

The deployment of theory in logistics research: A systematic literature review



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Background: Contemporary economic systems are characterised by the increasing volumes and flow of goods. This attribute highlights the importance of logistics wherein one of the key focus areas pertains to the movement and storage of freight at different geographical scales.

Objective: In the light of the importance of theory in research as well as the significance of geographical location in logistics processes, the objective of the paper is to analyse the extent, scope and gaps of theory utilisation in logistics-related research.

Method: The paper is based on a systematic literature review approach that encompassed 243 sources. The searches were conducted on the Internet database platforms using keywords such as logistics, logistics activities, geography of logistics activities, supply chain management, logistics theories and freight models.

Results: The relationship between logistics research and theory is ambiguous in that the majority of the research does not explicitly incorporate theory. Logistics particularly benefits from theory originating from other disciplines, such as economics, strategic management and marketing; however, the use of theories that originate from human geography has been limited in logistics research.

Conclusion: The drive to understand the movement and storage of freight at different scales has relevance to human geography, particularly the subdisciplines of transport geography and economic geography. It is therefore recommended that logistics research consider the theoretical frameworks originating from human geography.

Keywords: logistics; logistics theory; location theory; supply chain management; theoretical incidence.

Introduction

Contemporary economic systems are characterised by the increasing volumes and flows of goods. This brings to the fore the concept of logistics, which refers to '... the strategic management of movement, storage and information relating to materials, parts and finished goods in supply chains, through the stages of procurement, work in progress and final distribution' (Tilanus 1993:9). Karatas-Cetin and Denktas-Sakar (2013) note that logistics is a fertile focus area for empirical research. The analysis of the movement and storage of goods is of interest to various stakeholders, such as authorities, logistics practitioners and managers of logistics companies, towards informing the physical location of logistics facilities. Jirsák and Kršňáková (2015) reiterate that the location of logistics facilities and their relationships with other facilities is a strategic decision taken by each logistics company. This consideration shows the strategic importance of geographical location in the operations of logistics companies.

This paper is framed against the backdrop of the argument that theory is the foundation for quality research (Lewin 1945; Mentzer 2008). As opposed to being a tool that is used to generate predictions and laws, the paper understands theory as an analytical lens that is used to conceptualise a particular phenomenon (Mokhele & Geyer 2021), such as logistics. As noted by Liu and McKinnon (2019), theory is important in two interrelated ways. Firstly, theory systematically describes and/or explains patterns and events that occur in practice; secondly, the application of theory in empirical research is important for the theoretical improvement of a discipline (Liu & McKinnon 2019), which is logistics in the context of the paper. Kuhn and Hawkins (1963) add that a discipline can only mature and progress once a theory is developed and adequately used. In general, theories establish a systematic structure within which phenomena can be analysed and/or anticipated (Hunt 1991). The objective of the paper is thus to analyse the extent, scope and gaps of theory utilisation in logistics-related literature.

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Method

The paper is based on a systematic literature review approach. The search was conducted on the Internet database platforms (including Google Scholar) using keywords such as logistics, logistics activities, geography of logistics activities, supply chain management, logistics theories and freight models. A total of 243 sources were discovered by applying the aforesaid keywords. The sources were then perused to identify and analyse the scope, extent and gaps of the theoretical orientation used in logistics-related research.

Theory utilisation in logistics research

The link between logistics-related research and theory has been vague, leading several scholars (e.g. Defee, Williams & Randall 2010; Mentzer & Kahn 1995; Schmenner & Swink 1998; Stock 1997) to advocate for the increased use of theory in logistics and supply chain management research. Although these calls may have induced some theory-oriented research (Frankel et al. 2008), the gap still remains because most research does not specify the theory used and the degree to which it is utilised (Defee et al. 2010). Karatas-Cetin and Denktas-Sakar (2013) believe that the field of logistics requires more theory utilisation to ensure a solid foundation for the field's development. It is also important to note that the field of logistics has the potential to apply more theories from other disciplines (Karatas-Cetin & Denktas-Sakar 2013). The traditional perspective of logistics as movement, inventory control and storage activities has slowly dissipated, with logistics-oriented journals recognising logistics trends and the boundary-spanning nature of the discipline (Bowersox, Closs & Cooper 2002; Mentzer, Min & Michelle Bobbitt, 2004). According to Defee et al. (2010), this recognition ensures that a broader supply chain management perspective is acknowledged. Therefore, logistics theory should consider supply chain management, which encompasses numerous points of intersection with various disciplines such as marketing, strategic management and retail (Defee et al. 2010).

