Evolution of the e-commerce enabled short food supply chain (SFSC) in local context: A knowledge management perspective

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Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References.

Abstract

Reflecting on unsustainable outcomes triggered by the highly industrialised conventional food provision such as resource wastage and vanished producer-customer relationships, short food supply chain (SFSC) as an innovative food management concept has been invented since the last century to facilitate sustainable food provision and reinforce multiple proximities between food producers and customers, and its increasing practices nowadays are drawing more public attention. Nevertheless, despite flourishing application of practices of the SFSC, its theoretical development remains to be contributed as a number of its gaps require solutions—such as the lack of a broadly accepted and accurate definition, and the lack of strengthening its role of food provision in related to the SFSC's supply chain nature. In response, with the aim of contributing to gap solving, this research first develops and proposes a new definition based on the SFSC's theoretical essence as dual proximity—i.e., both supply chain and emotional proximities—that is identified through literature review. Then, by integrating the three complementary theories that are respectively introduced from the fields of knowledge and supply chain management—i.e., the knowledge-based view (KBV); the resource orchestration theory; and the supply chain evolution theory—into discussion, this research investigates and discloses a local supply chain evolution mechanism of a particular type of the SFSC practices—i.e., the e-commerce enabled SFSC, hence demonstrating how supply chain operation of the SFSC could emerge and evolve in the given local context. Moreover, as cases of China's Taobao villages—a booming Chinese rural economic phenomenon that is enabled by the e-commerce platform of Alibaba Group—are chosen to underpin the investigation, this research hence further contributes to theoretical development of the SFSC, since its theorisation has been face the lack of the experiences from world non-developed countries.

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Chapter 1: Introduction

The first introduction chapter introduces this doctoral thesis about understanding evolution of the e-commerce enabled short food supply chain in local context, and it has been grounded in interpretations of the diverse knowledge management activities which behind drive the supply chain evolutions of the three food e-commerce villages in China. In so doing, the chapter first demonstrates research logic leading to the topic and contribution. Then, it moves on to present design of the three research questions, which is followed by an explanation of thesis structure.

1.1 Research logic and contribution

The discussion about the alternatives to the conventional food provision can be traced back to the mid-20th century (Baker, 2008; Tudisca *et al.*, 2014), at the time when highly industrialised food production is criticised for abusing mechanisation; chemicals; intensive farming practices; and being dominated by global markets (Volpentesta *et al.*, 2013), which then together lead the conventional food provision to slowly detach from its social, environment and economic bases and trigger a series of issues—such as environmental pollution; resource wastage; deterioration of diversity; and cost-price squeezes (Ilbery *et al.*, 2006; Baker, 2008; Levidow and Psarikidou, 2011). Besides, this detachment also causes food supply chains monitored by large companies to significantly expand, resulting in increases of the structural complexity of supply chain that diminishes the closeness between food producers and customers (Chiffoleau, 2009; Volpentesta *et al.*, 2013). In consequence of all these, a series of food scandals such as dioxin contamination and the outbreaks of foot-and-mouth disease break out in the 20th century, and they soon fuel a wider social movement that seeks innovative food management alternatives to the conventional food provision, in which concept of the short food supply chain (SFSC) arises and its practices begin to rapidly grows (Marsden *et al.*, 2000; Chiffoleau, 2009; Charatsari *et al.*, 2018).

In contrast with the industrialised conventional food provision, practices of the SFSC focuses on facilitating multiform proximities in producer-customer relationship and providing quality food products that are different from the mass-produced ones (Renting *et al.*, 2003; Blasi *et al.*,

2015). Although such a concept is not modern because similar practices—such as food trading happened in neighboring areas—have been historically common and still existed in the places where public infrastructure is underdeveloped (Tudisca *et al.*, 2014; Dubois, 2019), nonetheless, rethinking of the SFSC in this modern era has deeper meanings, especially when it is conceived alongside development of the conventional food provision (Enjolras and Aubert, 2018; Malak-Rawlikowska *et al.*, 2019). In this regard, the SFSC to date is interpreted in terms of political-economy, sociality, territorial governance, etc., hence reflecting new meanings of repositioning and resocialising food productions of the global markets or highly industrialised practices, and also of fighting social exclusion and promoting fair trade (Marsden *et al.*, 2000).

Due to these innovative new meanings and significance of the SFSC in providing a solution to those unsustainable issues triggered by the conventional food provision, it is observed that lots of attentions are given to the SFSC from the government level, especially in a number of world developed countries in where practices of the SFSC are rapidly growing (Bimbo *et al.*, 2015; Eugenio *et al.*, 2017; Popp *et al.*, 2018). For instance, American government sees the SFSC as an important tool to facilitate new food citizenships; agrarian citizenships; and civic agriculture, and it has positive impact on promoting residents' access to food and nutrition, which therefore leading the number of American farmer markets—a common form of the practices of SFSC—to triple from 1,755 to 5,274 between 1994 and 2009 alone (Hergesheimer and Wittman, 2012; Bimbo *et al.*, 2015). Comparing with cases of the Western Hemisphere, numerous efforts have been made by European developed countries in the Eastern Hemisphere where most of existing practices and discussions of the SFSC are generated (Renting *et al.*, 2003; Bimbo *et al.*, 2015; Enjolras and Aubert, 2018). According to the EU regulation No. 1305/2013 and the Common Agricultural Policy 2014-2020, advocation of the SFSC has been officially defined as a priority in securing long-term sustainability and development of European rural regions (Giampietri *et al.*, 2016).

Although more than 20 years have passed since arising of the SFSC, nonetheless, the researcher suggests understanding of this innovative food management concept remains insufficient after

reviewing literature of research of the SFSC, which is also reflected by the identified lacks of researchers' common views on basics of the SFSC—such as the lack of a widely recognised definition—and the lack of the timely summary of research achievements and gaps (Renkema and Hilletofth, 2022). As a conclusion, these evidence pieces jointly indicate the urgent demand of re-assessing theoretical route and future directions of the SFSC research, which hence leads the researcher to plan on fulfilling this demand. Nonetheless, such a plan is rather challenging, considering the potential restrictions caused by complexities and diversity of the SFSC—such as diverse typologies, definition confusion and the SFSC's unclarified relations to other similar food management concepts (Grant and Booth, 2009; Ilbery *et al.*, 2006; Kneafsey *et al.*, 2013). In this regard, the researcher decides to follow the philosophical stance of interpretivism and repositions the idea of this research as a beginning of future discussions, determining its main contribution as introducing broader research avenues via developing an insight into operation and evolution of a particular type of the SFSC practices—i.e., the e-commerce enabled SFSC—that requires more attentions than the other types at the moment.

To facilitate discussion of this research, cases sampled from China's Taobao villages—a group of rural villages that dedicate to the e-commerce enabled by Taobao.com—is chosen, after they are justified as having strong connection with concept of the SFSC. Additionally, as a booming economic phenomenon in a developing country, Taobao villages' participation in this research also solves the lack of experiences of world non-developed countries in current research of the SFSC. Overall, a total of three Taobao villages that selling food products are chosen to serve this research—i.e., Yuezhuang village of apple e-commerce; Daxing'zhuang village of seafood e-commerce; and Bainiu village of hickory nut e-commerce.

Along with determination of the main research contribution, three complementary theories—i.e., the knowledge-based view (KBV); the resource orchestration theory; and the supply chain evolution theory—are chosen to cooperate with extant knowledge of the SFSC so they jointly underpin interpretation and understanding of evolutions of the e-commerce enabled SFSC in local contexts of the three Taobao villages. Moreover, choosing of these three complementary

theories reflect an important decision of the researcher that this research is from the perspective of knowledge management, which is a result of the literature review finding that operation of e-commerce enabled SFSC is highly associated with a number of knowledge possession and utilisation activities. Furthermore, to facilitate capacities of the chosen complementary theories in research discussion, the researcher integrate the three into an initial conceptual framework showing the research pathway of "possessed knowledge—resource orchestration—measurable or evaluable performance" (Asiaei *et al.*, 2021) so that later data collection and both within and cross-case analyses can be better guided in practice.

1.2 Research question design

In summary, to fulfill the research goal as understanding evolution of the e-commerce enabled SFSC in local context that is through the knowledge management perspective, a total of three research questions are designed, they include:

RQ1: *How does knowledge management help to explain the evolution of the e-commerce enabled SFSC?*

This first question directly addresses the research goal—i.e., understanding evolution of the e-commerce enabled SFSC in local context. To answer this question, substantial work is required after the initial conceptual framework is generated and put into action, and it includes reflecting on the similarities and differences between findings and the initial conceptual framework, and also on the theoretical and practical experiences gained from literature review; data collection; and data analysis. Such a process ensures that this question is answered by in-depth reflections that jointly disclose a local mechanism of knowledge management through which local supply chains are underpinned to operate and evolve.

RQ2: *How do knowledge management activities affect the evolution of the e-commerce enabled SFSC in a local context?*

After knowing how evolution of the e-commerce enabled SFSC is underpinned in local context, this second question represents a further demand to discover effect of knowledge management

activities—especially to discover how supply chain evolution and the diverse contents of local context are connected because of the activities. In so doing, effort is made to examine the four knowledge management activities of Chaffey *et al.*(2015)—i.e., identifying, creating, storing and sharing—that are defined as enabling managers to acquire knowledge from local context, according to findings of literature review.

RQ3: *How could findings from case studies in Taobao villages contribute to SFSC research?*

This third question is designed to discuss the potential contribution of the three cases of Taobao villages—i.e., Yuezhuang village of apple e-commerce; Daxing'zhuang village of seafood e-commerce; and Bainiu village of hickory nut e-commerce, apart from their basic contribution of underpinning the interpretation of local supply chain evolution. In summary, as research of Taobao villages has been restricted to sociological discussion—such as the villages' impact on rural transformation—and shown the lack of supply chain thinking, the researcher attempts to find how Taobao village cases continuously contribute to the broader SFSC research, to which future researchers can refer.

1.3 Thesis structure

Overall, this thesis is structured into seven chapters (See Figure 1). **First of all**, the introduction chapter plays the role of providing research brief at the thesis beginning, and its object is about presenting background information and demonstrating designs of the three research questions that reflect the four key research components—i.e., the e-commerce enabled SFSC; knowledge management; local context; and cases of Taobao villages. **Second**, the literature review chapter plays the role of laying research's theoretical foundation, and its main objects include preparing knowledge reserve; identifying the primary gap of the SFSC research by answering the review questions; forming the research goal; and also generating the initial conceptual framework that guides later research stages. In particular, for the research goal of understanding evolution of the e-commerce enabled SFSC in local context, its formation is finished by a series of literature reviews and answering review questions, during which the starting idea of contributing to the

SFSC knowledge is first narrowed down to the intention of examining upstream operation of the e-commerce enabled SFSC, and then the intention is further narrowed down to the research goal which at the same time emphasises adoption of the knowledge management perspective. **Third**, the research methodology chapter plays the role of designing research, and its object is about planning research conduction and putting data collection into practice. Furthermore, in this SFSC research adopting interpretivism stance and methodology of multiple case study, its data saturation is found reached after a total of three Taobao village cases and 30 interviewees are included, hence the collected data are sufficient to support case analysis.

Moving on to the **fourth** chapter of within-case analysis, it plays the role of presenting findings of single cases in case study research, and its object is about displaying the data collected from the three Taobao village cases—i.e., Yuezhuang village of apple e-commerce; Daxing'zhuang village of seafood e-commerce; and Bainiu village of hickory nut e-commerce, through which insights and understanding of the SFSC operations and evolutions of the three Taobao villages are then drawn. Thereafter, the **fifth** chapter of cross-case analysis plays the role of presenting and comparing findings of multiple cases in case study research, and its object is summarising and analysing the similarities and differences across findings of the three cases, which is mainly associated with managers' acquisition, possession and utilisation of knowledge, and also with the caused operational and evolving outcomes of the SFSC. **Sixth**, the discussion chapter plays the role of analysing findings and research result, and it has the object of answering the three research questions after reflecting on the result of cross-case analysis. More importantly, when answering the questions, the researcher proposes a total of seven research propositions which jointly disclose a unique local mechanism of the SFSC operation and evolution. **Seventh**, the final chapter of conclusion plays the role of critically summarising the accomplished research, and its objects include introducing research contributions; discussing research limitations; and providing opportunities for future discussions.

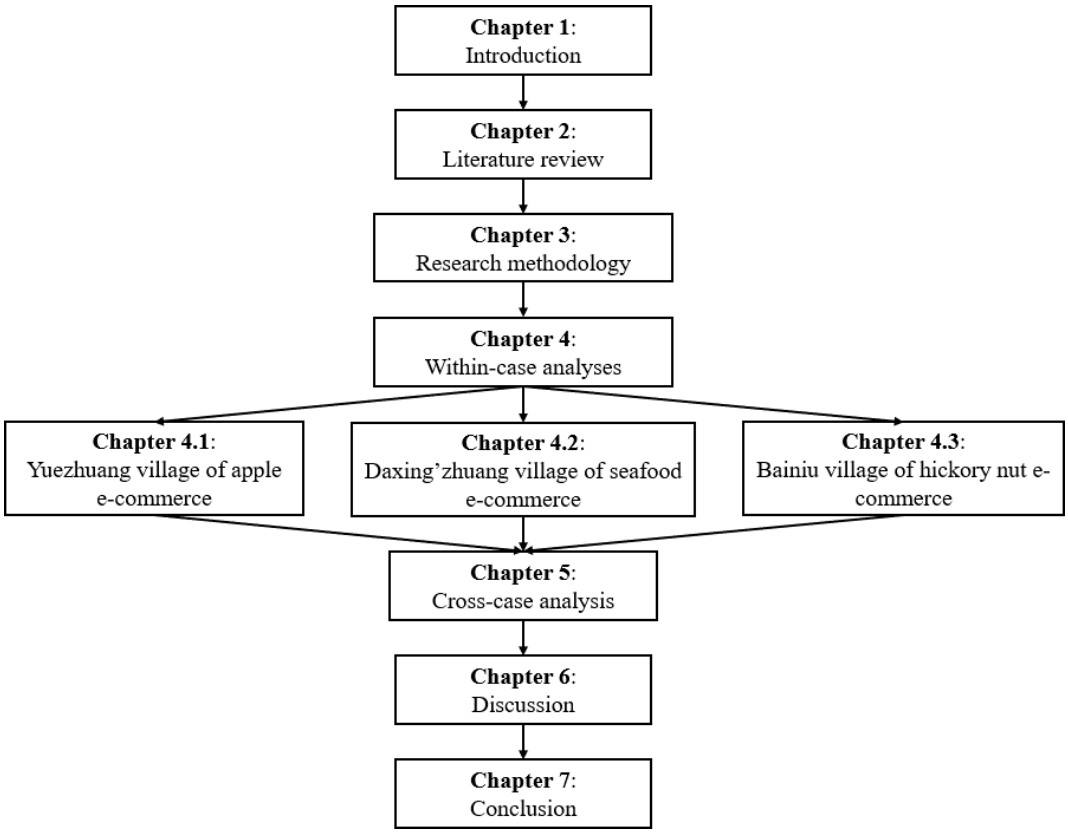

Figure 1. Thesis structure

Chapter 2: Literature review

This chapter 2 demonstrates literature review findings and result that lead to the research goal of understanding evolution of the e-commerce enabled SFSC in local context (See Figure 2). This chapter first offers an introduction of the SFSC basics in terms of definition and typology. Then, the chapter moves on to justify the systematic search and review approach as the suitable approach for literature review, which is followed by a summary that illustrates current research of the SFSC and it helps identify the primary research gap as developing knowledge of the e-commerce enabled SFSC—a particular type of the SFSC practices enabled by e-commerce.

Thereafter, this chapter reviews identified literature of the e-commerce enabled SFSC to form a knowledge base for the researcher, and it continues to perform other literature reviews of the three complementary theories that are chosen to enhance the explanatory power and problem-solving capacity of research discussion—i.e., the knowledge-based view (KBV); the resource orchestration theory; and the supply chain evolution theory. More importantly, verification of the connections between the three theories leads to an initial conceptual framework that guides later research stages of data collection; within and cross-case analyses; and discussion.

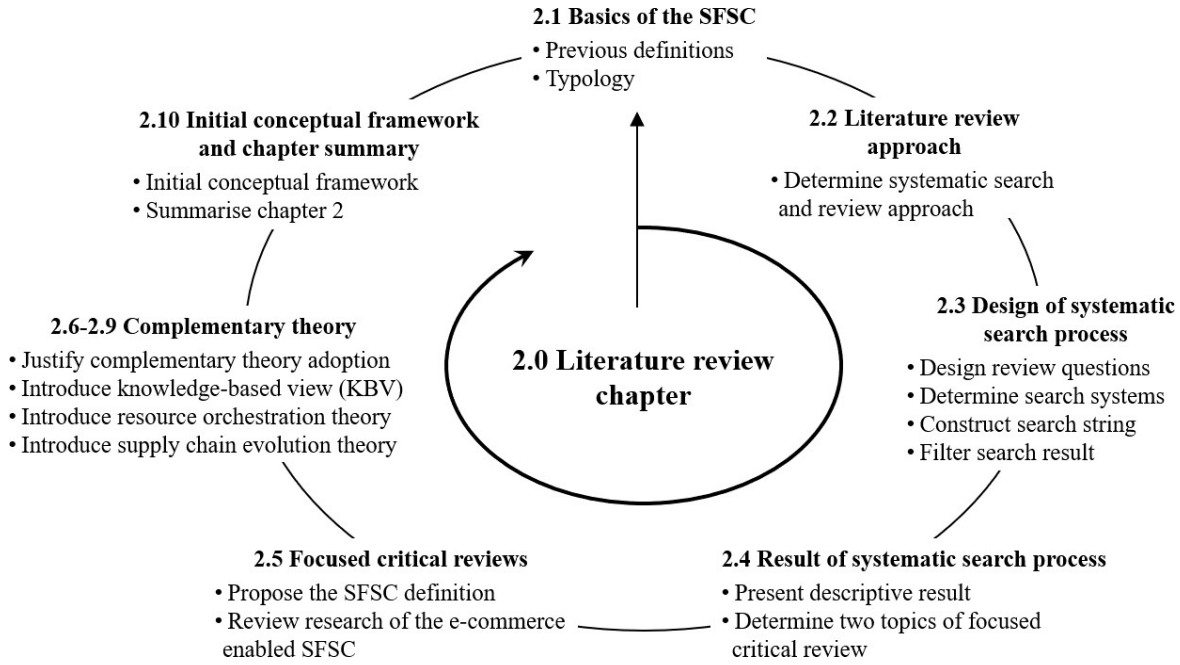

Figure 2. Outline of chapter 2

2.1 Basics of short food supply chain knowledge

Before starting the review process, this section introduces knowledge basics of the definition and typology of SFSC, in which the present confusion of defining the SFSC is identified and it shows an urgent need to redefine the SFSC through literature review.

Interpretations of the SFSC have been carried out throughout its theoretical development by a series of discussions; national authorities; and organisations (Kneafsey *et al.*, 2013; Kneafsey, 2015; Augère-Granier, 2016). However, because those interpretations often use the term "short food supply chain" to reflect a variety of social meanings and criteria (Jarzębowski and Bezat, 2018), confusion has arisen in how to accurately define the SFSC (See Table 1). Therefore, to prevent this research from being affected by the confusion, the researcher decides to propose a new definition based on the previous researchers' experiences and the planned literature review of the SFSC.

Table 1. Definitions of the SFSC

Source	Meanings or Criteria	Definition
EU regulation No. 1305/2013 (later supplemented by regulation No. 807/2014)	Supply chain, social relationship, regional development, number of intermediaries	The SFSC is the supply chain with limited economic operators and it commits to co-operations, local economic development and the **geographically and socially close relationships in between producers, processors and customers**; moreover, the SFSC has at most one intermediary between producers and customers.
French Ministry of Agriculture, Food and Forestry (2009)	Marketing, number of intermediaries	The SFSC is the marketing model that involves the **direct sales between producers and customers** and the **indirect sales with no more than one intermediary.**
Marsden *et al.* (2000)	Emotional relationship, embeddedness, information transmission, customers' perception	The SFSC triggers connection between producers and customers and allows food products to reach to customers with **embedded information**; thus, the SFSC enables customers to establish close associations with the production places and methods.
Ilbery and Maye (2005)	Constructions of new norms and standards	In addition to product exchanges, **relationships between producers and customers** in the SFSCs involve constructions of knowledge; value; and the meanings of product and product provenance, production and consumption, and producers and customers themselves.
Peters *et al.* (2012)	Geographical distance, supply chain, number of intermediaries, emotional relationship	The SFSC emphasises the **short distance between production and sales** ("*as short as possible*"), **the minimum intermediaries** ("*as few as possible*"), and **the promoted understanding and communications between producers and customers**.
Slow Food Foundation for Biodiversity (2011)	Social relationship, strategy, promotion of producers, number of intermediaries, geographical distance	The SFSC is created when producers and customers are aware of the same goal they share; the SFSC is an alternative strategy that enables producers to play the active role in local food system and it dedicates to **minimising the number of involved processing steps and the food miles in food provisions**.

Progress achieved in the discussion of typology is another critical knowledge basics of SFSC. In summary, besides categorising the SFSC by region or food type that cause fragmented result (Nakandala and Lau, 2019), the SFSC is normally categorised by the way via which customers perceive closeness towards food processing and production, hence including the face-to-face SFSC; the proximate SFSC; and the spatially extended SFSC (Marsden *et al.*, 2000) (See Table 2). However, despite this categorising method of Marsden *et al.* (2000) being widely applied and acknowledged by the public, the researcher argues that the method's exclusion of supply chain intermediary is debatable, especially when the SFSC as well is a supply chain knowledge, and the critical role of intermediary is verified by influential research institutions—such as the Council of Supply Chain Management Professionals (CSCMP) (Gibson *et al.*, 2005; Engelseth, 2016).

Table 2. Categorising method of Marsden *et al.* (2000)

Types	Explanations	Examples
Face-to-face SFSCs	Customers purchase products directly from producers and therefore immediately perceive production information via **face-to-face interactions.**	Farm shops, farmers' markets, roadside sales, food fairs
Proximate SFSCs	Products are produced and marketed in a specific **region** in where customers can instantly be aware of localness of the products.	Community-supported agri-food business, local schools' procurements of meals, local outlets and restaurants that source from regional farmers
Spatially extended SFSCs	Through the **information embedded** in products, customers who are **outside the production region** or have no experience of that region still perceive closeness to production when purchasing.	Agricultural e-commerce business, food exports guaranteed by the Protection of Designated Origin (PDO) or the Protected Geographical Indications (PGI)

2.2 Justification of systematic search and review approach

To understand the latest situation of SFSC research, the systematic search and review approach is chosen to assist capturing, examining and summarising the result of extant literature. Overall, since being able to facilitate explorations of diverse knowledge and to generate or refine initial

research idea (Saunders *et al.*, 2009; Tranfield *et al.*, 2003), literature review has been widely performed across academic disciplines and becomes a vital part of research (Meredith, 1993; Easterby-Smith *et al.*, 2002). Therefore, after determining the initial idea of contributing to the SFSC knowledge, the researcher decides to refine it via the literature review of the SFSC. And when seeking for the suitable literature review approach, the work of Grant and Booth (2009) in summarising literature review types allows the researcher to form a comprehensive insight for comparison and making choice.

Besides the work of Grant and Booth (2009), an exploratory overview was performed by the researcher in September 2019 to form the first understanding of the SFSC knowledge and assist making choice, which includes the papers and reports collected from the Google Scholar using "short food supply chain" as the search string; for example, the four rated by Charatsari *et al.* (2018) as the representative studies—i.e., Marsden *et al.* (2000); Renting *et al.* (2003); Ilbery and Maye (2005); and Kneafsey *et al.* (2013). Thereafter, based on the above preparations, the researcher first eliminates the two options of the meta-analysis review and the mixed studies review/mixed methods review, since these two are grounded in the quantitative techniques that are not been chosen for conducting this research. Then, for other options of the umbrella review; the scoping review; and the qualitative systematic review/qualitative evidence synthesis, they are eliminated as the result of exploratory overview suggests that extant literature fails to show research consistency due to the unclarified confusion in the SFSC knowledge, and it causes the shortage of the timely summative works and quality assessments that are required by the three reviews. In consequence, after a series of eliminations, the researcher decides that the choice of review approach is made among the rest options of the critical review; the literature review; the overview; the systematic review; the systematic search and review; and the systematised review.

When comparing the rest of these six types of literature reviews, the researcher discovers that they can be divided into two groups by whether explicit systematic procedure is required when being performed (See Table 3). In this regard, the researcher then questions the less systematic

reviews—i.e., the overview; the literature review; and the critical review—because their shared feature of being inexplicit and unstructured could lead to literature review result that is more vulnerable to bias (Grant and Booth, 2009). Moreover, the researcher doubts the necessity of performing a fully systematic literature review, as the previous exploratory overview suggests that SFSC research has faced multiple issues involving the shortage of timely reviews (Wubben *et al.*, 2013; Renkema and Hilletofth, 2022); the participation of non-English discussion in the earlier period (Murdoch *et al.*, 2000; Rogers and Fraszczak, 2022); and the unclarified relations between the SFSC and other similar concepts—i.e., the alternative food network and the local food system (Volpentesta *et al.*, 2013; Chiffoleau *et al.*, 2016; Sureau *et al.*, 2019). As a result, thoroughly tracking the argumentations in the extant literature is overchallenging and beyond the researcher's plan of narrowing down the research intention.

Also, the researcher eliminates the option of performing the systematised review because it is not recommended for assisting higher standard research, but Master's assignments (Grant and Booth, 2009). Finally, the researcher determines the systematic search and review as the chosen literature review approach, especially after considering its benefit of allowing literature review to focus on identifying, reviewing and contributing to a specific knowledge aspect. In addition, the systematic search and review approach will be cooperated with rigorously designed process to minimise its weakness when in practice (Grant and Booth, 2009).

Table 3. Comparing the six approaches (Grant and Booth, 2009; Mallett *et al.*, 2012)

	Perceived strengths	Perceived weaknesses
Overview	It provides a broad and often comprehensive summation of the topic area and it has value for those coming to a subject for the first time.	In contrast to the systematic overview/review, it normally represents other types of overview that particularly face the lack of systematic methods and explicit reporting.
Literature review	It seeks to identify what has been previously achieved in research, hence especially benefiting consolidation; building on previous work; summation; avoiding duplication; and identifying omissions or gaps.	As it has no explicit intention to maximise the review scope or data, its result could be more open to bias.
Critical review	It allows innovation to develop via the process of evolution or accretion, with each successive version adding to the predecessors. By being critical, it benefits value evaluation of the previous works as well as resolving competing schools of thought; it fits assisting conceptual development and subsequent testing.	In practice, it does not particularly demonstrate systematicity; search methods; synthesis; and analysis explicitly. It faces the lack of quality assessment and objective interpretative elements.
Divide: whether explicit systematic procedure is required when being performed		
Systematic review	As the best-known literature review type, it seeks to draw together all known knowledge in a topic area. It is valuable as it helps increase review breadth; improve transparency; and emphasises empirical evidence over pre-conceived knowledge.	Its single study design often makes the review lose inclusiveness, so its procedure regarding timeframe or data resources should be rigorously designed.
***Systematic search and review (chosen)**	It combines strength of critical review with comprehensive search process. Its broad scope benefits multiple types of research.	Its result could become a subjective selection of the literature supporting a specific line of argumentation, if there is no explicit inclusion and exclusion criteria and no clearly defined synthesis process.

Systematised review	In practice, it is like the simplified systematic review with lower standards. It follows comprehensive search but without much cataloguing searched literature.	As it prioritises satisfying academic demand over considering methodology, its result could be more open to bias.

2.3 Systematic search and review process

After the review approach is determined, this section further informs details of the subsequent literature review process which includes setting up review questions; selecting search systems; constructing search strings; and filtering search result. Overall, design of such a comprehensive review process will enable a solid basis for later identification of critical review topics, showing consistency and systematicness of this research.

2.3.1 Set up literature review questions

Considering the complex issues in SFSC research that are disclosed by the previous exploratory overview, three review questions are set by the researcher to ensure a focused literature review when in practice:

- **How is the development of SFSC research at the present time?**
- **What are the gaps in current SFSC research?**
- **How to define the concept of SFSC?**

In summary, the first question allows the researcher to first map the overall situation of current SFSC research, collecting detailed information by comprehensive search process of the chosen systematic search and review approach. Then, the second question aims to drive the researcher to analyse the obtained detailed information, shaping the initial research idea and thus leading to a refined research intention. Finally, the third question enables the researcher to find solution to the definition confusion in SFSC research, and proposing of a new definition is vital to this research.

2.3.2 Search systems selection

To underpin literature review using the chosen systematic search and review approach, several online search systems and their databases have been selected. More importantly, selections are made after consulting the summative work of Gusenbauer and Haddaway (2020), in which they comprehensively examine a range of online search systems and determine 14 of them are rather

effective in underpinning the reviews using systematic searching (See Table 4). Based on their recommendations, the researcher examines accessibility[1] and primarily covered subjects of the 14 systems, and hence decides to select EBSCOhost; ProQuest; ScienceDirect; Scopus; Web of Science; and Wiley Online Library to serve thoroughly capturing literature from the field of SFSC research. In addition, Google Scholar is excluded from the researcher's selections, as it is not a principal search system. (Boeker *et al.*, 2013; Gusenbauer and Haddaway, 2020).

