UNIVERSITY OF CAMBRIDGE

Team Effectiveness:
Demystifying Key Success Factors in Cross-Functional Supply Chain Teams

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Abstract

Internal integration is a challenge companies are currently facing when aiming to improve supply chain performance. However, this requires cross-functional collaboration and a highly effective supply chain team. As there has not been any research carried out in this field, this study aimed at investigating the most important mediators that contribute to the success of internal supply chain teams. This was accomplished by the following: analyzing simulation data, conducting interviews and carrying out a survey. The three methods were completed in a sequential manner to build on the insight derived by each method.

As a result, relevant factors were identified. It was also found that these factors possess an inherent hierarchy of importance. The factors can be seen in the following, based on their level of importance:

1. Communication
2. Strategy
3. Collective Knowledge
4. Collaboration
5. Leadership
6. Participation
7. Familiarity
8. Openness

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Statement of Original Authorship

I hereby declare that I produced the submitted paper with no assistance from any other party and without the use of any unauthorized aids and, in particular, that I have marked as quotations all passages, which are reproduced verbatim or nearby-verbatim from publications. Also, I declare that this thesis has never been submitted to any other examination board in either its present form or in any other similar version.

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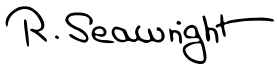
Reginald Seawright



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1. Introduction

Companies increasingly operate globally by sourcing and selling their products in a worldwide marketplace. Mentzer (2001) attributes this to a reduction in trade barriers and an improvement in transportation. He mentions that technological improvements have eased communication and made global production possible. This however also leads to more and more competitors entering the market. In addition, customer expectations have been rising steadily (Mentzer 2001). Customers today not only demand low prices but also ask for further aspects such as ethical behavior and environmental good practices. For that reason, companies such as Nike and Adidas have been held responsible by their customers for condoning inhuman working conditions or causing water pollution (Seuring & Mueller 2008). Thus, effective supply chain management has become crucial.

Numerous studies have been conducted, investigating various aspects of supply chain management and researching methods for improvement. In these studies supply chain collaboration has been mentioned as one of the most important aspects in achieving an effective supply chain (Holweg et al. 2005). This highlights that organizations rely on cross-functional collaboration. Coordinating this activity requires the collaboration of various functions that are often geographically dispersed. However, no research has been identified investigating what makes this cooperation successful. Therefore, this study will address this topic and determine the factors that are essential for a good supply chain team.

1. Literature Review

An extensive literature review was conducted in order to obtain an understanding of *supply chain management teams* and the relevant factors that influence their performance. This was done in a systematic manner by selecting key literature based on citations. The literature review was carried out utilizing libraries at the Massachusetts Institute of Technology (MIT), electronic searches in Google Scholar as well as the online libraries of MIT and the University of Cambridge.

1.1. Supply Chain Management

Supply chain management can be regarded as the management of the total flow of goods or services from suppliers to customers (Cooper et al. 1997). It spans across all business functions inside an organization and involves suppliers as well as customers (Mentzer 2001). This can be seen in Figure 1 below.

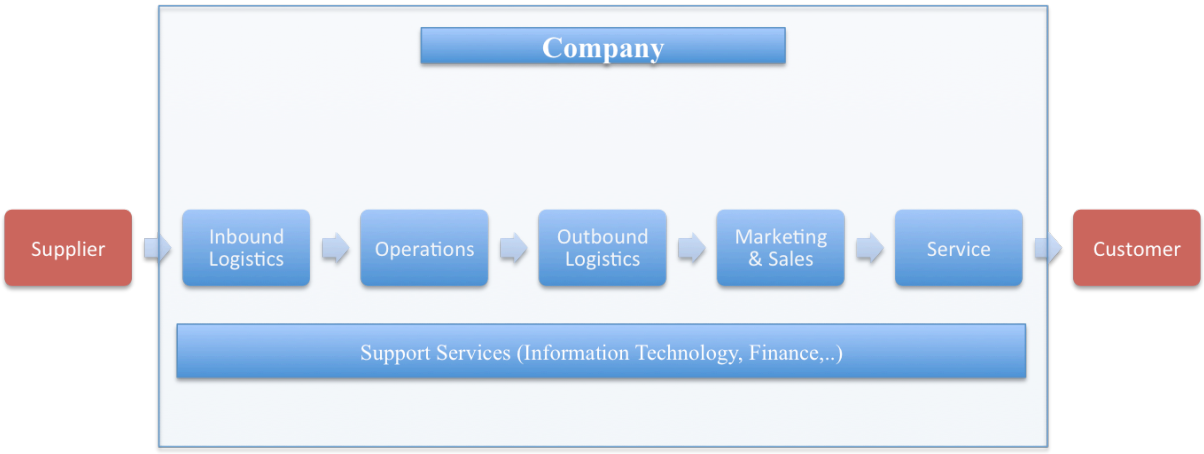

Figure 1: Supply Chain. Adapted from Porter (2003).

Research mostly focuses on the entire supply chain instead of certain parts of it (Mentzer et al. 2001). Studies explore how factors such as cost reduction, inventory management or corporate culture influence supply chain performance (Tummala et al. 2006). To identify ways of improvement, recent research has been focusing on internal integration (Flynn et al. 2010). This emphasizes sharing information, money, material and decision flows among all functions (Mentzer et al. 2001; Fabbe-Costes & Jahre 2008; Schoenherr & Swink 2012). That was proven to have a positive effect on performance if the individual functions are linked effectively (Lambert et al. 2008). This can be done by introducing cross-functional teams (Mentzer et al. 2001). Research shows that companies that promote internal integration by working in such teams perform better than competitors that do not (Stank et al. 1999; Basnet 2013). Ideally the entire organization should work as a team to ensure internal integration and supply chain effectiveness (Holweg et al. 2005). This cross-functional collaboration describes an internal supply chain team. However, Basnet (2013) points out that there is neither a measure of internal integration nor considerations of what makes such collaboration successful.

1.2. Supply Chain Management Teams

To understand internal supply chain teams, literature was consulted by searching for key words such as “internal supply chain teams”, “supply chain teams”, “cross-functional supply chain teams” and “cross-functional teams”. However, there was no literature found on internal supply chain teams that span across the whole organization. The teams mentioned in literature typically consist of members from a single function such as engineering or sourcing (Paletz & Schunn 2010; Meschnig & Kaufmann 2015). If teams involve more than one function, they are commonly researched with regard to a specific topic like innovation or corporate entrepreneurship (Love & Roper 2009; Ferdousi 2012). These cross-functional teams were found to be beneficial to an organization as they offer a variety of thoughts, experiences and ideas of improvement (Boer et al. 2001; Santa et al. 2010).

To understand the possible characteristics of internal supply chain teams, the literature on cross-functional teams, was consulted. Studies investigate product development teams that are characterized by functional diversity (Sethi et al. 2001). Sundstrom et al. (2000) conclude that such cross-functional teams come together for a certain time to conduct specialized, defined and time-bound projects. Another example of cross-functional teams is governmental counter terrorist groups. Studies by Hayne et al (2011) show that these teams are highly specialized as their global and complex working environment requires detailed knowledge. From this literature, supply chain teams were identified as being cross-functional, conducting highly complex tasks and requiring broad and specialized knowledge. These features are summarized in Figure 2 below.

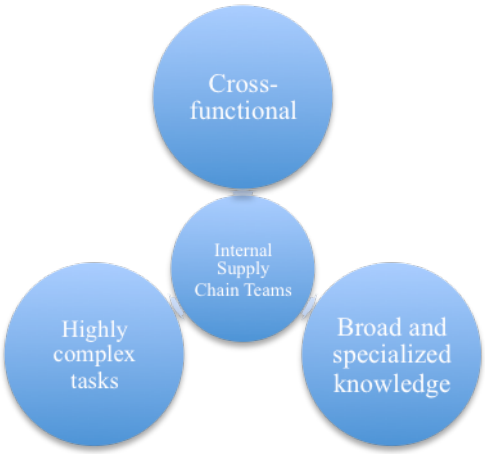

Figure 2: Characteristics of Internal Supply Chain Teams

1.3. Team Performance

As no research has been identified concerning what makes internal supply chain teams effective, 230 pieces of literature on general teams were consulted. These are defined as a group of individuals with different knowledge and skills who make decisions, focus on tasks and are often confronted with time pressures as well as high workloads (Orasanu, Judith, Salas 1993; Salas et al. 1995). Literature also identifies factors that are critical for team performance and provides frameworks from which the factors can be categorized.

1.3.1. Frameworks

The frameworks were identified by searching for the terms "team effectiveness", "team dynamics", "team effectiveness framework" and "team performance". The framework, developed by McGrath in 1964 (The *Input-Process-Outcome*), was selected as it is regarded as the original key work in this field and most literature on team effectiveness revolves around it (Cohen & Bailey 1997; Kozlowski & Bell 2001; Mathieu et al. 2008). Over the years, this framework was reviewed and improved through several iterations. Finally, it resulted in the *Input-Mediator-Output-Input* framework developed by Ilgen et al. (2005). The IMOI framework was chosen as it is widely adopted and displays a high number of citations (1382).

1.3.1.1. McGrath (1964) Framework IPO

The Input-Process-Outcome (*IPO*) consists of three entities: *inputs*, *processes* and finally *outputs*. Kozlowski and Bell (2001) describe inputs as internal and external resources that are available to all levels of the team. They explain processes as mechanisms that enable or hinder team members in working together based on the various inputs. Processes finally transform inputs into outcomes, which can be measured against the completion of a team's goal (Kozlowski & Bell 2001). Figure 3 below depicts the IPO framework and details an example. For instance, group diversity (input) could influence a team's approach to communication (process) and consequently influence the quality of the final product (outcome).

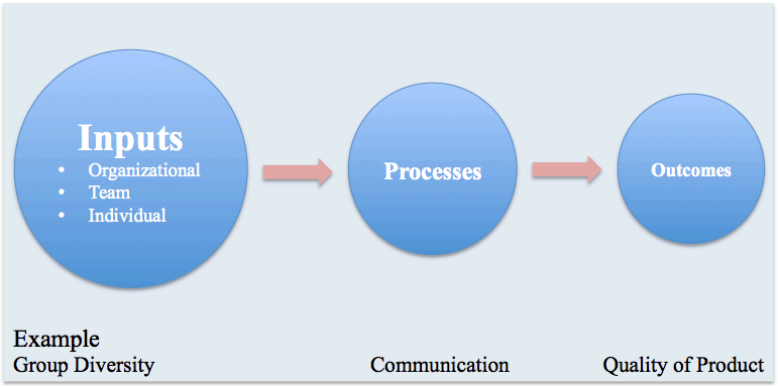

Figure 3: Input-Process-Outcome Framework. Adapted from Mathieu et al. (2008).

However, the framework has also been critiqued. Cohen & Bailey (1997) have evaluated the framework and determined that teams can also be influenced by external inputs, for example by the economy. Recent studies suggest that the IPO model not only flows from left to right but feedback loops give the model a dynamic character (Mathieu et al. 2008). Marks et al. (2001) comment that *emergent states* may also impact performance. These are "cognitive, motivational, and affective states" that are interlinked with processes but do not reflect an interaction (Marks et al. 2001, p. 357).

1.3.1.2. Ilgen et al. (2005) Framework IMOI

Based on the above and further research, Ilgen et al. (2005) developed the Input-Mediator-Output-Input (IMOI) framework, which can be seen in Figure 4. This model addresses all of the points mentioned above. The IMOI framework combines processes and emergent states under the umbrella term *mediators*. Outcomes are related back to inputs by feedback loops.

