

# Mastering timely deliveries using dynamic capabilities: perspectives from logistics service providers and shippers

Mastering  
timely  
deliveries

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## Abstract

**Purpose** – The criticality of late deliveries in transportation lies in the threat of considerable multi-level supply chain costs. This study aims to reveal the dynamic capabilities playing a facilitating role in preventing delay, thus providing timely delivery, as well as developing an understanding of how and when those capabilities are activated within the supply chain network.

**Design/methodology/approach** – An exploratory study was conducted involving 16 semi-structured expert interviews with the representatives of logistics service providers and shippers. Following an interpretive phenomenology framework, the prevention phenomenon was explained.

**Findings** – Findings revealed two preventive capability categories in delay prevention: (1) proactive capabilities, referring to the enabling actions planned before departure, and (2) reactive capabilities, referring to actions planned after departure. Findings pinpoint that, in addition to the proactive capabilities, reactive capabilities enabled by innovative problem-solving actions are crucial for adapting to a dynamically changing environment in prevention. Moreover, this study shows that prevention capabilities are characterized by tangible and intangible resources and integration of resources with external links which constitute a delay prevention network within a wider service ecosystem.

**Originality/value** – This study stands out with its specific focus on delay prevention capabilities and enabling actions from the perspectives of logistics service providers and shippers. The premises of the resource-based view are combined with dynamic capabilities theory, leading to a proposed time-based taxonomy of proactive and reactive capabilities in supply chains, aimed at creating value and strengthening resilience.

**Keywords** Prevention, Late delivery, Reactive, Proactive, Dynamic capabilities, Shippers, Logistics service providers, Adaptation, Supply chain resilience

**Paper type** Research paper

## 1. Introduction

Timely delivery acts as a positioning tool that constitutes a base for the reputation of logistics service providers (LSPs) (McColl *et al.*, 2019) and a key order-winning criterion in the competitive world (Day and Barksdale, 1992). However, time uncertainty exists inherently in logistics operations, making it essential to implement specific policies and dynamically allocate resources to hedge against variances in delivery lead times (Waller *et al.*, 2008; Senapati *et al.*, 2012). Through supply chain (SC) capabilities, actors can reduce the probability of disruptive events, and/or respond quickly to reduce the negative impacts of disruption (Pereira *et al.*, 2014; Chowdhury and Quaddus, 2017). Preventive dynamic capabilities can enhance resilience in SC management by reducing risk, thereby positively impacting inventory levels, cycle times, processes, and ultimately, customer service levels (Guiffrida and Nagi, 2006).



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Any problem in logistics operations may disrupt the whole SC network, resulting in delivery delays (Perlekar and Thakkar, 2019; Wiedenmann and Gröbler, 2021). For business partners, late deliveries bring production stoppage, lost sales, longer bureaucratic processes, higher inventory costs, and loss of goodwill (Ozaydin *et al.*, 2015; Peng and Lu, 2017). The criticality of late deliveries derives from their high likelihood of occurrence, with considerable relational and monetary costs (Perlekar and Thakkar, 2019). Transport delays have been associated with severe damage to a company's image, reputation, trust, and customer relationships (Ward and Duray, 2000; Zhang and Figliozzi, 2010; Biggemann, 2010) causing domino effects across multiple SC levels. In the literature, on-time delivery has been examined along with risk management, resilience, and supply disruption (e.g. Carvalho *et al.*, 2012; Chen *et al.*, 2016; Li *et al.*, 2017; Pettit *et al.*, 2019; Perlekar and Thakkar, 2019). Late delivery as a service failure is also well-studied both in business-to-consumer (Chiu *et al.*, 2014; Peng and Lu, 2017; Song *et al.*, 2019) and business-to-business (B2B) contexts (Ciccullo *et al.*, 2017; Bushuev *et al.*, 2018; Zhang *et al.*, 2019). Given the insufficient attention to B2B late delivery prevention in existing literature, we aim to fill this gap by revealing the dynamic capabilities that aid in preventing delays and understanding when and how these capabilities are activated within the SC network.

Given these discussions, our research questions are as follows:

- RQ1. What are the dynamic capabilities used by LSPs and shippers to provide timely delivery?
- RQ2. When and under what circumstances are the identified dynamic capabilities activated to provide timely deliveries?

This study employed semi-structured expert interviews with representatives of LSPs and shippers to explore the phenomenon of prevention and utilized an interpretive phenomenology framework. Our aim aligns with the need for interpretive research in logistics and SC management, as noted by recent scholars in the field (Mittal *et al.*, 2018; Darby *et al.*, 2019; Touboulic and McCarthy, 2020; Wieland, 2021; Hendriksen, 2023).

This study contributes to the literature fourfold: (1) Despite risk management and risk mitigation orientation in SC literature (e.g. Chopra and Sodhi, 2004; Heckmann *et al.*, 2015; Nayal *et al.*, 2022), DC (dynamic capability) orientation has attracted little attention in connection with transportation disruptions. Our study specifically focuses on preventive actions from the perspectives of LSPs and shippers. (2) Our study combines the premises of the resource-based view (RBV) and DC theories and utilizes resources, capabilities, and relations to explain the prevention phenomenon in SC and logistics management contexts for strengthening resilience. (3) Findings underline the timing of prevention actions with the taxonomy of proactive and reactive capabilities along with an action time framework. Proactive prevention capabilities relate to the capabilities deployed before the departure of cargo to mitigate risk, and reactive capabilities are the response actions to obvious late delivery risks after the cargo is already en route. With the taxonomy, we also pinpoint the innovative problem-solving capabilities established reactively for adapting to a dynamically changing environment. (4) Our study demonstrates that prevention capabilities can be either internal, external, or a combination of both. They can be built through the utilization of internal resources and links. However, findings also indicated that prevention capabilities are also established by external links among the SC members, indicating a delay prevention network within a wider service ecosystem (SE). This can be achieved via collaboration and the establishment of links among LSPs, shippers, business customers, and other service providers such as second-tier suppliers and customs service providers.

