Service supply chain management: a behavioural operations perspective

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Abstract

Purpose – The purpose of this paper is to provide an overview of the evolution of service supply chain management from a behavioural operations perspective, pointing out future research directions for scholars.

Design/methodology/approach – This study searched five databases for relevant literature published between 2009 and 2018, selecting 64 papers for this review. The selected literature was categorised according to two dimensions: a service supply chain link perspective and a behavioural factor perspective. Comparative analysis was used to identify gaps in the literature, and five future research agendas were proposed.

Findings – In terms of the perspective of service supply chain link, extant literature primarily focuses on service supply and service co-ordination management, and less on service demand and integration management. In terms of the behavioural factor's perspective, most focus on classic behaviour factors, with less attention paid to emerging behaviour factors. This paper thus proposes five research agendas: demand-oriented management and integrated supply chain-oriented behavioural research; broadening the understanding of the scope of behavioural operations; integrating the latest backgrounds and trends of service industry into the research; greater attention to behavioural operations in service sub-industries; and multimethod combination is encouraged to be used to dig into the interesting research problems.

Originality/value – This study constitutes the first systematic review of service supply chain research from a behavioural perspective. By categorising the literature into two dimensions, the state of existing research is evaluated with an eye towards future research avenues.

Keywords Service industry, Service supply chain management, Behavioural operations, Research agenda

Paper type Research paper

1. Introduction

Service has become a significant driving force in the development of the world economy (Wang *et al.*, 2015). As a result of fierce market competition, many manufacturing companies have gradually expanded their product range from tangible products to value-added services in order to survive. This trend is called "product servitization" (Sousa and da Silveira, 2019). In this context, service has been introduced to different research fields, such as service marketing, service operation management and service supply chains. According to Youngdahl and Loomba (2000), in traditional supply chain management, each stage of the supply chain presents managers with opportunities to incorporate service roles and improve supply chain effectiveness, thereby increasing customer intimacy and attracting greater attention.

Many scholars have explored the service supply chain from different perspectives, producing many interesting studies. Wang *et al.* (2015) have reviewed the operational models in the service supply chain, covering a variety of hot topics, including service procurement, service outsourcing, contract design, pricing and quality decision making.

However, considering the complex interactions and dynamic behaviour factors among the service supply chain members, some of the premises of the extant literature need to be revised, because traditional research in operations management (OM) focused on providing tools and recipes to help decision makers with tactical operational decisions (Nagarajan and Sošić, 2008), and the neglect of the behaviour results in decision bias (Chen and Krajbich, 2018). Indeed, decision makers do not simply pursue the optimisation of their own material payoff, but the "most satisfactory result" in accordance with social preferences. It is important to note that behavioural economics is not a negation of traditional economics, but an amendment – the aim of which is to make academic research better serve practice (Croson *et al.*, 2013; Thaler, 2016).

Scholars have carried out in-depth discussions in the independent research fields, namely behaviour management and service supply chain management (SSCM). As service depends heavily on human involvement (Boshoff and Leong, 1998; Sengupta *et al.*, 2006), therefore, it is necessary to consider the impact of individual behaviour on the traditional operational setting in the service industry (Bendoly *et al.*, 2006). Due to the character of service industry, such as intangibility, heterogeneity and customer participation, the decision-making backgrounds in the service supply chain are diverse. An increasing number of scholars have been paying attention to the cross-disciplinary direction in recent years – that is, SSCM research from a behavioural operations perspective. It refers to introducing behavioural factors in the research situation of SSCM, and the optimal decisions will be affected after considering various behaviours of supply chain members (Liu and Wang, 2015; Liu, Wang, Shen, Yan and Wei, 2018; Dan *et al.*, 2018). The objective of this study is to review the extant literature of SSCM from the perspective of behavioural operations in order to identify the gaps in the research and agendas for future research, thereby facilitating the understanding of the development and potential of this cross-disciplinary research area.

2. Research method and literature selection
2.1 Service supply chain management (SSCM)
As the service industry grew in importance, scholars began integrating the impact of service into the traditional manufacturing supply chain, resulting in the service supply chain (Anderson and Morrice, 2000). Scholars initially regarded the service supply chain as a complement to the manufacturing supply chain. de Waart and Kemper (2004) defined the service supply chain as all processes and activities involved in the planning, movement and repair of materials to enable after-sales support of the company's products. Based on production-based supply chains – including Hewlett-Packard, SCOR and GSCF models – Ellram *et al.* (2004) constructed a SCC management framework and identified the main service functions. With the deepening of research, scholars have gradually recognised the characteristics of service and the differences between service supply and manufacturing supply chains (Sengupta *et al.*, 2006; Baltacioglu *et al.*, 2007; Liu, 2007; Ivanov *et al.*, 2018). Sengupta *et al.* (2006) argued that service supply chains differ in terms of the standardised and centralised procedures and controls in manufacturing supply chains, with many supply chain decisions made locally and greater variation and output uncertainty resulting from the human involvement in service supply chains. Liu (2007) differentiated between service and manufacturing supply chains based on supply chain structure, product form, stability and supply chain co-ordination (Table I). Ivanov *et al.* (2018) have studied the drivers of supply chain flexibility for manufacturing, supply chain and service operations, and review the relevant literature on service supply chain. Meanwhile, detailing the characteristics of

Item	Service supply chain	Manufacturing supply chain
Structure	Service provider → service integrator → customer	Supplier → manufacturer → wholesaler → retailor → customer
Product from	Intangible service or "tangible product with intangible service"	Tangible product
Supply chain co-ordination	Co-ordination of service capacity and service plan	Co-ordination of production plan and inventory management
Stability	Lower stability	Higher stability
Performance evaluation	Based on the service operation, which is more subjective and has abstract indicators	Based on the product operation, which is more objective and has indicators that are easy to observe
Influence factor of bullwhip effect	Service signal, demand signal and pricing fluctuation	Inventory, demand signal and pricing fluctuation

service, Baltacioglu *et al.* (2007) have proposed a new definition of service supply chain: a network of suppliers, consumers, service providers (SPs) and other supporting units that provide the resources necessary to produce services, transform resources into supporting and core services and then deliver these services to customers.

A widely accepted structure of service supply chain is: "Service Provider (SP)- Service Integrator (SI)-Customers" (Choy *et al.*, 2007; Liu, Wang, Shen, Yan and Wei, 2018). SIs usually have stronger control power and can outsource the functional services to SPs in order to maintain competitive advantages. They then integrate these functional services into integrated service solutions for end customers. Based on this structure, many scholars have expanded and enriched research on service supply chain in the logistics industry (Liu, Wang, Shen, Yan and Wei, 2018), advertising industry (Zhao *et al.*, 2017), consulting industry (Breidbach *et al.*, 2015), call-centre industry (Coyle, 2010; Xia *et al.*, 2015) and professional services industry (Harvey, 2016). Wang *et al.* (2015) subdivide the service supply chain into two categories based on the specific form of the product: namely, the service only supply chain (SOSC) and product service supply chain (PSSC). In SOSC, the product is pure service, such as body/health checks in healthcare, while the product in PSSC is the combination of a physical product and intangible service. The majority of extant service supply chain literature focuses on the PSSC, introducing service elements in the research context (Stock *et al.*, 2010; Maull *et al.*, 2012; Li *et al.*, 2016). Few SOSC studies explicitly focus on the service sector and consider the characteristics of service – including those of intangibility, simultaneity, heterogeneity, perishability and labour (customer) intensive. These characteristics make it difficult to visualise and measure service and more challenging to manage service supply chain (Baltacioglu *et al.*, 2007; Maull *et al.*, 2012).

