Logistics Strategy for Building Contractors
CONTEXT, CONTENT, AND PROCESS

Petter Haglund
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Abstract

A logistics strategy is at the foundation of how a company manages the flow of resources in the supply chain. It ensures that the logistics function of a company contributes to fulfilling strategic goals. In the project-based building construction industry, logistics is a means of supporting building operations by ensuring that resource flows are managed efficiently in the supply chain and at the construction site. However, there is a tendency to focus on operational logistics issues and to adopt established logistics principles from other industries to solve logistics-related problems in building construction, which typically favour “one size fits all” solutions. These approaches to construction logistics are problematic because building contractors target different market segments through their type of products, production methods, and supply chains. Therefore, there is not a “one best way” of managing logistics in building construction.

This thesis focuses on how a building contractor can adopt a more strategic and long-term approach to logistics. Strategy is typically regarded in terms of three dimensions: context, content, and process. Consequently, building contractors need to understand the logistics strategy context, how it influences the logistics strategy content, and the process of formulating and implementing a logistics strategy. The purpose of this licentiate thesis is therefore to investigate the fit between logistics strategy context and content for building contractors.

To fulfill the purpose, the following two research questions are answered:

RQ1: What elements of logistics strategy context and content can be used to assess the fit of building contractors’ logistics strategies?

RQ2: What leads to fit/misfit in building contractors’ logistics strategies?

To answer the research questions, a combination of conceptual and empirical research methods has been used. The conceptual part comprises a literature review that was used to derive constructs to develop conceptual research frameworks. The literature review also served as input to defining research questions and as guidance for collecting empirical data. The empirical methods used are based on case studies to further develop and verify the conceptual research framework.

The main findings of this thesis are four logistics strategy context elements and five content elements that can be used to assess the fit between a building contractor’s logistics strategy context and content. This fit is important to facilitate logistics’ role as a support function for a cost/delivery or flexibility-oriented competitive strategy. However, fit is difficult to achieve in practice and the logistics strategy process can be constrained by the building
contractor’s previous investments and the support given by internal stakeholders. This means that fit is not solely a deliberate choice made for efficiency/effectiveness reasons but includes comprises between previous and future directions and managerial discretion.

This thesis contributes to the logistics strategy body of knowledge concerning the context, content, and process dimensions of logistics strategy within building construction. The thesis shows that there are trade-offs in selecting a logistics strategy that supports a cost/delivery or flexibility-oriented strategy. These trade-offs emerge as a consequence of different degrees of pre-engineering, type of production systems, and supply chain structures employed by building contractors, which building contractors needs to address during logistics strategy formulation. A logistics strategy profiling template was developed, which is a tool that managers in building contractor organizations can use to analyze and reconfigure a logistics strategy. Furthermore, the thesis highlights that building contractors should establish a central logistics function that takes responsibility for strategic logistics decisions, regardless of their logistics strategy context.
Populärvetenskaplig sammanfattning

En logistikstrategi utgör grunden för hur ett företag hanterar flödet av resurser i försörjningskedjan och säkerställer att logistikfunktionen bidrar till att uppfylla företagets övergripande strategi. Inom husbyggande har logistik en stötande funktion som avser att hantera resursflöden effektivt i försörjningskedjan och på byggarbetsplatsen. Byggentrepenörer tenderar dock att fokusera på logistikten i enskilda projekt och på att föra in etablerade logistiska principer från andra branscher. Detta tillvägagångssätt är problematiskt eftersom logistiklösningar som fungerar i andra branscher inte nödvändigtvis fungerar i bygpproduktion. Bygpproduktion skiljer sig från industriell produktion och husbyggnadsbranschen är mångsidig med olika typer av entreprenörer som ritar sig till olika marknadssegment genom att leverera olika typer av produkter, vilket i sin tur kräver olika typer av produktionsmetoder och försörjningskedjor. Därmed behöver byggentrepenörer anpassa sin logistikstrategi till dess kontext eftersom generella lösningar riskerar att vara dåligt anpassade för att hantera logistiken i olika typer av husbyggande.

Forskningen som presenteras i denna licentiatavhandling fokuserar på hur en byggentrepenör kan ta ett mer strategiskt och långsiktigt förhållningssätt till logistik. Syftet är därför att undersöka hur logistikstrategin bör anpassas till dess kontext. Studierna som avhandlingen bygger på har genomförts hos stora byggföretag som i huvudsak har sin verksamhet i Sverige.

I denna avhandling har fyra beståndsdelar identifierats som representerar logistikstrategins kontext samt fem beståndsdelar som representerar logistikstrategins innehåll. Dessa beståndsdelar kan användas för att bedöma hur väl anpassad logistikstrategins innehåll är till dess kontext. Denna situationsanpassning är viktig för att underlätta logistikfunktionens roll som stöd för en kostnadseffektivitets- eller flexibilitetsinriktad konkurrensstrategi. Forskningsresultaten visar dock att detta är svårt att uppnå i praktiken då implementeringen av logistikstrategin begränsas av byggentreponörens tidigare investeringar och av olika interna aktörers intressen. Detta innebär att det inte enbart går att utforma sin logistikstrategi utifrån effektivitetshänseende, utan det behövs tas hänsyn till balansgången mellan tidigare och framtida strategiska inriktningar.

Denna avhandling bidrar till kunskap om logistikstrategi i termer av strategikontext, innehåll och process hos byggentreponörer. Avhandlingen visar att det finns avvåningar i att välja en logistikstrategi som stödjer en kostnadseffektivitets- eller flexibilitetsinriktad strategi. Dessa avvåningar uppstår som en konsekvens av att logistikstrategin måste vara utformad för att tillgodose den komplexitet och förutsägbarhet som finns i logistikprocesser, vilket i sin tur beror på graden av förprojektering, typ av
produktionssystem samt försörjningskedjans struktur. För att underlätta för byggentrepreneurs i deras logistikstrategiarbete har en profileringsmall utvecklats. Mallen är ett verktyg som logistikehefer och logistikansvariga i byggeföretag kan använda för att analysera en befintlig, eller formulera en ny, logistikstrategi. Detta arbete bör ha sin utgångspunkt i en central logistikfunktion som tar ansvar för strategiska logistikfrågor, vilket i dagsläget är ovanligt hos byggentrepreneurs.
Foreword

As of writing this foreword in March 2022, being a PhD student has been better than I could imagine before I started about two and a half years ago in September 2019. I have no doubt that this is because of the people around me that make life at work and outside work a fun experience. The next few lines are dedicated to the people that have supported me, directly and indirectly, up until this point in my PhD-studies.

First, I would like to give a big thank you to my supervisor duo, Martin Rudberg and Ahmet Sezer. I was fortunate to get you two as my supervisors when I started my PhD and I look forward to continuing working with both of you.

Second, I wish to thank my colleagues in the construction logistics group, Mats Janné, Micael Thunberg, Anna Fredriksson, Yashar Gholami, Farah Naz, and Abdalla Mubder. Thank you, Mats, for being the best (and possibly my only?) mentor I have ever had. To Yashar and Farah, SP6202 would not be the same without you!

Third, I want to thank my colleagues at the division of Communcation and Transport Systems. Special thanks go to Viveka Nilson and Sophie Lindesvik, your help to me (and to everyone else at the division) is invaluable.

Last but not least, my thanks go out to my dear friends and family. To those in Norrköping, Ulricehamn, Umeå, and Göteborg, your support means everything, and you make life outside work the best. I want to thank you Fanny for the life we have here together in Norrköping with our two “kids” (two slightly overweight, but adorable, domestic cats).

Petter Haglund
Norrköping, April 2022
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Thesis Outline

This licentiate thesis is a compilation thesis (thesis by publication) comprising three articles: one under review in *Construction Management and Economics*, one published in the proceedings of the CIB International Conference on Smart Built Environment, ICSBE, 14-15 December 2021, and the final one under review in *International Journal of Logistics Management*. The thesis is titled *Logistics Strategy for Building Contractors: Context, Content, and Process* and consists of two parts. The first part includes the introductory chapters and describes the background to why this thesis is necessary, together with the formulation of the research problem, purpose, and research questions. It also includes the theoretical frame of reference and a summary of the included papers. Furthermore, the first part answers the thesis’ research questions followed by a discussion of the thesis’ purpose. Finally, the contributions of the thesis are outlined along with suggestions for further research. The second part consists of the three papers that the thesis is based on, which are listed below.

**Paper 1**


**Paper 2**


**Paper 3**


xi
Vad har du blitt? Ingenting! Och vad kan du? Ingenting!

Nåe, far har ju lärt mej allt han kan!

— Nils-Erik och Lennart Kristersson (Snålvatten och Jäkelskap)
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Paper 1 – Logistics strategy, structure, and performance: A typology of logistics
configurations in construction

Paper 2 – Organizing logistics to achieve strategic fit in building contractors: A
configurations approach

Paper 3 – Logistics strategy implementation in construction: The influence of strategic
choice
1. Introduction

In this section, the background is described to motivate the focus on logistics strategy for building contractors. Next, the research problem is described, which highlights a contingency approach to logistics strategy in building construction. This leads to the purpose and scope of the thesis, followed by a presentation of the thesis outline.

1.1 Background

Logistics in construction projects is critical for delivering projects on time, budget, and at the right quality. Better managed material flows reduce the time used for material handling and the number of transports. This in turn can increase the efficiency on the site (Janné and Rudberg, 2022, Sundquist et al., 2018) and in the supply chain (Ying et al., 2018), while reducing greenhouse gas emissions generated from transports to and from the construction site (Sezer and Fredriksson, 2021). Therefore, logistics is an important supportive function and has a central role in construction projects, in terms of both efficiency improvements (project cost and duration) and reduced environmental impact (Browne, 2015).

Despite the benefits of improving logistics management in construction, not all types of construction projects can apply the same measures. There is a great deal of variety in the scale and complexity of construction projects that impact logistics management (Browne, 2015). Previous research advocates that construction should borrow logistics principles from other industries, such as manufacturing (Vrijhoef and Kockela, 2000). However, this has faced scepticism due to the major differences between the typically one-off, project-driven construction and the relatively stable and repetitive production environment in manufacturing (Green et al., 2005). This suggests that logistics principles from manufacturing may not be applicable to all types of construction. Building construction, comprising of residential and non-residential construction, has the closest resemblance to high volume production, and thus it is a more feasible sub-industry to adapt logistics principles from manufacturing than, e.g., the major infrastructure sector (Winch, 2003).

