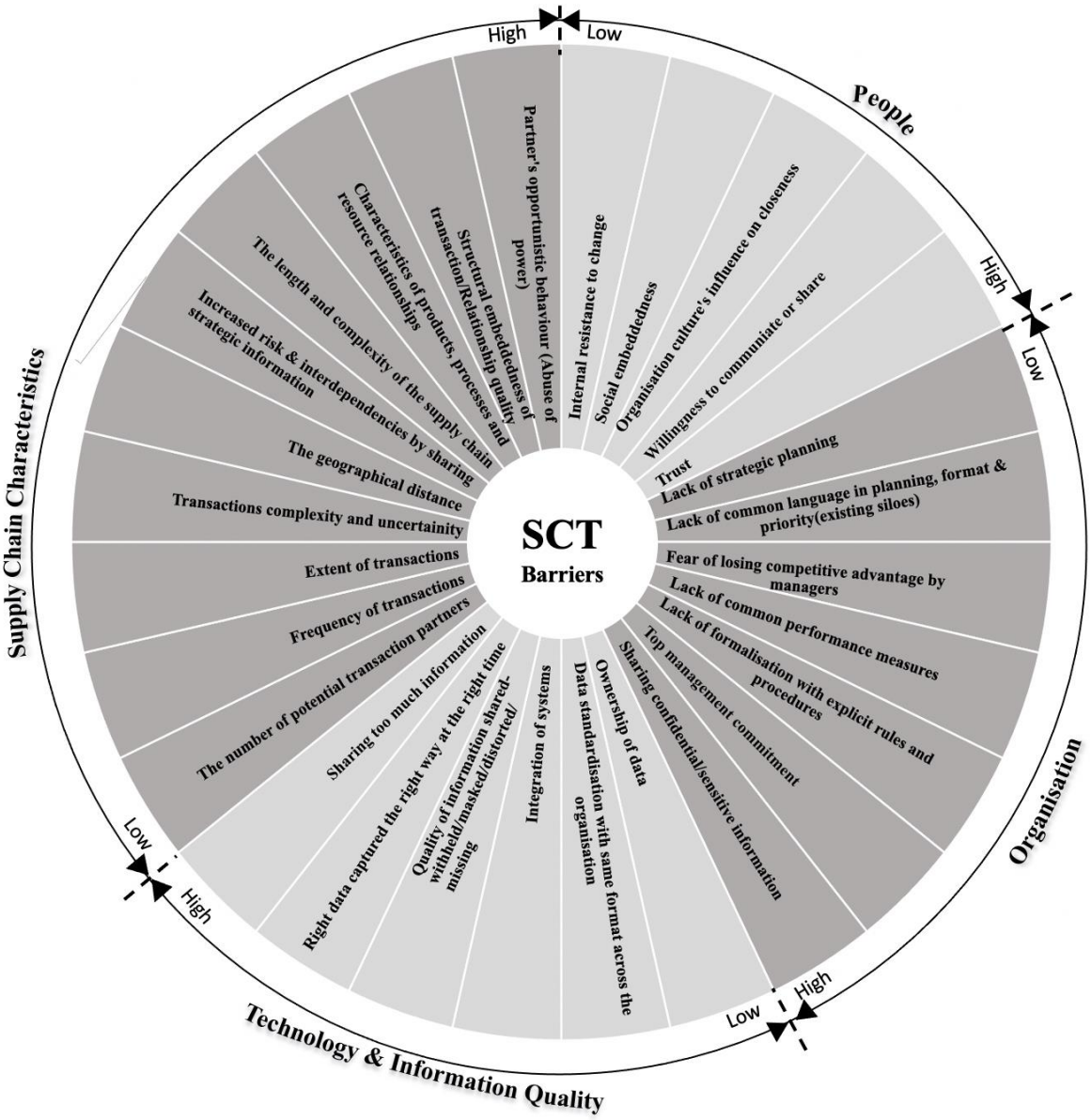

Figure 30: Zoomed in view of SCT barriers included in the framework

The investigation framework also served as a starting point to develop the interview guide and survey questionnaire for the thesis study and derive the relevant empirical findings. As the framework is based on theoretical findings any organisation that aims for the SCT implementation and digitalisation can use this as a theoretical reference.

5. Findings/Empirical data

This chapter highlights the empirical data that has been gathered through the interaction with people at the company. The study uses explanation building techniques to understand IKEA's supply chain, current situation of the company in enabling SCT by identifying top management commitment through initiatives, typical information shared, tools in place to share information, current information sharing process. Later part of the chapter discusses the benefits and finally the barriers existing at IKEA in implementing SCT.

5.1 IKEA's Supply Chain

IKEA's supply chain is huge starting with designing and developing a product as shown in figure 31. The products are purchased from the selected suppliers globally who procure the required raw material, components, paper pallets and packaging material from the sub-suppliers. Often the manufactured products are sent from the suppliers to the IKEA stores directly and other selling units to fulfill its customer needs. In some cases, the materials are stored in the distribution centers before it is distributed further. Products that have high volume and cannot be directly sent to the stores are stored at high flow distribution centers close to the IKEA stores. On the contrary, low flow distribution centers are used to store low volume products, which are automated and located in few places. When suppliers have less volume to be sent to the receiver, their volumes are consolidated, and this is done by having a mid-receiver (CP) located near the suppliers. DC are located closer to the stores/ units of customer fulfilment to consolidate the volumes from the suppliers and thereby improve the fill rate. IKEA has multi-channel customer fulfillment modes which are the stores and online. Understanding the evolving customer needs is important to make sure the availability of products. Customer ordered products can be picked either at stores or at pick up points. Some orders are picked by the customer themselves at the pickup points and some are ordered to be delivered at their desired locations which are distributed from the stores, CDC, or CPU. IKEA is also working to take back products from customers for reusing, refurbishing, remanufacturing, or recycling throughout the entire supply chain.

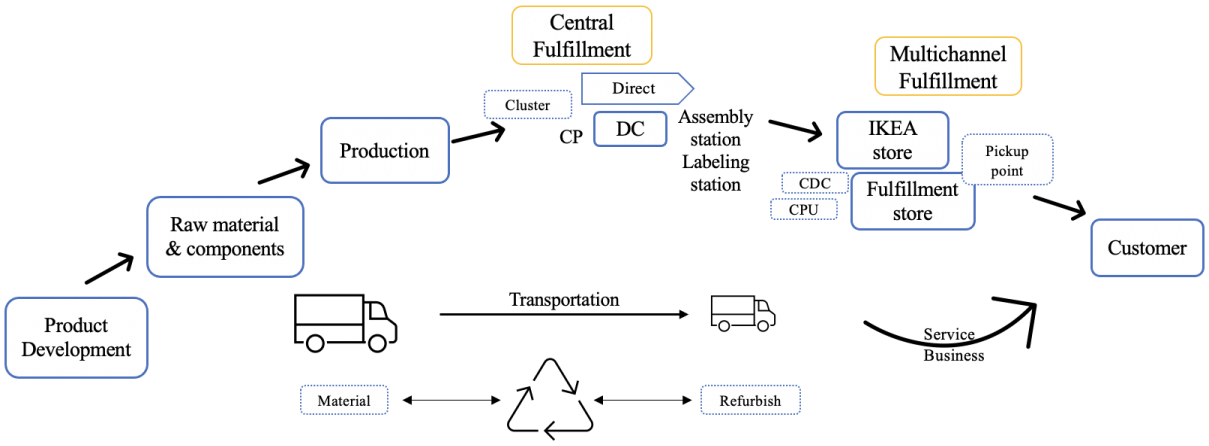

Figure 31: Representation of IKEA's supply chain. Adapted from Inter IKEA, 2019

5.2 SCT practices at IKEA

With continuous change in customer behaviour, new business models fueling up and new technologies leading to increasing business competition, having a customer centric supply chain could be a key enabler to keep up with increasing trends and market changes. IKEA aims for higher precisions in supply chain execution and has identified SCT as a key enabler to realise this ambition (the assessment document of SCT made in 2020, provided by IKEA).

5.2.1 Top management commitment

Top management commitment is one of the key enablers in implementing SCT at IKEA. The top management at IKEA continuously takes constant efforts in taking the company forward in development. This is especially evident when it comes to the SCT initiatives as mentioned in section 5.2.2 and is also assured by most of the interviewees. Although the top management seems to have taken many initiatives, three important observations could be seen. Firstly, there was a mention of several initiatives taken. Although the purpose is to enable supply chain transparency, rather than taking numerous steps, the efforts could be consolidated to few strong initiatives. Secondly, it is common that every co-worker in IKEA is aware of the top management's commitment and even eight out of thirty-four responses in the survey feel that top management's commitment could be barriers in this implementation journey. Lastly, few of the respondents in the interview expressed that IKEA is a little behind when it comes to digitisation like SCT. One of the interviewees attributed to the same fact that IKEA is not a technology company. But the top management is taking several initiatives to bridge this gap.

5.2.2 SCT initiatives

Several initiatives to enable transparency of information within IKEA's supply chain are taking place. The following are few such initiatives implemented at different parts of the supply chain.

IPIM

Currently, the products are identified by an article number. The same article number is used for the product regardless of which supplier or date it came from or the state of the product like full pallet or half pallet or sales unit. Variants within the same article number are not traceable and a product cannot be described for what it really is. This makes communication about the product unprecise. IKEA product information management will set the foundation for how IKEA, in many years to come, protect, secure and develop product information across the value chain - from suppliers to customers (Inter IKEA B.V, 2019).

GS1 standards

Adhering to the GS1 standards is one of the key enablers of IPIM. The GS1 standard enables organisations of any size to order, track, trace, deliver and pay for goods across the supplier chain, anywhere in the world. The GS1 standard is a common language for how to identify, capture and share supply chain data– ensuring important information is accessible, accurate and easy to understand (Inter IKEA B.V, 2019). In practice, GS1 helps to answer the questions of what, where, when, who and why by identifying, capturing and sharing this data around our products with global identifiers and achieving traceability across the value chain. By answering these questions, a product can be followed throughout the value chain while sourcing the material, producing the products and transporting them to different destinations around the world. IKEA will also be able to follow a product through various types of circularity solutions (Inter IKEA B.V, 2019).

ASV

Advanced Shipment Visibility (ASV) is a feature in ITM, the IKEA Transport Management Solution. The purpose of ASV is to get visibility into IKEA's shipments and to simplify the communication process utilising real time location data. Sending units (e.g., suppliers) with ITM visibility access will receive a frequently updated predicted Estimated Time of Arrival (ETA) based on real time location data of the truck/loading unit. Receiver units (e.g., Stores, Distribution Centres), will be able to follow the shipment from sender to receiver unit, and will get a frequently updated Predicted Estimated Time of Arrival (Inter IKEA B.V, 2019).

LCT control tower

As mentioned in the introduction chapter, IKEA has an ongoing project 'Luminous control tower' that looks into aspects and roadmap of enabling SCT at IKEA. The project aims to connect the end-to-end supply chain of IKEA through information sharing. The background work of this initiative helped the authors identify the previous work done on SCT at IKEA and acted as a starting point for this thesis.

5.2.3 Typical information shared within IKEA

Depending on the function and the area, the information shared within a department and between departments varies greatly. Operational, Tactical and Strategic data were shared among the teams depending on their purpose of their function. Operational data is shared on a regular basis to carry out day to day activities. Tactical planning is mostly done for a time horizon of six to twelve months and strategic planning is done for a time horizon of one to one and half years. Examples of typical information shared within IKEA identified through the interviews is mentioned in table 10. The roles and responsibilities of SCD and SCO functions (appendix 5) indicates their functionalities. The corresponding stakeholders of each of the functional areas identified through the data collected is mentioned in the appendix 5. To fulfil their assignments, they share information at tactical, operational and strategic levels with their stakeholders through different information sharing systems as mentioned in section 5.2.4.

Table 10: Examples of typical information shared within IKEA identified through the interviews

Operational	Operational plans, delivery plans, transport plans, order information, transport information, price, market operations, forecasts for sales and demand, predict need, order management, order flows from creation to execution, shipment and consignment follow-ups
Tactical	Parts to be handled at distribution centers, preparation of containers, transport optimization, intermodal networks
Strategic	Developing networks, differentiation of routes, service provider classification, setting up KPIs for new developments and projects,

5.2.4 Tools used in sharing information

In the current scenario several tools and platforms are used at IKEA to share information with stakeholders ranging from local department specific tools to global information sharing platforms. Mostly with the current way of working the different functions have developed their own specific tools to facilitate sharing information and have been using them to communicate and share information for their work. Findings from interviews highlighted as these systems are own built specific solutions, they lack integration functionality and sharing information with other departments could lead to additional steps of filtering the information and converting information to new formats as per their need increasing additional work of improvising data. Participants highlighted “the platforms do not talk in one common language and therefore translation is required when information moves between departments.” To overcome this issue of local tools and non-integrated platforms, IKEA is progressing towards the next step of developing global integrated tools that will enable free flow of user-specific information.

Also, another aspect to the local ways of working creates hindrance in accessing the relevant information at the right time. In most cases IKEA co-workers use their own specific excel sheets to share operational information leading to not having access to required information and they have to use networking to gather relevant information relying on emails and phone calls.

The different local and global tools identified through the interview are mentioned below. The functionalities of different tools are highlighted along with the departments who use them to extract relevant information for their work.

DSP Fulfillment tool

DSP fulfillment is used within the plan and balance sales and supply process to create Need and safety stock calculations as well as capacity and constraint planning on store, distribution centers and supplier level. The users of this system are need planners, supply developer receivers, RSI sales and supply support specialists, supply planners in purchasing, sourcing developers and business developers. It provides various solutions like safety stock calculations on several levels both in static and dynamic fashion, supply plan visibility, allocation of goods in line with IKEA's business requirements, plan and work with capacity agreements and platform for IKEA's replenishment solutions (Inter IKEA B.V., 2019). The output of these processes are stock exceptions and order proposals. Participants in the interviews highlighted "DSP fulfillment is an integrated tool for execution of supply chains and helps in creating supply plans required for downstream actors reaching up to 84 weeks into the future".

TFP- Transport Forecast Planning tool

TFP tool is a tool supporting transport capacity planners in three processes namely Short-Term Planning (STP), Mid Term Planning (MTP) and Tender Land in defining future capacity needs and network within transport. It also supports the Category Oceans yearly Tender process with future volume and network. The users of this system are transport capacity planners and category analysts and global transport and logistics services (Inter IKEA B.V, 2019).

DORS- Define Optimal Replenishment Solutions

DORS solution is about defining how Stores, Customer Distribution Centres and Central warehouses are replenished in a cost-optimised way, taking costs in the Supply chain into account from Purchasing price until Sales place in Stores (purchase price, transportation, customs, handling costs, inventory costs) (Inter IKEA B.V, 2019).

The main users of this solution are FRD – Flow Replenishment Developer, Retail Logistics, SCO Flow capacity planner, SCO, Supply Operations Developer, NP - Need Planner and CLL – Category Logistic Leaders.

Transport booking/EDI

Transport booking/EDI messages are exchanged between carriers and IKEA and need to be in human readable format to be able to see what information has been exchanged in case of disputes. The following messages are connected to shipment namely transport booking, booking confirmation and shipment status (Inter IKEA B.V, 2019).

ITM- IKEA Transport Management

ITM is a complete transportation management solution covering the entire Supply Chain globally, including all modes of transportation. It is a web-based application accessible from anywhere in the world by using a standard web browser.

ITM is based on a bought solution from Oracle which provides the following functions:

- Order Management: Provides order entry options and visibility of purchase orders, release orders and transportation orders.
- Planning/Optimisation: Provides options for automated and manual optimisation of all inbound, internal and outbound moves.
- Shipment Management: Allows shipments to be reviewed, modified as required and approved.
- Booking and Tendering: Provides options for the automated engagement of carriers and other service providers (e.g., tendering and booking).
- Visibility: Provides various solutions for the "Where's my goods?" questions, by collecting and showing shipment data and events.
- Settlement: Provides solutions for payment, billing, tax calculation, cost allocation and financial analysis, etc.

ITM supports multi-party collaboration, and the solution can be used both by IKEA and external parties. It is a flexible solution which can be adapted to Supply Chain requirements and opportunities.

ITM enables sustainable logistic processes where planning and execution are integrated. Increased optimization enables better control and reduction of the transportation cost and aims to minimize environmental impact.

OMS- The Order Management System

The Order Management System collects and visualizes stock and order information and is a part of the centralized need calculation for the replenishment of DC to the Selling Unit (Inter IKEA B.V, 2019). This tool:

- collects and visualizes stock & order information
- provides up to date and synchronized stock and order information to the IKEA Supply Chain (e.g., inputs to the need calculation)

- processes order & stock information from different solutions
- manages the order lifecycle (from creation to reception / cancellation) of all replenishment orders within IKEA
- sends data to different solutions (e.g., Operational Data Storage for follow up purpose)

There are 1700 OMS users; in Retail Logistics, Customer Fulfilment, Non INGKA Franchisee, DCG Operations, IoS Need Planners.

Supply Chain Matrix- SCM

SCM stands for Supply Chain Matrix, which steers the supplier matrix in the IKEA Supply Chain. SCM handles:

- Creating and changing of the Supply matrix
- Secures that there is no gap in replenishment when the matrix is changed
- All Replenishment solution for the following relations: Supplier - DC, DC - Selling Unit, Supplier - Selling Unit
- Lead time view and updates
- Distribution set up as a base for the price-mix

The users of SCM are Need Planners, Flow Optimisation Developer, Logistics Operations Developer, CDOS, Flow & Capacity Planners, BA specialists, Sales & Supply Support, Capacity & Flow Planners and Supply Planners (Inter IKEA B.V, 2019).

Other ways of information sharing

Other than the tools or platforms, IKEA co-workers also use emails, telephones, newsletters, open sessions, voluntary drop-ins, meetings to share and disseminate information. Newsletters are generally used for sharing information related to expansion projects and other strategic information. QlikView, Qlik Sense and Tableau are business intelligence tools focusing on data visualisation, dashboarding and data discovery. These platforms help users to see and understand the data, connect to several databases, drag and drop to create visualisations and share with a click. Excel is also the most common tool to share information with stakeholders and is used to perform calculations.

5.2.5 Current process in place that enables information sharing

Working methods are established in all functions and areas to assist and guide the IKEA co-workers in performing their activities that are similar in the nature of the activity. When it comes to new projects, the processes are created based on its execution. IKEA co-workers have access to the working methods available in the IKEA toolbox. The working methods are classified based on different topics like accounting and invoicing, finance, inventory, product quality, handling and ordering goods, supply quality, transport etc. There are working methods related to communication in each functional area, which can be referred to identify the stakeholder to whom the information must be shared with and also from whom the information can be gathered. However, there is a deviation of how the processes are defined and how different actions take place in reality at some

places. The working methods are updated quite frequently (between a period of one-one and half year), but not the processes.

5.3 Benefits of SCT at IKEA

As understood through interactions with supply chain professionals in the interviews, compared to other more fragmented supply chains, today IKEA is progressing towards creating SCT. Although the information is shared through some common networks, there exist organisational silos and different home-grown legacy systems hindering total transparency across the supply chain. Currently, IKEA also lacks in real time tracking and tracing of physical movements of goods. Interviewees highlighted that IKEA aims to attain a connected and customer centric supply chain. According to them the SCT transformation is a way forward to enable connected information sharing systems, securing visualisation of information, real-time tracking and tracing, breaking silos, and harmonising ways of working and creating one source of truth through collaboration across IKEA's supply chain. The benefits that SCT could bring to IKEA can be categorized into individual benefits regarding the individual departments and co-workers and collective benefits regarding IKEA as an overall organization as gathered through interviews and surveys.

5.3.1 Individual department benefits of SCT

SCT will bring multiple benefits to individual departments and overall functions at IKEA. During interviews and surveys the participants highlighted that supply chain transparency will help them improve in all dimensions starting from having access to relevant information at the right time, reducing their manual work and non-value adding activities to providing a holistic view of the entire value chain. People from the SCO function in flow capacity planning and category food logistics services highlighted that transparency would enable better accuracy of calculations and forecasting and will save working hours in finding relevant information in-turn reducing the workload. The interviewee stated capturing different events in the supply chain will help in accurately measuring the performance of the service providers both when it comes to lead-time accuracy and on-time delivery. Coming to food SCT will aid in identifying first expiry first out improving the quality claims.

Transparency will help the flow performance department with tracking and tracing of goods enhancing the visibility throughout the supply chain. The interviewee stated that “We strongly believe there will be huge improvement in processes, it will help to simplify the process and help align the processes globally.” According to him, SCT will enable common sources of truth and will simplify the communication channel between stakeholders and will provide opportunities to create alliances.

SCT will benefit Need planning & Balancing by providing them a holistic view of the entire value chain and will help co-workers understand how decisions made in different functionalities have an overall impact. Category Distribution will have a better understanding of how to secure availability

to stores, send out the right pallets at the right moment, inventory management and stock management real-time tracking and tracing. The participants highlighted through interviews and surveys, SCT could bring the following benefits to individual departments in SCO and SCD.

- Improve accuracy and reliability of information
- Access to updated information at the right time leading to speeding up the work
- Have access to common data enabling dynamic decision making and solving problems through the same perspectives
- Enable value-based decision making taking into consideration different parameters like cost and availability
- Will make work much easier and more time-efficient
- Reduced interdependencies to extract information
- Will ease up finding information
- Better follow-up on order flows
- Reduce workload
- Clear structure of documentation storing
- Will eliminate unnecessary discussions and will improvise forecasts
- Enhancing confidence in co-workers regarding working with the latest information
- New learnings and insights
- Easier access to source data and less bureaucracy
- Accurately measure performance of external service providers, like lead-times and on-time deliveries
- Information sharing will improve work efficiency but only if it's at right level to make a decision and with right quality
- Provide a bigger picture to decision making
- Reduce transportation costs
- Huge potential to simplify the processes
- Quicker decisions and clearer ownership
- Eliminate own local ways of working
- More time for value adding tasks

5.3.2 Collective benefits of SCT to IKEA

IKEA and its co-workers have identified SCT as an enabler towards achieving a connected customer-centric supply chain. The interviewees stated that SCT is the way going forward and transparency will help them achieve right capabilities and improve in all dimensions. It will enable tracking and tracing of products providing real-time information which will limit/reduce the firefighting in terms of fetching containers and eliminate bureaucracy. The interviewee from Category Land stated, "Looking at the total supply chain and logistics part when you have goods availability and information about the right number of trucks, you know exactly if a delay has occurred which will

help in planning the activities enabling real-time decision making, avoiding non added value activities and manual errors."

The participants emphasized this initiative will help simplify the processes, reduce complexities by harmonising the ways of working. According to interviewee from Category Food Logistics Service: "IKEA as an organisation aims to offer a wide range of well-designed, functional home furnishing products at prices so low, that as many people as possible will be able to afford them. Better transparency, granularity, improved frequency of follow-ups, enhanced data quality and measurement will help the business spot areas to reduce costs. It will also benefit IKEA to drill down more to the sustainability agenda by knowing more in detail the impact of certain modes of transportation, and how the routes and networks are set up, and identify opportunities to improve in all dimensions."

Overall, as per IKEA co-workers, dramatic improvement opportunities will open up and possibilities to secure the right data at the right time at the right place will be a dream come true. Through transparency, IKEA will increase efficiency, decrease unnecessary communication and it will build the possibility to develop the capabilities around data. The numerous benefits highlighted by the respondents are summarized below.

- Remove/Integrate silos
- Provide holistic view of value chain
- Will harmonise and create common ways of working across the organisation
- Will help in reverse flow of products from customers
- Help in simplifying the communication across the organisation
- Efficient and Improved knowledge sharing
- Track and trace enabling supply chain visibility
- Improved accessibility of information leading to proactive actions
- A potential to integrate with suppliers, retailers, and customers
- Integration of different information sharing systems
- Better planning of inventory and stock optimisation benefiting the overall business
- Reduced scope of hidden actions and masking information
- A way of removing/integrating different legacy systems
- Reduced blame games and acquisitions and better coordination
- One common source of truth
- Reduction in lead-times
- Better visibility on planning v/s execution
- Enable collaboration and trust
- Increased productivity, organisational efficiency, and improved services
- Clarity and honesty towards the end customers
- First step to an autonomous supply chain

- Reduce the complexity across organisation
- Establishing the right balance between cost and efficiency
- Help in capturing different events in the supply chain
- Increased visibility will lead to taking more focused and specific actions for improvements in different business areas
- Transparency in information sharing will enable collaboration amongst stakeholders leading to executable supply chains

5.4 Barriers of SCT at IKEA

As discussed in the theoretical findings (section 3.4), there could be barriers limiting the supply chain transparency. Through interviews and surveys co-workers at IKEA mentioned barriers related to people, technological and information quality, organisational, and supply chain characteristics. Their views are presented in the sections below.