[1] Data accesses of this review are from e-resources of the University of York; see full list of the search systems or databases that are of the university at: <https://subjectguides.york.ac.uk/az.php>.

Table 4. Features of the fourteen most effective search systems for systematic searching (Gusenbauer and Haddaway, 2020, p.198-201)

Name of search system	**Primary subject**	**Size** (by 2019)	**Retrospective coverage**	**Search string length** (characters)
ACM Digital Library	Computer science	2,000,000+	1947	100
Bielefeld Academic Search Engine (BASE)	Multidisciplinary	144,252,584	Unknown	100 ≤ 1,024
ClinicalTrials.gov	Medicine	301,373	1999	37
Cochrane Library	Medicine	1,317,434	1908	100
***EBSCOhost (selected)**	Multidisciplinary	41,603,758 for education studies, health studies, economics and sports studies	1800	1,000
OVID	Health studies	34,000,000+ for studies of the sciences of psychology, society, behaviour and health	1806	500 ≤ 1,000
***ProQuest (selected)**	Multidisciplinary	37,144,472 for studies of business, management and health	1855	25 ≤ 50
PubMed	Health studies	29,000,000+	1790	1,000
***ScienceDirect (selected)**	Multidisciplinary	15,000,000+	1823	Approx. 8 ≤ 25
***Scopus (selected)**	Multidisciplinary	70,000,000+	1861	1,000
Transport Research International Documentation (TRID)	Transportation studies	1,200,000+	1900	100

Virtual Health Library	Health studies	865,836	1902	1,000
***Web of Science (selected)**	Multidisciplinary	73,000,000+	1900	1,000
***Wiley Online Library (selected)**	Multidisciplinary	8,000,000+	1798	100

2.3.3 Search string construction

During the previous exploratory overview, two studies are found attempting to construct search strings for capturing the literature of the field of SFSC research—i.e., Kumar *et al.* (2018) and Paciarotti and Torregiani (2020) (See Table 5). However, the researcher criticises effectiveness of their strings, as they exclude the term "alternative" —the SFSC is once named as "alternative food supply chain" in research (Ilbery and Maye, 2005; Chiffoleau, 2009; Heiss *et al.*, 2015), and they are as well affected by the unclear connections in between the SFSC and other similar concepts—i.e., the alternative food network and the local food system. Hence, the researcher decides not to consult the previous strings but construct a new search string to better serve the planned literature review.

Table 5. Previous search strings

Literature info.	Research goal	Search string
Exploring short food supply chains from triple bottom line lens: A comprehensive systematic review (Kumar *et al.*, 2018)	To understand how the SFSC commits to sustainability by focused systematic review.	● "short food supply chain", "sustainable food supply chain", "sustainability & food", "short supply chain & food", "alternative food networks" and "local food system"
The logistics of the short food supply chain: A literature review (Paciarotti and Torregiani, 2020)	To understand the role of logistics in improving effectiveness and sustainability of the SFSC by literature review.	● "short food supply chain" OR "local food systems" OR "alternative food network"

Overall, by reflecting on the two previous strings (Kumar *et al.*, 2018; Paciarotti and Torregiani, 2020), the researcher is aware of the importance to make the new string display supply chain nature while involving historical terms of "alternative" and "local"—the SFSC is once named as "local food supply chain" in research (Filippini *et al.*, 2016; Nakandala and Lau, 2019). Also, because accepted search operators of the selected six online search systems are different from each other[2], the new string shall also be able to ensure its inclusiveness and effectiveness when

[2] For example, search operators such as NEAR/n, PRE/n, and EXACT are only accepted by ProQuest, Scopus, and Web of Science (partially) but not by ScienceDirect, Wiley Online Library, and EBSCOhost; please see full search instructions via the homepages of the six selected search systems.

being applied to the six systems respectively. Finally, after considering the problems above, the new search string is constructed as follow:

("short food" OR "alternative food" OR "local food") AND ("supply chain" OR chain)

In addition, it is noteworthy that the term "circuits court"—which occasionally appears in some early studies in SFSC research—is actually the French expression of "short food supply chain", and this term is excluded from the string as it is not yet universal in English literature (Rogers and Fraszczak, 2014).

2.3.4 Search result and literature filtering

After being constructed, the new search string is applied to each of the online search systems and their databases (See Table 6), and it is only applied for the searching of titles and abstracts rather than full texts for higher accuracy. The searching has been conducted three time between October 2019 and November 2020 without setting time restriction, so it ensures that literature is captured thoroughly. And to secure quality of the captured literature, the searching is limited to the peer-reviewed English journal papers only and the document type is limited to the article.

Table 6. Selected databases

Name of search system	Selected databases
EBSCOhost	**Business Source Premier**: the industry's most used business research database. **GreenFILE**: covering all aspects of the human impact to environment. It includes contents on global warming; green building; pollution; sustainable agriculture; renewable energy; recycling; etc.
ProQuest	**PAIS Index**: covering public affairs; public and social policies; international relations in social science. **Publicly Available Content Database**: it is designed to complement other databases.
ScienceDirect	**SciVal**: it uses bibliometric data from Scopus to provide analyses of over 4,600 research institutions and 220 countries worldwide.
Scopus	**Scopus Database**: Elsevier's abstract and citation database.
Web of Science	**Web of Science Core Collection**: it has over 21,100 peer-reviewed, high-quality scholarly journals published worldwide in over 250 sciences; social sciences; and arts &

	humanities disciplines.
Wiley Online Library	**Wiley Online Library Database**: owning a large collection of several hundred full-text journals across a variety of the subject areas in life science; physical science; medical science; technical science; and social science.

Following the searching, the researcher designs two sets of inclusion and exclusion criteria to help filter the captured literature. In summary, the set A is designed to guide the filtering when the researcher navigates through the articles' titles and abstracts, and the set B is designed to provide the benchmark of identifying core literature when the captured is filtered again by full texts (See Table 7).

Table 7. Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Set A (for filtering by titles and abstracts)	● Articles cover discussion of a food practice that is related to supply chain and is identified as being different to conventional practice.	● Articles dedicate to informing non-management studies, such as ecological study; biological study; and health study. ● Articles clearly claim the focus on the alternative food network or the local food system.
Set B (for filtering by full texts)	● Articles intend to contribute to SFSC research. ● Articles contribute to the SFSC related discussion with/without realising it, such as an article contributed to discussion of the direct sales of European mountain food.	● Articles discuss the supply chain practice but the practice cannot be further identified as having no more than one intermediary in between food producers and customers. ● Articles only mention or refer to the SFSC without giving adequate discussion.

As the result of the searching, a total of 151 peer-reviewed journal articles are identified as the core literature in current SFSC research, and they would form the base on which the literature review is performed (See Figure 3).

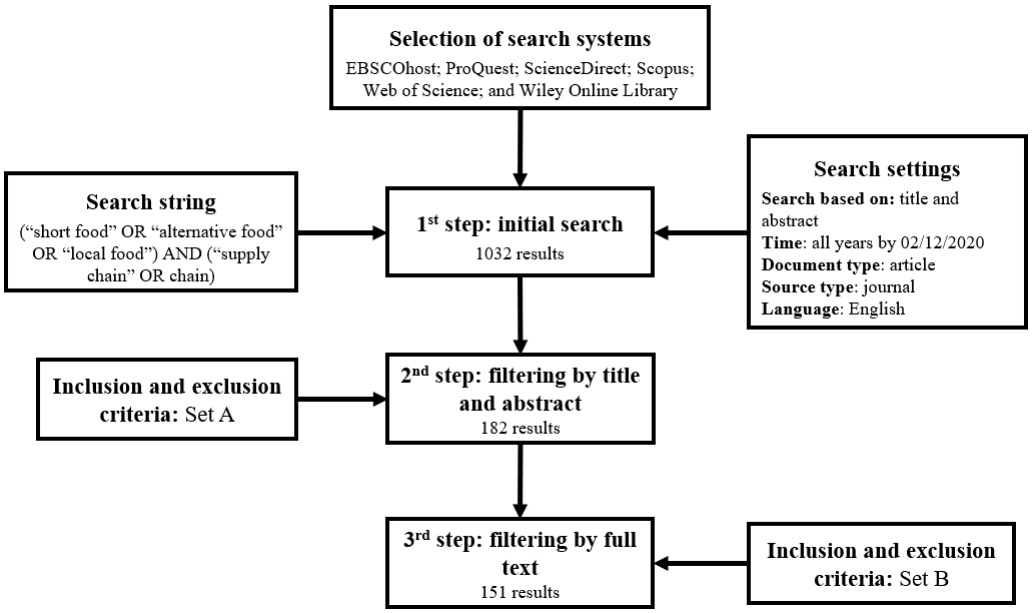

Figure 3. Identification of core literature

2.4 Descriptive review result

After the core literature is collected, this section discovers the gaps in current SFSC research. And in doing so, the collected 151 articles are thoroughly reviewed for reaching the descriptive result that demonstrates the current situation of SFSC research, which hence triggers discovery of the first gap of understanding the e-commerce enabled SFSC—a particular type of the SFSC practices, and also the second gap of the current SFSC research facing the lack of supply chain examinations. More importantly, discovery of the two gaps shapes the initial research idea, thus leading to the research intention as understanding evolution of the e-commerce enabled SFSC in local context. Additionally, this section helps answer the first and second review questions i.e., "*How is the development of SFSC research at the present time?*", and "*What are the gaps in current SFSC research?*".

Mapping the situation of current SFSC research allows the researcher to focus on identifying, reviewing and contributing to a specific aspect of SFSC knowledge, and its fulfilment would require a series of summaries; illustrations; and descriptions of the features showed throughout the research history. In this regard, a figure is firstly produced to summarise the historical trend

of SFSC research, in which all 151 articles as the core literature are put into the statistic of their publication years (See Figure 4), and it is observed that the overall trend has been divided into two phases by the year 2012. To summarise, the first phase lasting before 2012 is in which the SFSC research gradually emerges and forms into shape in its early stage, and the second phase lasting after 2012 shows a flourishing sharp rise of the SFSC research that temporarily reaches its peak in 2020. And based on the rising trend on the figure, the SFSC research is expected to continue rising in the next years.

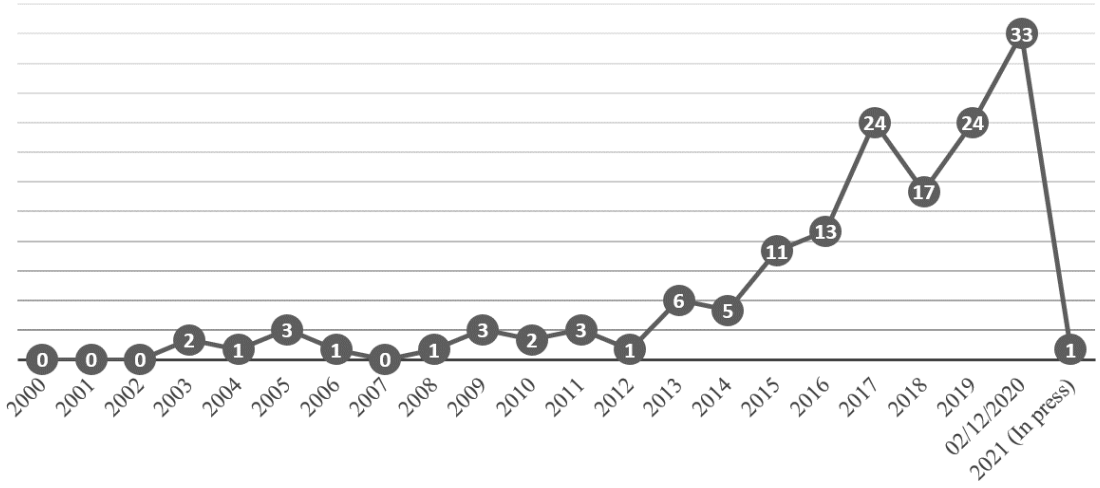

Figure 4. Core literature by publication year

After the historical trend of SFSC research is informed, another statistic is produced to enable origin knowing of the used cases (See Figure 5). In particular, case study by far is the primary research method in the discussions, and the previous researchers often employ it to differentiate or assist interpretation of various SFSC practices. All in all, it is discovered that cases of the European developed countries have dominated the SFSC research, and the behind reason could be the fact that many European countries long-term see the SFSC as an important solution to help integrate food provision and sustainability for food management, in which Italy; France; UK; and Spain become the most active countries leading this trend. Nonetheless, this discovery of case origins reflects the demand of informing experiences from those non-European or non-developed countries.

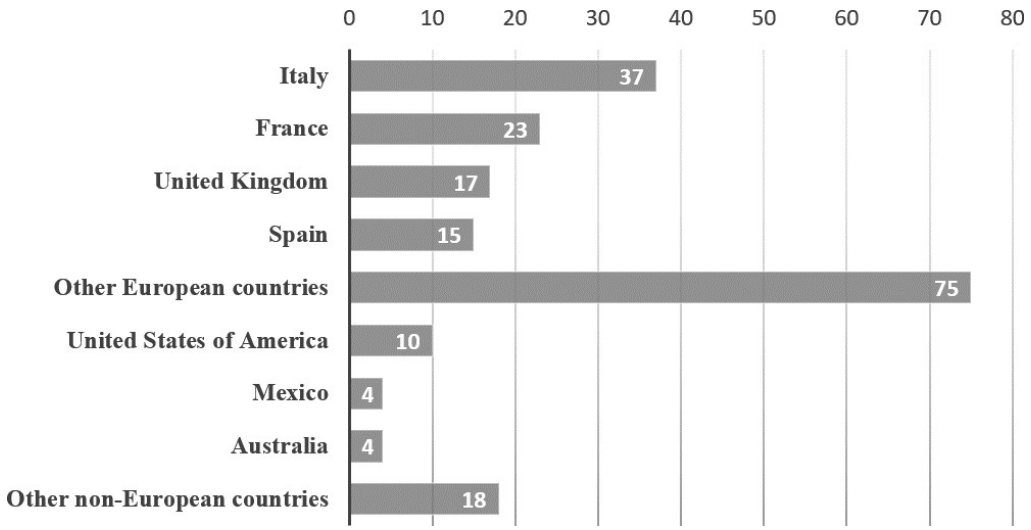

Figure 5. Case origins in current SFSC research

Besides case origins, the previous researchers' emphasis of food types is another critical feature discovered in current SFSC research, since food types are widely recognised as the determinant to features and outcomes of the SFSC practices. For instance, the SFSC practices of livestock products have been frequently described as a special type, because processing and production of livestock products are rather special and exclusive comparing with other foods (Ilbery and Maye, 2005; Plakias *et al.*, 2019). In this regard, the Figure 6 summaries all food types involved in the 151 articles, by which it is discovered that vegetables (e.g., potatoes; carrots; asparagus) and livestock products (e.g., meat; cheese; milk) are the most discussed types, while fruits (e.g., apples; peaches; berries) and processed foods (e.g., red wine; bread; olive oil) follow.

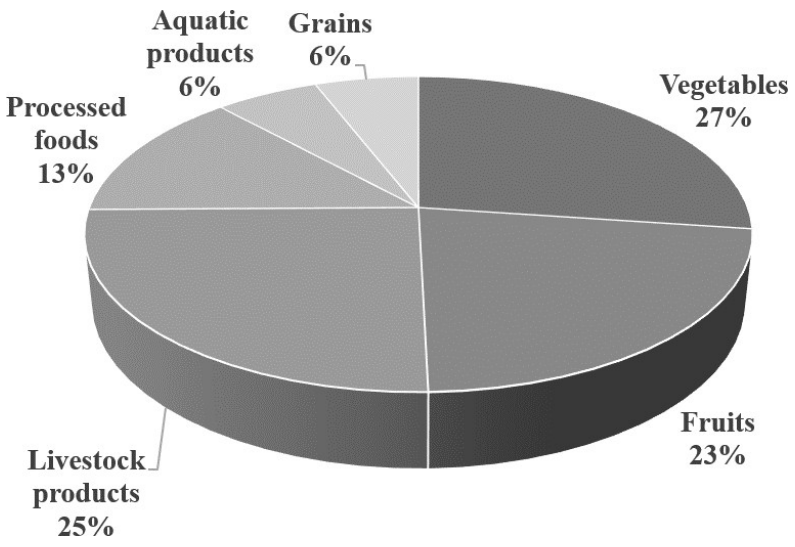

Figure 6. Food types in current SFSC research

As being previously introduced, the SFSC practices are categorised into three types by the way through which customers perceive closeness towards food processing and production—i.e., the face-to-face SFSC; the proximate SFSC; and the spatially extended SFSC. And to understand how they have affected the current SFSC research, effort is made by the researcher to produce statistic of these three types in the 151 articles, and the final result is displayed in the Figure 7. Overall, comparing with the other types that together dominate the current SFSC research, the research gap of understanding the e-commerce enabled SFSC—a particular type of the SFSC practices and also a form of the spatially extended SFSC—is discovered, which hence shapes the research idea and orients the researcher's intention towards contributing to the knowledge of e-commerce enabled SFSC.

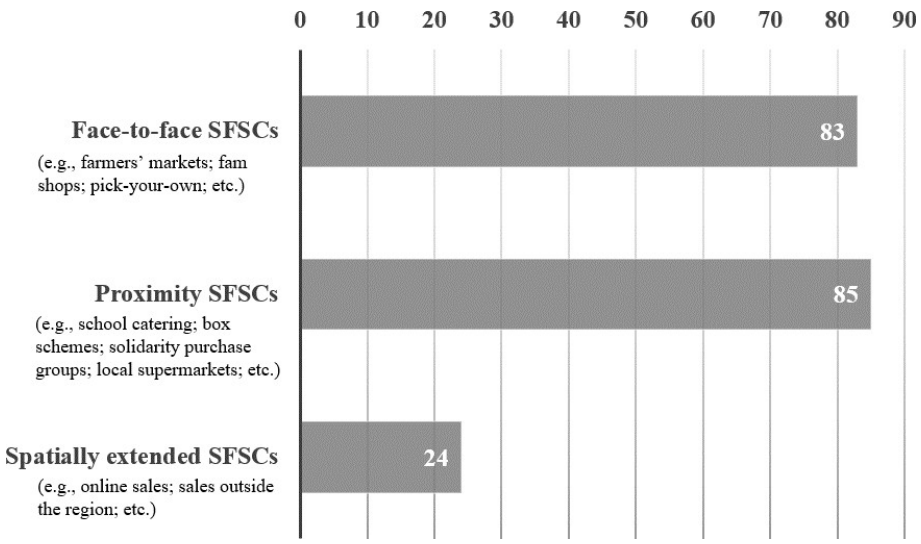

Figure 7. SFSC types by article number

Several other figures are produced by the researcher to summarise more detailed information of current SFSC research, which inspire the researcher with ideas on designing later research stages such as methodology. To summarise, in terms of research methods, data suggest the use of: interviews (by 90 articles); questionnaire surveys (by 51 articles); modelling (51 articles); and observations (by 12 articles) are the most adopted methods in the SFSC research. In terms of complementary theories, the lack of adopting complementary theories to underpin research discussion is discovered, and it leaves the theory of planned behaviour (by 6 articles) and the contingency theory (by 3 articles) to be the two most adopted theories at the present time.

When producing figures, the researcher further discovers another gap as current SFSC research facing the lack of supply chain examinations. In other words, because the previous researchers have frequently viewed the SFSC as marketing channel and apply it to a range of sociological topics—such as business strategy; entrepreneurship; customer behaviours; rural development; and sustainability (Paloviita, 2009; Canfora, 2016; Giampietri *et al.*, 2018), the SFSC's supply chain nature has been greatly neglected in current research. In response, the researcher decides to strengthen the supply chain examination of this research, and hence proposing the research intention of understanding evolution of the e-commerce enabled SFSC in local context. More

importantly, adding of the term "local context" can allow the planned supply chain examination to exclude examining the customer side and concentrate more on supply chain upstream and downstream, because efforts are already made by the previous researchers to promote customer related discussion (Paloviita, 2010; Cembalo *et al.*, 2015; Garner and Ayala, 2018; Barska and Wojciechowska-Solis, 2020).

2.5 Critical review topics and result

This section 2.5 informs critical literature review result in regard to the SFSC definition and extant discussion of the e-commerce enabled SFSC, since these two are determined as review topics. In brief, the first topic of the SFSC definition not only answers the third review question that is "*How to define the concept of SFSC?*", but also helps the researcher to propose a new SFSC definition for this research regardless of the confusion in accurately understanding and defining the SFSC. Thereafter, the second topic of extant discussion of the e-commerce enabled SFSC summarises a total of ten identified articles contributed to the knowledge of e-commerce enabled SFSC, which will benefit the researcher in preparing a knowledge base before moving to later research stages.

2.5.1 Definition of short food supply chain

The present confusion in accurately understanding and defining the SFSC has led the previous researchers to hesitate during discussion (Ilbery *et al.*, 2006; Kneafsey *et al.*, 2013; Rogers and Fraszczak, 2014). Hence, to avoid being again affected by the same confusion, the researcher critically reviews and gathers related debates from all 151 articles, and decides to develop and propose a new SFSC definition that would also facilitate the planned supply chain examination of this research.

Overall, the researcher discovers that to challenge pressures and unsustainability brought by the highly unified industrial standards and the overpowered intermediaries in the conventional

food provision (Murdoch *et al.*, 2000), the concept of SFSC[3] is first invented as an innovative practice that dedicates to processing; producing; and selling food products in local area, with its new norms and standards created by negotiations between producers and customers instead of the modern industrial ones (Murdoch *et al.*, 2000). However, as there has been a controversy of how to define the term "local" [4], localism in this early stage of the SFSC knowledge begins to fade away (Ilbery *et al.*, 2006; Sellitto *et al.*, 2018), which then leads to researchers' attempt to redefine the concept in the early 2000s.

As localism fades away, a school of researchers attempting to transform the expression of being local into emotional perception quickly arises and affects the redefinition discussion (Marsden *et al.*, 2000; Aggestam *et al.*, 2017), introducing the thinking that the SFSC actually integrates both the supply chain proximity—i.e., shortening supply chain distance by disintermediation—and the emotional proximity—i.e., allowing customers to perceive closeness to food processing and production when purchasing (Marsden *et al.*, 2000; Ilbery and Maye 2005; Charatsari *et al.*, 2018). All in all, the researcher suggests that this introduced thinking of "dual proximity" shall be firmly determined as the theoretical essence of the SFSC to avoid any future confusion, because it accurately reflects the essence of SFSC as an alternative practice to the conventional food provision, and also as a solution to reconnect food producers and end customers after their relation is weakened by industrial mass production (Levidow and Psarikidou, 2011; Rogers and Fraszczak, 2014; Blasi *et al.*, 2015; Giampietri *et al.*, 2018). As a result, the researcher decides that the new SFSC definition for this research would be developed and proposed by following the dual proximity.

Because the theoretical essence of the SFSC is determined, the researcher now develops and proposes a new SFSC definition as follow:

The short food supply chain (SFSC) integrates all supply and demand activities of food

[3] Despite the various terms used in different periods, the concept they intended to deliver has been in line with the present concept of SFSC (Ilbery *et al.*, 2006).

[4] For example, the American act defines "local" as a state and associates it with a total transportation distance of less than 640 km in between the production and sale location, while the French government defines the distance as less than 200 km until it is replaced by a new definition that gives up geographical restriction (Aubry and Kebir, 2013; Engelseth, 2016).

provision that arise within and across its supply chain members—i.e., food producer; the only supply chain intermediary (if an intermediary is applied); and end customer. Besides, as essence of the SFSC underlines emotional proximity, the SFSC in practice particularly dedicates to creating end customers' close feeling of food processing and production.

In summary, this proposed new definition not only follows the dual proximity as the theoretical essence of the SFSC, but also partially consults the supply chain definition of the Council of Supply Chain Management Professionals (CSCMP) (Gibson *et al.*, 2005)[5], so it can strengthen the SFSC's supply chain nature that is long neglected in the SFSC research.

2.5.2 E-commerce enabled short food supply chain

In the collected 151 articles, the researcher identifies that ten of them have contributed to the knowledge of e-commerce enabled SFSC. And through critically reviewing and summarising their discussions, the researcher intents to accomplish three targets—that are, developing and proposing a definition of e-commerce enabled SFSC; looking into the knowledge aspects to which they respectively contribute; and demonstrating current achievements by summarising findings of the ten articles. Moreover, in order to facilitate the review process, the ten articles are divided into four groups by their topics in advance (See Figure 8).

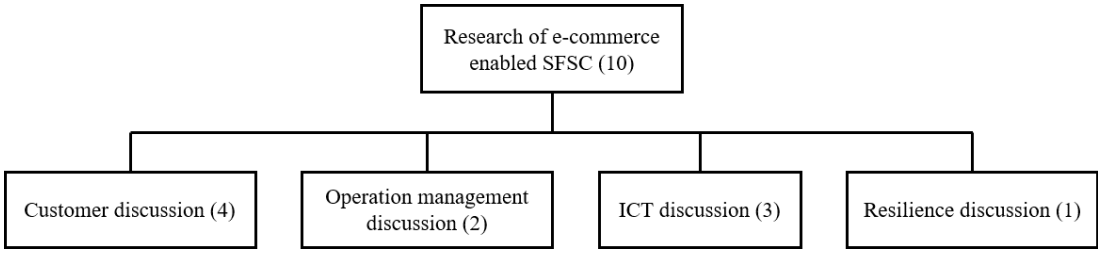

Figure 8. Four discussion groups by topic

[5] According to the CSCMP, "*supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.*" (Gibson *et al.*, 2005, p. 22).

Although no evidence shows that any of the ten articles has attempted to clearly define the e-commerce enabled SFSC, after reflecting on the descriptions used by the Food Assembly team (2017), Espelt *et al.* (2019) and Elghannam *et al.* (2020), the researcher proposes an inclusive definition of the e-commerce enabled SFSC—that is, the e-commerce enabled SFSC represents the supply chain practices that virtualise achievement of the dual proximity through committing to e-commerce. More importantly, as the booming ICTs such as e-commerce have significantly changed the way via which food producers engage their customers, allowing them to reach the customers of broader regions with richer product information (Elghannam *et al.*, 2020; Barska and Wojciechowska-Solis, 2020), the e-commerce enabled SFSC is expected to become more distinct from the other off-line SFSC types in future.

After developing and proposing the definition, the researcher looks into the knowledge aspects to which the ten articles respectively contribute, and this begins with the four in the customer discussion group (See Table 8). Nevertheless, despite researchers' efforts made to understand the e-commerce enabled SFSC from the customer side, the extant customer discussion is found being limited to the supply chain practices enabled by social media platform only, which leaves an opportunity to compare the discussion result with that of professional e-commerce platform.

Table 8. Customer discussion of e-commerce enabled SFSC

Title	Keywords	Findings
A cross-cultural consumers' perspective on social media-based short food supply chains (Elghannam *et al.*, 2018)	Online marketing, social media platform, cross-cultural study	Efficient delivery; trust; and positive experience of previous purchase are the drivers for customers in Spain, Egypt and Mexico to engage the SFSCs enabled by social media platform.
Short food supply chains from a social media marketing perspective: a consumer-oriented study in Spain (Elghannam and Díaz, 2019)	Online marketing, social media platform	Positive experience of previous purchase; product quality that follows regulations or standards; and competitive prices are the drivers for Spanish customers to engage the SFSCs enabled by social media platform.
Consumers' perspectives on alternative short food supply chains based on social media: A focus group	Online marketing, social media platform, electronic word-of-	Success of the SFSCs enabled by social media platform relies on low cost; potential to be accepted by young customers; and

study in Spain (Elghannam *et al.*, 2020)	mouth	ability to collect key customer information and receive real-time feedbacks.
E-consumers and local food products: A perspective for developing online shopping for local goods in Poland (Barska and Wojciechowska-Solis, 2020)	Local food market, customer behaviour	The SFSC practices play an important role in promoting the e-commerce of local food in Poland.

For the two articles in the discussion group of operation management, Todorovic *et al.* (2018) and Gruchmann *et al.* (2019) respectively discuss the distribution design (See Figure 9) and its performance in different scenarios and the determinants to more sustainable distribution—i.e., supply chain orientation; coordination; innovation; and strategy. In particular, their works have reflected the fact that as being an alternative practice to the highly industrialised conventional food provision, achieving balance between costs and outcome becomes the primary challenge faced by the SFSC in operation, in which distribution design plays a critical part. Nevertheless, the only two articles for now are insufficient to support further understanding of this particular operation management challenge, especially when they have been downstream exclusive and hence neglected the other operational practices in upstream.