Some scholars have explored the processes and links of the service supply chain. In this regard, Baltacioglu *et al.* (2007) have proposed that SSCM can be divided into demand management, capacity and resources management, customer relationship management, supplier relationship management, order process management, service performance management and information and technology management. Rezaei Pandari and Azar (2017) have divided service supply chain into the following components by means of coding: service delivery management, service-relationship management and customer relationship management, market management, service-capability management, knowledge and information-flow management, cash-flow management and risk management. This study divides service supply chain into four links by means of open and axial coding (Table II): service supply management, service integration management, service demand management and service co-ordination management.

2.2 Research method

A literature review should take rigorous, replicable, scientific and transparent factors into consideration (Spina *et al.*, 2013). Figure 1 illustrates the specific steps of the research method: source identification, source selection and extraction and source evaluation and categories generation (Agrawal *et al.*, 2015; Liu, Bai, Liu and Wei, 2017). Following these steps, the structured classification and corresponding categories were obtained.

2.2.1 Source identification. It is the first step of literature review. It aims to identify four crucial points: source, scope, keywords and time span. To identify and select relevant literature, this study used five popular databases: Wiley, Web of Science, Emerald, Taylor and Francis and ScienceDirect. Next, the scope needs to be well defined to provide the focus of the research (Croson *et al.*, 2013; Boysen *et al.*, 2015), it is crucial to decide which papers qualifies as "SSCM research from a behavioural operations perspective" and which does not. To satisfy this study's research topic, the literature must meet the following two conditions: First, it needs to occur in the service supply chain context, including the PSSC and SOSC mentioned above. Second, it is necessary to reflect the influence of behavioural factors in the study. That is to say, the decision-making process is indeed affected by the introduced behavioural factors and leads to the limited rationality of the decision makers, who no longer aim at maximising their own profits.

According to the above criteria, this paper first conducted a preliminary search on the literature that combines service supply chain and behavioural factors in five databases. Since behavioural science is a broad concept, it contains a variety of behavioural subtypes. Some studies may not use "behave/behaviour/behavioural" as keywords and choose other keywords of subtypes instead. Similar to Croson *et al.* (2013), this study chose factors that fundamentally correct the rational decision makers' actions as behavioural factors. Most existing literature focus on the following subdivided behavioural factors: risk attitude and prospect theory, fairness concern, forecast bias, reciprocal and altruism and strategic behaviour. In the process of literature search, we also found that some scholars are concerned about other behaviours in the service supply chain, such as relationship-related behaviour, competitive behaviour and cognitive behaviour. Although these behavioural factors are not the mainstream factors in the field of behavioural science, their existence triggers the transformation of the decision makers' objective functions and result in the decision bias. This paper classifies these factors into the category of "other behaviour". The concepts of the six behavioural factors and the keywords for literature search are shown in Table III.

The papers with the above keywords and "service supply chain" in the title and abstract were identified. As the research on SSCM from the perspective of behavioural operations is a relatively new research area, most relevant studies are published in the last 10 years. Thus, this study's time span was defined as 2009–2018. The number of initial papers is shown in Table IV. Table IV shows the number of papers initially identified from the five databases.

2.2.2 Source selection and extraction. The purpose of this step is to extract papers that are more relevant to the research topic from the initially identified literature. Considering the

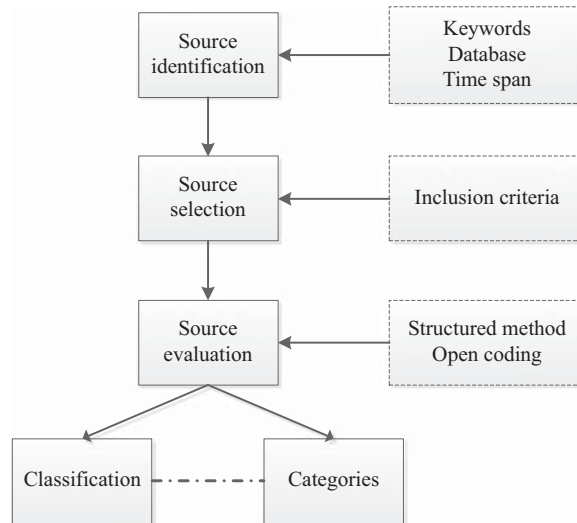| Link	Object oriented	Main task
Service supply management	SP	Outsource, order management, optimal decisions of SP
Service demand management	End customer	Demand management and customer relationship management
Service integration management	SI	Capacity and resource management, optimal decisions of SI
Service co-ordination management	Holistic SCC	Performance management, global co-ordination and optimisation

Table II.
SSCM links

Figure 1.
Overview of the
literature research
strategy process

Subtype	The meaning of subtype	Keywords
Prospect theory and risk attitude	Risk attitude refers to the performance of decision makers in the face of risk. Prospect theory shows that decision makers are risk-averse when faced with gains and risk preference when facing losses	Prospect theory, loss aversion, risk attitude, risk averse/aversion, risk seeker/seeking, risk preference
Fairness concern	The difference of profit among supply chain members can trigger fairness concern among decision makers, resulting in a significant impact on the utility functions	Fairness, fairness preference, fairness concern
Forecasting bias	The gap between the predicted result and the real result. Overconfidence is a common forecast bias	Forecasting bias, overconfidence/overconfident, over-placement, overestimation, over-precision
Reciprocity and altruism	Reciprocity is a social norm of responding to a positive/negative action with another positive/negative action, altruism means an unconditional motivational state with the goal of benefitting another	Reciprocity, reciprocal, altruism, altruistic
Strategic behaviour	Narrow definition of strategic behaviour is forward-looking behaviour; generalised strategic behaviour refers to decision making that considers other influencing factors	Strategic/myopic, customer/consumer, supplier/service provider, integrator/LSI behaviour
Other behaviour	Other behaviours caused by human involvement	Competition, relationship, cognitive/cognitive hierarchy