5.4.1 Barriers related to people

Interviewees had mixed opinions when it comes to people-specific barriers limiting SCT. Some of the participants highlighted internal resistance to change could pose challenges to this new transformation as many might not be aware of benefits transparency could bring to their work or are just too comfortable with the current ways of working. The fear of entering the digital world and not being capable to adhere to the change could make people reluctant to SCT transformation. Out of thirty-four respondents in the survey (figure 32), twenty-one identified internal resistance to change as the biggest people specific barrier to SCT. On the other hand, other interviewees highlighted that togetherness, openness, trust, and transparency has been a part of IKEA values which they nurture. People are aware of the necessity to be transparent, and this thinking has been prevalent in the organization for a long time.

Other interesting aspects highlighted through interviews were willingness to share information and trust between business partners. Participants in interviews, informed that when it comes to sharing information with external stakeholders, they have legal barriers with respect to sharing sensitive and confidential information. Internally within IKEA, co-workers trust each other and have a willingness to share information. Information is shared when the different business areas need that information for their work and generally people do not hide information. However, the interview participants conveyed that within IKEA information is not shared in one of the following instances, if it is sensitive, confidential, inaccurate, or incomplete, unreliable, or that particular information is thought of not adding value to others work (to avoid overload of irrelevant information).

Through interviews it was identified that at many instances people do not have access to complete information due to stakeholder's unwillingness to share information or not trusting each other with the information. This is also supported through the survey results as fifteen of thirty-four respondents believe that willingness to communicate or share information could be a challenge, followed by

fourteen respondents identifying trust between business partners as a barrier to SCT. This could also be linked to the existing organisational culture background and closeness aspect as twelve co-workers have voted for it as a people specific barrier.

Other barriers in this category reflected by respondents in the survey were (i) information sharing between different legal entities of IKEA like INGKA and Inter IKEA, and (ii) risk/worry of information being used incorrectly leading to confusion.

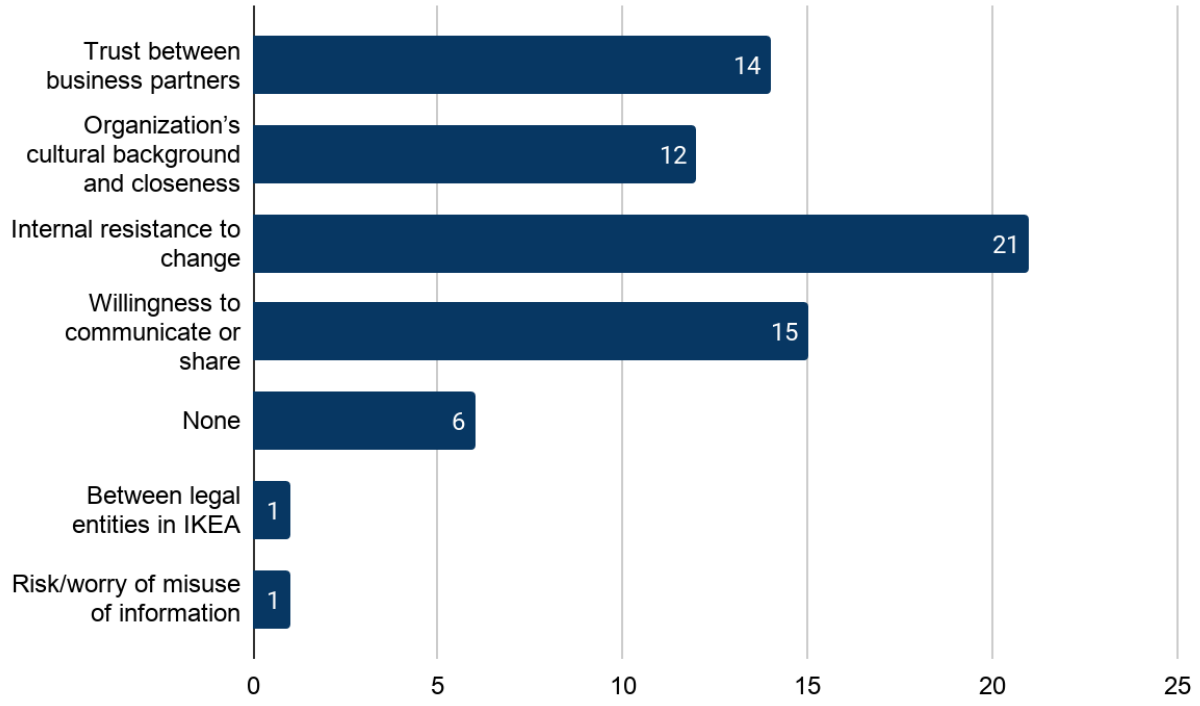

Figure 32: Survey response for SCT barriers related to People. (No of survey responses- 34)

5.4.2 Barriers related to organisation

From the responses received during interviews and surveys (figure 33) it was highlighted that silo culture and silo thinking is highly prominent at IKEA with different functions having specialisation in their own domains. According to all the interviewees and twenty one out of thirty-four respondents in the survey, it could be the biggest organisational challenge towards achieving transparency. One of the interviewees stated: Even though specialisation is good as individual parts could be optimised and specialisation could be achieved in that domain, it is also important to realise how different functions are connected and how they impact each other in totality. Working in silos could limit information sharing and could impact the trust and collaboration amongst different functionalities at IKEA.

Eight out of thirty-four participants in the survey chose top management commitment as a potential organisational barrier. Although during interviews the interviewee reflected that the top management is highly committed towards this initiative of making IKEA's supply chain transparent and have taken several initiatives as mentioned in section 5.2.1 and 5.2.2.

Lack of common performance measures has been identified as a potential barrier by fifteen of the survey respondents. Through the interview, it was evident that the different functions and departments have their own performance measures and are more siloed, but they also share common KPIs. On a high level there are common goals, for example, to reduce total cost, sustainability, and reaching to many people. Though one the interviewee stated: In the current scenario there is no granularity to support all discussions on a higher level based on the total picture as co-workers today might have different pictures. Everyone might believe that they are looking at the same picture but that might not be the case.

According to nineteen participants in the survey, the absence of explicit rules laid out by the organization when it comes to formalising the initiatives related to SCT could be a potential barrier. Every function in IKEA is driven towards fulfilling IKEA's strategic goals. But the routes that they take to achieve are quite varying where there are differences in planning, format and priority of tasks. This can be attributed to the Siloed way of working of the individual departments as highlighted in the interviews. Nineteen out of the thirty-four respondents of the survey also feel the same and they think this could be the largest potential organisation barrier (from the lists provided) in implementing SCT at IKEA.

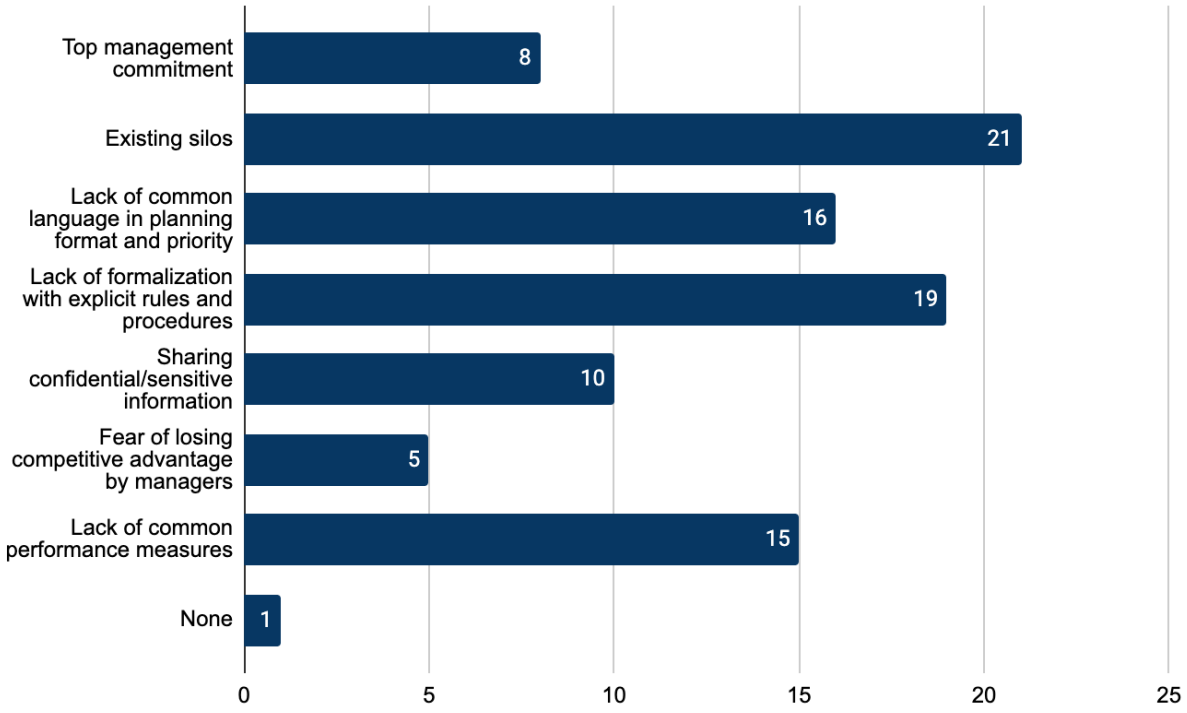

Figure 33: Survey response for SCT barriers related to Organisation. (No of survey responses- 34)

5.4.3 Barriers related to Technology and information quality

The barriers related to technology and information quality that were listed in the survey for respondents to answer were: sharing of right data at the right time at the right time, ownership of data, data standardization with the same format across the organization, integration of systems, sharing of limited and distorted information, sharing too much information/facts that are not central to one's own problem solving and last option being none of the above (figure 34). When looking at the responses, twenty-three out of thirty-four participants think the integration of the systems could be the biggest potential barrier in enabling SCT. The interviewees also mentioned the use of several legacy tools developed by the individual departments which will make the integration of the systems difficult to have a transparent flow of data. The interviewees were also posed with a question of "what could be the biggest barrier in implementing SCT at IKEA" and most of them unanimously answered that the current IT infrastructure is quite complex and integrating the systems could be a huge potential barrier.

As different IT systems are used in different departments, the data format of each of the systems is also different. When information is shared between the stakeholders, the interviewees feel that the information received is in a different format and need some rework to be done to change it to the format required by the user. One classic example could be the differences in the use of stock terms and definitions. One of the interview participants highlighted those different functional areas use different handling units like piece, pallet, cubic units etc. Converting the data to the required format

would be time consuming and could be a potential barrier while implementing SCT to have a standardised data format across the organisation. Eventually this is one of the second biggest potential barriers highlighted by the survey participants. This can also be related to Sharing the right data at the right time. The non-interaction of the legacy systems causes connectivity of data issues and sometimes people do not know where to find the information and whom to contact. This hampers the availability of the right data at the right time. The other second biggest potential barrier found from the survey is the ownership of data.

Enabling SCT will give the coworkers access to a lot of information that is not central to their functional area. This might sometimes result in an overload of information that could be potentially impeding criteria for people not wanting to share information. Twelve of the thirty-four participants in the survey identify this to be a potential barrier when it comes to technology and information quality. The interviewees also emphasized the fact having access to information is important, but the quality of the information is even more important.

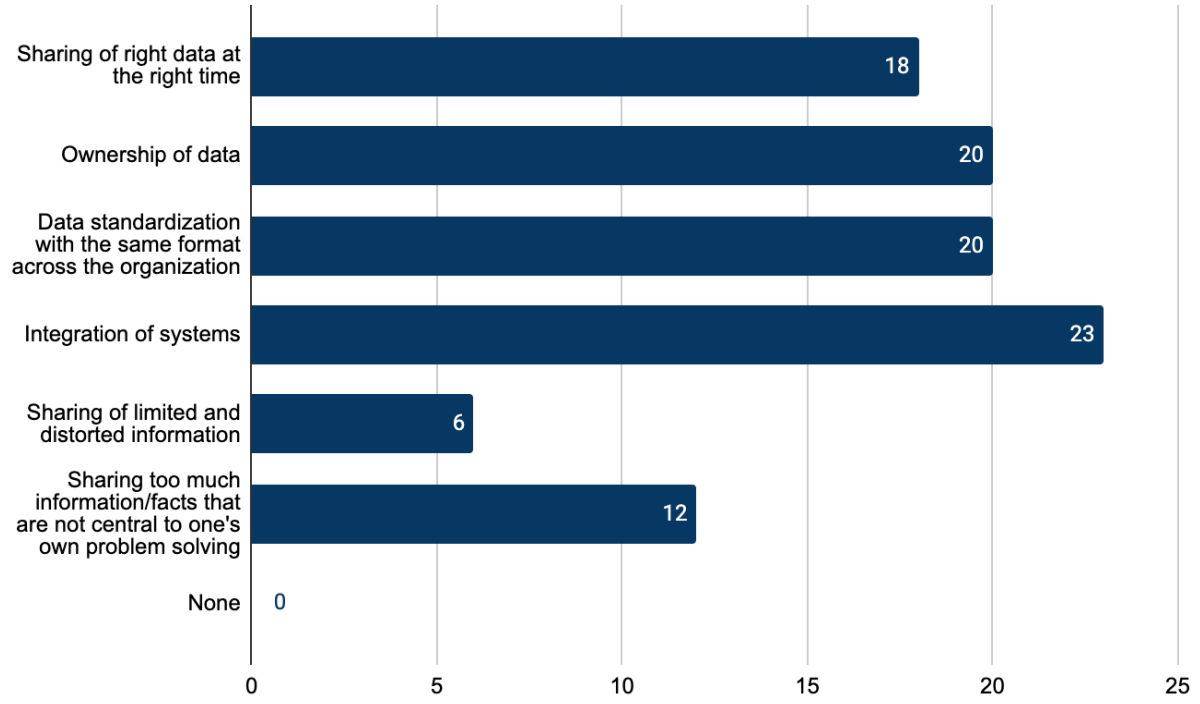

Figure 34: Survey response for SCT barriers related to Technology and information quality (No of survey responses- 34)

5.4.4 Barriers related to Supply Chain Characteristics

The options provided to the participants of the survey on the barriers related to supply chain characteristics (figure 35) are: (i) Characteristics of products, processes, and resource relationships, (ii) The length and complexity of the supply chain, (iii) The number of potential transaction partners, (iv) Frequency of transactions, (v) Extent of transactions, Transactions complexity and uncertainty,

(vi) Relationship quality between the supply chain partners, (vii) The geographical distance, (viii) Increased risk and interdependencies by sharing strategic information and (ix) Fear of Partner's opportunistic behavior/ Abuse of power.

The length and complexity of IKEA's supply chain is voted to be the largest barrier by nineteen out of thirty-four participants with regards to supply chain characteristics. This fact was also conveyed through interviews about how huge an organisation IKEA is, and it would be challenging to cover the entire landscape while implementing SCT. As the company is huge and as can be seen in the stakeholder list of few people from SCO and SCD in appendix 5 the number of transaction partners for each of the functional areas is large. This makes the interdependencies between the functions complex and pose a barrier to enable SCT at IKEA. This is also conveyed by eighteen out of thirty-four participants to be the second largest barrier with regards to supply chain characteristics. As can be understood through interviews, the people at IKEA are interdependent on each other for their day-to-day routine work as they collaborate a lot and this makes the frequency of transactions to be higher. This is also one of the biggest barriers identified by fourteen survey participants. Indirectly this contributes to the (i) extent and (ii) complexity and uncertainty of transaction to be potential barriers as conveyed by six and ten participants of the survey.

One of the important aspects of information sharing is existing relationship quality between stakeholders. Through literature study it was identified that the extent of relationship quality could pose barriers to information sharing and can cause resistance in people to share information due to lack of trust. When this question was posed to the participants during the interviews few of them elaborated that generally everybody is open in sharing information with each other internally in IKEA until and unless it is not marked as confidential and sensitive information. The IKEA values drive people to trust and co-operate with each other. They emphasized relationships within departments are usually good and there will be no problems in sharing information. On the other hand, other participants said that sometimes trust plays an important role in sharing information and when priorities of different activities clash it affects the relationships. Twelve participants in the survey also feel the relationship quality between the supply chain partners could be a potential barrier in this implementation journey. When it comes to sharing strategic and confidential information few interviewees think there would be increased interdependencies between the stakeholders, and this makes them not want to share this information. Four of the survey participants also think this could be a barrier in wanting to share information.

Participants in the interviews had varying thoughts on the pitfall of opportunistic behaviour being a barrier in sharing information. A few of the participants said that there will always be a scenario where people would want to capitalise and use the information for their benefit, and this could be a risk while others said the signed agreements and the legal processes play an important role against safeguarding IKEA from this aspect. Many emphasized on the importance of trust and long-term

partnerships and how this avoids abuse of power by another individual. This is also reflected in the survey where only one participant thinks this could be a potential barrier.

IKEA has a global spread and members of a team are located across the world. Despite this fact, interviewees believe that it is the IKEA values that brings them together and the digital connectivity has brought them even closer. The geographical distance is not considered to be a huge inhibitor in enabling SCT at IKEA. Only four of the thirty-four participants in the survey think it to be a barrier when it comes to supply chain integration.

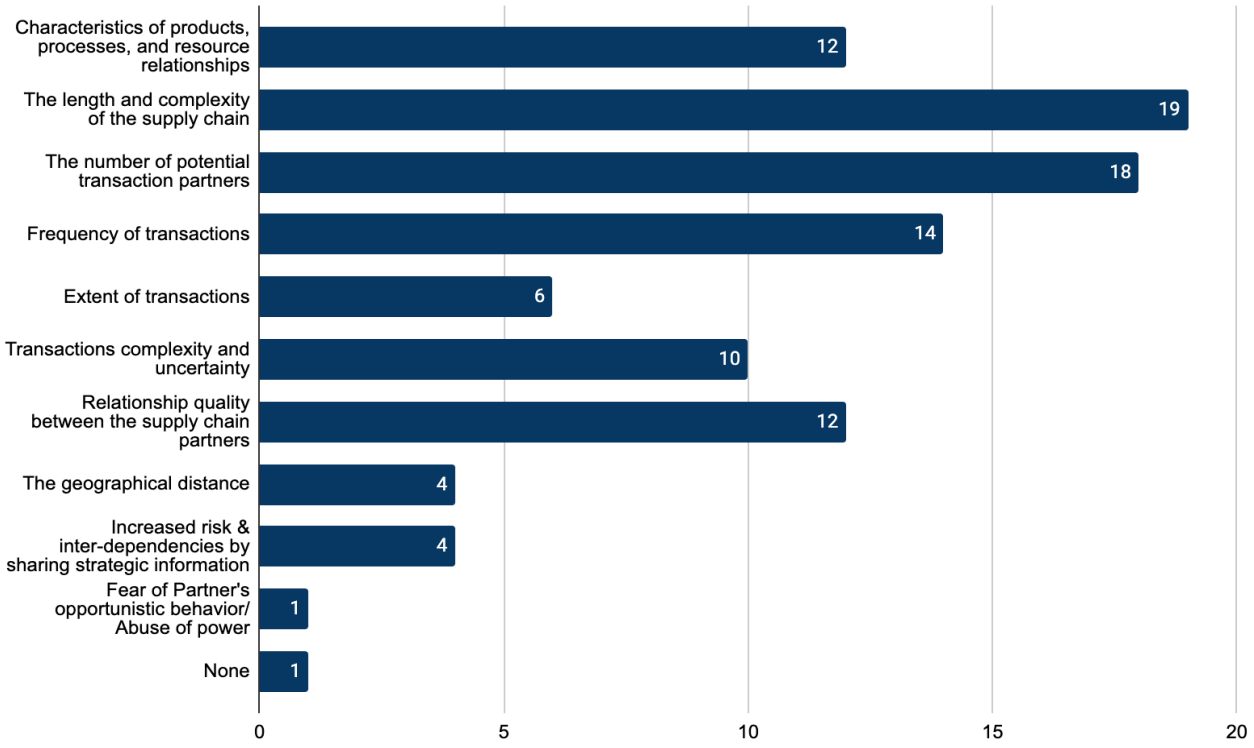

Figure 35: Survey response for SCT barriers related to Supply chain characteristics (No of survey responses- 34)

6. Case Analysis

In this chapter the case analysis is done using pattern matching. The chapter is mainly divided into three main parts namely the Analysis of SCT at IKEA, Analysis of Benefits of SCT and Analysis of Barriers of SCT. The analysis is done by comparing to theory in developing the final framework. A root cause analysis is also performed to identify major causes including ways of overcoming the barriers identified through theory and empirics.

6.1 Analysis of SCT practices at IKEA

In the journey of implementing supply chain transparency the following concepts and facets of transparency could add value to this transformation. The sections below correlate IKEA's current scenario and practices with developed theoretical foundations related to SCT.

6.1.1 Conditions to implement transparency

As suggested by theory (figure 26) an organisation should implement or transition towards supply chain transparency when (i) stakeholders distrust the organisation, (ii) organisation sell undifferentiated products/services or (iii) it strives for ethical excellence. Based on the critical findings from the interview and the assessment document of SCT made in 2020, provided by IKEA, the company aims to implement SCT as their business is transitioning from (i) traditional customer interaction to omni-channel with many interactions, (ii) standard products to tailored offering and services, (iii) only mass production to improved mass-customisation, and (iv) continuously changing customer behavior demands this new transformation to digitalisation, in turn implementing supply chain transparency. These new drivers are the business drivers enhancing their choice of SCT.

IKEA co-workers also highlighted that IKEA should transition from a silo way of working to an end-to-end connected supply chain. According to them, SCT is required for achieving (i) coordination and enriching trust between stakeholders, (ii) enabling real-time tracking and tracing of products along the value chain, (iii) identifying factors to reduce cost and enhancing sustainability, (iv) creating clarity and honesty towards the end customer.

Comparing theory to empirics it is evident that IKEA is in line with the condition's theory suggests for implementing SCT. IKEA as an organisation is aiming for enriching trust and collaboration with their stakeholders and seeks to create clarity and honesty towards the end customers (striving for ethical excellence). Also, the business drivers (as mentioned above) identified by IKEA clearly justify their choice of digital transformation and achieving an end-to-end integrated supply chain.

6.1.2 Types of Transparency

Hultman and Axelsson (2006) defined four different types of transparency (figure 15). Exploitation of new technology and through digitalisation firms could increase transparency in different dimensions.

Interviewees highlighted currently there is limited transparency and that there is no technology in place that can track and trace the products and flows along the supply chain which limits the degrees of visibility. Moreover, a few participants highlighted the lack of clear line of visibility, i.e., creating difficulty in extracting information for their work as they might not be aware of whom to contact and where to find the required information. With this new transformation they are certain that SCT (i) will enable visibility along the supply chain through track and trace, (ii) will integrate related systems and enhance communication providing a line of visibility concerning where to find the relevant information, (iii) will connect silos and supply chain systems.

Therefore, it is evident that IKEA aims at achieving supply transparency, organisational transparency and have also taken into consideration technological transparency. Through use of new technological solutions IKEA can also aim for cost transparency as it will provide transparency on price and cost aspects to enable effective sourcing.

6.1.3 Degrees of Transparency

Different degrees of transparency can be present between stakeholder relationships. Evaluating the responses from the participants, it can be observed that the different departments experience different degrees of transparency (Table 11 and 12).

The Category food logistics service and the Category Distribution departments in SCO chose to be completely transparent and according to them there is no specific information which could be kept secret from their internal stakeholders. On the other hand, the rest of the departments also are open to share relevant information with their stakeholders which is considered to be important for their work. However, they also deal with confidential/sensitive/strategic information for which they would not provide access to other stakeholders. In addition to this, participants also highlighted, that they would not share some specific information if they were not confident of the appropriateness of the information (as it might lead to other departments distrusting them in the future). Therefore, based on these feedbacks they are considered to be translucent, sharing only specific information with each other. Though a fact to be noted here is that the departments have legal boundaries with respect to sharing strategic/confidential information.