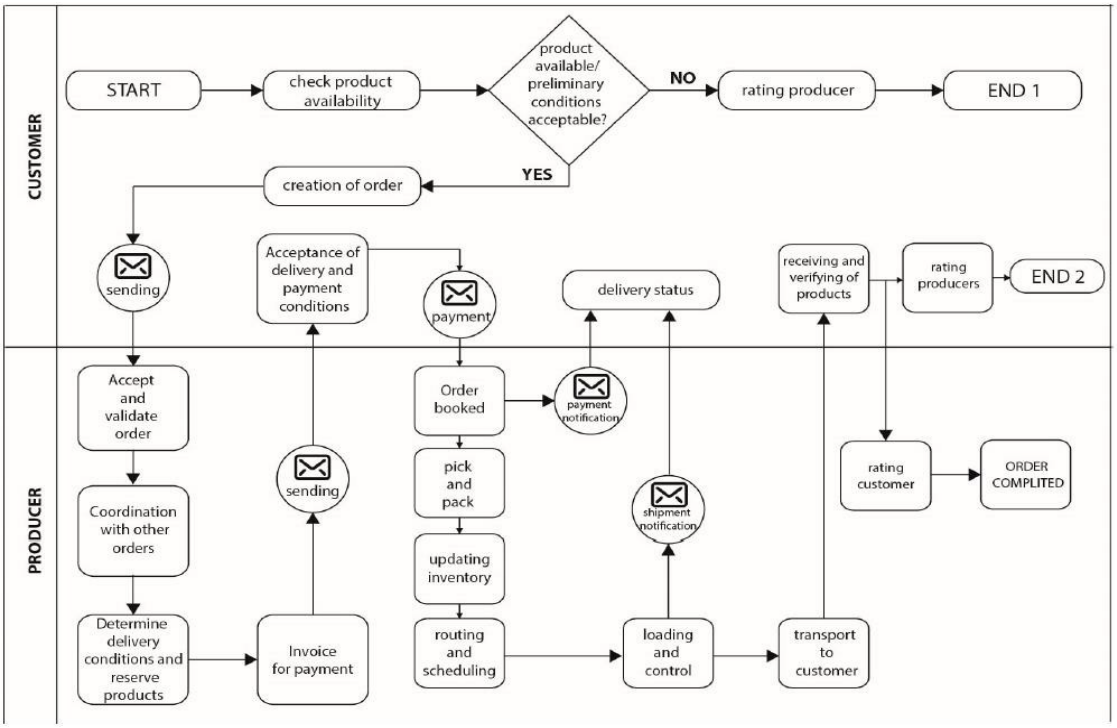

Figure 9. Business process model of the digitised SFSC with producers' distribution service (Todorovic *et al.*, 2018, p.15)

For the three articles in the ICT discussion group, Elghannam *et al.* (2017); the Food Assembly team (2017); and Espelt *et al.* (2019) inform the positive outcomes generated by integration of the ICT and the SFSC in practice—that are, re-connecting producers and customers; promoting agroecological cooperativism and also factors facilitating this outcome such as social network building; and platform's strong capability. Overall, the researcher suggests although their works to an extent disclose how the SFSC is affected by the ICT, their lack of in-depth examinations and the consideration of potential negative outcomes leaves room for future discussion.

Furthermore, as the latest response to the global COVID-19 pandemic, the only article offered by Thilmany *et al.* (2020) in the next resilience discussion group discloses the two favourable features of the e-commerce enabled SFSC when in operation, that are, allowing managers' fast and accurate decision making; and enabling higher efficiency of supply chain operation. More importantly, this work is one of the few that underline the SFSC's supply chain nature in SFSC

research, and considering on-going influence of the global pandemic, the resilience discussion group is expected to witness more contributions.

After all ten articles are reviewed and their findings are summarised, a literature-based model is generated to demonstrate current achievements in developing the knowledge of e-commerce enabled SFSC (See Figure 10). In consequence, this review not only benefits the researcher in preparing a knowledge base before starting investigation of the e-commerce enabled SFSC, but also offers four reflections that help the researcher inspect the shaped research intention—i.e., the supply chain nature of the e-commerce enabled SFSC requires to be strengthened; in-depth supply chain examinations and the consideration of negative supply chain outcomes require to be involved; to achieve comprehensiveness in research, practices of both supply chain upstream and downstream require to be examined; and the requirement of understanding the e-commerce enabled SFSCs underpinned by professional e-commerce platforms.

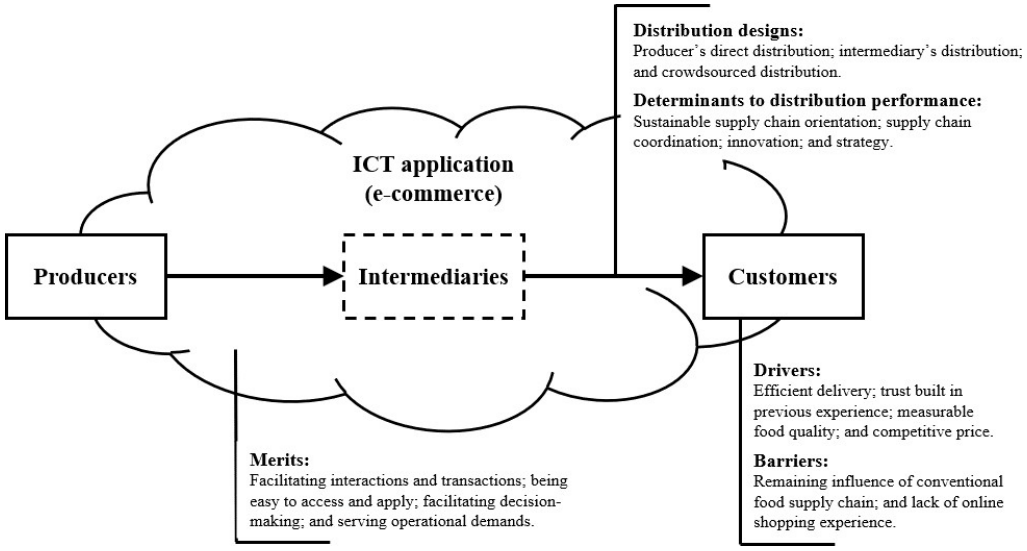

Figure 10. A literature-based model demonstrating current achievements

2.6 Justification of complementary theory

After shaping the research intention and developing understanding of the e-commerce enabled SFSC, the researcher begins to review the knowledge about the knowledge-based view (KBV);

the resource orchestration theory; and the supply chain evolution theory, since these three are chosen to jointly underpin discussion of this research. But before the researcher demonstrates contents of the theories, this section is going to first justify adoption of complementary theory in supply chain research.

2.6.1 Justification from supply chain research

Overall, the term "complementary theory" represents the theory being adopted to assist dealing the problems that cannot be dealt by one particular theory alone (Halldórsson *et al.*, 2015). And to decide whether complementary theory should be adopted to this research of the e-commerce enabled SFSC, a critical literature review is performed to help the researcher realise importance of adopting complementary theories to research discussions of the supply chain management field.

To perform the review, the researcher constructs the search string—theory AND "supply chain management"—and applies it to the online search systems and databases that have well served all literature reviews in the chapter 2 (See Table 6), for searching through the titles and abstracts of peer-reviewed English journal articles. During searching, the researcher chooses to include articles which are published in AJG 4 or 3 journals and they disclose impact of complementary theory on developing the broader supply chain knowledge, while exclude articles which refer to the impact but only in particular scopes. As a result, a total of three articles are collected and identified as the core literature (See Table 9).

Table 9. Articles disclosing complementary theory in supply chain research

Title	Journal and ranking	Findings
Complementary theories to supply chain Management (Halldórsson *et al.*, 2007)	Supply Chain Management: An International Journal (AJG 3)	In practice, development of supply chain knowledge can be assisted by applying economic; socio-economic; and strategic research perspectives.
Complementary theories to supply chain management revisited – from borrowing	Supply Chain Management: An International Journal (AJG 3)	Theory application; new theoretical combinations; and sensitivity to managerial practice are primary ways of developing

theories to theorizing (Halldórsson *et al.*, 2015)		supply chain knowledge.
A look into the past and future: theories within supply chain management, marketing and management (Gligor *et al.*, 2019)	Supply Chain Management: An International Journal (AJG 3)	Researchers produce a statistic of the 15 most adopted complementary theories in supply chain research.

All in all, review of these three articles reveals that among all ways of developing supply chain knowledge, adoption of complementary theory has been widely recognised as the primary one (Halldórsson *et al.*, 2007; 2015), which hence leads a number of cross-disciplinary or external theories to be introduced to the supply chain management field (See Table 10) (Gligor *et al.*, 2019). In this regard, based on the articles' discussion, the researcher gathers four reasons that have driven adoption of complementary theory in supply chain research. **First**, as supply chain practice has been interpreted as the hybrid of diverse knowledge since its beginning—such as the hybrid of logistics and organisational study, or that of logistics; purchasing; and operations management (Halldórsson *et al.*, 2007; 2015), supply chain knowledge displays the nature of being holistic and integrative, hence it requires combination of the theories from more than one field to assist developing (Halldórsson *et al.*, 2015). **Second**, because supply chain knowledge has been debatable and full of controversies—for example, researchers debate about if supply chain is only extension of logistics (Halldórsson *et al.*, 2007), it requires cross-disciplinary or external theories to help achieve its completeness when being developed. **Third**, since supply chain research has particularly emphasised discussion of real-life practices, it faces lack of its own theoretical discussion and hence often seeks assistance from other theories (Eriksson and Engström, 2021[6]). **Fourth**, as supply chain practice has been facing radical changes triggered by a range of disruptive technologies such as 3D printing and blockchain, knowledge of supply chain requires external assistance to help strengthen its own explanatory power and problem-solving capacity (Halldórsson *et al.*, 2015). In consequence, adoption of complementary theory

[6] Although the work of Eriksson and Engström (2021) is excluded in literature filtering as it mainly discusses the philosophical stances in supply chain research, the researcher appreciates their summative opinion of supply chain research and therefore refers it.

holds significant meaning in facilitating development of supply chain knowledge.

Table 10. Theories within supply chain management[7] (Gligor *et al.*, 2019, p.172)

Theory	Frequency	(%)	% Cumulative
Resource-based View (RBV)	71	18	18
Transaction cost economics (TCE)	49	13	31
Game theory	41	10	41
Institutional theory	27	7	48
Contingency theory	26	7	54
Organisational theory	24	6	61
Agency theory	23	6	66
Resource dependence theory	21	5	72
Stakeholder theory	20	5	77
Social exchange theory	21	5	82
Inventory theory	18	5	87
Social capital theory	17	4	91
Relational exchange theory	13	3	95
Competence and capability theory	11	3	97
Information processing theory	10	3	100

2.6.2 Justification from research of e-commerce enabled SFSC

After gathering the four reasons that drive adoption of complementary theory in supply chain research, the researcher looks into how research of the e-commerce enabled SFSC has fallen into these four, thus it enables a more solid justification that this research requires combination of cross-disciplinary or external theories to assist its discussion. **First**, for adoption reason of displaying the nature of being holistic and integrative, the e-commerce enabled SFSC falls into it as the SFSC has been an umbrella concept reflecting different and multiple social meanings or criteria since its beginning—which simultaneously is the reason of the researcher developing and proposing a new SFSC definition, hence the e-commerce enabled SFSC requires assistance of other theories when in research discussion. **Second**, for adoption reason of being debatable and full of controversies, research of the e-commerce enabled SFSC falls into it, considering

[7] Gligor *et al*. (2019) produce this statistic based on the 411 articles that are published in the six top supply chain management journals from 2009 to 2018 (Gligor *et al.*, 2019); the statistic shows adoption frequency of a number of complementary theories identified in supply chain research.

the evidence that its research has faced a number of issues such as definition confusion and the unclear connections between the SFSC and other similar concepts. Therefore, research of the e-commerce enabled SFSC requires assistance from other theories to achieve its completeness when in research discussion. **Third**, for adoption reason of lacking own theoretical discussion, research of the e-commerce enabled SFSC falls into it, since to date only ten articles are found directly contributing to the research, therefore it requires assistance of other theories if in-depth examination is planned. **Fourth**, for adoption reason of facing radical changes, the e-commerce enabled SFSC falls into it, since this particular type of the SFSC practices is highly related to the booming e-commerce triggered by the disruptive ICT, therefore it requires to strengthen its own explanatory power and problem-solving capacity by other theories' assistance. As a result, the researcher realises that adoption of complementary theory holds meaning to this research, and the theories will include the KBV; the resource orchestration theory; and the supply chain evolution theory.

2.7 Knowledge-based view (KBV)

The first complementary theory chosen to be adopted is the knowledge-based view (KBV). In summary, the KBV means the theoretical view that underlines the role of knowledge possession and utilisation in creating organisational values (Asiaei *et al.*, 2021; D'Oria *et al.*, 2021), and is an influential variant of the resource-based view which has been one of the most introduced theories in supply chain research (Gligor *et al.*, 2019); more importantly, adoption of the KBV also shows the researcher's decision of understanding evolution of the SFSC from a knowledge management perspective. In this regard, this section is designed to introduce theoretical essence of the KBV; develop insight into its extant adoptions in supply chain research for a knowledge base; justify the researcher's choice of the KBV as well as offer solutions to the identified four theoretical limitations of the KBV when in practice.

2.7.1 Essence of knowledge-based view

According to the summative work of D'Oria *et al.* (2021) that demonstrates evolving paths of

the resource-based view, the researcher identifies works of Grant (1996); Grant (1997); Chaffey *et al.* (2015); and Pereira and Bamel (2021) as being core to theoretical discussion of the KBV, thus they are the basis on which the researcher's understanding of the KBV is developed[8].

The resource-based view is a critical theory in the strategic management field, and it underlines the roles of valuable, rare, inimitable and non-substitutable resources in allowing organisations to obtain the sustained competitive advantages that cannot be duplicated by competitors (Asiaei *et al.*, 2021; D'Oria *et al.*, 2021). In contrast, the KBV as its influential variant emphasises the role of knowledge and proposes that knowledge is the fundamental resource which has allowed sustained competitive advantages to be obtained by organisations (Grant, 1996; Asiaei *et al.*, 2021; Pereira and Bamel; 2021). Furthermore, in contrast with the resource-based view which focuses on resource possession, the KBV not only focuses on possession but also on utilisation of knowledge (Grant, 1996; Pereira and Bamel; 2021). Nevertheless, to the best of researcher's knowledge, no evidence has supported that a mechanism is developed by the KBV to specify how knowledge as the fundamental resource is acquired; possessed; and then utilised (Grant, 1996; D'Oria *et al.*, 2021; Pereira and Bamel; 2021). Moreover, the researcher finds no clear definition of knowledge is given by the KBV in its discussion (Grant, 1996; Pereira and Bamel; 2021).

Besides the definition, previous theoretical discussion of the KBV discloses characteristics and typology of the knowledge which is possessed and utilised. All in all, Grant (1996) summaries knowledge's five characteristics as: 1) the transferability which indicates knowledge's ability to be transferred within or between organisations; 2) the capacity of aggregation that indicates quality of knowledge being transferred within or between organisations; 3) the appropriability which indicates individuals' value creation ability after possession; 4) the specialisation which indicates requirements for possession and utilisation; and 5) the requirement of production.

[8] The work of Grant (1997) is identified when reviewing historical works of the same author; the work of Pereira and Bamel (2021) is identified when searching for latest summative works of the KBV on ScienceDirect and Web of Science; the work of Chaffey *et al.* (2015) is identified, when researcher attempts to solve limitations of the KBV by referring to discussion of the knowledge management field.

For knowledge typology discussion, Grant (1996) proposes an influential solution that divides knowledge into explicit types and tacit types. To summarise, explicit knowledge types specifies the knowledge that is articulate and hence "*can be readily detailed in procedural manuals and databases*" (Chaffey *et al.*, 2015, p.502)—such as certain processes and procedures, while tacit knowledge types specifies the knowledge that is rather less tangible and difficult to encapsulate, so it is often saved in individuals' mind and learnt via reacting to certain situations that involve a number of variables (Chaffey *et al.*, 2015). Furthermore, although these two knowledge types are independent of each other, transforming tacit knowledge types into explicit types has been a critical research goal in the knowledge management field (Chaffey *et al.*, 2015).

2.7.2 Knowledge-based view in supply chain research

To develop insight into extant adoptions of the KBV in supply chain research that helps prepare the researcher with a knowledge base before later discussion, the search string—"knowledge based view" AND "supply chain"—is constructed and then applied to the online search systems and their databases (See Table 6), so the string assists searching through the titles and abstracts of peer-reviewed English journal articles for core literature. Furthermore, the researcher limits core literature to publications of AJG 4 or 3 journals for quality control, and also exclude the articles fail to set discussion of the KBV and supply chain as research priority. In consequence, a total of 11 articles are identified and they would serve this literature review (See Table 11).

Table 11. Articles of the KBV and supply chain

Title	Journal and ranking	Findings
Information processing, knowledge development, and strategic supply chain performance (Hult *et al.*, 2004)	Academy of Management Journal (AJG 4*)	Based on the KBV; organizational information processing; and organizational learning, a model is constructed to examine supply chain performance by cycle time.
The effects of innovation–cost strategy, knowledge, and action in the supply chain on firm performance (Craighead *et al.*, 2009)	Journal of Operations Management (AJG 4*)	Performance of supply chain is affected by how well the alternative chain strategy is complemented by the knowledge development capacity and the intellectual capital.
A structural model of supply chain performance in an emerging economy (Yang, 2012)	International Journal of Production Research (AJG 3)	Interaction between the sharing of explicit and tacit knowledge and the development of supply chain capabilities would lead to improvement of supply chain performance.
Harnessing value in knowledge management for performance in buyer–supplier collaboration (Yang, 2013)	International Journal of Production Research (AJG 3)	Performance of the manufacturers with collaborative buyer–supplier relationship is affected by knowledge management process and supply chain integration level.
Improving operational performance through knowledge exchange with customers (Nagati and Rebolledo, 2013)	Production Planning and Control (AJG 3)	Supplier's operational performance is affected by the exchange of explicit and tacit knowledge types within supplier-customer relationship, and this exchange is further affected by the supplier-customer integration level and inter-organizational trust.
Strengthening the innovation chain: The role of internal innovation climate and strategic relationships with supply chain partners (Oke *et al.*, 2013)	Journal of Supply Chain Management (AJG 3)	Key supply chain partner's innovativeness is affected by product innovation strategy, and this can be further affected by levels of the strategic relationship and the innovation climate.

The impact of knowledge transfer and complexity on supply chain flexibility: A knowledge-based view (Blome *et al.*, 2014)	International Journal of Production Economics (AJG 3)	If transformation between internal and external knowledge positively affects supply chain flexibility, then supply complexity could negatively affect the relationship between internal transformation and supply chain flexibility but positively affect the relationship between external transformation and supply chain flexibility.
The roles of supply chain intelligence and adaptability in new product launch success (Schoenherr and Swink, 2015)	Decision Sciences (AJG 3)	Supply chain adaptability significantly affects the benefit capturing of supplier's technological intelligence, and it assists enhancements of product innovation capability; success rate of launching new products; and organisation's financial performance.
Supply chain risk mitigation competency: an individual-level knowledge-based perspective (Ambulkar *et al.*, 2016)	International Journal of Production Research (AJG 3)	Supply chain managers with orientation of high-risk mitigation would own the higher level of absorptive capacity that helps enhance their risk mitigation competency and supply chain risk management.
The impact of intellectual capital on supply chain collaboration and business performance (Shou *et al.*, 2018)	IEEE Transactions on Engineering Management (AJG 3)	In supply chain context, intellectual capital affects the inter-organisational communication by which it further affects inter-organisational shared vision, leading to change of business performance.
How does intellectual capital affect product innovation performance? Evidence from China and India (Zhang *et al.*, 2018)	International Journal of Operations & Production Management (AJG 3)	Supplier's knowledge integration indirectly affects innovation performance by supply chain adaptability.

When reviewing the 11 articles, the researcher finds that extant adoptions of the KBV in supply chain research have mainly served innovation discussion and discussion of examining supply chain performance, hence leaving plenty room for future discussion of supply chain evolution. Additionally, it is found that all 11 articles have followed the similar research procedure of first forming a conceptual model by the hypotheses developed from literature, and then testing the model by questionnaire survey data and diverse modeling methods such as structural equation modelling (Yang, 2012; Nagati and Rebolledo, 2013; Zhang *et al.*, 2018); such a widely shared application of quantitative research procedure also leads to lack of the in-depth interpretation of non-numerical data in discussion. Then, as case study has been the primary research method employed by the 11 articles, it is discovered that cases from world developed countries such as United States of America; Canada; Germany; and Australia have dominated discussion (Nagati and Rebolledo, 2013; Oke *et al.*, 2013; Blome *et al.*, 2014; Schoenherr and Swink, 2015), thus showing an opportunity of referring to cases of world non-developed countries in future.

Following summary of displayed research features, the researcher continues to develop insight into extant adoptions via reflecting on details of the articles' theoretical discussion, and hence finds that the previous researchers underline two aspects when adopting the KBV: 1) difference between explicit and tacit knowledge types and their respective impacts on operation of supply chain (Craighead *et al.*, 2009; Yang, 2012; Yang, 2013; Nagati and Rebolledo, 2013); and 2) the KBV's ability to enable a research perspective that allows researchers to continue with the knowledge management discussion in supply chain research, which in practice would then be assisted by other adopted complementary theories or diverse modeling methods (Yang, 2013; Ambulkar *et al.*, 2016). As a result, based on these two findings, the researcher first decides to follow the previous researchers' experience of the first aspect in research, that is, underlining respective impacts of explicit and tacit knowledge types on supply chain operation. Then, after reflecting on the second aspect, the researcher understands another theoretical limitation of the KBV, that is, the KBV has been low in explanatory power and problem-solving capacity as an individual theory if it is alone adopted to discussion—in this regard, the researcher decides to choose more complementary theories to cooperate with the KBV in this research.

2.7.3 Justification of knowledge-based view

After a solid knowledge base is formed in review of the KBV knowledge, this section justifies adoption of the KBV in this research of the e-commerce enabled SFSC and offers solutions to the identified four theoretical limitations of the KBV.

The connection is identified between the KBV and the e-commerce enabled SFSC. In particular, as essence of the e-commerce enabled SFSC is virtualising achievement of the dual proximity by committing to e-commerce, its practice is bound to be related to application of the ICT and hence it consists of the possession and utilisation of diverse knowledge—especially when its practice also requires disintermediation and the creation of customers' perceived closeness to food processing and production. In consequence, the researcher proposes the first proposition in this chapter 2—i.e., **Knowledge possession and utilisation happen in the practice of e-commerce enabled SFSC.**

To ensure efficient adoption of the KBV, the justification also offers solutions to the identified four limitations of the KBV, i.e., 1) the KBV has lack of the specification of how knowledge is acquired and possessed; 2) the KBV has lack of the specification of how possessed knowledge is then utilised; 3) the KBV has lack of the clear definition of knowledge; and 4) the KBV has lack of explanatory power and problem-solving capacity when it is adopted alone. Essentially, these four limitations have long-term existed in discussion of the KBV, causing researchers to either adopt more complementary theories or develop the definitions fitting own demands. For example, in the research of supply chain manager's risk mitigation competency, Ambulkar *et al.* (2016, p.1398) define knowledge as "*the information about firm's resources that pertain to management of supply chain risk*". Hence, in response to the limitations, the researcher chooses to first solve definition confusion by referring to the summative work of Chaffey *et al.* (2015)[9]

[9] The *Digital business and e-commerce management* (6th ed.) by Chaffey *et al.* (2015) is one of the core reading materials of the researcher, since this book involves rich discussions in regard to digital business; e-commerce; e-marketing; knowledge management; supply chain management; etc. However, the researcher chooses not to refer to the latest 7th edition due to its significantly changed contents—for instance, knowledge management content is replaced by strategic management discussion in the latest edition.

from the knowledge management field, in which they define knowledge as "*the combination of data and information, to which is added expert opinion, skills and experience, to result in a valuable asset which can be used to aid decision making*" (Chaffey *et al.*, 2015, p.502). And by further specifying this definition with added notions of the e-commerce enabled SFSC and supply chain evolution, the researcher develops and proposes a new definition which more fits this research, i.e.:

In this research, knowledge is the combination of data and information, to which is added expert opinion, skills and experience, to result in the valuable asset which can be used to aid decision making of local managers, by which their e-commerce enabled SFSCs are driven and evolve.

Apart from being referred for knowledge definition, work of Chaffey *et al.* (2015) is also found constructive to assist solving another theoretical limitation of the KBV, that is, the KBV has lack of the specification of how knowledge is acquired and possessed. All in all, a framework is proposed by Chaffey *et al.* (2015) to demonstrate the four core activities that together enable knowledge management in practice (See Figure 11), on which the researcher further suggests that enabling knowledge management at the same time means accomplishing the knowledge acquisition that allows knowledge possession. Therefore, the four core activities of knowledge management now also means the four core activities of knowledge acquisition, which include 1) knowledge identifying via which knowledge is analysed for availability and completeness based on demand; 2) knowledge creating via which knowledge is created in either individual or organisational level; 3) knowledge storing via which explicit knowledge is stored through structured methods, while tacit knowledge is stored in either individual minds or organisational routines; and 4) knowledge sharing by which knowledge availability is increased and it helps ensure knowledge is correctly utilised (Chaffey *et al.*, 2015). Moreover, when connecting work of Chaffey *et al.* (2015) with the defined knowledge acquisition, the researcher is inspired and proposes the second proposition in this chapter—i.e., **In the practice of e-commerce enabled SFSC, supply chain manager's possessed knowledge is acquired through execution of the four knowledge acquisition activities.**

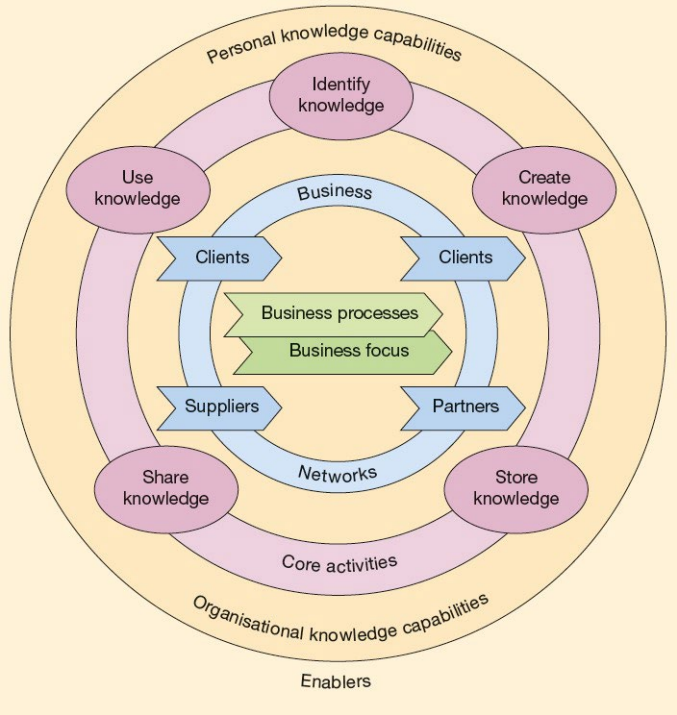

Figure 11. Knowledge management framework (Chaffey *et al.*, 2015, p.503)

For the rest two theoretical limitations, that are, the KBV faces lack of the specification of how possessed knowledge is then utilised; and of explanatory power and problem-solving capacity when being adopted alone, the researcher decides to solve both through introducing the second complementary theory to this research—that is, the resource orchestration theory. In summary, this theory proposes a series of managerial activities and elements that in detail explain how organisation's resource is orchestrated to generate sustained competitive advantages, which is suitable to complement the KBV and assists the latter in explain how possessed knowledge as organisation's fundamental resource is utilised/orchestrated in practice. Besides, participation of the second theory in this research would also enhance its explanatory power and problem-solving capacity when facing the planned research discussion involving in-depth examination of supply chain. Then, the next section 2.8 is designed to exclusively inform knowledge of this resource orchestration theory.

2.8 Resource orchestration theory

The choosing of the resource orchestration theory as the second complementary theory in this research, its behind reason can be traced back to review of the KBV knowledge, during which the important work of D'Oria *et al.* (2021) published in the Journal of Management (AJG 4) is collected and reviewed. Their work not only recalls theoretical origin and development of the KBV, but also verifies complementary relationship between the resource orchestration theory and the resource-based view, by which they further propose the research pathway of "strategic resources–actions–performance". Overall, this section 2.8 exclusively informs knowledge of the resource orchestration theory via introducing its theoretical essence; developing insight into its extent adoptions; and justifying its adoption to this research.

2.8.1 Essence of resource orchestration theory

Starting with recommendations of D'Oria *et al.* (2021), several works are identified as being core to theoretical discussion of the resource orchestration theory, and they include works of Sirmon *et al.* (2007); Helfat *et al.* (2007); Sirmon *et al.* (2011); and D'Oria *et al.* (2021)—these works form the basis on which the researcher's understanding of the theory is developed.

Similar to the KBV, the resource orchestration theory is another theory that originates from the resource-based view, and it first emerges in the latter's extended discussion of how possessed resource is effectively utilised for value creation (Sirmon *et al.*, 2011). In brief, to complement the resource-based view's theoretical limitation showed by the extended discussion, Sirmon *et al.* (2011) integrate discussions of two external research streams—i.e., streams of the resource management and the asset orchestration, and thus invent the resource orchestration theory that enables a framework through which possessed resource can be effectively utilised in practice (Sirmon *et al.*, 2011; D'Oria *et al.*, 2021).