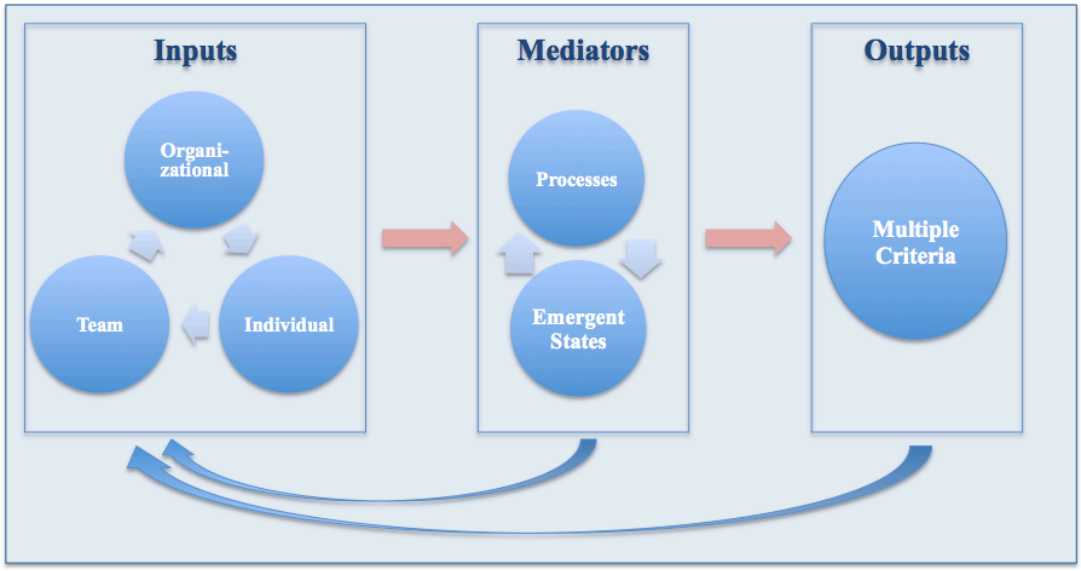

Figure 4: Input-Mediator-Output-Input Framework. Adapted from Mathieu et al. (2008).

1.3.2. Success Factors

By searching for key words such as "team dynamics", "team effectiveness" and "team performance", relevant factors for team performance were identified. For the purpose of this study, mediators were selected as the focus topic, since they are mechanisms that enable or hinder team members in working together. These are factors that can be measured against the completion of a team's goal. The most prominent factors, based on citations will be addressed in the following sections. These are divided into processes and emergent states, even though occasionally it can be difficult to clearly distinguish between the two (Mathieu et al. 2008).

Processes

Structure

In order to work efficiently and manage tasks in a timely manner, teams require structure and a project schedule (Brown & Dobbie 1999; Wheelan 2014). Brown and Dobbie (1999) highlight that not meeting deadlines is a key threat to the success of a team. This risk can be reduced by conducting meetings in a regular cycle and limiting the activities that are not related to the project (Tichenor et al. 1994; Wheelan 2014). Adequate project scheduling allows tasks to be assigned to particular team members, which increases the overall output (Somech et al. 2009). Wheelan (2014) also remarks that the ideal team should consist of the least amount of people required to achieve goals and complete tasks.

Participation

Effective teams consist of members jointly engaging in the decision making process (Campion & Medsker 1993). However, Tjosvold (1987) mentions that participation can also be destructive and threaten the success of a project. It is critical to ensure that all team members have a common set of goals in order to avoid conflict (Tjosvold 1987). As participation can have both positive and negative effects, a multidimensional view has to be undertaken when assessing the potential impact of participation. Employee ownership and indirect participation, for example, appear to have a positive impact on performance, whereas short-term participation can have the opposite effect (Anon 1988).

In addition, not all team members within a team engage to the same extent. This can be seen with teams of students. Their performance is most commonly diminished by social loafing, which describes a situation of students failing to contribute to the project and instead acting as "free riders" (Borrego et al. 2013). Borrego et al. (2013) discovered that social loafing leads

to a lack of trust, which results in conflict. Thus, it is imperative to ensure engagement of all team members.

Collaboration

Collaboration can develop when group members work together and take joint ownership of their portion of the work (Liedtka 1996; Franz 2012). They suggest that high performing teams know how to collaborate in a spirit of cooperation and mutual respect. This requires teams to understand the necessity of collaboration and its positive influence on performance. In these situations team members should be willing to support each other (Brannick et al. 1997; Dyer Jr. et al. 2013). This allows them to make better decisions and to work together constructively. According to Somech et al. (2009) conflict should be solved in a collaborative manner as teams learn from their experiences. However, cooperation has its disadvantages as well. If a team is too cooperative, it can become unfocused and lose sight of its goals (Levi 2014).

Communication

Communication is the key to foster the exchange of ideas and connectivity within a team (Losada 1999). In a study of over 60 teams those that performed best, showed a high degree of interconnection and communication (Losada 1999). Studies by Pentland (2012) support this argument and identify communication as the most relevant predictor of performance. Pentland (2012) further states that not only the frequency but also the style of communication makes a difference. Successful teams display mutual respect and listen and talk in equal amounts. They are also more energetic and take regular breaks to explore and gather information from outside the team. High performing teams engage by face-to-face communication rather than by email or text messages (Pentland 2012). Such teams communicate openly and use regular feedback sessions to improve individual and team effectiveness (Wheelan 2014).

Emergent States

Collective Knowledge

Teams perform better than individuals as they are able to access a joint pool of knowledge (Littlepage & Silbiger 1992). This is created through interaction and is greater than the sum of knowledge of each individual (Wegner 1987; Wegner et al. 1991). Austin (2003) describes

this phenomenon as *transactive memory*. It includes the knowledge of each individual as well as the collective consciousness of "who knows what" within the team (Austin 2003). He states that high performing teams are able to identify experts within teams quickly and thus can become highly specialized. This increases efficiency and reduces duplication of work (Hollingshead 2000; Austin 2003). In addition, the performance of a team is influenced by its willingness and capability to engage with the outside world (Ancona 1990; Austin 2003).
Newer research agrees with the theory of transactive memory but develops it further. Recent studies show that if the knowledge of "who knows what" is centralized, it enables one team member to function as a catalyst for knowledge exchange and integration (Mell et al. 2014). This improves the effective assignment of tasks and has a positive impact on performance.

Conflict

As most teams face periods of conflict, it is critical to resolve these in an effective manner (Somech et al. 2009). Dealing with disagreement cooperatively, leads to quicker conflict resolution and, consequently, higher team performance (Alper et al. 2000). According to Somech et al. (2009) this fosters trust and loyalty. Teams that deal with conflict competitively take longer to resolve issues and show inferior performance (Alper et al. 2000). This is often due to conflicting goals (Somech et al. 2009). Whether conflict is cooperative or conflictive also depends on the communication style within the team (Ayoko et al. 2002). Their research shows that explaining oneself and attempting to understand other team members impacts conflict resolution positively, whereas speech interruption has a negative effect. Another method to ensure conflict is productive and not affective, is to focus on team cohesion (Ensley et al. 2002). Cooperative conflict can be a source of team confidence, new ideas and improved performance (Gruenfeld et al. 1996; Alper & Tjosvold 1998).

Creativity

Creativity can be understood as an input but it is also a mediator since the level of creativity is not only influenced by the characteristics of different team members but also by the way these interact (Taggar 2002). Creativity has a positive influence on performance (Gilson et al. 2005). It can be promoted by team cohesion, continuous feedback and a learning culture (Joo et al. 2012). However, factors also exist that can have a negative impact on creativity. Research shows that time pressure and a need for closure are negatively correlated with

creativity and team performance (Chirumbolo et al. 2004). It was also found that creativity can be impacted by conflict in a positive or negative manner (De Dreu 2006).

Empowerment

Empowerment can also influence the performance of teams. Teams should ideally work autonomously and make meaningful decisions (Alper & Tjosvold 1998; Kirkman et al. 1999). Such teams work more effectively and show higher levels of performance (Cohen & Ledford 1994). However, Cohen and Bailey (1997) state that the influence of empowerment varies by the type of team. For example, they mention that work teams perform better if highly autonomous, whereas project teams, which are limited in their collaboration time, perform better when provided guidance.

Goals

Team members can have both group and individual goals. These can be of a cooperative or conflictive nature, which has a significant impact on a team's performance (Tjosvold 1987). Tjosvold (1987) states that if their goals are cooperative, team members feel motivated and want to empower each other to succeed. Team members with conflicting goals are less likely to collaborate or may even work against each other, which is harmful for the overall team performance (Tjosvold 1987). In order to be effective, teams should emphasize cooperative goals (Alper & Tjosvold 1998).

Leadership

Leadership ensures that group members work towards goal attainment (Levi 2014). Having the right person(s) in a leadership role can add tremendous value to any collective effort (Larson & LaFasto 1989; Levi 2014). Team leaders should work to develop a team culture, guide and encourage members. In addition they should also reinforce positive behavior and link the team with the rest of the organization (Franz 2012). Yazid (2015) shows that a leader, in the case of self-managing teams, should facilitate the right working environment and manage conflict. This results in enhanced team performance. The role of a team leader increases substantially over time as the level of conflict increases (Yazid 2015). Leaders in self-managing teams however often emerge even though they might not be best suited for the position (Lanaj & Hollenbeck 2015). Interestingly, it was found on the other hand that team

members that respect and support fellow team mates rarely emerge as leaders (Lanaj & Hollenbeck 2015).

Psychological Safety

Edmondson (1999) shows that the performance of a team also depends on each individual's feeling of safety. She comments that this feeling of safety can be based on having the opportunity to ask questions, seek help and make mistakes. When employees feel safe, team members are more likely to take risks, which not only result in new opportunities but also functions as a learning experience for the team (Edmondson 1999). This is of particular importance for teams that rely on creativity and experimentation, as psychological safety increases the motivation and speed of engagement in a process of creative thinking (Kostopoulos & Bozionelos 2011).

Strategy

Mathieu and Rapp (2007) suggest that strategies for teamwork as well as performance promote a team's effectiveness. Mathieu and Rapp (2007) mention that *teamwork strategies* encompass a plan specifying how to collaborate, detailing objectives and assigning responsibilities. They add that that *performance strategies* entail a plan on how to carry out and sequence the task, for example, in the form of a roadmap. Their research points out that teamwork strategies are relevant at the beginning of a project, whereas performance strategies are critical throughout the task. Both strategies show a positive effect on performance but the performance strategy is more significant (Rapp & Mathieu 2007). Gurtner et al. (2007) reveal that reflecting on past performance can also lead to better results. This can be done individually as well as within a group. Their research shows that reflection and subsequent discussion of the results, promotes team effectiveness. Interestingly, individual reflection was shown to have a greater impact than group reflection (Gurtner et al. 2007). Furthermore, Katzenbach and Smith (1993) mention that a common vision is critical for the success of a team.

Team Identity

Cohen and Bailey (1997) found that team identity has a positive influence on team performance. This is further confirmed by more recent studies. In a study of seventy-seven

technology companies by Somech et al. (2009), a high level of team identity was shown to improve team performance.

Trust

Team members must trust each other in order to achieve high team effectiveness. Gruenfeld et al. (1996) point out that a lack of trust limits the exchange of ideas and hinders decision making. Hakenen and Soudunsaari (2012) mention that development of trust is a slow process that can only be accelerated with open interaction and good communication skills. Trust can be earned rapidly by exhibiting respect and shared vision, as well as defined roles and responsibilities (Hakanen & Soudunsaari 2012).

1.3.3. Conclusion

There has been extensive work conducted in the field of team effectiveness. Based on this, the fourteen most prominent mediators were identified. Most of them have a positive influence on performance, which can be seen in Table 1 below. Some of these factors were also said to have a negative effect depending on the context. However, the different methods might be responsible for the different findings.