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The remainder of the paper is organized as follows. We first discuss the relevant literature. Then we explain our methodology and proceed with the evaluation of the findings. Lastly, discussion and implication parts are provided.

## 2. Theoretical background

The RBV (e.g. [Wernerfelt, 1984](#); [Barney, 1991](#); [Hall, 1992](#)) examines how companies can achieve competitive advantage through the acquisition, control, and bundling of tangible and intangible resources with capabilities. RBV considers capabilities as organizational routines or mechanisms for acquiring and deploying resources to facilitate the production or delivery of services and inter-firm links are also considered under the context of resource-acquisition capability ([Rungtusanatham et al., 2003](#)). Capability is acknowledged as information-based tangible and intangible processes that enhance productivity and strategic flexibility creating bonds with DC theory ([Amit and Schoemaker, 1993](#)). DC theory refers to “a firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” ([Teece et al., 1997](#), p. 516). SC members can achieve congruence through continuous reconfiguration of their physical, human, knowledge, information, and relational resources referring to external links with other members ([Cui and Pan, 2015](#); [Chowdhury et al., 2023](#)).

SC resilience is the ability to respond quickly to unexpected events and restore operations to previous performance levels ([Pereira et al., 2014](#); [Chowdhury and Quaddus, 2017](#)), and is achieved by integrating capabilities with SC characteristics ([Kochan and Nowicki, 2018](#)). Preventive capabilities are DCs that contribute to the construction of dynamic resilience in SCs ([Hamel and Valikangas, 2003](#)).

Through proactive and reactive capabilities, companies increase the required level of readiness, response, and recovery ability during the pre and post-disaster phases ([Chowdhury and Quaddus, 2017](#); [Sanchis and Poler, 2019](#)). Proactive prevention takes place before the occurrence of disruptive events ([Fernández et al., 2016](#)). In this regard, the factors vital for late delivery risk mitigation in a proactive manner are “end-to-end” visibility ([Sheffi, 2001](#); [Christopher and Lee, 2004](#)), coordination, cooperation, and information sharing ([Sheffi, 2001](#); [Mandal, 2019](#); [Giuffrida et al., 2021](#); [Song et al., 2022](#)), risk identification and process analysis ([Breuer et al., 2013](#); [Käki et al., 2015](#); [Pradita et al., 2020](#)), and multi-sourcing strategies ([Sheffi and Rice, 2005](#); [Ray and Jenamani, 2016](#); [Ivanov, 2021](#); [Rehman and Ali, 2022](#)). For proactively mitigating risks, LSPs can configure transportation modes (e.g. use of multi-modal), detail scheduling and routing, and plan resources regarding the fleet, vehicle, and capacity ([Tang, 2006](#); [Naim et al., 2006, 2010](#); [Govindan and Chaudhuri, 2016](#); [Brusset and Teller, 2017](#)), while shippers utilize tools such as postponement, preventive maintenance, process controls, safety stocks, and manufacturing flexibility operations to proactively deal with delivery time uncertainties ([Sheffi, 2001](#); [Ala-Risku and Kärkkäinen, 2004](#); [Sheffi and Rice, 2005](#); [Hallgren and Olhager, 2009](#); [Van Kampen et al., 2010](#); [Mackay et al., 2020](#); [Xu, 2020](#)).

Although generally discussed within a proactive logic, SC resilience is not only a function of the preparedness to react to disruptive events, but it also depends on adaptiveness ([Fayezi and Ghaderi, 2022](#)). Adaptive capability is the capacity to make decisions dynamically in daily activities, crises, or any disruptions ([Sanchis et al., 2020](#)) to minimize the spread of disturbance, maintain control, respond with effective reactive plans, and restore the SC to a robust and agile state ([Kamalahmadi and Parast, 2016](#); [Hohenstein, 2022](#)). Some studies address reactive acts of LSPs and shippers ([Hallgren and Olhager, 2009](#); [Candace et al., 2011](#); [Eckstein et al., 2015](#); [Liu and Lee, 2018](#); [Mackay et al., 2020](#); [Xu, 2020](#); [Yang et al., 2021](#); [Aldrighetti et al., 2021](#)). In disruptions, parties may reactively reduce market uncertainty by addressing their internal and external integration capabilities for gravitating to new supply

markets, expediting resources, ordering additional inventory and transshipment (Candace *et al.*, 2011; Eckstein *et al.*, 2015; Liu and Lee, 2018; Mackay *et al.*, 2020; Aldrighetti *et al.*, 2021), reconfiguring processes and planning through real-time operational information (Hallgren and Olhager, 2009; Yang *et al.*, 2021).

In the inter-organization relationship, one essential issue is how to co-create services and values for customers. Within this context, SCs involving both shippers and LSPs are part of a value co-creation network which is consistent with the propositions of Service-Dominant (SD) logic (Lin *et al.*, 2015). This logic reflects the interactive and networked nature of value creation, highlights the collaborative nature of services, and acknowledges business actors as integrators of resources (Yazdanparast *et al.*, 2010). Manufacturers and other stakeholders in services ecosystems co-create this value by combining resources, facilitating the development of new combinations of resources and capabilities enabling them to develop superior systems (Sinkovics *et al.*, 2018).