Table III.
The meaning and
keywords of six
subtypes of
behavioural factor

research scope, only papers that directly discuss behavioural operations in service supply chains and have strong relevance are included, the specific criteria for inclusion and exclusion are as follows. While retaining peer-reviewed journal articles, this study excludes conference papers, working papers, commentaries and book reviews (Liu, Bai, Liu and Wei, 2017). Retaining studies that clearly indicate that behavioural factors have influenced the research context of the service supply chain, papers involving only relevant concepts were excluded. For instance, Williams and Waller (2011) studied demand forecast in the supply chain. Although the keyword "service" appeared in the abstract, this study does not discuss

service-related content and did not highlight the impact of behaviour in forecasting. Consequently, this article was eventually excluded from this study. Duplicate papers selected according to different keywords were eliminated. Some studies in Table IV might be counted more than once. For example, one paper may be found when using "behaviour" and "fairness concern" as keywords. In order to obtain a more authoritative research status and propose research agendas with better reference value, this study give preference to studies published in top journals in the field of operational management, including: *Journal of Operations Management, Manufacturing and Service Operations Management, Management Science, Decision Sciences, Production and Operations Management, International Journal of Operations & Production Management*, and the *European Journal of Operational Research*. Some journals pay much more attention to supply chain management, including *International Journal of Production Economics, International Journal of Production Research, Journal of Purchasing and Supply Management* and *Transportation Research Part B and Part E* (Donohue and Schultz, 2018). However, for subtypes that only have a small number of initial papers, papers from other publications were also retained in order to reflect the status quo. Using the principles to screen the literature, a total of 64 papers consistent with the research topic of this study were selected. Table V lists the statistics of the journals of 64 articles.

2.2.3 Source evaluation and categories generation. To define the categories of each classification from the selected papers, open coding and axial coding was also performed in content analysis. Open coding is the process of extracting, refining and analysing the relationship between constructs, while axial coding aims to finding the intrinsic link between constructs (Strauss and Corbin, 1994; Hollebeek *et al.*, 2017). This approach enabled us to increase the validity of the relationship between classifications with its corresponding categories. The coding method and classification result will be explained in detail in next section.

3. Findings
3.1 Overview of the extant literature
Further analysis of the publication year, type of behaviour and main authors was conducted. As Figure 2 indicates, "SSCM from the perspective of behavioural operations" has received greater attention over the last 10 years. The 64 selected articles were divided into six types according to the dimension of behavioural factors, as follows: risk attitude and prospect theory (13 studies), fairness concern (8 studies), forecast bias (6 studies), reciprocity and altruism (7 studies), strategic behaviour (17 studies) and other behaviour (13 studies). As noted, an analysis according to the main authors was also conducted. Figure 3 shows dominant authors in this field. It can be found that Chinese scholars have paid more attention to this research field. This is due to the following two facts: on the one hand, in recent years, as the world's second largest economy, China's service economy has developed rapidly. In 2007, the service industry accounted for 40.1 per cent of GDP. After 10 years, this ratio has reached 51.6 per cent in 2017, and China is aiming to increase that number to 60 per cent in 2025 (Zhu, 2017). In order to maintain core competitiveness, more

Database	Prospect theory and risk attitude	Fairness concern	Forecasting bias	Reciprocity and altruism	Strategic behaviour	Other behaviour	Total amount
Wiley	11	8	5	5	33	13	75
Web of Science	14	14	1	6	49	35	119
Emerald	10	3	14	10	84	39	160
Taylor & Francis	22	13	36	7	24	9	111
ScienceDirect	14	49	52	59	41	21	236

Table IV.
Number of papers initially identified from each database

Journal title	Number
International Journal of Production Economics	6
International Journal of Production Research	5
Annals of Operations Research	5
European Journal of Operational Research	4
Journal of Business & Industrial Marketing	3
Production & Operations Management	2
Asia-Pacific Journal of Operational Research	2
Transportation Research Part E: Logistics and Transportation Review	2
Control and Decision	2
European Journal of Industrial Engineering	2
Discrete Dynamics in Nature and Society	2
Chinese Journal of Management Science	2
Journal of Supply Chain Management	2
The International Journal of Logistics Management	1
International Journal of Operations & Production Management	1
Journal of Cleaner Production	1
Journal of Service Research	1
International Journal of Shipping and Transport Logistics	1
Other journals	20
Total	64

Table V.
The number of papers covered in major journals
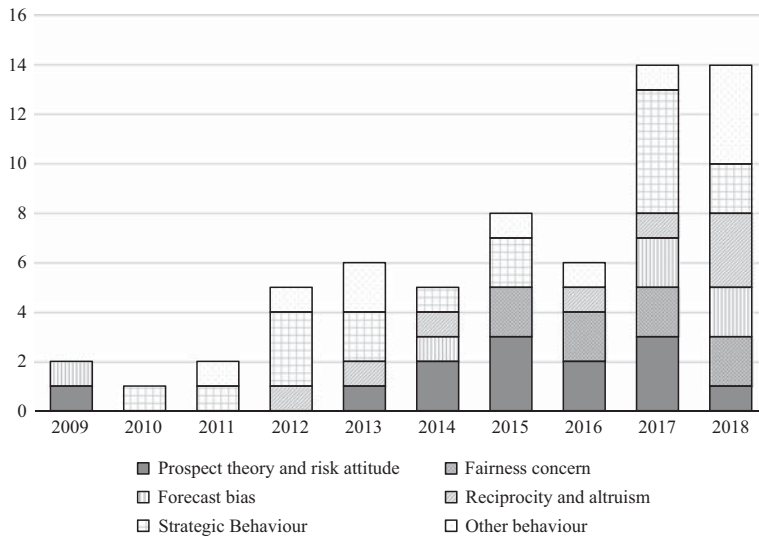
Figure 2.
Analysis of research topics, 2009–2018

and more enterprises have begun to outsource functional services to providers and play the role of SIs, thus forming an organisational structure of service supply chain in industrial practice (Liu, Wang, Shen, Yan and Wei, 2018). For example, China's Cainiao Network is a typical logistics SI, which integrates providers' resources to provide logistics solutions for end customers. The rich cases in practice have brought more research motivation to scholars. On the other hand, behavioural operations have attracted the attention of many scholars in China, the international workshop on behavioural OM has been organised by the Operations Research Society of China for 10 years. Many excellent

Figure 3.
Analysis of main
authors

and creative studies have emerged from this workshop, enriching the participants' understanding of behavioural operations.

During open coding, the 64 selected papers were analysed to identify the research themes as open codes. During axial coding, the relationships among these open codes were assessed and grouped into four axial codes. For example, Liu, Liu and Ge (2013) studied the order allocation of logistics service supply chain (LSSC) based on cumulative prospect theory, which focuses on the behavioural impact on the SP, while Sawik (2016) studied the impact of risk aversion on joint selection of supplier. These two studies were coded as "order allocation (SP)" and "joint selection of SP", respectively, during open coding. Then, according to the classification of the main axis, these two papers were classified as service supply management during axial coding. Similarly, Liu, Wang, Shen, Yan and Wei (2018) studied the impacts of peer-induced and distributional fairness concerns on optimal decision making in order allocation and contract design from the perspective of SI. This paper was coded as "order allocation (SI) and contract design" in open coding and service integration management in axial coding.