Table 1: Factor Influence on Team Effectiveness

Positive	Ambivalent
Collaboration	Conflict
Collective Knowledge	Empowerment
Communication	Participation
Creativity	
Goals	
Leadership	
Psychological Safety	
Strategy	
Structure	
Team Identity	
Trust	

It was found that the literature often generalizes results and does not consider different types of teams. It also seldom studies industrial teams and draws conclusions concerning corporate teams based on student simulations, which are not necessarily representative. No research was found investigating team dynamics in the context of supply chain teams. Since these teams offer specific characteristics such as cross-functionality, the importance of each factor and its

impact may vary. Finally, research was found to investigate single factors without developing a hierarchy of the most important ones.

2. Research Design

The following section will deal with the research question and the approach that was selected in order to address it.

2.1. Research Question

As the literature fails to address what makes internal supply chain teams successful, this question still remains unanswered. The focus of this study is to understand which mediators are critical for teams to perform well. Given the time constraints and the resources available, seven out of the fourteen factors were chosen for further research. These were selected as they can be explored with the given dataset. The factors can be seen in Figure 5 below.

Figure 5: Team Effectiveness Framework

Despite literature suggesting that the factors are interlinked, the framework aims at being as mutually exclusive as possible. As the literature on strategy highlights the importance of defining team goals, the factors Goals and Strategy were merged under the name of Strategy in order to ensure mutual exclusiveness.

This framework was utilized to address the following research question:

What are the most important mediators, contributing to the performance of internal supply chain teams?

With the sub-question of:

Can these factors be structured in a hierarchical manner?

2.2. Research Methodology

In order to address the research question effectively, key literature was consulted, to provide an understanding of research theory. It was understood that research can either be progressive, by attempting to advance a field, or critical (Bryman & Bell 2011). Moreover, it was shown that research theory can be divided into three different elements: *Epistemology*, *Ontology* and *Logic*. These are based on each other and are listed in Table 2 below.

Table 2: Research Design. Adapted from Bryman & Bell (2011)

Philosophical Position	Quantitative Data	Qualitative Data
Ontology	Objectivism	Constructionism
Episteomology	Positivism	Interpretivism
Logic	Deduction	Induction

Ontology deals with an individual's understanding of reality (Bryman & Bell 2011). According to Bryman & Bell (2011) it can be split into two main groups: *Objectivism* and *Constructionism*. Objectivism presumes that social phenomena can be studied independently of specific actors and consequently measured objectively. For this reason, this method relies on quantitative data. *Constructionism* on the other hand is directed at qualitative research. It supposes that social phenomena are subjective, as they are being shaped by their actors on a on-going basis (Bryman & Bell 2011; Robson 2011).

Epistemology investigates how knowledge about reality can be derived (Bryman & Bell 2011). Robson (2011) differentiates between *Positivism* and *Interpretivism*. Positivism presumes an external reality, which is objective and can be measured quantitatively. The data then can be used to draw general conclusion that apply to a wide coverage of situations (Robson 2011). Interpretivism assumes that topics such as team dynamics, are part of the social sciences and therefore have to be regarded differently than research in the natural

sciences field (Williams 2000). Williams (2000) highlights that actions and meanings require interpretation and cannot simply be measured objectively.
Research logic considers whether studies should rely on *Deduction* or *Induction*. In deductive theory, a researcher drafts a hypothesis based on his/her knowledge and then collects data to test it (Bryman & Bell 2011). Induction however uses observations in order to form theory that can then be generalized (Bryman & Bell 2011).

Having defined the philosophic position of the research, different research instruments can be selected. Research that relies on Objectivism often uses experiments or field experiments (Bryman & Bell 2011). Constructionistic studies commonly depend on interviews or surveys (Robson 2011). Further methods that cannot directly be attributed to one of the research theories are case studies, action research and observation (Robson 2011).

2.2.1. Research Approach

To be able to address the research question comprehensively, three different research instruments were chosen. This was done to develop an improved understanding with each method. The three methods were carried out in a sequential manner, which can be seen in Figure 6. Mixing different methods is recommended by some researchers and practitioners as it provides a richer picture of reality (Robson 2011). By using quantitative and qualitative data, methodological limitations can be overcome and the impact of the analysis increased (Grbich 2013). If the research is done in a consecutive manner, it can first be used in an exploratory and then in an explanatory manner (Grbich 2013). As the aim of this progressive study was to extend current literature on team effectiveness and supply chain management by exploring team dynamics in a supply chain setting, this approach was well suited (Lakatos 1970; Bauer & Gaskell 2008).

Figure 6: Research Approach

The three selected methods included the usage of simulation data, interviewing and surveying. Simulations allow the researcher to capture and analyze quantitative data in a fast and economical manner while providing an objective answer to the research question (Easterby-Smith & Thorpe 2010). This approach was chosen because it helps in testing the research

framework and identifying if the success factors relate to performance. As it is difficult to measure team performance, simulations are often used in the field of team dynamics (Mathieu et al. 2008). Similar studies have been carried out by Earley (2000), Mathieu & Schulze (2006) and Mathieu et al. (2015).

Since the research question, however, deals with supply chain teams as opposed to student teams, interviews were conducted to understand whether the findings from the simulation also apply to industrial supply chain teams. The interviews were also intended to obtain a better understanding of the selected factors while identifying new ones that were currently missing in the framework. Easterby-Smith & Thorpe (2010) recommend the method of interviewing, as it not only is the appropriate tool to understand people's meanings but can also be adjusted when new ideas emerge. Lastly, an industry survey was conducted to validate the importance of the original and newly identified factors and to prioritize them. Bryman and Bell (2011) recommend the usage of surveys, since they are well suited for descriptive studies that explore or test a hypothesis.

2.2.2. Research Instruments

In the following section the three methods as well as the respective research samples will be described in more detail.

2.2.2.1. Supply Chain Simulation

The data was kindly made available by the *Supply Chain Strategy Lab* of the MIT. It consists of data from a student supply chain game that was played over a period of three to six weeks in 2015 and 2016. Although maintaining diversity was a priority in this game, students were teamed up at random. Each group consisted of four team members, each of whom was responsible for a specific business function such as purchasing, supply chain, operations and sales. As the success of the game was dependent on overall team performance, cross-functional alignment was required. Even though the different functions were compared across the different teams, there was no strong incentive to pursue personal goals over team goals.

The game was played remotely in 2015 and face-to-face in 2016 by two different student cohorts. The students' grade depended on their performance and participation in the game.

The data consisted of the *Return-of-Investment (ROI)* of each team per round and 28 survey questions concerning different aspects of team performance such as leadership. The questions were asked at the beginning of the last round (6^{th}). The questions were derived from data gathered from questionnaires and interviews with students that had participated in previous

years. Although no formal literature review had been conducted prior to the simulation, the questions accurately matched the factors identified by literature.

227 graduate students from the MIT participated in the game. The average age of the participants in this simulation was 29 years and the average time in the workforce was 7 years, 5 years of which had been supply-chain related. Overall, the students represented more than 30 countries. A cohort of students was selected that was representative of industry based on their experience and diverse backgrounds.

2.2.2.2. Industry and Expert Interviews

The interviewees were recruited through *Convenience Sampling*. This approach allows the researcher to engage with people that are within his/her reach rather than selecting interviewees on a probability basis (Weiss 1994). Given the time constraints, this was an appropriate approach, which allowed a sufficient number of interviewees from different backgrounds to be recruited. Candidates were selected by contacting former colleagues, family, friends and research partners of the MIT. By talking to these people, as well as obtaining referrals, a total of 31 interviews were conducted. This was done over the telephone in five different countries (Canada, England, Germany, Switzerland and United States of America). The number of interviews can be regarded as sufficient by literature, especially since a level of theoretical saturation was reached (Gubrium et al. 2012). These interviews were voluntary and did not involve compensation.

When selecting appropriate candidates, the focus was to obtain a diverse pool of interviewees. The interviewees represented several different industries such as tooling equipment, heavy industry, information technology, electronics, fast moving consumer goods, software and defense. These businesses covered a broad range of company sizes, ranging from a yearly turnover between 50 Mio. Euros and 80 billion Euros. Moreover, the interviewees worked in different business functions such as sales, logistics, production control or procurement. In order to get a holistic understanding, non-managerial employees and different levels of management were interviewed.

Each interview lasted approximately 45 minutes as this is suggested as a good time according to Weiss (1994). The interviews were recorded with the permission of the interviewee. The first part of the interview was *semi-structured* focusing on episodes when the interviewee experienced positive or negative teamwork. This was to determine factors without biasing the interviewee (Silverman 2007). The second part consisted of *structured* questions. This was done to discuss the framework factors (Silverman 2007). The questions were slightly adapted

throughout the interviews to tailor for new relevant points. The pre-defined interview questions can be seen in appendices 1 to 3.

In addition, two leading academic experts in the field of team dynamics were consulted to ensure the research framework as well as the research approach reflected current research. Professor Ancona and Professor Mathieu were generous enough to give their time and valuable insight, agreeing to a meeting and a Skype call.

2.2.2.3. Industry Survey

With the insights gathered from the simulation and the interviews, a survey was developed. Participation in the survey was voluntarily and not compensated. The sample consisted of 214 former students from the MIT, who had graduated with a certificate in Supply Chain Management between 2011 and 2016. This program was directed at students from Latin America, who had several years of experience in a supply chain-related field. These students were selected due to their relevant industrial experience, which allowed them to comment from a practical perspective. It also made the overall data set increasingly diverse and increased the possibility of generalization as the focus of the industry interviews was on Europe and North America. The former MIT students were contacted by email and invited to conduct an online survey, requiring all questions to be completed. After one week, a reminder was sent to all unresponsive candidates. Overall, a response rate of 44% (95 answers) was achieved. This can be viewed as an excellent result for an online survey, given that research with response rates between 18-25% has been published in highly regarded journals (Bryman & Bell 2011).

3. Analysis & Results

The results of the simulation, the interviews and finally the survey will be presented below.

3.1. Supply Chain Simulation

The remote and face-to-face data for 2015 and 2016 was analyzed jointly. Considering only one of the two years would have caused the sample size to be too small.

However, before the data could be utilized, it had to be structured and cleansed. During this process only 17 relevant questions were selected to specifically address the research questions. These are presented in appendix 4 and 5. The questions were then categorized according to the respective factor from the research framework, which is displayed in Table 3 below.

Table 3: Simulation Question Categorization

Factor	Question
Strategy	18. Did your team perform any type of postmortem analysis after a round?
Strategy	21. Was there any strategy or set of goals informing the decision making process of your team?
Strategy	22. Would strategically aligned be a fair way to describe the key decisions of your team?
Participation	1. In the first six rounds played so far, were members of your team actively engaged in the game?
Participation	2. In this first half, did every member of your team at least do something to participate?
Participation	3. Did your teammates made sure to find the time to participate in the game?
Participation	4. Did your teammates give enough priority to participating in the game?
Participation	5. Overall, would you say the members of your team were very enthusiastic about the game?
Participation	6. Did any member of your team dropped the ball at any point during the first rounds?
Leadership	19. In your team's decision making, did anybody serve as a leader to facilitate agreement?
Communication	7. Which of the following best describes the pattern of communication inside your team?
Communication	17. In your team, did you receive and/or give feedback after each round was played?
Collective Knowledge	14. Which of the following best describes your individual investment of time and effort into understanding your function?
Collective Knowledge	15. As a team, how much time and effort did you invest into learning about the decisions in other functions?
Collective Knowledge	16. As a team, how much time and effort went into figuring out the impact of the decisions of every function on all the other functions?
Collabaration	10. If any took place, were key decisions made separately or in consultation with the team?
Collabaration	11. If any was made, how did your team arrive at these joint decisions?
Collabaration	12. If any were made, were your teammates flexible and willing to accept suggestions?

For reasons of practicality, a weighted average ROI (*Total ROI*) was taken of all six rounds. The following weights were assigned to the six rounds: 2%, 4%, 6%, 13%, 25% and 50%. The reason the ROI of the last rounds had more weight was because teams had been collaborating for a longer period as the game progressed. This is more reflective of industry since teams in practice usually work together on projects for a longer period of time. Additionally, as the survey questions were asked between the fifth and sixth round, the survey data is more comparable to the team performance in the last two rounds. The individual survey answers were then aggregated to a group level in order to compare the self-reported group characteristics to team performance. Aggregating answers is not always unproblematic but it is common when investigating team characteristics at a macro-level (Campion & Medsker 1993; Kirkman et al. 1999).