Concerning all these arguments, it is vital to study how SC actors with diverse resources and capabilities contribute to value creation and how SD logic can be used to manage service value co-creation (Vlachos and Polichronidou, 2023). There is a need to define proactive and reactive preventive capabilities in transportation by delineating the time of action. Moreover, many studies have emphasized preparedness, yet there is a growing need to prioritize effective reactive actions for resilience building (Targosz, 2010). In this regard, this study also aims to reveal a deeper understanding of how and when preventive dynamic capabilities are activated within the SC network.

### 3. Methodology

#### 3.1 Research design and sampling

Social phenomena, like actions, texts, and institutions, are concept-dependent which requires contextual understanding, and interpretation justifying qualitative methodologies to reveal interpretations' effects (Aastrup and Halldórsson, 2008). SC management is not a fixed structure, but a decontextualized, translated, and adapted recipe for the actual organizational practices of actors. Therefore, it is better to be interpreted and applied in various ways in various firms depending on their unique settings. Due to this contextuality, it is impossible to make predictions based on external cause-effect relationships, and it primarily requires qualitative methodologies (Gammelgaard, 2004). In this regard, the best-suited method to explore, describe, examine, interpret, and gain deeper insight into the prevention capabilities of shippers and LSPs, is semi-structured interviews (Saunders *et al.*, 2016; Schymanietz *et al.*, 2022).

For a holistic view, we opted for purposive expert sampling, to shed light on the research questions (Etikan and Bala, 2017). In this regard, we collected data from a sample of highly qualified experts in the subject area (Weber, 2021) and we followed a two-step purposive sampling process to access knowledgeable and experienced informants (Breckenridge and Jones, 2009). First, we contacted the shippers (manufacturers, distributors and retailers) who play a pivotal role for all SC entities. Second, we focused on the LSPs fulfilling a broad array of value-added services to the shippers, and who are responsible for the cargo until the destination. All participating companies, international pioneers with extensive industrial experience, provided a comprehensive and detailed perspective on the phenomenon. In this regard, an exploratory study was conducted involving 16 face-to-face semi-structured expert interviews (Table 1).

#### 3.2 Data collection and analysis

In SC studies the main focus is resilience and agility (Cherian *et al.*, 2023) with increasing importance of time aspect. However, the actions for facilitating timely delivery are mostly

Company	Operation areas	Industrial experience of informant	Operational scope	Employee number	Position of the informant	Duration (min)
S1	Commercial and military industry	25	134 countries in Africa, Asia, Oceania, Europe, Middle East, North and South America	900	Purchasing engineer	48
S2	Fashion and textile industry	16	12 countries in Europe, North America, Russia, Middle and Far East, Central Asia	7,500	Customer and production coordinator	50
S3	Wheel industry	15	9 countries in Europe	200	Order management specialist	40
S4	Food industry	18	19 countries in Middle and Near East, Europe	400	Logistics manager	31
S5	Construction industry	11	20 countries in Europe and Asia	500	Logistics specialist	35
S6	Air conditioning industry	13	15 countries in Europe, Middle East	7,500	Logistics specialist	45
S7	Mining industry	9	50 countries in Europe, Middle and Far East, Africa, America	200	Logistics specialist	46
LSP1	Transportation, analytics and optimization, trade risk management, export and import facilitation, project logistics and warehousing	14	80 countries in Middle East, Gulf Countries, North Africa and Turkic Republics	3,500	Overland freight manager	43
LSP2	Transportation, warehousing, supply chain solutions, project logistics and customs	12	110 countries in Asia, Europe, America, and Oceania	3,900	Road operation specialist	51
LSP3	Warehousing service, dangerous goods and container transportation	11	22 countries in East and Southeast Asia, Central and Eastern Europe, the Balkans, and South America	3,000	Sales manager	38

(continued)

**Table 1.**  
Sample of the study

Company	Operation areas	Industrial experience of informant	Operational scope	Employee number	Position of the informant	Duration (min)
LSP4	Transportation, warehousing and customs	16	40 countries in Western and Eastern Europe, South America	2,900	Freight operations officer	60
LSP5	Transportation, project logistics, warehousing and customs	17	39 countries in Europe and Asia	1,400	Logistics manager	62
LSP6	Transportation, warehousing, port management, project logistics and customs	20	150 countries in Africa, Asia, Caribbean, Europe, North, Central and South America	4,000	Sales manager	43
LSP7	Freight forwarding, warehousing, customs, transportation and project logistics	15	14 countries in Asia and Europe	500	Land freight manager	50
LSP8	Transportation, warehouse, and distribution centre management, customs and supply chain solutions	7	38 countries in Europe, Asia, America, Far East	1,500	Customer representative	40
LSP9	Freight transportation, project logistics, multi-modal transportation, warehousing, distribution and e-commerce fulfillment	9	30 countries in Europe, Balkan, Baltic, Middle East, America and Asia	200	Customer service and operations specialist	35

**Note(s):** \*\*Due to confidentiality, company names are shown as “S” referring to shipper firms, and “LSP” for logistics service providers

**Source(s):** Authors’ own work

**Table 1.**

hindered. Thus, we have conducted an exploratory qualitative study to illuminate this unexplored phenomenon. Interpretive phenomenology goes beyond mere delineation of the core concepts and aims to unearth and interpret meanings of experiences and actions that are not readily recognized (Cohen and Omery, 1994). Herein, the experiences of the people involved are crucial for understanding the phenomena (Creswell *et al.*, 2007; Eatough and Smith, 2017; Holgado and Niess, 2023). By using an abductive approach, we employed interpretive phenomenology (Smith, 2004; Creswell *et al.*, 2007) to gain new insights (Kovács and Spens, 2005) from experts through semi-structured interviews. Richer understandings were gained by viewing the experiential perspectives of SC actors directly involved

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(e.g. Towers *et al.*, 2020; Holgado and Niess, 2023). With a creative iterative process of theory matching (Dubois and Gadde, 2002; Busse *et al.*, 2017), we systematically combined theory and our empirical study and conducted data collection simultaneously with theory building. The existing theories were used as lenses to shape and organize data collection and analysis procedures, and also to encode data into a pre-existing coding framework (Braun and Clarke, 2006) (Table 2).