Research on the practical and methodological domains of logistics strongly contrasts the inadequacy of research on the theoretical domain. Defee et al. (2010) reinforce this position by noting that minimal research addresses the theoretical aspects of logistics and supply chain management. Mentzer and Kahn (1995) concur by asserting that the literature on logistics tends to shy away from developing, testing and/or applying theory. To determine the extent as well as the prevalence of theory utilisation in logistics research, Stock (1997), Spens and Kovács (2006), Defee et al. (2010) and Karatas-Cetin and Denktas-Sakar (2013) evaluated top logistics and supply chain management journals. Together, these scholars examined over three decades (from 1980 to 2012) of the literature pertaining to logistics theory.

Stock's (1997) aim was to highlight the benefits of integrating theories from other disciplines to aid logistics theory development and research. According to Stock (1997), the major benefits of this cross-fertilisation include learning from

others' experiences, gaining knowledge from established and extensively researched disciplines and the indirect benefit of integrating and establishing linkages between logistics and other disciplines. Stock (1997) analysed logistics-related publications in major journals between 1980 and 1996, which included the *International Journal of Logistics Management* (IJLM), the *International Journal of Physical Distribution & Logistics Management* (IJPDL), the *Journal of Business Logistics* (JBL) and the *Transportation Journal* (TJ). The importance of these journals is substantiated by Emmelhainz and Stock (1989) and Fawcett, Vallenga and Truitt (1995), who hail them as the most significant contributions to the logistics field.

It is noted in Stock's (1997) findings that most theories directed at addressing logistics-related issues between 1980 and 1996 were embedded in various disciplines. More specifically, the disciplines that have contributed to logistics theory include accounting, business and management, computing, economics, marketing, mathematics, philosophy, political science, psychology and sociology. Table 1 illustrates Stock's (1997) findings by linking the different theories with their corresponding disciplines.

Table 1 shows that logistics is not an isolated discipline; hence the importance of other disciplines should not be disregarded when identifying an appropriate theory. The integrated logistics foundations model, developed by Novack, Rinehart and Fawcett (1992), is a good example. The model establishes linkages between logistics and other organisational functional areas, and it acknowledges several logistics constructs concerning strategy, structure, capacity, movement, facilities, people and financial components. Essentially, the foundation for logistics research on constructs such as these is based on the findings of researchers and specialists with different disciplinary background. Thus, to address the constructs identified in the integrated logistics foundations model, Novack et al. (1992) consulted a number of theories originating from various disciplines, including economics, marketing, accounting and management. Other scholars (Carver & Scheier 1982; Dunn, Seaker & Waller 1994; Gadamar 1976; Helson 1964; Meredith et al. 1989; ed. Miller et al. 1987; Osgood & Tannenbaum 1955; Pisharodi & Langley 1990; Suppe 1977; Thibaut & Kelley 1959; Wilson & Woodside 1994) have contributed to the theoretical foundation of logistics by borrowing ideas from other disciplines (Stock 1997).

Stock (1997) adds that advancements in the field of logistics can be achieved without reinventing the wheel. Instead, theoretical knowledge gained from other disciplines could prove valuable to logistics research. Spens and Kovács (2006) recognise Stock's (1997) contribution and classify that research as one of a few that focuses on abductive research processes. Spens and Kovács's (2006) aim was to classify logistics research into inductive, deductive and abductive approaches for the purpose of establishing the trends and hierarchy of these approaches within the logistics field. Inductive research approaches can be defined as theory

TABLE 1: Logistics-related theories and their corresponding disciplines (1980–1996).

Theories	Discipline
Activity-based costing	Accounting
Asset valuation theory	
Management accounting techniques	
Transfer pricing	
Learning curve	Business and management
Logical flow models	
Expert systems	
Bureaucracy	Computing
Cost-benefit analysis	
Elasticity	Economics
Input-output analysis	
Least cost location theory	
Neoclassical theory	
Pareto efficiency	
Product life cycle theory	
Transaction cost economics	
Utility theory	
Weber's theory of the location of the firm	Marketing
Industrial buyer behaviour models	
Segmentation	
Vertical marketing systems	
Cybernetics	Mathematics
Graph theory	
Nomograms	
Queuing theory	
Hermeneutics	Philosophy
Likert scale	
Perception	
Logical empiricism	
Logical positivism	
Bureaucracy	Political science
Conflict theory	
Critical theory	
Power	
Systems theory	
Adaptation level theory	Psychology
Artificial intelligence	
Attribution theory	
Congruity theory	
Control theory	
Exchange theory	
Social exchange theory	
Bureaucracy	Sociology
Conflict theory	
Power	
Systems theory	

Source: Stock, J.R., 1997, 'Applying theories from other fields to logistics', *International Journal of Physical Distribution and Logistics Management* 27(9/10), 515–539. <https://doi.org/10.1108/09600039710188576>

development processes that revolve around the observation of specific events to which generalisations on phenomena are identified (Spens & Kovács 2006). Deductive research approaches test an established theory by applying it to specific events or phenomena (Hyde 2000). Lastly, abductive research provides the reasoning of events or phenomena (Lamma et al. 1999).