The survey questions were not mandatory, therefore not all students responded. However, the data was adjusted for missing values, as every omitted question would have otherwise led to a list-wise deletion of the respective respondent in the analysis (Enders 2010). This would have reduced the sample size and, consequently, the usability of the data significantly (Little & Rubin 2002). When tests were carried out, it was realized that while only 141 out of 4313 data points were missing, equating to 3.27%, this would have led to a deletion of 134 out of 227

(59 %) participants. Therefore, the missing values were estimated using an *EM Imputation*. This technique is commonly accepted and utilized when whole data sets are required, e.g. in the case of factor analysis (Little & Rubin 2002). Little & Robin (2002) mention that before an EM Imputation can be used, it is important to prove that the data is *missing at random*. This was done with a non-significant Little's MCAR test (p = .12), which suggested that the data was missing *completely at random* (Little 1988). Since less than 5% of the data was affected and was completely missing at random, it was fair to use EM imputation to improve the statistical power of the analysis (Enders 2001; Scheffer 2002). The data was subsequently analyzed by utilizing three different statistical techniques and the software programs SPSS and AMOS.

3.1.1. Confirmatory Factor Analysis

First a *Confirmatory Factor Analysis (CFA)* was carried out to assess if the factors of the research framework were able to predict performance. This method enables the researcher to investigate hypotheses (Cattell & Nesselroade 1988). A CFA is accomplished by first testing the presumed factor structure and then assessing its fit to the data (Ona & Tepeci 2014). CFA is a *structural equation modeling* method that is commonly used in psychology and more specifically team dynamics (Cattell & Nesselroade 1988). It requires at least two, ideally three, individual variables to load on the latent factors (Kenny et al. 1998; Brown 2006). Since it would have only been possible to associate one question with Leadership and Communication, these two factors could not be tested. Therefore, they were not part of the model. In addition, Q10 and Q16 were deleted as they showed low factor loadings and reduced model fit. This was due to *multicollinearity*. Brown (2006) points out that in such cases the individual factor can be excluded from the model. The research model is shown in appendix 6.

3.1.1.1. Model Fit

The model fit was tested to evaluate if the data resembles the research model. This is shown in Table 4 below.

Table 4: Confirmatory Factor Analysis Model Fit. Adapted from Ona & Tepeci (2014).

Goodness-of-Fit Indices	Good Fit	Acceptable Level of Fit	Source	CFA Indices
χ^2/df	0< χ2/sd≤2	2< χ2/sd< 3	(Kelloway 1998)	1.31
RMSEA	0<RMSEA≤0.05	0.05<RMSEA< 0.08	(Brown 2006)	0.04
CFI	0.97≤CFI<1	0.95<CFI< 0.97	(Brown 2006)	0.99
TLI	0.97≤CFI<1	0.95<CFI< 0.97	(Brown 2006)	0.98

Based on model fit ratios recommended by literature, the *CFA* model was proven to have a good level of fit. This was shown with a χ^2/df value of 1.70, which is in the advised range of 0 and 2. The same can be seen with *RMSEA*, *CFI* and *TLI*. Since good model fit was achieved, it could be tested to ensure whether the individual factors were able to predict performance in the simulation game.

3.1.1.2. Regression Analysis

The results of the regression are displayed in Table 5 below. A confidence level of 5% was selected since it is less strict than 1%, yet it still assures the recognition of relevant factors. All individual questions loaded on their respective latent factors. Strategy and Participation were highly significant at the 1% and 5%-confidence level and showed positive effects on performance. When comparing the standardized coefficients of Strategy (0.42) and Participation (0.33), it became clear that Strategy was the strongest predictor of ROI *(Total)* in the model. However, Collaboration and Collective Knowledge showed p-values above 0.05 and were therefore insignificant. This could have been caused by only selecting two questions loading on each latent factor.

Table 5: Confirmatory Factor Analysis Regression Weights

	Unstandardized Coefficients		Standardized Coefficients	P
	B	Std. Error	Beta	
Total <--- Strategy	6.30	2.24	0.42	0.00
Total <--- Participation	4.95	1.84	0.33	0.03
Total <--- Collective_Knowledge	-0.95	1.38	-0.06	0.76
Total <--- Collaboration	-0.59	1.32	-0.04	0.44
Q11 <--- Collaboration	0.37	0.09	0.40	***
Q12 <--- Collaboration	0.50	0.10	0.66	***
Q6 <--- Participation	0.56	0.06	0.55	***
Q4 <--- Participation	0.86	0.05	0.88	***
Q3 <--- Participation	0.62	0.05	0.70	***
Q1 <--- Participation	0.73	0.05	0.80	***
Q15 <--- Collective_Knowledge	0.80	0.05	0.94	***
Q14 <--- Collective_Knowledge	0.52	0.05	0.67	***
Q5 <--- Participation	0.82	0.06	0.81	***
Q2 <--- Participation	0.33	0.04	0.49	***
Q17 <--- Strategy	1.01	0.08	0.76	***
Q18 <--- Strategy	0.90	0.06	0.83	***
Q19 <--- Strategy	0.42	0.05	0.57	***
Q21 <--- Strategy	0.80	0.05	0.84	***
Q22 <--- Strategy	0.99	0.59	0.89	***

3.1.2. Simple Linear Regression

CFA helped in understanding which factor was relevant. However, the aim was to confirm these results and to understand which aspect of each factor was most prominent. Therefore, the questions were regressed individually against the *Total ROI* of each team. Basic descriptive statistics and the regression coefficients are shown in the table below.

Table 6: Simple Linear Regression Results

Question	Factor	Unstandardized Coefficients (β)	Standard Error	Standardized Coefficients (b)	T	P
Q22	Strategy	7.83	0.72	0.59	10.93	0.00
Q7	Communication	8.42	0.77	0.59	10.89	0.00
Q4	Participation	8.48	0.84	0.56	10.10	0.00
Q21	Strategy	8.66	0.87	0.55	9.99	0.00
Q1	Participation	8.36	0.93	0.52	9.02	0.00
Q5	Participation	7.48	0.84	0.51	8.89	0.00
Q17	Communication	5.69	0.64	0.51	8.85	0.00
Q10	Collaboration	6.61	0.80	0.48	8.23	0.00
Q15	Collective Knowledge	7.77	1.04	0.44	7.44	0.00
Q16	Collective Knowledge	7.65	1.04	0.44	7.38	0.00
Q3	Participation	7.20	1.00	0.43	7.19	0.00
Q14	Collective Knowledge	7.40	1.19	0.38	6.22	0.00
Q19	Leadership	7.53	1.25	0.37	6.02	0.00
Q6	Participation	5.32	0.90	0.37	5.93	0.00
Q2	Participation	8.12	1.37	0.37	5.92	0.00
Q11	Collaboration	2.94	1.05	0.18	2.80	0.01
Q12	Collaboration	3.12	1.27	0.16	2.45	0.02

The analysis showed that each question had significant effects ($p < 0.05$) on the ROI. As the aim of the analysis was to identify the strongest predictors of performance measured relatively to each other, *standardized coefficients* (b) were utilized. The following questions

were identified as having a positive impact on the ROI and to be the best predictors of performance:

1. Q22: Alignment of Decisions Towards Common Goal or Strategy
1. Q7: Frequency of Communication
3. Q4: Priority Given to Participation
4. Q21: The Decision Making Process was Informed by Strategy and Goals
5. Q1: Engagement of All Team Members

Since question Q22 and Q7 had the same p and t values, they were both ranked as number one.

3.1.3. Multiple Linear Regression

As the literature review indicates that several factors are related, high multicollinearity in the data set was assumed. This means that independent variables are highly correlated with each other, which can lead to a loss of accuracy in identifying the most significant variables (Treiman 2009; Ramsey & Schafer 2013). In such cases, it is advisable to conduct single as well as *multiple linear regression* analysis (Ramsey & Schafer 2013). Therefore, the questions were regressed a second time in order to control for other factors.

Table 7, Table 8 and Table 9 summarizes the descriptive statistics and analysis results. The overall model produced an *Adjusted* R^2 of 0.48. This means the 18-predictor model was able to account for 48% of variation in team performance. The multiple regression model possessed a total of 208 residual degrees of freedom and a p value of <0.01, which made the model highly significant. *Understanding Own Function* (Q14) and Frequency of Communication (Q7) were seen as the only two significant factors since they offered a p-value of 1% and 3%. They both indicated a positive effect on ROI based on their unstandardized coefficients. Although Q14 was more significant than Q7, Q7 showed higher standardized coefficients, which indicated its effect to be stronger.

Table 7: Multiple Linear Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.693[a]	.480	.435	11.1913117

Table 8: Multiple Linear Regression Model Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24007.447	18	1333.747	10.649	.000[b]
	Residual	26051.055	208	125.245		
	Total	50058.502	226			

Table 9: Multiple Linear Regression Model Analysis

Question	Unstandardized Coefficients		Standardized Coefficients (ß)	T	P	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-47.29	5.45		-8.68	0.00		
Q14	3.38	1.35	0.18	2.51	0.01	0.52	1.94
Q7	2.96	1.35	0.21	2.18	0.03	0.28	3.56
Q2	2.58	1.35	0.12	1.92	0.06	0.68	1.48
Q10	-2.43	1.29	-0.18	-1.89	0.06	0.29	3.49
Q21	2.63	1.42	0.17	1.85	0.07	0.30	3.30
Q17	1.40	0.89	0.13	1.57	0.12	0.40	2.51
Q11	1.36	0.88	0.09	1.55	0.12	0.83	1.21
Q4	2.30	1.50	0.15	1.53	0.13	0.26	3.93
Q22	1.95	1.38	0.15	1.42	0.16	0.23	4.28
Q12	-1.54	1.09	-0.08	-1.41	0.16	0.78	1.28
Q1	1.70	1.29	0.11	1.32	0.19	0.39	2.54
Q16	-1.68	1.45	-0.10	-1.16	0.25	0.36	2.81
Q19	1.41	1.26	0.07	1.12	0.26	0.65	1.55
Q3	-1.28	1.31	-0.08	-0.98	0.33	0.40	2.49
Q6	0.68	0.90	0.05	0.75	0.45	0.64	1.56
Q15	-0.85	1.44	-0.05	-0.59	0.55	0.37	2.72
Q5	0.52	1.17	0.04	0.45	0.66	0.39	2.55
Q18	-0.37	1.27	-0.03	-0.29	0.77	0.30	3.39

It was also investigated whether multicollinearity was actually present. Ramsey and Schafer (2013) recommends the usage of the *variances inflation factor* (*VIF*). Literature mentions that VIF scores should not exceed values between 4-10 (Hair et al. 1995; Pan & Jackson 2008). Table 9 shows the VIF values for each question ranged between 1.21 and 4.28. Although, moderate levels of multicollinearity appeared, these levels were not sufficient to effect the validity of the analysis.

3.2. Interviews

The outcome of the interviews with industry as well as with academic experts will be discussed in the following section.

3.2.1. Industry Interviews

Coding techniques were applied in order to analyze the interview data. This method allows the researcher to summarize and categorize qualitative data (Flick 2007). Flick (2007) recommends first using *Open Coding* followed by *Focused Coding*. The researcher initially

should be open to any categories or concepts that can be seen in the data and then focus on the most frequent codes (Flick 2007). On this basis, a *codebook* can be developed which helps at classifying and sorting the data (Weiss 1994; Grbich 2013). Grbich (2013) emphasizes the importance of updating the codebook on a regular basis. For this reason, the relevant sections from the interview recordings were transcribed and categorized. Simultaneously, a codebook was developed which was updated consistently. The codebook entailed categories from the research framework as well as new factors. In the next step, the data was sorted according to its respective category. This provided an extensive overview of information that related to each factor. Finally, each factor named by each interviewee was translated into a score to enable subsequent analysis. As the focus was on key success factors, the scores were given according to Table 10. Should a factor be mentioned in both parts, the score of the open part was given. The relevant interview questions are shown in appendix 2 and 3.