By applying the hermeneutic circle (Frechette *et al.*, 2020), an interpretive phenomenology data analysis framework, we conducted a continuous analysis of the text, comparing and contrasting co-constructed categories to gain a comprehensive perspective. This cycle approach enabled us to engage with distinctions and shared aspects of participants' experiences.

For trustworthiness, we assessed credibility, transferability, dependability, and confirmability criteria (Lincoln and Guba, 1985; Wallendorf and Belk, 1989; Erlandson *et al.*, 1993; Halldórsson and Aastrup, 2003). For credibility, three researchers documented interviews, conducted categorization, and executed coding phases, enabling the assessment and comparison of individual outcomes. Respondents were also contacted to verify data accuracy. In terms of transferability, participants were selected based on expertise and awareness of the topic, and effective thick descriptions were provided for a deeper understanding of the context in analysis and reporting. For dependability, we transparently documented process and method choices, allowing for traceability and external validation. Lastly, for confirmability, two experienced qualitative researchers were requested to investigate the technique and assess the outcomes using expert peer reviews for the assurance of objectivity and integrity.

With interviews, we aimed to focus on the impacts of delays, and we asked about the preventive actions and their timing to understand the proactive and reactive logic better. The interview protocol is provided in Appendix. In total, we interviewed respondents representing 16 companies, consisting of both LSPs and shippers. The interview duration ranged between 31 and 62 min and they were audio-recorded with permission.

## 4. Findings

Capability dimensions emerged under two main categories: proactive and reactive prevention capabilities (Figure 1). The timing of actions taken to prevent late deliveries determines the extent of the actions and the capability of the company. Proactive actions are implemented before the departure of a vehicle even when there is no foreseen risk and usually involve mid- or long-term resource planning and organization. Whereas reactive actions typically pertain to sporadic, temporary, and immediate responses, highlighting the significance of adaptive capabilities. Moreover, we observe that the companies establish their prevention capabilities by focusing on (1) fully internal actions and resources, (2) fully external actions through external links, and (3) a combination of both sides. Hereby, we begin with the capabilities related to internal actions and resources. We then move on to examine mixed action-based capabilities involving both internal and external links before presenting the fully externally established prevention capabilities.

### 4.1 Proactive prevention capabilities

4.1.1 *Contract management capabilities.* The findings highlight the importance of preventive contractual capabilities, which encompass the ability to establish time window statements and adhere to penalty terms, pinpointing internal capabilities. Determining the optimal delivery window is a practice executed at the contract agreement stage to reduce future delivery variation. During these time window arrangements, LSPs either manipulate the

**Table 2.**  
Overview of the coding  
process

Time-based taxonomy	Capability links	Preventive capabilities	Preventive actions	Example quote
Proactive dynamic capabilities	Internal	Contract management capabilities	Compliance to penalty statements Time window arrangements	“... when we know there is a delay clause in a contract, we plan accordingly. We act proactively.” (LSP9) “We abstain from defining precise delivery dates, especially for less-than-truckload (LTL) cargo deliveries, and prefer to provide an estimated arrival time with a buffer of $\pm 2$ days.” (LSP5)
	Mixed	Capacity planning capabilities	Safety stockpiling of resources	“A portion of our trailers is stored at a trailer yard to provide solutions to the problems that may arise related to customs or vehicle breakdowns.” (LSP5) “If our sub-carriers give a definite deadline guarantee, I ask them to allocate 5 vehicles, and I pay them even if I do not use the assigned vehicles.” (LSP8) “When selecting companies every year, we evaluate loading transit and delivery performance.” (S3)
		Sourcing capabilities	Supplier performance evaluation Supply base rationalization Multi-sourcing	“We eliminate the sub-carriers that make us pay penalties due to the late deliveries or unfinished customs issues to have better performance and avoid penalties.” (LSP9) “We have many truckers in our supply base. If they are not able to provide on-time delivery, we collaborate with premium sub-carriers listed for our priority customers, albeit at a higher cost.” (LSP9) “The shipowner’s system enables comprehensive tracking of shipments, including detailed explanations. If a vessel is delayed due to port congestion, alternative arrangements can be made to prevent delivery delays.” (LSP8)
	External	Information network capabilities	External information networks	“We have in-plant service provider employees here. Whenever we have a problem, we have immediate communication with them.” (S4) “We cooperate with shippers for multi-modal transportation. Mode and route option-based collaborative plans are generated with our long-term customers (shippers).” (LSP8)
		Collaborative planning capabilities	Collaborative routing and scheduling Collaborative shipment planning	“If I face an urgent situation, an LSP sends a part of the load by air in advance and then ships the rest later.” (S7)

(continued)