Table 11: Degree of transparency in different functional areas in SCO

		Transparency strategies			
Function	**Area**	**Transparent**	**Translucent**	**Opaque**	**Comments by the participants**
SCO	Flow Replenishment		x		Around 90% of the cases no secrets are kept, and information is shared completely with stakeholders. Cases when relevancy of information is uncertain and if the information is confidential and sensitive (like purchasing price) then in that case it is shared with only specific departments. Your own department information that you would not want to share with the other department
	Category Land		x		At times people might ask for irrelevant information which might not concern them and is specific to the category land department. For example, product costs or transportation prices in such cases the information is not shared.
	Flow Performance		x		Transport prices should only be available for SCO as they are working with it and responsible for pricing and costing (sensitive information)
	Category Food Logistics services	x			There are generally no secrets internally and transparency should be the way forward. No such information is there which cannot be shared
	Flow capacity planning		x		Information related to scenario planning is not generally shared until its fully complete and reliable but in other cases information is shared freely. Information that you believe would not add value to other work, your own department information that you would not want to share with the other department
	Category Distribution	x			Stakeholders are provided with complete access to information apart from confidential and sensitive information
	Supply Operations		x		Information that you believe would not add value to other work
	Service Provider Operations		x		Confidential & Sensitive information, Information that you believe would not add value to other work

Table 12: Degree of transparency in different functional areas in SCD

Function	Area	Transparent	Translucent	Opaque	Comments by the participants
SCD	Need Planning and Balancing		x		There are legal obligations working with retailers with respect to confidentiality and GDPR, therefore restricted and pre-specified information is shared.
	SCD Support		x		Confidential & Sensitive information
	Need Planning		x		Confidential & Sensitive information, Information that you believe would not add value to other work
	SCD Design and Planning		x		Information that you believe would not add value to other work, more time to explain the data and probably they may use it in a wrong way. so good to understand the actual need rather than accessing the entire database. Confidential & Sensitive information
	SCD Planning		x		Information that you believe would not add value to other work

6.1.4 Direction of Transparency

SCT can be either unidirectional or bidirectional depending on the nature of the relationship between the stakeholders. As explained above in section 4.2.2 under facets of transparency, in many scenarios even when the information flow is bidirectional the sharing of information need not be reciprocal. As per the interviews, generally in most of the cases the information sharing is bidirectional, i.e., stakeholders sharing information with each other, despite being translucent. While sharing information with external stakeholders IKEA extracts information from the external service providers at the same time-sharing relevant information with them such as forecasts, volumes, capacities etc. As there are legal rules and regulations in place, they restrict sharing confidential/sensitive/strategic information to avoid data breach or to avoid misuse/exploitation of information by the competitors. Therefore, even though along the supply chain there is a bidirectional flow of information exchange, the sharing of information is not reciprocal in nature as also suggested by theory (Kembro *et al.*, 2017).

6.1.5 Distribution of Transparency

As discussed in the theoretical framework (figure 14), transparency in information exchange can be distributed either vertically or horizontally. From the data collected through the interviews, it is identified that although SCO and SCD functions are dependent on each other for information, there is certain information that one function does not want to share with the other. These are due to multiple reasons like relevance of information to the other department, non-finalised activities,

people from one department think that the information is not needed for other departments, confidential, sensitive information such as cost, retailer information. GDPR policies were also one of the reasons quoted by the interviewees for not wanting to share information with the other department. These practices indicate the presence of silos between the functions. Although there is transmission of information between functions, it is not fully vertically transparent between SCO and SCD functions.

6.2 Analysis of benefits of SCT

6.2.1 Benefits to people, function, and information quality

Based on the insights from interviews and survey responses, it is evident that SCT can bring numerous benefits to the people, individual functions (SCD and SCO) and IKEA as an organisation through improved information quality. According to the majority of IKEA co-workers this new SCT transformation is a way going forward and it will benefit IKEA and its co-workers. The benefits that are not mentioned in theory are marked in red and underlined in table 13.

Table 13: SCT Benefits to people, function and information quality in SCO and SCD

People	Will make work much easier and more time-efficient
	Will ease up finding information
	Reduce workload
	Will eliminate unnecessary discussions
	New learnings and insights
	More time for value adding tasks
	Clearer ownership
	Quicker decisions
	Enhancing confidence in co-workers regarding working the latest information
	Reduced interdependencies to extract information
Functions	Have access to common data enabling dynamic decision making and solving problems through the same perspectives
	Improvised forecasts
	Accurately measure performance of external service providers, like lead-times and on-time deliveries
	Provide a bigger picture to decision making
	Huge potential to simplify the processes

	Eliminate own local ways of working
	Reduce transportation costs
	Less bureaucracy
	Better follow-up on order flows
	Enable value-based decision making taking into consideration different parameters like cost and availability
Information quality	Improve accuracy and reliability of information
	Information sharing will improve work efficiency but only if it's at right level to make a decision and with right quality
	Easier access to source data
	Clear structure of documentation storing
	Access to updated information at the right time leading to speeding up the work

One of the open-ended questions posed in both the interviews and survey was 'How would SCT benefit you as an individual?' A variety of answers were received as indicated in the empirical section. As the definition of SCT goes "*Transparency of a supply chain is the extent to which all the stakeholders have a shared understanding of, and access to, the product-related information that they request, without loss, noise, delay and distortion",* it mainly aims to improve the quality of information being transmitted. Many participants also believed that the initiative would improve the data quality by having a common data source that will be easily accessible, accurate, reliable and updated. Having access to the right information in the right format will improve the work efficiency by reducing the work and time spent on collecting, filtering, and converting the information to the required format. Instead, the coworkers can spend this time on value added activities. When the people work with the right updated information, it enhances their confidence as suggested by a survey participant.

Hofstede *et al.* (2004) emphasized that SCT enables sharing relevant information at the right time eliminating masking or distortion of information and provides access to the required information. On the other hand, empirics also highlighted that apart from enjoying the benefits which theory suggested, transparency in information exchange will also provide a clear structure to information sharing and storing documents at the right place. Looking into the aspect of people-specific benefits of SCT, theory highlights benefit of SCT related to job engagement, improvement in job performance, enabling collaboration with SC partners, enhanced trust in management and improved decision making but empirics stated different benefits than what suggested in theory (table 13). This clearly states that SCT will not only benefit people in reducing the workload, eliminating unnecessary discussions and non-value-added tasks, reducing interdependencies and enabling

quicker decision making but as theory suggests will also improvise their job performance, enable trust and collaboration and will improve the decision-making process taking into consideration a holistic view of value chain.

As discussed earlier, the SCO and SCD functions are quite interdependent on each other for information. On implementation of SCT, the information will be uploaded in one common platform from where it can be accessed when required. This reduces the interdependencies among people who want to access a certain information from another. Through SCT, people will be equipped with a larger gamut of information which helps them to get an entire perspective on IKEA's supply chain. This helps in better informed decision making within the function and at the organisation level. As the functions will be integrated through a common information thread, it will eliminate local ways of working of the functions and align the people's perspectives. Theory also suggests SCT will enable better decision making with total supply chain integration (Auramo *et al.*, 2005, Barratt, 2003, Barratt and Oke, 2007, Handfield and Nichols, 2002, Parris *et al.*, 2016, Maskey *et al.*, 2019, Kembro and Selviaridis, 2015).

Most of the work done in SCD and SCO are built on forecast. Improper forecasts have an impact on the inventory level, resource utilisation, built up cost, fulfilling the KPIs etc. As the same forecast is also shared to the external stakeholders, it might impact the relationships and business collaboration. Having access to the right figures through SCT will help the functions and the organisation to improve the forecasts. Accurate forecasting aids with reduction of unnecessary spending, proper scheduling of production/staffing, avoiding missing potential opportunities, and managing the company's overall cash flow.

Through tracking and tracing features, SCT will help in better follow up of orders, reducing transportation cost by accurate planning and consolidating. The umbrella of SCT at IKEA extends to the external stakeholders like suppliers, transport service providers, external service providers and other legal entities of IKEA like Ingka. By mutual exchange of information, it is possible to measure the performance of the external service providers for example if they meet the promised levels on lead times, on-time deliveries, quality etc. When participants were asked what benefits SCT could bring to their individual work they stated multiple advantages to SCT, most of them mostly in line with theory. Although ability to measure performance of external service providers was an added benefit to the exhaustive list of benefits (table 13). According to IKEA co-workers, SCT transformation will be a steppingstone in simplifying processes and harmonising common ways of working leading to less bureaucracy.

6.2.2 Benefits to IKEA as an Organisation

Despite benefitting people, function and information quality, the previously discussed benefits ultimately contribute to further development of the organisation in a variety of ways through implementation of SCT. Apart from these benefits, table 14 indicates a list of benefits that were

answered by the co-workers on the second open ended on benefits of SCT, “What benefits could transparency in information sharing bring to IKEA and its supply chain?”. Interesting insights can be derived comparing theory to empirics. The benefits that are not mentioned in theory are marked in red and underlined in the table 14. Only 42% of the responses are in line with theory and findings through empirics highlighted further additional SCT organisational benefits related to reducing complexity across organisation, integrated IT systems, creating one common source of truth and common ways of working. Also, theory does not identify the siloed way of working as a SCT barrier but according to empirics, participants in the interview highlighted SCT should be a solution to integrate silos. Therefore, implementing SCT will help in overcoming the silo way of working in the near future which could be a potential limiting factor currently towards achieving this transformation. Moreover, theory suggests that SCT enables end-to-end connectivity in the supply chain and improves visibility. Adhering to this fact, it can also be seen through empirics that SCT is considered to be a first step in creating an autonomous supply chain and can enable capturing different events along the supply chain.

Some of the benefits like creating common ways of working by eliminating local working methods, trackability and traceability, and providing a holistic view of IKEA’s supply chain are already discussed in the previous section where it contributes to the functions and the organisation. Apart from these, having a common source of information helps in simplifying the communication across the organisation, as the co-workers need not have to be behind all the stakeholders asking for information. Overall, through these realised benefits, there will be better coordination and collaboration among the people leading to an enhanced supply chain.

Currently, as highlighted through the survey and interviews, different tools are used by different functions and there are legacy systems that use different data formats, there is always a clash of commonality of data, as different functions have their versions of data. It is evident that through SCT, there will be one source of true information that will be used by all the functions. This will eliminate the misunderstandings, conflicts that happen between the functions because of the difference in the represented information and also enhance the trust between the partners. Better collaboration among the coworkers paves the way to improved knowledge sharing that benefits the organisation. This argument can be further supported with theory as enhancement in trust between partners and collaboration will positively influence transparency (Van Dijk *et al.*, 2003) along the supply chain and will also ensure that others will not abuse the power gained from increased knowledge (Palanski *et al.*, 2011).

Enabling SCT will help IKEA in improved planning with the right information at hand. This will reduce the deviations between the planning and what happens in reality. Better planning will help in improving the organization's productivity, efficiency, lead times, better management of cash flows, reduced organisational complexity and will equip the organisation to be proactive in taking actions. IKEA is an organization whose business model and value chain are mainly focused on meeting the

customer's needs. Enabling SCT will help IKEA to provide better services to its customers and also help its circularity goal through better reverse flow of products. These benefits totally align with theory as well. As discussed in section 4.3, researchers indicate transparency enables better coordination of physical movements within the supply chain through real time tracking, triggers immediate, corrective actions relating to flow of products and materials, and improves customer service elements and customer satisfaction by enhancing customer trust.

Table 14: SCT Benefits to IKEA as an organisation

Remove/Integrate silos	Provide holistic view of value chain
Will harmonise and create common ways of working across the organisation	Will help in reverse flow of products from customers
Help in simplifying the communication across the organisation	Efficient and Improved knowledge sharing
Track and trace enabling supply chain visibility	Improved accessibility of information leading to proactive actions
A potential to integrate with suppliers, retailers and customers	Integration of different information sharing systems
Better planning of inventory and stock optimisation benefiting the overall business	Reduced scope of hidden actions and masking information
A way of removing/integrating different legacy systems	Reduced blame games and accusations
One common source of truth	Reduction in lead-times
Better visibility on planning v/s execution	Enable collaboration and trust
Increased productivity, organisational efficiency and improved services	Clarity and honesty towards the end customers
First step to an autonomous supply chain	Reduce the complexity across organisation
Establishing the right balance between cost and efficiency.	Help in capturing different events in the supply chain
Increased visibility will lead to taking more focussed and specific actions for improvements in different business areas	Transparency in information sharing will enable collaboration amongst stakeholders leading to executable supply chains
Improved sustainability through network optimisation	Better coordination

6.3 Analysis of Barriers of SCT

In this section the list of barriers collected through extensive literature review and the list of barriers identified through the survey at IKEA are compared to understand the similarities and differences of perception of SCT at IKEA. The section is classified into subsections based on SCT implementation barriers related to i) People, ii) Organisation, iii) Technology and information

quality and iv) Supply Chain Characteristics. The same classification pattern is followed as the theoretical and empirical sections related to barriers of SCT.

6.3.1 Barriers related to people

Trust between the stakeholders is considered to be one of the important barriers and discussed most in the theory on SCT. As explained in section 4.4.1 (people specific barriers), trust directly impacts transparency as it acts as a governance mechanism towards information exchange and enhances willingness to share information between business partners. But when comparing it to the answers received from coworkers at IKEA, only 40% of the participants seem to think trust could be a barrier among people. It is the IKEA values that drive the people who work together in achieving the company's strategic goals. But at the same time a little above 60% of the participants think that internal resistance to change among the co-worker could be the biggest barrier in implementing SCT, which in theory is conveyed by only 15% (figure 36). The study mainly aimed to look at transparency within IKEA's supply chain through collecting data from SCO and SCD functions. This could be reason for deviation between the theory that talks about transparency between supply chain players and empirics that mainly focuses on intra organisational transparency.

Based on comparison of theory and empirics (figure 36), Organisation culture's influence on closeness and Willingness to communicate or share information seems to be quite similar in trend to theory. Although in interviews people conveyed the fact that they would not mind sharing any information between departments within IKEA, willingness to communicate was still mentioned as a barrier by more than 40% of the participants. Two barriers that were identified by the survey participants and not highlighted in the literature review, were barriers due to (i) risk or worry of misuse of information by the person sharing information and (ii) different legal entities, which is the case in IKEA. One of the key takeaways is that according to theory, the role of trust is the most discussed barrier of all categories. So, trust should also be considered as one of the important barriers in implementing SCT at IKEA, although it was given little less importance in the data collected from SCD and SCO functions. This could also be an important determinant when it comes to information sharing between external stakeholders like suppliers, service providers and IKEA. Although the confidentiality of information is covered through legal contracts, trust plays a major role for the partners to freely share information enabling transparency in the supply chain.

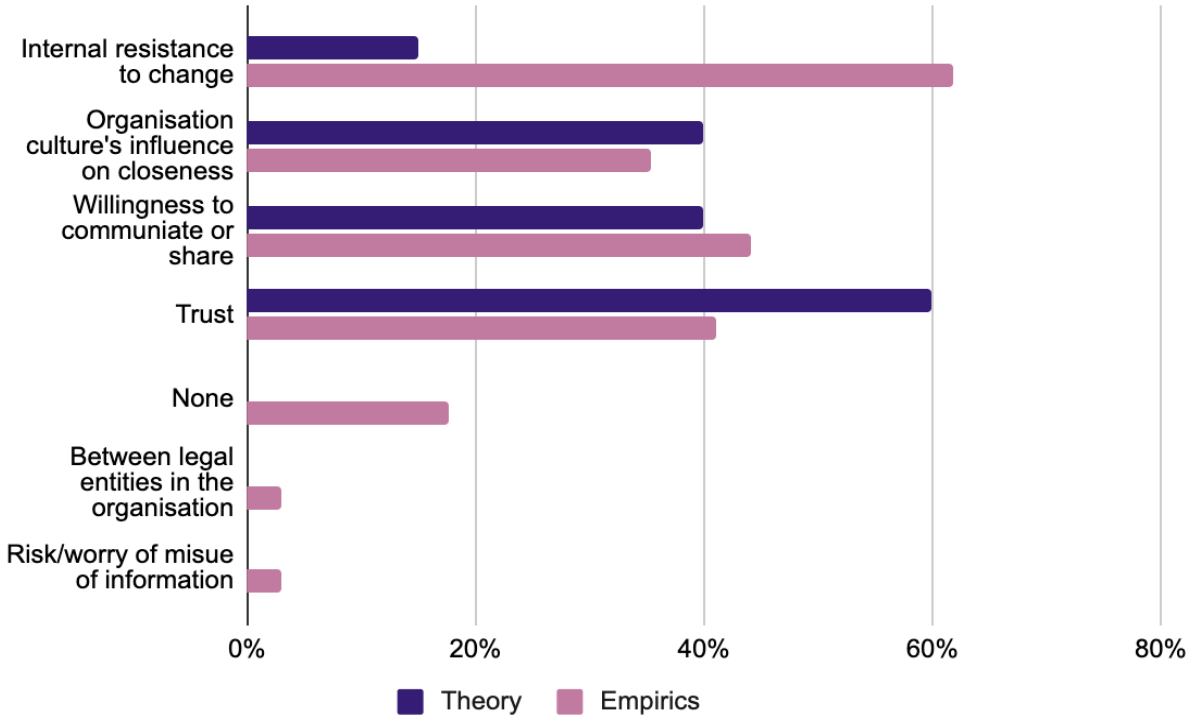

Figure 36: Comparison of people specific barriers from theory and empirics

6.3.2 Barriers related to organisation

As identified at several instances previously, the existing organisational silos is one of the topmost barriers in implementing SCT, highlighted both by the interviewees and survey participants. (i) Lack of communication between the functions, (ii) Losing focus on company goals, (iii) Lack of common language in planning, format, and priority, (iv) Lack of common performance measures (figure 37) could be some of the reasons for interorganizational silos. In interviews, the participants were asked if they have a common performance measure and the answers received were that they have individual metrics but still are connected to the company's strategic goals. But one important observation made through the interviews and surveys is that people miss seeing the bigger picture of what they are contributing to. In that journey they are lost in the Silos. Although several organisational changes have taken place in the recent past at IKEA to integrate different functions, it can be assured through the findings of the thesis that the existing silos are a major barrier not only in the implementation of SCT but also in the success of organisational initiatives. Contrarily, theory does not identify working in silos as a limiting factor of SCT, but instead many authors as explained in section 4.4.1 (table 9) highlighted lack of formalization, common performance measures, and common language in planning as barriers of SCT which could be interlinked to the siloed way of working.

Top management commitment is considered to be a moderate barrier both in theory and survey. This is also reflected in the interviews where the participants conveyed the fact that the top management is committed when it comes to the implementation of SCT at IKEA, as it is one of the important

enablers in the success of implementation. The importance is twofold. Firstly, any implementation/change initiative creates resistance in the organisation. To address this resistance, it is significant that top management expresses its commitment and support to the people in taking up changes in their ways or working/ adapting to new technologies. Secondly, an initiative like SCT involving the latest technologies requires huge financial investments, which is not possible without the top management's interest. Although, through interviews it was evident that top management is taking the right initiatives and is committed towards this change (refer sections 5.2.1 and 5.2.2). However, one of the participants stated that "Currently too many initiatives are running, and people might not be aware of them due to the siloed way of working. Rather it will be beneficial to collaborate together and take one initiative benefitting all." This aspect brings out two perspectives: (i) Top management is committed as many initiatives have been taken, and on the other hand (ii) too many initiatives focusing on the same agenda could lead to duplication of work and not benefitting the entire organisation.

Second most important barrier in the organisation category is the lack of formalisation with explicit rules and procedure. According to IKEA co-workers, the lack of IT standardization and use of different legacy systems affects explicitness and timeliness of information. Participants in the interviews highlighted that the systems do not talk in common languages and information is shared in varying formats which needs filtering of the information before its use. For instance, forecasts being mentioned in weeks in some scenarios and in pieces in some scenarios, logistics backlogs are sometimes measured in cubic meters and sometimes in the number of trucks. As highlighted above in section 4.4.1, formalization is necessary for successful collaboration execution (Min *et al.*, 2005), therefore lack of uniform format across the organisation can be a potential barrier affecting collaboration and could create mistrust between business partners, in-turn affecting transparency.

Sharing confidential and sensitive information is in line with the theoretical trend with around 30% of the survey participants think this could be a barrier in implementing SCT. Few interviewees also addressed this aspect with the response that information that is considered sensitive/confidential cannot be shared with external stakeholders. As highlighted by an interviewee "within IKEA they do not find the reason for not wanting to share". However, in reality the co-workers do not want to share confidential/sensitive information with other functions. This can also be attributed to the inter-organisational silos.

Kembro *et al.* (2017) highlighted in their research that companies might be fearful of sensitive/confidential information reaching their competitors and being misused. Being in line with this fact, IKEA co-workers also informed that careful measures are taken to ensure sensitive/confidential information is not shared with external stakeholders in-order to ensure information is not misused against IKEA. Though, the participants in the interviews stated they have right legal laws and regulations in place which clearly indicate what information to be shared and

with whom information can be shared within and outside the company. This is in line with Kembro *et al.* (2017) legal framework as explained above in section 4.4.1 (organisational barriers).

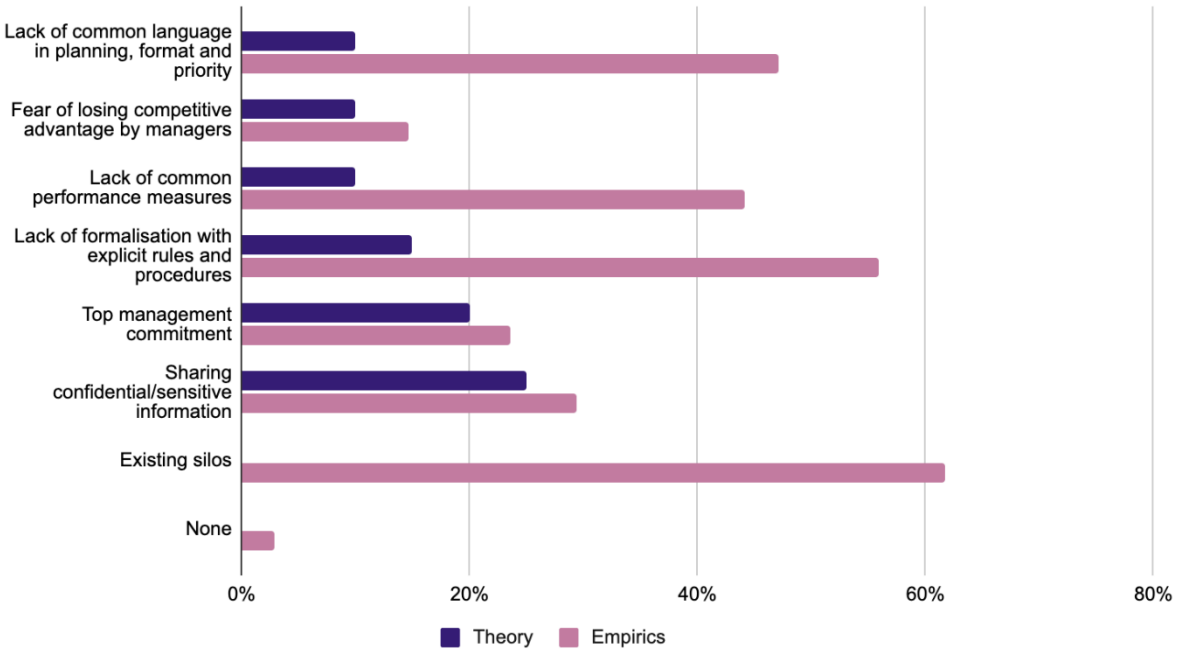

Figure 37: Comparison of organisational barriers from theory and empirics

6.3.3 Barriers related to technology and information quality

As discussed in the empirical section, legacy systems are one of the highlighting points mentioned in the interviews and most of the interviewees and majority of the survey participants think that could be a huge barrier in integrating the systems. This is because the different systems have different data formats which makes it difficult for the systems to integrate. This is also voted out to be the topmost barrier in the technology and information quality category in enabling SCT. In fact, integration of systems tops the entire list of barriers to SCT on the contrary to theory where only 20% of the literature considers this aspect to be a barrier. Similarly, considering the several tools used currently and their different data formats, standardisation of the data format across the organisation at IKEA would be cumbersome and is also conveyed as one of the major barriers of SCT by approximately 60% of the survey participants but only by 15% of the literature in theory.

Only twelve of thirty-four survey participants (figure 38) think they have the right information sharing platform. Twenty of the remaining participants said that they have the right tools only partly. This can be attributed back to the legacy systems in some functional areas that are not accessible by the many and at the same time also due to the accessibility of common tools like QlikView, Power BI where many reports can be accessed. As identified through interviews and survey, email tops the mode of information exchange. This clearly indicates how there are multiple chances of information

loss, delay, distortion and non-accessibility to all those who need it and can be seen as a barrier as highlighted by 50% of the survey participants as 'Right data captured the right way at the right time'.