As the integration of two research streams, the resource orchestration theory has automatically inherited and displayed both theoretical and practical features of the resource management and

the asset orchestration (See Figure 12). Therefore, the resource orchestration theory proposes that to effectively utilise organisation's possessed resource for value creation, manager should focuses on practices of the three managerial activities (See Table 12): **1)** structuring activity by which possessed resource is acquired, accumulated and divested to form up resource portfolio; **2)** bundling activity by which the structured resource portfolio is then stabilised, enriched and pioneered for needed organisational capacities; and **3)** leveraging activity by which the bundled and oriented resource is mobilised, coordinated and deployed to finish transforming possessed resource into competitive advantages as value creation (Sirmon *et al.*, 2007; 2011). In addition, the resource orchestration theory lists three organisational elements which affect the utilisation, that are, organisation's **4)** governance and organisational structure; **5)** business model; and **6)** innovation. In practice, the three elements not only directly affect the utilisation—for example, a corporation can directly achieve value creation by its subsidiaries' innovations—but also are affected by the utilisation at the same time—for example, a corporation might plan to establish new departments that change its extant governance and organisational structure, for facilitating the utilisation. Furthermore, the resource orchestration theory as well emphasises that although these three managerial activities and three elements can affect the utilisation alone, **7)** potential of resource orchestration is unleashed when all six are synchronised and work in concert with each other (Sirmon *et al.*, 2011; D'Oria *et al.*, 2021).

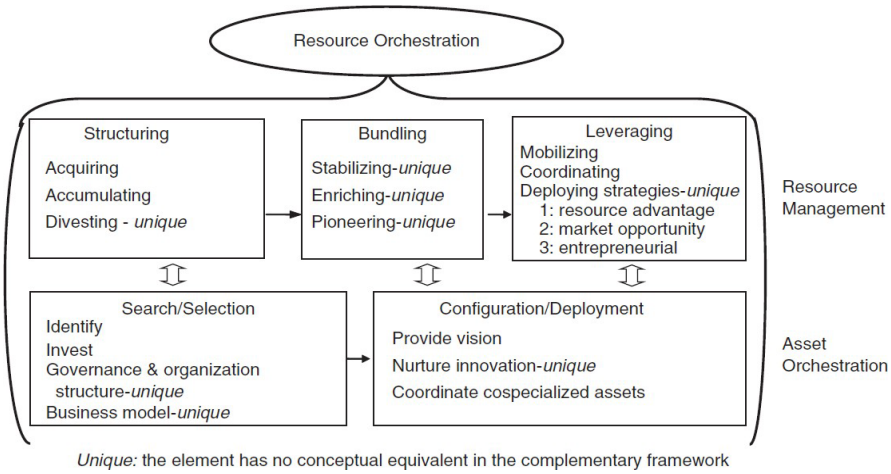

Figure 12. Comparing resource management and asset orchestration frameworks (Sirmon *et al.*, 2011, p.1395)

Table 12. Resource Management Processes and Distinctions (Sirmon *et al.*, 2007, p.277)

Components/ Subprocesses	Description
Structuring	Refers to the management of the firm's resource portfolio.
• Acquiring	The process of purchasing resources from strategic factor markets.
• Accumulating	The process of developing resources internally.
• Divesting	The process of shedding firm-controlled resources.
Bundling	Refers to the combining of firm resources to construct or alter capabilities.
• Stabilizing	The process of making minor incremental improvements to existing capabilities.
• Enriching	The process of extending current capabilities; although the degree of enrichment can vary, it extends beyond keeping skills up to date.
• Pioneering	The process of creating new capabilities with which to address the firm's competitive context.
Leveraging	Refers to the application of a firm's capabilities to create value for customers and wealth for owners.
• Mobilising	The process of identifying the capabilities needed to support capability configurations necessary to exploit opportunities in the market.
• Coordinating	The process of integrating identified capabilities into effective yet efficient capability configurations.
• Deploying	The process of physically using capability configurations to support a chosen leveraging strategy, which includes the resource advantage strategy, market opportunity strategy, or entrepreneurial strategy.

2.8.2 Resource orchestration theory in research

To develop theoretical insight that helps prepare the researcher with a knowledge base before later discussion, review of extant adoptions of the resource orchestration theory is respectively performed in research streams of the KBV and supply chain, due to the manageable number of involved articles as core literature.

Despite researchers' past experiences of adopting the resource orchestration theory in research of the resource-based view, it is unexpected to find that extant adoptions of the theory remain scarce in research of the KBV. After constructing and applying the search string—"knowledge-based view" AND "resource orchestration"—to online search systems and their databases (See

Table 6), only one article is identified as being relevant. Overall, in the only article of Asiaei *et al.* (2021), the resource orchestration theory is adopted to assist examining connection between companies' knowledge management and a range of measurable or evaluable performances, in which Asiaei *et al.* (2021) particularly emphasise benefit of the research pathway of "strategic resources–actions–performance" (D'Oria *et al.*, 2021), and further transform this pathway into the "possessed knowledge—resource orchestration—measurable or evaluable performance" to better facilitate their research discussion. More importantly, by looking into application of this transformed new pathway, the researcher is inspired and proposes the third proposition in this chapter—i.e., **Supply chain manager's possession and utilisation of acquired knowledge trigger evolution of the e-commerce enabled SFSC.**

To serve reviewing and developing insight into extant adoptions of the resource orchestration theory in supply chain research, the constructed search string—"supply chain" AND "resource orchestration"—is applied to online search systems and their databases by the researcher (See Table 6). And after searching through the titles and abstracts of peer-reviewed English journal articles which are published in AJG 4 or 3 journals, a total of nine articles are identified as core literature (See Table 13). Then, rather than scanning for comprehensive details, the researcher reviews features displayed when these nine articles integrate the resource orchestration theory and supply chain management into discussion, which hence leads to the first finding that when adopting the resource orchestration theory, research pathway of "strategic resources–actions–performance" or its similar research procedure is emphasised and followed by all articles; for example, through introducing the resource orchestration theory, Ketchen *et al.* (2014) examine the connection in between company's resource endowment and its four types of product recalls as performance (See Figure 13). Besides, it is found that current examinations of supply chain using the resource orchestration theory fall into two groups, i.e., the group of examinations that is for individual supply chain outcomes such as product development and product recall (Smals *et al.*, 2020; Ketchen *et al.*, 2014); and the other group of examinations that is for overall supply chain performances such as supply chain finance and sustainability (Liu *et al.*, 2016; Wong *et al.*, 2018). In this regard, the researcher suggests that discussion of supply chain evolution using

the resource orchestration theory remains to be contributed.

Table 13. Articles of the resource orchestration theory and supply chain

Title	Journal and ranking	Findings
Resource gaps and resource orchestration shortfalls in supply chain management: The case of product recalls (Ketchen *et al.*, 2014)	Journal of Supply Chain Management (AJG 3)	Cascading recall; precise recall; incomplete recall; and overkill recall, these four types of product recall are identified based on the recall scenarios that is connected to company's resource endowment and orchestration activities.
Examining the process R&D investment–performance chain in supply chain operations: The effect of centralization (Davis-Sramek *et al.*, 2015)	International Journal of Production Economics (AJG 3)	Performance of investment–performance chain is weakened when supply chain decision making is centralised.
The configuration between supply chain integration and information technology competency: A resource orchestration perspective (Liu *et al.*, 2016)	Journal of Operations Management (AJG 4*)	Connection in between supply chain integration and the IT competency is affected by company's financial and operational performances.
How does sustainable development of supply chains make firms lean, green and profitable? A resource orchestration perspective (Wong *et al.*, 2018)	Business Strategy and the Environment (AJG 3)	Sustainable customer development is underpinned by sustainable developments of suppliers and internal side, which further leads to cost reduction and supply chain's active performance in finance.
Supply chain learning of sustainability in multi-tier supply chains: A resource orchestration perspective (Gong *et al.*, 2018)	International Journal of Operations & Production Management (AJG 4)	Through setting up new internal departments; cooperating with external parties; communicating with suppliers; and applying governance to lower-tier suppliers, multinational corporations facilitate sustainable learning in their supply chains.
The role of supply chain analytics capability and adaptation in unlocking value from supply chain relationships (Ahmed and Mahmoodi, 2020)	Production Planning and Control (AJG 3)	When level of procedural justice is low, supply chain's analytics capability becomes key to extracting value from buyer-supplier relationship; but when level of procedural justice is high, supply chain's supplier adaptation becomes key to the value extracting.

Explaining changes in supplier involvement in complex new product development: A resource orchestration perspective (Smals *et al.*, 2020)	IEEE Transactions on Engineering Management (AJG 3)	In practice, supplier involvement and resource orchestration are solutions to company's development of complex new products.
A resource orchestration view of supply chain traceability and transparency bundles for competitive advantage (Malik and Andargoli, 2021)	Business Strategy and the Environment (AJG 3)	Whether company gains high financial performance via supply chain traceability, this depends on whether company's perception of supply chain transparency is developed from a wide range of stakeholders.
Supply chain flexibility fit and green practices: Evidence from the event industry (Yoo and Cho, 2021)	International Journal of Contemporary Hospitality Management (AJG 3)	Supply chain flexibility fit is in positive relationship with the supplier's performance of green practices.

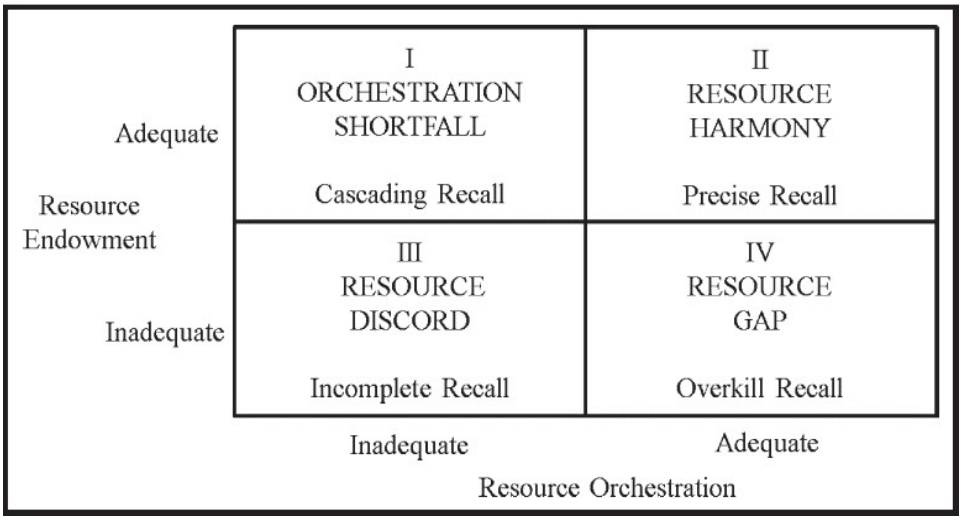

Figure 13. Product recall types mapped to resource scenarios (Ketchen *et al.*, 2014, p.12)

2.8.3 Justification of resource orchestration theory

After a knowledge base is formed in the literature review of resource orchestration theory, this section moves on to justify adoption of the theory in this research of the e-commerce enabled SFSC, during which it as well emphasises the significance of applying the research pathway of "possessed knowledge—resource orchestration—measurable or evaluable performance".

In summary, connection between the resource orchestration theory and this research is showed by how the theory is related to the individual elements comprising this research—i.e., the KBV and supply chain. **First**, since both have originated from the resource-based view, the resource orchestration theory and the KBV share the same essence of emphasising the role of possessed resource in value creation, and the resource orchestration theory can complement the KBV by its resource utilisation framework that the latter has lacked. **Second**, adoption of the resource orchestration theory is expected to fit this research that displays supply chain nature, since the previous researchers' works have verified validity of the theory in effectively assisting supply chain discussion (See Table 13).

Following the justification, the researcher suggests that the identified research pathway of the theory—that is, the "possessed knowledge—resource orchestration—measurable or evaluable performance" of Asiaei *et al.* (2021)—would significantly benefit later of this research if being applied, as the pathway has allowed a practical procedure to guide the researcher to establish and examine the connection between the knowledge possessed by supply chain managers and the triggered supply chain evolution. This is significant to designs of later research stages such as within and cross-case analyses and discussion, especially after the researcher has decided to strengthen the SFSC' supply chain nature by planned in-depth examination. However, to fully release potential of the research pathway during its application, the researcher faces challenge of making supply chain evolution become measurable or evaluable for discussion, and it thus leads to introduction of the third complementary theory in this research—i.e., the supply chain evolution theory.

2.9 Supply chain evolution theory

Briefly, the supply chain evolution theory dedicates to informing how supply chain can "*evolve and change in size, shape and configuration, and in how they are coordinated, controlled and managed.*" (MacCarthy *et al.*, 2016, p.1696), and as this theory can help supply chain evolution to become measurable or evaluable in practice, it is chosen to serve as the third complementary

theory in this research, for the applied research pathway of "possessed knowledge—resource orchestration—measurable or evaluable performance". All in all, this section 2.9 is designed to demonstrate theoretical essence of the supply chain evolution theory and justify its adoption in this research[10].

2.9.1 Essence of supply chain evolution theory

Despite uses of the term "supply chain evolution" in historical discussion that refers to general changes of supply chain structure, the supply chain evolution theory is formally conceptualised for the first time by MacCarthy *et al.* (2016), in their work published in the International Journal of Operations & Production Management (AJG 4). Overall, based on researchers' case study experiences and insights into several modern industries including electronics; aerospace; steel; clothing; auto; and supply chain innovations triggered by the ICTs, the theory of MacCarthy *et al.* (2016) divides evolution of supply chains into the four stages that together form a complete supply chain lifecycle—i.e., emergence, growth, maturity and decline.

To summarise, the first emergence stage indicates beginning of the lifecycle when structure of supply chain is newly established, and supply chains in this stage often find themselves facing the various evolving options that can all be exploited in future. Then, the growth stage indicates the second evolving stage of the lifecycle, in which supply chains are often featured by "*rapidly growing use of the supply chain along with improvements in the performance and stability of supply chain processes and their enabling technologies*" (MacCarthy *et al.*, 2016, p.1700), and they therefore witness rapid increases of product flow; information transformation; and service requirement in operation. Next, the defined maturity stage indicates the third evolving stage of the lifecycle, in which supply chains' demand level becomes highly certain and their operations are underpinned by mature and reliable process and technologies; hence, possibility that supply chains are affected by changes is low (MacCarthy *et al.*, 2016). Finally, the fourth decline stage

[10] This section 2.9 excludes review of extant adoptions of the supply chain evolution theory in research, since the work of MacCarthy *et al.* (2016) is found to be the only one contributing to the supply chain evolution theory to date. Through selected online search systems and their databases, the researcher identifies 20 articles that cite the supply chain evolution theory but none of them is found dedicating to its theoretical development.

indicates end of the lifecycle, and supply chains evolved to this stage normally find themselves facing notable decline of throughputs, and this could be caused by a variety of reasons such as negative impacts of external market, or newly established supply chain that disrupts the extant one (MacCarthy *et al.*, 2016). Furthermore, in addition to naturally evolving through these four stages, MacCarthy *et al.* (2016) also suggest that supply chains of certain evolving stages could be instantly achieved by merging or acquisition.

Apart from the evolving stages of lifecycle, the work of MacCarthy *et al.* (2016) identifies six factors which can affect supply chain evolution—i.e., technology and innovation; procurement and sourcing; economics; markets and competition; policy and regulation; and strategies and re-engineering of supply chain.

2.9.2 Justification of supply chain evolution theory

Although the researcher has reviewed several theories which potentially assist making supply chain performance measurable or evaluable in discussion—such as the theory of supply chain integration[11], nonetheless, the supply chain evolution theory is seen as the more suitable option for this research due to the four main reasons.

First, the supply chain evolution theory is in line with essence of this research, as both of them propose the same goal of understanding the temporal dynamic development of targeted supply chain, by which the planned supply chain examination can be allowed. **Second**, the concept of supply chain lifecycle can assist enhancing explanatory power and problem-solving capacity of the other two chosen complementary theories—i.e., the knowledge-based view (KBV) and the resource orchestration theory, because it enables a framework consisting of four evolving stages that facilitates constructing later discussion of this research. **Third**, it is discovered that when Sirmon *et al.* (2011) examine practicability of their invented resource orchestration theory,

[11] The theory of supply chain integration dedicates to informing manager's unified control or ownership over the operational process that is carried out in supply chain (Cao and Zhang, 2011). The researcher excludes its adoption in this research, as the theory is less effective when assisting interpretation of the temporal dynamic development of supply chain structure. Moreover, the researcher identifies that as the theory of supply chain integration and the supply chain collaboration theory are often interchangeably used, theoretical confusion has arisen in discussion (Cao and Zhang, 2011).

the four company scenarios introduced by them—i.e., company's start-up; growth; mature; and decline—have been in consistency with the four evolving stages of the supply chain evolution theory—i.e., supply chain emergence, growth, maturity and decline. Such an overlapping of theoretical discussions not only shows connection between these two theories, but also verifies their complementary adoption when in practice. **Fourth**, although being proposed in 2016 by MacCarthy *et al.* (2016), the supply chain evolution theory to date is an emerging theory thus requiring researchers' continuous efforts and contributions to push forward its development—by the time when this review chapter 2 is accomplished, the work of MacCarthy *et al.* (2016) is still found to be the only one contributing to their theory.

2.10 Initial conceptual framework and chapter summary

Before ending the literature review chapter, this section will first generate an initial conceptual framework based on the review findings, which is designed to support and guide later research stages of data collection; within and cross-case analyses; and discussion in this research. Then, this section will offer a summary of the findings and result of all performed literature reviews in the literature review chapter, which include that of the SFSC; the e-commerce enabled SFSC; the knowledge-based view (KBV); the resource orchestration theory; and also the supply chain evolution theory. More importantly, the summary not only helps maintain research consistency before entering the next chapters, but also assists the researcher in further shaping and refining the previous research intention and hence determining the final research goal.

2.10.1 Initial conceptual framework

When performing literature reviews of the three complementary theories—i.e., the KBV; the resource orchestration theory; and also the supply chain evolution theory, their connections are verified by the researcher and it at the same time enables a basis on which an initial conceptual framework can be generated to guide the later research stages. In summary, the connection in between the KBV and the resource orchestration theory is primarily reflected by how they share the same theoretical origin as the resource-based view, which gifts them the similar theoretical

essence as emphasising the role of possessed resource/knowledge in value creation. Then, since the resource orchestration theory offers a concrete resource/knowledge utilisation framework that the KBV lacks in explaining value creation, the resource orchestration theory can play the theoretical extension of the KBV in discussion. This viewpoint of extension is accepted by the previous researchers as well, and it inspires the research pathway of "possessed knowledge—resource orchestration—measurable or evaluable performance", which is identified and applied by the researcher to support structuring the initial framework for its significance in enabling a complete research procedure. Furthermore, to ensure that the applied research pathway achieve its completeness in practice, the researcher introduces the four knowledge acquisition activities that specify how knowledge is acquired before possession and utilisation, and the supply chain evolution theory that uses a four-staged lifecycle to allow evolution of the SFSC to be evaluable.

In addition to the connections verified between the three chosen complementary theories and the applied research pathway's significance in structuring the initial conceptual framework, the researcher proposes three propositions when reflecting on knowledge of the three theories (See Table 14). Overall, the three propositions are designed to be highly relevant to the knowledge management in the practice of e-commerce enabled SFSC, hence they can better transform the verified connections and the introduced four knowledge acquisition activities into the versions that are more down to the research intention—i.e., understanding evolution of the e-commerce enabled SFSC in local context, which allows the generated initial conceptual framework to be more fitted when guiding data collection; within and cross-case analyses; and discussion. As a result, after integrating all the three complementary theories; the applied research pathway; the knowledge acquisition activities; and the three propositions, an initial conceptual framework is generated (See Figure 14).

Table 14. Three propositions

Propositions	Contents
P1	Knowledge possession and utilisation happen in the practice of e-commerce enabled SFSC (See Section 2.8.3).
P2	In the practice of e-commerce enabled SFSC, supply chain

	manager's possessed knowledge is acquired through execution of the four knowledge acquisition activities (See Section 2.8.3).
P3	Supply chain manager's possession and utilisation of acquired knowledge trigger evolution of the e-commerce enabled SFSC (See Section 2.9.2).

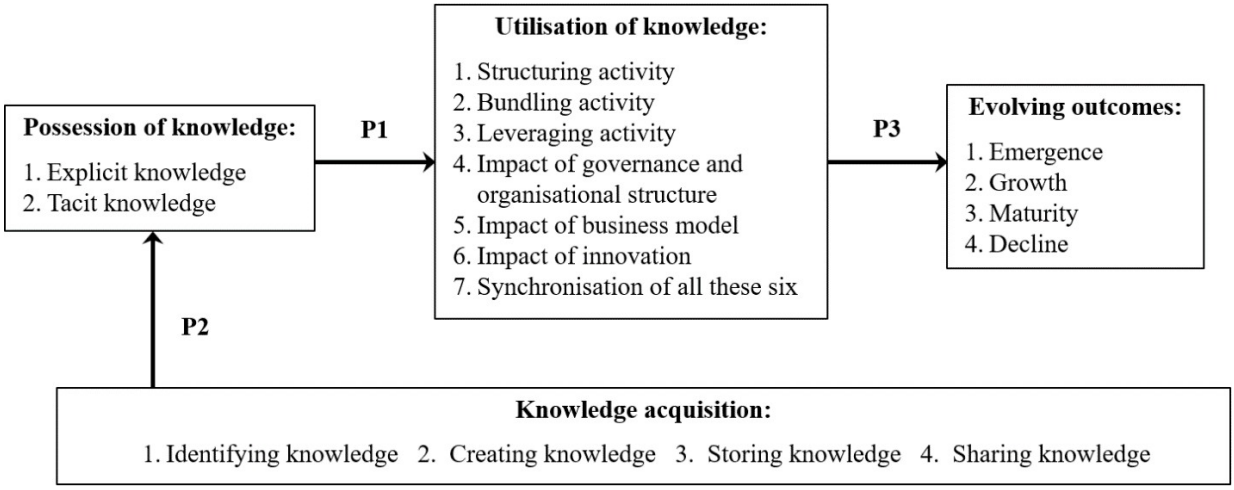

Figure 14. Initial conceptual framework

2.10.2 Chapter summary and research goal

A number of literature reviews have been performed in this chapter to help lay this research's theoretical foundation, including literature reviews of the short food supply chain (SFSC); the e-commerce enabled SFSC; the KBV; the resource orchestration theory; and the supply chain evolution theory.

In summary, after informing basics of the SFSC to allow an initial understanding of this rising food supply chain knowledge requiring future contributions—such as for solving its definition confusion, the literature review chapter 2 is started with determination of the systematic search and review approach—an approach which combines comprehensive search process and critical review—as the solution for review performing, and it is first applied to enable a review of the SFSC literature that results in identification of the e-commerce enabled SFSC as the primary research gap to which this research contributes. Thereafter, further to focused literature reviews

of the SFSC definition and the e-commerce enabled SFSC, the researcher solves the definition confusion of the SFSC for this research, via developing and proposing a new definition which follows the theoretical essence of the SFSC—that is, the dual proximity indicating supply chain and emotional proximity, and the researcher as well identifies four reflections from research of the e-commerce enabled SFSC that would help inspect and shape the research intention—i.e., the supply chain nature of the e-commerce enabled SFSC requires to be strengthened; in-depth supply chain examinations and the consideration of negative supply chain outcomes require to be involved; to achieve comprehensiveness in research, practices of both supply chain upstream and downstream require to be examined; and the requirement of understanding the e-commerce enabled SFSCs underpinned by professional e-commerce platforms.

After the reviews lead to the shaped research intention of contributing to the knowledge of e-commerce enabled SFSC, the researcher moves on to choose three complementary theories—that are, the KBV; the resource orchestration theory; and the supply chain evolution theory—to help enhance the explanatory power and problem-solving capacity of this research, therefore the knowledge of these three chosen theories are respectively reviewed. As a result, performed literature reviews of the three theories not only allow the connections between the theories to be verified, but also allow the researcher to propose the three propositions that fully integrate the theories into content of this research, hence leading them and the applied research pathway of "possessed knowledge—resource orchestration—measurable or evaluable performance" to together enable the basis on which an initial conceptual framework is generated. All in all, the Table 15 summarises the main findings in this literature review chapter 2.

Table 15. Main findings in chapter 2

Findings	Contents	Solutions
Definition confusion of the SFSC.	There has been a lack of accurate definition since the previous researchers' understanding of the SFSC concept varies (See Section 2.1).	A focused literature review is performed to find theoretical essence of the SFSC concept, on which a new definition is proposed after integrating the found essence and the referred supply chain definition (See Section 2.5.1).
Few case studies informing experiences from the non-developed countries.	Development of the current SFSC research is mainly based on experiences contributed by the cases studies from the European developed countries (See Section 2.4).	Cases from the developing China are planned to be chosen to serve the sampling and discussion of this research.
Less contributed knowledge of the e-commerce enabled SFSC.	Comparing with other types of the SFSC practices, contributions towards knowledge of the e-commerce enabled SFSC remains less (See Section 2.4).	The researcher determines the intention that this research contributes to knowledge development of the e-commerce enabled SFSC (See Section 2.4).
No definition of the e-commerce enabled SFSC.	Due to confusion in defining the SFSC, the e-commerce enabled SFSC as well faces the lack of its own definition (See Section 2.5.2).	Based on the proposed new SFSC definition, a definition of the e-commerce enabled SFSC is developed and proposed by the researcher (See Section 2.5.2)
Lack of supply chain examination in research of the SFSC/the e-commerce enabled SFSC.	When reviewing research of the SFSC/the e-commerce enabled SFSC, the researcher identifies the lack of supply chain examination—especially for the examination of upstream activities—in discussion (See Section 2.4 and 2.5.2.).	The research intention is further shaped to emphasise the role of supply chain examination in this research (See Section 2.4 and 2.5.2).
The introduced KBV has theoretical limitations	When reviewing knowledge of the KBV, its main theoretical limitations are identified as lacking a clear definition of knowledge; lacking explanation of how possessed knowledge is first acquired; and lacking	The researcher develops and proposes a definition of knowledge fitting demand of this research, and further introduces the four knowledge acquisition activities (See Section 2.7.3) and the second complementary theory—i.e.,

	explanation of how possessed knowledge is then utilised (See Section 2.7.1).	the resource orchestration theory (See Section 2.8)—to help explain how possessed knowledge is acquired and utilised in research discussion.
Supply chain evolution requires to become evaluable in discussion.	The application of the identified research pathway—i.e., the "possessed knowledge—resource orchestration—evaluable performance"—requires the final performance as supply chain evolution to become evaluable (See Section 2.8.3).	The supply chain evolution theory as the third complementary theory is introduced to this research, due to its enabled supply chain lifecycle concept that consists of four evolving stages (See Section 2.9).

Besides laying theoretical foundation of this research through the performed literature reviews which in the end generate an initial conceptual framework, significance of the literature review chapter 2 is shown by how it allows the researcher to shape and refine the beginning research idea, hence leading to the later research intention and the final research goal that becomes much detailed; focused; and also practical. To summarise, beginning with a general research idea of contributing to knowledge of the SFSC, the followed review of the SFSC literature offers an insight into situation of current research, through which the researcher realises the importance of contributing to knowledge development of the e-commerce enabled SFSC—a particular type of the SFSC practices, and also that of strengthening the supply chain examination in research discussion since the SFSC's supply chain nature has been long neglected. These two findings shape and refine the research idea and therefore lead to a more oriented research intention of understanding evolution of the e-commerce enabled SFSC in local context. Then, after another followed literature reviews of the three complementary theories—i.e., the KBV; the resource orchestration theory; and the supply chain evolution theory—which are chosen to help enhance the explanatory power and problem-solving capacity of this research, it is finally decided that this research adopts a knowledge management perspective, and the researcher also determines the final research goal as:

By committing to supply chain examination and the knowledge management perspective enabled by adoption of the knowledge-based view; the resource orchestration theory; and the supply chain evolution theory, this research is designed to help understand evolution of the e-commerce enabled SFSC in local context.

Chapter 3: Research methodology

After laying theoretical foundation and determining the final research goal, this chapter moves on to demonstrate complete methodology design of this research (See Figure 15). Overall, this chapter first informs the researcher's decision of determining interpretivism as philosophical stance. Then, it continues to inform the determined approach to help develop knowledge of the e-commerce enabled SFSC in research discussion—i.e., the abductive approach, which will be followed by more decisions of the methodology—i.e., multiple case study—and of the research instruments chosen to serve data collection—i.e., semi-structured interview and secondary data collection. Moreover, the cross-sectional solution is determined as the fitted option for solving time horizon issue of this research.

Thereafter, this chapter introduces method of following the four dimensions of Yin (2003) to maintain case study research rigour, and also introduces method of adopting teleological view to guide research ethics standards in practice. Furthermore, it presents the design and result of case sampling and data collection, which have been respectively enabled by the purposive and snowball sampling and the designed interview question list consisting of five sections and 14 questions. Then, after data are collected from a total of 30 online interviews with the 30 local managers of the three sampled Taobao villages—i.e., Yuezhuang village of apple e-commerce; Daxing'zhuang village of seafood e-commerce; and Bainiu village of hickory nut e-commerce, this chapter introduces the researcher's chosen methods for data coding and analysis—i.e., the provisional coding and template analysis.