Building construction is a typical engineer-to-order (ETO) type of production, i.e., the product is engineered and produced after a customer order has been received. The products are large and typically produced at its place of use in a “temporary factory”, making building construction a typical project-based production system (Hill and Hill, 2009) where a temporary project organization, comprising several organizations, manages day-to-day operations. Moreover, building projects are characterized by reciprocal interdependencies between activities and actors (Bankvall et al., 2010) in which production activities do not follow a linear sequence (Sacks, 2016). This leads to a high degree of complexity and
Logistics Strategy for Building Contractors

unpredictability in the process of supplying components, materials, and other resources to sustain efficiency in site operations (Guffond and Leconte, 2000).

However, in contemporary construction logistics practice, there is a tendency among building contractors to set up logistics organizations, processes, supplier bases, and technologies for individual projects to respond to the variations between projects (Dubois et al., 2019). Consequently, strategic decisions are delegated to project and/or site managers who do not possess sufficient time, budget, and logistical expertise (c.f. Elfving, 2021, Janné and Rudberg, 2022). This typically leads to a situation where the strategic level is neglected and all efforts are made to solve logistics-related problems at individual construction sites (Thunberg and Fredriksson, 2018).

1.2 Research Problem

The research problem addressed in this thesis comprises two parts. The first part concerns the absence of a strategic approach to logistics among building contractors. This is a general problem in building construction because it increases logistics-related problems at the construction site, which can be avoided through strategic logistics planning (Thunberg and Fredriksson, 2018). A logistics strategy can be a means of achieving economies of scale that is not possible at the project level due to time, budget, and resource constraints. Furthermore, a logistics strategy helps with establishing a suitable logistics organization, processes, supplier base, and technologies that follow a logical pattern so that the logistics function contributes to the company’s business objectives (Klaas and Delfmann, 2005). A logistics strategy is thus not only means of improving efficiency and reducing costs, but can contribute to gain a competitive advantage (Heskett, 1977). In this pursuit, logistics in production environments ensures that materials, components, and products are available at production facilities at the right time, amount, and quality. However, to achieve the desired outcomes, the logistics strategy must exhibit a fit with the logistics strategy context, which determine the complexity and predictability of logistics tasks (Christopher, 1986). This leads to the second part of the research problem.

The second part of the research problem concerns what type of logistics strategy that is effective under certain conditions. Based on the definition of strategy by De Wit and Meyer (2010), a logistics strategy comprises three dimensions: context, content, and process. The logistics strategy context determines the feasibility of the logistics strategy content, that is, a set of logistics strategy components. The strategy process is the formulation and implementation of the strategy content. This definition of strategy is used in this thesis, which focus on the three separate, but interrelated dimensions: the logistics strategy context, the logistics strategy content, and the logistics strategy process.

The notion that the logistics strategy content should be consistent with a company’s logistics context is not new. Previous research advocates the contingency approach to logistics strategy to study the relationship between logistics strategy context and content (Klaas and Delfmann, 2005). Christopher (1986) suggest two contextual factors: the product and production process dimensions in the product/process matrix, which
determines the feasibility of logistics strategy alternatives. In other words, the contingency approach to logistics strategy suggest that the logistics strategy is dependent upon a combination of product and production process characteristics. In addition to product and production process characteristics, logistics researchers highlight the supply chain structure as a third contextual factor. This is defined as the geographical dispersion of the supply chain and the type of business relationship with suppliers and customers (Hofer and Knetmeyer, 2009, Rao and Young, 1994).

However, there is a lack of knowledge concerning how building contractors’ product, production process, and supply chain characteristics influence the logistics strategy content, and the implications this has on the performance of their logistics system. As such, there is a risk that contractors’ logistics strategy content exhibits a misfit with their logistics strategy context. Logistics strategy research suggests that such a misfit negatively impacts firm performance (Chow et al., 1995, Klaas and Delfmann, 2005, Stank and Traichal, 1998). To establish logical patterns in strategic logistics decisions, the decisions need to be based on a logistics strategy that is consistent with the type of product, production process, and supply chain (c.f. Christopher, 1986, Klaas and Delfmann, 2005). However, there is little known how this can be achieved within building construction.

1.3 Purpose and Research Questions

The short-term focus of logistics in construction hinders contractors in establishing a fit between their logistics strategy context and content. There is a need to adopt a more long-term approach, where strategic decisions are made at the company level that span across contractors’ projects, programs, and portfolios. To address this issue, the purpose of this licentiate thesis is therefore to investigate the fit between logistics strategy context and content for building contractors.

The thesis considers three dimensions of logistics strategy: the logistics strategy context, content, and process. The first research question aims to identify ideal logistics strategies, i.e., where there is a fit between the first two dimensions of logistics strategy, context and content. The first part is addressed by the following research question:

RQ1. What elements of logistics strategy context and content can be used to assess the fit of building contractors’ logistics strategies?

The second research question focuses on applying the framework developed in the first research question to building contractors. The theoretical constructs and the postulated relationships are used to investigate contemporary logistics strategy practices among building contractors, which also includes the logistics strategy process that is left out of RQ1. The second research question addresses how fit and misfit is established, including the process of establishing fit in building contractor organizations. The second research question is formulated as follows:

RQ2. What leads to fit/misfit in building contractors’ logistics strategies?
Logistics Strategy for Building Contractors

The thesis considers two perspectives on fit that are described in strategic management research: the content of fit and the process of arriving at fit (Venkatraman and Camillus, 1984). The two perspectives are complementary and share the same assumption, i.e., that there needs to be a fit between the strategy context and content. However, they have different theoretical and practical implications. The first part only takes the content of fit perspective, which describes the fit between the logistics strategy context and content. This can provide general advice to building contractors for how their logistics system should be designed to establish a fit with their product, production process, and supply chain characteristics. However, the content of fit perspective only provides a snapshot of fit. This is where the second part plays a complementary role in this thesis by also including the process of establishing fit between the logistic strategy context and content. This can answer questions about the practical constraints to establishing fit in building contractor organizations, which are not addressed in the first part of this thesis.

1.4 Scope
This thesis takes a starting point in logistics management with a focus on how building contractors manage the overall flow of resources, including materials, components, and equipment to produce buildings efficiently and effectively. The term “Logistics Strategy” is used to denote that the emphasis is on the strategic level that involves the long-term decisions that lays the foundation for managing logistics at the building contractor’s tactical and operational levels.

This thesis considers the building construction sector, including both residential (multi-family residencies) and non-residential buildings (hotels, schools, commercial buildings, office buildings). This includes contractors that employ a variety of building methods, ranging from prefabricated volumetric modules to on-site production of buildings. Single family residences, infrastructure (e.g., construction of railways, bridges, and tunnels), and industrial construction (e.g., nuclear powerplants and oil and gas platforms) are not considered in this thesis. The thesis mainly considers large building contractors (i.e., companies with a staff headcount above 250 employees and/or an annual turnover over €50 million according to the European Unions recommended definition of small and medium-sized enterprises). The companies studied in this thesis mainly operate in the Swedish building construction sector.

1.5 Thesis Outline
This is a thesis by publication comprising three papers that are the result of three studies carried out during the research process. The thesis is structured as follows: The first section introduces the background and the research problem. The theoretical frame of reference is outlined in the second part, which provides an overview of previous logistics strategy research, a description of fit derived from organization design and strategic management research, and definitions of logistics strategy context, content, and process in building construction. In the next section, the research design of the thesis is described, including individual descriptions of the three studies’ research designs. This is followed by a
1. Introduction

summary of the three papers and a sub-section with a discussion of the paper findings in relation to the thesis purpose and research questions. The final section outlines the contributions of the research, addressing the three research questions, and presents ideas for future research.

The three papers that the thesis is based upon are listed below and includes a statement of the author’s contribution to each paper.

**Paper 1: Logistics strategy, structure, and performance**

Paper 1 is a conference paper presented at the CIB International Conference on Smart Built Environment in December 2021. The author of this thesis is the single author of Paper 1, but the main supervisor and co-supervisor provided support in the form of ideas and feedback on the paper.

**Paper 2: Organizing logistics to achieve strategic fit in building contractors**

Paper 2 is currently under review in *Construction Management and Economics*. The author of this thesis took main responsibility for the literature review, data analysis, writing of the paper, and developing the paper into the journal version. Both the main supervisor and co-supervisor contributed with feedback, overall discussion during the writing process, and finalizing parts of the paper in the development of the journal version. The author of this thesis and the main supervisor both contributed to the data collection.

**Paper 3: Logistics strategy implementation in construction**

An early version of Paper 3 was presented at the 28th Annual EurOMA Conference in July 2021. The conference version of the paper has been further developed and is currently under review in the *International Journal of Logistics Management*. Both authors contributed to collecting the primary data, but the main supervisor provided the secondary data. The author of this thesis took main responsibility for the literature review, data analysis, writing of the paper, and developing the paper into the journal version. The main supervisor contributed with feedback and overall discussion throughout the writing process and in the development of the journal version.
2. Theoretical Frame of Reference

In this section, an overview of logistics strategy research is presented, which leads to the next sub-section where the central concept of “fit” is described. Next, the three logistics strategy dimensions: context, content, and process, are described.

2.1 An Overview of Logistics Strategy Research

Logistics strategy research has evolved in three streams: the “one best way” stream, the lifecycle stream, and the contingency stream. This thesis rests upon the research within the contingency stream to account for the influence of contextual factors on the logistics strategy content, which is neglected with the first two streams. Table 1 provides a short description of the dominant view of logistics strategy within each research stream.