The four main axes and their corresponding open codes are summarised as follows:

(1) service supply management: supply uncertainty, supplier selection and evaluation, outsourcing and order allocation (focus on the SP's problem), procurement management, contract choice and SP's optimal decision;

(2) service demand management: demand uncertainty, customer segmentation, customer relationship management, customer participation and value creation;

(3) service integration management: resource and order integration (focus on the SI's problem), supply and demand matching, contract design and SI's optimal decision (pricing decision, service quality management and supervision); and

(4) service co-ordination management: performance evaluation and management, service supply chain co-ordination and optimisation, profit distribution and global management framework.

As such, based on the results of open and axial coding, this study derived four links in the service supply chain, which constitute the second dimension of this literature review. The result of the classification of the 64 selected studies into two dimensions is shown in Table VI.

Behaviour Link of SSC	Risk attitude and prospect theory	Fairness concern	Forecast bias	Reciprocity and altruism	Strategic behaviour	Other behaviour
Service supply management	Liu, Liu and Ge (2013), Liu et al. (2014), Liu and Wang (2015), Benedettini et al. (2015) and Sawik (2016)	Liu, Liang, Liu, Wang and Wang (2015) and Liu, Wang, Zhu, Wang and Shen (2017)	Liu, Shen, and Wang (2018) and Liu, Wang, Tang and Zhu (2018)	Chu et al. (2012) and Zhang, Li and Gou (2017)	Haas et al. (2013), López and Zúñiga (2014), Zhang et al. (2015) and Zhang, Xing and Li (2018)	Jin and Ryan (2012), Nagurney et al. (2015), Dan et al. (2018) and Huang et al. (2018)
Service demand management			Liu, Wang, Tang and Zhu (2018)		Kurata and Nam (2010), Kurata and Nam (2013) and Sampson and Spring (2012)	Narayanan and Moritz (2015)
Service integration management	Yang et al. (2009), Choi (2016) and Chen (2017)	Li, Q.H. and Li, B. (2016), Du and Han (2018) and Liu, Wang, Shen, Yan and Wei (2018)	Bao (2014) and Liu, Shen, and Wang (2018)	Wang and Dai (2014) and Beitelspacher et al. (2018)	Dan et al. (2017), Wang et al. (2017), Cai et al. (2017) and Zhao et al. (2017)	Liu and Xie (2013)
Service co-ordination management	Selviaridis and Norrman (2014), Liu, Shang and Lai (2015), Yang and Xiao (2017), Zhang, Kou, Leng, Wang and Dan (2017) and Truong and Hara (2018)	Liu and Shu (2015), Wang et al. (2016), Ma and Chen (2017) and Liu, Wang, Shen, Yan and Wei (2018)	Manary et al. (2009), Baecke et al. (2017), Meeran et al. (2017) and Liu, Wang, Tang and Zhu (2018)	Hwang and Rho (2016), Liu, Yan, X., Wei, Xie and Wang (2018) and Dania et al. (2018)	Song et al. (2011), Maull et al. (2012), Zha et al. (2015), Wang et al. (2015), Wang et al. (2017), Boon-itt et al. (2017) and Komulainen et al. (2018)	Afonso Vieira et al. (2011), Gligor and Holcomb (2013), Rezapour and Farahani (2014), Narayanan and Moritz (2015), Xia et al. (2015), Song et al. (2016), Rezaei Pandari and Azar (2017) and Wang et al. (2018)

3.2 Dimension analysis results

The main findings of the analysis of the two dimensions of the extant literature can be summarised as follows. In terms of the behavioural factor dimension, the six types of behaviour factors attract varying degrees of attention. Of the 64 selected papers, 17 papers are related to strategic behaviour. Of these, 8 studies consider the impact of the customer and 5 conducted qualitative research to illustrate the importance of customer presence in the service supply chain. Risk attitude and prospect theory (13 studies) and fairness concern (8 studies) are hot topics. As two common behaviours in the OM field, the models and measurement methods of risk attitude and fairness concern are relatively mature. In total, seven studies consider reciprocal and altruistic behaviour. Forecast bias appears to receive the least amount of attention with only six relevant studies and most of these studies focus on overconfident behaviour. Overall, the number of studies has gradually increased since 2015, indicating that the cross-disciplinary research on behavioural economics has attracted more attention. Moreover, as Figure 2 shows, the number of researches on reciprocal and altruistic behaviour, strategic behaviour and forecasting bias has gradually increased in recent years.

In terms of the supply chain link dimension, most scholars have focused on service supply management and service co-ordination management, with few studies considering service demand and integration management. Although many studies introduce customer segments, the core considerations of these studies are optimal decision-making issues of other supply chain members rather than customer decision problems, and suggestions for demand and customer management are limited. Breidbach *et al.* (2015) suggest that the current research on service supply chain is narrow and lacking in-depth analyses from the view of customer while some scholars have begun attaching importance to customer behaviour in manufacturing supply chain. For instance, Yi *et al.* (2018) discuss the impact of customer's fairness concern on channel selection, and Amornpetchkul *et al.* (2018) study the overspending behaviour of customer. Moreover, the limited attention to service integration management indicates that the uniqueness of this SI may not be fully understood. Many scholars regard SI in service supply chain as corresponding to the role of the retailer in the manufacturing supply chain; while this may be true in PSSC, it is not suitable in SOSC. In SOSC, the SI may have no physical resources to undertake the service and can take part in the service supply chain by using the advantage in marketing, information and management. As such, the decision-making problem of the SI will differ from that of the retailer (Li, X. and Li, Y., 2016). Thus, strengthening customer-oriented research and behavioural research that focused on the integration of service supply chain is an important trend in SSCM, which can provide managers with more valuable suggestions.

4. Discussion

This section first provides a brief review of the concept and development of the identified behavioural factors, then presents the systematic review of the extant literature to propose a SSCM research agenda from the perspective of behavioural operations.

4.1 Main behavioural factors in the OM field

From a cognitive system perspective, behaviour is the result of dual processes during decision making: a fast and intuitive process on the one hand, and a slow and deliberative process on the other (Urda and Loch, 2013; Krajbich *et al.*, 2015; Chen and Krajbich, 2018). In 2001, the American Economic Association's highest honour, the John Bates Clark Medal, was awarded to Matthew Rabin, who introduced human psychological behavioural factors into the economic model. In 2002, the Nobel economics prize was awarded to Kahneman and Tversky, who proposed prospect theory in 1979. Prospect theory modifies the traditional

risk decision theory and demonstrates that decisions made in uncertain environments are biased. Behavioural economics and behavioural operations have gradually gained attention and begun developing rapidly. This section first shows the brief review of the six behavioural factors, as shown in Table VII.