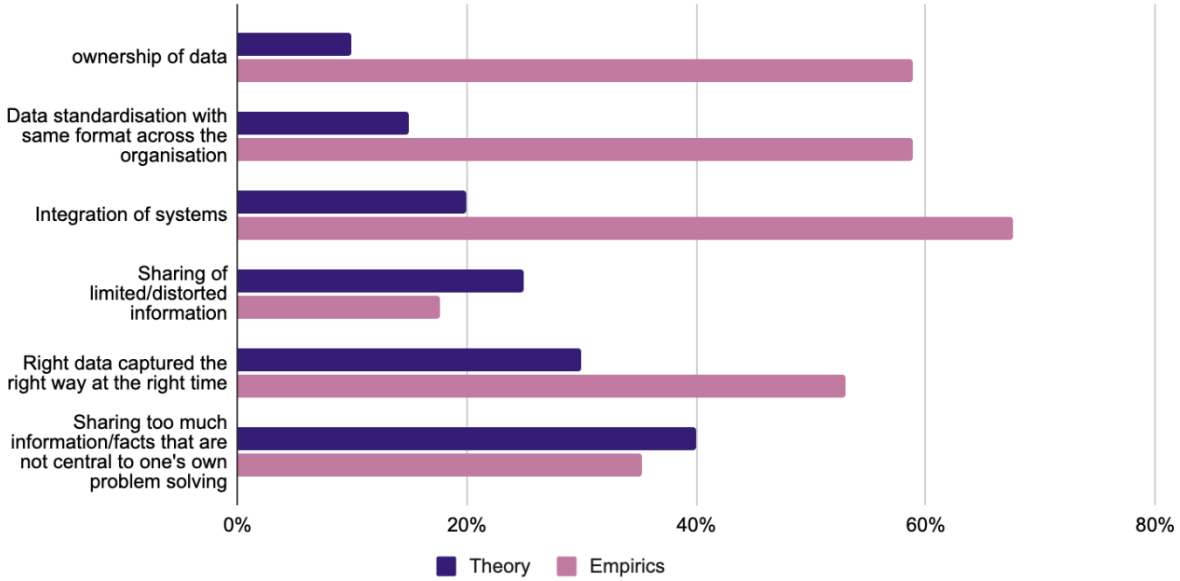

Figure 38: Comparison of technology and information quality barriers from theory and empirics

Some interviewees also conveyed the fact that they had to update a particular piece of information with several tools for other people to access the right information. This results in loss of time and efficiency of the co-worker. This could be clearly interlinked to a critical finding from theory. According to Kembro and Selviaridis (2015), delayed information has little or no value for decision making in the supply chain. It can in fact be detrimental for upstream partners because decisions are made on "old" and potentially incorrect information.

With these different tools in place, eight survey participants (figure 38) do not find it easy to extract information for their work as it makes it difficult to hunt for a piece of information at the right place and from the right person. It is also identified through the data collected that there is no process owner who takes responsibility for a specific process. Similarly, the process also does not define the responsible person who owns the data. This could create difficulties in implementing SCT as the lack of ownership of data causes an imbalance in ensuring the right quality of data and is considered to be a major barrier as shared by around 60% of the survey participants. As discussed in the empirical section, there is a gap between what is laid out in processes than what happens in reality. Rightly structured processes are a strong foundation to guide the coworkers in performing efficiently in their work and a key enabler of SCT at IKEA by laying down required guidelines for all aspects of communication like where to access a particular data, which stakeholders are to be updated when there is a change in data, whom to get in touch in case of discrepancies in data, how frequently to

update a certain piece of information, which information can and cannot be shared to different stakeholders and similar.

Every initiative has its own pros and cons. There are possibilities that some of the disadvantages might become barriers that stop people from not wanting to take up the initiative. In the case of SCT, it feeds the user with a large amount of data that can be perceived as a non-valuable overload of information. Although this is not considered to be a huge barrier by researchers in theory, around 60% of the survey participants and majority of interviewees in IKEA think this to be one of the major barriers in realising SCT. One of the interviewees rightly pointed out the fact that rather than pushing all the information, pulling the required information would help overcome this barrier of fear of overload of information.

The business market of IKEA is dynamic, and the needs of its customers are frequently changing. This calls the need for SCT at IKEA for quick transmission of information from end to end, enabling quick decision making to meet the changing customer demands. Currently, there are several instances that are identified through interviews that certain reports are less frequently updated than how it needs to be done. Also, people wait for other stakeholders to share information when asked upon, as they do not have access to the required tools. This causes delay in receiving the information and people are forced to make decisions on old and potentially incorrect information. Apart from the delays, there are many chances of misinterpretation of data between stakeholders due to the non-uniformity of data formats and the need for data conversion. As discussed in the empirics, one classic example could be the differences in the use of stock terms and definitions. One of the interview participants highlighted those different functional areas use different handling units like piece, pallet, cubic units etc. Such delayed, misinterpreted/distorted poor quality information is detrimental to the decision made. Hence it is considered as a barrier to SCT by only six of thirty-four (18%) survey participants. In theory it is considered as a barrier by 25% of the researchers (figure 38).

6.3.4 Barriers related to supply chain characteristics

IKEA is a global organisation that operates in more than 50 countries with approximately 1100 suppliers delivering goods through more than 35 DC or directly to 433 stores. A long and complex supply chain of IKEA's has a large number of potential transaction partners, high frequency and extent of transaction, lots of transaction complexity and uncertainty as mentioned in the theoretical and empirical sections. When SCT is implemented at IKEA, the implementation cannot be done in the entire organisation but in different phases at different parts of the organisation. However, as identified through interviews, there are a lot of interdependencies between the functional areas which makes it even more complex to implement SCT at IKEA's supply chain. These are the reasons why the above-mentioned aspects are considered as barriers as mentioned in the figure 39. The trends of these factors in theory are relatively less compared to the complexity of IKEA's supply chain.

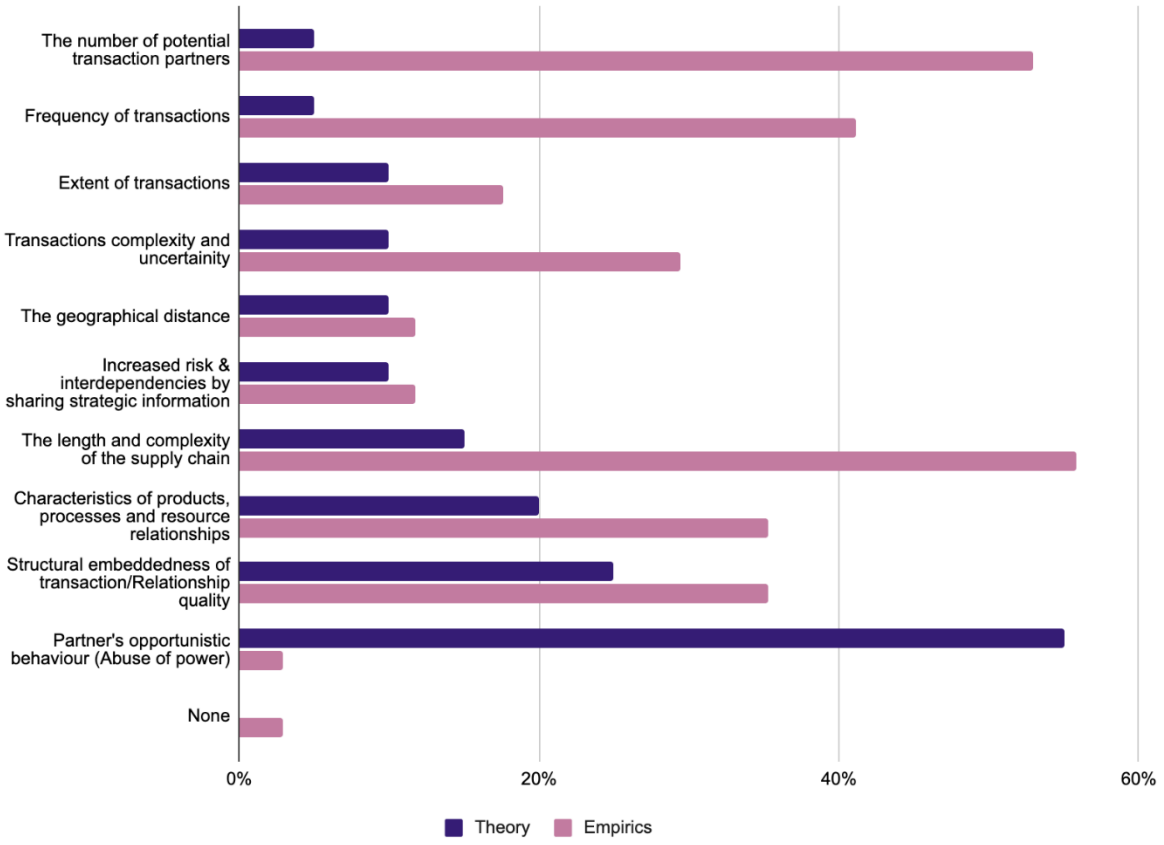

Figure 39: Comparison of supply chain characteristics barriers from theory and empirics

IKEA handles more than 10,000 unique articles in each store, and this indicates a huge product range. Sustainability is an important goal of the company and as a part of it responsible sourcing plays a key role. There are several compliances specific to product with respect to material, production techniques, labour laws depending on the place of manufacturing and similar others. This creates complex characteristics of products, processes and relationships of resources involved and is considered a SCT barrier by 35% of the survey participants which is higher than theoretical references (20%).

One of the notable inferences in the figure 39 is the response to the opportunistic behavior of the supply chain partners. Much research has discussed this to be one of the important barriers that hinders the people in freely sharing information. One of the interviewees explicitly mentioned this aspect that would stop him from sharing a certain information to other co-workers within IKEA, who might use it against him. However, the other interview responses were similar in expressing how IKEA values bring them together and they have not experienced such situations. This conveyed the fact that fear of opportunistic behavior will not be a huge barrier in implementing SCT at IKEA as also identified through survey responses. However, it could be a potential barrier limiting the

information exchange with companies outside of IKEA, that might reduce the scope of the SCT solution.

As mentioned in the empirics, relationship quality is one of the important aspects that determines the accessibility of information from stakeholders and can be a moderate barrier in enabling SCT, as it might be a little difficult task to bring people onboard when there are indifferences. However as conveyed through the interviews, IKEA values comes above all indifferences in bringing people together. SCT can be looked at as a way forward to remove this barrier to make sure people have the access to all the required information to perform their work efficiently.

Theory suggests that through enabling SCT, there would be increased interdependencies between the stakeholders and risk involved in sharing strategic information (Kwon and Suh, 2005, Kembro *et al.*, 2017). However, it is considered as a barrier by only 10% of the survey participants and as well by interviewees who felt there would be a problem in sharing such information within IKEA. In fact, one of the benefits of SCT quoted by an IKEA co-worker is "Reduced interdependencies to extract information".

6.4 Root cause analysis of Barriers

A root cause analysis (figure 40) was performed on the identified barriers to SCT. Although the barriers are classified into categories based on their commonality as discussed in the previous sections, upon analysing the root cause of each of the barriers, five major causes were identified. They are (i) Organisational silos, (ii) Change Management, (iii) IT infrastructure, (iv) Information sharing practices and processes and (v) Supply chain complexity. It is to be noted that the different barriers in different categories (people, organisation, technology and information quality and supply chain characteristics) were due to these five major causes. Addressing these major causes will help IKEA overcome several barriers attributed to it.

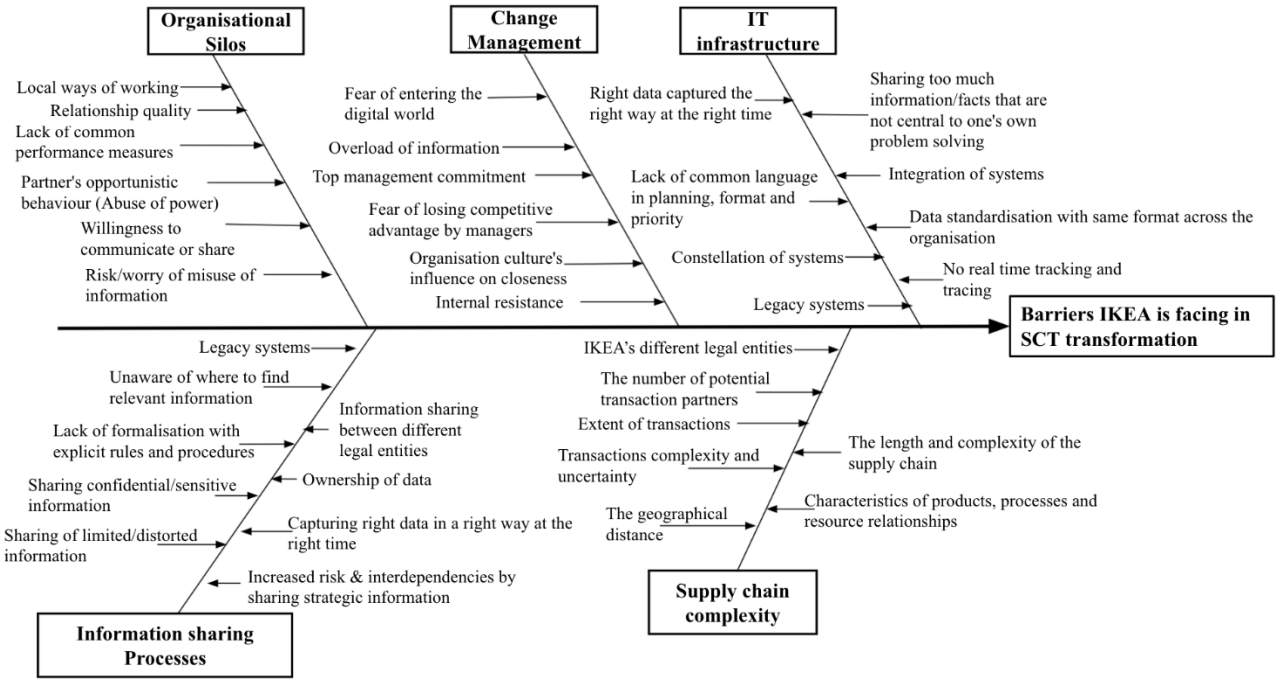

Figure 40: Root cause analysis using Fish-bone diagram

6.4.1 Information sharing practices and processes

One of the key root causes to which most of the barriers were attributed was the current information sharing practices and process. As mentioned in the technology and information quality barrier section, several improvements could be made to the current processes as identified through the collected data. This can be done by laying down guidelines for all aspects of communication like where to access a particular data, which stakeholders are to be updated when there is a change in data, whom to get in touch in case of discrepancies in data, how frequently to update a certain piece of information, which information can and cannot be shared to different stakeholders and similar. By doing so, it improves the current inhibitors of sharing the right information at the right time and as well guide the person searching for information.

In IKEA different legal entities like Ingka who interact with IKEA range and supply also pose some challenges when it comes to information sharing, as they are considered to be different organisations and information shared between these entities have legal restrictions. Also, currently as highlighted through interviews there is no clearly defined ownership of data. This might cause reluctance to share information with stakeholders and could create distrust amongst different departments (due to fear of partner's opportunistic behavior) leading to not sharing information freely or sharing limited information.

6.4.2 Organisational silos

Addressing the issue of intra-organisational silos will help overcome the barriers as mentioned in figure 40. Eliminating silos or rather having bigger silos will integrate different functions and enable common ways of working among the co-workers. As mentioned in the empirics, people do not have any inhibitions in sharing information with fellow functional members but there is a reluctance when it comes to sharing information with someone from another function. Discrepancy in the ways of working sometimes results in conflicts between people from different functions while sharing information. This in turn has an impact on trust between the parties and also affects the relationship quality that determines the accessibility of information. One of the sub-causes that can also be related to siloed way of working is the lack of common performance measures. When the participants were asked their view on siloed ways of working at IKEA, one of the participants answered "Sometimes silos are needed as they help in achieving functional excellence and they will exist. Instead, there should be bigger silos like SCO so that the department has access to all information". On the same note another participant said, "Even though specialisation is good as individual parts could be optimised and it helps in achieving specialisation in that specific domain, it is very important to understand how these parts are connected and how they impact each other should not be forgotten".

On the other hand, one of the interviewees had a totally different argument stating, "IKEA is working in silos and information is not talking to each other that in turn creates information discrepancies, therefore we have started to work cross-functionally eliminating silos and it has worked very well so far". These different perspectives of IKEA co-workers provide several critical insights to eliminate silos like as mentioned in table 15.

Table 15: Ways to eliminate silos identified through empirics

(i) Create bigger silos if they cannot be completely eliminated
(ii) Understand how different parts are connected and how they impact the total value chain
(iii) Work in cross-functional teams

6.4.3 Change Management

Any transformation is susceptible to resistance to change from the people in the organisation. However, a thoroughly planned change management initiative helps in guiding people through the process and helps in overcoming potential barriers in the transformation journey. Similarly, SCT implementation at IKEA also needs a change management initiative that prepares people in looking at a long-term benefit that SCT could bring to them as individuals and to IKEA as an organisation. It will help overcome the temporary hurdles like fear of opportunistic behaviour by partners, fear of losing competitive information, fear of overload of information, fear of entering the digital world.

Top management's involvement and organisation's cultural values are key drivers of this change management initiative. One of the interviewees that has been associated with IKEA since past 25 years stated that he has been a part of many business transformations and when asked what according to him is the biggest driving force in any change initiative he stated the following steps:

(i) Doing a proper preparation to understand the complexity of what needs to happen
(ii) To have regular, relevant, updated, and timely communication with all the people involved
(iii) Repeating the message on 'why the change, how will it happen, what aspects will change, who are the people who will be affected and when the change will happen' is important,
(iv) Repeating benefits of the change to motivate the people to take up the change,
(v) Support and train the leaders for acceptance of change
(vi) Leaders must understand where their teams are to support all the coworkers in the transformation journey.

Another participant also stated, "conducting training and workshops to educate them, gain competencies and knowledge, getting more skilled in data analytics and understanding the complete picture of the value chain will also help in adapting to the transformation."

6.4.4 IT infrastructure

The required IT infrastructure are visualisers of SCT. Currently IKEA lacks in certain aspects like track and trace capability, lack of common language in planning and format because of legacy systems used, a constellation of IT systems with no common databases, integration of systems, non standardised data format across the organisation that act as barriers in enabling SCT. As highlighted by one of the interviewees "The existing different legacy systems at IKEA creates the "constellation of systems interacting" in different languages and formats. The challenge would be to either integrate these different systems or have a technological solution that can extract information from these different systems and provide explicit information in required formats to different users. To integrate legacy systems and IT one of the participants in the interview reflected "It's just a matter of time to change management. First step of SCT, will be to provide a holistic view and complete picture of the entire supply chain. Initially, you keep actions on legacy systems and then you increase capabilities of the new SCT system step by step. Later, the system will learn through AI and when people are comfortable you can allow the system to take actions by itself."

6.4.5 Supply Chain Complexity

Finally, the supply chain of IKEA is complex and implementing SCT comes with its own difficulties of enabling it across the huge organisation. Although the supply chain characteristics are mentioned as barriers, it just increases the complexities considering the interdependencies. A well-planned

initiative starting with mapping the entire supply chain with the interdependencies and executing the transformation in phases will help overcome these barriers.

6.5 Summary of Analysis

Comparing empirics with theory, it is evident that IKEA has clearly identified the need for SCT transformation and meets all the conditions that strongly recommend SCT. Looking at the current scenario, IKEA has limited transparency across the supply chain. Today it lacks track and trace capabilities and with the current ways of working in a siloed manner, IKEA does not have fully integrated IT platforms that can enable sharing explicit and relevant information at the right time.

Going forward with the SCT initiative, IKEA is susceptible to challenges due to their silo way of working, existing information sharing practices and processes, IT architecture, complexity of IKEA as a global supply chain and inherent resistance that comes with any change initiative. IKEA being a complex organisation with its business spread all over the globe, has a constellation of systems in place leading to various databases with different architectures and technologies in place. It has a multitude of existing legacy systems and IKEA must enhance their capabilities to create common databases / architectural systems for sharing information in common data formats across the organisation. Coming to people's specific challenges, preparedness is highly required for the change. Top management commitment should act as a driving force and associated IKEA co-workers must clearly communicate the benefits and requirements of change to overcome internal resistance within the organisation.

Top management is committed towards the change, and they have taken several initiatives to make IKEA’s supply chain more transparent. Majority of the participants in the interviews and surveys were aware of the change and were motivated towards creating transparency. The long list of benefits (section 5.3) of SCT listed by the participants indicates their readiness to take up the SCT initiative that would benefit them as individuals and as well IKEA as an organisation that constantly works to lead by example.

7. The Final Framework

In this chapter, the final framework is developed comparing the theoretical framework and empirical evidence collected at IKEA through interviews and survey. The chapter also presents recommendations to IKEA on how to overcome the barriers, in its journey of implementing SCT.

7.1 Developing the final framework- Connecting theory to empirics

This section elaborates on the different parts of the framework connecting theoretical insights and findings from the empirical analysis. The zoomed-in views of the different sections of the framework reflects the current scenario at IKEA, helps in identifying the prospective barriers limiting the change, and highlights the extensive benefits of SCT.

7.1.1 Concepts of SCT

The first section "concepts of SCT" (figure 41) of the framework clearly reflects that IKEA has identified the *need of implementing SCT*. Participants through interviews and the survey emphasized SCT is the way forward to create competitive advantage and successfully meet the business needs in the future. As customer demands are constantly changing and IKEA is constantly transforming its business to meet the customer needs, supply chain transparency can provide the required aid to IKEA by enabling complete visualisation of the reality and will help in taking real-time informed decisions.

Based on empirical findings, it is evident that IKEA is already aiming for *organisational, technological and supply transparency* which will benefit the organisation in expanding their relational horizons, integrate and harmonize the current ways of working, and will provide line of visibility (outcomes of organisational transparency), keep a check on technological developments (outcomes of technology transparency) and be updated with real-time information along the supply chain through real time tracking and tracing of products and components (outcome of supply transparency).

Today IKEA is mostly *translucent* when it comes to information sharing due to legal aspects (confidential, sensitive information such as cost, retailer information), relevance of information to the other department, non-finalised activities, people from one department think that the information is not needed for other departments. There is a scope of implementing full transparency internally within IKEA if the siloed way of working is lifted and common information sharing platforms are enabled in the organisation providing access to explicit information at the right time. Currently, the siloed way of working is highly prominent in IKEA due to which although there is transmission of information between functions, it is not fully *horizontally transparent*.

IKEA being a complex organisation with a global supply chain network, it has *bidirectional flow of transparency both upstream and downstream*. When the information is shared with stakeholders, IKEA can formalise the information sharing through a legal framework (highlighted by Kembro *et al.*, 2017): (i) what information can be shared, (ii) how to interpret the information, (iii) how to use the information for in decision making in production or similar, (iv) how to store and treat the information, and (v) with whom information can be shared within and outside the company.

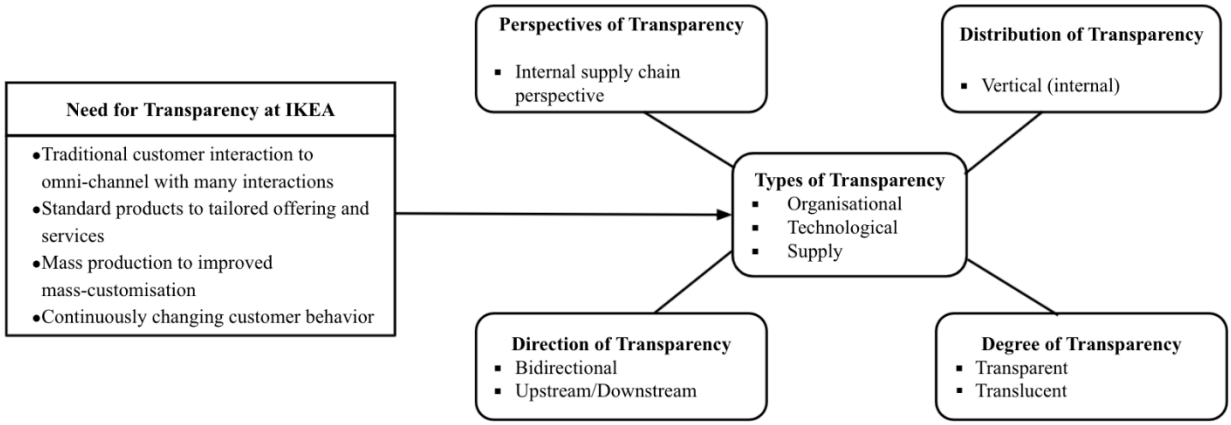

Figure 41: IKEA in line with identified SCT concepts

Comparison with theoretical concepts

Comparing the empirical findings (section 6.1) with the theoretical concepts (section 4.2.2):

1) Upon understanding the *different network mechanisms* as shown in figure 18, IKEA has fully embedded networks between the SCO and SCD functions sharing information with each other.
2) As explained in section 6.1.1, IKEA is in line with the *condition's theory suggests for implementing SCT*, aiming for enriching trust and collaboration with their stakeholders and seeks to create clarity and honesty towards the end customers (striving for ethical excellence).
3) Studying the *types of transparency* (figure 15), IKEA currently aims at supply transparency, organisational transparency and have also taken into consideration technological transparency as explained in section 6.1.2. Through use of new technological solutions IKEA can also aim for cost transparency as it will provide transparency on price and cost aspects to enable effective sourcing.
4) Different *degrees of transparency* (both transparent and translucent) are present currently at SCD and SCO functions at IKEA (section 6.1.3). None of the functions studied are opaque hiding or resisting to share information with each other.
5) Despite few departments being translucent, as highlighted in section 6.1.4 information sharing is bidirectional and flow is both upstream and downstream along the supply chain.

Therefore, the *direction of transparency* is bidirectional and information flow is both upstream and downstream.