Table 10: Interview Factor Scores

Mentioned in/ Described as	Open part	Semi-structured part
Important	2	1
Very Important	3	2

The different mediators were then ranked according to their importance based on the cumulative factor scores, which can be viewed in
Table 11.

Table 11: Industry Interview Factor Ranking

Ranking	Score	Mediator	Impact	Origin of Factor
1	75	Communication	+	Research Framework
2	71	Strategy	+	Research Framework
3	68	Collective Knowledge	+	Research Framework
4	52	Leadership	+	Research Framework
5	51	Familiarity	+	New Factor
6	49	Collaboration	+	Research Framework
7	38	Participation	+	Research Framework
8	33	Chemistry	+	New Factor
9	23	Openness	+	New Factor
10	22	Conflict	-	New Factor
11	19	Empowerment	+	New Factor
12	17	Trust	+	New Factor
13	16	Pressure	-	New Factor
14	7	Team Spirit	+	New Factor
15	6	Culture of Mistakes	+	New Factor
16	2	Transperency	+	New Factor
17	2	External Knowledge	+	New Factor

The table also shows if the factor has been newly identified or was part of the research framework. This meant whether the majority of interviewees found a particular factor to have a positive or negative influence on performance. It indicated that Communication was the most important mediator followed by Strategy and Collective Knowledge. All these factors had a positive effect. Moreover, the interviews provided meaningful insights of each factor. The top ten mediators will be discussed in depth in the following section. The top ten factors were selected as they are relevant to the research framework and can be researched within the given time frame.

3.2.1.1. Communication

The interview targeted a thorough understanding of communication in general, means of communication and the role of feedback.

Communication in general

Communication was found to be of utmost importance as it provided a thorough understanding of other functions in the company. It also provided individuals with a better understanding of their colleagues' goals. The interviewees described five different dimensions of communication, which are shown in Figure 7. These consisted of frequency, quality, timeliness, style and structure of communication.

Figure 7: The Five Dimensions of Communication

Several participants pointed out that frequent communication was critical and pertinent information should be shared within the organization. The ideal level of frequency was

dependent on the complexity of the product. However, there also was the risk of over-communication. This for example was the case in meetings where numerous participants were involved and irrelevant topics were discussed. In terms of quality, it was mentioned that only relevant information should be communicated and that this should be carried out in a precise and clear manner. One interviewee stated difficulty in obtaining information from the legal department. Information was presented in such a complicated manner that it was useless to the interviewee. As for timeliness, this was the point in time when communication took place. A software engineer stated for example, the sales department often promised features to customers that were not feasible from a technical perspective. This could have been prevented if the sales departments included the engineers in their discussions with customers earlier. The interviewees also mentioned the importance of an honest and cooperative style of communication. According to the interviewees, effective communication should be ensured by a communication structure. This entailed only scheduling meetings that were necessary and involved the right personnel. These meetings should have an agenda and be supplemented by communication rules.

Means of Communication

The four different means of communication that were mentioned were email, telephone, face-to-face and, in rare cases, video-conference. Email was the most frequently used means of communication. The reason for this was, in the event that something negative occurs, the history of the conversation had been recorded which individuals saw as protection from blame. However, this method of communication was commonly viewed as having a negative impact on communication. Face-to-face communication was declared the most effective because it allowed for thorough explanations, improved relationships, engagement, trust and team identity. Nonetheless, face-to-face communication was not always an option due to geographical dispersion.

The Role of Feedback

Having a cross-functional feedback process was shown to be extremely beneficial, especially in large projects. It was described as a vital method for self-improvement as well for promoting team spirit and common goals. However, such a process was rarely implemented and in the rare cases where it was implemented, it was not properly executed. This was mainly due to four factors:

- Lack of sense of importance and value to the work force
- Lack of time to execute it properly
- Lack of support by leadership
- No effective method of storing results

According to the interviewees, communication was hindered by language barriers, participation, stress and staff turnover. Also mentioned was that all communication should be based on facts not on speculation. Interviewees also revealed the importance of increased transparency of information from management. In contrast to most non-managerial employees' views, managerial interviewees put more emphasis on active listening rather than talking. They also believe that cross-functional feedback should be given at a management level only.

3.2.1.2. Strategy

Based on the interviews, strategy was structured into three sub-groups. These categories were labeled as *overall strategy, collaboration strategy* and *goals*, which often existed independently.

Overall Strategy

Overall strategy could be broken down into business strategy and supply chain strategy. While the concept of a supply-chain strategy was not very familiar to the interviewees, the majority confirmed that a business strategy was being executed in their respective organizations, especially in large organizations. However, very few were able to articulate the business strategy that was in place. This was mostly due to an unclear business strategy and lack of communication to lower-level employees. Nevertheless, interviewees expressed the importance of having a business strategy in place that was useful to employees.

Collaboration Strategy

Implementing a strategy on how to collaborate cross-functionally was beneficial, whether it was for the entire organization or for individual projects. Some organizations possessed this in form of a handbook or checklist, which defined responsibilities and milestones. Although it was not utilized on a regular basis, this was perceived to be very useful, especially in large organizations or complex projects. However, a collaboration strategy should be flexible and promote collaboration as opposed to creating a bureaucratic work environment.

Goals

All interviewees agreed the alignment of goals throughout the company was crucial. Although most departments had defined goals, they lacked alignment. Consequently, in some cases, this resulted in conflicting goals and led to difficulty prioritizing tasks and responsibilities. This occurred specifically with certain departments such as sales and production control or dispatch and logistics. For example, the sales department wanted a product to be delivered as soon as possible to increase customer satisfaction, while the logistics department insisted standardized delivery timeframes. Such situations fueled conflict, bad chemistry, and low levels of communication, which prohibited joint understanding and collaboration. Fortunately, communication and a good relationship reduced these effects.

3.2.1.3. Collective Knowledge

Collective Knowledge was described as the consciousness of the job profile and the incentives of cross-functional coworkers. Collective knowledge could be obtained either by being aware or possessing a deep understanding of multiple functions in an organization. Although a deep understanding of different functions was not always necessary, it was beneficial to have a basic comprehension of the function and the mindset of colleagues. This promoted a more collaborative environment, reduced overlap of work and eased communication. It was suggested that collective knowledge was especially useful in large, geographically dispersed companies. Employees that possessed these skills were able to facilitate collaboration throughout the organization. Although collective knowledge was not always possible, it could have been promoted by increased openness and communication. Moreover, it was stated that management should sensitize the organization of its importance and employ *job rotations* and *a flexible desk policy* to promote collective knowledge. An example provided by an interviewee was that the finance department required an account assignment object in order to value inventory and expected all other departments to utilize this system. However, the engineering department failed to see the benefits of this system and therefore refused to implement it. This led to inefficient processes and conflict between the two departments.

3.2.1.4. Leadership

Clear hierarchies and a leader were thought to be useful in complex environments or conflict. Without clear hierarchies, it was difficult to prioritize in cases of conflicting interests. For this reason, clear hierarchies and leadership should be ensured from the early onset. In addition, it

was said that the leader's role should be to facilitate accurate tools for collaboration, enable communication, create psychological safety, coordinate efforts and goals while driving culture and ensuring that an overall supply chain strategy is addressed. Leadership was stated to be existent in three different ways.

Intradepartmental Leadership

This was in the form of a department manager, who ensured participation of all members and prioritized tasks and goals for his/her department. Additionally, in cases of conflict, he/she reconciled and mediated with other department managers.

Interdepartmental Leadership

Interdepartmental leadership provided a clear hierarchy among the different departments when collaborating. Ordinarily, departments such as sales, project management or finance coordinated processes, set deadlines and prioritized conflicting goals. Several interviewees thought that this was, at times, unconstructive and hindered teamwork.

Cross-Functional Leadership

Cross-functional leadership was when one neutral department or individual coordinated cross-functional efforts. Although, this was rarely in place it was seen as very useful.

3.2.1.5. Familiarity

Interviewees revealed the importance of becoming familiar with relevant coworkers from other functions. This was especially important in geographical dispersed or diverse teams. Becoming familiar with coworkers improved collective knowledge, collaboration, communication, chemistry and participation. Familiarity was established through job rotation or team events. These allowed members to get to know each other on both a professional and informal basis. By knowing individual preferences, team performance improved substantially. This entailed knowing whether a colleague preferred to communicate via telephone or email or if a coworker's information could be trusted.

3.2.1.6. Collaboration

Collaboration was stated to be important, especially in complex environments that relied on teamwork. Successful collaboration however required openness, participation, a culture of tolerance of mistakes, clear defined responsibilities and good chemistry within the team.

Suggestions

In collaborative organizations cross-functional suggestions were made and ideally accepted. This was pointed out in one example, where the engineering department approached the marketing department to develop a new product for the Middle East. The marketing department passed this suggestion to product management who then implemented it.

Joint Decisions

Decisions were mostly made within a department and hardly any were made cross-functionally. Interviewees revealed this was mainly caused by conflicting goals. Some interviewees however argued that joint decisions should be enforced.

3.2.1.7. Participation

Participation was found to be important since lack of participation often led to conflict. Low levels of participation were mostly associated with having no clear, defined goals as well as personal characteristics, dispersion or external factors such as layoffs. Participation was improved through communication and recognition. Nonetheless, it was reported that lack of participation was not an issue in most cases, as management would ensure active participation from most employees.

3.2.1.8. Chemistry

Chemistry was described as getting along well with co-workers, ideally in a friendly manner. This included for example talking about topics that were non-work related and personal. It was shown to improve collaboration and foster trust. It enabled receptiveness of feedback, reduced conflict, improved familiarity and engagement levels in times of pressure. To the contrary, bad chemistry impacted teams negatively. One interviewee mentioned, that the collaboration with the head of another department was hindered due to personal differences. This negative chemistry made it impossible to carry out projects and work in a professional manner. The interviews revealed that diversity had a negative effect on chemistry. One

interviewee mentioned his company emphasized personal interests and values during the hiring process. This ensured a good personal fit with the company and helped to achieve positive chemistry amongst coworkers.

3.2.1.9. Openness

Openness to new ideas was also an important factor. Although most interviewees perceived their work place to be an open environment, they believed it could further be improved. Openness promoted collective knowledge, trust, communication and receptiveness to suggestions. One interviewee, for example, mentioned two departments that had a similar financial management process, were merged into one due to the openness of the employees.

3.2.1.10. Conflict

Conflict was seen to be negative by most interviewees. However, one interviewee stated that conflict resolution could actually improve collaboration. Conflicts often evolved from conflicting goals, poor communication, low participation levels, diversity and pressure. Effective leadership, collective knowledge and good team chemistry resulted in reduced conflicts.

3.2.2. Expert Interviews

Professor Ancona and Professor Mathieu confirmed the research framework and the approach was accurate and reflected current research. Moreover, as Professor Ancona explored the benefits of teams engaging with people outside the team, she believed this was an aspect that should be considered.

3.3. Industry Survey

Based on the simulation results and insights from the interviews, survey questions were developed. These specifically addressed the top ten factors from the interviews that showed a positive effect on performance. This was done as it helped in answering the research question. Therefore, Conflict as a success factor was not further investigated since it was mentioned to have a negative effect. The respondents were asked to rank the different factors on a Likert scale from low to high importance (1-5), which could easily be transformed in to quantitative data and analyzed. The most important questions are shown in Figure 8 and Figure 9 as well as in appendices 7-9. Five respondents were deleted from the sample as they were employed

as either academics or consultants and therefore were not part of the target group. This reduced the sample size to a total of 90 participants. Appendix 8 shows that 8% of the respondents did not see themselves as part of the supply chain. Nonetheless, they remained in the data set as they worked in a logistics, marketing or engineering department, which all fall under the definition of supply chain. All respondents were required to engage cross-functionally, which is shown in appendix 9. Good Communication, Alignment of Objectives and Cooperative Interaction were seen as the most important factors, which is shown in Figure 8.