Table 1 Streams within logistics strategy research

<table>
<thead>
<tr>
<th>Stream</th>
<th>Dominant view</th>
<th>Representative papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>“One best way”</td>
<td>Companies should appoint a logistics manager that integrate logistics activities that cross functional boundaries. Proponents argue for a matrix organization where the logistics manager is a programme manager.</td>
<td>De Hayes and Taylor (1972)</td>
</tr>
<tr>
<td>Lifecycle</td>
<td>Early logistics operations in companies’ lifecycle focus on individual logistics activities. As the company grows and matures, these activities become more advanced, taking a coordinating role that resembles the integrating role of the logistics manager as prescribed in the “one best way” stream.</td>
<td>Beier (1973), Bowersox and Daugherty (1987)</td>
</tr>
<tr>
<td>Contingency</td>
<td>There needs to be a fit between the logistics strategy and contextual factors. This gives rise to trade-offs because the logistics strategy can only exhibit a fit with one type of logistics context. A logistics manager is not necessarily a viable option for all companies, and it ultimately depends on the logistics context.</td>
<td>Persson (1978), Shapiro (1984)</td>
</tr>
</tbody>
</table>

The contingency stream was introduced in logistics strategy research because the “one best way” and the lifecycle stream did not consider the advancements in generic strategy and organizational design research. Furthermore, the research within the “one best way” and lifecycle stream had little empirical support, which pushed logistics strategy researchers towards using, at the time, advancements in contingency theory to study logistics strategy. In contrast to the “one best way” and the lifecycle stream, the researchers within the contingency stream argue that the logistics strategy involves making deliberates choices that need to be consistent with logistically relevant contextual factors (Persson, 1978).
Logistics Strategy for Building Contractors

Consequently, the logistics strategy needs to have a strategic orientation that support the corporate/business strategy of the company (Bowersox and Daugherty, 1995).

Researchers within the contingency stream advocate that the company must select either a cost/delivery or flexibility-oriented logistics strategy. Heskett (1977) was among the first to highlight the role of logistics as a competitive weapon for manufacturing firms. This was highly influenced by the neighbouring research field, manufacturing strategy, which Wickham Skinner set the research agenda for with his article “The focused factory” (Skinner, 1974). However, it was not until 1984 before Roy D. Shapiro published his article in the Harvard Business Review “Get leverage from logistics” (Shapiro, 1984) that the idea grew that a logistics strategy involves making choices between being cost-efficient and responsive to the market. Inspired by manufacturing strategy research and by the work of Skinner, Shapiro argues against the idea of “one best way” when companies design their logistics systems. Thus, the contingency stream introduced the notion of trade-offs into logistics strategy research:

Much as with Wickham Skinner’s notion of the “focused factory”, no single logistics system can do everything well. Trade-offs are inevitable, for example, among considerations of low cost, range of services, and flexibility to changes in product specifications, volume, and customer preferences. Thus, the crucial question for managers is, "What must our logistics system do particularly well?".

(Shapiro, 1984, p. 120)

A central concept within the contingency stream is “fit”. The main form of fit is the configurational approach, which view fit as “a pattern of structure and processes that matches the contextual setting and is internally consistent” (Drazin and Van de Ven, 1985, p. 521). This is the main definition of fit used by logistics strategy researchers within the contingency stream. A configurational approach to fit assumes that the logistics strategy must exhibit “fit” with several contextual factors that are logistically relevant. As such, the system boundary for a logistics strategy is smaller than for a corporate/business strategy and logistics strategy context is primarily characterized by the internal characteristics of a company, i.e., their product, production process, and supply chain.

2.2 Defining Fit

The concept of fit is defined in many ways in contingency research, ranging from precise definitions of fit typically involving two variables to a larger set of variables known as “configurations” (Venkatraman, 1989). This research adopts the latter definition, the configurational approach to fit, in which there are two main perspectives: the content of fit and the process of establishing fit. The content of fit describes how the context and content elements interact, while the process of establishing fit describes fit as an ongoing process of retaining or regaining fit. The two perspectives are complementary; the content of fit provides a snapshot of the interaction between context and content elements, while the process of establishing fit looks at how the interaction between contextual and strategic elements change over time. The first is important to understand which elements that
2. Theoretical Frame of Reference

determine the fit between the strategy context and content, while the second perspective provides insights into how this fit is influenced by factors beyond the strategy context. The two perspectives to fit are described in the following sub-sections.

2.2.1 Content of Fit

The content of fit perspective considers the interaction of a company’s external and internal context with its strategy (Drazin and Van de Ven, 1985). There are thus two types of fit: external and internal fit (Mintzberg, 1979):

1. External fit – The fit between external strategy context and content (e.g., the fit between the logistics strategy and the marketplace).
2. Internal fit – The fit between the internal context and strategy content (e.g., the fit between the logistics strategy and other functional strategies).

While external and internal fit comprise different aspects, Mintzberg (1979) argue that they are not mutually exclusive and that both can be achieved simultaneously. He therefore proposes an integrated view of external and internal fit, the extended configuration hypothesis, in which fit is an ideal configuration of the external and internal context and strategy. Consequently, companies can achieve the same outcome, often regarded in terms of financial performance, by the means of many different strategies, as long as they exhibit a fit with the external and internal context of the company. Trade-offs thereby emerge as a result from the existence of multiple ideal types of configurations that respond to different demands in the market (Drazin and Van de Ven, 1985). No company can satisfy the demand of every market segment because trade-offs limit a company’s ability to excel within every performance category.

2.2.2 The Process of Establishing Fit

The content of fit is limited by the static view on fit because it does not consider the process behind establishing fit of the external and internal context with strategy. The primary concern of strategic management research is that the content of fit perspective does not consider how and why strategies fail due to misfits. The process of establishing fit perspective focus specifically on this issue. Broadly speaking, this perspective views fit as a dynamic phenomenon (Venkatraman and Camillus, 1984), which involves making strategic decisions for the purpose of retaining or regaining fit. This is also called dynamic fit (Zajac et al., 2000) to highlight that the primary goal of the strategy process is to retain/regain a fit between the strategy context and content.

The strategy process can take the form of a deliberate strategy process or an emergent strategic change (grass-roots strategy), where most strategies are the result of a combination of the two (Mintzberg and Waters, 1985). Therefore, the strategy context alone does not determine a company’s strategy, but it is influenced by the choices made under uncertainty and limited decision-making authority (Turner and Miterev, 2019). This is the central argument made by Child (1972) who suggest that the strategic orientation of a company is primarily determined by strategic choice in managerial decision-making. The decision-makers are informed and constrained by the external and internal context that limit their
Logistics Strategy for Building Contractors

discretion in formulating and implementing strategic alternatives. Their ability to establish a fit between the strategy context and content is then constrained by the level of managerial discretion, which in turn can be determined by organizational objectives, previous performance levels, previous investments, etc. (Montanari, 1978). In short, managerial discretion denotes the level of authority a manager possesses to formulate and implement a strategic plan (Montanari, 1979).

2.3 Logistics Strategy Context, Content, and Process in Construction

One shortcoming of previous logistics strategy research is that it largely neglects developments in related fields such as strategic management and operations strategy. Strategy context, content, and process are established concepts in both these domains, but this is not the case for logistics strategy. However, logistics strategy context and content are implicitly treated by logistics strategy researchers. For instance, the interaction between logistics strategy context and content appears in the view that product/process combinations influence the degree of centralization and formalization in the logistics organization (Chow et al., 1995, Christopher, 1986).

The logistics strategy process has received even less emphasis, which indicates that logistics strategy research can benefit from related domains. Figure 1 illustrates the theoretical foundations of the three logistics strategy dimensions treated in this research: context, content, and process. The fit between logistics strategy context and content is based on the content of fit perspective, which is derived from contingency theory. The logistics strategy process is based on the process of establishing fit perspective, which has its roots in strategic choice theory.

![Diagram of Logistics Strategy](image)

*Figure 1 The theoretical foundations of logistics strategy context, content, and process*
2. Theoretical Frame of Reference

In the absence of explicit descriptions of logistics strategy dimensions, there are still some common grounds provided by previous logistics research. Persson (1978) suggests that researchers need to identify relevant contextual factors that determine the feasibility of a certain logistics strategy. The contextual factors can include external market related factors, internal characteristics of the company, or both. The logistics strategy need to be aligned with the external and internal context to generate desired performance outcomes and contribute to the company’s competitive strategy (Chow et al., 1995). The external context characterize the competitive environment in which a company operates, such as competitors, demand variability, and technology trends within an industry (Stock et al., 1998). The internal context describes the operational characteristics of a company that have logistical consequences (Rushton and Saw, 1992), such as the combination of product, production process, and supply chain characteristics.

The following sub-sections presents the elements that can be used to describe the logistics strategy context, content, and process in building construction. The elements that are used to describe the logistics strategy context are the degree of pre-engineering, production system, and supply chain structure. Logistics strategy content include logistics organizational structure components and logistics process components. The interaction between logistics strategy context and content build on the content of fit perspective. Furthermore, the logistics strategy process is described from the process of establishing a fit perspective.

2.3.1 Logistics Strategy Context

Construction is a heterogeneous industry from a logistics perspective (Lundesjö, 2015) and contractors’ have distinct contextual conditions, which their logistics strategy needs to be tailored for. The logistics strategy context denotes a set of logistically contextual factors that affect the building contractor’s logistics strategy. Based on Persson (1978) and Christopher (1986), three contextual factors are identified that constitute a building contractor’s logistics strategy context: the degree of pre-engineering (product characteristics), the choice of production process, and the supply chain structure. These three factors influence the logistics strategy content through different levels of logistics task predictability and the number of logistics decision elements.

The degree of pre-engineering

The degree of pre-engineering is used to distinguish between different levels of product standardization in an ETO situation. In construction, products are only produced after a customer order has been received. However, this definition can refer to make-to-order (MTO) and to differentiate between MTO and ETO, the product dimension needs to encompass the amount of engineering work that is performed prior to the customer order has been received (Wikner and Rudberg, 2005). When the degree of pre-engineering is reduced, this leads to a low frequency and degree of repetition while ordering materials and components (Schonsleben, 2000). This increases the number of logistics decision elements and reduces the predictability of logistics tasks (Christopher, 1986), which tend to favour decentralized day-to-day management of logistics activities (Pföhl and Zöllner, 1997). Physical constraints may also arise due to a high degree of customization in products, such
Logistics Strategy for Building Contractors

as special requirements for transportation, storage, and handling (Hofer and Knemeyer, 2009). Based on Wikner and Rudberg (2005), three levels of pre-engineering are identified that determine the number of logistics decision elements and the predictability of logistics tasks:

- Engineer-to-stock (ETS): The product design is fully determined prior to customer order. A high degree of pre-engineering entails a fixed product structure with only standard components. Standard components are shared across all building projects, which enable a design and engineering inventory.
- Adapt-to-order (ATO): The product design is partly determined prior to customer order has been received, but changes to this predetermined design is accepted. A moderate degree of pre-engineering allows some modifications to the product structure. Some standard components are shared across all building projects and can be “stored” by the building contractor, but some customized components need to be designed and engineered for each project.
- Engineer-to-order (ETO): All engineering activities take place after the customer order has been received. A low degree of pre-engineering entails a flexible product structure that comprises many unique components. Although the number of levels and breadth in the product structure can be the same as in ATO and ETS situations, it contains only unique components that are designed and engineered for each customer order.