Time-based taxonomy	Capability links	Preventive capabilities	Preventive actions	Example quote
Reactive dynamic capabilities	Internal	Adaptive process capabilities	Routing flexibility  Mode flexibility  Delivery flexibility  Fleet flexibility	<p>"If there is a delay and if the load is scheduled to be unloaded at the second or third address, the address will be modified. In the event of issues at a border gate, vehicles can be redirected to alternative gates and routes are modified." (LSP2)</p> <p>"When there is a queue at customs, we change the route from road to sea transportation. It is more rational to use road transportation for a journey from Hungary over Romania but we ship the load through Trieste port in those cases." (LSP7)</p> <p>"In case of late delivery, we split the entire load into two parts to make partial, but the customer does not know that. We reconsolidate the loads in Europe and deliver them accordingly." (LSP6)</p> <p>"When there is a possibility of delay, another vehicle is immediately supplied, and double drivers are arranged to avoid late delivery. We may also transfer loads to prioritized refrigerated vehicles if there is a queue at the border gates." (LSP7)</p> <p>"If we do not have a suitable vehicle in the region or if the vehicle could not unload on the specified date, we transfer that load to our warehouse that has long working hours for expediting." (LSP3)</p> <p>"There was a situation in Germany and there would be a delay. I immediately searched the warehouses in the region and made the connection and completed the transfer." (LSP8)</p> <p>"If I can only send 5 tons of material and the remaining order is to be delayed, my customer supplies the rest from the domestic market so that the production line does not stop." (S1)</p> <p>"When the carrier fails to arrive at our factory within 1 day, which is the maximum acceptable timeframe for us, we immediately seek a spot offer from an alternative shipping company." (S3)</p>
	Mixed	Adaptive network development capabilities	Node flexibility  Link flexibility	
	External	Adaptive sourcing capabilities	Maverick buying  Spot service buying	

**Source(s):** Authors' own work

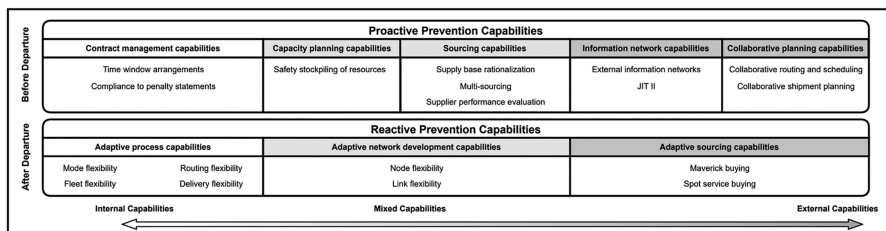
Table 2.

transit time offered to the customer via lead time buffering (suppressing possible delays and stating an extended lead time) or transfer the risk to the customer by explicitly declaring the likelihood of meeting the deadline. Findings also suggest that LSPs generate these lead time buffering capabilities over time with their increasing knowledge of their customers' deficiencies (e.g. operational tardiness). The same pattern is visible on the shippers' side as stated by shipper informants.

By agreeing on contract terms, regarding termination and penalties, the parties assure that they will comply with those statements. These terms underpin the assurance of refunds for shippers' loss, and also set parameters for the operations of LSPs. As our informant companies state, when the penalties are defined, they design the operations accordingly, to avoid incurring any penalty clauses. Various forms of monetary penalties are specified in contracts for late deliveries, including lost sales, overtime fees, or refunds for express delivery or spot freight price differentials.

**4.1.2 Capacity planning capabilities.** Capacity planning capability refers to a prevention capability that facilitates proactive safety stockpiling of goods and vehicles or other transportation equipment. Capacity planning capabilities can be developed both internally and through established external links. Our findings from shipper companies endorse the use of safety stock to enhance customer satisfaction and prevent late deliveries to business customers. As stated by our informant S1, the shippers keep safety stock in-house for high-turnover items, especially for emergencies and for their key customers. At any point in time, if the risk of delay increases, they can bypass the manufacturing phase and use finished good safety stock. On the LSP side, with buffer vehicles, LSPs can provide flexibility in unexpected setbacks. They utilize buffer trailer capacity by retaining empty vehicles at their facilities enhancing their ability to formulate contingency plans. Some informant LSPs also apply a similar strategy to human resources capacity, ensuring that the number of employees in logistics operations will be adequate to monitor the shippers' operations and to prevent poor performance and delays. Findings also demonstrate that with the external links, LSPs buffer the sub-contracted carriers' vehicles to sustain operations, especially if the sub-contractors guarantee timely delivery.

**4.1.3 Sourcing capabilities.** We observe the same pattern of internal and external preventive capabilities in sourcing. The ability to create formalized performance evaluation is an internal capability that enables the selection of suitable service providers and performance monitoring. Both shippers and LSPs utilize formalized performance evaluation systems to assess delivery performance indicators. As another internally constituted sourcing strategy, through supply base rationalization, LSPs eliminate carriers that cause delays from their supply base to prevent future late deliveries. In addition, we observe the external sourcing link-driven prevention capabilities. Shippers and LSPs prefer to apply multi-sourcing for logistics services. In this way, they proactively create



**Figure 1.**  
Proactive and reactive prevention capabilities of logistics service providers and shippers

Source(s): Author's own work

alternative approaches to cope with emergency cases in delay prevention through working with more than one service provider.

*4.1.4 Information network capabilities.* Information networks enable information ubiquity by establishing external information-sharing links among suppliers, buyers, and customers. SC members form external information networks for tracking and control, constituting a form of resource integration for value creation. Participant companies on both sides, emphasized the importance of updated and timely data sharing to take the necessary actions. Proper tracking systems can capture delays at any phase, and facilitate interventions to expedite processes or execution of alternative plans. As some of our LSP informants explained, the information networks enabled through the use of ERP or similar software allow the implementation of route updates and real-time truck tracking. Besides, social networks connect the shippers, LSPs, and drivers en route for information sharing (e.g. sharing photographs of border gate queues), which is beneficial for late delivery prevention.

To ensure a timely flow of information for customs, some LSPs also proactively facilitate early document shipment through fast courier services. Right after dispatch, essential freight documents are sent via a courier to reach the customs clearance points ahead of the vehicle. This ensures timely information flow and processing and prevents delays. Moreover, findings from informant companies reveal the utilization of JIT II. In this practice, an in-plant service provider employee works full-time in the shipper's firm to improve communication among parties to prevent any problems and resulting delays.