6) *Distribution of transparency* that can found at IKEA through the data collected from the SCD and SCO functions is that although information exchange happens between the functions, it is not fully vertically transparent. Internal transparency will aid IKEA to achieve horizontal transparency with its competitors when SCT is extended in future.

7.1.2 SCT Benefits

Based on theoretical findings (section 4.3) and insights gathered from participants' responses (section 5.3.1 and in section 5.3.2), the SCT initiative will provide multiple benefits to IKEA. The perception is that SCT will improve the information quality and streamline the information sharing practices, which will benefit IKEA co-workers, IKEA, and its supply chain. This could in turn also help IKEA in benefiting its customers and society. The "SCT benefits" section (figure 42) of the framework lists down benefits of SCT based on different categories which could be used as an enabler supporting the change.

Comparison with the theoretical SCT Benefits

As compared to the SCT benefits discussed in theory in figure 29, the empirical data collected at IKEA has thrown light into a lot more benefits apart from the ones discussed by several researchers in literature. The benefits indicated in the articles gathered were classified into two main headings under which they fall, namely benefits to organisation and benefits to people. However, the final framework contains benefits that include theory as well insights gathered from people at IKEA and can be seen categorised in multiple categories like benefits to information quality, people, organisation, supply chain, customer, and society. This is an indication that SCT can create numerous benefits to multiple aspects as shown in figure 42.

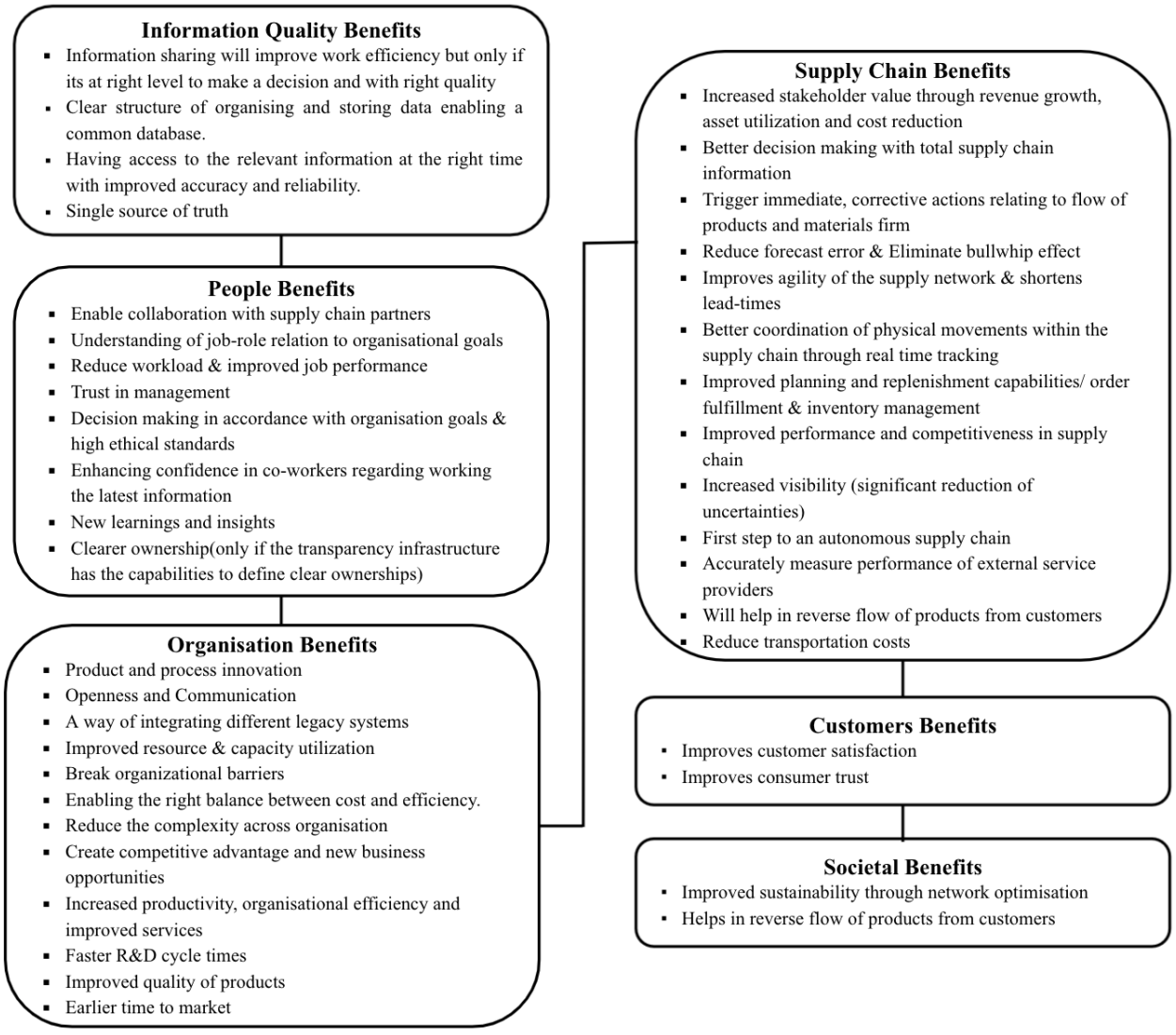

Figure 42: SCT benefits

7.1.3 SCT Barriers

There are several challenges that act as potential barriers for an organisation willing to implement SCT. This section highlights barriers that can limit the transformation identified through thorough literature study and insights gained from IKEA co-workers through interviews and survey questionnaire (refer figure 43). Based on empirical analysis, the barriers are classified into different categories and their intensity towards limiting the change are ranked from low to high. This should serve as a starting point for IKEA to get a total understanding of different factors that impact the change and also which barriers that could pose a major threat to implementing SCT.

Comparison with the theoretical SCT Barriers

The barriers identified through the literature study has been ranked high to low based on its frequency of discussion by the researchers as seen in figure 30. The barriers displayed in the final

framework is a combination of barriers identified through theory and few extra barriers identified through data collection at IKEA namely Existing silos in the organisation category, between legal entities in the organisation and Risk/ worry of misuse of information in the people category. The perception of the consideration of barriers differs between theory and empirics. This could be due the fact that the thesis looked into internal transparency at IKEA and theory mainly discusses transparency between supply chain players.

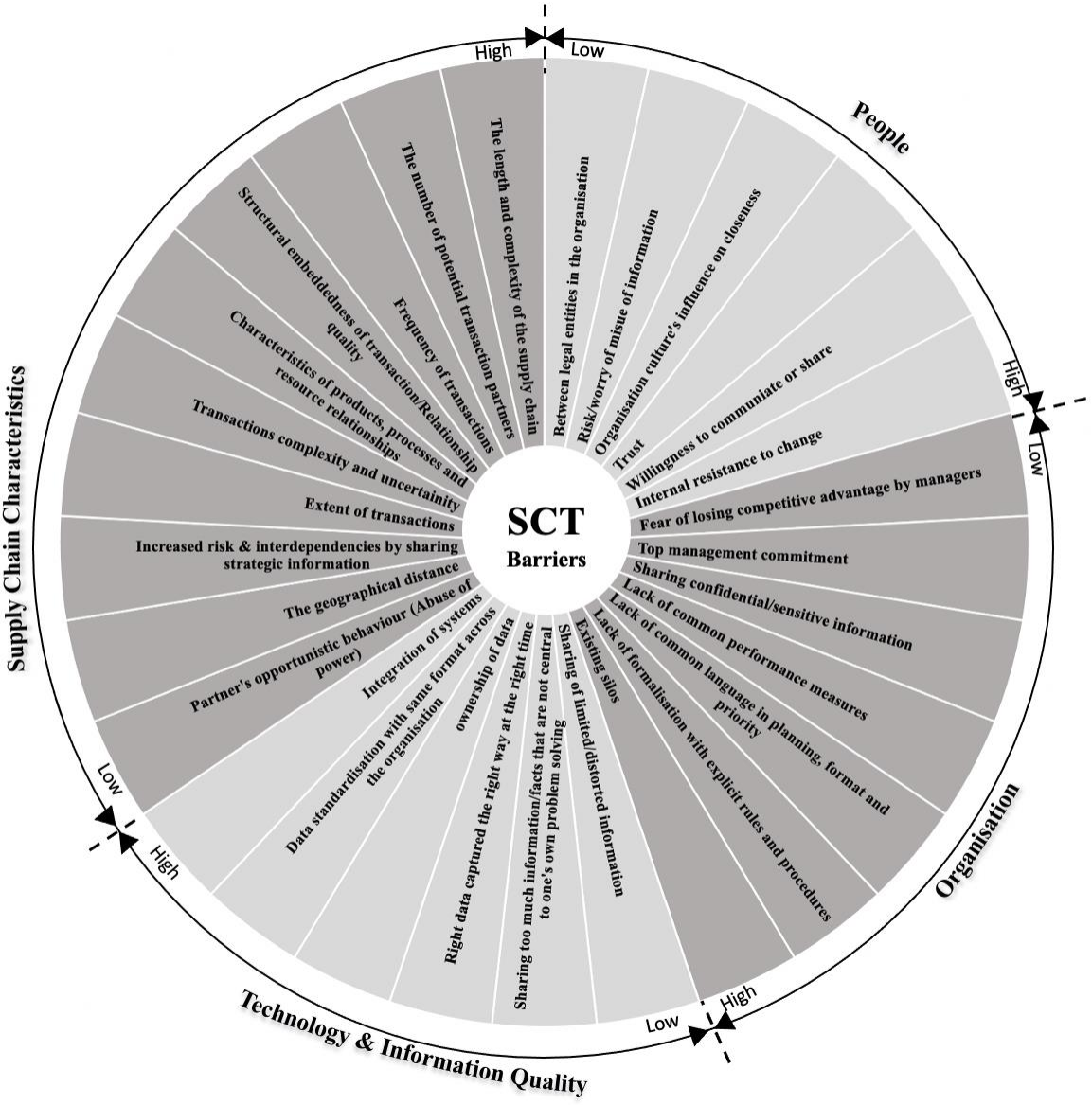

Figure 43: SCT barriers

7.1.4 Addressing the barriers

From the list of barriers as presented in section C, root cause analysis was performed to identify the major causes that could probably impact IKEA towards SCT transformation. Although the different

barriers were categorised based on their commonality, the root cause analysis indicated five major causes to which all the identified barriers can be attributed. They are (i) Information sharing processes (ii) Organisational silos, (iii) Change Management, (iv) IT, and (v) supply chain complexity. By addressing these five major causes several sub causes related to the main cause could be eliminated and this would help IKEA in its SCT transformation. Implementing these changes would not only help in implementing SCT but will also help IKEA as an organisation to gain competitive advantage in the long term.

7.2 Final Framework

The final framework (figure 44) was developed by combining theoretical and empirical insights. This would help IKEA understand (i) the theoretical concepts of SCT and how well they relate to IKEA's current scenario, (ii) SCT benefits, (iii) SCT barriers and (iv) Addressing the barriers. To guide the reader through the framework the below mentioned logical order could be followed.

Beginning with SCT Concepts: Understanding the concepts of SCT, drives the transformation. Defining the scope and establishing the goals are important steps in the beginning of this SCT initiative at IKEA. Implementation of SCT by understanding the need for transformation at IKEA, defining the type, degree, direction, perspective, and distribution of transparency helps the organisation to understand the nuances of SCT.

SCT Concepts→ SCT Benefits: Implementation of SCT will bring in a lot of benefits to the information quality which will benefit the co-workers and IKEA as an organisation. The mentioned benefits can be used as enablers and motivate the co-workers about the importance of SCT at IKEA. These benefits drive to develop IKEA's supply chain further, ultimately benefiting its customers and the society.

SCT Benefits→ SCT Barriers: Any transformation comes with its pros, cons and so is SCT. There are certain benefits that act as barriers impeding this transformation at IKEA. For example, SCT gives people access to a lot of information. However, it might make people think that there is an overload of information which can act as a barrier. Similarly free flow of information through SCT increases the risks and interdependencies between the stakeholders, which could be perceived as a barrier. Apart from these few barriers, there is a list of barriers classified into categories as (i) people, (ii) organisation, (iii) supply chain characteristics and (iv) Technology and information quality, based on commonality of who/ what is responsible for the barrier. These barriers act as a hindrance towards the people and the organisation in pursuing SCT and developing its supply chain.

SCT Barriers → Addressing the barriers: The root cause analysis (refer figure 39) of the list of barriers in different categories, pointed to five major causes (i) Information sharing processes (ii) Organisational silos, (iii) Change Management, (iv) IT infrastructure, and (v) Supply chain complexity. These root causes should be addressed simultaneously as they are interrelated with each

other. Starting with designing the information sharing processes will enhance IKEA's ability to define the desired capabilities. Upon clear definition of the processes, the next step is to organise the work and identify the competencies needed to carry out the different tasks, which are identified in each process. While re-designing the processes, common performance measurement solutions must be included to integrate the silos, monitor, and manage the processes. IT infrastructure is a must to support the process of redesigning and integrating the silos. A thoroughly planned change management initiative is an integral part of each step leading towards a transparent supply chain. IKEA's supply chain complexity is an inevitable challenge that must be taken into consideration while addressing the above-mentioned barriers.

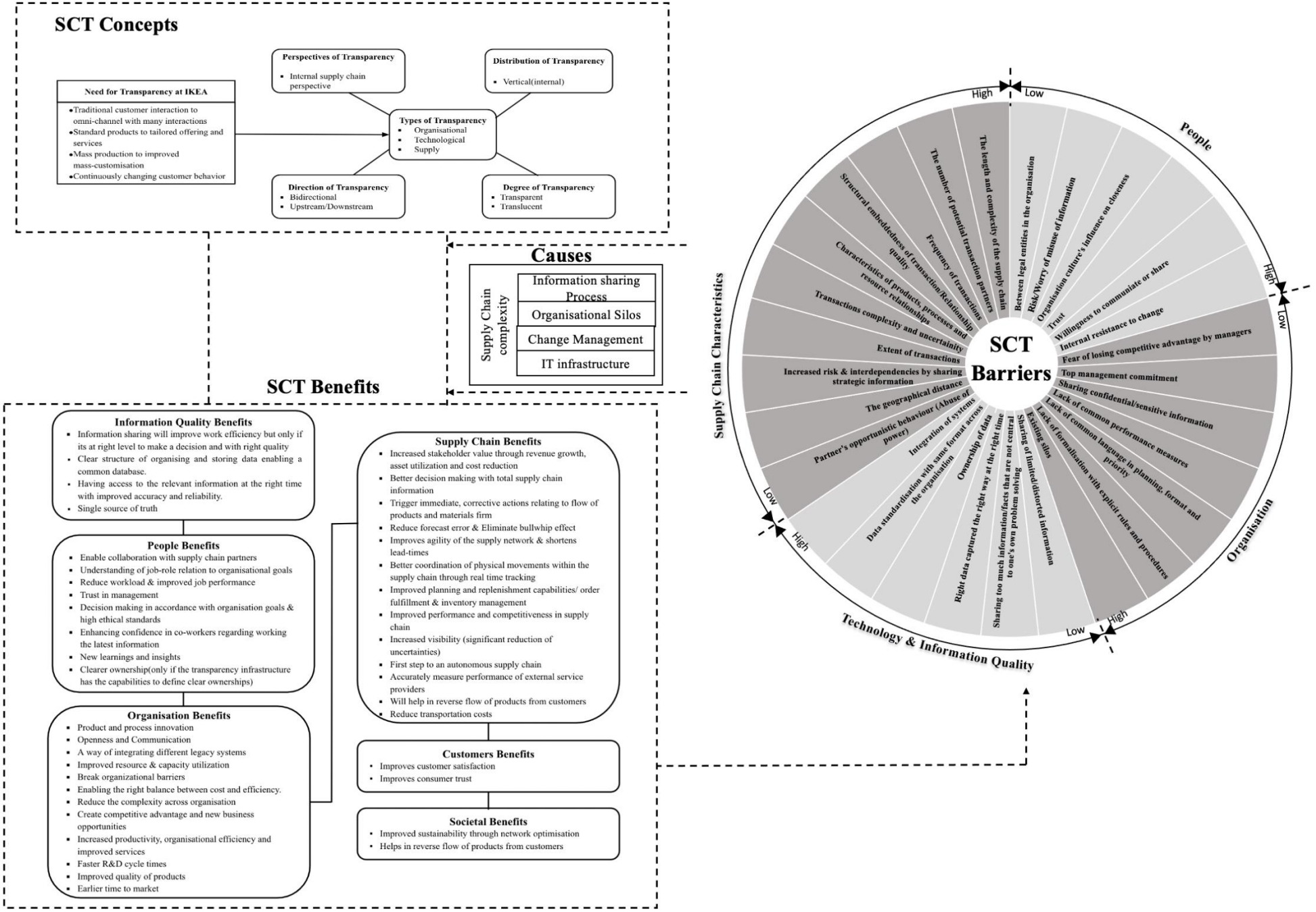

Figure 44: Final Framework

7.3 Overcoming root causes for barriers

The following sections discuss how IKEA can overcome the five major root causes of the barriers indicated in section 7.1.4.

7.3.1 Information sharing processes

Improvements could be done to the current information sharing practices through implementing changes in the working methods that will set things right in the first place and act as a guide to promote people to share the right information at the right time. The following changes could be done in the working methods to assist people for communication which is developed on analysing the current situation and also as suggested in theory by Kembro *et al.* (2017):

(1) Appointing a process owner (which is discussed lacking in section 6.3.3) who would take responsibility for creating, augmenting, and updating the process to the needs of the user in reality. This would bridge the gap between formally created working methods and what happens in reality.
(2) Providing a holistic picture of how a particular function is involved in contributing to IKEA's strategy (which would help people see the bigger picture as mentioned in 6.3.2).
(3) Making a list of information needed for the required function and accessibility to the relevant tools. This way people would not have to hunt for information that they need to perform their routine work (as discussed in section 6.3.3).
(4) Making a list of important stakeholders for accessing information from and also sharing the information with.
(5) Lists of information that can be shared and how to interpret the shared information
(6) Instructions on how to use the information for in decision making in the respective function
(7) Instructions on how to store the information
(8) List of with whom the information can be shared within and outside the company.
(9) Standardising the terms and definition of different data across the organisation which will help to communicate in common data format in turn avoiding confusions and errors that occur in misinterpreting the data as highlighted in section 6.3.3.

7.3.2 Organisational Silos

Although there are several organisational changes undertaken to eliminate silos, the study identified the presence of organisational silos that is a root cause to several barriers that impede the implementation of SCT at IKEA. The following suggestions could be taken to eliminate the siloed ways of working of the functions as also discussed in section 6.4.2.

Currently the organisational charts of IKEA indicate only the vertical view as shown in figure 9, and there are no charts that explain the cross-functional relations between the functions in IKEA. Creating a cross-functional view with the flow of work helps to give a view of how things happen in reality across functional boundaries as indicated by Rumler and Brache (1991) in section 4.4.3.

Interviews indicated how people lack the bigger picture and how their work contributed to IKEA's goals. It is important to impart the holistic view, common performance measures and common ways of working, to the individuals and to the functions to encourage them towards an integrated work environment. Doing so will eliminate the indifferences among the co-workers from different functions, chances of mistrust due to discrepancies in the shared information and eventually improve their willingness to share information. The organisational values are the most important aspect that keep people together at IKEA irrespective of their differences. A constant reminder of the values to the people that brings them together will eliminate the siloed way of working and improves the information sharing across the organisation.

7.3.3 Change Management

Every transformational change can be hard and IKEA being open to communicating, leading by example, engaging employees and taking initiatives to continuously improve can tremendously improve their odds of achieving success in the SCT transformation. IKEA co-workers who have been associated with bringing up transformational changes in the past reflected that doing a proper preparation to understand the complexity of what needs to happen serves as the biggest driving force towards any change as indicated in the analysis section 6.4.3. Therefore, IKEA to achieve success in the desired SCT transformation can take following actions that is in line with Sabri and Verma (2015) and Jacquemont *et al.* (2015) discussed in section 4.4.2:

(1) Understand the nuances of SCT.
(2) Identify areas that will be impacted with this transformation.
(3) Clearly identify roles and responsibilities in the transformation.
(4) Top management should be totally committed to the SCT transformation and should openly communicate the transformation's progress and success across the organisation.
(5) Support and train the leaders for acceptance.
(6) Communicate why the change is required and create awareness of the benefits of the SCT. To create awareness, develop the understanding of the improvement potential and communicate it with the people associated with change.
(7) IKEA's value of leading by example can benefit leaders in being a role model and showing IKEA co-workers by examples the behavior changes and ways of working that are expected out of employees.
(8) Communicate openly transformation's implications for individuals' day-to-day work. Conduct training and workshops to help people develop the capabilities required to adapt to the change.
(9) Have a dedicated organising team centrally coordinating the transformation.
(10) Assign high-potential individuals to lead the supply chain transformation and give them direct responsibility for initiatives.

7.3.4 IT infrastructure

IT infrastructure is the important thread that links the organisation in making a common information sharing platform. The new technology used to enable SCT at IKEA must synchronise with the different legacy systems and inherent tools that are already available rather than replacing them with new ones. This way the business disruption can be minimized. The implementation of the new platform will cause disturbances in the short term, however, will support IKEA's journey towards its strategic goals in the long term.

Several initiatives are already undertaken at IKEA (section 5.2.2) to implement transparency in their supply chain like IPIM, GS1, ASV, LCT and similar such initiatives. One of the important requirements of the SCT platform must be that it should be scalable to match the evolving global supply chain of IKEA. Also, the solution must be accessible from any part of the world, as IKEA is widespread globally and so are the users.

As the same information will be accessible across the organisation, it is important to validate the authenticity of data. Upon implementation, the users need to be provided the required support in operating the new technology and overcome any issues that might come along the way.

On an overall note, the new solution should help capture the right data in the right way at the right time, that can be used across the organisation to make timely, accurate decisions that helps the organisation in fulfilling the ever-changing customer demands. By implementing the new solution, the data format across the organisation can be standardised and will reduce the co-workers time spent on converting it to their required format, misinterpretation, cases of mistrust and conflict between functions as indicated through benefits obtainable through implementing SCT in figure 42.

7.3.5 Supply Chain complexity

Considering the huge network of IKEA's supply chain, implementing SCT across the entire organisation comes with its own challenges. All the efforts taken towards eliminating the barriers of SCT as stated above must be carefully executed taking into consideration IKEA's complex supply chain as it is inevitable. In the efforts of increasing transparency across the whole value chain, to bring everyone on board for the new implementation, collaboration and partnerships are the key. As SCT will be extended to the external stakeholders of IKEA in future, it is important to convey the importance and benefits of SCT to the supply partners to have a win-win, as SCT mutually benefits all the supply chain partners with enriched information availability. It is important to create a comprehensive purpose and to provide holistic approach to the decision making and educate people how these different functions interlink and how individual decisions made in one function without considering the totality will affect the entire value chain.

7.4 Verification of the final framework

A virtual session over the communication tool ‘Teams’ was conducted with five IKEA co-workers who participated in the interviews earlier. It was a brainstorming session, where the thesis findings were presented, and the participants were asked to look at the relevance of the suggestions to IKEA and suggest changes if any. Overall, the participants liked the outcome of the thesis and were in line with the suggested list of benefits, barriers, and root cause of barriers. Some of the participants felt that the framework was quite complex, and it addressed all the research questions. Therefore, the same framework is finalised as it fulfils the purpose of the thesis. The different sections of the framework can be treated as a framework by itself, for e.g., if any IKEA co-worker wants to identify the barriers that they can expect in SCT transformation, can use the barrier wheel in the framework and so are the other sections. One interesting discussion was on the suggestion of improvements in the information sharing process and majority of the participants accepted that augmenting changes in the processes with act as a benchmark for IKEA co-workers to follow the right processes every time and would eliminate several issues associated with it. Change management was also another interesting discussion that happened during the session. One of the participants asked how to downplay the change management and it was suggested that it was more related to improvement in the current ways of working and communicating.

8. Conclusion

The thesis is concluded in this final chapter where firstly the findings are summarized, and the research questions are explicitly answered. Secondly, additional findings that could be of interest to the company are presented. Thirdly, the thesis contributions to theory are discussed. Fourthly, the limitations of the thesis are described. Lastly, ideas for areas of future research are highlighted.

8.1 Summary of findings

The purpose of this research and master thesis can be looked at from two perspectives. Primarily as an effort to develop the research area within SCT with a live case of a global supply chain and secondly to assist IKEA in their transformation journey to develop further as an integrated transparent global supply chain. The final framework (simplified version in figure 45) has been developed to provide a structured understanding of SCT concepts for the implementation and realise several benefits through transparency of information shared. The list of barriers mentioned in the framework are potential limiting factors that might hinder IKEA in its transformation journey. Addressing the root cause of the barriers parallelly will help IKEA be prepared for a successful transformation enabling SCT. The theoretical framework, case analysis, and the final framework have developed the existing research on SCT. The three research questions were created in order to reach the purpose and are answered below.