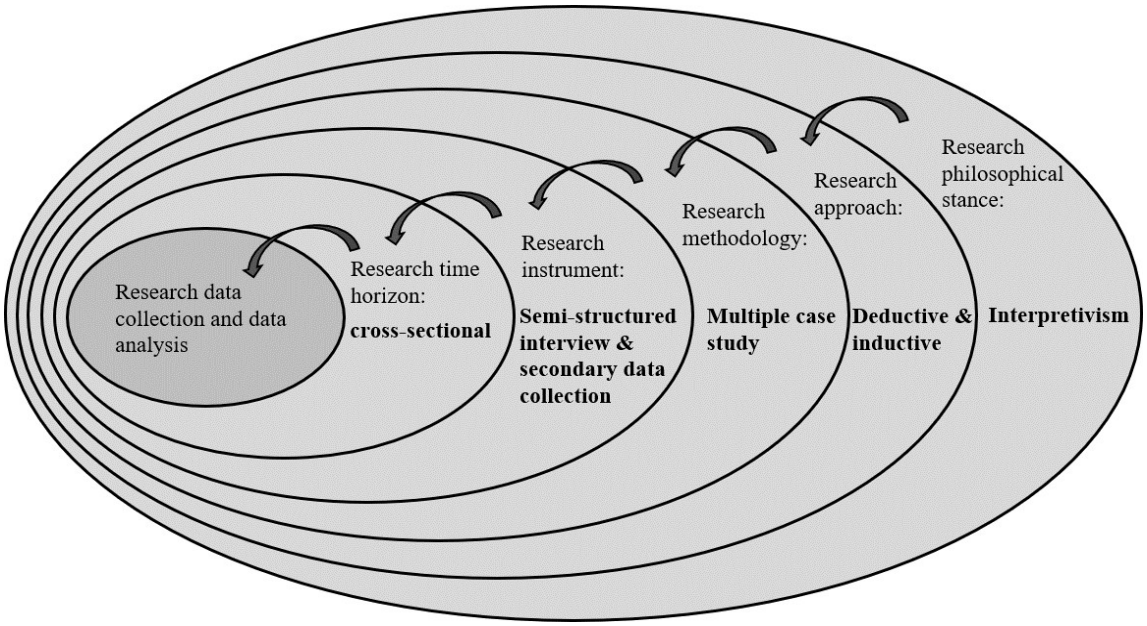

Figure 15. Research design following onion solution of Saunders *et al.* (2009)

3.1 Philosophical stance

This section 3.1 informs the decision of determining interpretivism as the philosophical stance. In doing so, it first highlights importance of the application of paradigm in research that would lead to determination of philosophical stance to affect methodology design (Ritchie and Lewis, 2003; Saunders *et al.*, 2009). Then, by referring to the work of Saunders *et al.* (2009), a total of four suitable philosophical stances are displayed and compared, during which interpretivism is determined as the final option for this research.

The reason to determine philosophical stance is connected with the requirement for paradigm in research (Saunders *et al.*, 2009). According to the definition by Saunders *et al.* (2009, p.118), paradigm represents "*a set of basic beliefs (or metaphysics) that deals with ultimates or first principles*". And for this research of examining the e-commerce enabled SFSC, its basic beliefs can be provided by the four philosophical stances that have been primarily used in the field of management—i.e., positivism, realism, interpretivism and pragmatism (See Table 16).

Table 16. Comparison of four research philosophies in management research (Saunders *et al.*, 2009, p.119)

	Positivism	Realism	*Interpretivism (chosen)	Pragmatism
Ontology: the researcher's view of the nature of reality or being.	External, objective and independent of social actors.	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist).	Socially constructed, subjective, may change, multiple.	External, multiple, view chosen to best enable answering of research question.
Epistemology: the researcher's view regarding what constitutes acceptable knowledge.	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements.	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts.	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions.	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data.
Axiology: the researcher's view of the role of values in research.	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance.	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research.	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective.	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view.
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative.	Methods chosen must fit the subject matter, quantitative or qualitative.	Small samples, in-depth investigations, qualitative.	Mixed or multiple method designs, quantitative and qualitative.

Although each of these four stances is proved to be suitable in assisting management related discussions, however, the researcher determines interpretivism as the final option and it is due to four reasons. **First**, considering the complexities identified from the literature review of the SFSC—such as the unclarified definition and the neglected supply chain nature, possibility of this research to generate law-like result becomes low and it eliminates the option of positivism. **Second**, the complexities not only lowers the possibility of law-like result but also hinders the researcher in gaining the sufficient experiences required by realism for research, hence realism is the next to be eliminated. **Third**, the researcher needs to exclude pragmatism because it is unavoidable that the complexities would affect research question design and make the question less rigour to lead research conduction. **Fourth**, reflecting on the sociality of the SFSC and the nature of interpretivism as appreciating the real world from a socially structured viewpoint, it is identified that these two can well cooperate with each other when in practice, therefore the researcher determines interpretivism as the final philosophical stance option for this research.

3.2 Theory development approach

After determining the philosophical stance, this section 3.2 continues to inform the researcher's another choice of the theory development approach—i.e., the abductive approach. In doing so, it begins with introducing the theory and the theory development defined in this research. Then, it moves on to show the connection between this research and the abductive approach, leading to the conclusion that the abductive approach is a suitable choice to assist development of the theory of the e-commerce enabled SFSC.

Despite debates around defining theory (Ridder, 2017) (See Table 17), theory can be normally referred as "*understanding relationships between phenomena which have not been or were not well understood before*" (Ridder, 2017, p.293), or as "*a final product or as a continuum, and there is an ongoing effort to define different stages of this continuum*" (Ridder, 2017, p.293). In this research, the primary theory on which the researcher targets is the knowledge of the e-commerce enabled SFSC.

Table 17. Definitions of theory

Proposers	Definitions
Campbell (1990, p.65)	● "*It is a collection of assertions, both verbal and symbolic, that identifies what variables are important for what reasons, specifies how they are interrelated and why, and identifies the conditions under which they should be related or not related*".
Bacharach (1989, p.498)	● "*... a system of constructs and variables in which the constructs are related to each other by propositions and the variables are related to each other by hypotheses*''.
Sutton and Staw (1995, p.378)	● "*Theory is about the connections among phenomena, a story about why acts, events, structure, and thoughts occur. Theory emphasizes the nature of causal relationships, identifying what comes first as well as the timing of such events*".
Corley and Gioia (2011, p.12)	● "*... theory is a statement of concepts and their interrelationships that shows how and/or why a phenomenon occurs*".
Ridder (2017, p.294)	● "*In sum, theories are a systematic combination of components and their relationships within boundaries*".

Comparing with the theory building which creates "*theoretical constructs, propositions and/or midrange theory*" (Eisenhardt and Graebner, 2007, p.25), or with the theory testing which aims to answer "*whether and how the scope conditions of competing theories should be expanded or narrowed*" (George and Bennett, 2005, p.90), the theory development indicates the process via which captured phenomena are first classified into similar categories, and then the similar categories and their relationships are defined by framework to develop new theoretical content (Gilbert and Christensen, 2005). In this research, rather than building or testing the theory of the e-commerce enabled SFSC, the researcher chooses to develop it based on the extant content and the newly captured phenomena in cases.

Although the deductive and inductive approaches have been the two common solutions to the theory development (Saunders *et al.*, 2009), the choice of abductive approach is considered to be more suitable to this research. Overall, the abductive approach seeks a logical consequence of observation and of the simple transformation of theory based on prediction; it is particularly

effective when being applied for discovering a new content and also eligible when cooperating with the theory development (Dubois and Gadde, 2002; Cooper and Schindler, 2008). Such a feature makes the abductive approach fit conditions of this research, as the e-commerce enabled SFSC is a rising theory with only ten articles so it is challenging to propose the less predictive hypotheses to deductively push forwards research discussion. Besides, considering the ongoing restrictions of international travel and the limited left time after the topic change, this research faces the difficulty of being highly structural and collecting the diverse inductive data via in-person and long-term fieldwork, therefore it would be a more flexible and feasible solution to strengthen observations of adequate online interview transcripts, notes, memos and secondary data, which is in consistence with the abductive approach as well.

3.3 Research methodology and instruments

After determining the theory development approach, this section 3.3 continues to inform the methodology and instruments that are chosen to serve this research—i.e., the methodology of multiple case study and the research instruments of semi-structured interview and secondary data collection.

3.3.1 Multiple case study methodology

Considering concept of research has meant "*the manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.*" (Slesinger and Stephenson, cited in Kothari, 2004, p.1)[12], how to in practice maintain effectiveness and efficiency of manipulation becomes priority, which therefore leads to design of the research methodology that acts as the research strategy to assist fulfilment of goal and ensure technical sense of academic activities (Kothari, 2004).

According to Kothari (2004), methodology represents the science of studying how research can

[12] The researcher finds no access to the original work of Slesinger and Stephenson (1930).

be conducted and advocates use of the different strategies for various research scenarios, such as case study; action research; and ground theory (Lawrenz *et al.*, 2003; Saunders *et al.*, 2009). In this regard, the researcher decides to choose case study—or more precisely, multiple case study—to serve as methodology of this research, as its properties of exploring phenomenon or system within real-life context and of benefiting interpretivism in research scenario setting (See Table 18), these two properties are well in line with essence of the determined interpretivism which emphasises participation of researchers in the discussions with small simple size but in-depth investigation, for helping understand the real world contents from research target's point of view (Saunders *et al.*, 2009).

Table 18. Properties of case study (Saunders *et al.*, 2009)

	Case study
Properties	● Exploring contemporary phenomenon/bounded system within its real-life context. ● Setting up research scenario for social anthropology and interpretivism to pursue interpretation and description. ● Fitting theory testing; theory building; theory elaborating; and description generation. ● Can be applied with single case or ***multiple cases (chosen)**.
Recommended instruments	e.g., interviews; document analysis; and observation.

For more basics of case study, according to the summative works of Yin (2003) and the latter Creswell (2013), case study indicates "*an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*" (Yin, 2003, p.13), and this empirical investigative enquiry has been normally processed by "*detailed, in-depth data collection involving multiple sources of information…and reports a case description and case themes*" (Creswell, 2013, p.97). Also, case study is widely recognised as a valid methodology or strategy that is frequently chosen by researchers to guide their discussions with either single or multiple cases (Yin, 2003), in which interview; observation; and document analysis are the most employed cooperative instruments to enable their data collection (Gibbert and Ruigrok, 2010). In this regard, the researcher makes

decision that multiple case study is chosen to guide this research's discussion, as this particular type of case study practices helps develop stronger analysis by allowing comparison in between multiple research cases (Baxter and Jack, 2008), thus more robust and reliable findings can be identified or generated comparing with single case study (Yin, 2003; Baxter and Jack, 2008).

3.3.2 Semi-structured interview

After determination of methodology, this section informs the researcher's decision that semi-structured interview—a particular type of interview practices—is employed to serve as the first research instrument that enables data collection of this research, especially when evidence has verified that interview is one of the most employed research instruments to cooperate with case study methodology in practice (Gibbert and Ruigrok, 2010).

Overall, term of research instrument indicates all techniques required for research conduction, and potentials of these techniques is fully released to assist fulfilment of research goal, if they are employed to cooperate with suitable research methodologies (Kothari, 2004). Nevertheless, employment of research instrument is not dependent on researchers' personal consideration, it is also affected by previously determined philosophical stance; theory development approach; and research methodology. And for this research of the e-commerce enabled SFSC, due to its demand of the primary research data that are exploratory and can better support understanding of the real world contents from the target's viewpoint, as well as better support more realistic findings to be identified or generated from in-depth investigation and then reflected back to the initial conceptual framework—this simultaneously is the integrative demand of interpretivism; the abductive theory development approach; and case study, in this regard , research instrument of interview is therefore seen as a competitive option.

Briefly, interview represents "*a type of framework in which the practices and standards be not only recorded, but also achieved, challenged and as well as reinforced*" (Jamshed, 2014, p.87), and interview is seen as expert in assisting collection of primary research data, as it in practice facilitates "*purposeful discussion between two or more people*" (Saunders *et al.*, 2009, p.349).

Furthermore, practices of interview can be divided into three types by the level of being formal and structural when they are designed—i.e., structured interview that is formal and structured; semi-structured interview that is semi formal and structured; and unstructured interview that is informal and unstructured (Saunders *et al.*, 2009). In this regard, although these three interview types own respective merits, comparing with the structured interview that has highest demand for procedural design or the unstructured interview that more fits long-term fieldwork (Jamshed, 2014; Adhabi and Anozie, 2017), the researcher eventually chooses semi-structured interview to serve data collection of this research of the e-commerce enabled SFSC, since its property of being flexibly designed and interviewee-friendly not only facilitates collection of quality and unexpected data (Adhabi and Anozie, 2017), but also allows data collection to be time and cost saving in practice—average interview duration advocated by semi-structured interview is from 30mins to 60mins and can be practised online (Saunders *et al.*, 2009; Jamshed, 2014), which altogether is important to the researcher, especially when considering the complexities caught in the previous literature reviews that hinder design of high standard interview procedure, or considering the travel and social restrictions triggered by the global COVID-19 pandemic that require research conduction to be more practical and effective.

3.3.3 Secondary data collection

Besides semi-structured interview, secondary data collection is the other instrument employed by the researcher to complement the interview instrument when in data collection. In summary, secondary data means research data that are previously collected and analysed (Kothari, 2004), and collection of them has been a rather common research instrument employed by discussions of case study research (Saunders *et al.*, 2009). Kothari (2004) divides secondary data into two types—i.e., published secondary data that tend to have wider and more opened access such as companies' annual reports and governments' publications; and unpublished secondary data that tend to have exclusive and more limited access such as diaries and letters.

Although being frequently employed in research discussions and owning various merits such as having fewer access requirements; being unobtrusive; and allowing permanent data to be

collected (Saunders *et al.*, 2009), practice of the collection of secondary data is challenging, as it might cause unsuitable or inadequate data; difficulty of controlling data quality; and difficulty of how collected data are presented (Kothari, 2004). In consequence, for this research of the e-commerce enabled SFSC, collection of secondary data is employed to complement the semi-structured interview that has been chosen to serve as the primary instrument for collecting core research data, thus collection of secondary data as the secondary research instrument is mainly responsible for collecting the data that help provide background information or verify validity of core research data, through which negative impact of the listed challenges would be reduced as well in practice. Furthermore, the researcher determines that secondary data targeted by this research basically involve information on government's website; available booklets and leaflets informing local e-commerce industry; and pictures of local contents provided by interviewees (See Appendix A).

3.4 Time horizon

As research instruments are determined, this section 3.4 moves on to inform the researcher's decision of time horizon solution. In summary, this section first introduces the concept of time horizon and its significance in methodology design. Then, it introduces the two main solutions to time horizon issue—i.e., the cross-sectional and the longitudinal solutions—and justifies the cross-sectional solution as the more feasible option.

Overall, the concept of time horizon means the timeframe within which research is conducted, and the determination of its solution would lead to the scope of single or multiple time episodes used for methodology, which also distinguishes between the cross-sectional solution and the longitudinal solution (Saunders *et al.*, 2009). For this research of the SFSC, the cross-sectional solution advocating single time episode is determined as the more feasible option due to three main reasons. **First**, since the present topic is changed once in the third year of PhD programme, scheduling adequate time for practising longitudinal solution before thesis submission would be overly challenging. **Second**, considering the international travel restrictions caused by the COVID-19 pandemic, there has been a lack of opportunities for the researcher to fly to China

and finish the long-term fieldwork required by longitudinal solution. **Third**, according to the previous researchers, the cross-sectional solution also produces the "diary of target" effect as the longitudinal solution, as long as adequate retrospective data are collected during practice (Ritchie and Lewis, 2003)—in response to this issue, retrospective questioning is adopted to interview design to assist collecting the data disclosing temporal evolution of the SFSC, and it is showed in the later section 3.8.1.

By now, the researcher has accomplished following design guidance of the onion solution of Saunders *et al.* (2009), including designs of research philosophical stance; theory development approach; research methodology; research instruments; and research time horizon. Nonetheless, before moving on to result demonstrations of case sampling and data collection, the researcher will further introduce methods adopted to secure research rigour and ethics.

3.5 Rigorous case study research

As maintenance of rigour is crucial to securing reliability and validity of research, a variety of criteria have been developed and proposed to help examine and maintain rigour of the research discussions of various methodologies, including criteria that is exclusive to case study research (Gibbert *et al.*, 2008; Gibbert and Ruigrok, 2010). All in all, Yin (2003) proposes the influential four dimensions that are developed from reliability and validity discussion to in practice help maintain rigour of case study research, and they include construct validity that helps establish correct operational measures for targeted concept; internal validity that helps establish causal relationships in research; external validity that helps generalise findings of immediate research; and reliability that helps with repeating possibility of research and research findings. As a result, the researcher decides to follow the four dimensions of Yin (2003) when planning maintenance of research rigour (See Table 19).

Table 19. Validity and reliability of this case study research

Validity and reliability	Proposed in this research	Yin (2003)'s proposal

Construct validity	● Data collection instruments include semi-structured interview and secondary data collection. ● Data are collected from both supply chain upstream and downstream, hence enabling comprehensive analysis. ● Findings are shared and reviewed with senior academics from who the researcher gains academic supports.	● Use multiple sources of evidence at data collection stage. ● Establish chain of evidence at data collection stage. ● Have key informants review draft case study report at composition stage.
Internal validity	● Planning structured coding and analysis procedure for this research. ● Analysis is based on chain of evidence.	● Do pattern matching or explanation building or time-series analysis at data analysis stage.
External validity	● Planning effective and practical case sampling strategy. ● Planning structured and rigorous coding and analysing procedure and practise it in analyses of multiple cases.	● Use replication logic in multiple case studies at research design stage.
Reliability	● Data collection is fulfilled by following orders and rules set by research methodology design and ethical approval. ● Database of this research consists of audio-recordings; transcripts; notes; and memos. ● Cooperating with senior academics to evaluate research methodology design and research conduction.	● Use case study protocol at data collection stage. ● Develop case study database at data collection stage.

3.6 Research ethics

The concern of ethics arises when methodology design begins, which is especially reflected in a number of research activities such as gaining data access; processing and storage of data; and result reporting (Saunders *et al.*, 2009). In response, researchers and those who delve into other individuals' lives for research demand shall take responsibility of maintaining rightness of their actions. In other words, they shall commit to "*honesty, integrity, and the responsible reporting of the data*", and prevent incidents of "*harm, consent, privacy, and the confidentiality of data*" from happening (Lune and Berg, 2017, p.43).

According to definition by Cooper and Schindler (2008, p.34), as term of ethics means "*norms*

or standards of behaviour that guide moral choices about our behaviour and our relationships with others", research ethics indicates all issues about how to maintain following these norms or standards when in research, which therefore guarantees that goal of research is fulfilled via moral and responsible way (Saunders *et al.*, 2009). Moreover, in addition to impact of common social norms, ethics of the research discussions using primary data is also affected by the five philosophical views guiding ethical standards in varying environments—i.e., teleological view; utilitarian view; deontological view; covenantal view; and critical view, in which teleological and deontological views have particularly dominated ethics consideration of the discussions in the field of management research (Deyhle *et al.*, 1992; Miles and Huberman, 1994; Saunders *et al.*, 2009). Furthermore, two other views are contributed by Flinders (1992)—i.e., relational and ecological views, which are competitive to teleological view and deontological view (See Table 20).

Table 20. Comparing seven philosophical views (Miles and Huberman, 1994; Saunders *et al.*, 2009)

Philosophical views	Meanings
***Teleological view (chosen)**	● It judges ethics of actions by research's primary ends. Therefore, the benefits of findings will be weighed against the cost of acting ethically.
Utilitarian view	● It judges actions regarding the consequences for various audiences, such as researchers; the researched; colleagues; and the public.
Deontological view	● Comparing with teleological view, deontological review argues that research's primary ends cannot determine research ethics, and research ethics can be examined by referring to one or more universal rules.
Covenantal view	● It judges research ethics by examining whether actions are congruent with the specific agreements made with others in trusted relationships.
Critical view	● It emphasises whether researchers become advocate to the researched, or, whether the researched are provided with direct benefits.
Relational view	● This review focuses on researchers' behaviours of attachment, caring and respect during research.
Ecological view	● Research's influences on a complete and independent system and their relations to a broadest possible context should be included in ethics considerations.

After comparing all these seven views and reflecting on situation of this research, the researcher makes decision of adopting teleological view to guide ethical standards of this research, due to its benefit of being flexible and practical in practice. More importantly, the researcher argues that consideration of being flexible and practical is critical, since this research is conducted in complex rural context in which tradition and modernity hybrid. And based on the researcher's experience gained in the Master dissertation of rural e-commerce research, complexity of rural context often interrupt plan of following rigorous ethical standards—especially when research is designed to develop in-depth understanding of local target, hence the research has to involve collection of the data relating to individuals' routines or private opinions. In consequence, the researcher agrees with meaning of teleological view which advocates balance between research conduction and ethical consideration. Nevertheless, although it might seem that the researcher chooses practicality over rigorous ethics consideration, a comprehensive ethics plan is actually developed by the researcher to strengthen the consideration in practice after following ethical code promoted by the University of York, and the plan passes examination of the Economics, Law, Management, Politics and Sociology Ethics Committee (the ELMPS Ethics Committee) of the university[13] (See appendix B).

3.7 Case sampling

To facilitate research discussion and begin investigation of the e-commerce enabled SFSC in actual context, China's Taobao villages are chosen to serve the planned case sampling. In doing so, this section first offers introduction of Taobao villages and then it justifies the connection between Taobao villages and the e-commerce enabled SFSC. Thereafter, it continues to inform the researcher's decisions of case sampling and the sampling result. Overall, case sampling of this research is practised in two levels: village and individual levels, leading a total of three villages and 30 managers to be involved.

[13] Link to the ethical code promoted by the University of York: https://www.york.ac.uk/staff/research/governance/research-policies/ethics-code/

Link to the committee of the University of York that is responsible for the ethical issues relating to research practices of economics; law; management; politics; and sociology: https://www.york.ac.uk/about/organisation/governance/sub-committees/ethics/elmps/

3.7.1 Taobao villages and justification

The Taobao villages mean a booming economic phenomenon in rural China, which is enabled by the e-commerce platform of Alibaba Group—i.e., Taobao.com—and normally appears in the form of individual villages (Wei *et al.*, 2020). According to definition released by the Group, a village is verified as a Taobao village when: 1) its residents use Taobao.com as their main e-commerce platform; 2) no less than 10% of households engage in e-commerce, or at least 100 e-stores are opened and operated locally; and 3) its annual e-commerce output shall exceed 10 million yuan—i.e., approx. 1.2 million pounds (Li, 2017; Wang *et al.*, 2020; Wei *et al.*, 2020). Overall, Taobao villages is seen as a typical example of the ICT applications around the world (Lin, 2019; Wei *et al.*, 2020); by accessing an influential C2C and B2C platform, a vast number of rural residents are now able to generate greater profits with owned resources more directly (Tang and Zhu, 2020).

As stated in the reports of Alibaba Group (Aliresearch, 2019; 2020), the rise of Taobao villages starts in the year 2009 when only three villages are found and verified. However, after years of increase, the number of Taobao villages quickly grows up to 5,425 to date (See Figure 16), of which 40% of them are with an annual output between 1.2-2.3 million pounds. Besides quick growth and the large total number, two key features are shown by Taobao villages. First, it is discovered that most of the extant villages appear in the eastern China where business culture and offline industries are historically famous, and it could indicate the potential impact of local context on Taobao villages (See Figure 17). Second, extant Taobao villages can be divided into two groups by product: the group promoting light industrial products such as clothing, furniture and handicrafts; and the other group promoting agricultural products such as fruits, vegetables and seafoods (Aliresearch, 2019). In this research, the researcher samples cases from the group promoting agricultural products only, as they best fit the SFSC's nature as food supply chain.

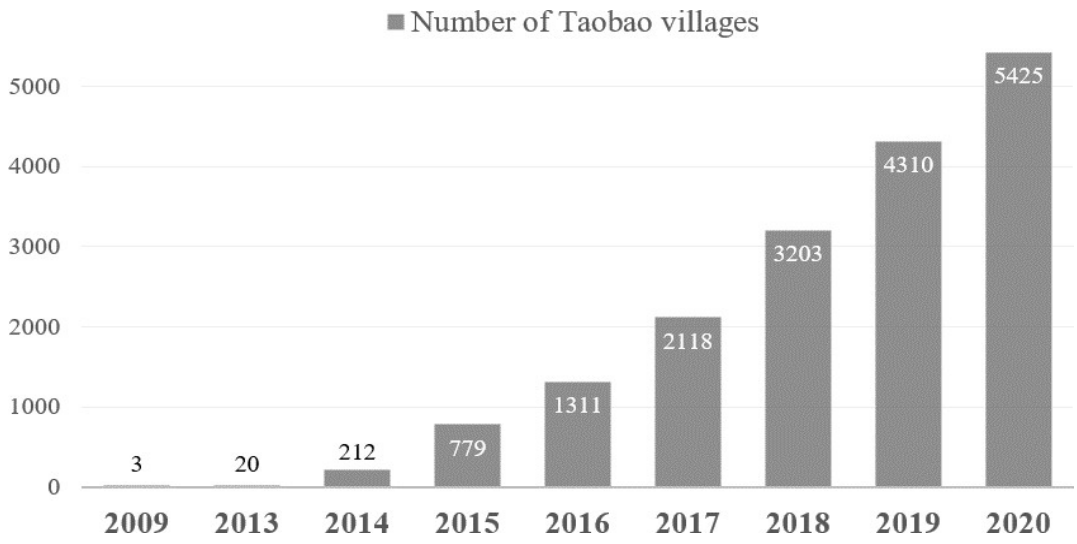

Figure 16. Rise of Taobao villages (Aliresearch, 2020)

Figure 17. Distribution of Taobao villages in four years (villages are marked by red spot) (Aliresearch, 2019, p.15)

The Taobao villages are chosen to serve the planned case sampling since the strong connection between the villages and the e-commerce enabled SFSC is found in related discussions, and it can be justified from theoretical and practical aspects. For theoretical aspect, Taobao villages and the e-commerce enabled SFSC have shared the same significance of being an initiative of empowerment. In particular, after examining real-life cases, discussion of rural development

discloses that Taobao villages are capable of effectively empowering rural residents, enabling them to not just benefit from the ICT application but also generate economic or social changes to local context (Lin *et al.*, 2016; Lüthje, 2019; Wu *et al.*, 2020); for example, by investigation of the Taobao villages in China's Zhejiang Province, Wang *et al.* (2020) record the happened institutionalisation and changes to livelihood. Such a finding is similar to empowerment effect emphasised in research of the e-commerce enabled SFSC (Elghannam *et al.*, 2017; the Food Assembly team, 2017; and Espelt *et al.*, 2019), in which researchers conclude that practices of the e-commerce enabled SFSC can effectively allow food producers to benefit from their direct connection with online customers, therefore they generate the sustainable economic or social outcome that is valued by European developed countries in rural policy making.

Moving to practical aspect, the strong connection between Taobao villages and the e-commerce enabled SFSC is shown by how they share the similar operational solution, since both of them utilise the ICT application/e-commerce to pursue the more direct connection between upstream managers/food producers and downstream customers. Such a shared solution also explains why distribution design appears in the related discussions; because of the need for disintermediation that leads to direct connection, upstream managers/food producers of either the villages or the e-commerce enabled SFSC have particularly faced the pressure of achieving balance between offering prime courier service and costs. For instance, in the works of Lüthje (2019) and Wu *et al.* (2020) analysing the ICT impacts on operation of Taobao villages, their findings all verify that establishing direct distribution is an important operational feature of Taobao villages.

3.7.2 Village level sampling

The case sampling indicates the research strategy of reducing the amount of required data while securing effectiveness and sufficiency of those collected (Ritchie and Lewis, 2003; Saunders *et al.*, 2009). Techniques of case sampling can be divided into two groups (See Figure 18), that are, the probability group of which probability of each case being selected from population is known and equal; and the other non-probability group of which probability of each case being selected from population is unknown and unequal (Ritchie and Lewis, 2003; Saunders *et al.*,

2009). For this research, considering its philosophical stance as interpretivism and the lack of the clear information about the Taobao villages promoting food products, the technique serving village level sampling should be chosen from the non-probability group.