4.2 SSCM from the perspective of behavioural operations

4.2.1 Risk attitude and prospect theory. As service is perishable, risk management in the service supply chain is an important issue that cannot be ignored (Baltacioglu *et al.*, 2007). These risks – including market and financial risks, among others – are not independent (Truong and Hara, 2018). Selviaridis and Norrman (2014) identify four influencing factors of financial risk in the service supply chain from the perspective of the provider: namely, performance attributability within the service supply chain, relational governance in service supply chain relationships, reward balancing and provider ability to transfer risk to sub-contractors. Benedettini *et al.* (2015) have demonstrated that the existence of service businesses will produce a greater threat of bankruptcy among supply companies, as well as greater environmental risk when enterprises provide demand chain related services. The existence of risk will lead to different risk attitudes among decision makers, resulting in different decision-making behaviours (Liu and Wang, 2015; Yang *et al.*, 2009; Yang and Xiao, 2017; Zhang, Kou, Leng, Wang and Dan, 2017). As such, it is important to consider the risk attitude of decision makers in the supply chain of service sectors with higher uncertainty, such as the logistics and financial industries (Sawik, 2016; Choi, 2016; Chen, 2017). Liu and Wang (2015) have found that logistics

Behaviour	Extant research issues in OM field
Risk attitude and prospect theory	Different measurement methods of risk: value-at-risk method (Hosseini and Verma, 2017), conditional value-at-risk method (Ye *et al.*, 2017), mean variance model (Cui *et al.*, 2016), risk attitude and supplier selection (Harrison *et al.*, 2009), risk attitude and quality control (Liu and Wang, 2015) and cumulative prospect theory and order allocation (Liu, Ge and Yang, 2013; Liu *et al.*, 2014)
Fairness concern	Channel co-ordination (Cui *et al.*, 2007), revenue management (Tereyağoğlu *et al.*, 2017), procedural fairness (Rabin, 1993), advantage and disadvantage fairness (Fehr and Schmidt, 1999) and fairness preference model (Bolton and Ockenfels, 2000; Cui and Wu, 2018)
Forecast bias	Different means of forecast bias (Goodwin *et al.*, 2018), overconfidence (over-placement, overestimation and over-precision) (Gervais *et al.*, 2003; Moore and Healy, 2008)
Reciprocity and altruism	Positive and negative reciprocity (Fehr and Gächter, 2000; Pereira *et al.*, 2006; Gal and Pfeffer, 2007), corporate social responsibility (Luo and Zheng, 2013), supply chain co-operation (Simatupang and Sridharan, 2005; Liang and Wan, 2007), supply chain co-ordination (Lin and Hou, 2014; Du *et al.*, 2014), optimal decision making (Xia *et al.*, 2018; Shi *et al.*, 2018; Liu, Yan, X., Wei, Xie and Wang, 2018), order allocation (Baltacioglu *et al.*, 2007; Zhang, Li and Gou, 2017) and altruistic behaviour and subtypes (Takano *et al.*, 2016)
Strategic behaviour	Narrowly defined strategic behaviour means forward-looking. Strategic customer (Liang *et al.*, 2018; Ghoshal *et al.*, 2018), the impacts of strategic behaviour (Zhang, Mantin and Wu, 2019; Papanastasiou and Savva, 2016; Kremer *et al.*, 2017). Generalised strategic behaviour refers to decision making that considers other influencing factors (Haas *et al.*, 2013; Liu and Xie, 2013; López and Zúñiga, 2014; Zhang, Xing and Li, 2018)
Other behaviour	Relationship-driven behavioural issues (Afonso Vieira *et al.*, 2011; Gligor and Holcomb, 2013), competitive behaviour (Kurata and Nam, 2010; Jin and Ryan, 2012; Nagurney *et al.*, 2015; Liu, Wang, Shen, Yan and Wei, 2018; Dan *et al.*, 2018) and bullwhip effect and cognitive profile (Narayanan and Moritz, 2015)

Table VII.
A brief review of six subtypes of behavioural factor

service integrators (LSI) prefer risk-seeking functional logistics service providers (FLSP) in order to obtain smaller supervision and larger compliance possibilities. Many scholars believe that decision makers show risk aversion in uncertain environments to minimise the negative impacts of risk. For instance, considering the risk aversion behaviour of the SP, Liu, Shang and Lai (2015) have proposed a knowledge sharing incentive model for the e-commerce service supply chain. Sawik (2016) has studied the optimal joint selection of suppliers and the stochastic scheduling of customer orders under random supply disruptions. Meanwhile, Choi (2016) has observed that to keep the level of risk under control in the service supply chain of the fashion industry, retailers tend to possess risk-averse behaviour that impacts their ability to make optimal decisions, implied inventory service levels and the value of the quick response system.

Prospect theory is also one behavioural factor that garnered the attention of scholars in the early time. Liu, Liu and Ge (2013) and Liu *et al.* (2014) introduced prospect theory in the research on LSSC, considering the impacts of reference point, loss aversion, as well as the risk attitude towards gains and losses, before revising the objective function of order allocation.

As two classic behaviours in the traditional OM field, prospect theory and risk attitude received more attention in the service supply chain. This is because the models and methods of risk measurement are relatively fixed, and scholars can alter these models flexibly and conduct new research in different research contexts, such as e-commerce (Liu, Shang and Lai, 2015), fashion industry (Choi, 2016). These studies are mostly based on traditional models (value-at-risk method, conditional value-at-risk method and mean variance model, etc.) and the innovation lies mainly in the research problem rather than the research method. Scholars can conduct in-depth research from the point of methodology, such as comparing the advantages and disadvantages of multiple risk measurement methods in the same research scenario or combining model and empirical method. Prospect theory is indeed a classic and interesting behavioural factor, but the attention received is much less than the risk attitude. Many traditional utility functions can be modified based on the prospect theory in different service scenarios combined with the characteristics of the service supply chain, and scholars can add new variables to traditional problems and explore whether the influence of prospect theory will be affected by other factors.

4.2.2 Fairness concern. As a result of the natural concern regarding material benefits, decision makers will select reference points for comparison. These reference points can trigger fairness concerns (Li, Q.H. and Li, B., 2016; Wang *et al.*, 2016; Liu, Wang, Zhu, Wang and Shen, 2017; Du and Han, 2018). In the service supply chain, fairness concern modifies the utility function, thereby affecting the mechanism of decision making and supply chain co-ordination (Liu and Shu, 2015; Ma and Chen, 2017). Although there are many ways to choose the reference point, these methods essentially aim to modify the utility calculation criterion in traditional economics by introducing the fairness preference (Cui and Wu, 2018). Choosing a member of the vertical supply chain as a reference point will lead to distribution fairness concern, while choosing one from the horizontal supply chain will trigger peer-induced fairness concern (Liu, Wang, Shen, Yan and Wei, 2018). Liu, Liang, Liu, Wang and Wang (2015) have constructed an adjusted order allocation utility function of FLSP during multiple periods based on inequity aversion theory. In doing so, they introduce FLSP's inequity feeling and patience limit, and examine their impact on order allocation in the LSSC. Wang *et al.* (2016) have investigated the channel co-ordination issue in a two-echelon LSSC comprising one LSI and one FLSP, finding that the LSI's reservation quantity and the channel profit are affected by the LSI's fairness concern. Du and Han (2018) have considered the combination of members' fairness concerns and the joint decision of pricing and service quality guarantees in the LSSC, demonstrating that the LSSC's overall profit is worse off with fairness concerns. Liu, Wang, Shen, Yan and Wei (2018) have established an LSSC

comprising an LSI and two FLSPs, thereby introducing distributional and peer-induced fairness concerns to the order allocation process. They find that the optimal utility of LSI increases with the new FLSP's peer-induced fairness concern and decreases with the incumbent FLSP's distributional fairness concern.