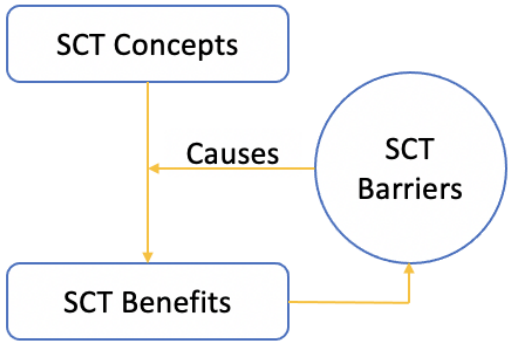

Figure 45: Simplified version of the final framework

8.1.1 RQ1: How can IKEA benefit from Supply chain transparency?

The benefits identified through the thorough literature review and the empirics collected from IKEA through interview and survey are categorised through the analysis as benefits related to (i) Information quality (ii) People (iii) Organisation (iv) Supply Chain (v) Customer and (vi) Society. SCT can bring in a lot of benefits to the individuals and IKEA as an organisation as mentioned below and will help IKEA towards achieving its strategic goals effectively with enriched information.

These benefits can be used as enablers in motivating the co-workers in contributing to the transformation to a transparent supply chain.

1. Benefits to Information quality

(i) Information sharing will improve work efficiency but only if it's at the right level to make a decision and with the right quality.
(ii) Clear structure of organising and storing data enabling a common database.
(iii) Having access to the relevant information at the right time with improved accuracy and reliability.
(iv) Single source of truth

2. Benefits to People

(i) Enable collaboration with supply chain partners.
(ii) Understanding of job-role relation to organisational goals.
(iii) Reduce workload & improved job performance.
(iv) Trust in management.
(v) Decision making in accordance with organisational goals and high ethical standards through creating common performance measures.
(vi) Enhancing confidence in co-workers regarding working with the latest information.
(vii) New learnings and insights.
(viii) Clearer ownership (only if the transparency infrastructure has the capabilities to define clear ownerships).

3. Benefits to Organisation

(i) Product and process innovation.
(ii) Openness and Communication.
(iii) A way of integrating different legacy systems.
(iv) Improved resource & capacity utilization.
(v) Break organizational barriers.
(vi) Enabling right balance between cost and efficiency.
(vii) Reduce the complexity across organisations.
(viii) Create competitive advantage and new business opportunities.
(ix) Increased productivity, organisational efficiency and improved services.
(x) Faster R&D cycle times.
(xi) Improved quality of products.
(xii) Earlier time to market.

4. Benefits to Supply chain

(i) Increased stakeholder value through revenue growth, asset utilization and cost reduction.
(ii) Better decision making with total supply chain information.
(iii) Trigger immediate, corrective actions relating to flow of products and materials firm.

(iv) Reduce forecast error & Eliminate bullwhip effect.
(v) Improves agility of the supply network & shortens lead-times.
(vi) Better coordination of physical movements within the supply chain through real time tracking.
(vii) Improved planning and replenishment capabilities/ order fulfillment & inventory management.
(viii) Improved performance and competitiveness in the supply chain.
(ix) Increased visibility (significant reduction of uncertainties).
(x) First step to an autonomous supply chain.
(xi) Accurately measure performance of external service providers.
(xii) Will help in reverse flow of products from customers.
(xiii) Reduce transportation costs.

5. Benefits to Customer

(i) Improves customer satisfaction.
(ii) Improves consumer trust.

6. Benefits to Society

(i) Improved sustainability through network optimisation.
(ii) Helps in reverse flow of products from customers.

8.1.2 RQ2: What are the existing barriers at IKEA towards implementing SCT?

By combining theoretical and empirical findings, different barriers were identified under different categories like people, organisational, technology and information quality and supply chain characteristics (figure 46). Under each category, the barriers are marked as low to high based on their intensities to impact the transformation, identified through the research.

The category "People" constitutes barriers related to relational dimensions. Stakeholders within the supply chain should have strong relationships and equal attention should be paid to the people's willingness of information sharing which largely depends on relationships characterised by a higher level of trust, commitment, power and dependence, personal connection, and organisational culture.

The category "Organisation" consists of those barriers that arise due to organisational culture, set performance measures and ways of working which the personnel from different functions perform with a view to achieve the business goals.

Barriers in the "Technology and information quality" category are those related to technological infrastructure and quality of information shared which must be accurate, timely, adequate, credible, and complete to enable SCT.

"Supply chain characteristics" represents the nature of supply chain that is determined by characteristics of products, process and resource relationship, length of supply chain, number of transaction partners, relationship quality and geographical spread.

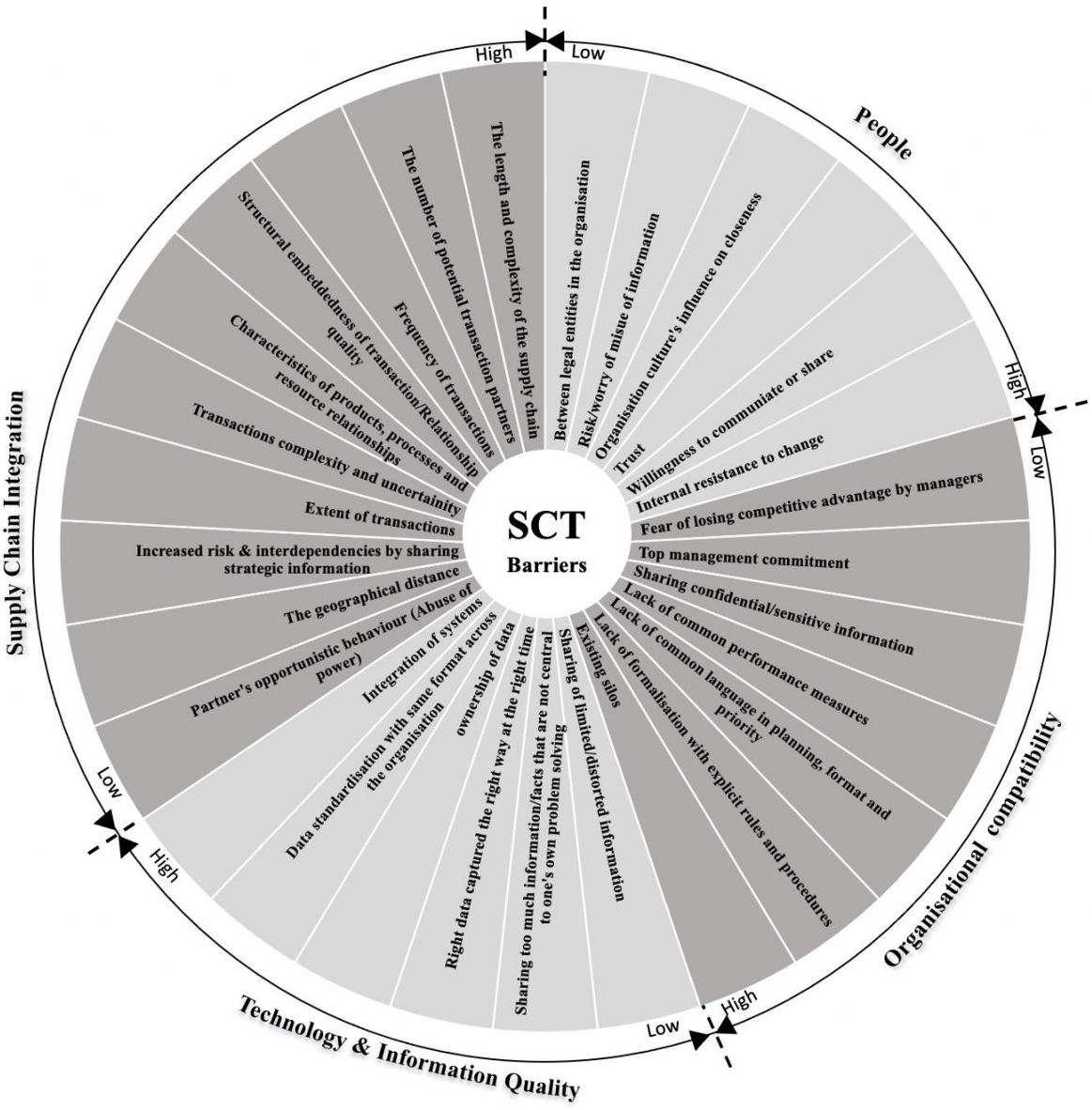

Figure 46: Barriers of SCT

8.1.3 RQ3: How can IKEA overcome these barriers?

From the identified list of barriers through RQ2, root cause analysis was performed to identify the major issues that impact IKEA towards SCT transformation. Although the different barriers were categorised based on their commonality, the root cause analysis indicated five major causes to which all the identified barriers can be attributed. They are (i) Information sharing processes (ii) Organisational Silos, (iii) Change Management, (iv) IT infrastructure, and (v) Supply chain

complexity. By addressing these five major causes simultaneously several sub causes related to the main cause could be eliminated and this would help IKEA in its SCT transformation. Addressing these barriers would not only help in implementing SCT but will also help IKEA as an organisation to gain competitive advantage in the long term.

8.2 Research Contribution

The main contribution of the thesis is the developed final framework (figure 44) which can be used by IKEA to analyse their current scenario when it comes to SCT in their supply chain. The concepts of SCT explained in the framework will help IKEA understand the different aspects of SCT and will also provide them with a strong theoretical base related to SCT. The benefits classified into different categories based on theoretical findings and empirics will serve as a guide for IKEA to impart knowledge to IKEA co-workers that are directly or indirectly associated with the transformation. One of the biggest challenges when it comes to any change is internal resistance to change. To overcome this issue of internal resistance the top management can use the benefits list to educate the IKEA co-workers and provide them an understanding of how SCT will help overcome current information sharing challenges, improvise their daily work and benefit the entire supply chain. Despite the numerous benefits of SCT, there are quite a few barriers that act as antecedents to information sharing through which it is difficult to implement SCT in a multi-tier supply chain. The barriers section of the framework integrates both theoretical insights and empirical findings. This reflects the loops present today when it comes to information sharing and also gives an overall perspective on how to overcome these barriers based on suggestions from experts in the research field of supply chain transparency and from IKEA co-workers' perspectives. Based on the insights identified to address the barriers will enhance the organisational preparedness towards the transformation. It will also provide the holistic view of relevant barriers that could limit SCT for IKEA. The theoretical framework of the thesis and its findings can be used as a benchmark for supply chains like IKEA aiming to SCT. The framework will be a SCT toolbox identifying the concepts, benefits it can bring to SC (which can be used as an enabler to educate employees), and will also throw light on the barriers that the organisation can come across in implementing SCT.

The thesis's contribution to theory can be found in the theoretical framework and analytical comparison comparing theory and empirics through pattern matching. The differences between theory and empirics are clearly highlighted and then also finally integrated in the final recommendations and answering the research questions. As Kembro and Selviaridis (2015) suggested in their future research that the underlying barriers of SCT in a multi-tier supply chain should be investigated. The authors highlighted "it would be valuable to increase the knowledge of how different factors impact benefits versus feasibility of implementing information sharing across multiple supply chain tiers. Related, it would be worthwhile to further investigate the underlying barriers to multi-tier information sharing". With the latest advancements in novel technologies in creating SCT like Blockchain, AI, cloud computing, supply chains are taking efforts to understand the concepts of SCT, and steps involved to transform it to a transparent SC. This thesis that is strongly backed up by theory, can be used as a reference for such a transformation as it clearly

indicates the following: (1) Network mechanisms of information sharing, (2) Conditions when transparency is strongly suggested, (3) Facets of transparency like degree, direction, and distribution, and (4) Types of transparency.

8.3 Limitation

There are some limitations to this thesis. One of those limitations is that the focus was only on the SCO and SCD function at IKEA and that the whole organisation could not be studied. The data collected from these two functions have been more leaned towards internal transparency at IKEA than between the different supply chain partners. By having a larger focus group to analyse the information sharing practices, several additional insights could have been drawn. However, considering that IKEA is a very big and complex cooperation, its internal communication system is allied in many aspects with external Supply chains (as mentioned in section 1.4). Moreover, due to limited time frame of the thesis, it was deemed that covering such a large focus group for the entire company would be practically not possible and would lead to difficulties. As the theoretical framework indicate concepts, benefits and barriers of SCT, and the empirics indicate internal transparency, some deviations between the theory and empirics could be noted as seen in the analysis chapter 6. Further, since the focus of the thesis mainly was on the SCD and SCO functions at IKEA, factors could have been missed. However, even though this thesis is driven mainly from internal insights, it can be used as a preliminary step for IKEA to extend these insights to enhance transparency with external supply chain partners. Nonetheless, it was the SCD function that initiated this thesis and are the ones that are going to work with the suggested process and strategies.

Another limitation was that the authors had no prior experience of working at IKEA and therefore some time was needed to understand the organization, the roles, the intranet, and the company culture. Supervisors and other co-workers at IKEA were therefore consulted to help the authors understand these aspects, the understanding also grew for each. The thesis does not focus on the IT architecture and digital solutions used for enabling SCT. Another limitation is the limited testing of the developed framework. The reason for this was mainly due to the ongoing Covid-19 pandemic that made it unreasonable to conduct a physical workshop with the entire or large part of the SCD and SCO functions. However, the thesis addressed this by conducting a virtual session with the interview participants and verifying the findings.

8.4 Future research

The developed final framework is based on the data collected at IKEA mainly in the SCO and SCD functions. The framework could be tested at several other functions within the Range and Supply to analyse its applicability and transferability. The study could further be extended to IKEA franchisees as well to study IKEA as a whole global supply chain. It would also be of interest to study other companies that, similar to IKEA, are in the starting phases of enabling SCT and how the theoretical framework of SCT should be applied. Further, similarities and discrepancies between this thesis and new case studies implementing SCT in decentralized organizations could also be studied. As the

study currently does not look into the IT infrastructure and digital solutions like Blockchain, Artificial intelligence, and cloud computing that are gaining momentum in the field of supply chain transparency, future studies could look into these aspects. While this study mainly focuses on inter-organisational transparency, the future studies could look into multi-tier supply chain and the influence of each of the supply chain actors like suppliers, manufacturers, retailers, distributors and external service providers in influencing the implementation of SCT for the whole supply chain. The impact of confidentiality and legal requirements that impacts full transparency in a supply chain could be studied in detail in future studies. The following future research questions are suggested:

1. Is the developed SCT framework of benefits and barriers applicable to the other organisations than IKEA?
2. How can SCT be implemented in a decentralised organisation and what are the corresponding benefits and barriers to implement it?
3. What are the factors that affect the implementation of SCT in a multi-tier supply chain and how to lead such a transformation?
4. How can the latest digital technologies like Blockchain/Artificial Intelligence/ Cloud computing be used to the organisation's advantage in implementing SCT? How can it be done without disturbing the inherent IT infrastructure?
5. How does confidentiality and legal requirements impact full transparency in a supply chain?

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Appendix 1. Theoretical study of benefits

Twenty-three different research articles were studied to identify benefits of SCT. Excel was used to create a checklist of different benefits and these benefits were later categorised into organisational benefits and people benefits. The figures below show the analysis conducted to classify benefits.

Table 16: SCT benefits identified from theory

Category	Benefits	Deimel et al. (2008)	Trienekens et al. (2011)	Parris et al. (2015)	Hofstede et al. (2004)	Fawcett,Wallin and Allred(2009)	Hultman and Axelson (2006)	Caridi et al.(2014)	Maskey et al. (2019)	Kembro and Selviaridis (2015)	(Lotfi et al., 2013)
Organisation	Better decision making with total supply chain information	☐	☐	☑	☐	☐	☐	☐	☑	☑	☐
	Increasing visibility (significant reduction of uncertainties)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Trigger immediate, corrective actions relating to flow of products and materials firm	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
	Reduce transportation costs	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Eliminate bullwhip effect	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑
	Reduce forecast error	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Improves agility of the supply network	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Improves customer service elements and customer satisfaction	☐	☐	☑	☑	☐	☐	☐	☐	☐	☐
	Better co-ordination of physical movements within the supply chain through real time tracking	☐	☐	☑	☑	☑	☑	☐	☐	☑	☑
	Improved responsiveness	☐	☐	☐	☑	☐	☐	☑	☐	☐	☐
	Improved performance and competitiveness in supply chain	☑	☐	☑	☐	☑	☐	☐	☐	☐	☐
	Improved resource utilization	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Optimized capacity utilization	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Shorter lead-times	☐	☐	☐	☐	☑	☐	☑	☐	☐	☑
	Improve inventory management	☐	☐	☐	☐	☑	☐	☑	☐	☑	☑
	Improved planning and replenishment capabilities/ order fulfillment	☐	☐	☐	☑	☑	☐	☐	☐	☑	☐
	Create competitive advantage and new business opportunities	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Increased productivity, organisational efficiency and improved services	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Increased stakeholder value through revenue growth, asset utilization and cost reduction	☐	☐	☐	☐	☐	☑	☑	☑	☑	☑
	Break organizational barriers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Enable detection of potential problems early-on	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Create joint alignments improving customer value delivery process/expand the relational horizons in a business relationship.	☐	☐	☐	☐	☐	☑	☐	☐	☐	☑
	Faster R&D cycle times	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
	Improved quality of products	☑	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Earlier time to market	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Better asset management	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
	Increased cash-to-cash velocity	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Consumer trust	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Product and process innovation	☑	☐	☐	☐	☑	☐	☐	☐	☐	☐
	Openness and Communication	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐
People	Enable collaboration with supply chain partners	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐
	Job-role engagement	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Understanding of job-role relation to organisational goals	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Job performance	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Trust in management	☑	☐	☑	☐	☐	☐	☐	☐	☐	☐
	Decision making in accordance with organisation goals and high ethical standards	☐	☐	☑	☐	☐	☐	☐	☑	☑	☐

Table 16: SCT benefits identified from theory

Category	Benefits	Auramo et al. (2005)	Barratt (2003)	Barratt & Oke (2007)	Eggert & Helm (2001)	Karkkainen (2003)	Kaipia and Hartiala (2006)	Handfield & Nichols (2002)	Hellström (2006)	McFarlane and Sheffi (2003)	Min et al. (2005)	Montgomery et al. (2002)	Ross et al. (2004)	Yu et al. (2001)
Organisation	Better decision making with total supply chain information	☑	☑	☑	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
	Increasing visibility (significant reduction of uncertainties)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Trigger immediate, corrective actions relating to flow of products and materials firm	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☐	☐	☐
	Reduce transportation costs	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐
	Eliminate bullwhip effect	☐	☐	☑	☐	☐	☑	☐	☐	☐	☐	☐	☐	☑
	Reduce forecast error	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐
	Improves agility of the supply network	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Improves customer service elements and customer satisfaction	☑	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐
	Better co-ordination of physical movements within the supply chain through real time tracking	☐	☐	☑	☐	☐	☐	☐	☑	☑	☐	☐	☐	☐
	Improved responsiveness	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Improved performance and competitiveness in supply chain	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Improved resource utilization	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Optimized capacity utilization	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Shorter lead-times	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
	Improve inventory management	☐	☐	☐	☐	☑	☑	☐	☑	☑	☐	☐	☑	☐
	Improved planning and replenishment capabilities/ order fulfillment	☐	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Create competitive advantage and new business opportunities	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Increased productivity, organisational efficiency and improved services	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Increased stakeholder value through revenue growth, asset utilization and cost reduction	☐	☐	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐	☐
	Break organizational barriers	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐
	Enable detection of potential problems early-on	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐
	Create joint alignments improving customer value delivery process/expand the relational horizons in a business relationship.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐
	Faster R&D cycle times	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Improved quality of products	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Earlier time to market	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Better asset management	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Increased cash-to-cash velocity	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Consumer trust	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Product and process innovation	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Openness and Communication	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
People	Enable collaboration with supply chain partners	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Job-role engagement	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Understanding of job-role relation to organisational goals	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Job performance	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Trust in management	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Decision making in accordance with organisation goals and high ethical standards	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Appendix 2. Theoretical study of barriers

Twenty different research articles were studied to identify barriers that can limit the SCT transformation. Excel was used to create a checklist of different barriers and these barriers were later categorised into people, information quality and technology, supply chain characteristics and organisational related barriers The figures below show the analysis conducted to classify barriers.

Table 17: SCT barriers identified from theory

Key Barriers	Barriers	Parris et al. (2016)	Martinez and Crowther (2008)	Zanden,Hultén and Wulff(2014)	Granados and Gupta (2013)	Fawcett,Wallin & Allred (2009)	Maskey et al. (2019)	Hultman and Axelsson (2006)	Kembro and Selviaridis (2015)	Moberg et al. (2002)
People	Trust	☐	☐	☐	☐	☐	☑	☑	☑	☐
	Organisation culture's influence on closeness	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Internal resistance to change	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Social embeddedness	☐	☐	☐	☐	☐	☐	☐	☐	☑
	Willingness to communiate or share	☑	☑	☐	☐	☑	☑	☑	☑	☑
Organisation	Top management commitment	☐	☐	☐	☐	☐	☑	☐	☐	☑
	Lack of strategic planning	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Lack of common language in planning, format and priority(existing siloes)	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Lack of formalisation with explicit rules and procedures	☐	☐	☐	☐	☐	☑	☐	☐	☐
	Sharing confidential/sensitive information	☐	☐	☐	☑	☐	☐	☐	☑	☐
	Fear of losing competitive advantage by managers	☐	☑	☐	☐	☐	☐	☐	☐	☑
	Lack of common performance measures	☐	☐	☐	☐	☐	☐	☐	☐	☐
Technology & Information Quality	Right data captured the right way at the right time	☑	☐	☐	☐	☐	☑	☐	☑	☑
	ownership of data	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Data standardisation with same format across the organisation	☑	☐	☐	☐	☐	☐	☐	☑	☑
	Integration of systems	☐	☐	☐	☐	☐	☐	☐	☑	☐
	Shared information is withheld, masked, distorted or just plainly missing, limiting the level of information needed for decision-making/ Quality of information shared	☐	☐	☐	☐	☐	☑	☑	☑	☐
	Sharing too much information/facts that are not central to one's own problem solving /explicitness of information that needs to be shared	☑	☑	☐	☐	☐	☐	☐	☐	☐
Supply Chain integration	Characteristics of products, processes and resource relationships	☑	☐	☐	☐	☐	☐	☐	☐	☐
	The length and complexity of the supply chain	☐	☐	☐	☐	☐	☑	☐	☐	☐
	The number of potential transaction partners	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Frequency of transactions	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Extent of transactions	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Transactions complexity and uncertainity	☑	☐	☐	☐	☐	☐	☐	☐	☐
	Structural embeddedness of transaction/Relationship quality	☐	☐	☐	☐	☐	☐	☑	☐	☑
	The geographical distance	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Increased risk & interdependencies by sharing strategic information	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Partner's opportunistic behaviour (Abuse of power)	☑	☐	☐	☐	☑	☑	☑	☑	☐

Table 17: SCT barriers identified from theory

Key Barriers	Barriers	Eggert and Helm(2001)	Kwon and Suh (2005)	Deimel et al. (2008)	Van Dijk et al. (2003)	Trienekens et al. (2012)	Childerhouse et al (2003)	Pujara (2011)	Kembro at al.(2017)	Lotfi et al. (2013)	Hofstede (2003)	Handfield & Nichols (2002)
People	Trust	☑	☑	☐	☑	☑	☐	☑	☑	☑	☑	☑
	Organisation culture's influence on closeness	☐	☑	☑	☑	☐	☑	☑	☑	☐	☑	☐
	Internal resistance to change	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☑
	Social embeddedness	☐	☑	☑	☑	☐	☐	☐	☑	☐	☐	☐
	Willingness to communiate or share	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐
Organisation	Top management commitment	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☑
	Lack of strategic planning	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
	Lack of common language in planning, format and priority(existing siloes)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☑
	Lack of formalisation with explicit rules and procedures	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐
	Sharing confidential/sensitive information	☑	☐	☐	☐	☐	☐	☐	☑	☑	☐	☐
	Fear of losing competitive advantage by managers	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Lack of common performance measures	☐	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐
Technology & Information Quality	Right data captured the right way at the right time	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐
	ownership of data	☐	☐	☐	☐	☑	☑	☐	☐	☐	☐	☐
	Data standardisation with same format across the organisation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Integration of systems	☐	☐	☐	☐	☑	☑	☑	☐	☐	☐	☐
	Shared information is withheld, masked, distorted or just plainly missing, limiting the level of information needed for decision-making/ Quality of information shared	☐	☐	☐	☐	☐	☑	☐	☐	☐	☑	☐
	Sharing too much information/facts that are not central to one's own problem solving /explicitness of information that needs to be shared	☑	☑	☑	☑	☐	☑	☐	☐	☐	☑	☐
Supply Chain integration	Characteristics of products, processes and resource relationships	☑	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐
	The length and complexity of the supply chain	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐	☐
	The number of potential transaction partners	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐
	Frequency of transactions	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐
	Extent of transactions	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐	☐
	Transactions complexity and uncertainity	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐
	Structural embeddedness of transaction/Relationship quality	☐	☐	☑	☐	☐	☐	☑	☑	☐	☐	☐
	The geographical distance	☐	☐	☑	☐	☐	☑	☐	☐	☐	☐	☐
	Increased risk & interdependencies by sharing strategic information	☐	☑	☐	☐	☐	☐	☐	☑	☐	☐	☐
	Partner's opportunistic behaviour (Abuse of power)	☑	☑	☑	☐	☐	☑	☐	☑	☐	☑	☐

Appendix 3. The interview guide

The interview guide was developed based on the developed investigation framework and IKEA co-workers were posed with the following questions to derive important insights to answer the research questions of the thesis.