From the extensive research on business logistics, Spens and Kovács (2006) concluded that deductive research approaches have become prominent in logistics studies. To address this, their research analysed the use of numerous research approaches applied in business logistics publications (from

TABLE 2: Research approaches identified in three major journals (1998–2002).

Approaches	IJPDL		IJLM		JBL	
	N	%	N	%	N	%
Deductive	97	46.4	35	45.5	59	62.7
Inductive	20	9.6	3	3.9	4	4.3
Inductive and deductive	3	1.4	6	7.8	4	4.3
Abductive	1	0.5	2	2.6	3	3.2
Not applicable	88	42.1	31	40.3	24	25.5

Source: Adapted from Spens, K.M. & Kovács, G., 2006, 'A content analysis of research approaches in logistics research', *International Journal of Physical Distribution and Logistics Management* 36(5), 374–390. <https://doi.org/10.1108/09600030610676259>

IJPDL, International Journal of Physical Distribution & Logistics Management; IJLM, International Journal of Logistics Management; JBL, Journal of Business Logistics.

1998 to 2002) in the most significant logistics-oriented journals. These included the IJLM, the IJPDL and the JBL. The use of these journals is substantiated by Gibson, Hanna and Menachof (2002, 2004) and Gibson and Hanna (2003).

The findings of Spens and Kovács's (2006) study resulted in the categorisation of five research approaches used to address logistics-related issues, which comprise deductive, inductive, inductive and deductive, abductive and articles not applicable to their study. Table 2 illustrates Spens and Kovács's (2006) findings.

Table 2 reflects that between 1998 and 2002, the dominant approach to logistics research was deductive. However, Spens and Kovács (2006) note that inductive and abductive approaches are gaining momentum. It is also highlighted that many publications are inclined to report inductive and abductive approaches as deductive, bringing forth misunderstandings within the discipline. This is portrayed by some researchers not questioning the applicability of deductive approaches within their research, and the validity and reliability of research is being put into question when nondeductive research is depicted as deductive (Spens & Kovács 2006). This calls for the embedding of rigour into logistics research for both qualitative (Ellram 1996; Golcic et al. 2002; Halldorsson & Aastrup 2003) and quantitative studies (Garver & Mentzer 1999; Keller, Lynch & Ellinger 2002; Mentzer & Flint 1997).

Although Spens and Kovács's (2006) study is of great relevance to the logistics discipline, Defee et al. (2010) indicate that the study was directed at addressing the methodological aspects and not the theoretical domain of logistics. Defee et al.'s (2010) aim was to determine the extent of use or prominence of theories used in logistics and supply chain management research. The research approach involved a comprehensive review of the literature on logistics and supply chain management publications from 2004 to 2009. This included 683 articles in major journals, namely the *Journal of Supply Chain Management* (JSCM), IJPDL, the IJLM, JBL and TJ. The use of these journals is substantiated by the work of Gibson and Hanna (2003), Carter et al. (2009) and Menachof et al. (2009).

Defee et al. (2010) followed a similar approach to Brown and Dant (2009), where the unit of analysis was

TABLE 3: Twenty-five most frequently identified theories (2004–2009).

Theory	Theoretical incidents (%)
Transaction cost economics	10.4
Resource-based view	8.6
Porter's framework	3.0
Contingency theory	2.5
Resource dependence theory	2.5
Bullwhip effect	2.3
Agency theory	1.9
Social exchange theory	1.9
Game theory	1.8
Core competency	1.6
General systems theory	1.6
Social network theory	1.6
General inventory theory	1.4
Relationship marketing	1.4
Communication theory	1.2
Market orientation	1.2
Organisational learning	1.2
Risk management	1.2
Alliance	1.1
Disconfirmation theory	1.1
Institutional theory	1.1
Organisational theory	1.1
Political economy	1.1
Supply chain risk	1.1
Total cost	1.1

Source: Adapted from Defee, C.C., Williams, B. & Randall, W.S., 2010, 'An inventory of theory in logistics and SCM research', *International Journal of Logistics Management* 21(3), 404–489. <https://doi.org/10.1108/09574091011089817>

theoretical incidence. Incidents were recorded by cataloguing each theory used in a logistics-related or supply chain management-related study. Of the 683 articles reviewed, 181 theories were identified. Interestingly, only 25 of these theories represented 54.8% of the total theoretical incidents. Table 3 displays Defee et al.'s (2010) findings by identifying the 25 most frequently used theories in the literature and the weight (in percentage) of their corresponding incidents.