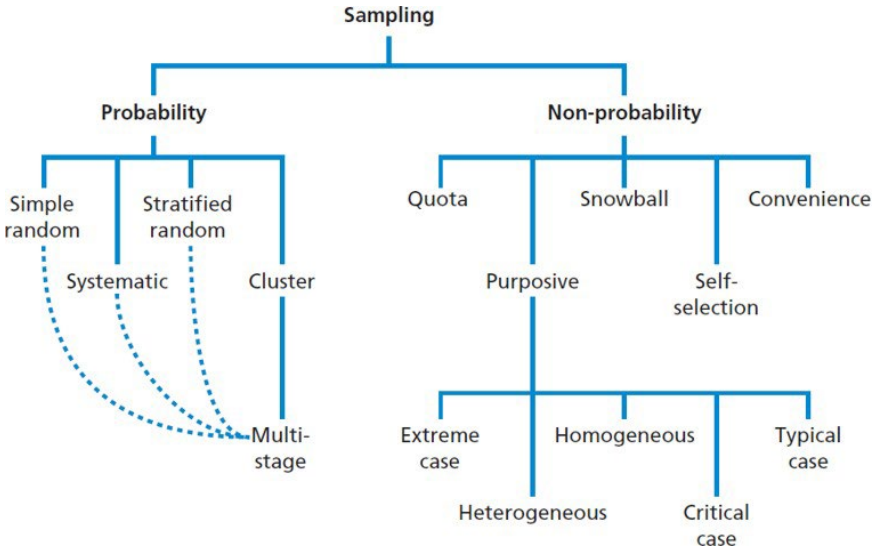

Figure 18. Sampling techniques (Saunders *et al.*, 2009, p.213)

After reviewing techniques of the non-probability group, the researcher makes the decision that the purposive sampling for critical cases is chosen to serve village level sampling. Comparing with the other techniques that advocate either strict or less control over cases—such as quota sampling and convenience sampling, purposive sampling advocates manageable case control hence it allows achievement of the balance between cases' representativeness—being extreme, critical, typical, etc.—and practicality (Saunders *et al.*, 2009). Such a feature not only benefits this research in being practical and receiving richer and unexpected data to help interpret the SFSC evolutions happened in the villages, but also benefits maintenance of rigour because the villages' representativeness is secured to an extent. Overall, during village level sampling, the researcher targets at the Taobao villages that are particularly mature and critical in comparison with the others.

As the total number of Taobao villages reaches 5,425 and no effort is found by far to summarise their detailed information, practising purposive sampling runs into challenges at the beginning.

However, by combining a list of 100 agricultural Taobao villages and other related descriptions from the Alibaba Group's reports (Aliresearch, 2019; 2020) (See Appendix C), the researcher takes manageable control over cases and hence determines a number of potential villages which promote agricultural foods. Then, to maintain the representativeness of villages as being mature and critical, the researcher verifies and filters the potential villages by recommendations from the reports and the gathered secondary data such as news, comments and articles; this step leads to less than 20 qualified villages being involved. Next, to examine accessibility of the involved villages, the researcher searches for their contact details and reaches out for initial contacts, in which online searching for the telephone numbers of village committees and local e-commerce associations plays a key role. Finally, through continuously communicating with the relevant persons in charge and explaining to them the meaning and plan of this SFSC research, a few villages begin to response and agree to participant by offering data collection supports. During this process, the Yuezhuang village of apple e-commerce and Bainiu village of hickory nut e-commerce are the first two to confirm participation, which are followed by the Daxing'zhuang village of seafood e-commerce that is the successor to a previously withdrawn case (See Figure 19 and Table 21). These three villages are later proved to be sufficient to support achieving the research goal of understanding the SFSC evolution, as rich and unexpected data are collected after their individual level sampling is finished, revealing the different evolutions happened in varying and complex local contexts. In other words, these three Taobao villages form the cases required by research discussion and hence the stop of village level sampling.

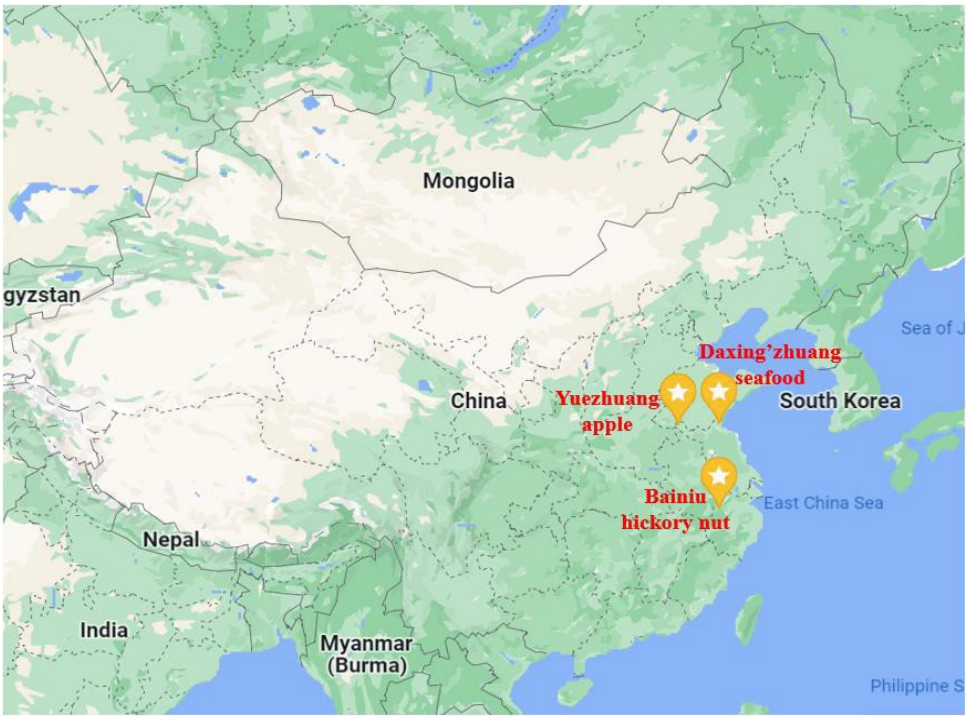

Figure 19. Geographical locations of the three sampled Taobao villages

Table 21. Information of the three sampled Taobao villages

Taobao villages	Types	Time	Reasons
Yuezhuang village in China's Jiangsu Province	Apple e-commerce	Since 2019	● Located at the third significant region for Chinese apple industry. ● Being recognised as the most influential e-commerce village in region. ● 41% of local households directly engage apple e-commerce practices. ● Village annual output of apple e-commerce reaches 1.8 million pounds in 2019.
Daxing'zhuang village in China's Jiangsu Province	Seafood e-commerce	Since 2020	● Located at the region bordering one of the eight most productive Chinese fisheries. ● Being recognised as one of the most influential seafood e-commerce villages in eastern China. ● 31% of local households directly engage seafood e-commerce practices. ● Village annual output of seafood e-commerce reaches 21 million pounds in

			recent years.
Bainiu village in China's Zhejiang Province	Hickory nut e-commerce	Since 2012	● Located at the nationally significant region for Chinese hickory nut industry. ● Being recognised as the most influential e-commerce village in region. ● Being set as an example of Taobao villages by Alibaba Group. ● 12% of local households directly engage hickory nut e-commerce. ● Village annual output of hickory nut e-commerce reaches 61 million pounds in 2020.

3.7.3 Individual level sampling

Along with happening of the sampling in village level, individual level sampling takes place in sequence and it leads a total of 30 SFSC managers to be involved—that is, ten interviewees per village case. Most importantly, this sampling result demonstrates effort of the researcher from three aspects. **First**, considering the received supports and accessibility, the final number of 30 interviewees is the best result that can be offered at the time. **Second**, it is discovered that data collected from the 30 interviewees are adequate to underpin the planned interpretations of local context and the SFSC operation and evolution; in other words, the data collected from 30 SFSC managers reach the saturation required by this research, hence the sampling aim is met. **Third**, when pursuing representativeness and diversity of the involved SFSC managers, arrangement of ten interviewees per village is found to be both effective and sufficient in providing rich and unexpected data, and it also helps control the later workloads for transcription, Chinese-English translation and coding.

The snowball sampling is chosen to serve the sampling in individual level. Same as purposive sampling, snowball sampling advocates manageable case control and also the balance between cases' representativeness and practicality (Saunders *et al.*, 2009). When in practice, snowball sampling especially fits the scenario that individual cases are difficult to be identified from a small and dispersed population (Ritchie and Lewis, 2003). Such a scenario is commonly shared

by Taobao villages, since the frequent lack of the villages' details often hinders the researcher from alone identifying individual samples. In consequence, supports and recommendations of locals are expected to play an assistant role during sampling.

To practise snowball sampling in Taobao villages, the researcher follows a basic procedure of having initial contact with village committee or e-commerce association, seeking their support to get in touch with a qualified manager who plays as the first interviewee. Then, after interview is finished, the first interviewee is asked to recommend the next manager for the researcher to contact, and this should continue until data collected via interviews are adequate to underpin interpretations of local context and SFSCs. During the procedure, the initial contact with village committee or e-commerce association is important because it allows identification of the first interviewee when local situation is unfamiliar to the researcher, hence a rigorous beginning of sampling is ensured. For sampling criteria, the researcher intends to involve the qualified local managers who have long-term based their operations of the e-commerce enabled SFSC in local context, so their valuable in-person experiences of local context and supply chain practices can be gathered to generate critical data. Also, the researcher is aware of the weakness of snowball sampling during practising, that is, the relying on individual recommendations could lead to a compromised and homogenous final sampling result, causing losses to representativeness and diversity (Ritchie and Lewis, 2003). In response, the researcher chooses to keep in contact with village committee or e-commerce association when sampling, consulting them for information if the qualification of an individually recommended manager needs to be verified. Besides, a list of sampling questions are provided to managers when asking for their recommendations, and they are designed to help managers better reflect before answering:

- **What is the reason driving you to make this recommendation?**
- **Based on acquisition; possession; and utilisation of knowledge and supply chain evolution, to which you see particular contribution from the recommended manager's operation?**
- **Comparing with operations of yourself and local others, how you evaluate the recommended manager's?**

● **Please now make one more recommendation.**

3.8 Data collection

This section 3.8 demonstrates the design of semi-structured interview and the data collection result. More importantly, considering the on-going impacts of the COVID-19 pandemic—such as lockdowns and travel restrictions, the researcher responds to the recent call for the practical data collections in pandemic and decides to practise remote and online interviews (Gummer *et al.*, 2020; Leemann *et al.*, 2020; Sastry *et al.*, 2020; Krause *et al.*, 2021).

3.8.1 Design of interview questions

To fulfill this SFSC research that includes the analyses of a number of elements—i.e., the SFSC; local context; knowledge management; and supply chain evolution, adequate and quality data are required to be generated from the finished interviews, and this shows the importance of the design of interview questions. Also, as data collection of this research has committed to semi-structured interview, the design needs to reflect the property of being flexible and interviewee-friendly. Therefore, after integrating these two considerations into the design, a list of questions that consists of five sections and 14 questions is proposed by the researcher for being used in practice (See Table 22).

Table 22. Design of interview questions

Interview questions	Targets
Section 1: Basics of the e-commerce enabled SFSC in local context	
1a. *Considering roles of producer; processor; and intermediary in local industry, which role is played by you in practice?*	Knowing the supply chain role of interviewee and mapping structure of the SFSC—with or without the only intermediary.
1b. *How do you establish relationships with downstream and upstream supply chain participants?*	Starting further investigation into structure and operation of the SFSC, forming up basis for later supply chain examination.
1c. *How do you enable online customers to perceive the closeness to your food processing or production so they are more willing to purchase? Such as use of origin*	Investigation of the emotional proximity that is part of the theoretical and practical essence of the SFSC operation.

protection logo or geographical indication.	
1d. *How does your supply chain be affected by the factors on platform? Such as impact of platform regulations or online customers' characteristics.*	Since the SFSC is enabled by Taobao.com, this question allows investigation of the impact of online platform on offline supply chain operation.
1e. *How does your supply chain be impacted by the factors in local context? Such as impacts of infrastructure; local traditions; local others; and authorities.*	Allowing investigation towards the interactions between the diverse contents in local context and the SFSC, in regard to supply chain operation.
Section 2: supply chain evolution	
2a. *If there is a list indicating the stages of supply chain evolution—i.e., emergence, growth, maturity and decline, in which stage your supply chain is and why? Or would you think yours is out of these four stages?*	Following the previous supply chain questions, this question continues to allow investigate towards evolution of the SFSC.
2b. *What do you learn from supply chain evolution and how do you apply the learnt?*	Focused investigation of the knowledge acquisition happened in supply chain evolution.
Section 3: knowledge possession	
3a. *Based on your experiences, what knowledge types are rated by you as important or must-have to your supply chain?*	Allowing investigation of the possessed knowledge types that are connected with operation and evolution of the SFSC.
3b. *Based on the knowledge types rated by you, please specify which of them are easy to be expressed; learnt; and applied, while which of them are not?*	Specifying explicit and tacit knowledge types that are possessed, hence benefiting further investigation of their respective effects in operation and evolution.
3c. *Please introduce to me your experience of reflecting on the knowledge types that you learn, which then leads to changes to the learnt knowledge types or creation of new ones.*	Focused investigation of the knowledge acquisition happened in possession of knowledge.
Section 4: knowledge utilisation	
4a. *Reflecting on the provided table of knowledge utilisation activities, how do the seven activities fit your situation so that knowledge can better underpin your supply chain?*	Following the previous knowledge possession questions, this question continues to allow investigation towards knowledge utilisation; a table demonstrating the seven knowledge utilisation activities are provided to help the interviewee reply (See Appendix C).
4b. *Please introduce to me any of your experiences that you gain new knowledge when practising knowledge utilisation activities.*	Focused investigation of the knowledge acquisition happened in knowledge utilisation.
Section 5: knowledge acquisition	
5a. *Where and how do you learn the knowledge types that are previously rated by you as important or must-*	Allow overall investigation of the knowledge acquisition happened in supply chain operation and evolution.

have to your supply chain?	
5b. *If there is a list indicating the activities of knowledge acquisition—i.e., identifying; creating; storing; and sharing knowledge, how do your experiences fall into these four? Please answer this with examples.*	Specifying practices of individual knowledge acquisition activities, hence benefiting further investigation of their respective effects in operation and evolution.

In summary, this question list first complies with the guidance offered by the initial conceptual framework, hence it not only enables comprehensive investigations of the SFSC; the contents in local context; and their interactions in between, but it also facilitates in-depth investigations of the related knowledge management activities—i.e., acquisition; possession; and utilisation of knowledge. Moreover, this list complies with the cross-sectional solution that is determined as the time horizon solution. By adding of the retrospective questions—such as question 1b, 3c and 4b, this list becomes capable of taking snapshots of the past and current changes of local SFSC operations, hence it allows investigation of how supply chains have evolved over time. Last but not least, as a table that introduces the complicated resource orchestration theory is included by the design and is provided to all interviewees to help them become confident when being interviewed (See Appendix D), this list complies with the property of semi-structured interview as being interviewee-friendly.

3.8.2 Interview result

Between 11st November 2021 and 04th March 2022, the question list is put into practice by the researcher and it then results in 30 semi-structured interviews with a total of 30 SFSC managers of the three sampled Taobao villages (See Table 23). These interviews are practised online via China's most used communication application WeChat, and the average duration is controlled between 30mins and 60mins. Moreover, practices of the first 10 interviews with the managers of Yuezhuang village are particularly constructive, because reflection of interviewees' feedback has allowed timely improvements to the list, such as changing questions' sequence and merging similar questions. Additionally, due to change of the second village case in February 2022, it is unavoidable that interviews with the managers of Daxing'zhuang village are later than ones of

the other two.

Table 23. Summary of interviews

Villages	Interviewees	Operational role	Interview data	Duration
Yuezhuang village (Apple e-commerce)	Interviewee_A	Manager of direct sales	11st and 25th Nov, 2021	48mins
	Interviewee_B	Manager of direct sales	11st Nov, 2021	32mins
	Interviewee_C	Manager of intermediary	11st Nov, 2021	46mins
	Interviewee_D	Manager of intermediary	12nd and 25th Nov, 2021	73mins
	Interviewee_E	Manager of direct sales	12nd and 26th Nov, 2021	52mins
	Interviewee_F	Manager of intermediary	12nd and 27th Nov, 2021	52mins
	Interviewee_G	Manager of intermediary	13rd and 27th Nov, 2021	45mins
	Interviewee_H	Manager of direct sales	15th and 28th Nov, 2021	58mins
	Interviewee_I	Manager of direct sales	15th and 29th Nov, 2021	47mins
	Interviewee_J	Manager of intermediary	16th and 29th Nov, 2021	50mins
Bainiu village (Hickory nut e-commerce)	Interviewee_A	Manager of intermediary	26th Nov, 2021	93mins
	Interviewee_B	Manager of direct sales	27th Nov, 2021	52mins
	Interviewee_C	Manager of intermediary	28th Nov, 2021	54mins
	Interviewee_D	Manager of intermediary	28th Nov, 2021	28mins
	Interviewee_E	Manager of direct sales	29th Nov, 2021	53mins
	Interviewee_F	Manager of intermediary	30th Nov, 2021	69mins
	Interviewee_G	Manager of intermediary	30th Nov, 2021	41mins
	Interviewee_H	Manager of intermediary	1st Dec, 2021	42mins
	Interviewee_I	Manager of intermediary	1st Dec, 2021	32mins
	Interviewee_J	Manager of intermediary	1st Dec, 2021	39mins
Daxing'zhuang village (Seafood e-commerce)	Interviewee_A	Manager of intermediary	01st Mar, 2022	41mins
	Interviewee_B	Manager of intermediary	01st Mar, 2022	66mins
	Interviewee_C	Manager of intermediary	01st Mar, 2022	47mins
	Interviewee_D	Manager of intermediary	02nd Mar, 2022	32mins
	Interviewee_E	Manager of intermediary	02nd Mar, 2022	39mins

Interviewee_F	Manager of intermediary	03rd Mar, 2022	49mins
Interviewee_G	Manager of intermediary	03rd Mar, 2022	31mins
Interviewee_H	Manager of intermediary	04th Mar, 2022	40mins
Interviewee_I	Manager of direct sales	04th Mar, 2022	56mins
Interviewee_J	Manager of direct sales	04th Mar, 2022	58mins

3.9 Data coding and analysis

After interviews are finished, the researcher first transcribes all 30 Chinese language interview records into English language word documents, then these MS word documents are processed for coding and analysis. Overall, this section informs the researcher's decision of choosing the provisional coding and the template analysis to respectively serve the processes of coding and analysis. During coding, assistance is offered by the applied NVivo 12—i.e., a computer-aided qualitative data analysis software (CAQDAS)—considering its benefit of improving efficiency, transparency and also rigour of research conduction (Saunders *et al.*, 2009; Saldaña, 2013) (See Appendix E). During analysis, each of the three Taobao villages is defined as a unit of analysis or a case that informs local e-commerce enabled SFSC, and the data collected from local SFSC managers have allowed the researcher to analyse and interpret the diverse contents of complex local context; operation and evolution of local SFSC; local knowledge management activities; and their interactions in between.

3.9.1 Provisional coding

As code means "*word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data*" (Saldaña, 2013, p.3), coding indicates the interpretive action through which code can be transformed to symbolise and attribute "*interpreted meaning to each individual datum for later purposes of pattern detection, categorization, theory building, and other analytic processes*" (Saldaña, 2013, p.4). In other words, since coding helps summarise; distill; condense; and add values to collected data, it enables the basis of data analysis and theory development (Saldaa, 2013) (See

Figure 20).

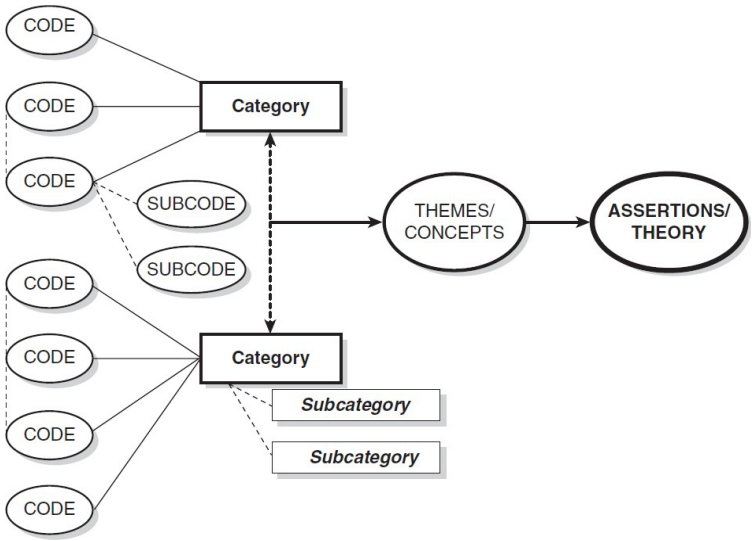

Figure 20. A streamlined codes-to-theory model for qualitative inquiry (Saldaña, 2013, p.13)

Although various methods have been developed to assist the data coding in diverse scenarios, the provisional coding is chosen to serve coding process of this research after considering its benefit of releasing the potential of initial conceptual framework. In particular, the provisional coding method advocates the use of a predetermined code list that is priorly prepared to assist data coding. The list could be produced from a number of preparatory sources—i.e., literature review; conceptual framework; research questions; historical code lists; etc., and it shall allow being revised, modified, deleted or expanded to involve new codes during data coding (Saldaña, 2013). In this research, such a predetermined code list can be directly produced from the initial conceptual framework that is previously generated to theoretically explain the SFSC evolution and the behind knowledge management (See Table 24).

Table 24. Code list for data coding

Categories	Code list
Knowledge possession	● Explicit knowledge ● Tacit knowledge
Knowledge utilisation	● Structuring activity

	● Bundling activity ● Leveraging activity ● Impact of governance and organisational structure ● Impact of business model ● Impact of innovation ● Synchronisation of all six
Evolving outcome	● Emergence stage ● Growth stage ● Maturity stage ● Decline stage
Knowledge acquisition	● Identifying knowledge ● Creating knowledge ● Storing knowledge ● Sharing knowledge

3.9.2 Template analysis

For the sampled Yuezhuang village of apple e-commerce; Daxing'zhuang village of seafood e-commerce; and Bainiu village of hickory nut e-commerce, analysis of this research defines each of these three Taobao villages as a unit of analysis or case, and hence allowing design of the later within and cross-case analyses. In brief, the within-case analysis represents the data displaying practice that draws and verifies findings of single case, while the cross-case analysis indicates another data displaying practice that further compares and sees processes and findings across single cases for developing in-depth and powerful findings (Miles and Huberman, 1994). To underpin the within and cross-case analyses in practice, the method of template analysis is chosen to be adopted in this research.

In summary, the concept of analysis means "*the search for patterns in data and for ideas that help explain why those patterns are there in the first place*" (Bernard, 2006, p.452). Although similar search practices can be identified in some other research stages such as literature review and data coding, data analysis is more rigorous and consists of the varying procedures specified by various methods (Bernard, 2006; Saunders *et al.*, 2009; Saldaña, 2013). In this regard, the summative work of Saunders *et al.* (2009) presents a number of the methods that are frequently chosen to serve in the qualitative research discussions of the management field (See Table 25),

and the methods are divided into two groups by whether their procedures tend to be deductive or inductive (Saunders *et al.*, 2009).

Table 25. Data analysis methods for management research discussions (Saunders *et al.*, 2009)

Methods	Contents
Deductive procedure group:	
Pattern matching	Predicting the pattern of outcomes based on conceptual or analytical framework, and then examining adequacy of the pattern as a solution to explain findings.
Explanation building	In an iterative manner, building explanation towards the developed theoretical proposition.
Inductively procedure group:	
Data display and analysis	Its procedure consists of reducing collected data; displaying reduced data; and then drawing and verifying findings from displayed data.
***Template analysis (chosen)**	The term template means the predetermined code list that can be amended during data collection. The procedure of template analysis consists of first attaching predetermined code list to collected data, and then verifying; amending; and exploring the implications of amending in comparison with the previous version.
Analytic induction	Using strategically collected data to intensively examine the explanation with loose nature.
Grounded theory	Building explanation or generating new theory around the themes emerged from data.
Discourse analysis	Assisting exploration of how language—either in the form of talk or text—inductively constructs; reproduces; or changes the social world.
Narrative analysis	Assisting exploration of linkages; relationships; and socially constructed explanations through story telling.

After reviewing the presented methods, the template analysis is chosen to serve the later within and cross-case analyses since it is in well concert with components of this research. First, when reviewing the template analysis, it is discovered that the analysis method and the chosen coding method—i.e., the provisional coding—share the same emphasis on the usage of predetermined code list or template, so their joint adoption would bring this research the consistency between

data coding and analysis. Second, as an initial conceptual framework has been generated in the first place, the code list or template required by adoption of the template analysis can directly refer to it and then waits for inductively examination.

Chapter 4: Within-case analysis

As data are collected and coded, this chapter 4 moves on to demonstrate within-case analyses of evolutions of the e-commerce enabled SFSCs identified in the three Taobao villages—i.e., Yuezhuang village of apple e-commerce; Daxing'zhuang village of seafood e-commerce; and Bainiu village of hickory nut e-commerce. And for each case, analysis is structured into seven sections: 1) beginning introduction of case background; 2) presentation of the basics of local e-commerce enabled SFSCs—i.e., their supply chain structures, local methods for creation of customers' perceived closeness, interactions in between supply chain operation and platform, and operational impacts of the contents of local context; 3) summary of the explicit and tacit knowledge types possessed by local SFSC managers; 4) analysis of the knowledge utilisation activities of local SFSC managers; 5) analysis of happened supply chain evolutions and their connection with knowledge management activities; 6) analysis of the knowledge acquisition activities of local SFSC managers; and 7) final summary of case analysis.

4.1 Yuezhuang village of apple e-commerce

4.1.1 Introduction

Neighboring China's upper eastern coast, Yuezhuang village is located at the Feng County in Jiangsu Province, the county that is acknowledged as the third significant region for Chinese apple industry due to the quality sandy loams deposited by an old course of Yellow River—Shahe River. The sandy loams occupy up to 82,368ac in the county region and enable perfect condition for growing fruits and vegetables, thus leading to successful plantation of a unique variant in Fuji apple family that was later named as "Great Shahe River" in 1991.

Despite the natural endowment, economic success of "Great Shahe River" was restricted to a geographical market extended across two neighboring provinces only. However, this situation totally changed after e-commerce entered the region, by which residents of Yuezhuang village became regional pioneers of first selling "Great Shahe River" apples on Taobao.com in 2011. By 2019, after years of accessing the broader market via platform, this Yuezhuang village, an

ordinary village featured 674 households in county, rapidly grew into an influential economic cluster that led 41% of local households to engage apple e-commerce practices, generating an annual output of 1.8 million pounds; during the same year, Yuezhuang village was officially verified as a Taobao village because it met all demands listed by Alibaba Group. In summary, this research is the first time that Yuezhuang village serves as study case in academic research, by which individual SFSCs and their behind knowledge management activities are identified and examined, hence contributing to understanding how e-commerce enabled SFSCs evolve in local context.