Fairness concern is also a widely discussed behaviour in the OM field. There are different expressions according to the choice of reference point. Early studies analysed the impacts of fairness concern on service supply chain decision making. Subsequent research began to consider complex research scenarios. However, the existing research still needs to be deepened. The characteristics of the service supply chain should be combined with fair concerns to create unique research contexts that are different from PSSC:

RQ1. Consider the heterogeneity and customer engagement of service supply chain, will customers show different fairness concerns due to the service quality?

RQ2. In the context of informatisation, is there any new technology that can help solve the impact of fairness concern?

These interesting research questions are waiting for academic insights.

4.2.3 Forecast bias. Economic forecasting uses a combination of statistical methods and human judgment, with human intervention required to correct the statistical prediction results. This makes forecast bias inevitable (Manary *et al.*, 2009). Goodwin *et al.* (2018) provide different behaviours of how individuals can game the forecasting process, such as enforcing, filtering, hedging and second guessing. The intangibility and perishability of service creates more uncertainties in the service supply chain and forecast bias has attracted the attention of numerous scholars (Baecke *et al.*, 2017; Meeran *et al.*, 2017). In the related research of forecast bias in the service supply chain, overconfidence receives most concern, which can be subdivided into over-placement, overestimation and over-precision. Many scholars have modified the traditional newsvendor model by introducing overconfident behaviour. Bao (2014) has examined overestimation and over-precision in the power service industry, demonstrating that overconfident managers cause insufficient service levels. Moreover, increasing regulatory punishment for electricity shortages and providing subsidies for capacity recovery are conducive measures for calibrating insufficient services levels, as well as the overconfident behaviour affecting the manager's judgment of the cost of capacity recovery. Liu, Wang, Tang and Zhu (2018) have developed a two-period service capacity procurement model, in which market demand surges in the second period. They consider the overconfidence of the LSI in LSSC and find that such behaviour leads to the lowest service level of the FLSP in the second period during demand surge. This study further proposes FLSP-led mechanism/dynamic wholesale price mechanism to reduce/ eliminate the negative impact of LSI overconfidence. Liu, Shen and Wang (2018) have examined overconfidence behaviours of shipping company and Tianjin port and found that the company's overconfidence influences the threshold of Tianjin Port's overconfidence level, and this effect is magnified in the context of demand updating.

On account of human involvement, predictive bias is a common behaviour in service supply chain. However, there are few relevant studies and most of them focus on the overconfidence behaviour. The bias caused by other factors can be supplemented; the seven possible reasons of the forecast bias in Goodwin *et al.* (2018) can provide some references for future research. In the service industry, the estimation of service capacity and service demand is the premise of decision making, and there are different influencing factors in different industries. For example, in the port industry, forecasts may be heavily influenced by policies, and forecasts may depend on the development of the e-commerce in the logistics industry. Therefore, it is very valuable to carry out relevant research after conducting in-depth research on some sub-sectors. In addition, new research backgrounds have spawned

some interesting research topics. In the era of big data, the forecast bias can be weakened intuitionally, but are there other factors that lead to counter-intuitive conclusion? These problems urge more research into behavioural research of service supply chain to achieve better combination of academia and practice.

4.2.4 Reciprocity and altruism. Partnership is more important in the service supply chain than in the traditional manufacturing supply chain, and reciprocal behaviour among members positively impacts the overall performance (Zhang, Li and Gou, 2017; Dania *et al.*, 2018). Chu *et al.* (2012) have demonstrated that reciprocal behaviour has a positive impact on supplier flexibility. Examining the strategic value of the reciprocal sharing of RFID among enterprises in the supply chain, Hwang and Rho (2016) have shown that reciprocal behaviour between organisations – that is, high-level shared information quality and inter-organisational RFID system quality – can improve supply chain visibility and agility, as well as enhance inter-organisational trust. Beitelspacher *et al.* (2018) have examined the reciprocal behaviour of returns between supplier salespeople and retailers in the reverse LSSC. In doing so, they argue that when one party produces a reciprocal move, the other party responds positively.

Altruism is a more selfless and unconditional action. An empirical study conducted by Urda and Loch (2013) shows that altruism is the result of emotional evolution, and that humans are strong altruists. Altruistic behaviour has a major impact on the utility functions of decision makers. Wang and Dai (2014) have explored the effects of altruistic behaviour on optimal supply chain decision making. Liu, Yan, X., Wei, Xie and Wang (2018) have examined the effects of the altruistic preferences of LSI and FLSP in the LSSC on the utility and contract effectiveness. They propose that *ex post* payment contracts and "revenue sharing + franchise fee" contracts can be used to co-ordinate the service supply chain.

In the related studies that use the analytical models, reciprocity and altruistic behaviour are easily confused with the concept of revenue sharing. In fact, reciprocity and altruism emphasise the endogenous willingness of a decision maker, and revenue sharing is an external manifestation of these two behaviours. It is difficult to adopt theoretical models to describe the internal and external differences. Therefore, in the future research, the combination of multiple methods is encouraged to solve the relevant problems. Scholars can use empirical model, case study, field experiment to examine the existence of reciprocal and altruistic behaviour based on observation of industrial practice and then construct the theoretical model; the conclusions obtained in this way will provide more valuable suggestions to practitioners.

4.2.5 Strategic behaviour. The strategic behaviour of the decision maker in service operations is another hot research topic. As noted earlier, narrowly defined strategic behaviour is the opposite of myopic behaviour. In contrast to manufacturing supply chain research, few studies have introduced the concept of the strategic customer into the service supply chain. This is because relevant studies on strategic customers usually hinge on the premise of the leftover inventory at the end of the main selling season in newsvendor model, but pure services are typically considered perishable and not able to be stored. Wang *et al.* (2017) have considered customer strategic behaviour in PSSC, analysing the impact of the product service system value, cost and service value ratio on consumer strategic behaviour. Supply chain co-ordination is finally realised using the revenue sharing contract. In studies of generalised strategic behaviour, the understanding of "strategic" is more diverse. Given the important role of customers in the service supply chain (Maull *et al.*, 2012; Sampson and Spring, 2012), much of the strategic behaviour literature considers customer's impact – including customer preference, customer satisfaction and customer loyalty (Kurata and Nam, 2010, 2013; Song *et al.*, 2011; Dan *et al.*, 2012; Liu and Xie, 2013; Haas *et al.*, 2013; Boon-itt *et al.*, 2017; Cai *et al.*, 2017). However, many studies only introduce the service element

into research situations in PSSC, with limited discussions on SOSC (Wang *et al.*, 2015). Haas *et al.* (2013) portray the strategic behaviour of the e-service supplier in complex service value networks, arguing that e-service suppliers who want to maximise their business success need to configure their services according to the preferences of the consumers. López and Zúñiga (2014) study the strategic ability adjustment behaviour of servers in the judicial service supply chain, noting that servers within the supply chain change their processing speeds in order to maintain a backlog of cases that is acceptable and credible. Zha *et al.* (2015) investigate the effort of a service platform in the hotel service supply chain and explore its influence on the hotel's decision and channel co-ordination. Zhang *et al.* (2015) and Zhang, Xing and Li (2018) have considered the quality preferences of strategic suppliers in the service supply chain that will determine their quality efforts. Komulainen *et al.* (2018) have examined how customer value experience affects the reorganisation of the bank service network. This study shows that the service supply chain needs to be reorganised according to customer experience, and that digital services cannot be provided by a single banking SP because the ecosystem of such services is becoming more complex.