Table 3 shows that transaction cost economics (TCE) and resource-based view (RBV) constitute the most theoretical incidents. The two theories together represent nearly 20% of theory used during the 5-year sample period of the study. Transaction cost economics incidents alone represent over 10% of theory use in logistics-related and supply chain management-related literature. Transaction cost economics theory was founded by Coase (1937) and extended by Williamson (1975). The theory depicts the behaviour of a firm subject to the value generated from unique assets. The political environment goes hand in hand with TCE theory; as firms may reap the benefits when the correct governance structures are implemented (Defee et al. 2010). Transaction cost economics has been extensively applied in numerous disciplines. Some of the notable uses of this theory have been identifying and explaining supplier selection (Hsu et al. 2006), modes of foreign market entry (Anderson & Gatignon 1986), channel structure (John & Weitz 1988), collaborative relationships (Glenn Richey & Autry 2009), integration (Chen, Daugherty & Landry 2009) and interfirm governance (Williamson 1979).

The RBV theory is the second-most used, which accounts for 8.6% of the theoretical incidents. The foundation for the theory was laid by Penrose (1959) and Wernerfelt (1984) and significantly gained recognition through the work of Barney (1991). The premise of the RBV theory revolves around unique, rare, nonsubstitutable and valuable resources possessed by a firm, which ensure competitive advantage (Defee et al. 2010). Numerous scholars have branched the theory to accommodate a more refined theoretical foundation for other disciplines. Extensions of the theory have been used to establish the capabilities theory (Helfat & Peteraf 2003), dynamic capabilities view (Helfat & Peteraf 2003), core competency view (Pralhad & Hamel 1990) and firm knowledge base view (Grant 1996).

The number of theoretical incidents significantly decreases after TCE and RBV theories, wherein Porter's framework comprises 3% of the theoretical incidents, whilst contingency theory and resource dependency each make up 2.5%.

Defee et al. (2010) further dissected the findings by compartmentalising the identified theories into 13 categories. One of these categories, labelled 'other', includes theories containing too few theoretical incidents to be reported on independently. Table 4 illustrates all theories identified in Defee et al.'s (2010) study corresponding to their theoretical categories. All theories in their respective categories are listed from the most to least used.

Table 5 illustrates the frequency of theoretical incidents in major logistics-related and supply chain management-related journals corresponding to their respective theoretical categories.

Table 5 shows that competitive and microeconomic categories represent the most theoretical incidents in logistics and supply chain management literature across the five major journals. Competitive theory, which includes RBV, appears to be the most frequently used theory in all journals but one. Defee et al. (2010) elaborate that theories falling under competitive theory are derivatives of the strategic management discipline used to explicate phenomena linked to logistics and supply chain management. The connection between strategic management and logistics and supply chain management reinforces Stock's (1997) notion of borrowing theories from other disciplines to deal with multifirm issues.

Microeconomic theory, which includes TCE, is ranked the second-most used theoretical category on average across all sample journals. It is said that economic theories are one of the most recognised and established theories within social sciences and have laid the theoretical foundation for what constitutes the firm (Coase 1937), management practice (Drucker 1954), outsourcing (Maltz 1994; Williamson 2008), marketing channels (Rindfleisch & Heide 1997), distribution (Shaw 1916) and foreign market entry (Anderson & Gatignon 1986; Madhok 1997). The premise of microeconomic theory is on the observation of market or industry trends and how they influence a firm's or an

TABLE 4: Categorisation of theories identified.