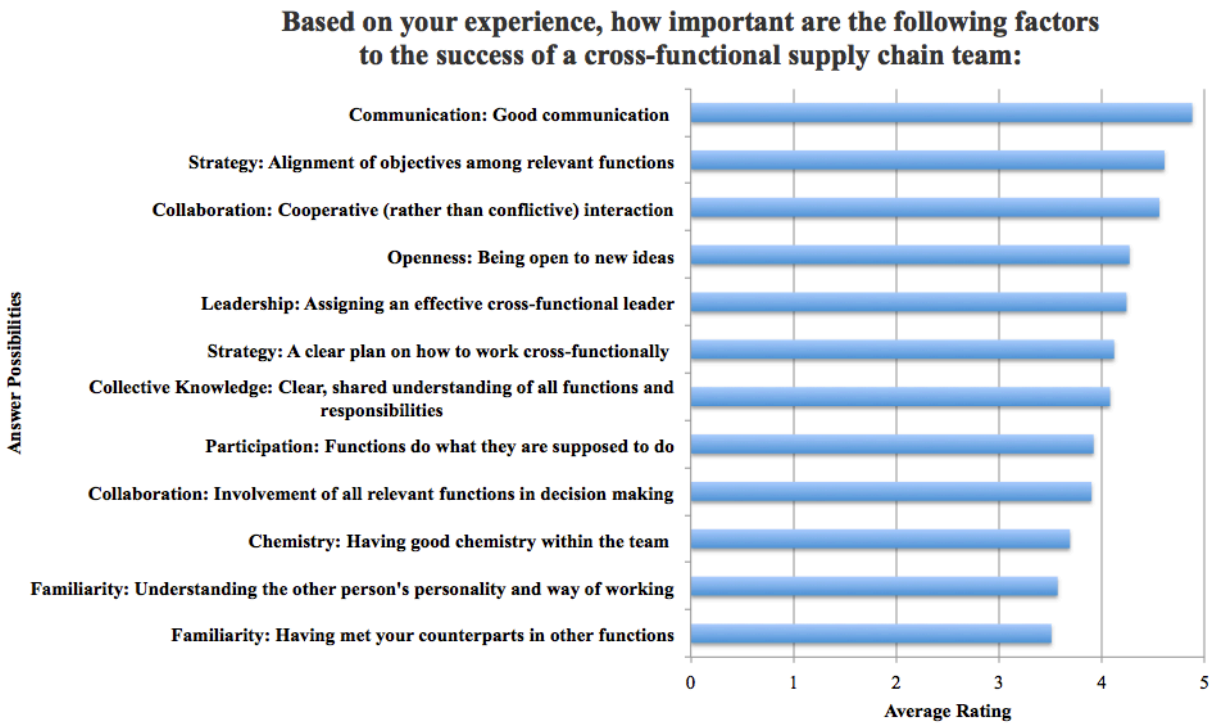

Figure 8: Survey Question Concerning Factor Importance

Moreover, the survey asked to indicate one factor that requires improvement in order to enhance the effectiveness of the supply chain.

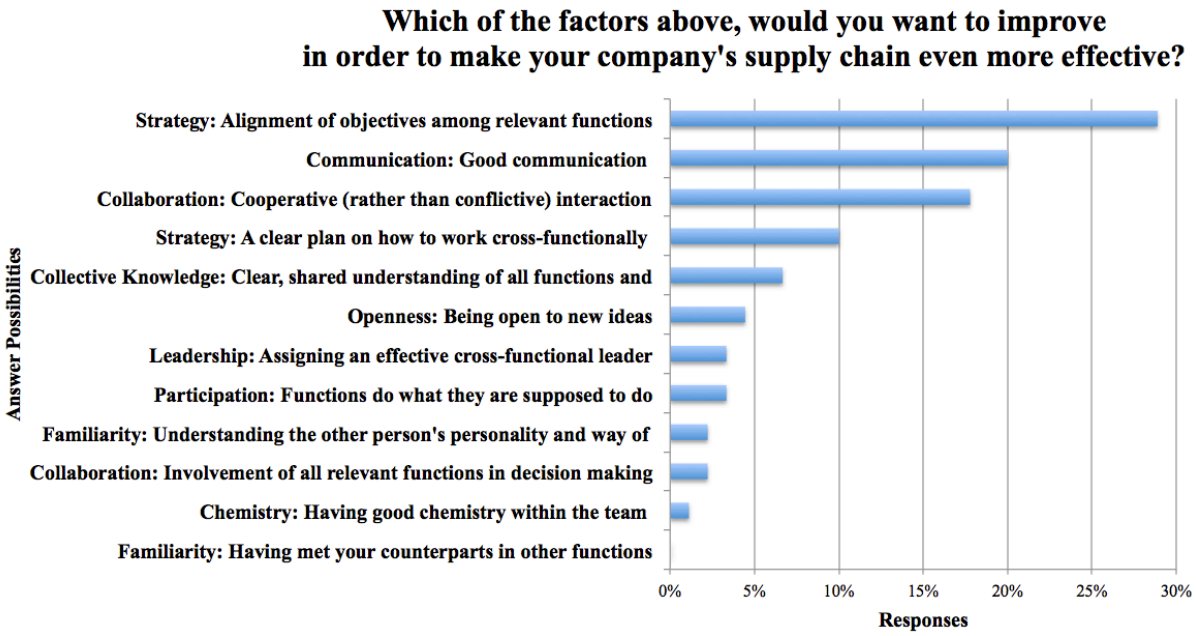

Figure 9: Survey Question Concerning Supply Chain Improvement

As Figure 9 shows, Alignment of Objectives followed by Good Communication and Cooperative Interaction, were perceived by respondents to be the determining factors that would mostly improve the effectiveness of the supply chain.

4. Discussion

The following section intends to establish a hierarchy of the most important factors across the different research methods. Therefore, the nine factors that were researched in the survey will be compared to each other. The factors will then be evaluated in more detail by analyzing the results of the different research approaches and considering relevant literature. Following which, further findings and the study limitations will be considered.

4.1. Comparison of Results Across Research Methods

Table 12 below ranks the most important factors according to each research method. The factors are sorted based on their average rank. The average rank is calculated by weighting the three different research methods equally. The different subcategories within each method are also equally weighted. Factors that could not be observed are excluded from the weighting. The factors that were proven to be insignificant were assigned the lowest rank possible given the respective research method. The lowest possible rank for multiple regression was 6, as

opposed to CFA where the lowest rating would be 4. Below is an example of the average rank calculated for the factor of Leadership:

$$\text{Average rank} = (((6 + 6) / 2) + (4 / 1) + ((5 + 6) / 2))) / 3 = 5.17$$

Table 12: Factor Ranking by Method

Factor	Method						Average Rank
	Simulation			Interviews	Survey		
	Single Regression	Multiple Regression	CFA	Factor Ranking	Survey Q1	Survey Q2	
Communication	1	2	-	1	1	2	1.33
Strategy	1	x	1	2	2	1	2.06
Collective Knowledge	5	1	x	3	6	4	3.78
Collaboration	4	x	x	5	3	3	4.56
Leadership	6	x	-	4	5	6	5.17
Participation	3	x	2	6	7	7	5.89
Familiarity	-	-	-	5	8	8	6.50
Openness	-	-	-	9	4	5	6.75
Chemistry	-	-	-	8	9	9	8.50

Legend
- Not observed
x No significant influence

The comparison indicates that Communication clearly is the most important factor, followed by Strategy. Although Familiarity only ranked number 8 in the survey, it was imperative in the survey interviews. The same can be said for Openness as it scored poorly in the interviews but was viewed as important in the survey. However, Chemistry performed poorly in both the interviews and the survey and is not considered as one of the most important factors predicting team performance.

The remaining eight factors will be discussed in more depth in the order of their importance, in the following.

4.1.1. Communication

Throughout all three methods of analysis, Communication was one of the top two factors. The simulation results suggest Frequency of Communication is critical. The interviews however mentioned that excessive communication can also be harmful for team performance. In addition, the interviews revealed that quality, style, timeliness and structure of communication should be considered when determining the effect of communication on team performance. Similar to the findings, the literature review points out that Communication is the most important factor and includes aspects such as frequency, style and feedback. It also confirms that individuals prefer face-to-face communication. However, the literature does not indicate that the appropriate method of communication varies by situation. Moreover, aspects

such as timeliness, structure and over-communication were not found to be addressed by literature in regards to team dynamics. In literature examined by this study, there was no mention of communication being dependent on company and product complexity. This can be the result of most of the literature found studying student teams as opposed to organizational teams.

4.1.2. Strategy

Strategy, specifically the alignment of goals, is extremely important as it was among the top two factors across all research methods. However, it was pointed out that objectives are not consistently aligned and this should be improved in order to promote supply chain performance. That can result from companies failing to identify a clear strategy. If companies have a strategy, this assists in the alignment of objectives throughout the organization as well as reducing the risk of conflicting goals. This is supported by literature as companies can only perform well if they consider how different activities within an organization impact each other and develop an overarching strategy (Porter 1996). The overarching strategy should then be broken down into business and supply chain strategies, which provide the various actors within the organization a basis on which to make decisions (Narasimhan et al. 2008; Hofmann 2010).

The two classifications of strategy according to Mathieu et al. (2009) are team strategy and performance strategy. Team strategies are comparable to collaboration strategies while performance strategies are more comparable to overall strategies. This study confirms that research.

4.1.3. Collective Knowledge

Single regression showed that Collective Knowledge had a low importance while multiple regression identified “having knowledge of one’s own function”, a part of Collective Knowledge, was the best predictor of performance. This may be due to the factor of Collective Knowledge being less correlated with other factors, which may cause the impact of the factor to be overestimated. Its importance may also be due to the nature of the simulation game. The game required students to become familiar with a new role in order to participate, where as in industry most employees are aware of their role. Therefore, it is not surprising the factor seemed to be of less importance in the interviews and the survey. Also, in industry in most cases a basic understanding of the other’s function as opposed to having a deep understanding is sufficient.

Past research has determined that collective knowledge can have a positive effect on performance and reduce the duplication of work. It also states that employees possessing this trait can serve as facilitators or catalysts. The interviews support these claims. However, the literature that was explored only addresses the impact of understanding others' function on performance and fails to investigate deeper aspects such as understanding the other person's way of thinking. Moreover, the ideal level of the factor has not been found to be researched yet. The study also does not find any indication that engaging with members outside the team is critical for the success of a supply chain team. This might be due to the cross-functional nature of supply chain teams since they already span across organization unlike dedicated functional teams.

4.1.4. Collaboration

Collaboration was shown to be of great importance in both the interviews and the survey. However, it was of less importance in the simulation data. This could be because the simulation focused on joint decision-making and suggestions, whereas the survey included the aspect of cooperative interaction. Consequently, working together cooperatively seemed to be more important than making joint decisions or cross-functional suggestions. This is also reflected by literature that emphasizes cooperative interaction. Nevertheless, there was no indication that proving too much cooperation can lead to diminished team results as stated by Levi (2014). This may be the case as supply chain teams are also part of a function and, therefore, may be collaborating less than other teams by nature.

4.1.5. Leadership

The interviews and the survey indicated that leadership is important while the simulation indicated the contrary. This may be caused by the fact that only one question concerning leadership was asked during the simulation game. In addition, as the game is less complex than industry it may not require an assigned leader. It was determined in the interviews that the presence of a leader is of greater importance in a more complex environment. Literature has confirmed leadership has a positive impact on performance. It also indicates that leadership becomes more important over time. This might also explain why leadership plays a less important role in the simulation as teams were newly formed. Although some research has been conducted on different types of leadership, there was no study found exploring the relation of these and team performance.