The choice of Production Process

For the choice of production process, the number and characteristics of production facilities determine the allocation of logistics tasks. Site production is common for products with a high degree of customization (Jonsson and Rudberg, 2015), which in turn increases the interdependencies between on-site activities (Bankvall et al., 2010). This tends to favour decentralized planning and control of logistics activities (Schonsleben, 2000). Although strategic logistics decisions can be aggregated into a central unit, operational activities requires decentralized planning and control units when the number of materials and components that need to be delivered to a production facility increases (Pfohl and Zöllner, 1997). Jonsson and Rudberg (2015) classify four different production systems in building construction that each correspond to different levels of logistics task predictability and number of decision elements:

- Component Manufacture and Sub-Assembly (CM&SA): Production activities and assembly workstations are arranged in accordance with the building layout. As a result, many types of material flows converge to the construction site and production activities are primarily reciprocally interdependent. This means that the inputs and outputs of two or more production activities and assembly works have a cyclical workflow. For instance, a drywall requires the carpenter to build the wooden frame before the electrician installs electrical fittings. However, the electrician must finish the electrical fittings before the carpenter installs the gypsum
boards. The two workers are therefore reliant on the intermediary outputs of each other’s production activities to produce the final output.

- Prefabrication and Sub-Assembly (PF&SA): This type of production system is similar to CM&SA but panel elements are produced in an off-site factory. This results in fewer material deliveries and consequently fewer on-site assembly works to plan and execute than in a CM&SA production system.
- Prefabrication and Pre-assembly (PF&PA): Panel elements are produced in an off-site factory where sub-assemblies are fitted to the panel elements prior to delivery to the construction site. This results in fewer materials that must be delivered to the construction site and consequently fewer on-site assembly works to plan and execute than in a PF&SA production system.
- Modular building (MB): Volumetric modules comprising usable indoor spaces are prefabricated in an off-site factory. Consequently, the production system in a construction project comprises at least two geographical production facilities: the factory and the construction site, each with distinct characteristics in terms of activity interdependence and number of inbound and outbound material flows. The factory has converging inbound flows with a wide variety of materials and components that are assembled at a production line, a batch flow layout, or a flow shop layout. The factory has few outbound flows that become the inbound flows to the construction site, resulting in a low number of materials, components, and modules and consequently a low number of on-site operations to plan and execute relative to the other production systems.

**Supply chain structure**

The supply chain structure refers to the geographical dispersion of and type of business relationship with suppliers and customers (Voordijk et al., 2006). It determines the complexity in logistics tasks in terms of the number of logistics decision elements. A geographically dispersed supply chain with many suppliers and customers increases the need for coordination and control (Hofer and Kneemeyer, 2009). In particular, the volume and variability in relationships with suppliers and customers influence the uncertainty in delivery reliability and quality (Flynn and Flynn, 1999). Consequently, a geographically dispersed supply chain with many suppliers and customers increases the need for processing information, e.g., related to placing orders, monitoring inbound and outbound material flows, and maintaining buyer-suppliers relationships (Hofman et al., 2009).

**2.3.2 Logistics Strategy Content**

Logistics strategy content comprises logistics structure and logistics process components (Klaas and Delfmann, 2005). Structure components constitute decisions regarding the degree of centralization, integration, and division of labour in logistics tasks. Process components refer to the degree of formalization in logistics processes and whether these are order-driven or speculative. Table 2 describes structure and process components, which are based on the works of Bowersox and Daugherty (1995), Chow et al. (1995), Pfahl and Zöllner (1997) and Harrison and van Hoek (2008).
Logistics Strategy for Building Contractors

Table 2 Logistics strategy content

<table>
<thead>
<tr>
<th>Content</th>
<th>Components</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure components</strong></td>
<td>Degree of centralization</td>
<td>The degree to which logistics decisions are concentrated to a single unit and its proximity to top management</td>
</tr>
<tr>
<td></td>
<td>Division of labour</td>
<td>The degree to which logistics tasks are pooled in a single unit or to an individual.</td>
</tr>
<tr>
<td></td>
<td>Integration</td>
<td>The degree to which logistics tasks are coordinated within the organization and across the supply chain.</td>
</tr>
<tr>
<td><strong>Process components</strong></td>
<td>Degree of formalization</td>
<td>The degree to which logistics processes are documented and their level of detail.</td>
</tr>
<tr>
<td></td>
<td>Order-driven/speculative</td>
<td>Which processes that are order-driven or speculative.</td>
</tr>
</tbody>
</table>

**Structure components**

Structure components refer to the set of decisions that determine location and allocation of logistics tasks in the organization structure. The decisions are mainly characterized by the degree of centralization and the division of labour. A high degree of centralization is feasible when there is a high degree of uncertainty and complexity in logistics tasks (Pföhl and Zöllner, 1997), e.g., in a CM&SA production system with a low degree of pre-engineering and a geographically dispersed supply chain. However, large project-based organizations can benefit from centralized planning to manage company-level resources, capacity constraints, and interdependencies that are not visible to the individual projects/production facilities (Hill and Hill, 2009). Therefore, a high degree of uncertainty and complexity in logistics tasks will typically lead to that a central logistics department take responsibility for strategic and administrative logistics tasks, while the operational and physical logistics tasks are delegated to projects/production facilities (Pföhl and Zöllner, 1997).

The division of labour is mainly determined by the number of logistics decision elements and predictability of logistics tasks. This refers to the extent that strategic and operational logistics tasks are carried out by separate specialist functions. A low division of labour is feasible in complex and unpredictable logistics contexts, while a low degree of complexity and predictability in logistics tasks typically leads to a high division of labour (Pföhl and Zöllner, 1997).

**Process components**

Process components refer to the design of logistics processes, which can be characterized by their degree of formalization and whether they are driven by order or speculation. Formally described logistics processes tend to be preferred in stable environments with few logistics decision elements (Pföhl and Zöllner, 1997). As such, formal logistics process become a feasible alternative when there is a high degree of pre-engineering, while generic guidelines are more feasible when there is a low degree of pre-engineering.
2. Theoretical Frame of Reference

The second component, order-driven/speculative, refers to which logistics processes that are carried out under certain/uncertain demand (Harrison and van Hoek, 2008). Since building construction is a typical ETO industry, buildings are seldom made to stock (except for rare cases). However, it is possible to distinguish between order-driven and speculation-driven components and sub-assemblies. At these lower levels in a building’s product structure, it is possible for a contractor to build up inventory of standard components (e.g., plaster boards and wooden studs) based on forecasts. For instance, building contractors may prefer to store high volume building materials in a nearby distribution terminal or warehouse to minimize/even out the number of transports to the construction site (Janné and Rudberg, 2022). Other types of components and/or sub-assemblies that are project-unique, such as concrete slabs and wall elements, are typically order-driven and delivered directly from the supplier to the construction site (Elfving et al., 2010). The extent to which logistics processes are order-driven or speculative is mainly determined by the degree of pre-engineering.

2.3.3 Logistics Strategy Process

Logistics strategy process models prescribe an outlined sequence of activities, typically beginning with strategy formulation, which is followed by strategy implementation (Christopher, 1986, Fabbe-Costes and Colin, 2003). These descriptions of the logistics strategy process prescribe a highly deliberate process that aims to realize the intended strategy. Figure 2 illustrates the predominant view on the logistics strategy process in logistics strategy literature.

![Logistics strategy process model](image-url)

Figure 2 Logistics strategy process model
Logistics Strategy for Building Contractors

The model prescribes a top-down strategy process that begins with formulating the corporate/business strategy in line with the external context of the company. This is the competitive strategy of the company, which outlines how it should succeed in the market. Next comes logistics strategy formulation, in which logistics performance objectives are derived from the corporate/business strategy. This is to ensure that logistics provides functional support so that the company can achieve its business objectives, whereby the logistics strategy is a part of the corporate/business strategy (Fabbe-Costes and Colin, 2003). When the performance objectives are set, the logistics strategy content are formalized in a strategic plan. The next step is to implement the logistics strategy. An incremental implementation of logistics strategy content is typically advocated because it provides more immediate performance implications than attempting the “big-bang approach” (Christopher, 1986). For the logistics strategy to be successfully implemented, it needs to be supported by logistics capability building, which includes areas such as inbound and outbound logistics, information management, and coordination capabilities (Mentzer et al., 2004). Finally, the logistics strategy is evaluated based on the performance measures defined during the formulation stage. This is used to adjust the strategy if necessary.

Although these strategy process models may be appealing due to their simplicity, they are criticized for implying a sequential top-down approach (Boyer et al., 2005). Although most strategic change processes involve formulation and implementation, they are seldom conducted in a linear sequence following a top-down approach. Furthermore, the strategy process is influenced by power and internal company politics that limits managers’ discretion to implement strategic plans (Rytte et al., 2007). In construction, there are both external and internal factors that influence the implementation of logistics improvement programs, such as low logistics competencies in projects and a lack of industry-level technology standards (Elfving, 2021). In other words, the logistics strategy process cannot be viewed as a deliberate action plan that is simply implemented across an organization. The logistics strategy process does not differ in this way from other strategy processes; the realized strategy is typically a combination of deliberate and emergent strategy (Mintzberg and Waters, 1985). In summary, the logistics strategy process, and in particular the implementation phase, requires change agents to manage expectations of stakeholders, consider the company’s historical endeavours, pursue simultaneous formulation and capability building, and realign performance objectives with unplanned/emergent strategies that go beyond the intended strategic plan (Kim et al., 2014).
3. Research Design

This section begins with a description of the research process, including an overview of the three studies and corresponding papers that this thesis is based upon. Next, the methods used in three studies are described and motivated.