Theoretical categories	Theories
Competitive	RBV, Porter's framework, contingency theory, core competency, knowledge-based view, relational view dynamic capabilities, resource advantage theory, supply chain orientation, structure-conduct-performance, natural resource-based view, strategy-structure-performance, B-to-B relationship theory, cluster theory, competitive advantage, information-based logistics orientation, market-based logistics orientation, modularity theory, process orientation, process-based logistics orientation, strategic behaviour theory, supply-demand strategy matrix, theory of production competence, time-based competition theory, work design.
Microeconomic	TCE, resource dependence theory, agency theory, game theory, principal-agent theory, fuzzy set theory, utility theory, Williamson's failure framework, coordination cost theory, diversification, transfer pricing theory.
Systems	Bullwhip effect, general systems theory, risk management, supply chain risk, total cost, network theory, total cost of ownership, network optimisation, theory of constraints, business process systems engineering, input-output choice, interorganisational conditions, multiple attribute utility theory, normal accident theory, pricing, system dynamics, 3D concurrent engineering theory.
Marketing	Relationship marketing, market orientation, alliance disconfirmation theory, collaboration customer orientation, collaborative advantage paradigm, dependence theory, asset specificity, buyer-supplier relationships, comparative advantage, competitor orientation, consumer-based brand equity, cost orientation, customer focus, exchange theory, information search, internal marketing, means-end theory, reciprocity theory, relationship management, relationship orientation, strategic choice, substitute, delay, leave, theory of channel behaviour, trust theory.
Theories of organisations	Organisational learning, organisational theory, coordination theory, interdependence theory, integration, Lewin's three-phase force field, manager behaviour, organisational citizenship behaviour, stakeholder influence, attraction theory, collaborative supply chain framework, competing values theory, configuration, constituency-based theory, inter-organisational relationship theory, managerial control, organisational change framework, organisation response to disaster, social identity, strategic orientation, theory of organisational design, value congruence.
Other social psychological or sociological	Communication theory, theory of reasoned action, theory of planned behaviour, actors approach, behavioural decision theory, conflict theory, consumer culture theory, cultural differences, employee turnover, human communication theory, media richness theory, relational theory, social penetration theory, social resource theory, theory of choice, theory of prejudices, training.
Social exchange	Social exchange theory, social network theory, social capital, balance theory, firm-specific factors.
Inventory	General inventory theory, EOQ, periodic review, portfolio effect, continuous review, square root law.
Institutional	Institutional theory, political economy, labour theory, ecocentric view, social costs, social welfare.
Decision	Auction theory, decision theory, vehicle routing problem, optimisation, negotiation theory, supplier selection decision theory, centralised decision theory, cost minimisation, decentralised decision theory, decision support.
Innovation	Diffusion of innovation, innovation adoption, innovation theory, creative distraction, innovation adoption, theory of logistics innovation.
Psychological theories for individuals	Power dependence, attribution theory, cognitive dissonance, developmental theory, rational choice theory, response to disaster.
Other	Corporate social responsibility, information processing, measurement theory, activity-based costing, chaos theory, adaptive cycle theory, bonding theory, causal chain approach, crime displacement theory, free cash flow model, individual effects model, information quality theory, integrated strategic positioning process, logistics social responsibility, path-goal theory, population ecology, probabilistic choice framework, product-process matrix, purchasing social responsibility, risk assessment framework, situational crime prevention theory, target costing theory, technology-market positioning portfolio, theory of insurance, unified integration model.

Source: Adapted from Defee, C.C., Williams, B. & Randall, W.S., 2010, 'An inventory of theory in logistics and SCM research', *International Journal of Logistics Management* 21(3), 404–489. <https://doi.org/10.1108/09574091011089817>

RBV, resource-based view; TCE, transaction cost economics; EOQ, economic order quantity.

TABLE 5: Frequency of theoretical incidents by journal (2004–2009).

Theoretical categories	IJLM (%)	IJPDLM (%)	JBL (%)	JSCM (%)	TJ (%)
Competitive	22.7	17.7	27.0	29.7	15.1
Microeconomic	9.1	15.1	18.9	30.4	11.0
Systems	13.6	16.1	9.0	4.7	13.7
Marketing	4.5	11.5	9.9	6.1	13.7
Theories of organisations	18.2	7.3	9.0	3.4	6.8
Other social, psychological or sociological	2.3	6.8	0.0	7.4	5.5
Social exchange	2.3	1.0	6.3	9.5	2.7
Inventory	4.5	6.3	7.2	0.0	4.1
Institutional	2.3	2.1	0.9	1.4	12.3
Decision	0.0	4.2	2.7	4.1	4.1
Innovation	2.3	2.1	1.8	0.0	6.8
Psychological theories for individuals	4.5	3.6	0.0	0.0	0.0
Other	13.6	6.3	7.2	3.4	4.1

Source: Defee, C.C., Williams, B. & Randall, W.S., 2010, 'An inventory of theory in logistics and SCM research', *International Journal of Logistics Management* 21(3), 404–489. <https://doi.org/10.1108/09574091011089817>

IJLM, International Journal of Logistics Management; IJPDLM, International Journal of Physical Distribution & Logistics Management; JBL, Journal of Business Logistics; JSCM, Journal of Supply Chain Management; TJ, Transportation Journal.

individual's decision-making pertaining to the allocation of scarce and/or limited resources (Dimand 2008). The unit of analysis for microeconomic theory is also the firm (Defee et al. 2010).

On average, systems and marketing theories are the third-most and fourth-most used theories across major journals. Marketing channels' theories have been a great asset to logistics and supply chain management, as they have

sprouted much thought and discussion on and within these disciplines (Bucklin 1965; Cadotte & Stern 1979; Gaski 1984). It is also no surprise that systems theory is one of the most used, as the complexity of supply chains is arguably comprehensively dissected through a system view. Notably, the use of marketing and systems theory is more evident in the TJ. It is probable that this is because of the inclination of measuring the relationships between logistics functional areas and transportation. Theoretical frameworks aid the decision-making accompanying the optimisation of costs for different functions against the total cost (Defee et al. 2010).

Table 6 further breaks down Defee et al.'s (2010) findings. Of the 683 articles examined across the sample journals, 389 articles were on supply chain management and 294 on logistics. About 43% of all articles were thus logistics oriented. Defee et al. (2010) also note that theory use was more prevalent in supply chain management-related articles than those of logistics. Table 6 illustrates the accumulated percentage of both logistics-related and supply chain management-related articles under the identified categories.