Among the 64 studies selected in this paper, there are 17 papers relevant to the strategic behaviour. Although many studies introduce the influence of customers' influence, they mainly focus on the generalised strategic behaviours and analyse the impact of customer's attributes (such as customer preference) on other members' optimal decisions. Compared to other service characteristics – such as intangibility, heterogeneity and simultaneity – customer involvement is more concrete and comprehensible, constituting an intuitive transformation from a traditional manufacturing supply chain to service supply chain through the introduction of the role of the customer. The extant research on the influence of customer role is not in-depth enough, future research needs to treat customers' decisions as endogenous variables and there is much space to be filled in the analysis of decision-making changes from the perspective of customer.

4.2.6 Other behaviour. In addition to the mainstream behavioural factors discussed above, this study observes several other behaviours that have attracted the attention of scholars: namely, relationship-driven behaviour, competitive behaviour and the cognition of the decision maker. In regard to relationship-driven behaviour, scholars are increasingly beginning to shift away from focusing on individual decision making to global decision problems. Moreover, the impacts of personal and group relationship have gradually begun receiving more attention (Afonso Vieira *et al.*, 2011; Gligor and Holcomb, 2013; Song *et al.*, 2016; Wang *et al.*, 2018).

Competitive behaviour in the service supply chain is another emerging topic. Liu, Wang, Shen, Yan and Wei (2018) have examined competitive behaviour between two FLSPs in the LSSC, noting its impact on order allocation. They show that horizontal competition has a positive impact on the LSI's optimal pricing and FLSPs' optimal levels of service innovation. In their study, Huang *et al.* (2018) have introduced two manufacturers who compete in terms of price, quality and service level. Research shows that when competition is weak, retailers tend to encourage co-operation between manufacturers to avoid poor quality and service level. Consequently, several scholars have introduced service competition in dual-channel supply chains to discuss the impact of competitive behaviour (Jin and Ryan, 2012; Nagurney *et al.*, 2015; Dan *et al.*, 2018). Dan *et al.* (2018) have proposed a two-channel supply chain comprising manufacturers and retailers who are competitive in terms of value-added services. In doing so, they found that when a manufacturer improves the warranty service level, the service competition is weakened, and that no value-added service competition emerges when the warranty service level is high enough. Integrating competition into their model of several existing rivals in the SC market, Rezapour and Farahani (2014) discuss competition between supply chains for price and service levels.

Emerging behavioural factors in the relevant research include the decision maker's cognition. Narayanan and Moritz (2015) have demonstrated how the growing complexity of the supply chain has resulted in higher expectation of service among customers. In doing so, they investigate the underlying behavioural factors contributing to the bullwhip effect, identifying the cognitive profile of decision makers as a contributor. Rezaei Pandari and Azar (2017) have conducted in-depth interviews with insurance industry experts in Iran. Defining the performance measure of the service supply chain based on a fuzzy cognitive map, these scholars developed a model for service supply chain performance evaluation. The introduction of these emerging behavioural factors has opened further research opportunities in SSCM.

4.3 Features and challenges
Based on the results of this literature review, this study identifies three significant features of SSCM from the perspective of behavioural operations: namely, the abundance of research issues, extensive research backgrounds and multiple methods and greater attention to the combination of academic research and practice. This study has also identified three challenges: many characteristics of service are difficult to quantify in modifying the analytical model; service is not standardised and there are significant industrial differences; and systematic, comprehensive and multidisciplinary research are urgently needed.

Regarding the features of SSCM from the perspective of behavioural operations, there is an abundance of research issues: the service supply chain is a complete chain with the integrator as the core enterprise and connecting the SP and end customers at both ends. Scholars can focus on a single link of the service supply chain (supply/demand/integration management) or conduct studies from a holistic perspective (co-ordination management). Service elements are introduced based on traditional factors – such as price, cost and quality issues – in combination with various research scenarios, which generate a wealth of alternative research questions. The second feature of this area is extensive research backgrounds and multiple methodologies. The basic structure of the service supply chain is widespread in many industries, including the logistics, medical, consulting and tourism industries. Consequently, scholars can observe behavioural factors in a variety of industrial cases and conduct research through various methods, such as behavioural experiment, empirical research, multi-case analysis, real-case study and system dynamics. The third feature is that it pays greater attention to the combination of academic research and practice. Indeed, in comparison to traditional supply chain management research, SSCM from the perspective of behavioural operations research attaches more importance to problem-solving orientation. Scholars work hard to explore the application value of theoretical conclusions by proposing management insights.

At the same time, SSCM from a behavioural operations perspective has three major challenges. First, many characteristics of service are difficult to quantify, making it difficult to modify the analytical model. Many classic research issues – such as the newsvendor problem, bullwhip effect and quality control – need to be solved through modelling. However, in the context of service supply chain, these models are difficult to be modified due to the differences between service products and tangible products. Therefore, the conclusions cannot display the essential differences between service and traditional supply chain management. As a result of this challenge, numerous scholars have adopted qualitative and empirical methods to investigate service supply chains. However, the difficulty of empirical research lies in the acquisition of information and data, which requires close co-operation in practice and a reliable research design. Second, service is not standardised, and there are significant industry differences. Unlike traditional supply chain research, service may have different characteristics according to specific industries. For example, consulting services are different from logistics services. The latter is provided

based on a tangible infrastructure, and it has a certain time lag as a result of the existence of space/distance between production and consumption. In contrast, consulting services embody the intangibility and simultaneity of service. In order to obtain valuable management insights, research on service supply chains need to be combined with a practical background. Finally, systematic, comprehensive and multidisciplinary research is urgently needed. Issues related to social, environmental and economic harmony in the service supply chain are important and require a global research perspective. As a result of these challenges, there are fewer studies on service supply chains than there are on manufacturing supply chain management, and still fewer studies on SOSC.

5. Research agenda

Given the importance of the service economy as driving force in the development of the global economy, the management scenario of service supply chain is becoming abundant. At the same time, more and more scholars begin to pay attention to behavioural operation management. Donohue and Schultz (2018) provide an aggregate view of recent trends and some exciting emerging topics in the behavioural operations field. This study reviews papers published from 2012 to 2017 and provides continuity with two prior reviews of literature on BOM from 1985 to mid-2005 (Bendoly *et al.*, 2006) and 2006–2011 (Croson *et al.*, 2013). In contrast, a small stream of publications focusses on the SSCM from a behavioural operations perspective; there are many areas that need to be filled and enriched. Once scholars can accurately integrate the characteristics of the service to show the differences from traditional research and provide insights for practitioners, the research will be valuable.