Interview Guide

General Introduction

1. A brief description of our thesis
2. A brief description about you: (About yourself, your department, and the departments you interact with for your work)
3. Permission to record the interview

Specific information about current information sharing

4. What kind of information do you share (operational/tactical /strategic)?
5. To what extent is the information shared within your department and between the departments you generally interact with during your work? For example, if you need any specific information do you have complete access to the information from other departments?

Specific information about people

6. What kind of information would you not share with other departments and if so, why?
7. According to you, are there any risks and interdependencies involved in sharing confidential and strategic information?

Specific information about organisation

8. How committed is the top management to making IKEA's supply chain transparent? Can you mention some initiatives taken?
9. Do you have processes in place that enable you to share information?
10. "Relationship quality is the assessment of the strength of a business relationship and affects the willingness of transaction partners to cooperate and share information," and overall, it impacts the supply chain transparency. According to you, has relationship quality been a hindrance in mutually sharing information?
11. Do you think by being transparent, there is a pitfall of opportunistic behavior? (Abuse of power by stakeholders/top management)
12. Do the different departments have common performance measures or are they more siloed?

Specific information about technology & information quality

13. How do you share information currently? Which tools or platforms are used for sharing information?
14. Do you think the information shared by other people is ready to use or needs some filtering and self-understanding to be done?

15. By being transparent do you think there will be an overload of information, i.e., information that is not needed for you?

Specific information about supply chain characteristics

16. What do you think could be the biggest challenge to implement Supply Chain Transparency at IKEA?

Specific information about future information sharing

17. Do you think you can benefit if there is full transparency?
18. Do you think IKEA can benefit if there is full transparency?

Appendix 4. The Survey questionnaire

Survey questionnaire was developed to complement the interviews and target a larger audience. Survey questions were either single choice or multiple-choice questions and were developed based on theoretical findings from the investigation framework and insights derived through interviews.

Employee perspective on Supply Chain Transparency initiative at IKEA

Dear participants

You are invited to participate in a research questionnaire which is a part of a Master thesis project pursued in the department of Design & Planning in SCD function at IKEA of Sweden AB. The main focus of the thesis is on exploring the benefits transparency can bring to work and IKEA's supply chain and barriers that can impede the implementation of supply chain transparency. This research survey is conducted by Charanya Sridharan and Yash Shrimali, second-year Master's students at Lund University.

The survey takes about 10 minutes to complete, and your participation is voluntary. No personally identifiable information is collected from the participants and the responses will be recorded anonymously. If you have any questions regarding this study, please feel free to contact us.

Your participation is greatly appreciated, and your few minutes would make a significant contribution to our research and completion of our master thesis project.

Thank you for your time and participation!

Section 1: Work-specific details

1. Which function do you represent?
2. What is your role?
3. What areas do you generally interact with within the SCO function (multiple choices can be selected)?
    a. Supply operations team
    b. Flow Capacity planning
    c. Flow Replenishment
    d. Flow Performance
    e. Category Distribution
    f. Category Mid-receiver Units
    g. Category Food Logistics Services
    h. Category Land
    i. Category ocean & air
    j. Sustainability

k. Quality
l. Communication
m. Business Navigation
n. People & Culture
o. None

4. What areas do you generally interact with within the SCD function (multiple choices can be selected)?
    a. Design & planning
    b. Execution
    c. Sourcing
    d. Market Logistics
    e. Intralogistics
    f. Technology
    g. Packaging & identification
    h. Development & Innovation Networks
    i. Communication
    j. People & Culture
    k. Business Navigation & Portfolio management
    l. None
5. Which are the other functions you interact with?
6. Who are your external stakeholders_____?

Section 2: Information sharing practices

7. What level of information do you share (multiple choices can be selected)?
    a. Operational
    b. Tactical
    c. Strategic
8. Do you have access to all the information required for your work?
    a. Yes
    b. No
    c. Partly
9. If yes, do you have access to that information at the right time?
    a. Yes
    b. No
10. If no, What could be the reason that you do not have access to the required information (multiple choices can be selected)?
    a. Confidential data
    b. The working methods indicate that your role cannot have access to that data
    c. Siloed thinking of the functions
    d. Others:_____
11. What is the quality of the information that you receive?

a. It’s ready to use
b. It’s incomplete
c. It is in a different format and needs some correction to use for your work
d. It is less frequently updated- which normally results in rework

12. Have you faced any scenarios where you have not shared information with other departments?
    a. Yes
    b. No
13. If yes, why: (multiple choices can be selected)
    a. Fear of losing ownership of the data
    b. They do not trust you with that information
    c. It is confidential & sensitive information
    d. The information is specific to their department
    e. They believe this information does not add any value to your work
    f. Others:_____
14. Have you faced any scenarios where you have not shared information with other departments?
    a. Yes
    b. No
15. If yes, why: (multiple choices can be selected)
    a. Fear of losing ownership of data
    b. You do not trust them
    c. Confidential & Sensitive information
    d. Information that you believe would not add value to other work
    e. Your own department information that you would not want to share with the other department
    f. Others:_____

Section 3: Information sharing platforms

16. How do you share information currently (multiple choices can be selected)?
    a. E-mails
    b. Meetings
    c. Common integrated tools/platforms
    d. Tools like _____
17. In your view, do you have the right information-sharing platforms or tools to share information with each other?
    a. Yes
    b. No
    c. Partly
18. For sharing information what types of systems are present currently (multiple choices can be selected)?

a. All the departments have their own legacy of systems of storing and sharing information
b. There are well-integrated central systems for storing and sharing information with each other.
c. There are no systems in place and you have to use networking to find information
d. IKEA Toolbox
e. Mix of legacy systems and global integrated systems
f. Others:_____

19. In the case of different legacy systems in place, do you believe it hinders sharing of information and acts as a barrier towards the free flow of information between departments?
    a. Yes
    b. No
    c. Maybe
20. Is it easy to extract information for your work?
    a. Yes
    b. No
    c. Partly
21. If not, why (multiple choices can be selected)?
    a. You are not aware of where to find that information
    b. Information is available at different systems and there is no common source
    c. There is too much information shared/ Overload of information makes it difficult
    d. Others:_____
    e.

Section 4: Benefits of Supply Chain Transparency (SCT)

22. Are you aware of what benefits SCT could bring to your work?
    a. Yes
    b. No
23. In your perspective what benefits could transparency in information sharing bring to your work?_____
24. In your perspective what benefits could transparency in information sharing bring to IKEA and its supply chain_____

Section 5: Barriers to SCT

From our designed theoretical framework and literature study we have identified that people-specific barriers, organizational barriers, IT and information quality barriers, and barriers due to supply chain characteristics could impede the implementation of SCT in an organization.
Please select the appropriate barriers in each category as per your view below:

A: People-specific barriers

a. Trust between business partners
b. Organization's cultural background and closeness
c. Internal resistance to change
d. Willingness to communicate or share
e. None
f. Others:_____

B: Organisational barriers

a. Top management commitment
b. Exiting silos
c. Lack of common language in planning format and priority
d. Lack of formalization with explicit rules and procedures
e. Sharing confidential/sensitive information
f. Fear of losing competitive advantage by managers
g. Lack of common performance measures
h. Others:_____
i. None

C: IT & information sharing

a. Sharing of right data at the right time at the right time
b. Ownership of data
c. Data standardization with the same format across the organization
d. Integration of systems
e. Sharing of limited and distorted information
f. Sharing too much information/facts that are not central to one's own problem solving
g. Others:_____
h. None

D: Supply Chain Characteristics

a. Characteristics of products, processes, and resource relationships
b. The length and complexity of the supply chain
c. The number of potential transaction partners
d. Frequency of transactions
e. Extent of transactions
f. Transactions complexity and uncertainty
g. Structural embeddedness /Relationship quality between the supply chain partners
h. The geographical distance
i. Increased risk & interdependencies by sharing strategic information
j. Fear of Partner's opportunistic behavior/ Abuse of power
k. Others:_____
l. None

Appendix 5. SCO and SCD functionalities and stakeholder interactions

The tables below give information about roles and responsibilities of SCO and SC functional areas and their stakeholder interactions. This gave an understanding of underlying interdependencies between different functional areas and also gave an insight on typical sharing of information between different stakeholders.

Table 18: Roles and responsibilities of SCD areas

Supply Chain Development areas	Role	Responsibilities
SCD Area Sourcing	Securing the total supplier lifecycle from the beginning to the end of cooperation	Sourcing and price management
		Supplier information
		Supplier Lifecycle management
		Quality deviation management
SCD Area Design & Planning	Securing a supply chain design and planning to deliver agreed service levels at lowest total cost	Sales & Demand planning
		Need planning & Balancing
		Capacity planning
		Network Design
SCD Area Execution	Securing execution excellence with seamless solutions and processes	Order
		Delivery & Settlement
		Replenishment optimisation
		Customs
		IKEA lead time concept
SCD Area Intralogistics	Working to establish, optimise, integrate, automate and conceptualise logistical flows for any IKEA unit that has logistic or fulfilment component	

SCD area Market Logistics	Completing the total offer of supply and logistics solutions to all IKEA retailers

Table 19: Roles and responsibilities of SCO areas

Supply Chain Operations	Departments	Roles & Responsibilities
Supply Operations	Flow Replenishment	Lead and develop the expansion and Flow Optimisation process
		Define, adjust and implement an optimal replenishment solution
		Optimisation of inbound flows
		Define & execute replenishment plan
		Secure the distribution set-up
	Flow Performance	Making proposals to re-designing of IKEA processes to SCD
		Manage order and delivery process
		Handling and Storage
		Handling risk of shortages
		Visualising IKEA's supply Chain Performance by building IT tools
	Flow Capacity Planning	Defining capacity needs for supply chain operations
		Securing capacity planning end to end perspective to support Transport (Land & Ocean) and Logistics services categories
		Lead development of SCO capacity planning processes
Category Area Transport	Category Land	Replenishment flows from 1) suppliers--> IKEA DC's, CDC's and stores 2) DCs--> stores

		One IKEA Transportation flows (procurement of transport capacity for IKEA components, IKEA industry and INGKA categories)
		Pre-/On-Carriage for ocean flows
	Category Ocean & Air	Plan, purchase, execute and follow-up on ocean transport solutions
		Deliver excellent transport and logistics solutions today, tomorrow and over time.
		Covers the shipment from port of loading to port of destination
Category Area Logistics Service	Category Distribution	Securing optimal fulfilment capacity
		Store replenishment deliveries at the right price/cost
		Fulfilling agreed service and quality demands
		Complying with safety and security requirements
	Category mid-receiver units	Define and establish the optimal value by sourcing and operating logistical units
		Consolidate small shipments to full loads at right place, at the right time and right cost
		Securing value-added logistics services including labelling and fumigation to satisfy local market requirements
	Category food logistics services	Source, procure and operate the cold chain transportation, warehousing and logistics services for IKEA food

Table 20: Stakeholder interaction of SCO

Which function do you represent?	What is your role?	What areas do you generally interact with in SCO function?	What areas do you generally interact with in SCD function?	Which are the other functions you interact with?	Who are your external stakeholders?
Supply Chain Operations	Flow Replenishment Developer	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Flow Performance, Category Mid-receiver Units, Category Land, Category Ocean & Air, Sustainability, Business Navigation	Design & planning, Sourcing, Development & Innovation Networks	Occasionally can be Retail (INGKA) partners.	Transport careers, such as Maerks, Schenker, DHL, etc.
Supply Operations	Supply Operations Manager	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Flow Performance, Category Distribution, Category Mid-receiver Units, Category Food Logistics Services, Category Land, Category Ocean & Air, Sustainability, Communication, Business Navigation, People & Culture	Design & planning, Execution, People & Culture	Purchasing development	Customer fulfilment (store and central fulfilment functions) at our franchisees
Business development	bd	Category Land	Business Navigation & Portfolio management	business development	Transport service providers
SCO	Category mgr	Category Distribution, Sustainability, Quality, Communication, Business Navigation, People & Culture	Design & planning, Intralogistics, Technology, Packaging & identification, Development & Innovation Networks, Communication	Finance, Customs	Service providers, local authorities
Development Support	Learning Lead	Communication	Design & planning, Execution, Sourcing, Technology, Communication	no other	Blue Yonder , IT vendor
Supply Chain operations, flow capacity planning	Flow Capacity Planning manager	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Flow Performance, Category Distribution, Category Mid-receiver Units, Category Land, Category Ocean & Air, Communication, Business Navigation, People & Culture	Design & planning, Execution	CFF (DC stakeholders), purchasing	nobody outside of IKEA group
Process Developer	Process DEveloper	Supply Operations Team, Flow Replenishment, Flow Performance	Design & planning, Execution, Sourcing, Market Logistics, Technology	Retail (both Ingka and non Ingka) functions,	Retail (both Ingka and non Ingka) functions
Supply Chain Operations	Flow Replenishment Developer	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Flow Performance, Category Land	Design & planning, Execution, Market Logistics	Purchasing	INGKA CFF FAS team, RSI teams
Supply Chain Operations	Service Provider Operational Developer	Supply Operations Team, Flow Capacity Planning, Category Land, Sustainability, Business Navigation	Sourcing	None	Transport Service Providers, "Transport (truck)"manufacturers, rail companies etc
Planning Support	Manager	Supply Operations Team	Design & planning, People & Culture	Category Logistics, CFF	Retail (Ingka and non-Ingka)
Supply	Solution Owner	None	Design & planning, Business Navigation & Portfolio management	Stated above	INGKA, NON-INGKA SERVICE OFFICES
Flow Performance development	Flow performance developer	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Flow Performance, Category Land, Category Ocean & Air, Business Navigation	Design & planning, Execution, Technology	Business Steering	External vendors (HCL, IBM, CapGemini, Blue Yonder)
Flow Replenishment Developer	Flow Replenishment Developer	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Flow Performance, Category Distribution, Category Mid-receiver Units, Category Land, Category Ocean & Air, Business Navigation, People & Culture	Design & planning, Execution, Sourcing, People & Culture, Business Navigation & Portfolio management	-	CFF/Retail

Table 21: Stakeholder interactions of SCD

Which function do you represent?	What is your role?	What areas do you generally interact with in SCO function? (multiple choices can be selected)	What areas do you generally interact with in SCD function? (multiple choices can be selected)	Which are the other functions you interact with?	Who are your external stakeholders?
Supply chain Development support	Project leader	Business Navigation	Design & planning, Technology, Communication, Business Navigation & Portfolio management	Project management office	Universities and external professional networks
Need Planning	Market Specific Need Planner	Supply Operations Team, Flow Replenishment, Business Navigation	Market Logistics	None	Supply Planner
Design & Planning	Need planner	Supply Operations Team, Flow Replenishment, Category Distribution, Business Navigation, People & Culture	Design & planning, Sourcing, People & Culture	None	None
SCD	Need Planning	Supply Operations Team, Flow Replenishment, Quality, Business Navigation	Design & planning, Execution, Sourcing	Sales	Supply Planners, Meeting the customer specialists, Sales collaboration specialists, SOD
Supply Chain Development	Manager	Supply Operations Team, Business Navigation, People & Culture	Design & planning, Execution, Sourcing, Technology, People & Culture, Business Navigation & Portfolio management	Indirect procurement	Software and consultant companies
Need Planning	Need Planner	Supply Operations Team, Flow Replenishment, Quality, Business Navigation	Design & planning, Execution, Sourcing, Market Logistics, Business Navigation & Portfolio management	Demand Planning	Retail Units
Need Planning	Need Planning Team Manager	Supply Operations Team, Flow Replenishment	Design & planning, Execution, Communication, People & Culture	Purchasing Development (Supply Planner, Category Logistic Leader, Category Manager, Category Sourcing Specialist), BA/Range (Supply Chain Leader, BA sourcing specialist, Business leader, Demand Planner, Project Controller)	Supplier, but always through Purchasing Development
Supply Chain Design	Supply Chain Design Manager	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Category Distribution, Category Mid-receiver Units, Category Food Logistics Services, Category Land, Category Ocean & Air, Sustainability, Business Navigation, People & Culture	Design & planning, Execution, Sourcing, Market Logistics, Intralogistics, Technology, Packaging & identification, Communication, People & Culture, Business Navigation & Portfolio management	IKEA Retail, Purchasing Development , Purchasing & Logistic Areas , Core Business Franchisee	Mainly IKEA Stakeholders
Needplanning	Needplanner manager	Supply Operations Team	Design & planning, People & Culture	Range & Supply, Purchase organisation	Suppliers
SCD	manager	Supply Operations Team, Flow Capacity Planning, Flow Replenishment, Flow Performance, Category Distribution, Category Mid-receiver Units, Category Land, Category Ocean & Air, Sustainability, Quality	Design & planning, Execution, Sourcing, Market Logistics, Intralogistics, Technology, Packaging & identification, Development & Innovation Networks, Communication, People & Culture, Business Navigation & Portfolio management	Finance, CFF, IoS etc	vendors

Design and planning	Business administrator	Business Navigation, People & Culture	Design & planning, Execution, Sourcing, Technology, Packaging & identification, Communication, People & Culture, Business Navigation & Portfolio management	Workplace operations at IKEA of Sweden.	Some suppliers for ex Telenor, Ingka companies (if that is seen as external)
SCD development support	development manager	Communication, Business Navigation, People & Culture	Design & planning, Technology, Development & Innovation Networks, People & Culture, Business Navigation & Portfolio management	sourcing, execution	IKEA Customers, IKEA components, IKEA Industry
SCDP	Development Manager	Supply Operations Team, Flow Replenishment	Design & planning, Execution, Sourcing, Technology	IKEA IT	Blue Yonder, HCL
SCDN	Project Leader	Communication, Business Navigation	Design & planning, Technology, Development & Innovation Networks, Communication	Demand Planning, Retail CFF and Retail Sales, Solution Ownwers, Process Owners	Blue Yonder , HCL and INGKA
SCD planning	process developer	None	Design & planning, Technology	Core business range	Franchisees
SCD Design and Planninf Sales and Demand	Process Developer	None	Design & planning, Communication, People & Culture	Range and Supply, Performance and follow up, CFF	HFBs, CFF
Supply Chain Design	Supply Chain Designer	Supply Operations Team, Flow Replenishment, Category Distribution, Category Mid-receiver Units, Category Land, Category Ocean & Air	Design & planning, Execution	Purchasing Development	Retail - CFF
Design & Planning	Project Manager	None	Design & planning	Sypply Operations, Nedd Planning, INGKA customer ful fillment	BlueYonder/Accenture
Supply Chain Design, Sales & Demand	Solution Owner	Supply Operations Team	Design & planning	Retail & Supply	Retail
SCD Technology	Project Leader	None	Design & planning, Execution, Market Logistics, Intralogistics, Technology, Packaging & identification, Development & Innovation Networks, Communication, Business Navigation & Portfolio management	Retail, IKEA Industry, IKEA FOOD, Range and Product Development, ...	IKEA Suppliers, Carriers, Authorities (e.g Customs)
SCD planning	Need Planner	Supply Operations Team, Flow Replenishment, Quality, Business Navigation	Design & planning, Execution, Sourcing, Business Navigation & Portfolio management	Purchasing development, sales	outside IKEA none, only rarely with INGKA CFF colleagues for local issues

Appendix 6. Mckinsey & Company 24 transformation steps

Below are the specific actions in order of their impact (from greatest to least) on the likelihood of a transformation's success.

1) Senior managers communicated openly across the organization about the transformation's progress and success
2) Everyone can see how his or her work relates to organization's vision
3) Leaders role-modeled the behavior changes, they were asking employees to make
4) All personnel adapt their day-to-day capacity to changes in customer demand
5) Senior managers communicated openly across the organization about the transformation's implications for individuals' day-to-day work
6) Everyone is actively engaged in identifying errors before they reach customers
7) Best practices are systematically identified, shared, and improved upon
8) The organization develops its people so that they can surpass expectations for performance
9) Managers know that their primary role is to lead and develop their teams
10) Performance evaluations held initiative leaders accountable for their transformation contributions
11) Leaders used a consistent change story to align organization around the transformation's goals
12) Roles and responsibilities in the transformation were clearly defined
13) All personnel are fully engaged in meeting their individual goals and targets
14) Sufficient personnel were allocated to support initiative implementation
15) Expectations for new behaviors were incorporated directly into annual performance reviews
16) At every level of the organization, key roles for the transformation were held by employees who actively supported it
17) Transformation goals were adapted for relevant employees at all levels of the organization
18) Initiatives were led by line managers as part of their day-to-day responsibilities
19) The organization assigned high-potential individuals to lead the transformation (e.g., giving them direct responsibility for initiatives)
20) A capability-building program was designed to enable employees to meet transformation goals
21) Teams start each day with a formal discussion about the previous day's results and current day's work
22) A diagnostic tool helped quantify goals (e.g., for new mind-sets and behaviors, cultural changes, organizational agility) for the transformation's long-term sustainability
23) Leaders of initiatives received change-leadership training during the transformation.
24) A dedicated organizing team (e.g., a project management or transformation office) centrally coordinated the transformation

Appendix 7. Survey Responses

The following figures below show the survey responses of 34 participants for different questions asked during the survey.