4.1.2 Basics of local e-commerce enabled short food supply chain

Supply chain structure

Overall, both supply chain structures with and without the only intermediary are identified in Yuezhuang village, which have been respectively operated by local managers in the forms of direct and indirect sales. However, comparing with being in charge of direct sales, operating indirect sales by being intermediaries as an operational option is almost exclusive to a small group of local managers whose e-commerce scales are large. These managers choose to save numerous efforts of managing own apple orchards—an important sign of upstream control in local apple e-commerce—and turn their SFSC operations into new platforms to access apple suppliers of broader regions, and also embrace more advanced practices such as establishing and managing operational team. Thus, in the case of Yuezhuang village, being intermediaries often means generating greater profits than operating direct sales, as well as a number of higher operational demands such as various investments and institutionalisation. Such a phenomenon is well addressed in the evidence provided by one influential local SFSC manager of indirect sales, interviewee_B:

> "*My e-commerce quickly expanded in the first two years and it attracted customers from all over the nation; this was also the time that I started sourcing apples from others instead of relying on my own orchard due to the fast-growing demand. ... My business has become a new platform, on which my team sources apples nationwide and dispatches them to customers after packaging. ... Purchasing agents in my team*

are assigned to finding those strong suppliers, and I set assessments to examine their performance." [Yuezhuang village, interviewee_B]

Creation of customers' perceived closeness

In addition to featured supply chain structures, creation of customers' perceived closeness is the other essence of e-commerce enabled SFSC, and in Yuezhuang village, this is fulfilled by a series of local managers' methods summarised in Table 26. In particular, it is identified that although previous discussion highlights embedding sufficient or authoritative information in foods for closeness creation, local managers' awareness of information embedment has been relatively low in comparison with other methods that target at engaging customers as directly and actively as possible. The researcher suggests its causes could involve the newly reformed national system of food origin protection that awaiting wider publicity; fame of "Great Shahe River" apples accumulated in national market as collective trademark; and restrictions on the managers' operational philosophy that are either of investment pressure or individual agency. As explained by Interviewee_C:

"*I haven't prepared brand or logo for my products. The "Great Shahe River" apples hold good fame in national market and it already benefits my sales. Besides, having no need for this arrangement helps me reduce operating costs.*" [Yuezhuang village, interviewee_C]

Table 26. Local methods for closeness creation

Methods	Steps	Examples
Improving customers' experiences	● Timely and high-quality customer services before and after sales. ● High-standard quality control in upstream apple sourcing and downstream apple packaging.	● "*After sensing customers' buying intentions, my team actively engages them, offering them assistances and prepared discount plans. Based on experiences, price and discount are the main reasons stopping customers from making instant buy.*" [Yuezhuang village, interviewee_E]
Fostering customers' loyalty	● Applying targeted strategies, such as dealing with known customers; word-	● "*My apples were sold to friends or old schoolmates only when I first started e-*

	of-mouth making; building friendships in customer groups; dedicating to satisfy demands from particular customers; etc. ● Establishing regular communications.	*commerce; it was them who furthered my apples to their known people, and thus the growth of my customers.*" [Yuezhuang village, interviewee_H]
Benefiting from collective trademark	● Displaying identity of "Great Shahe River" apples in product descriptions and on packaging.	● "*I haven't prepared brand or logo for my products. The "Great Shahe River" apples hold good fame in national market and it already benefits my sales.*" [Yuezhuang village, interviewee_C]
Information embedment	● Professionally designed e-store and product descriptions, transferring prepared information to customers effectively. ● Prepared information is dispatched with products, such as the leaflet introducing the plantation history of local apples.	● "*My packaging comes with the leaflet that tells story of "Great Shahe River" apples, like the history of local apple industry from the very beginning.*" [Yuezhuang village, interviewee_A]
Inheriting offline methods	● Agritourism; enabling customers' close feeling towards "Great Shahe River" apples by inviting them to visit offline orchards.	● "*I run agritourism and often organise online consumers to visit my orchard, picking fresh apples themselves and thus making them catch a close feeling to my business.*" [Yuezhuang village, interviewee_B]

Interactions with online e-commerce platform

The meaning of local managers' interactions with e-commerce platform is not just held by the managers' received empowerments, but also by the received pressures which drive changes to local managers' SFSC operations. All in all, in the case of Yuezhuang village, the researcher identifies that despite empowerments such as access to broader market, local managers have been under the four increasing pressures from platform, including decrease of website traffic caused by competitions from the rising new platforms; increase of changing regulations as a result of platform's institutionalisation; rising competitions with other managers on platform; and rising cost of purchasing platform's services. Therefore, the four pressures have together forced local managers to plan changes to their SFSC operations and also seek opportunities to optimise extant practices. According to interviewee_G:

"*In platform's section of agricultural food products, monopolies happen and damage small managers. ... Nowadays new platforms are rising. ... I plan to learn how those new platforms can work for me. ... I plan about using livestream for marketing next year. ... Operating e-commerce used to be easy, but everything turned difficult after platform started to often change its policies.*" [Yuezhuang village, interviewee_G]

Interactions with offline local context

Knowing local context is fundamental to understanding how local supply chains evolve over time, especially when targeted e-commerce enabled SFSCs have rooted in a less-known rural environment. To summarise, three local factors are identified as essential to SFSC operations, i.e., quality of available courier services; local transportation conditions; and development of accessible allied industries. The researcher defines these three are of the material set of local context, and they have well underpinned local managers' operations. According to comment of interviewee_F:

"*Quality of courier services is acceptable. ... Supply of packaging materials is stable. For local managers, it is easy to find providers of packaging materials because lots of them are just out there in nearby villages and neighboring counties.*" [Yuezhuang village, interviewee_F]

Furthermore, the researcher defines the spiritual set that forms the other half of local context and it consists of two abstract factors, i.e., the previous norms and values and the existing e-commerce atmosphere. More importantly, connection is identified between the two factors, as positive effect of the previous norms and values could lead to the more favourable existing e-commerce atmosphere that further contributes to the material set. For example, being the vital activity enabling the wide spread of e-commerce practices among local managers, knowledge sharing activity in Yuezhuang village has been based on strong local norms and values such as kinship; neighborship; and unity spirit in community, thus it produces the existing e-commerce atmosphere that successfully triggers flourishing clustering of allied industries and also local government's investments in infrastructure. Such changes to the material set caused by factors

in the spiritual set have secured a stable environment for local SFSC operations.

4.1.3 Knowledge possession

The Table 27 shows the knowledge possessed by SFSC managers in Yuezhuang village when in e-commerce practices. Among explicit knowledge types, the most noticeable ones are apple sourcing and team management as they have been exclusive to certain local managers, showing impact of having different operational practices on knowledge management. Besides, regarding the tacit types including individual agency and operational philosophy, examples suggests that they are capable of significantly shaping managers' plan and execution of operational practices.

Table 27. Knowledge possessed by local SFSC managers

		Name	Explanations	Examples
Possessed knowledge	**Explicit types**	Digital literacy	Knowing and mastering how to mobilise ICTs such as Internet and computers, when practising e-commerce; an integration of technical skills and cognitive.	● "*Need of computer and Internet knowledge.*" [Yuezhuang village, interviewee_A] ● "*Data analysis besides computer and internet knowledge.*" [Yuezhuang village, interviewee_J]
		General operational practices	Knowing of common and shared operational practices in local apple e-commerce, such as steps of packaging; pricing; negotiating with courier service providers.	● "*You need to learn how to cooperate with courier service providers; to package apples; to conduct quality controls; to respond to customers' feedback.*" [Yuezhuang village, interviewee_H]
		Apple orchard management	Knowing from caring an individual "Great Shahe River" apple tree, to every related arrangement for an orchard of "Great Shahe River" apple trees.	● "*Due to environmental reasons, local apples feature 'ugly' appearances in comparison with other apples; however, it can now be improved by the latest techniques.*" [Yuezhuang, interviewee_H] ● "*It is important to have regular inspections and spraying in orchard management.*" [Yuezhuang village, interviewee_A]
		Apple sourcing (intermediary exclusive)	For those relying on upstream apple suppliers, mastering of sourcing is essential, including knowing how to source; what to source; where to source; etc.	● "*First, you shall be familiar with all the key origins and features of their apples. Second, you shall evaluate suppliers' capacities and their abilities to continuously supply you.*" [Yuezhuang village, interviewee_J]
		Team management (institutionalised exclusive)	For those who have more institutionalised operations, knowing of team management is essential; for example, how to recruit staffs for	● "*Team management is key to my business since my staffs are assigned to different roles, and coordination of them becomes critical; business goals are achieved*

			different positions, or how to set regular assessments of staff performances.	*when they have good cooperation.*" [Yuezhuang village, interviewee_D]
	Tacit types	Individual agency	Ability to take actions and fulfill intention of oneself, especially when in challenging situations; often related to abstract spiritual contents, such as wills and senses.	● "*Learning will and time investment, they are foundation of having rich experiences and knowledge.*" [Yuezhuang village, interviewee_A] ● "*Reviewing my business journey, I think exploration and innovation are two vital things.*" [Yuezhuang village, interviewee_D] ● "*You need the knowledge of 'putting every element together'.*" [Yuezhuang village, interviewee_F]
		Operational philosophy	Forming foundational thinking of how local apple e-commerce and the oneself in it are seen, by which later operational practices of oneself are guided; even being a determinant to which stages that SFSCs can evolve.	● "*Concentrating on how to offer better and featured products and services, you shall have this intention in the first place.*" [Yuezhuang village, interviewee_D] ● "*I would say oneself should hold a thought for business. For me, my thought about my business is "try it as long as its benefit outweighs cost", which makes me different from local others and gain achievements.*" [Yuezhuang village, interviewee_F]

4.1.4 Knowledge utilisation

Managerial activities of structuring, bundling and leveraging

In reviewing the knowledge utilisation arisen in Yuezhuang village, three managerial activities of structuring, bundling and leveraging are identified as the most essential, because interviewed local managers are found sharing the same opinion that apple e-commerce is about leveraging the offline and online knowledge bundles structured by smaller components. By accepting this mindset, it becomes clear to see how these three managerial activities and their collaborations have underpinned practices of managers' day-to-day operations in the bottom-up and additive manner, therefore eventually driving SFSCs to evolve. For example, nature of tree caring is a leveraging of different bundles of smaller structured knowledge components such as planting; pruning; spraying; etc. And after such bundling arrangements are settled, tree caring becomes a new structured component waiting to be further bundled with others to serve leveraging of the apple orchard management—which is another component of the offline knowledge bundle required for leveraging apple e-commerce. This finding works for online practices as well, in which structured knowledge components such as computing and design sense are bundled for leveraging of the e-store decoration that is a further component of e-store management bundle, and then of online knowledge bundle for leveraging apple e-commerce (See Figure 21).

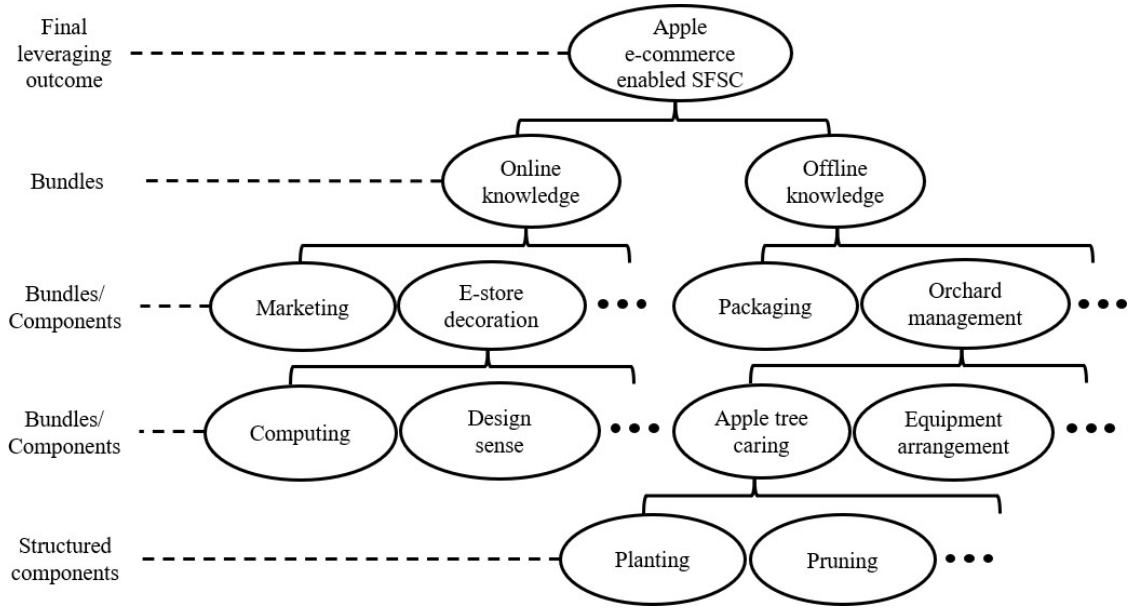

Figure 21. Example of structuring, bundling and leveraging in Yuezhuang village

Impact of governance and organisational structure

Giving the divide in between local managers with and without more institutionalised operations, impact of governance and organisational structure is one important element to the knowledge utilisation in Yuezhuang village. In brief, for those majority local managers whose operations are less institutionalised, they intend to maintain operations in the form of home business the same as how they have started in the first place, embracing a simple yet effective structure that allow swift knowledge utilisation at low costs. On the other hand, for the rest few managers in Yuezhuang village, they access more advanced and efficient knowledge utilisation as they take the chance to invest in complex but professional structures. Despite differences between these two and their varying outcomes, local managers have seen them both as the options fitting local demands, hence no conclusion to which one is superior. The following Table 28 shows features and examples of the two operations when facing knowledge utilisation issues in local context.

Table 28. Knowledge utilisation and the two operations

	Less institutionalised operations	**More institutionalised operations**
Features	● Mostly playing as direct sales. ● Cutting off costs of institutionalisation, easing financial pressures on rural SFSC managers. ● Swift knowledge utilisation, since managers are close to practices. ● Opportunities for self-improvement because managers and practitioners are often the same individuals.	● Mostly playing as intermediaries in indirect sales. ● Advanced knowledge utilisation, benefited by fine management. ● Saving on managers' self-inputs. ● High operational efficiency by being professional.
Examples	● "*I'm in charge of offline management, and I assign my daughter-in-law to online management … I can handle everyday operation in my own house … I have not made expansion plan.*" [Yuezhuang village, interviewee_A] ● "*I run business with helps from family members. As my son knows ICTs better than me, he is responsible for online customer services, which allows me to focus on my orchard … I don't have independent warehouse, apples are freshly picked and dispatched after I receive orders.*"	● "*In my business, I have staff working in positions of accounting; human resources; designing; sourcing; selling; and customer services … I think my working arrangements can satisfy all basic demands of a general company.*" [Yuezhuang village, interviewee_D] ● "*Professional jobs should be leaved to professional people … I often hold discussion meetings in my company, in where we sit together and share our new*

[Yuezhuang village, interviewee_B]

- "*It was very challenging for me to understand new things like e-marketing; planning investments; designing homepage; etc., however, I was gradually used to them after some practices myself.*" [Yuezhuang village, interviewee_C]

thoughts and findings, good chances to learn from each other." [Yuezhuang village, interviewee_E]

- "*It's worthy to build your own operational team, and my team has offered me very useful suggestions regarding product management and e-marketing.*" [Yuezhuang village, interviewee_J]

Impact of business model

The business model is another acknowledged element that capable of determining knowledge utilisation. Because of the demand to create customers' close feeling on Taobao.com, business models adopted by managers in Yuezhuang village are primarily customer-oriented, and it leads to numerous efforts of promoting related operational practices in local context. Nevertheless, although the customer-oriented business model has dominated local adoptions, it is observed that its practices vary according to different local managers and operations, and the researcher suggests this is a result of being shaped by agency of respective individuals and the operational philosophies developed from respective individual experiences. For example, for the account of interviewee_H on how to adopt customer-oriented business model by a more conservative method:

> "*I focus on dealing with regular customers, and I have been doing this since I started my e-commerce on Taobao … My apples were sold to friends or old schoolmates only when I first started e-commerce; it was them who furthered my apples to their known people, and thus the growth of my customers … I send messages to all my customers to inform them of harvests of apples, offering them discounts when they place orders.*" [Yuezhuang village, interviewee_H]

In contrast, interviewee_F chooses a more open method that helps engage a broader customer base by setting high production standards, and this method has well served the SFSC in mature stage:

> "*I make lots of efforts in apple selling, which is not just for own benefits but for the*

prosperities shared by me; my suppliers; and my customers—this is also my business thinking … I only source quality apples that weight 125g or more … Standards set for sourcing have led to few customer complains to my business, which helps me improve my reputation in online customers." [Yuezhuang village, interviewee_F]

Impact of innovation

In the resource orchestration theory, innovation is the third organisational element defined to have impact on knowledge utilisation, and its impact is much more direct because innovation allows new knowledge to instantly emerge. Overall, three important sources of innovations are identified in Yuezhuang village—that are, the new bagging technique to improve local apples' imperfect appearances; the pruning technique which is essential to orchard management; and the planning of operational strategy. Further to these innovations, the researcher investigates their emergence and founds that instead of being sudden inspirations, emergence of the three is grounded in the stable operations in local context, showing their nature as the accumulated reflections on day-to-day operations. For instance, interviewee_A talks about how regular local communications facilitate emergence of the pruning techniques:

"*Pruning controls growing of trees and also trees' productions of fruits … Pruning is difficult to master unless you spend three or up to five years in learning …… I often spend time communicating with the locals my age for learning, like, we discuss how individual apple trees shall be pruned in order to have better growing or produce more fruits. Accumulation of experiences is important.*" [Yuezhuang village, interviewee_A]

Moreover, interviewee_G underlines importance of planning the innovating strategy that helps managers stay in line with platform:

"*I come up with a new strategy that is in line with the regulations on Taobao.com; this not just helps me grow online sales but also secures sustainability of my business when it is run on the platform.*" [Yuezhuang village, interviewee_G]

Synchronisation of all six managerial activities and elements

Although the six managerial activities and elements are already powerful when each of them is adopted alone for knowledge utilisation, greater potential is unleashed when all these six are synchronised in practice, and this in fact has always been the solution of the SFSC managers in Yuezhuang village despite their unawareness when in day-to-day local operations.

In brief, it is observed that local synchronisation begins with development of an initial mindset of apple e-commerce being about leveraging smaller knowledge components, which has been a result of local managers' shared summary of the experiences of engaging apple e-commerce. Thereafter, based on this mindset, process of local knowledge utilisation unfolds, and managers start to acquire meaningful explicit and tacit knowledge contents from their surrounding local context for own use—such as apple tree caring lessons from last generations and learning of e-commerce from others, in which the three managerial activities—i.e., structuring; bundling and leveraging—together represent local managers' steps to rearrange acquired knowledge contents for utilisation, hence it results in the production of required operational practices. Nevertheless, production of required practices does not end after the three managerial activities, because the three organisational elements—i.e., governance and organisational structure; business model; and innovation—will further shape the produced practices until they are effective and efficient enough to meet local managers' demands and situations, therefore they become eligible to be integrated into operations of the e-commerce enabled SFSC in local context. In other words, for establishment of operation of the e-commerce enabled SFSC in Yuezhuang village, it at the same time means synchronisation of all six managerial activities and organisational elements in local context. Additionally, the researcher discovers that in Yuezhuang village, local SFSC managers have preferred the more exploratory solution to their operations of the e-commerce enabled SFSC, which could be affected by individual agency and operational philosophy. For instance, interviewee_G introduces how exploration is applied in learning process:

> "*For local intermediaries like me, basic practices in daily operation include sourcing apples; quality inspection; packaging; dispatching; and some other practices added on individual demands—for example, some managers choose to divide sourced apples into groups by size, colour, weight, etc. … Explorations are fundamental in changing*

environment of e-commerce … By step-by-step explorations, your ability to adopt to changing e-commerce is forged … I have regular business trips to other apple origins to learn from their experiences—such as how to price apples, which then benefits my own strategy planning." [Yuezhuang village, interviewee_G]

4.1.5 Supply chain evolution

Instead of making rational judgment on evolution of supply chain, it is an unexpected finding that SFSC managers in Yuezhuang village tend to be more affective-thinking when facing this question, hence a clear difference between argumentations of the supply chain evolution theory and findings from Yuezhuang village is identified (See Table 29). This difference also reveals the finding that comparing with the widely known modern industrial solution of understanding supply chain via accurate and comprehensive examinations—for example, calculating supply chain throughputs of the given time, another more private solution has been developed by local managers to review and affect their SFSC operations, in which managers' individual agency and operational philosophy play a vital role. The researcher argues whether these two solutions should compete with each other, as the more private solution has proved its effectiveness and efficiency by long-term underpinning local managers' operations, showing itself as a unique product in Yuezhuang village, and it is well fitted to local managers' operational demands and situations.

In consequence, the researcher decides to highlight this finding because it could be an important determinant to evolutions of the e-commerce enabled SFSCs in Yuezhuang village. As adopting a locally produced solution of reviewing supply chain operation, affective operational decisions are frequently made by local managers in practice, which further affects how local e-commerce enabled SFSCs evolve in the lifecycle. Thus, in the case of Yuezhuang village, it becomes rather common that operation of a growing supply chain is suddenly stopped because its managers think enough profits have been met, or that of a mature supply chain continues to experience unknown challenges because its managers have higher individual agency and therefore is keen on exploring new possibilities. For example, Interviewee_A doubts the need for future supply

chain evolution after comparing own operation with local others':

> "*I will say my supply chain operation is in growth stage. My scale is small, and I have not made future plan yet … I'm satisfied with what I have achieved in business running; I doubt whether I should do more this age.*" [Yuezhuang village, interviewee_A]

Table 29. Comparing the theory and actual findings

Identified local Evolving stages	Theoretical features	Actual features	Examples
Growth stage	● Supply chains face rapidly growing use; improvements in performance; and stability of supply chain process and enabling technologies.	● Practices remain to be shaped, or routine remains to be established or improved. ● Perception of leashed potential when in operation, both in self and supply chain side. ● In comparison with supply chain evolutions of local others.	● "*I'm still learning how to improve my operation so collecting customers' feedbacks. Packaging is one that I wish to improve.*" [Yuezhuang village, interviewee_B] ● "*I plan to improve my branding in future, and to find opportunities to expand my scale.*" [Yuezhuang village; interviewee_E]
Maturity stage	● Supply chains face highly certain demand level; mature and reliable operational process and enabling technologies. Possibility of experiencing significant changes becomes low.	● Mature and reliable practices and routine. ● In comparison with supply chain evolutions of local others. ● Self-satisfaction.	● "*It's in maturity stage because I feel like my operation had experiences lots of changes and growing in the past two or three years; now it is much stable.*" [Yuezhuang village, interviewee_C] ● "*I see myself and my business as one of the leading locals, so I would say mine is in maturity stage.*" [Yuezhuang village, interviewee_F]
Decline stage	● Supply chains face decline of throughputs.	● Decline of practices and routine.	● "*Pandemic and bad weathers affect my apple business in recent years.*" [Yuezhuang village, interviewee_J]

4.1.6 Knowledge acquisition

In the previously generated initial conceptual framework, knowledge acquisition and its four activities—i.e., identifying; creating; storing; and sharing of knowledge—are defined as source to local managers' possessed knowledge, and the four activities are carried out in each step of supply chain evolution process. This theoretical proposition is proved legitimate in the case of Yuezhuang village, as evidence of how managers integrate acquisition activities into operations of local e-commerce enabled SFSCs are identified (See Table 30). To summarise, the first main finding emerged from the evidence is that rich connections exist in between the four knowledge acquisition activities when in practice. Rather than acting alone, identifying; creating; storing; and sharing of knowledge have been cause and effect to one another; for instance, knowledge sharing such as business trips and local communications simultaneously provides the chances for local managers to identify required knowledge or to consult for creating new knowledge, and potential interactions happened during knowledge identifying or creating will further lead to future sharing.

Table 30. Knowledge acquisition activities identified in local context

Activities	Contents	Examples
Identifying knowledge	● Benefits of rigorous quality control ● Demands of effective customer services ● Supplier management methods ● Team management methods ● Maintaining individual agency ● Techniques for general operational practices ● Self-learning methods	● "*Product quality answers why customers are fond of my business, and I think it is more significant than just relationship building with customers.*" [Yuezhuang village, interviewee_A] ● "*Trust between you and suppliers shall reach a certain level, in which reliability of received information is secured. You and suppliers shall realise cooperations are for shared prosperity.*" [Yuezhuang village, interviewee_D]
Creating knowledge	● Own strategic planning ● Offline operational practice improvements ● Offline supplier management methods ● Online customer services improvements ● Online e-marketing methods	● "*Creating knowledge is important, and I and my team have created our own strategy of maintaining good quality and services, which is frequently followed by local others.*" [Yuezhuang village, interviewee_D] ● "*I was the first one to update the local*

	● Online cross-platform operation	*bagging technique, after I reflected on and modified the observed methods from other origins.*" [Yuezhuang village, interviewee_B]
Storing knowledge	● Individuals' mechanism ● Local traditional mechanism ● Public sector mechanism ● Private sector mechanism	● "*Accumulation of experiences is important to oneself.*" [Yuezhuang village, interviewee_A] ● "*I start to know apples since my childhood. The whole region has been famous for apple plantation and hence is full of apple knowledge.*" [Yuezhuang village, interviewee_E] ● "*Training sessions are organised by local government for us.*" [Yuezhuang village, interviewee_C]
Sharing knowledge	● Sharing within operation ● Sharing with local others ● Sharing with broader industrial participants	● "*I often spend time communicating with the locals my age for learning, like, we discuss how particular apple trees should be pruned in order to gain better growth or produce more fruits.*" [Yuezhuang village, interviewee_A] ● "*I communicate with people from apple industry for latest information, such as information about other apple origins; suppliers; and impacts of weather.*" [Yuezhuang village, interviewee_D]

Further to knowledge acquisition, the researcher specifies four mechanisms under knowledge storing—i.e., individuals' mechanism; local traditional mechanism; public sector mechanism; and private sector mechanism. The first individuals' mechanism discloses how managers store knowledge by themselves, in which accumulation effect is crucial and knowledge is stored in mind—but for managers with highly institutionalised operations, professional tools or facilities could be applied such as regular brainstorming sessions and meeting records. For the second local traditional mechanism, knowledge is stored in a variety of local traditions such as kinship, neighborship, local morals, local industrial basis; etc. Due to solid underpinning of these long existing abstract contents of local context, the second mechanism is robust and plays a critical role in the beginning of local e-commerce. Then, the third public sector mechanism is another

robust and influential storing mechanism to managers, as authorities such as local government and agricultural research institutions are the mechanism's maintainer. From promoting training sessions to offering access to local big data, the third mechanism of public sector demonstrates both professional and authoritativeness, and it can be more accessible to managers because it aims for efficient local governance rather than profiting. In contrast, the fourth private sector mechanism is maintained by those for-profit companies such as Alibaba Group, and it involves primary methods such as targeted training; consulting services; access to platform system; etc., which are often related to business relationships such as buyer-seller relationship; memberships; and strategic partnerships.

Moreover, as another main finding emerged from the evidence, the four knowledge acquisition activities in Yuezhuang village are found being highly integrated into day-to-day operations of local SFSC managers, revealing themselves as what is frequently referred as "exploration" in local context. Overall, local managers fulfill knowledge acquisition in the form of explorations in practice, and the researcher suggests that it has become a key practice of their operations of the e-commerce enabled SFSC. By exploring complex local context, managers not only acquire explicit knowledge required for later utilisation, but also acquire and forge tacit knowledge that includes individual agency and operational philosophy. For example, Interviewee_G confirms that individual agency can be acquired and forged through exploration:

> "*I consider the ability of adopting to changing environments comes from explorations. Changing environments is uncertainty, and to learn adopting to the uncertainty, you need to get close to it, starting investigation and trying it with your first thought. If it cannot be solved the first time, adjusting your thought a little and have a second try … My reflection is that I keep seeing importance of this ability in operation; the more I practise, the more I value this ability.*" [Yuezhuang village, interviewee_G]

Another example is offered by interviewee_F, showing how exploration can forge enterprising operational philosophy:

> "*I would say oneself should hold a thought for business. For me, my thought about my*

business is 'try it as long as its benefit outweighs cost', which makes me different from local others and gain achievements." [Yuezhuang village, interviewee_F]

4.1.7 Summary of apple e-commerce case

After investigating how the SFSCs enabled by apple e-commerce have evolved in Yuezhuang village, the researcher identifies that a series of related findings showing how evolution can be affected by varying determinants in complex local context (See Table 31), among which local managers' agency and operational philosophy could be the most critical because they are found behind drive the more active possession; utilisation; and acquirement of knowledge. Moreover, it is suggested that exploration as a common practice referred by local managers, its impact on supply chain operation and evolution is significant.

Table 31. Main findings of case analysis

Findings	Contents
Determinants to structures of e-commerce enabled SFSC	● In Yuezhuang village of apple e-commerce, structures of supply chain are not fully determined by managers' operational decisions, but more related to scales of their e-commerce. And the role of supply chain intermediary is almost exclusive to those whose e-commerce scales are large.
Methods to creation of customers' perceived closeness	● Local managers prefer methods that allow them to directly engage customers on platform, so creating closeness feeling in their e-commerce enabled SFSCs. The methods are real-life reflections of their understanding of online customers, which is developed from long-term and daily operational practices.
Contents of local context	● Local context of Yuezhuang village consists of material and spiritual sets; these two sets have positive correlation and facilitate each other.
Interactions with platform	● Besides platform empowerments, local managers receive constant managerial pressures from Taobao.com, which force them to make operational adjustments.
Possessed knowledge	● Knowledge possessed by local managers consists of explicit and tacit types, in which tacit types including individual agency and operational philosophy can significantly shape managers' plan and execution of operational practices.

Knowledge utilisation	● Managerial activities of structuring, bundling and leveraging in knowledge utilisation underpin local managers' operational practices, which further contribute to establishment of their operational routines. ● Individual agency and operational philosophy have active impact on knowledge utilisation, which is also the cause to local managers preferring more exploration-oriented or self-conducted practices in their operational routines.
Supply chain evolution	● In contrast to theoretical discussion, individual agency and operational philosophy drive local managers to make affective decisions on supply chain operations, therefore influencing how their e-commerce enabled SFSCs evolve in the supply chain lifecycle.
Knowledge acquisition	● Connections between the four acquisition activities are rich and diverse in the case of Yuezhuang village; the often play as cause and effect to one another, or synchronously take place. ● The four activities have highly integrated into operational routines of local managers, revealing themselves as what is refereed by managers as "exploring and attempting". ● Evidence suggests that local managers develop agency and operational philosophy via practices of exploring and attempting.

4.2 Daxing'zhuang village of seafood e-commerce

4.2.1 Introduction

If travellers at Yuezhuang village choose four hours and 20 mins drive eastwards by highways, they will see China's upper eastern coastline and arrive at the Haitou town in Jiangsu Province, where Daxing'zhuang village is located and borders one of the eight most productive Chinese fisheries—Haizhou Bay Fishery. The fishery covers 6.7 million ac in Yellow Sea and its depth ranges from 16m to 50m, with surface temperature remains at 14.4 ºC to 15.7 ºC all year round. These three favourable features and the nutrient enrichment coming from a dozen coastal rivers together make Haizhou Bay Fishery a home to diverse fishes and shellfishes, such as beltfish; little yellow croaker; swimmer crab; oyster; scallop; prawn; abalone; etc. Besides wild fishing, local aquaculture is another developed industry fostered by natural endowment.