*4.1.5 Collaborative planning capabilities.* Findings revealed that SC members can proactively prevent late deliveries by utilizing their external link capabilities via collaboration among LSPs, shippers, and shippers' business customers. LSPs in contact with shippers can plan appointment-based dispatching and routing of vehicles. LSPs need to consider delivery/collection sequence, because non-sequentially loaded cargoes may result in an additional cost and loss of time, and thus, delayed deliveries. In this context, the shippers cooperate with LSPs to synchronize the warehouse freight handling schedules and to assign inbound and outbound deliveries. Collaborative efforts can minimize the total vehicle wait time before dispatch, and prevent late deliveries. For instance, during severe weather conditions, the most appropriate route is planned in cooperation with shippers before the transport, and the shippers plan the manufacturing phase accordingly, considering the extended transit times.

Within collaborative shipment planning, several actions are deployed in the form of split, direct, early, and permitted early shipments. Apart from these, shippers and their business customers plan delivery-to-stock (DTS) operations for buffering the prioritized stock-keeping units (SKUs). Collaborative split deliveries are employed by splitting the total load into two partials during the planning phase, to guarantee timely delivery of the shipment, with additional cost. Moreover, shippers and LSPs coordinate the shipment planning by formulating early vehicle sending plans. Joint action may also employ direct shipment plans with additional drivers or with full-truckload shipment planning for LTL freight. Shippers and LSPs engage in collaborative inventory and distribution planning while the supplies from various suppliers are directed to one of the LSPs' warehouses for consolidation. In this joint operation, the consolidated freight is directly shipped as a full truckload to the shipper's production facility.

Shippers and their business customers also benefit from their external link capability and engage in joint actions, such as permitted early shipments and delivery to stock. Findings showed that if permitted, these could act as a preventive measure for time risks. Permitted early shipments allow advancing outbound orders, without extra cost at destination points. Additionally, according to our informant companies, shippers, in collaboration with their business customers, engage in DTS operations for buffering prioritized SKUs.

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#### 4.2 Reactive prevention capabilities

*4.2.1 Adaptive process capability.* We define adaptive process capability as the adaptive changes in internal business processes as a reaction to the perceived delay risk. Mode, routing, fleet and delivery flexibilities are important components of adaptive process capability since transportation processes often require various adaptive actions. Mode flexibility is the ability to provide different modes of transport, while fleet flexibility is the ability to offer different vehicle types. Although mode selection decisions are made during supplier and mode selection stages, findings show that in practice, shippers may request immediate mode changes when timing concerns arise. Accordingly, during within or inter-mode changes, LSPs may pursue different routes to expedite delivery, indicating routing flexibility. For instance, our informants state that they may change routes to use different border gates to minimize the disruptive effects of operational contingencies.

LSPs also benefit from their fleet flexibility skills. To avoid long border waits, they transfer loads to refrigerated vehicles, or foreign license plate vehicles, both of which may have priority in border passes. Within the same context, after becoming aware of a delay, LSPs may immediately allocate additional vehicles for greater flexibility.

Similarly, to ensure delivery flexibility, when LSPs foresee a delay risk, to shorten the transit times or the total distances traveled, they split the load into two and later recombine these at a distribution center or plan for direct deliveries by bypassing other nodes in the planned route. For those direct deliveries, LSPs provide second drivers to prevent break-related halts during transportation.

*4.2.2 Adaptive network development capability.* We define adaptive network development capability within the context of node and link flexibility, referring to both internally and externally built prevention capabilities. We define node flexibility as the ability to utilize the existing nodes based on internal links and resources. For instance, if LSPs are unable to unload at the specified date, they utilize their warehouses that have fewer working hour restrictions. Thereby, LSPs position those transshipment points as new nodes through inland haulage. Similarly, problematic loads detected at customs are left in one of the LSPs' warehouses while the vehicle continues its journey, ensuring that the other loads are delivered on time.

SC link flexibility is the ability to create new external links in an adaptive way to prevent foreseen delays. For instance, after departure, a designated agency of informant LSP9 in the destination country makes contact with consignees to resolve customs problems before the vehicle arrives at the terminal, minimizing time spent at customs and preventing delays. In a similar line, LSPs cooperate with third-party warehouses to move the (potentially) delayed loads to these warehouses as a reactive strategy. Moreover, findings showed that, to solve problems and facilitate timely delivery, shippers might directly form an external link to customs authorities, and become involved in logistics operations themselves.

*4.2.3 Adaptive sourcing capabilities.* The findings indicate that companies establish external links through maverick and spot purchases, which helps them develop adaptive sourcing capabilities to prevent delays. Maverick material buying is a reactive resolution for business customers and shippers. In maverick buying, the firm bypasses authorized vendors, via off-contract buying. In the transportation phase, when the shippers and their business customers become aware of an impending late delivery, they tend to engage in maverick buying in small quantities from local, proximate suppliers to keep the business running as explained by our informants S7 and S1.

Another reactive option for shippers and LSPs is to purchase transport services from spot freight markets in which shipment price is generated by the market at the transaction time rather than long-term contracts with fixed prices and predetermined discounts. As in our informant companies, spot markets can be considered for excessive or immediate freight shipments. When the contracted LSP's vehicles are delayed, shippers urgently seek another

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spot carrier from those markets and seek reimbursement for the price differentials between contracted and spot delivery fees.