3.1 The Research Process

The thesis builds upon three studies (see Figure ) that have been conducted over the course of about two years, between the first quarter of 2020 and the first quarter of 2022. The research has been conducted within the research project “Logistics Strategy for Resource Efficient and Sustainable Housebuilding” financed by the Development Fund of the Swedish Construction Industry (SBUF). The purpose of the project was to explore the current state of how building contractors work with logistics strategies, to suggest what a logistics strategy should contain, and how it should be implemented. The research process was divided into three studies, which are presented as papers (see Figure 3).

![Diagram](image)

Figure 3 The research process

Figure 4 illustrates the papers’ associated research questions. The conceptual study was carried out in Q2 2021 and resulted in Haglund (2021), which is referred to as Paper 1 in this thesis. It describes ideal logistics strategy configurations in building construction. This was done through a conceptual review to identify and describe logistics strategy context and content elements. The multiple case study started in Q1 2020 and resulted in Haglund et al. (2022), which is referred to as Paper 2 in this thesis. It is mainly descriptive to identify
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relevant logistics strategy context and content elements. The findings from the multiple case study initiated a narrower focus for the thesis, which led to the single case study that started in Q1 2021 with the purpose to study the logistics strategy process at a large building contractor. The single case study therefore took the process of establishing fit perspective and focused on the formulation and implementation of a logistics strategy. Furthermore, since the conceptual study and multiple case study provided a snapshot of building contractors’ logistics strategies at one point in time, this study further extended the research by examining the logistics strategy process. The study resulted in Haglund and Rudberg (2022), which is referred to as Paper 3 in this thesis. It is based on a longitudinal single case study approach to enable a deeper examination of a building contractor’s logistics strategy process. The methods used in each study is described further in the following sub-section.

![Conceptual model of fit-performance relationship in building contractors’ logistics configurations.](image)

**Figure 4 Overview of the papers and corresponding research questions**

### 3.2 Methods

This thesis relies on a combination of empirical and analytical conceptual research methods. Paper 2 and 3 were empirically based, while Paper 1 falls into the analytical conceptual category. Conceptual modelling was used to deduce concepts from literature and their postulated relationships, which is complementary to the empirical methods, such as case studies and survey-based studies (Wacker, 1998). Qualitative case studies were used as the main empirical method because they allow for more depth than, e.g., studies based on statistical sampling and are suitable for contingency research including several strategy context and content elements (Sousa and Voss, 2008). However, the two empirically-based
paper (Paper 2 and 3) contains literature reviews to identify and formulate research problems (Jesson et al., 2011) and to modify tentative research frameworks based on empirical observations (Kovács and Spens, 2005). The methods used in each study are further described in the following sub-sections.

### 3.2.1 The Conceptual Study

The conceptual study focused on identifying logistics strategy context and content elements, which addresses RQ1 in this thesis. This study was conceptual with the purpose to develop a typology of ideal logistics configurations in construction. Here a conceptual review was used to clarify central concepts and how they should be operationalized before conducting empirical research (Jesson et al., 2011). The identified variables were then used to develop a typology of ideal logistics configurations, which were proposed to produce different logistics performance outcomes.

Typologies in conceptual research are used to classify items when there are two or more variables present (Meredith, 1993), which was necessary given that the configurational approach advocates the use of many context, content, and performance variables (Meyer et al., 1993). However, the goal was not to explain the relationships between constructs, but to provide conceptual definitions and how these can be operationalized for further empirical testing (Meredith, 1993). The motivation behind the conceptual design in Paper 1 was thus to focus on theory-building in order to develop relevant measures for the constructs prior to testing the theory (Wacker, 1998).

The conceptual review started with the articles related to logistics strategy context and content, where the articles were found through a snowballing technique. Three types of articles were used in the study: 1) generic research on configurational approaches to strategy and organization design, 2) logistics contingency research, and 3) empirical research on logistics management in construction. The first type of articles (i.e., configurational research articles) provided the basic assumptions of strategy configurations that was used to develop the conceptual model. This type of research provided input to the structure of the conceptual model and its type of fit to ensure that future studies can examine the relationships between variables with a feasible statistical method. The second type of articles (i.e., the logistics contingency research articles) were used to derive tentative conceptual definitions of logistics context, content, and performance variables. The identified logistics configuration variables were then used to build up the conceptual model. The third type of articles (i.e., the empirical research on logistics management in construction) were used to adapt the conceptual definitions to the building construction context.

### 3.2.2 The Multiple Case Study

In the multiple case study, the purpose was to explain the fit between the logistics context and the organizing of logistics at a strategic level, which addresses RQ1 and RQ2 in this thesis. Study 1 followed the logic of abductive reasoning (Kovács and Spens, 2005), which can be used for either suggesting a new framework or an extension of a theory that matches the empirical context (Dubois and Gadde, 2002). This study falls into the latter category,
Logistics Strategy for Building Contractors

i.e., the empirical material was used to adapt previous logistics contingency studies that did not focus on the building construction industry. Therefore, the research process began with a review of previous logistics contingency research to identify logistics context and content elements. This provided tentative logistics context and content that served two purposes in the early phase of the research: 1) to develop a conceptual framework that provided the basis for a logistics configuration profiling template, and 2) to structure early data collection.

The empirical data was collected using a multiple case study to adapt the logistics strategy context and content elements derived from literature to building construction. The multiple case study comprised a total of four cases: three general-purpose contractors and one industrialized housebuilder. The three general-purpose contractors resemble typical large construction companies with a focus on the Nordic countries. The industrial housebuilder mainly operates in Sweden. They produce building modules in a factory and their modules are standardized and can be combined into a limited number of variants.

The multiple case study design was selected to examine fit in different logistics strategy contexts, which Eisenhardt (1989) refers to as selecting cases for theoretical reasons. The reasons can be to replicate previous cases (literal replication), to fill theoretical categories (theoretical replication), or a combination of both. In this study, the cases were selected based on a combination of theoretical and literal replication. The reason for selecting cases based on theoretical replication was to identify building contractors with contrasting logistics strategy contexts, which were expected to differ significantly in terms of their organizational structure in industrialized housebuilders and general-purpose contractors. However, general-purpose contractors tend to exhibit different organizational structure across geographical regions and projects (Koch et al., 2015). Therefore, three general-purpose contractors were selected based on literal replication to test whether they exhibited similar characteristics due to their similar logistics contexts as expected or used different organizational structures for other reasons.

The data collection was guided by a case study protocol. It was used to develop themes in the interview guide to ensure that all the constructs in the conceptual framework had been covered. Semi-structured interviews were held with representatives from each company that worked in a logistics department or similar, or who had a broader role that included logistics. The semi-structured interview format ensured that the main topics had been covered, while retaining flexibility to unanticipated discussions of interest with the respondents. The interview guide derived from the case protocol contained three types of questions: 1) the logistics strategy context of the case company, 2) the structure of the logistics organization and/or who managed logistics in their projects; and 3) background information about the respondent, their company, and the company’s level of awareness in logistics management.

All three themes had to be covered during the interviews, but not in a particular order. The interviews provided new insights into the tentative logistics context and content variables, which led to a new literature review with a narrower scope on papers using a
configurational approach to logistics strategy. This led to the development of a logistics configuration profiling template that was used to analyze the interview data. The profiling template was based on the strategic profiling method, which is a method to illustrate the degree of fit between the strategy context and content, and is suitable when there are four or more variables considered (Hill and Brown, 2007). The interview data was used to make tentative profiles for each case, which was done through an interpretative approach (McCutcheon and Meredith, 1993). The tentative profiles were based on the researchers’ interpretation of the participants responses. In line with the abductive approach used in the study, the researchers arranged three workshops with the case participants to verify the tentative profiles. This measure was taken to increase content validity (McCutcheon and Meredith, 1993), i.e., that the operationalization of the logistics context and organizing of logistics made sense to the case participants and in their company.

3.2.3 The Single Case Study

The single case study focused on the process of establishing fit/misfits between the logistics context and content, and addresses RQ2 in this thesis. The purpose was to examine how strategic choice influences the logistics strategy process. This was achieved by conducting a longitudinal single case study. Single case studies can be used for generalizing findings if they are atypical cases that deviate from the “average” case (Yin, 2018). The case selected was an atypical case due to the broad focus on several logistics aspects and that the logistics strategy process was initiated at a strategic level, which is uncommon in construction. Although the case company was a typical large contractor in the Swedish construction industry, few building contractors address logistics at a strategic level (Green et al., 2005, Thunberg and Fredriksson, 2018) and there were to the authors’ best knowledge no similar cases of a deliberate logistics strategy process in the construction industry. Furthermore, the researchers had access to process data that covered 11 years (2008-2019) of the logistics strategy process. The case selection was thus motivated by the accessibility to appropriate data and by obtaining information on an atypical case (Flyvbjerg, 2006). The longitudinal design enabled investigation of how changes to the logistics context and strategic choices over time shape the outcome of the logistics strategy process, and thus how fit/misfit between the logistics strategy context and content is established.

The data collection methods and analysis techniques used in this study were inspired by the suggestions for studying the strategy process made by Van de Ven (1992) and Langley (1999). To study the strategy process, the overall research approach must accommodate for temporal sequences between activities, decisions, and events and how they influence strategic choices that lead to a fit/misfit (Van de Ven, 1992), which is in favour of collecting and analyzing process data. At the start of the study, the authors had already access to extensive documentation of the logistics strategy content, pilot projects where they tested the strategy, time plans for the strategy process, and implementation plans. However, the research process began with a literature review, in line with the recommendations by Voss et al. (2002) to establish a focus early in the research process. The literature review comprised literature from three distinct, but related areas: 1) organization design and strategy, 2) organization design and strategy in logistics management, and 3) logistics
Logistics Strategy for Building Contractors

management in construction. Here the researchers identified a need to collect additional interview data to complement the archival data. The rationale for interviewing key persons involved in the strategy process was partly based on gathering additional information beyond the archival data, but also to triangulate data sources in order to increase construct validity (Yin, 2018). The researchers decided to interview one current logistics developer at the company and two key persons that were responsible for the strategy process.

The interviews were semi-structured to allow the respondents to give their view of the strategy process, while retaining a focus on identifying which decision, activity, and/or event that generated an outcome. The first interview was held with the current logistics developer at the company, who had spent one year analyzing the company’s experiences from the strategy process. Although it did not reveal direct indications of what had led to the outcomes of the strategy process, the interview findings provided valuable input for the following interviews the key persons behind the logistics strategy. The key persons interviewed were the logistics manager who had the main responsibility of the strategy formulation, and the project manager who was primarily involved in testing the strategy through pilot projects and in the implementation phase. The interviewees gave their experiences from the years that they had been involved in the logistics strategy process, which provided useful information on the sequence of decisions, activities, and events, and what had generated the strategy process outcomes.