4.1.6. Participation

Participation was identified as being very important in the simulation game but it played an inferior role in the interviews and surveys. Perhaps this is due to participation in the game being voluntary whereas in industry participation is mandatory. Literature indicates participation can also be destructive and that social loafing can pose issues. However, this cannot be supported by this research. Social loafing may not be as big of an issue in supply chain teams as employees are obliged to contribute and, in most circumstances, other employees from the same function can cover during absences. Also, in literature, participation was found to be beneficial and not have a negative impact on performance.

4.1.7. Familiarity

Familiarity was introduced as a factor during the interviews. It was of greater importance in the interviews in comparison to the survey. That can be explained by the fact that most interviewees mentioned familiarity in the open section of the interview as part of telling an anecdote. This might be because individuals may not be aware of the significance of familiarity when not reflecting on certain situations and therefore answered less favorably in the survey. The study found familiarity promotes collaboration and reduces conflict. Although familiarity was not part of the initial literature review as it can qualify as an input and mediator, literature states it has a positive effect on performance (Guzzo & Dickson 1996; Huckman et al. 2012).

4.1.8. Openness

Openness was also mentioned during the interviews. The importance of openness was ranked significantly lower in the interviews in comparison to the survey. This might be the opposite effect than with familiarity. Individuals may perceive openness as critical but when asked for specific examples of good teamwork, they failed to provide concrete examples, which makes it seem to be less important. Openness can also be seen as an enabler that fosters successful collaboration and performance. This finding is supported by the recent work of Homan et al. (2008).

4.2. Further Findings

The analysis shows that multiple factors are highly correlated with each other. Moreover, it indicated that poor performance leads to conflict, which then influences collaboration,

resulting in negative performance. This confirms the theory of feedback loops as discussed by Ilgen et al. (2005).

4.3. Limitations

The quality of research can be assessed by looking at *internal* and *external validity*, (Robson 2011). Robson (2011) defines internal validity as the guarantee that the identified effect was caused by the measured variable. External validity, on the other side, reflects the extent that the findings in the sample can be generalized. The different research methods will be assessed separately on this basis.

As the survey relied on self-reported survey answers, it was difficult to objectively evaluate the different team characteristics and their effect on performance. In addition, the data was vulnerable to *attributional bias* as the answers were retrospective and the participants may have tried to find explanations for their performance (Podsakoff et al. 2003). Since the data did not accurately represent industry, as it relied on a simulation, this had to be considered when generalizing. The industry interviews focused on self-reported answers, therefore, they were also subject to attributional bias. In addition, team effectiveness could not be measured objectively, which made it difficult to evaluate a factor's influence on performance.

Since the interviews were carried out in various industries and countries, the answers should accurately reflect industry. As the survey was self-reported, it was also subject to attributional bias. Respondents may have also been influenced or limited by the answer possibilities. Generalizability seemed to be less of an issue, when industry professionals answered the survey.

Finally, comparing the results of the different approaches objectively was difficult as the methods were different.

5. Conclusion

The research was aimed to determine two things, one of which was to identify the most important mediators that contribute to the success of internal supply chain teams. The study confirmed the importance of the six factors identified in the research framework and further extended the framework by two new factors. In addition, the study suggested that each factor is not of equal importance since a hierarchy exists, which met the second aim of the study. Currently, the hierarchy of factors has not been investigated by literature. Within this hierarchy, Communication and Strategy emerged as the two most important factors. The remaining factors were also ranked based on their level of importance using different research methods. Their exact ranking position may lack accuracy as the scores are very close and it is difficult to compare using different research methods. The study revealed correlations exist amongst the various factors. The research framework was adapted in order to reflect these findings. It is now split into two different categories, which are shown in Figure 10 below.

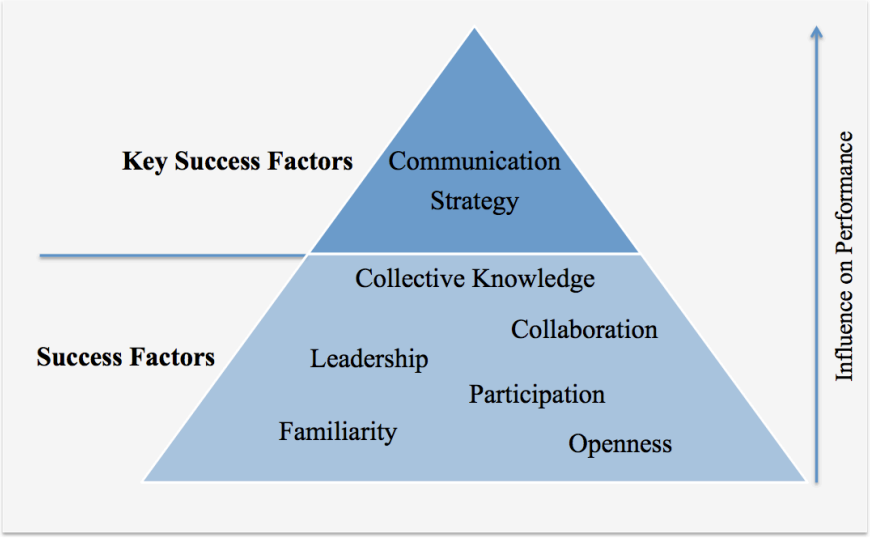

Figure 10: Re-fined Supply Chain Team Effectiveness Framework

The various factors are sorted by their influence on performance on the horizontal axis. The elements of less importance are summarized under *Success Factors*. Although all the factors are necessary in order for teams to perform well, the most important factors are labeled *Key Success Factors*. These factors have the strongest impact on team performance and should be the focus for improving a team's effectiveness.

The findings can be generalized to supply chain teams as the research drew on a diverse sample. The outcome of the research may be applicable to other types of teams. While it can

be assumed that the success factors for other types of teams are also bound to a hierarchy, this may differ from the hierarchy identified for supply chain teams. It is probable that Communication plays a major role in teams overall. However, the importance of Strategy might be more applicable to other forms of cross-functional teams. These teams may, similar to supply chain teams, be very complex and confronted with conflicting team goals and functional goals. The research found it extremely important for strategies and goals to be aligned. This can be accomplished by incentivizing employees to achieve both individual and supply chain goals. One interviewee mentioned this could be achieved by introducing bonuses based on accomplishing cross-functional supply chain goals. Another idea to improve the supply chain would be to introduce communication and meeting processes in order to reduce the risk of over-communication.

The research has both theoretical and practical implications. While it combines the subjects of team dynamics and supply chain management, it introduces the topic of supply chain team effectiveness and offers good insight of success criteria. Thus, the research lays the ground for more relevant work in this area. In addition, it provides management with a guideline to identify factors on which to focus to improve team performance. The study also identified new fields of research that could be of interest. For example, it would be intriguing to further develop the research framework and identify all the relevant factors as well as their relationships. Communication and Strategy should also be further researched in order to investigate topics such as over-communication or effective strategy deployment in their relation to team effectiveness. It would also be interesting to evaluate the different perspectives of management and non-managerial employees on the different factors and to determine which view is most accurate. Furthermore, research could address if the importance of the identified factors varies by industry or corporate size. Lastly, as this study focused on making internal supply chain teams successful, further research can extend this analysis to determine what factors outside the intra-supply chain contribute to cross-organizational supply chain team's success.

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Appendices

Interview Guide

Introduction (~2 minutes)

Hi, _____, this is _____, calling from MIT's Center for Transportation and Logistics. How are you doing today?

Thanks for agreeing to talk with me, and thanks for your time. As you may know, this interview is part of a research project we are conducting in collaboration with the University of Cambridge regarding team dynamics in cross-functional supply chain teams. The interview will take no more than 45 minutes. I remind you that:

- Your answers will be treated anonymously. Your name will not be linked to any answer.
- The interview is voluntary. You have the right to decline to answer any given question,
- I understand we have your consent to record this interview. Is that correct? I remind you that have the right to revoke this permission at any time.

Do you have any questions? (Answer the questions, if any). Let's proceed.

Positioning questions (~7 minutes):

Encourage them to speak at length about their experience, to warm them up and build rapport. Follow up with questions like

- **How long have you been with (Company)?**
- **Help us locate you in the big picture. To which function, department or area does your current position belong?**
- **How long have you been in the (Function) function?**
- **Before joining the (current function) function, were you part of any other function or department inside (company)?**
- **How long have you been in your current position?**
- **What are the main activities of your position? What are your responsibilities?**

1

Appendix 1: Interview Guide 1

- **Help us understand to what extent you engage with employees from different departments or functions, such as procurement, sales, manufacturing, etc.** *(Make a note of whether they answer Yes or No to this question.)*

If the respondent answered "No" to the interaction question above, then ask if he/she could put you in contact with somebody more appropriate. If the answer is "Yes", then proceed.

Open section (~15 minutes):

Pursue interesting areas in the form of a conversation. Pay attention to what the respondent says, and try to understand it, and ask follow up questions.

1) **How would you describe the relationship with other functions?**
2) **What factors do you think are important in order to make this collaboration successful?**
3) **Please think of a project or engagement that went well.**
    - **Can you please describe this situation?**
    - **What do you think the reason was for this?**
4) **Now, please think of a project that did not go well.**
    - **Can you please also describe this situation?**
    - **What do you think the reason was for this?**
5) **How do you think team performance could be enhanced in your organization?**

During the course of this conversation, try to move the conversation from the individual to general themes, and try to keep it anchored on concrete activities and the reason behind these activities.

- *For interesting things, ask:* "**Tell me more about X**".
- *When the respondent is getting vague, ask:* "**Can you give me an example of X?**"
- *If the conversation is getting lost in details, ask:* "**What do you think the purpose of this is?**" *or* "**What is the reason behind this?**"

2

Appendix 2: Interview Guide 2

Semi-Structured section (~15 minutes)

(Only ask those questions that address things that have not been answered before during the course of the conversation.)

Now I would like to ask you specifically about a few factors. I would ask you to comment on these by describing what they mean to you and then assessing their importance.

1) **How do you communicate with other functions?**
   - **Are you satisfied with this ways of communication?**
   - **Do you and coworkers from other departments give each other feedback on past performance?**
2) **Do you feel your goals and the goals of your coworkers are aligned?**
   - **Do you think having a common strategy in place is important for the success of your SC?**
3) **Are you satisfied with how engaged other functions are in _____ (decision making for the SC)?**
   - **Please explain.**
4) **Does your function and other functions make joint decisions that affect the supply chain?**
   - **Are other functions willing to accept suggestions from your function?**
5) **How well would you say that other functions understand the challenges that your function is facing?**
6) **How well would you say that you understand the challenges that other functions are facing?**
7) **Is there any function or individual facilitating or orchestrating the interaction?**

Wrap Up (~1 minute)

That's pretty much what I had to ask you. Thank you very much for your time. I really appreciate your answers and your time. I hope I can contact you with follow up questions after I have analyzed our conversation. Do you have any questions? (Answer the questions, if any

Thanks again!