## 5. Discussion

Several capabilities are being utilized to prevent late delivery, and these preventive dynamic capabilities are formulated through the utilization of internal, and external links or a combination of both. In the proactive part, we realized that the way the parties shape their contracts could become an internal capability to prevent instances of delayed deliveries. This is because both shippers and LSPs take into account lead-time buffering and strategically establish the optimal delivery window. As another contractual action, the ability to comply with the established penalty statements can be entitled as a proactive preventive capability. That finding is in line with the literature stating that penalty costs are commonly introduced for late deliveries to reduce delivery time window variances as a strict policy by the partners (Guiffrida and Nagi, 2006; Roy and Sarker, 2021) and the management of contracts is essential for carrying out business operations, particularly in highly volatile circumstances (Cao *et al.*, 2021; Modgil *et al.*, 2022).

In proactive capacity planning, we see both internally and externally formulated capabilities. Companies facilitate a buffer stock of their resources enabling them to manage uncertainties and provide capacity flexibility (Gupta *et al.*, 2000; Graves and Willems, 2000; Sheffi and Rice, 2005). Besides, we found that human resource capacity planning appears as an important aspect of preventing delays which grants companies competitive advantages in line with the prior literature (Song and Huang, 2008; Jha *et al.*, 2017). In a similar vein, we see both internal and external actions building up proactive sourcing capabilities. Findings showed that formalized supplier selection and evaluation systems are essential for monitoring delivery performance and preventing delays. This aligns with the literature that emphasizes the importance of supplier performance evaluation for building a robust SC (Kannan and Tan, 2002; Prahinski and Benton, 2004). Additionally, supply-base rationalization actions constitute another form of internal preventive capability while multi-sourcing practices are formed with external links. These practices are discussed in the previous literature for risk mitigation strategies (Ivanov, 2021; Rehman and Ali, 2022).

Establishing external links for information networks is critical. As in the literature (Song *et al.*, 2022), the facilitation of information sharing occurs through structured and formal means such as software, or with unstructured and common means such as social media links. The informants also benefit from the JIT II procedure enabling joint operational planning, and preventing delays (Harvard Business School, 1994; Pragman, 1996; Barratt and Barratt, 2011). We also found that delivery-oriented actors collaborate with their logistics partners against the risk of delays as suggested by Giuffrida *et al.* (2021), resulting in collaborative planning capabilities. Parallel to the literature, we found that through detailed collaborative planning in routing and scheduling, members create mutually agreed control over the process, improve the plan's effectiveness, and prevent delays (Kilger *et al.*, 2015). Moreover, within collaborative shipment planning, several actions are deployed jointly in the form of split, direct, early, and permitted early shipments. Although early shipment is generally forbidden to avoid complexities and extra costs (Kanet and Christy, 1989; De *et al.*, 1993; Leu, 1996), findings showed that shippers execute permitted early shipments as their customers confirm shipment-free times. Moreover, through DTS, shippers deliver more than the ordered quantities, enabling stockpiling when there is a high likelihood of delay for the next planned shipment, thus optimizing urgent orders and cases of long lead times (e.g. Lütjen *et al.*, 2012).

On the reactive part, parallel to the literature (Dror and Trudeau, 1989; Naim *et al.*, 2006; Chang *et al.*, 2006; Engebretsen and Dauzère-Pérès, 2019) informant companies internally utilize mode, fleet, routing and delivery flexibility to adapt their processes following the

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flexibility definition of [Sheffi and Rice \(2005\)](#) and [Sandberg \(2021\)](#). For adaptive network capabilities, informants emphasize how they extend networks internally (i.e. through the facilities of the company) and externally (i.e. via an independent warehouse). In the literature, establishing links and nodes are acknowledged as common flexibility strategies to adapt to changes in transportation networks ([Rogerson et al., 2022](#)). Lastly, companies execute maverick and spot-buying activities adaptively with external links. These forms of sourcing are also entitled as off-contract buying in the literature ([Seifert et al., 2004](#); [Angeles and Nath, 2007](#); [Garrido, 2007](#); [Karjalainen et al., 2009](#); [Rothkopf and Pibernik, 2016](#)).

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## 6. Conclusions

### 6.1 Theoretical implications

In this study, we aim to reveal the DCs playing a facilitating role in preventing delays, thus providing timely delivery, as well as developing an understanding of how and when those capabilities are activated within the SC network. This enables a redefinition of concepts of reactive and proactive actions, which are generally discussed in the literature within the context of preparedness and adaptive capacity. Regarding transport services, we develop an action time framework and define the proactive capabilities enabled by actions taken before the transportation journey, even before a delay risk is evident. In contrast, we consider reactive capabilities as the ability to take action when the risk becomes apparent while the journey is in progress. Thus, the time state of the journey clearly defines the type of actions. Whilst in the literature, proactive perspectives dominate, our findings show that, in line with [Kamalahmadi and Parast \(2016\)](#), a considerable proportion of the preventive actions involve adaptive-reactive actions. As stated by [Altay and Pal \(2023\)](#), organizations acquire or build resources and capabilities depending on their prior experience with disruptions and their risk mitigation measures. Through the organizational learning processes, the participant companies have learned from previous delivery disruptions and developed proactive DCs over time. However, due to changing dynamics, reactive actions are also essential for providing flexibility and preventing late deliveries. Our findings also expand the growing body of the triple A-supply chain perspective ([Lee, 2004](#)) in which adaptability, agility, and alignment are combined and mutually reinforce one another and facilitate superior firm performance through different resource and process reconfigurations against delivery uncertainties ([Feizabadi et al., 2021](#)). In the context of this perspective, our research sheds light on the impact of late delivery and explores how organizational structures and strategic approaches, when aligned with the principles of adaptability, agility, and alignment, interact to influence both internal and external fit/congruence. This underscores the crucial role of synchronized reconfigurations in mitigating the effects of unexpected risks like late delivery and enhancing overall SC performance ([Paul et al., 2023](#)). The results of the research also strongly support the dimensions of responsiveness which is coupled with a reactive adjustment and conceivably proactive positioning of the business partners for future adjustment ([Richey et al., 2022](#)).