The data analysis was carried out in two steps: First, a visual map was created based on the interview and archival data that illustrated important decisions, activities, and events during the strategy process. Thereafter, the interview data was used to link the decisions, activities, and events to the logistics strategy process outcomes. This enabled the researchers to draw conclusions of what had caused a strategy component to be successfully implemented or why it had remained unrealized.
4. Summary of Papers

This section provides a summary of the three papers that this thesis is based on. The main findings and contributions of each paper are presented.

4.1 Summary of Paper 1

The purpose of Paper 1 was to develop a typology of ideal logistics configurations in construction. Furthermore, the paper includes a discussion of how to validate these ideal logistics configurations empirically. The purpose was achieved through a conceptual review of configurational approaches within organizational design research, logistics contingency studies, and contemporary construction logistics research. The literature constituted the basis for a conceptual model that was used to develop the typology. The conceptual model is illustrated in Figure 5 and links the logistics strategy content (i.e., structural components referred to as “organization of logistics activities”) to the degree of pre-engineering and off-site assembly (the latter refers to the element “choice of production process” used in this thesis). The middle part of Figure 5 imply that each logistics strategy context has an ideal logistics configuration profile comprising logistics strategy context and content elements. By adhering to an ideal profile, a building contractor can achieve desirable logistics performance outputs that are in line with a cost/delivery or flexibility-oriented strategy. Building contractors that deviate from an ideal profile should exhibit lower performance across logistics performance categories.

![Diagram](image-url)

Figure 5 Conceptual model of logistics configurations in building construction (Haglund, 2021)
Logistics Strategy for Building Contractors

Based upon the conceptual model, a typology of two ideal logistics configurations was defined: the product/process-oriented configuration and the project-oriented configuration. These are two configurations positioned at the extremes of a continuum. By adhering to one of these two configurations, a building contractor should benefit from either low costs and short project lead times, or a flexibility in the building design and the ability to deliver a wide range of projects.

The product/process-oriented configuration achieves low costs and short project lead times through a geographically fixed supply chain structure combined with long-term relationships with materials suppliers. Logistics tasks are typically part of a central department. This enables short sourcing cycle times, high delivery reliability, and contributes to low administration and transportation costs. In contrast, the project-oriented configuration excels within flexibility related measures. They achieve this by designing their logistics system in a way that it can adapt to unanticipated changes to the demand of building materials. Administrative logistics tasks can be performed by a central department, but operational and physical tasks need to be managed at the regional and/or project level. This configuration works best for building contractors that have many temporary supply chains that are geographically dispersed. The main advantage is the high degree of physical supply and purchasing flexibility. Physical supply flexibility indicates that material suppliers and goods reception resources can respond to sudden changes in material flow characteristics and demand volatility. Purchasing flexibility indicates that the building contractor can source components from many different suppliers in varying batch sizes on a short notice.

The main contribution of Paper 1 to this thesis is the classification of ideal logistics configurations that highlight the trade-offs building contractors face when pursuing a certain logistics strategy configuration. This provides a starting point for further empirical research and can be used by managers to identify misfits in their company’s logistics strategy.

4.2 Summary of Paper 2

The purpose of Paper 2 was to explain the fit between the logistics context and the organizing of logistics at a strategic level. This was achieved by identifying three logistics strategy context elements (upper part of Figure 6) and five content elements (lower part of Figure 6) in literature. These elements were used to develop a profiling template that could illustrate the degree of fit in building contractors’ logistics strategy configurations. The profiling template was then applied to four building contractors using a multiple case study (see Figure 6, where a straight line indicates fit, and a dogleg indicates misfit). Three building contractors were classified as “general-purpose contractors” due to their broad range of clients and building projects. The fourth was classified as a “residential building contractor” to highlight that they focus on multi-family residences, producing low-cost housing for private clients.
4. Summary of Papers

<table>
<thead>
<tr>
<th>Variables</th>
<th>Range</th>
<th>4. Summary of Papers</th>
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</thead>
<tbody>
<tr>
<td>Logistics context</td>
<td>General-purpose contractor</td>
<td></td>
</tr>
<tr>
<td><strong>External context</strong></td>
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<tr>
<td>Competitive priorities</td>
<td>Flexibility</td>
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<tr>
<td>Internal context</td>
<td>CM&amp;SA</td>
<td></td>
</tr>
<tr>
<td>Process choice</td>
<td>DTO</td>
<td></td>
</tr>
<tr>
<td>Product characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization of logistics</td>
<td>Project-oriented</td>
<td>Product and process-oriented</td>
</tr>
<tr>
<td>Formal structure</td>
<td>Decentralized</td>
<td></td>
</tr>
<tr>
<td>Physical structure</td>
<td>Integral</td>
<td></td>
</tr>
<tr>
<td>Division of labour</td>
<td>Unspecialized</td>
<td></td>
</tr>
<tr>
<td>Formalization</td>
<td>No documentation of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>processes, plans, policies</td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td>Separate logistics function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cross-functional</td>
<td></td>
</tr>
</tbody>
</table>

Figure 6 Logistics configuration profiling of the four case companies (Haglund et al., 2022)

The paper provided insights into typical characteristics of different logistics strategy configurations. Three logistics strategy context elements were identified: competitive priorities, process choice (i.e., the choice of production process), and product characteristics (i.e., the degree of pre-engineering), and five logistics strategy content elements: formal structure, physical structure, division of labour, formalization, and integration. The multiple case study indicated that the profiling template proved to be a useful tool in explaining the fit between the logistics strategy context and content.

The case studies indicated that general-purpose contractors (GC1, GC2, and GC3) need to distinguish between which logistics tasks that are aggregated into a central unit (i.e., centralized) and which are delegated to the project level (i.e., decentralized). Strategic logistics decisions need to be taken at a central level. This contrasted with the existing situation of the general-purpose contractors in the case study, which delegated these decisions to projects. Furthermore, it was found that both the general-purpose contractors and the industrialized housebuilder can benefit from formalizing logistics processes. Formal logistics processes, policies, and procedures developed by a central logistics department provide a frame of reference for logistics operations, while the execution of logistics tasks is performed at the project level.

Paper 2 describes relevant elements and their respective characteristics that can be used to determine the fit between the logistics strategy context and content. Furthermore, the paper highlights the need for a formalized logistics strategy to establish a fit between the logistics context and organizing of logistics. The multiple case study revealed that this might be
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uncommon in the Swedish construction industry and that there are substantial benefits in formalizing a logistics strategy rather than pursuing an *ad hoc* strategy.

### 4.3 Summary of Paper 3

Paper 3 focused on the process of establishing fit, which is the activities, decisions, and events that shape the ultimate outcome of the logistics strategy process. While fit can be observed at a point in time, the process behind establishing fit is often overlooked. This is problematic because the strategy process is typically unpredictable and characterized by managers’ level of discretion in strategic decision making (i.e., strategic choice is highly affected by the manager’s decision-making authority and background). The purpose of Paper 3 was thus to examine how strategic choice influences the logistics strategy process. This was achieved through a longitudinal single case study, which was carried out in retrospective of a large building contractors logistics strategy process. To fulfil the purpose, the following research questions were studied and answered:

- **RQ1.** How does managerial discretion constrain logistics strategy formulation and implementation?
- **RQ2.** How does strategic choice influence logistics strategy and structure in terms of fit?

The paper provided insights into the process of establishing fit between the logistics context and strategy in a building contractor organization. It revealed that the building contractor’s previous endeavours in logistics, production, marketing, etc., can restrict their ability to pursue an ideal logistics configuration. This suggests that building contractors are prone to path-dependency when choosing among logistics strategy alternatives. Consequently, building contractors can take several routes to achieve a fit between the logistics strategy context and content: 1) the logistics strategy context can be adapted to the existing logistics strategy content (i.e., changing the degree of pre-engineering, production system, and/or the supply chain structure), 2) changing the logistics strategy content to the existing logistics strategy context (i.e., reorganize logistics tasks, decision-making authority, and logistics processes), and 3) a combination of 1) and 2). The most feasible alternative ultimately depends on the type of constraints managers face and whether these constraints mostly affect the implementation difficulty in the logistics strategy context or content.

Paper 3 contributes to this thesis by identifying and presenting the constraining factors to logistics strategy implementation, which are summarized in Table 3. These factors mediate the fit between the logistics strategy context and content of the building contractors. In particular, the paper highlights that a top-down strategy process model cannot be regarded a universal solution to formulating and implementing a logistics strategy in building construction. The initial conditions are never the same prior to the logistics strategy process, and the top-down strategy process model disregards that the logistics strategy is path-dependent and involves making choices that are influenced by internal company politics and conflicting priorities at different levels of a building contractor organization.
4. Summary of Papers

Table 3 Identified constraints to logistics strategy implementation (based on Haglund and Rudberg, 2022)

<table>
<thead>
<tr>
<th>Logistics strategy dimension</th>
<th>Intended outcome</th>
<th>Realized outcome</th>
<th>Identified constraints</th>
<th>Implications for fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>- Increased level of standardization - Long-term relationships with suppliers</td>
<td>- Low use of standard components - Mainly local suppliers</td>
<td>- Lack of cooperation between central purchasing department and project purchasers</td>
<td>- Low degree of logistics task predictability - Many logistics decision elements</td>
</tr>
<tr>
<td>Content</td>
<td>- Centralized logistics with regional planning units - Standardized administrative and operational logistics processes</td>
<td>- Centralized logistics development</td>
<td>- Lack of top management support - Low level of logistics expertise in the purchasing department - Lack of incentives to change among site managers</td>
<td>- In favour of customized logistics solutions for individual projects - Local adjustments to logistics processes based on project conditions resulting in ad hoc problem solving</td>
</tr>
</tbody>
</table>
5. Discussion

In this section, the two research questions are answered, followed by a discussion of the thesis’ purpose.

5.1 Research Question 1
What elements of logistics strategy context and content can be used to assess the fit of building contractors’ logistics strategies?