The findings in Table 6 show that competitive theories are the most prevalent in both logistics and supply chain management research. The ranking of theoretical categories for logistics indicates that systems theory is the second-most used, with microeconomics at a close third.

TABLE 6: Breakdown of theoretical categories by logistics and supply chain management (2004–2009).

Theoretical categories	Logistics (%)	SCM (%)
Competitive	21.0	23.5
Microeconomic	11.9	21.9
Systems	12.5	10.7
Marketing	11.4	8.7
Theories of organisations	8.0	7.1
Other social, psychological or sociological	2.8	6.1
Social exchange	2.3	5.6
Inventory	10.8	1.5
Institutional	6.3	1.5
Decision	4.5	3.1
Innovation	2.8	1.8
Psychological theories for individuals	1.1	1.8
Other	4.5	6.6

Source: Adapted from Defee, C.C., Williams, B. & Randall, W.S., 2010, 'An inventory of theory in logistics and SCM research', *International Journal of Logistics Management* 21(3), 404–489. <https://doi.org/10.1108/09574091011089817>

SCM, supply chain management.

However, microeconomic theory is more dominant in supply chain management-related research, with systems theory being third.

Defee et al. (2010) note that the manifestation of theory in logistics-related and supply chain management-related research is more prevalent than that of no theory. Around 53.3% of the articles explicitly mentioned the use of theory. Thus, Defee et al. (2010) believe that the inclination of theory use in logistics and supply chain management research has steadily improved. However, the question is whether 53.3% is adequate, as Defee et al. (2010) argue that there is more room to expand theory application in logistics and supply chain management.

The research findings illustrate that TCE and RBV are the most prevalent theories used in logistics and supply chain management research: they accounted for 19% of the total theoretical incidents. Statistics indicate that 40% of the theoretical incidents were associated with the two theoretical categories of competitive and microeconomic theory. Defee et al. (2010) argue that, although these theories are dominant, they are not necessarily overused because they continue to deliver valuable findings to the logistics and supply chain management disciplines. However, a question remains on whether other theoretical categories are underutilised and whether the scope of logistics and supply chain management disciplines is being limited because of the dominant use of competitive and microeconomic theory. Defee et al. (2010) add that it is still possible for other theoretical categories to significantly contribute to logistics and supply chain management and potentially lay the foundation for future cohesive theory.

Karatas-Cetin and Denktas-Sakar's (2013) research built on the work of Brown and Dant (2009) and Defee et al. (2010), wherein the unit of analysis was theoretical incidence. The research evaluated the most prominent logistics theories and their associated disciplines. The analysis covered 974 logistics-oriented publications from 2001 to 2012 in three major journals, namely the JBL, the IJLM and the IJPDLM.

TABLE 7: Breakdown of theoretical categories by logistics and supply chain management (2001–2012).

Theory	Disciplines	JBL	IJLM	IJPDLM	Total
Eighteen most frequently identified theories (2001–2012)					
1. Resource-based view	Strategic management	23	11	18	52
2. Transaction cost economics	Economics	10	7	16	33
3. System theory	Systems	1	5	13	19
4. General inventory theory	Inventory	9	3	7	19
5. Relational view	Strategic management	4	2	10	16
6. Relationship marketing	Marketing	6	4	6	16
7. Social exchange theory	Sociology	6	3	3	12
8. Network theory	Marketing	2	3	7	12
9. Relationship management	Marketing	3	2	6	11
10. Innovation	Theories of organisation	2	3	6	11
11. Value chain	Strategic management	0	3	7	10
12. Competitive advantage or strategy	Strategic management	1	1	8	10
13. Risk management	Risk	1	7	2	10
14. Contingency theory	Theories of organisation	4	1	4	9
15. Collaboration theory	Marketing	2	6	1	9
16. Interorganisational relationship theory	Theories of organisation	5	3	1	9
17. Integration theory	Strategic management	4	3	2	9
18. Culture and organisational culture	Theories of organisation	3	1	5	9

Source: Karatas-Cetin, C. & Denktas-Sakar, G., 2013, 'Logistics research beyond 2000: Theory, method and relevance', *Asian Journal of Shipping and Logistics* 29(2), 125–144. <https://doi.org/10.1016/j.ajsl.2013.08.001>

JBL, Journal of Business Logistics; IJLM, International Journal of Logistics Management; IJPDLM, International Journal of Physical Distribution & Logistics Management.

The importance of these journals has been substantiated as the most significant contributions in the field of logistics in the work of Mentzer and Kahn (1995), Stock (1997) and Spens and Kovács (2006). It is important to note the overlap in sample years between the studies of Karatas-Cetin and Denktas-Sakar (2013) and Defee et al. (2010).