Drawing on the RBV and DC theories, we also discover that participant companies leverage their internal/external resources and links for developing proactive and reactive preventive capabilities. To prevent delays, the actors utilize their tangible (e.g. facilities-warehouses, multi-modal fleet, human resources) and intangible resources (e.g. planning and networking capabilities), which in turn, improves their performance and increases their competitive advantage via the unique capabilities in delay prevention. Additionally, in transport disruptions, value creation is generated through the interplay of resources and collaboration in line with the studies of [Hohenstein \(2022\)](#) and [Dovbischuk \(2022\)](#). Our study provides solid ground for showing how intercompany resource alignment serves as a source of resilience. Collaboration as an inter-firm resource refers to the joint work by sharing information, resources, risks, and rewards to create joint value by increasing responsiveness

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toward disruptions (Scholten and Schilder, 2015; Ralston *et al.*, 2020). This resource is acknowledged as “relational rent” for partners having huge interdependence to tackle unplanned situations and it helps to develop resilience capability (Chowdhury *et al.*, 2023). Firms develop external SC linkages as a source of capability with their SC members (e.g. Rungtusanatham *et al.*, 2003; Barratt and Barratt, 2011) to respond to disruptions (Cohen and Levinthal, 1990). Moreover, our findings support the existence of extended SE by revealing the links generated among shippers, business customers, LSPs, and other service providers in late delivery prevention. This is in line with the extended SD logic theory, where all parties become involved in service exchange and engage in resource integration activities, indicating a network structure (Lusch, 2011; Chandler and Vargo, 2011; Akaka *et al.*, 2013; Vargo and Lusch, 2017). Findings showed how companies benefit from their extended SE through value creation with parties other than predetermined transaction parties both in proactive capabilities (i.e. leveraging sub-contractor resources) and in reactive ones (i.e. third-party warehouses). In this regard, our findings extend these previous arguments, by providing further evidence for the contribution of those linkages to SC resilience.

### *6.2 Managerial implications*

With study, we examine the preventive capabilities and the enabling actions of both LSPs and shippers on a proactive and reactive basis. The companies should be aware of the advantages that prevention capabilities bring in terms of resilience and operational sustainability, leading to competitive advantage. They should adopt proactive approaches in their logistics planning process by considering all the resources, and the extra value potentially generated through collaborative efforts and integration of external resources. Also, companies should develop reactive capabilities to adapt to emergent risks in operations. They should reflect these perspectives in their resource planning processes, and carefully consider the required tangible and intangible resources in delay prevention.

This study provides an action time framework to guide practitioners in planning preventive actions, whether internally, externally through external links, or a combination of both. In this regard, realizing the existence of an extended SE and the benefits of other parties such as sub-contractors and their resources would be beneficial in the development of prevention capabilities. By understanding the network members' actions, it may be possible to establish a basis for further proactive and reactive collaborative action to mitigate delays. For instance, for late delivery prevention, it is important to consider how far SC members can provide the integrity of SC linkages by structuring formalized information-sharing mechanisms. We believe that with a greater network of formalized external links, it is possible to lower costs and improve on-time service levels.

The study also provides practitioners with insights into the environmental and social impacts of preventive capabilities to mitigate delays. Reactive capabilities often facilitate actions that impose higher costs and environmental challenges, such as utilizing direct shipments and opting for full truck shipments for urgent LTL deliveries. Contrarily, proactive capabilities impose early engagement and strategic planning of operations, shipment consolidation, and collaborative planning and routing fostering resource optimization, and reduction in greenhouse gas emissions. Hence, managers must establish networks and resources to enhance proactive prevention capabilities through the planning and development of an extended SE. Additionally, firms can recognize the implications of reactive prevention actions and utilize this awareness to shape their system ecosystem proactively. For instance, instead of resorting to maverick buying, companies can diversify their supply base by incorporating local suppliers. This strategic move empowers them to collaborate with local suppliers during urgent scenarios, fostering a more adaptive and responsive SC network.

### 6.3 Future research directions and limitations

We believe several research directions are available for late delivery prevention in B2B. To advance our understanding of late delivery prevention actions, future research can validate the proposed taxonomy, with quantitative or mixed design studies. Moreover, a focused dyadic approach can reveal deeper perspectives on how these actors interact in late delivery prevention. Interestingly, the study's findings point out an extended SE, involving multiple links among SC players in late delivery prevention. Therefore, it would be valuable to include a wider range of SC actors in the investigation.

As distinct findings may occur across industries, further study might be conducted with a broader reach, with other industries. In this way, it will be possible to gain insights into the industrial commonalities and distinctions regarding preventive DCs for delays.

Certain actions within the preventive framework might not currently align seamlessly with sustainable principles. Thus, there is an opportunity to bridge this gap and to examine how preventive capabilities contribute to broader sustainability objectives.

The current focus on timely delivery not only tackles immediate challenges but also propels logistics research into a new era of transformative advancements applicable to various future disruptions, including catastrophic ones.

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### Appendix

#### Interview protocol

##### *Introduction and demographics*

- (1) Introduction of interviewer and participant, study overview
- (2) Title and position of the participant; brief job history
- (3) Brief background on organization/industry

##### *Impacts of delays*

- (1) Customer reactions to delayed and deferred deliveries
- (2) The impact of delays on overall performance and business relations
- (3) Difficulties in accordance with delivery and deadlines



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*Prevention of delays*

- (1) The preventive actions and the enabled capabilities to mitigate late delivery
- (2) The timing of preventive actions (e.g. pre-transportation (in the planning phase) or during transportation when the risk is perceived)
- (3) The interdependent or collaborative actions in late delivery prevention

Mastering  
timely  
deliveries

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