This thesis suggests nine elements that can be used to assess the fit between the logistics strategy context and content, four context and five content elements. The logistics strategy context elements are competitive priorities, the degree of pre-engineering, the choice of production process, and supply chain structure. The suggested logistics strategy content elements fall under two categories that are referred to as structure components (formal structure, integration, and division of labour) and process components (formalization and order-driven/speculative).

Competitive priorities determine the contractor’s strategic orientation. They influence the logistics strategy content so that they are configured in a way that favours a cost/delivery or flexibility-oriented competitive strategy (Bowersox and Daugherty, 1995). The three internal context elements are the degree of pre-engineering, the choice of production process, and the supply chain structure. The degree of pre-engineering is primarily related to the predictability of logistics tasks. A high logistics task predictability (e.g., in an ETS situation) favours formalization of logistics processes in the form of standard policies, procedures, and goals (Persson, 1978). Industrialized housebuilders can therefore standardize their logistics processes to a further extent than general-purpose contractors. The choice of production process and supply chain structure were found to influence the degree of centralization in the logistics organization. For instance, an ETO situation requires a high level of flexibility in production and distribution (Klaas and Delfmann, 2005). In Paper 2 it was found that this needs to be supported by a combination of a centralized logistics function and decentralized control and execution.

In Paper 1, two distinct logistics strategy configurations were described: the product/process-oriented and the project-oriented configuration. The product/process-oriented configuration strive for economies of scale and long-term relationships with material and component suppliers. Building contractors that adopt this configuration exhibit high performance in primarily cost and delivery related measures. In contrast, the project-oriented configuration delivers superior performance in flexibility related measures. The logistics strategy is thus a means of supporting a strategic orientation (Bowersox and Daugherty, 1995). For instance, building contractors with a product/process-oriented configuration are typically industrialized housebuilders that can
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deliver building projects with short project lead times and at a low cost. The project-oriented configuration is typically a feasible alternative for general-purpose contractors that compete based on their ability to deliver a variety of building projects. These findings add further insights into the trade-off between productivity and flexibility-related capabilities in building contractors’ production strategy highlighted by Jonsson and Rudberg (2015). The trade-offs are not only a consequence of the strengths and weaknesses of different production systems but are also determined by a configuration of the logistics organization structure, the supply chain structure, and characteristics of logistics processes. This means that the logistics strategy must exhibit a fit with the production and marketing strategies to support a cost/delivery or flexibility-oriented strategy.

However, there are risks involved with trying to combine the two configurations as this may lead to the situation of being “stuck in the middle” (Porter, 1996). Although concepts, such as mass-customization, is highlighted as a means of overcoming the productivity/flexibility trade-off in building construction (e.g., Bonev et al., 2015), it can be questioned whether these trade-offs really are eliminated. On the contrary, the thesis findings suggest that it is a compromise between the product/process and project-oriented configuration. Using the product/process matrix developed by Jonsson and Rudberg (2015), the mass customization strategies fall in the categories between the two extremes of pure product customization (ETO) and standardization (ETS). A mass customization production strategy resembles the ATO degree of pre-engineering, which in turn involves trade-offs. For instance, a building contractor with the product/process-oriented configuration that decides to move from ETS to ATO to allow for a more flexible building design will experience an increase in administrative costs. Furthermore, the added customization in the product increases variation in the production phase (da Rocha et al., 2016), leading to an increase in the number of logistics decision elements brought by an increased degree of pre-engineering. This incurs increased administrative costs because of increased information processing requirements to handle the reduced logistics tasks predictability and increased number of logistics decision elements (Persson, 1978, Pföhl and Zöllner, 1997).

5.2 Research Question 2

*What leads to fit/misfit in building contractors’ logistics strategies?*

Paper 2 illustrate three building contractors with misfits and one building contractor exhibiting a fit. The strategic profiling template was used during the workshops as a basis for discussing the concept of fit, which indicated that fit was not a conscious choice mainly due to the lack of a central logistics department with responsibility for strategic decisions. This was apparent in the building contractor that had the highest degree of fit, which led to *ad hoc* logistics decision-making at the project level. Therefore, the logistics strategy process needs to be “owned” by a department or unit that is detached from the projects and is not constrained by the projects’ time and budget.
5. Discussion

The findings in Paper 3 provide insights into the logistics strategy process in a building contractor organization. Logistics strategy process models do not adequately explain the link between the logistics strategy process and its outcomes. This is because the logistics strategy alternatives available to a building contractor are constrained by prior investments, internal political influences, and incentive structures, to name a few. This is in line with contemporary construction logistics research that report other factors than the logistics context as the primary barriers towards implementing logistics solutions, such as a lack of widespread technology standards for sharing information in the supply chain (Elfving, 2021). Furthermore, the strong project-focus in construction is highlighted as a limiting factor for building contractors with the intention to centralize logistics and coordinate multiple projects and their supply chains (Dubois et al., 2019). Projects are limited by time and budget constraints, which indicate that strategic logistics decisions must be made at a company level. This includes the permanent part of contractor organizations that allocate resources and provide expert support to projects (Winch, 2014). A central logistics function is thus an important enabler for logistics strategy implementation.

The logistics strategy process was also found to be path dependent, where investments in, e.g., production technology or logistics infrastructure can generate lock-in effects that limit logistics strategy alternatives. Building contractors should consider different options to establish fit between their logistics strategy context and content and strive for the option with lowest implementation difficulty. This means that establishing fit is a continuous process, where the company must balance trade-offs rather than trying to find an optimal solution (Sandberg, 2017). Paper 3 outlines three alternatives that a building contractor can pursue to establish fit: 1) change the logistics strategy context (i.e., the degree of pre-engineering, the production system, or supply chain structure), 2) change the logistics strategy content (i.e., change the organizational structure and/or logistics processes), or 3) a combination of 1) and 2).

5.3 Purpose

The purpose of this licentiate thesis was to investigate the fit between logistics strategy context and content for building contractors. Fit has been extensively discussed, explicitly and implicitly, in logistics strategy research. By investigating the fit between the logistics strategy context and content, this thesis identifies the internal sources of complexity that influence a building contractor’s logistics strategy content. Building contractors face similar internal sources of complexity as companies within other types of industries, and this thesis consider those that are logistically relevant, namely the number of logistics decision elements and the predictability of logistics tasks. These are determined by four logistics strategy context elements: competitive priorities, product, production process, and supply chain characteristics (Christopher, 1986, Klaas and Delfmann, 2005). In this thesis, they are adapted to the ETO type of production in building construction and defined as the contractor’s competitive priorities, degree of pre-engineering, the choice of production process, and supply chain structure.
5.3.1 Logistics Strategy Context and Content

Building contractors need to apply the right measures to handle the number of logistics decision elements and predictability in logistics tasks. This is to ensure that the logistics organization and logistics processes are designed to handle the decision elements and the level of predictability generated by the logistics context. This thesis puts forward two distinct situations that represent general-purpose contractors and industrialized housebuilders:

(1) Building contractors with few logistics decision elements and predictable logistics tasks, such as industrialized housebuilders, can benefit from a central logistics department with a high division of labour. This tends to be combined with formalized rules, policies, and procedures for how to perform logistics tasks.

(2) Building contractors with many logistics decision elements and unpredictable logistics tasks, such as general-purpose contractors, can benefit from centralizing strategic and administrative logistics tasks, but they need decentralized control for operational logistics tasks. This favours a low division of labour and a low/moderate degree of formalization.

It should be noted that a central logistics department is suggested for both general-purpose contractors and industrialized housebuilders. In Paper 2 it was found that central logistics functions can serve different purposes in the two logistics contexts. Previous logistics strategy research has suggested that the project-structure is most feasible when logistics tasks are unpredictable (Pfohl and Zöllner, 1997). However, this thesis partially contradicts this notion. A central logistics function does not eliminate the possibility to manage day-to-day logistics operations at the project level. Strategic logistics tasks, such as strategy formulation and logistics development, should be centralized. The number of logistics decision elements and the predictability of logistics tasks then determine to what extent logistics needs to be decentralized to retain responsiveness to variation at the operational level (Abrahamsson et al., 2003). This indicates that building contractors’ logistics strategies need to be adjusted to the contextual conditions of the company, and not just to the conditions at the construction site (Rudberg and Maxwell, 2019).

The most feasible option for building contractors’ logistics organizations is thus a matrix structure to combine autonomous projects with a central logistics function (see Figure 7). The central logistics function is present in projects, albeit to varying extents depending on the logistics strategy context. A highly formalized logistics strategy that is executed by a central logistics function is thus a natural response to a standardized product, while a flexible product offering creates a need for a logistics strategy that facilitates reconfigurable solutions for each project (Rudberg and Maxwell, 2019). In general terms, the balance between a central function and the projects is determined by the diversity in products and the need for coordination between specialist functions to deliver projects (Galbraith, 1971). Project oriented matrix structures are preferred for organizations delivering complex projects, while functionally oriented matrix structures are suitable in for less complex projects (Slack and Lewis, 2017). Based on the findings in Paper 2, the following two paragraphs describe how a central logistics function can be incorporated into two types of
building contractors, where the first situation represents an industrialized housebuilder and the second a general-purpose contractor (see Figure 7).

*Industrialized housebuilder*  
*General-purpose contractor*

![Diagram showing the comparison between industrialized housebuilder and general-purpose contractor in logistics organization structures](image)

Figure 7 Continuum of logistics organization structures

In the situation of an industrialized housebuilder, the central logistics function has the role of a governing body. A logistics manager (or someone with a similar job title) has the primary responsibility for a central logistics function, which in turn contains one or more units. These units can be divided according to different logistics tasks, e.g., delivery planning, site logistics and material handling, pre-construction planning, coordination, etc. One unit can also comprise several of these tasks, e.g., one unit is responsible for site logistics and material handling. The logistics units are responsible for executing formalized logistics processes defined by the central logistics function, and they significantly influence logistics tasks in projects. This type of logistics organization is suitable for building contractors with a relatively low number of logistics decision elements and predictable logistics tasks. Therefore, building contractors with a high degree of repetition in projects (i.e., an MB production system, ETS, and a stable supply chain structure) will most likely employ this logistics organization structure. This situation is illustrated in the left part of Figure 7, where the solid lines represent the influence that logistics units have over projects.