Karatas-Cetin and Denktas-Sakar (2013) explain that the determination, for the most part, of what exact logistics-related theory was used and their corresponding disciplines was explicit. However, a number of outliers did not establish a clear theoretical link and base discipline (Karatas-Cetin & Denktas-Sakar 2013). The classification of theory into individual categories and subject disciplines took cognisance of Stock (1997) and Defee et al.'s (2010) work discussed earlier in the paper. The distinct differences in theory classification by Karatas-Cetin and Denktas-Sakar (2013) pertain to identifying and linking logistics-related theory to their corresponding disciplines. To demonstrate, Defee et al. (2010) classified RBV, resource advantage theory and competitive advantage under the category of competitive theory, whilst Karatas-Cetin and Denktas-Sakar (2013) believe they are appropriate under the strategic management discipline. Although the classification might differ, the findings are similar. Table 7 illustrates Karatas-Cetin and Denktas-Sakar's (2013) findings by showing the number of theoretical incidents in logistics-related literature, found in the three major journals of JBL, IJLM and IJPDLM, pertaining to the 18 frequently-used theories (between 2001 and 2012) and their corresponding base disciplines. The findings show that RBV and TCE are the most used theories in logistics research, also identified by Defee et al. (2010). The disciplines of

strategic management, marketing, economics and theory of organisation represent over 65% of all identified theoretical incidents. The findings reinforce Stock's (1997) notion of theory 'borrowing' from other disciplines.

Although the findings of Defee et al. (2010) and Karatas-Cetin and Denktas-Sakar (2013) are largely similar, there are some differences regarding the ranking of theory. Karatas-Cetin and Denktas-Sakar (2013) found that the RBV theory was the most prevalent, followed by TCE. It is important to note that Defee et al. (2010) evaluated two more journals, including the TJ and the JSCM, over a shorter period. Karatas-Cetin and Denktas-Sakar's (2013) study sheds light on the limitations of logistics literature. Firstly, numerous articles reviewed did not incorporate a theoretical position. Secondly, triangulation proved useful only in some studies. Triangulation is only applicable when all methods are defined and the analysis and findings are present (Golicic & Davis 2012). Lastly, Karatas-Cetin and Denktas-Sakar (2013) believe that it is possible for data to be flawed to some degree as the counting and classification or categorisation of numerous sources might be misrepresented as a result of data portrayed in the work of scholars being collected multiple times. Karatas-Cetin and Denktas-Sakar (2013) believe that their study would influence and educate other scholars on the importance and relevance of theory in logistics.

Gaps and possible expansion of the current theoretical orientation

As evident in the paper, logistics theory is mostly based on economics, strategic management, marketing and organisational theory. Contrariwise, Hesse (2007) believes that logistics has long been undermined in the discourse of human geography. In the light of the importance of geographical location highlighted in the introduction, it is surprising that human geography (particularly the subdisciplines of transport geography and economic geography) and allied disciplines are underrated as spatial development has significantly benefitted from them throughout the course of history (Braudel 1992). Major location theories, including industrial location theory, market network and central place theory (Hesse 2007), have been established through regional economics and economic geography. Location theory has also been linked to other areas such as trade theory and industrial organisation. Its origin can be traced to the classical location theory established when economists discovered imperative relationships between economic processes and specific locations (Fengru & Guitang 2019). The application of location theory has arguably been beneficial because it allows for the identification of concerns to which plans can be developed to improve social welfare, ensure environmental sustainability and stimulate economic growth (Murray 2009). The locus of location theory is set in the geographic dimension of economic decision-making affecting the behaviour of firms. The value of such theory is evident in its scope as not only are the interactive individual spatial decisions of firms analysed, but also the geographical patterns, trends and structures resulting from those decisions

TABLE 8: The evolution of location theory.

Theorists	Years	Theory
Von Thünen	1826	Agricultural location theory
Weber	1909	Industrial location theory
Hotelling	1929	Market area analysis
Christaller	1933	Central place theory
Losch	1944	Economic location theory (An extension of central place theory)
Perroux	1955	Growth pole theory
The transition from classic to modern interpretations of location theory (post-World War 2)		
Isard	1956	Regional science
Moses	1958	Classic theory integrating location and production theory
Smith	1971	Builds on Weber's industrial location theory
Krugman	1991	New economic geography

Source: Adapted from Krugman (1998), Jakubicek (2010), Gavrilă-Paven and Bele (2017), Fengru and Guitang (2019)

(Gorter & Nijkamp 2001). Location theory has been branched and reinterpreted into numerous variant theories through the centuries (Table 8).

The concept of distribution has been undervalued in theory and is described as a 'missing link' by Hesse (2007). The interest in the concept is difficult to come by in the literature but has the potential to be rekindled with the growing recognition and importance of logistics (Hall, Hesse & Rodrigue 2006; Hesse & Rodrigue 2004). Coe et al. (2004) argue that directing research towards spatial development, logistics networks and logistics systems would be beneficial to the production of networks on a global scale. In addition, Hesse (2007) notes that the entirety of the value-added chain would include a comprehensive evaluation and analysis. The potential progression of this could amplify the scientific community's cognisance of flows and nodes, transport and mobility and networks (Castells 2010; Crang 2002).