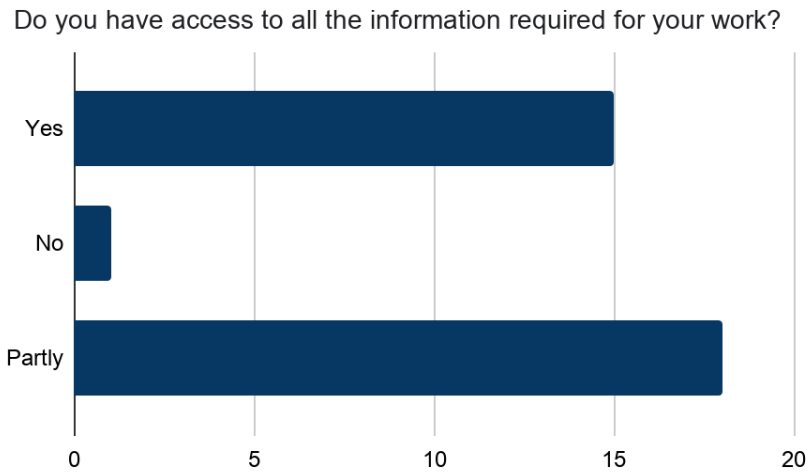

Figure 47: Survey response to the question "Do you have access to all the information required for your work?" (No of survey responses-34)

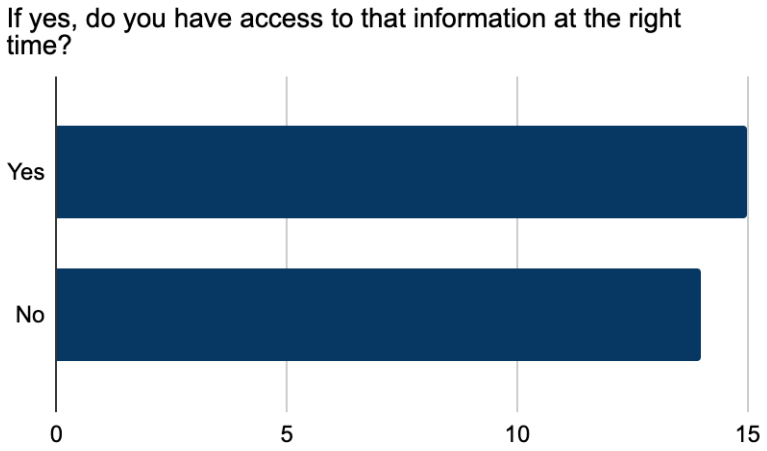

Figure 48: Survey response to the question "If yes, Do you have access to that information at the right time?" (No of survey responses-34)

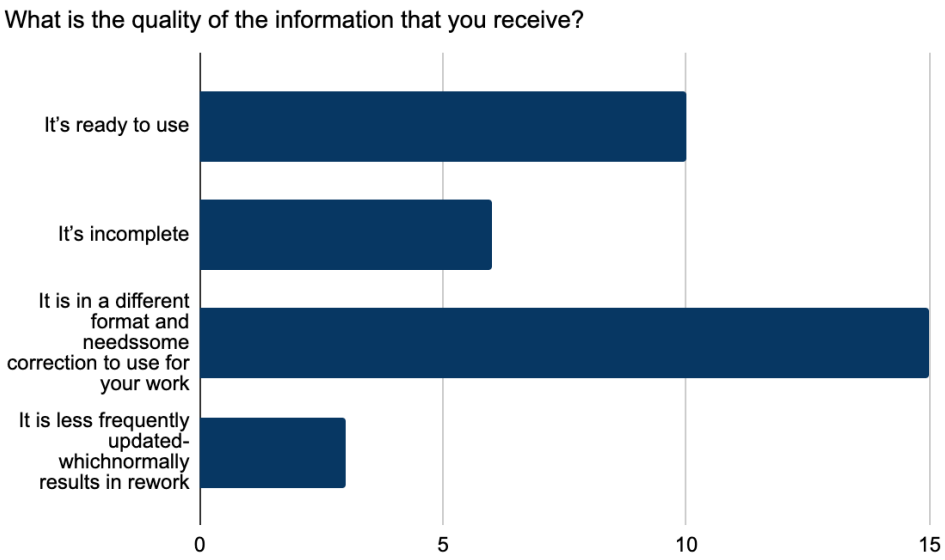

Figure 49: Survey response to the question "What is the quality of the information that you receive?" (No of survey responses-34)

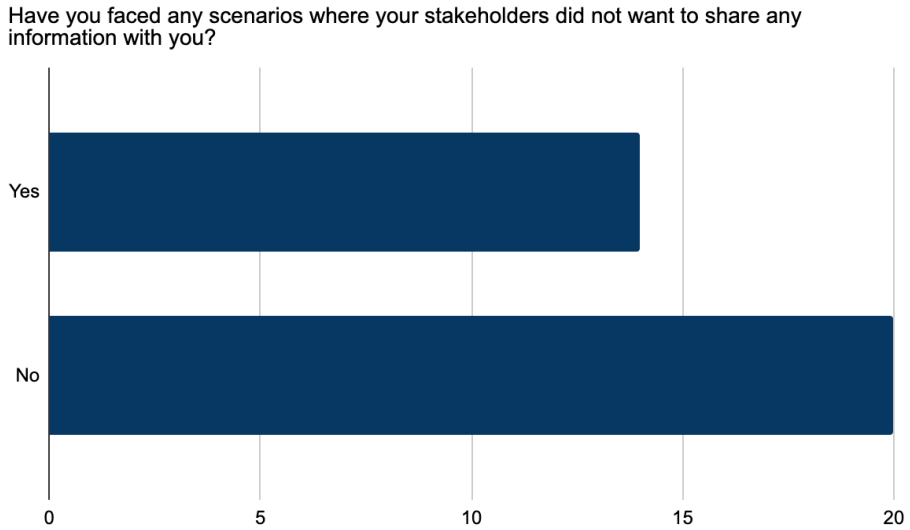

Figure 50: Survey response to the question "Have you faced any scenarios where your stakeholders did not want to share any information with you?" (No of survey responses-34)

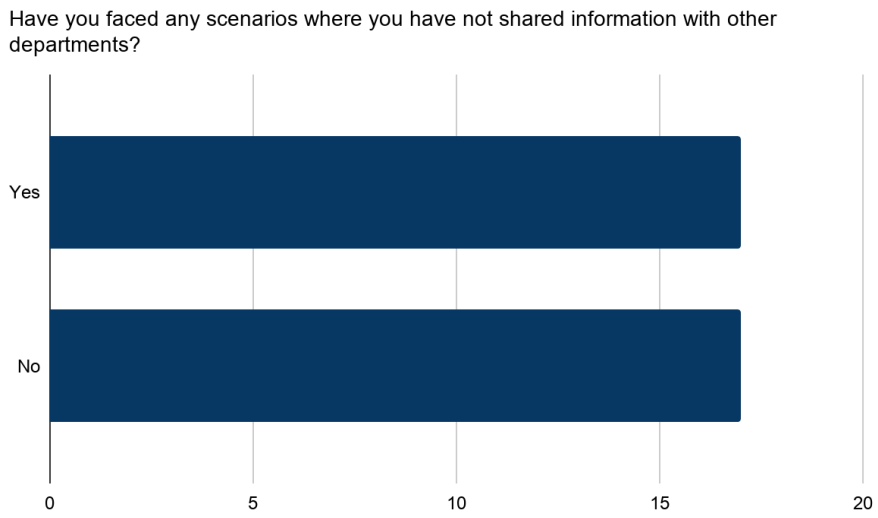

Figure 51: Survey response to the question "Have you faced any scenarios where you have not shared information with other departments?" (No of survey responses-34)

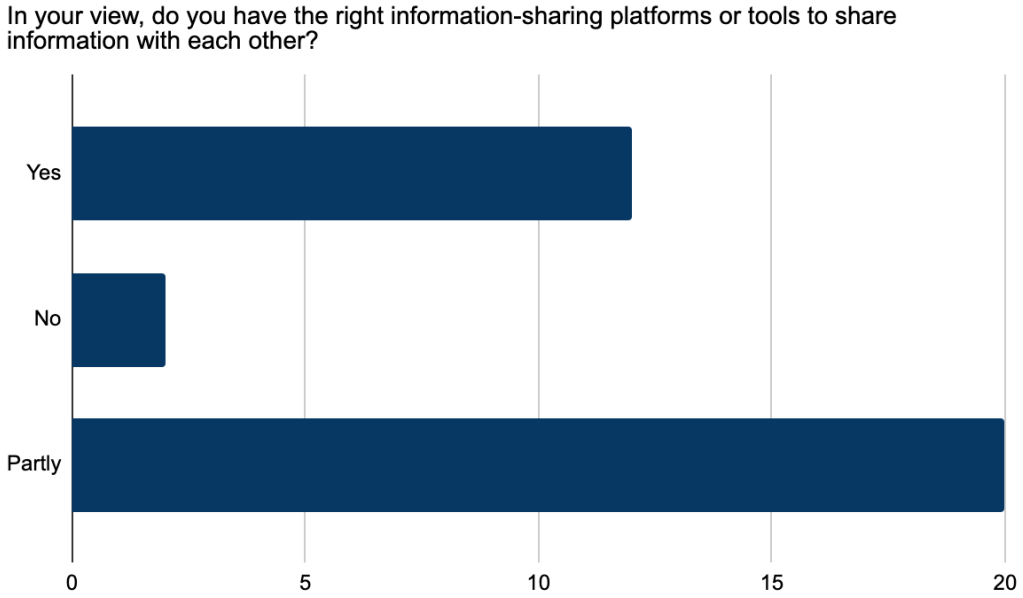

Figure 52: Survey response to the question "In your view, Do you have the right information-sharing platforms or tools to share information with each other?" (No of survey responses-34)

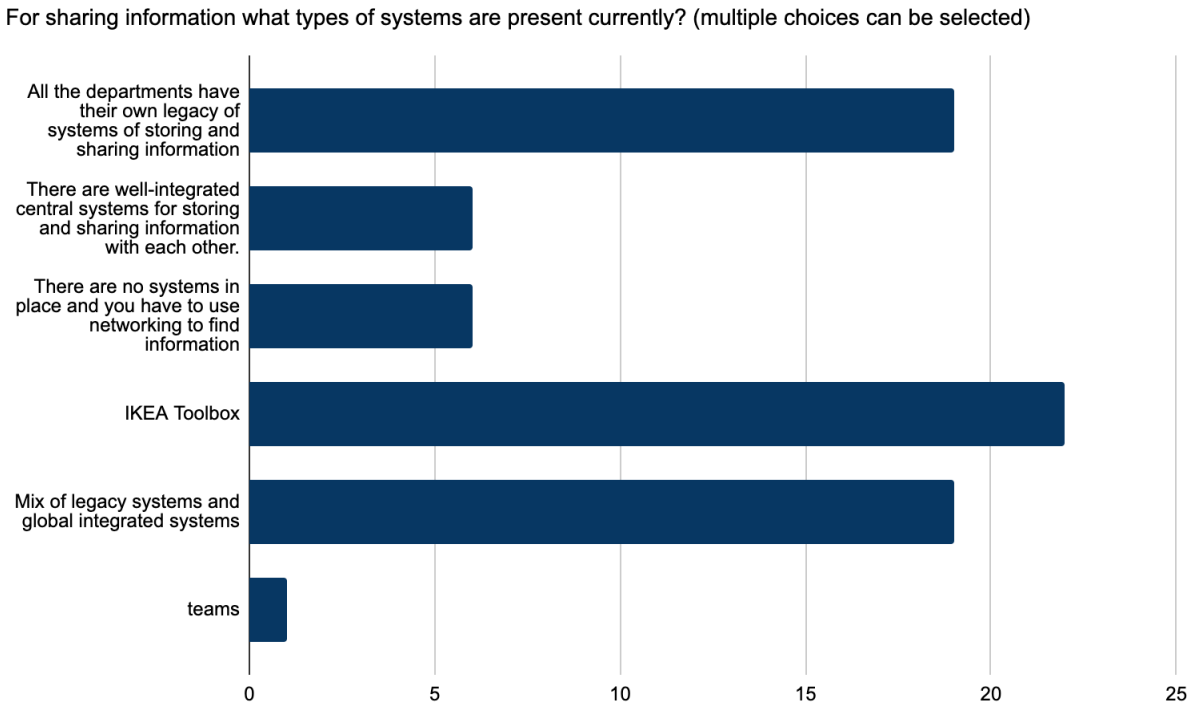

Figure 53: Survey response to the question "For sharing information what types of systems are present currently?" (No of survey responses-34)

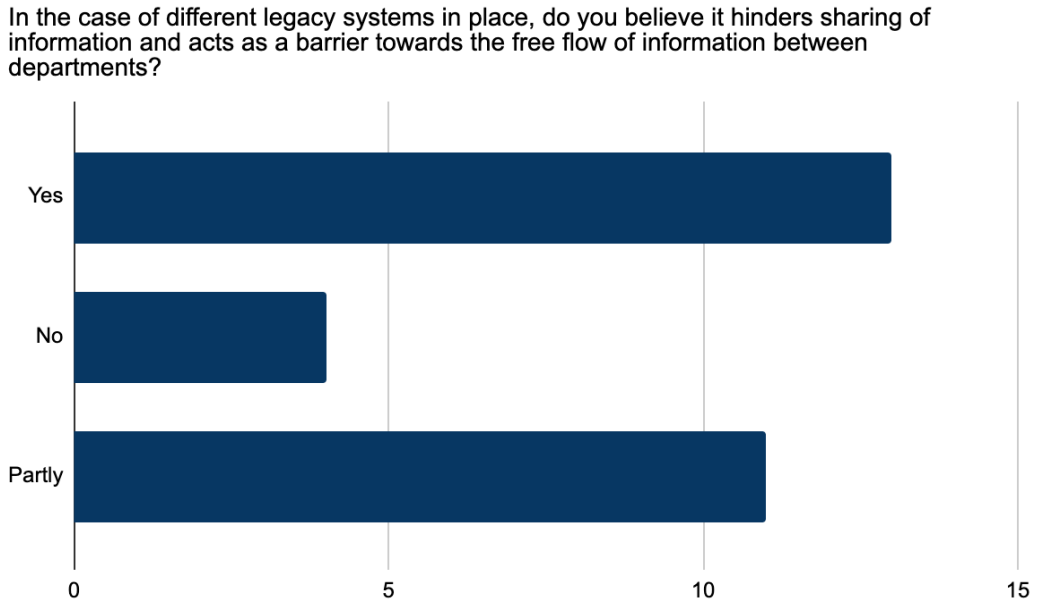

Figure 54: Survey response to the question "In the case of different legacy systems in place, do you believe it hinders sharing of information and acts as a barrier towards the free flow of information between departments?" (No of survey responses-34)

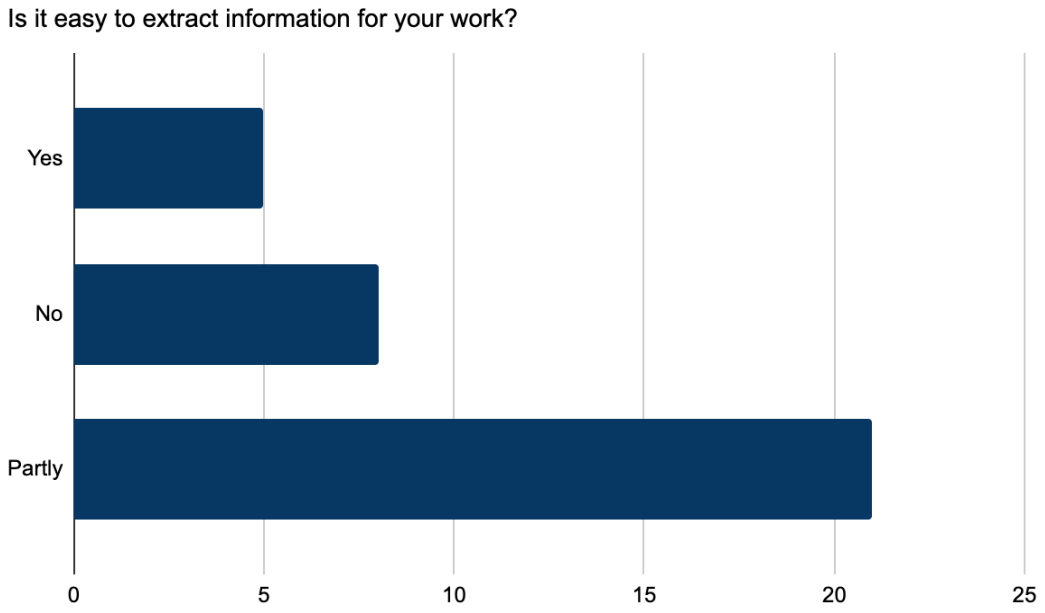

Figure 55: Survey response to the question "Is it easy to extract information for your work?" (No of survey responses-34)

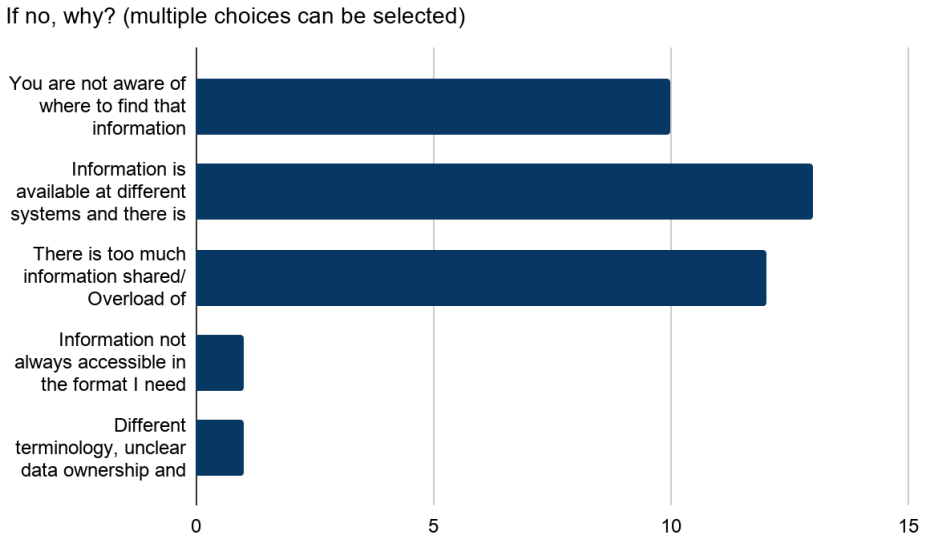

Figure 56: Survey response to the question "If no, why?" (No of survey responses-34)

Appendix 8. Sabri and Verma (2015) Supply chain change management framework

The following section explains change management transformation steps and provides brief description of eight phases and success factors in Sabri and Verma (2015) framework (figure 57).

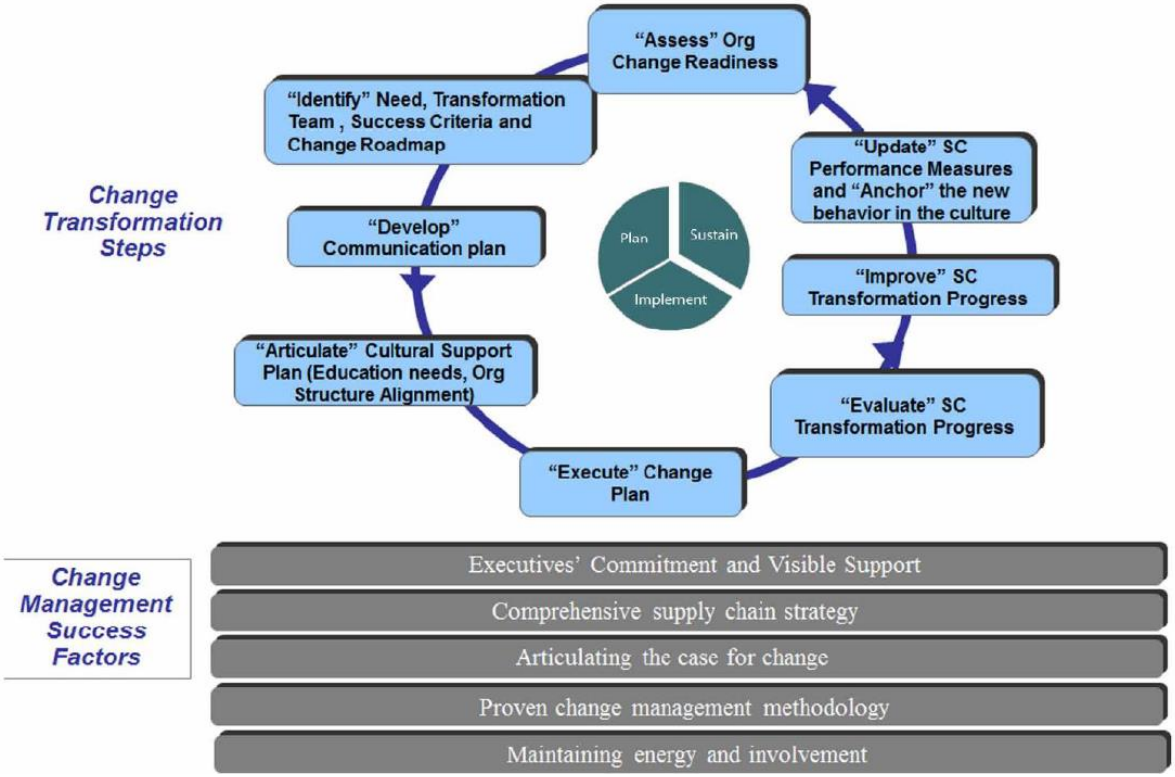

Figure 57: Supply chain change management framework (Sabri and Verma, 2015, p.133)

Phases of change management framework

Step 1: "Assess" Organisation Change Readiness

The following activities required in assessing organisational readiness are:

1. To identify the anticipated and desired change.
2. To assess the alignment of proposed change project (using SWOT analysis) with the vision, mission, and strategic plan.
3. Evaluating the existence of five success factors for mastering change management as shown in figure 57 above by scheduling one-on-one interviews, group meetings, questionnaire and reviewing documents.

This step will provide clarity of the problem statement, high level idea of desired position and alignment with organisation vision and strategic goals, and readiness assessment report.

Step 2: "Identify" Need, Transformation team, Success Criteria and Change Roadmap

The following activities of this very crucial step are:

1. Articulate the need for change: Understand the corporate goals, secure the buy-in from upper management, create the sense of urgency and get stakeholders out of their comfort zone (as-is-state).
2. Identify the transformation team: Document the required skills for different role of players involved in change management, determine number of resources required for every role and match resources to different identified roles considering following factors: (i) when the resources/roles are needed and for how long, (ii) any special skills required over and above those roles, (iii) certification requirements, (iv) experienced resources required for critical roles, (v) proactive thinker who can anticipate next steps and plan actions, (vi) positive leader who can lead by his/her actions, (vii) collaborative skills, (viii) accountability.
3. Identify the success criteria for the transformation program: address the vision of the program i.e., "why are we changing," understand the bigger picture, identify the interaction between supply chain processes, and create a detailed planning and discussion to create "objectives" transforming vision into clarity.
4. Define the change roadmap: identify the required process, technology, and governance changes, finalise the implementation timeline of the transformation, conduct process analysis to determine the extent of process & governance changes and identify additional software capabilities to support the "end state" processes.

Step 3: "Develop" communication plan

Two focus areas identified for this step are: (i) communication about the program (why and how we are changing), and (ii) communication about the end state and solution being delivered with stakeholders, team members, support team members, functional group members, and front-end users. Communication about the program is important to maintain the awareness among all the members in an organisation. Effective communication is required to provide a clear understanding of what is taking place, motivate the team, reduce conflicts, keep senior management committed and avoid miscommunication.

Step 4: "Articulate" Cultural Support Plan

Culture support plan must be articulated which includes the education requirements/plan and organisation structure realignment changes. The major activity of this step is to plan for organisational realignment to support the end state.

Step 5: "Execute" Change Plan

Sabri and Verma (2015) recommended to develop the change plan on the idea of incremental value delivery. They suggested it is crucial to have long-term (program) plan for success, but one should also not ignore the importance of providing short-term wins (projects). For every project plan, milestones, tasks, budget, and resources must be identified and in addition, a project manager and a target for every key performance indicator must be determined.

Step 6: "Evaluate" Supply Chain Transformation Progress

Progress evaluation should be done against the expected benefits (success criteria). The achieved value of the projects need must be tracked and checked off with time. Program manager and sponsor must continue to diligently monitor the progress of transformation and every ongoing project.

Step 7: "Improve" Supply Chain Transformation Progress
Once positive change happens and a successful project improvement (short-term win) is accomplished, management must work to make it a part of the organisational culture. This will encourage the culture of continuous improvement and fine tuning the new solution. Developing corrective actions for the root causes when performance measurement targets are not achieved would achieve incremental improvement.

Step 8: "Update" SC Performance and "Anchor" the new behaviour in the culture
Acknowledging and rewarding stakeholders for new behaviours are essential to stabilise the new process and anchor the new culture. The performance measures should be updated to reflect the new performance baselines, by coming up with new performance measures, modifying the existing ones, or establishing owners to the performance measures.

Five change management success factors
Success factor 1: Executive's commitment and visible support
The leader of the organisation must embrace change first and then display their commitment and show their support. They must speak with one voice and model the desired behaviour. According to Sabri and Verma (2015), executive's commitment is one of the most critical success factors for a transformation.

Success factor 2: Comprehensive Supply Chain Strategy
The comprehensive strategy must be based on exhaustive research considering common pitfalls. Considerations should be given to the following while developing comprehensive strategy: (i) Unanticipated market changes, (ii) effective competitor responses to strategy, (iii) distinctiveness to the strategy, (iv) poorly conceived business models, and (v) align organisational design and capabilities with the strategy.
According to Sabri and Verma (2015), comprehensive supply chain strategy must ideally include:

1. Re-examine/define strategy as changes occur in the global marketplace,
2. Translate strategy into prioritized, actionable and practical improvement plans,
3. Develop a three-to-five-year roadmap that guides the transformation of supply-and-demand capabilities and take planning processes to next level,
4. Highlight how to achieve one or more corporate goals like growth or customer service levels,
5. Capitalize on large opportunities for improvement that deliver significant ROI over time, as well as "quick win" operations improvements with as fast payback,
6. Eliminate outdated roles and responsibilities, unnecessary activities, and performance metrics that no longer reflect current realities, and

7. Align operational processes and metrics across the supply chain to reflect the over-arching supply chain strategy.

Success factor 3: Articulating the case for change

Sabri and Verma (2015) suggested developing a good business case for change is very important where every stakeholder's requirement is taken into consideration. Three steps should be followed in developing the case:

1. Articulate a convincing need for change based on the company's current situation and market opportunities.
2. Quantify the expected operational and financial benefits, estimate cost, and calculate the return on investment (ROI).
3. Explain how to show progress and measure success, which metrics will be improved to achieve the expected benefits, what will be the new performance targets and deadlines, and who will be accountable.

Elizabeth and Joe (2007) developed the six-step approach to building more rigorous and robust business case as follows:

Step 1: Identify business driver and investment objectives.
Step 2: Identify benefits, measures, and owners.
Step 3: Structure the benefits.
Step 4: Identify organisational changes enabling benefits.
Step 5: Determine the explicit value of each benefit.
Step 6: Identify costs and risks.

Success factor 4: Proven Change Management methodology

Having a structured and proven methodology to show the way in the change transformation is a must. A structured and formal plan for managing change – beginning with the transformation team and then engaging by stakeholders and leaders – should be developed early and executed effectively as changes move through the organisation.

Success factor 5: Maintaining Energy and Involvement

Sabri and Verma (2015) highlighted setting right KPIs, and tracking, performance measurement, and award & recognition have the most significant impact in sustaining organisational improvement. Efforts should be taken to make stakeholders understand why change is happening, how their work will change, what is expected of them during and after the transformation program, how they will be measured, and what benefits success will bring to them personally.