In the situation of a general-purpose contractor, the central logistics function takes a more passive role as a support function. The projects take primary responsibility for logistics decisions and execution but can utilize the logistics units for expert advisory. This logistics organization is suitable for building contractors with a relatively high number of logistics decision elements and unpredictable logistics tasks. This is to retain responsiveness to the high number of logistics decision elements and unpredictability in operational logistics tasks. Consequently, there is a need for logistics expertise at or in vicinity to the project level in the form of project logisticians and/or regional planning units. This logistics organization structure is suitable for building contractors with an CM&SA production system, an ETO degree of pre-engineering, and temporary supply chains. This situation is illustrated in the right part of Figure 7, where the projects’ solid lines represent their influence on the logistics units.

The two situations signify that there is not one best way to organize logistics, which is in line with the contingency stream of logistics strategy research (Christopher, 1986, Persson, 1978). The findings of Paper 1 strengthen the contingency approach to logistics strategy in building construction. It was found that the industrialized housebuilder’s logistics
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organization, depicted in the left part of Figure 7, promote economies of scale, while the general-purpose contractor’s logistics organization, depicted in the right part of Figure , facilitate responsiveness and flexibility. Yet, the matrix structure is deemed necessary in both cases due to the inherent project-based operations in building construction. It is not a matter of either a pure project-oriented logistics organization or a single central logistics function, but that different degrees of centralization, formalization, integration, and division of labour within the matrix structure are suitable for different logistics strategy contexts, as highlighted in Figure 7.

5.3.2 Logistics Strategy Process

The situations previously described are based on the content of fit perspective that is based on a cross-sectional view of fit. The cross-sectional view provides a snapshot of the fit between the logistics strategy context and content. However, establishing fit is an ongoing activity, which takes place continuously in construction projects and at a central level. This view implies a more dynamic view on fit than what is typically considered in logistics research (Sandberg, 2017, Zajac et al., 2000).

The organizing of logistics has received some attention in construction logistics research, but typically they focus on organizing logistics activities and resources in the supply chain (Dubois et al., 2019, Sundquist et al., 2018) or from the perspective of the building project (Le et al., 2020), but not from the perspective of the building contractor. As seen in Paper 3, the logistics strategy is influenced by strategic choice, where managerial discretion constrains the ability to establish fit between the logistics strategy context and content. Therefore, the permanent part of the building contractor organization poses additional constraints to logistics strategy formulation and implementation apart from the challenges towards implementing logistics solutions in projects, such as complex interdependencies between activities and actors (Dubois et al., 2019). Winch (2014) state the permanent part of the project-based organization possess the resources that are used to deliver projects. As such, the challenges towards formulating and implementing a logistics strategy at a centralategic level should not be undermined because individual projects possess little time and resources for these undertakings. Paper 3 highlights this issue, in which the logistics strategy process was severely constrained due to insufficient support from top management at the centralategic level and constrained time schedules and budgets at the project level.

The two variations of matrix structures for building contractors’ logistics organizations in Figure 7 can potentially be means of overcoming the challenges related to scarce project resources and a lack of connection between strategic and operational level logistics. The central logistics function should take responsibility for formulating the logistics strategy. To firmly establish the logistics strategy throughout the organization, it needs to be translated into explicit guidelines for the project level (Rudberg and Maxwell, 2019). In the case of a typical industrialized housebuilder (left part of Figure 7), the logistics strategy can be implemented with less effort because the central logistics function is more involved in the day-to-day operations. However, a general-purpose contractor needs to put more effort into translating strategic level plans to the project level. This is due to the difficulties
5. Discussion

with maintaining knowledge of all logistics decision elements in situations with highly diverse product characteristics (Galbraith, 1971), such as in the case of general-purpose contractors (right part of Figure 7) that combine ETO with a CM&SA production system. However, in both situations, a better connection between the strategic and operational level can help mitigating many logistics-related problems in construction projects and in the construction supply chain (Thunberg and Fredriksson, 2018).
6. Conclusions, Contributions, and Further Research

In this section, conclusions, the thesis’ contributions, and suggestions for further research are presented.

6.1 Conclusions
The purpose of this thesis was to investigate the fit between logistics strategy context and content for building contractors. This thesis provides the following conclusions on the fit between the logistics strategy context and content in building construction by answering two research questions:

RQ1. What elements of logistics strategy context and content can be used to assess the fit of building contractors’ logistics strategies?

Competitive priorities, the degree of pre-engineering, the choice of production process, and supply chain structure were identified as the main logistics strategy context elements that determine the number of logistics decision elements and the predictability of logistics tasks for a building contractor. The number of logistics decision elements and the predictability of logistics tasks then determine the degree of centralization, formalization, integration, division of labour, and whether logistics processes are formalized and driven by order or speculation.

RQ2. What leads to fit/misfit in building contractors’ logistics strategies?

The logistics strategy content needs to exhibit fit with the logistics strategy context to support a cost/delivery or flexibility-oriented strategy. A misfit between the logistics strategy context and content can hinder building contractors in pursuing a cost/delivery or flexibility-oriented strategy. However, the logistics strategy process is not a deliberate choice between logistics strategy alternatives but is a compromise between previous and future undertakings. Building contractors need to consider the constraining factors, such as limited authority among strategic decision-makers and previous investments, towards implementing a logistics strategy. Failing to address these constraints can lead to a misfit and they must choose the alternative that involves the least risk. This can be done by 1) adapting the logistics strategy context to the existing logistics strategy content 2) adapting the logistics strategy content to the existing logistics strategy context, or 3) a combination of 1) and 2).
6.2 Contributions

The main research contribution of this thesis is to the logistics strategy body of knowledge concerning the context, content, and process dimensions of logistics strategy within the building construction industry. Previous logistics strategy literature has mainly focused on manufacturing industries (e.g., Harrison and van Hoek, 2008, Stock et al., 1998). This thesis provides descriptions of logistics strategy context and content elements that have been adapted to the building construction industry. Furthermore, the concept of fit has been investigated and highlights that building contractors need to pursue different logistics strategies for the logistics function to support their competitive strategy. The profiling template (Figure 6) and the suggested logistics organization structures (Figure 7) can be used by researchers and practitioners to pursue further studies of how to establish fit and as a tool to analyze and reconfigure a logistics strategy, respectively.

6.2.1 Research Contributions

The thesis shows that a configurational approach to logistics strategy context and content can be used to determine the trade-offs, where the fit between multiple interrelated logistics strategy context and content elements can either support a cost/delivery or flexibility-oriented strategy. Consequently, the main argument put forward in this thesis is that the different degrees of pre-engineering, type of production systems, and supply chain structures employed by building contractors need to exhibit a fit with the five logistics strategy content (degree of centralization, formalization, integration, division of labour, and whether logistics processes are order-driven/speculative). The identified logistics strategy context elements represent building contractors’ internal sources of the number of logistics decision elements and the predictability of logistics tasks. The identified elements and the logistics configuration profiling template in Figure 6 can be used by researchers studying the fit between building contractors’ logistics strategy context and content.

Furthermore, the insights related to the process dimension of logistics strategy suggest that the fit between the logistics strategy context and content is not the result of deliberate choice for efficiency/effectiveness reasons. The examples of constraints to logistics strategy formulation and implementation increases the understanding of how the fit between the logistics strategy context and content can be established. The research also shows that failing to address these constraints can lead to a misfit between the logistics strategy context and content, which is proposed to negatively affect the performance of building contractors’ logistics operations.

6.2.2 Contributions to the Building Construction Industry

The configurational approach used in this thesis not only brings research contributions, but it highlights that the logistics strategy carry implications for other functional areas in building contractor organizations. The logistics configuration profiling template in Figure 6 can serve as a managerial tool to assess the fit of their current logistics strategy and/or evaluate the consequences of changing the degree of pre-engineering or the production system on the logistics strategy. For instance, a building contractor that aims at reducing their degree of pre-engineering to offer more customization for the client will need to...
address the consequences this has on their logistics strategy. In the situation where a contractor wants to increase the degree of off-site assembly, e.g., by moving more value-adding activities to an off-site factory, this will change the characteristics of the materials and components that need to be delivered to the construction site for the final assembly. Both these two changes determine whether logistics processes can be formalized and the degree to which they need to be centrally managed, respectively.

The research process that led to this thesis started out with the ambition to describe how building contractors currently work with logistics strategies. However, it was discovered early in the process that logistics strategies in the building construction industry are more or less non-existent, if one refers to systematically developed strategic plans for how to manage logistics. This thesis does not provide an explicit managerial framework that outlines in detail what a logistics strategy should contain and step-by-step guidelines for how a building contractor should formulate and implement a logistics strategy. It does however provide more general advice in the form of the identified logistics strategy context elements, the structure and process components, and challenges to logistics strategy implementation that needs to be addressed. Furthermore, the thesis highlights the need for a central logistics function among building contractors, although their role can differ depending on the need for decentralized planning and execution. These findings can promote a more strategic approach to logistics in which building contractors consider logistics as an important functional area that increases the likelihood of delivering successful building projects.

6.3 Further Research

As mentioned in section 6.2.2, this research does not provide explicit guidelines of what a logistics strategy should contain in terms of structure and process components. Paper 1 and 2 focus on structure components, while Paper 3 comprises both structure and process components. However, the process components identified in Paper 3 are derived from analyzing one case and need to be further investigated to provide more explicit guidelines.

In addition, the thesis does not provide a set of performance measures to evaluate the effects of a logistics strategy. A logistics strategy should prescribe performance measures that enable building contractors to evaluate the performance on process level outputs rather than on firm level outputs. Process-level performance should provide a less distorted view on how “healthy” their logistics strategy is since other factors that contribute to performance are not considered. Furthermore, process-level performance measures can be used to identify the effects of deviating from an ideal logistics strategy configuration.

The effects of company size and geographical market segmentation of building projects have not been investigated in this thesis. Size and geographical market segmentation can potentially influence the structure of the logistics organization, but this was left out to direct the initial focus on large building contractors with projects that are geographically dispersed. However, future research should consider small and medium-sized contractors with concentrated geographical market segments. In terms of absolute numbers, small and
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medium-sized contractors dominate the Swedish construction industry, and their smaller size and low degree of geographical dispersion can favour more centralized planning and control of material flows. Further research on this avenue can benefit both construction logistics research and the construction industry by providing insights for a common, but overlooked, type of building contractor in construction logistics research.
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Papers

The papers associated with this thesis have been removed for copyright reasons. For more details about these see:

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