Based on the review of the literature and identification of research trajectories, this study suggests five research agendas that may be of value to researchers going forward.

First, in terms of service supply chain links, researchers need to pay more attention to the research of demand-oriented management and integrated supply chain-oriented behavioural research. Based on the previous analysis, service demand management and service integration management receive less attention and more research is needed. In the existing literature, the customer-related research mainly considers the impact of customer involvement on other supply chain members, rather than treating the customer's behaviour as the endogenous factor and analysing the decision making from the perspective of customers. The future research needs to be adjusted to focus on the analysis of customers' behavioural motivation, to guide demand management. In addition, the SI in service supply chain does not fully correspond to the manufacturer in the manufacturing supply chain. SI has stronger control power than SP and is usually the leader in the service supply chain. Future research can combine this feature and carry out in-depth research to highlight the particularity of service supply chain.

Second, in terms of behavioural influence, although behavioural economists have confirmed the diversity of behavioural factors through numerous experiments, it is necessary to expand the understanding of behavioural operations. Many behavioural factors yet to be introduced into service supply chain research, including mental account, cognitive hierarchy and regret behaviour. These factors require further attention. Many scholars believe that the understanding of behavioural operations should not be limited to influencing factors related to cognition and psychology. In 2016, *Annals of Operations Research* published a special issue entitled, "Behavioural Operations Management in Social Networks", noting that: "most published papers focus on the individual cognitive level and study the manner in which personal behavioural traits. Study of patterns of individuals' decision making and behaviours in a social environment is still lacking in the literature". In fact, there are many behavioural factors in the service supply chain that deserve more in-depth analysis. Doing so may provide different conclusions and insights to those derived

from manufacturing supply chain research. Taking traditional competitive behaviour as an example: in the service supply chain, demand is more sensitive to service and the main body of service provision is more flexible, resulting in diverse forms of service competition, such as peer competition, upstream and downstream competition and supply chain competition. Moreover, the study of complex service supply chains influenced by multiple behavioural factors is an important trend. By introducing multiple behavioural factors, the research situation will be closer to the real decision-making scenario. This agenda reminds researchers that they can read a wide range of literature, not limited to their own research field. Interdisciplinary literature may bring more novel ideas to scholars. In addition, it is necessary to consciously combine practical cases with academic theories.

Third, in terms of the background of the service industry, scholars should pay attention to behavioural research in new service industrial scenarios. No matter in developed or developing countries, service industry is undoubtedly the fastest growing and changing industry. Fierce market competition forces service innovation and optimisation. Scholars should pay close attention to the latest industry development trend. Here are some important trends:

- Smart supply chain development in the new technology era: amid the new technological revolution, emerging technologies have provided more development opportunities for the transformation of the service supply chain, including the behavioural decisions produced by the smart service model and big data operation.

- Sustainable development of service supply chain: decision makers will no longer only pay attention to absolute material benefits. Rather, environmental impact and social responsibility are becoming increasingly important principles in decision making.

- Platform transformation of service supply chain: with the improvement of basic infrastructure, the digitisation of operational processes and sound technologies of supply-demand matching, the platform economy has become one of the important transformation directions in service supply chain innovation and value chain restructuring (Zha *et al.*, 2015; Shi *et al.*, 2017). Based on the service supply chain platform, the traditional supply chain structure, upstream and downstream relationships and other factors may change greatly. In addition, considering the improvement of consumer demand, customised and personalised service has gradually replaced traditional mass production.

  Some scholars have conducted researches in the context of sustainability (Darkow *et al.*, 2015; Liu, Bai, Liu and Wei, 2017; Tseng *et al.*, 2018), big data (Fernando *et al.*, 2018; Boone *et al.*, 2018) and demand updating (Liu, Zhu and Wang, 2017). However, they are yet to consider the influence of behavioural factors. Indeed, the impact of these new operating environments on the behaviour of decision makers constitutes a valuable research direction going forward.

Fourth, in terms of service segmentation, it is necessary to combine the characteristics of sub-industries. This is especially true for pure service industry, such as consulting service and judicial service, because the research problems in these industries may differ significantly from those of existing or traditional supply chain research. This study recommends that scholars adopt multiple methods – for example, combining empirical methods with models or algorithms with field experiments and multi-case analysis – and identify interesting behavioural factors in various industries, thereby enriching service supply chain research from the perspective of behavioural operations and presenting valuable recommendations for service supply chain managers.

Finally, from the perspective of research method, it is encouraged to use the combination of multiple methods to dig into the interesting research problems in the service supply chain.

Donohue and Schultz (2018) review 238 articles on behavioural operations, they find that nearly 30 per cent of papers in the publication set use at least two different methodologies to shed light on their research questions. The mainly used methods are analytical model, laboratory experiment and empirical method, including secondary data, survey and case study. In the 64 publications reviewed in this paper, the analytical model and empirical research are still the most widely adopted methods, and there is a lack in the use of laboratory experiment and field experiment. We are excited to see that some scholars have used the multimethod combination. For example, Song *et al.* (2011) use survey and case study method, López and Zúñiga (2014) use system dynamics and case study method, and Liu, Wang, Shen, Yan and Wei (2018) used Stakelberg game and make a case verification at the same time. Mutual verification of multimethod can provide a robust understanding of the research topic. Although this will increase the research difficulty, it is an inevitable trend with the deepening understanding of SSCM from the perspective of behaviour operations.

6. Conclusion

SSCM is an emerging trend in the field of supply chain management, with relatively few studies from a behavioural operations perspective. This paper selected 64 articles published between 2009 and 2018. These papers were systematically reviewed according to two dimensions: the first dimension is service supply chain link, which includes service supply management, service demand management, service integration management and service co-ordination management; the second dimension is behavioural factor. Based on the analysis of the literature, this study finds that different behaviour factors receive varying degrees of attention, with strategic behaviours receiving the most attention and forecast bias receiving the least. In addition, existing research has tended to focus more on service supply management and co-ordination management and less on service demand and integration management.

According to the overall analysis of the literature, this paper identifies three distinctive features of SSCM from the perspective of behavioural operations: abundant research issues, diverse research backgrounds and multiple methods and the greater attention of this research towards the combination of academia and practice. This study also identifies three major research challenges: service characteristics are difficult to quantify; service is not standardised; and systematic, comprehensive and multidisciplinary research is urgently needed. These challenges present research opportunities going forward. This paper also suggests five research agendas: demand-oriented management and integrated supply chain-oriented behavioural research; broadening the understanding of the scope of behavioural operations; integrating the latest backgrounds and trends of service industry into the research; greater attention to behavioural operations in service sub-industries; and multimethod combination is encouraged to be used to dig into the interesting research problems.

However, this study still has some limitations. First, due to limitations of time span, databases and selected keywords, some relevant literature may be omitted. Second, given the rapid pace of change in the service industry, this study may not cover all the valuable research topics.

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