Logistics systems and physical distribution have significantly evolved over the years. Hesse (2007) highlights that despite the significant value logistics systems and physical distribution bring to the restructuring of spatial location and spatial relation systems, it is clear that it has been glossed over. It is only fair that logistics is recognised for its complexity, development dynamics and structural significance. Its place in research under the human geography canon is justified, as most research reported on in the paper is aligned with the technical and financial aspects of logistics (Hesse 2007).

Of the limited studies on the use of location theory in logistics, Qiao, Zhang and Wu (2010) and Dai and Yang (2013) present valuable contributions through the use of the growth pole theory. Dai and Yang's (2013) study indicates that the growth pole theory can be used to stimulate regional economic growth through the establishment of logistics parks. The findings indicate that logistics parks have the potential to harness the growth pole's dominance, multiplier and polarisation-diffusion effects to establish relationships between economic sectors. The inherent benefits of this include the strengthening of commercial circulation, stimulating regional economic development, enriching and

improving urban logistics, enhancing investment and offering more employment opportunities (Dai & Yang 2013).

Using the study area of Huailai in China, Qiao et al. (2010) assess the use of the growth pole theory to improve the efficiency of transport and ensure environmental protection. Their research establishes the need for optimal logistics information platforms to ensure regional logistics management and operations. The logistic information platforms tie into the standardising of logistics infrastructure and information and the order and structure of processes associated with logistics information technology within a designated region (Xu & Sun 2007). The verdict is that these platforms promote resource integration on a regional scale, which in turn reduces the operating costs and increases the flow of goods and user efficiency, and that trade management is supported by decision-making services. Not only does growth pole's diffusion and polarisation provide a scientific foundation for local socioeconomic development but it is also oriented towards an all-inclusive development approach (Qiao et al. 2010).

Conclusion

The relationship between logistics research and theory has arguably been ambiguous, leading to several scholars advocating for the increased utilisation of theory in the field of logistics. The call has brought forth more practical research (Giunipero et al. 2008; Grawe 2009; Keller & Ozment 2009; Miyazaki, Phillips & Phillips 1999; Selviaridis & Spring 2007; Stock 2001; Stock & Broadus 2006; Stock & Luhrsén 1993; Williams & Tokar 2008) and methodological research (Ashenbaum, Maltz & Rabinovich 2005; Craighead et al. 2007; Menachof et al. 2009; Spens & Kovács 2006) to the table, albeit some research still disregards theory. The objective of the paper was to analyse the extent, scope and gaps of theory utilisation in logistics-related research. Defee et al.'s (2010) study identified that only 43% of theory-oriented supply chain management and logistics literature focused specifically on logistics, whilst 57% focused on supply chain management. Karatas-Cetin and Denktas-Sakar's (2013) analysis of supply chain and logistics research identified only 48% of the literature to be theory-inclined. This illustrates that over 50% of logistics research does not explicitly incorporate theory. It is therefore argued that the theoretical basis of logistics-related research requires improvement. Although Swanson et al. (2017) identified an increase in theory-based research, the growth is largely due to the wide utilisation of a few theories, such as transaction cost economies and resource-based view.

The literature concurs that the use of theory can significantly contribute towards the advancement of knowledge within the logistics discipline. Logistics currently benefits from the theories originating from more established disciplines, drawing mainly from the realms of economics, strategic management, marketing and organisational theory (Defee et al. 2010; Karatas-Cetin & Denktas-Sakar 2013). The composition of logistics-related theory not only demonstrates

the inclination to draw from theories of other disciplines but also reflects a gap in the avenue logistics research is predominantly directed. Swanson et al. (2017) argue that there is a room to further apply theories from sociology, psychology, political science, computer science and philosophy.

Against this backdrop, Hesse (2007) believes that logistics and freight transport have long been undermined in human geography. The findings indicate that major logistics-oriented journals, including the JSCM, the IJPDLM, the IJLM, the JBL and the TJ, rarely publish logistics-related theory that emanates from human geography, particularly the subdisciplines of transport geography and economic geography. Although they offer great potential, location theories have surprisingly been undervalued in logistics research (Fengru & Guitang 2019). Given that more borrowing is plausible (Swanson et al. 2017), human geography could be further explored towards widening the theoretical lens of logistics-related research, particularly with regard to analysing the locational patterns of logistics facilities.

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Competing interests

The authors declare no conflict of interest.

Authors' contributions

M.M. was the supervisor for the research conducted by B.F-H. M.M. conceptualised and drafted the manuscript based on the research of B.F-H.

Ethical considerations

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