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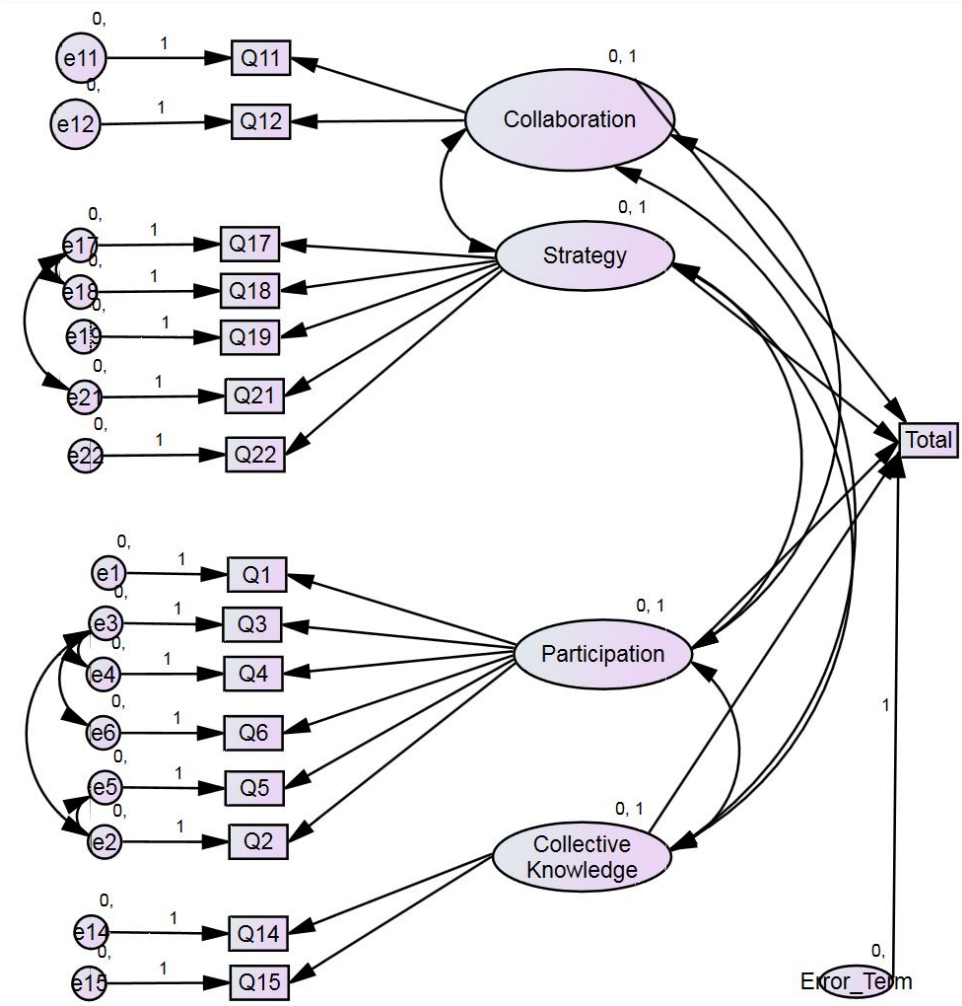
Appendix 3: Interview Guide 3

Rating	Question
	1. In the first six rounds played so far, were members of your team actively engaged in the game?
1 a)	None of the teammates was actively engaged in the game.
2 b)	A few teammates were actively engaged, but most were less so.
3 c)	Most teammates were actively engaged, but others were less so.
4 d)	Every teammate was actively engaged.
	2. In this first half, did every member of your team at least do something to participate?
1 a)	None of the members of the team did anything to participate in the game.
2 b)	A few of the members of the team did something, but most did nothing.
3 c)	Most of the members of the team did something, but a few did nothing.
4 d)	Every single member of the team did at least something to participate.
	3. Did your teammates made sure to find the time to participate in the game?
1 a)	None of the teammates found the time. We were all too busy.
2 b)	A few teammates found the time, but most were too busy with other things.
3 c)	Most teammates found the time, but a few were too busy with other things.
4 d)	Every teammate made sure to find the time for the game, despite being busy.
	4. Did your teammates give enough priority to participating in the game?
1 a)	None of the teammates gave it enough priority. We were all too busy.
2 b)	A few teammates gave enough priority to it, but most were too busy.
3 c)	Most teammates gave enough priority to it, but a few were too busy.
4 d)	Every teammate made sure to give enough priority to the game.
	5. Overall, would you say the members of your team were very enthusiastic about the game?
1 a)	None of the teammates was very enthusiastic about the game.
2 b)	A few teammates were very enthusiastic, but most were less so.
3 c)	Most teammates were very enthusiastic, but others were less so.
4 d)	Every teammate was very enthusiastic.
	6. Did any member of your team dropped the ball at any point during the first rounds?
1 a)	Often teammates would drop the ball.
2 b)	A few times teammates dropped the ball.
3 c)	Once only a teammate dropped the ball, but it never happened again.
4 d)	None of my teammates dropped the ball at any point.
	7. Which of the following best describes the pattern of communication inside your team?
1 a)	There was no pattern of communication inside our team.
2 b)	Before some of the rounds only, but not all, our team communicated.
3 c)	Before every round our team communicated, but not after rounds.
4 d)	Before and after every round our team communicated.
	10. If any took place, were key decisions made separately or in consultation with the team?
1 a)	None of the key decisions were made in consultation with the team.
2 b)	A few key decisions were made in consultation with the team, but most were individual decisions of functions.
3 c)	Many key decisions were done jointly, after discussion and agreement.
4 d)	Every key decision was done jointly, after discussion and agreement.

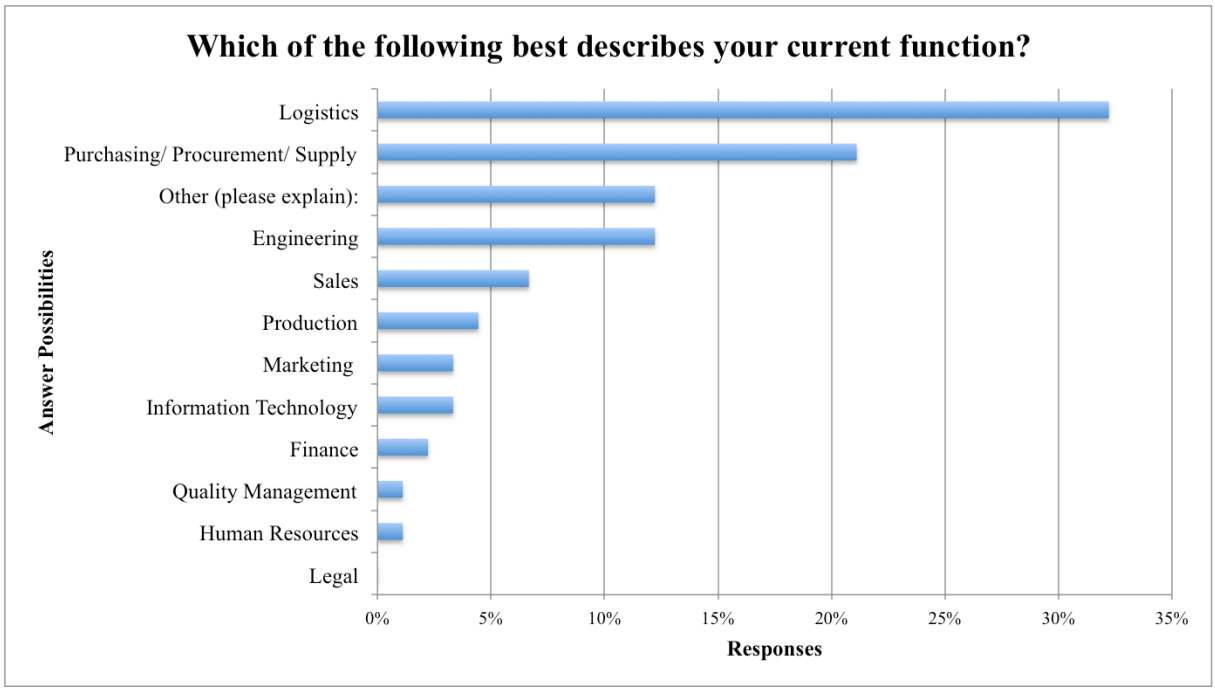
Appendix 4: Selected Supply Chain Simulation Questions 1

Rating	Question
	11. If any was made, how did your team arrive at these joint decisions?
0 a)	This question does not apply to us.
1 b)	Without much debate, the team would reach a consensus.
2 c)	A single round of discussion was often enough to reach an agreement.
3 d)	Two or more rounds of discussion were usually needed for our team to reach agreement.
	12. If any were made, were your teammates flexible and willing to accept suggestions?
1 a)	There was no flexibility or willingness to accept suggestions.
2 b)	There was little flexibility or willingness to accept suggestions.
3 c)	There was some flexibility and willingness to accept suggestions.
4 d)	There was a lot of flexibility and willingness to accept suggestions.
	14. Which of the following best describes your individual investment of time and effort into understanding your function?
1 a)	I invested almost no time on this. I never really understood all the details.
2 b)	I invested some, but not enough, to feel confident about my decisions.
3 c)	I invested enough to feel rather confident regarding my decisions.
4 d)	I invested more than enough. I feel very confident regarding my function.
	15. As a team, how much time and effort did you invest into learning about the decisions in other functions?
1 a)	We invested almost no time on this.
2 b)	We invested some time, but not enough to feel confident about it.
3 c)	We invested enough time and effort to feel rather confident about it.
4 d)	We invested more than enough. We feel very confident about it.
	16. As a team, how much time and effort went into figuring out the impact of the decisions of every function on all the other functions?
1 a)	None or very little time and effort went into understanding these impacts.
2 b)	Some, but not enough to feel confident about our knowledge of these impacts.
3 c)	Enough to feel confident regarding our knowledge of these impacts.
4 d)	More than enough. We feel very confident regarding these impacts.
	17. In your team, did you receive and/or give feedback after each round was played?
1 a)	There was no significant feedback exchanged in my team after a round.
2 b)	I would give feedback to my teammates after a round, but I did not get any.
3 c)	I would get feedback after a round, but I did not give any to my teammates.
4 d)	In my team we would both give and receive feedback after a round.
	18. Did your team perform any type of postmortem analysis after a round?
1 a)	There was no meaningful discussion in my team about any past round.
2 b)	Some individual comments were shared after a round, but no joint analysis of what happened was done.
4 c)	We made sure to perform a joint and in-depth postmortem analysis after each round was run.
3 d)	Somewhere between answers 2 & 3.
	19. In your team's decision making, did anybody serve as a leader to facilitate agreement?
0 a)	In my team nobody has any sort of leadership role. We have no leader.
1 b)	In my team, somebody has come to play a leadership role, unofficially.
1 c)	In my team, somebody was explicitly given a leadership role.
2 d)	**In my team, there are two or more people playing a leadership role.**
	21. Was there any strategy or set of goals informing the decision making process of your team?
1 a)	Does not apply. There was no informed decision making in my team.
2 b)	My team had some vague idea about what we wanted to achieve, but I would not call it "strategy" or "goals."
3 c)	Many key decisions in my team were aligned with a common goal or strategy.
4 d)	Most / all key decisions in my team were aligned with a common goal or strategy.

Appendix 5: Selected Supply Chain Simulation Questions 2

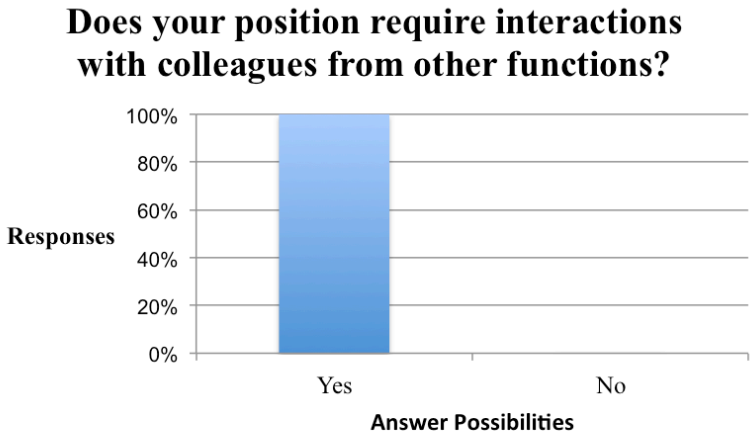


Appendix 6: Confirmatory Factor Analysis Output



Appendix 7: Survey Question 1

Appendix 8: Survey Question 2



Appendix 9: Survey Question 3