The modern business activities of seafood in Daxing'zhuang village can be traced back to 1996, when more than six hundred villagers established own business entities to seek opportunities of selling local seafood to neighboring provinces. By 2015, such a local trend ran into rising e-commerce and several e-stores were firstly opened on Taobao.com, which attracted a group of young villagers who finished study or worked outside to return and participate. In few years, annual output of local seafood e-commerce reached 21 million pounds, making Daxing'zhuang village catch attention of Alibaba Group and therefore be verified as a Taobao village in 2020. Until now, more than 450 local households directly engage seafood e-commerce and they take up to 31% of the total households, triggering a regional economic cluster involving a series of allied industries such as cold storage and packaging material production. Overall, similar to the previous Yuezhuang village, this research is the first time that Daxing'zhuang village serves as study case in academic research, and identification and examination of the individual SFSCs underpinned its collective achievements would assist understanding how e-commerce enabled SFSCs evolve in local context.

4.2.2 Basics of local e-commerce enabled short food supply chain

Supply chain structure

Although both supply chain structures with and without the only intermediary are identified in Daxing'zhuang village, difference between them is significant because structure with the only intermediary is found dominating local SFSC managers' operations in the form of indirect sales, whilst the other one in the form of direct sales merely affects 10% of the operations according to interviewed managers' estimates. Data suggest such a phenomenon is caused by nature of practising seafood e-commerce in local context, as it always requires numerous efforts and hard work, as well as financial and time investment, especially after managers decide to stretch into upstream practices—such as management of fishing vessels or aquaculture. Overall, being the only intermediary in supply chain is the most practical and shared solution to the managers in Daxing'zhuang village, which also allows them to more dedicate to e-commerce practices yet develop lean operations fitting individual demands and situations. And for those few managers who are in charge of direct sales, their operations are often grounded in solid offline bases from

the beginning, hence are easier to achieve large scale e-commerce and greater business benefits. For example, as an influential SFSC manager in local direct sales, interviewee_J unfolds details about the two supply chain structures in Daxing'zhuang village:

> "*I am responsible for managing offline aquaculture and my wife is in charge of online operation. … My family has run seafood business and managed fields for aquaculture before e-commerce. … It is easy for you to start e-commerce and earn much from the beginning if you already run powerful offline business. … Local managers with large e-commerce scales own independent workplaces, such as warehouses or cold storages that are either self-owned or rented from professionals, whilst the rest local managers finish all their operations in family houses—these managers seldom set long goals but practising e-commerce day in and day out as they can. … Very few locals are capable of running fishing and seafood e-commerce at the same time, since its demand for time and efforts is huge.*" [Daxing'zhuang village, interviewee_J]

Creation of customers' perceived closeness

The SFSC managers in Daxing'zhuang village have employed a number of methods to enable platform customers to perceive closeness to their seafood (See Table 32). Essentially, ensuring seafood arrives fresh and setting reasonable seafood prices are seen as the two basic practices in improving customers' experiences, which would further contribute to the closeness creation in operation. As another important method, fostering customers' loyalty not just helps reduce customers' distance feeling but also triggers the critical practice of growing regular customers. Regular customers are particularly valued by local SFSC managers since they can sustainably support the managers' operations, especially when seafood e-commerce is hit by uncertainties, such as the pandemic and decline of fishery. Besides, phenomenon that inland customers hold strong curiosity towards seafood greatly facilitates closeness creation, making the managers' practices easier to be accepted by customers in the first place. However, this favourable feature of seafood selling could lead the managers to be less aware of other potential closeness creation methods—such as information embedment, which is observed via account of interviewee_B:

> "*I do not build own brand because I see the geographical location of my business as*

the best marketing, that is next to the harbour. Everyday fresh seafood is transported to the harbour by fishing vessels and waits to be immediately sourced and dispatched by me and local others; this is actually the most attractive marketing to customers." [Daxing'zhuang village, interviewee_B]

Table 32. Local methods for closeness creation

Methods	Steps	Examples
Improving customers' experiences	● Quality as freshness and reasonable price are the two priorities to seafood e-commerce. ● Timely and high-quality customer services before and after sales.	● "*My method is ensuring quality and reasonable price of my seafood for customers.*" [Daxing'zhuang village, interviewee_E]
Fostering customers' loyalty	● Applying targeted strategies, such as word-of-mouth making; decision making from customers' view; building friendships in customer groups; etc. ● Accumulation effect of customer-friendly practices in daily operation.	● "*I focus on growing and dealing with regular customers, those who can further introduce my business to people around them. … Regular customers become more important to me in this pandemic.*" [Daxing'zhuang village, interviewee_A]
Benefiting from collective trademark	● Displaying identity of local fishery in product descriptions and on packaging.	● "*I don't have own brand; I feel like we locals together benefit from the shared regional brand or fame that has been effective in dealing.*" [Daxing'zhuang village, interviewee_D]
Information embedment	● Professionally designed e-store and product descriptions, transferring prepared information to customers effectively.	● "*I always integrate pictures and videos into description of my seafood. … I also provide customers with information about how to tell freshness of seafood and how to cook seafood.*" [Daxing'zhuang village, interviewee_B]
Inheriting offline methods	● Customers from broader inland regions hold strong curiosity towards seafood.	● "*Most of my customers live away from sea, so they are particularly interested in seafood when seeing it online.*" [Daxing'zhuang village, interviewee_A]

Interactions with online e-commerce platform

In the case of Daxing'zhuang village, complex interactions are identified between local SFSC managers and e-commerce platform, which simultaneously is a consequence of the managers' conflictive understanding of real-life situation. Overall, long-term participating in e-commerce makes local SFSC managers realise the duality of platform. On the one hand, platform enables their operations in the first place, empowers them with a variety of resources such as access to broader market, and would continue to affect them as the supervisor of common prosperity. On the other hand, however, platform is an independent business entity pursuing its own interests, which means it profits by rising up the managers' operating costs; distinguishes the managers and treats them unequally for supervision reason; might set aside the managers' interests when dealing with customer complains; and, most importantly, it pushes the managers to alter their operational practices in order to fit its changing regulations during platform institutionalisation, bringing pressures that even suppress their SFSC operations sometimes.

Interactions with offline local context

A number of factors from local context are found deeply connecting with operations of the e-commerce enabled SFSCs in Daxing'zhuang village, particularly for the four from the material set—i.e., quality of available courier services; local transportation conditions; development of accessible allied industries; and core facilities to daily operations of local SFSCs, which include the harbour and regional fishery market at where the managers source seafood. Furthermore, the researcher especially considers development of accessible allied industries critical, since the managers' cooperation and coordination with local industries of fishing and aquaculture; packaging material production; and cold storage have been fundamental to practising seafood e-commerce daily in the village, hence making this factor a determinant to outcomes of local SFSC operations. Also, on the other hand, evidence suggests development of allied industries could receive impact from local SFSC operations, based on the example of how upgrade has happened to local packaging material production:

"*Before, local packaging material providers simply target at satisfying long-distance transportations by lorries and coaches—plenty small buyers from nearby regions use to travel by coaches. However, after seeing growing demand from local e-commerce, the providers soon change their strategy, introducing professional moulds to produce polystyrene boxes in new sizes. They also add production lines of ice bag to factories, which are later replaced by lines of dry ice bag that bring great convenience to our packaging and transportations. Prices of these materials were high at first but then dropped to friendly level.*" [Daxing'zhuang village, interviewee_B]

In addition to those visible and tangible, abstract factors from the spiritual set in Daxing'zhuang village are found significant to local SFSC operations as well. They include the previous norms and values that root in living traditions, which encourage sharing and learning in the managers and thus facilitating e-commerce to grow. And secondly, the existing e-commerce atmosphere that inherits and enhances positive effect of the previous norms and values, while bringing new pressures and challenges to the managers' SFSC operations that is observed in the village. To sum, local business competitions have been rapidly rising along with the increasing number of SFSC managers, causing a long and aggressive price war that even shakes the national seafood market; according to the explanation of interviewee_B:

"*Price war is a big issue. Benefits from seafood e-commerce drop in recent years, and it is getting worse because lots of managers choose to profit by quantity. This situation causes higher demands for seafood and then unstable supplies from upstream, which further triggers selling cost to rise and therefore makes benefits drop again; in sum, a loop has formed in this issue.*" [Daxing'zhuang village, interviewee_B]

4.2.3 Knowledge possession

The Table 33 summarises the knowledge possessed by local SFSC managers in Daxing'zhuang village when in e-commerce practices, showing diversity under both two groups of explicit and tacit types. Overall, rather than being independent of each other, interrelations are found exist between these types. This suggests orientations already start before the following knowledge

utilisation, and seafood knowing and operational philosophy serve as the centre around which others are filtered and then possessed by local SFSC managers. For instance, in Daxing'zhuang village, feature knowing of fishes and shellfishes leads to the possession of varying packaging methods in general operational practices, hence seafood kinds with more tenacious vitality—such as octopus—are often prepared by simpler packaging materials and steps, whilst most of others have to follow the rigid packaging procedure to arrive fresh. Additionally, although local managers have been aware of the nature of tacit knowledge as being less tangible and difficult to encapsulate, the researcher finds that they seldom claim hardship of learning as they believe having discovered the solution, that is, learning through constant individual explorations and summative reflections in real-life practices.

Table 33. Knowledge possessed by local SFSC managers

		Name	Explanations	Examples
Possessed knowledge	**Explicit types**	Digital literacy	Knowing and mastering how to mobilise ICTs such as Internet and computers, when practising e-commerce; an integration of technical skills and cognitive.	● "*Knowledge of computer and internet is essential to e-commerce.*" [Daxing'zhuang village, interviewee_A]
		General operational practices	Knowing of common and shared operational practices in local seafood e-commerce, such as steps of packaging; cost allocation; and communicating with customers.	● "*Where your money comes from; how much you spend; and how much others owe you, you need to stay clear about questions like these.*" [Daxing'zhuang village, interviewee_J]
		Seafood knowing	Consisting of a complex knowing system of various seafood aspects, such as seafood identification; seafood quality telling; and storage by seafood's features.	● "*Professional seafood knowledge is required, for instance, knowing how to tell seafood quality by looking and touching.*" [Daxing'zhuang village, interviewee_I]
		Fishing vessel and/or aquaculture management (exclusive to direct sales managers)	For those very local few who are in charge of seafood direct sales, mastering of upstream practices is a must, including knowing of managing fishing vessels and/or aquaculture fields.	● "*My family has run seafood business and managed fields for aquaculture before e-commerce.*" [Daxing'zhuang village, interviewee_J]
	Tacit types	Individual agency	Ability to take actions and fulfill intention of oneself, especially when in challenging situations; often related to abstract spiritual contents, such as wills and senses.	● "*To us managers, keeping learning is perhaps one of the most important.*" [Daxing'zhuang village, interviewee_C] ● "*Ability of being practical and improvised according to changing situations is needed.*" [Daxing'zhuang village, interviewee_D]

				● "*Dedication, if you decide to start seafood e-commerce, you shall be prepared to do it full time every day.*" [Daxing'zhuang village, interviewee_H]
		Operational philosophy	Forming foundational thinking of how local seafood e-commerce and the oneself in it are seen, by which later operational practices of oneself are guided; even being a determinant to which stages that SFSCs can evolve.	● "*My reflection is you need to be true and faithful to both you and your business.*" [Daxing'zhuang village, interviewee_B] ● "*Be water and go with flow; this might be the best attitude of local managers when in operation.*" [Daxing'zhuang village, interviewee_J]

4.2.4 Knowledge utilisation

Managerial activities of structuring, bundling and leveraging

Almost all the interviewed managers in Daxing'zhuang village first agree on the importance of structuring, bundling and leveraging when recalling on their own knowledge utilisation, hence delivering the essential role of these three managerial activities in daily operations of local e-commerce enabled SFSCs. This is because while participating in and experiencing long-term seafood e-commerce locally themselves, the managers have developed a shared mindset of how to understand seafood e-commerce in practice, i.e., seafood e-commerce represents a complex integration of fragmented knowledge components, and effective utilisation of the components around the orientations serving the final operational goal can help ensure positive outcome in changing environment. Hence, to have effective utilisation, procedure of structuring knowledge components into larger oriented bundles and then leveraging gradually arises, and it is carried out in the bottom-up and additive manner (See Figure 22).

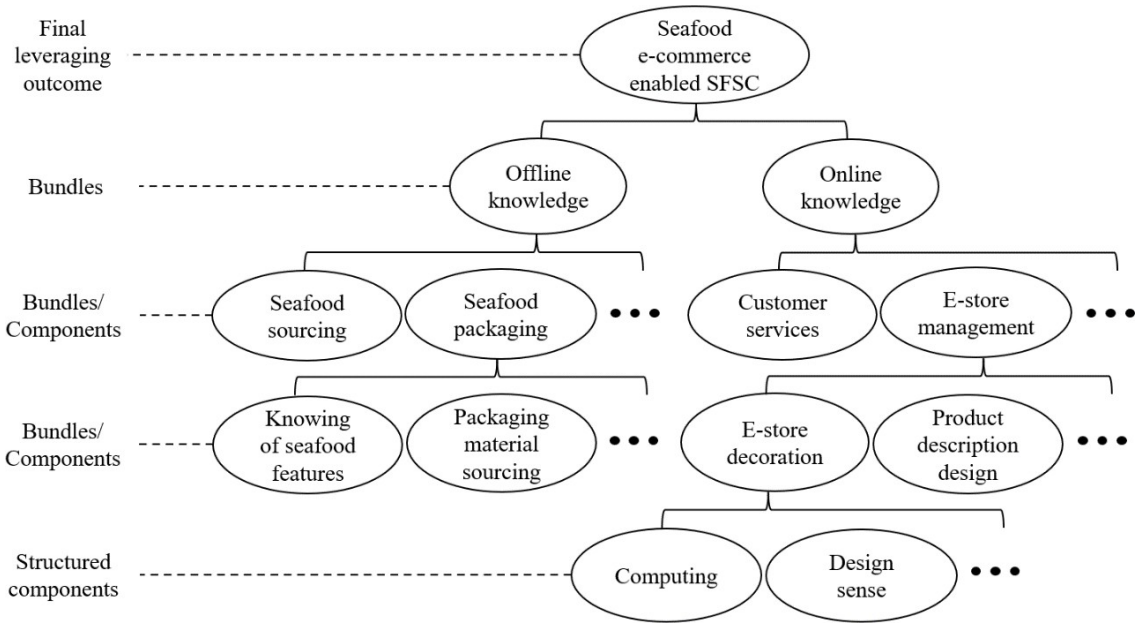

Figure 22. Example of structuring, bundling and leveraging in Daxing'zhuang village

Impact of governance and organisational structure

As previously stated, because practising seafood e-commerce has been rather demanding, how to keep SFSC operation less institutionalised while ensuring its outcome becomes a common

issue to local managers' consideration, hence causing the universal adoption of home business across Daxing'zhuang village. More importantly, by fitting operational practices in own living space, not just change of modern business activities to local managers' daily life is controlled, but also facilitating a simple yet effective structure of governance and organisation to emerge, of which the managers and family members are fully in charge. Such a structure greatly affects the knowledge utilisation in local context, allowing the managers to save costs; ease themselves from extra workloads and pressures of being institutionalised; and therefore, as intermediary, directly react to and concentrate on supply chain downstream. Nevertheless, despite merits of this structure, a group of local managers also dedicate to develop another driven solution, via which they achieve a semi-institutionalised structure by flexible yet enterprising operational management, thus ensuring themselves advanced outcomes in comparison with local others'. According to an example of interviewee_H who benefits from a semi-institutionalised structure:

> "*I seldom worry about computing and internet because I recruit employees who are particularly good at solving related problems. ... After peak season, I only keep three employees in total to help me maintain daily operation. ... Since I am the only person in charge, my operation can quickly react to my latest decisions, such as my flexible recruitment policy.*" [Daxing'zhuang village, interviewee_H]

Impact of business model

As practitioners of the e-commerce enabled SFSCs, managers in Daxing'zhuang village have long-term committed to the customer-oriented business model, which in return deeply affects their knowledge utilisation in operation. To summarise, improving customers' experiences by guaranteeing their orders arrive fresh is seen as the most basic practice in seafood e-commerce, as well as one priority to creating customers' close feeling. To fulfil this demand, the managers have to first rule out local fishes and shellfishes which tested to be vulnerable to long-distance transportation, leaving the more easy-to-survive seafood kinds—such as oyster; scallop; prawn; octopus; swimmer crab; and abalone—to form up their e-commerce exclusive product line and guide packaging knowledge utilisation. Furthermore, adoption of customer-oriented business model encourages the managers to continuously try out latest methods of customer engagement

along their business journey, such as livestream shopping and big data services empowered by platform, which have been upgrading the ways they communicate with customers.

Impact of innovation

The meaning of innovation should not be restricted to novel and radical creations. In the case of Daxing'zhuang village, innovation and its impact on knowledge utilisation are more shown in how local managers produce the practices that not only fit individual demands and situations but also are durable to underpin their operations in local context. This is more innovative than it first sounds because managers have to accomplish it while being in complex local context, searching for opportunities under pressures and challenges; in other words, it simultaneously indicates a lengthy process requiring clear operational philosophy and high individual agency until outcome becomes visible. Seeing through this perspective, a number of previously listed knowledge utilisation examples can be counted as innovation, such as forming the e-commerce exclusive product line or using a semi-institutionalised governance and organisational structure to achieve advanced outcome. In this regard, Interviewee_J explains own innovation of seafood packaging that is an outcome from years of experience:

> "*My packaging technique is based on previous experiments. … When weather is cold, only using one layer of insulation sheet and one ice bag every package; when weather is hot, adding one extra ice bag every package and remembering to use layers of film to prevent leaking.*" [Daxing'zhuang village, interviewee_J]

Synchronisation of all six managerial activities and elements

Despite being separated into individual sections for focused analysis, the listed six managerial activities and elements in knowledge utilisation display deep connections in action, especially through the case of Daxing'zhuang village. Overall, as the theory states, synchronisation of the six indeed generates powerful effect, because the six themselves have respectively represented fundamental bases of local SFSC operations, or premises of the operations' stable running in local context; in other words, synchronisation of the six managerial activities and elements in knowledge utilisation, at the same time, means reaching the operation of e-commerce enabled

SFSC in Daxing'zhuang village.

To summarise, the three managerial activities—that are, structuring, bundling and leveraging—represent the three interrelated practices daily executed by managers for seafood e-commerce, hence they are the basis of reaching complete operation. Moreover, the element of governance and organisational structure represents the framework within which the operation is secured to run stably through the timeline, since the framework owns a stable feature of being structural after being created and shaped in local context. Next, the element of business model represents the foundation upon which the operation is established, and it has the strong feature of being customer-oriented due to managers' commitment to the e-commerce enabled SFSC, which in return guides the operation to be continuously customer-oriented in future. Last but not least, the element of innovation means the boost that happens from time to time during the operation, triggering effects such as bringing operation to a higher level and helping solve problems or difficulties.

4.2.5 Supply chain evolution

The supply chain evolution data collected from the managers in Daxing'zhuang village reveal a slightly different story from the argumentation of supply chain evolution theory, which often makes identifications of the evolving status of local e-commerce enabled SFSC challenging. All in all, instead of rationally consulting previous operation and comprehensive operational aspects such as demand level and product flow, local managers are found being more affective thinking and hence easier to base their SFSC evolution judgments only on perceived situations of the present operation; perceived online and offline impacts; and even personal opinions. For instance, the manager might simply think own SFSC is in maturity stage because "*I don't see any major issue in front of my present operation*" [Daxing'zhuang village, interviewee_D].

Nevertheless, despite the brought research challenge, the researcher suggests this phenomenon also brings two valuable insights by its behind reasons. First, the professionality held by local SFSC managers could be distinct from the one recognised in modern industrial world, therefore

it would be unfitted to alone adopt the theories developed from the latter—such as the supply chain evolution theory—to assist interpreting the SFSC evolution happened in local context. Second, to a certain extent, this phenomenon reflects the important role of "being affective" in the managers' operations in Daxing'zhuang village. Essentially, it is observed that as not being trained by modern industrial knowledge from the beginning, maintaining active perception and reflection by being affective in practice—this has always been local managers' self-developed solution to day-to-day SFSC operations, and has eventually driven their SFSCs to evolve. This observed solution also explains why the practice of "exploration" is frequently mentioned and highlighted by the managers in Daxing'zhuang village—as well as by the managers from the first case of Yuezhuang village—during providing their operational experiences, showing the term is already given richer meaning when local SFSC managers try to reach the operation of e-commerce enabled SFSC in seafood e-commerce, which simultaneously represents a small but important institutionalisation accomplished in local context, a key concept to understand before interpretation of the SFSC evolution in Taobao village. Moreover, the researcher argues that similar connection exists between this observed solution and the identified tacit types of knowledge—i.e., individual agency and operational philosophy, because individual agency can indicate the degree of managers being active in exploration, while operational philosophy can indicate the robust result of perception and reflection, being able to stably guide local managers' operations in respect of time.

4.2.6 Knowledge acquisition

The managers in Daxing'zhuang village highly recognise significance of the four knowledge acquisition activities in practice—i.e., identifying; creating; storing; and sharing, hence they provide vivid details about how the four activities have supported their SFSC operations (See Table 34). Overall, although being theoretically classified into independent activities, the four show strong interrelations as identified in practice, often acting in synchronisation and being cause and effect to one another. For instance, sharing experiences with suppliers is also when the managers identify and store up-to-date information of supply chain upstream, which could instantly inspire them to create new ideas for solving supply chain issues. In summary, while

being in seafood e-commerce, identifying; creating; storing; and sharing play significant role in allowing the managers to acquire fragmented knowledge contents in local context. Then, the acquired knowledge contents are orchestrated according to given orientations—such as seafood knowing and operational philosophy, therefore they form into organised knowledge types for being efficiently possessed.

Besides the connection with knowledge possession via which acquired knowledge contents are orchestrated into oriented types for being possessed, the four knowledge acquisition activities are found connecting with knowledge utilisation as well. In particular, their connection is not just showed by the similar effect in between the creating activity and the impact of innovation, but also showed by how the four activities can be directly affected by the other two elements proposed in knowledge utilisation—i.e., the governance and organisational structure and the business model. In other words, in the case of Daxing'zhuang village, the researcher observes that besides knowledge possession, orientations and their impacts on local SFSC managers are traceable in their knowledge acquisitions, as determinations of the home business model and the adopted governance and organisational structures—either less or semi institutionalised—have orientated them to continuously pursue and acquire effective yet cost-friendly knowledge in operation; such as reducing marketing costs by taking advantage of inland customer's strong curiosity, and minimising ice bags used per package by experiments.

In the previous finding of the revealed conflict in between argumentation of the supply chain evolution theory and the managers' affective thinking, the researcher discusses exploration that serves as a primary solution to local operations and is given richer meaning—i.e., maintaining active perception and reflection by being affective in practice. More importantly, the researcher further argues this exploration solution deeply connects with the four knowledge acquisition activities, since its involved perception and reflection are the premise to achieving the four in operation. Essentially, after the managers in Daxing'zhuang village decide to participate in the seafood e-commerce that once unfamiliar to them, the long-term practice of exploration as an instinct begins in their SFSC operations, during which perception and reflection gradually stand

out and are identified by the managers as the two underpinning actions to constitute the practice, hence being particularly underlined in the added rich meaning of exploration in local context. In this regard, as the verified indispensable part of local SFSC operation, the four knowledge acquisition activities and their achievements have automatically hooked with the two actions from the beginning, because nature of identifying and sharing is more of the outward motional activities structured on the managers' perceptions of external contents, while nature of creating and storing is more of the inward emotional activities structured on the managers' reflections of internal contents. Put it another way, the four knowledge acquisition activities are achieved in the operations of e-commerce enabled SFSC in Daxing'zhuang village, because local SFSC managers have been able to perceive and reflect.

Table 34. Examples of knowledge acquisition

Activities	Features	Examples
Identifying knowledge	● Essential online and offline techniques to reach operation. ● Superior online and offline techniques to reach better-performed operation. ● Significance of individual agency and operational philosophy.	● "*Seafood kinds that can survive transportation for at least three days are the best options for selling alive in e-commerce.*" [Daxing'zhuang village, interviewee_J] ● "*As platform customers cannot see and touch products until receiving them, being faithful is important to running online business.*" [Daxing'zhuang village; interviewee_B]
Creating knowledge	● Online and offline techniques fitting individual demands and situations when in operation. ● Individual agency and operational philosophy.	● "*My wife knows nothing about e-commerce at the beginning and learns everything by exploration, therefore she later comes up with the operational method fitting us well.*" [Daxing'zhuang village, interviewee_J] ● "*The key is having your own idea of operation. I always think about how to be unique in comparison with others in e-commerce, so that my operation is more attractive to customers.*" [Daxing'zhuang village, interviewee_I]
Storing knowledge	● Individuals' mechanism. ● Local traditional mechanism. ● Public sector mechanism. ● Private sector mechanism.	● "*Managers need to be familiar with all the needed practices, such as how to pick fresh seafood kinds and roughly process some of them; especially for shellfishes that require sand to be removed.*" [Daxing'zhuang village,

		interviewee_F] ● "*Older generations in the village know seafood better than us young managers, so we seldom travel outside for seafood learning.*" [Daxing'zhuang village, interviewee_B]
Sharing knowledge	● Sharing within operation ● Sharing with local others ● Sharing with broader industrial participants	● "*If you run into difficulties or want to improve your operation, recruiting professionals can be the solution.*" [Daxing'zhuang village, interviewee_A] ● "*After being in seafood e-commerce, I learn even more about seafood when communicating with my suppliers.*" [Daxing'zhuang village, interviewee_B]

4.2.7 Summary of seafood e-commerce case

In this case analysis of the Daxing'zhuang village seafood e-commerce, the researcher targets at understanding evolution of the e-commerce enabled SFSC in local context via knowledge management viewpoint. Under the guidance of the previous conceptual framework, this target is fulfilled by a series of analysing works regarding local SFSC basics; knowledge possession; knowledge utilisation; supply chain evolution; as well as knowledge acquisition, upon which findings are generated (See Table 35) and enable interpretation of local supply chain evolution. All in all, in local context of Daxing'zhuang village, reaching of the operation of e-commerce enabled SFSC is marked by the managers' synchronisation of the six managerial activities and elements in knowledge utilisation, which also means the beginning of evolution. Afterwards, although the supply chain evolution theory is proved to be unfitted to assist identifying the later evolving status of local supply chains, the conflict reveals local managers' primary operational solution that underpins and drives their SFSCs to evolve in local context—i.e., the practice of exploration that is given richer meaning. In summary, the researcher suggests that this solution requires to be further interpreted and examined, together with the potential improvement to the supply chain evolution theory that would allow the theory to be more fitted to assist evolution discussion.

Table 35. Main findings of case analysis

Analyses	Findings
Local SFSC basics	● Supply chain structure with the only intermediary dominates local SFS operations, due to the nature of practising seafood e-commerce in local context. ● Local context consists of the material and spiritual sets, of which factors significantly influence local SFSC operations. ● E-commerce platform both empowers and suppresses local SFSC operations.
Knowledge possession	● Interrelations exist between the possessed explicit and tacit types of knowledge, such as the orientation impacts of seafood knowing and operational philosophy on the others.
Knowledge utilisation	● Local managers develop a shared mindset of how to understand seafood e-commerce in practice, i.e., seafood e-commerce represents a complex integration of fragmented knowledge components. ● In Daxing'zhuang village, synchronisation of all the six managerial activities and elements means reaching the operation of e-commerce enabled SFSC.
Supply chain evolution	● Current Supply chain evolution theory unfits to the discussion since local managers' SFSC operations are influenced by affective thinking. ● "Being affective" reflects local managers' primary operational solution which also drives their SFSCs to evolve, i.e., the practice of exploration; this exploration practice has been given the richer meaning of "maintaining active perception and reflection by being affective in practice" in local context. ● Giving of the richer meaning is related to the individual agency and operational philosophy in possessed tacit types of knowledge.
Knowledge acquisition	● Synchronisation exists between the four knowledge acquisition activities in practice. ● The four activities allow local managers to acquire fragmented knowledge contents and then orchestrate them by orientations, hence they form into organised knowledge types for being efficiently possessed. ● The exploration practice in local context enables fulfillment of the four activities in operation.

4.3 Bainiu village of hickory nut e-commerce

4.3.1 Introduction

Bordering Jiangsu Province's lower part, Zhejiang Province represents another economically and culturally developed province in east China. The province is also known for the rich forest resources in the region of capital city's Lin'an District, where the nationally significant hickory

nut industry and Bainiu village is located. This industrial flourishing is attributed to the Tianmu mountain embracing the whole district region, which measures 200km in length; 60km in width; and from a few hundred meters to 1.8km in height, with average precipitation and temperature remain at 55in and 16ºC all year round. These favourable natural features have together allowed hickory nut forests to grow freely in the mountain for hundreds of years without being disturbed by human activities, which is a rarely gifted natural endowment enabling solid basis of the later industry, since planting and managing hickory nut trees artificially is considerably challenging.

Despite advantages on the doorstep, Bainiu village has not benefited from hickory nut industry at first, as its unfavourable geographical location had disconnected the village from any supply chain linkage in the district region (See Figure 23)—hickory nuts harvested in west forests are usually processed in nearby plants and then transported to the east market where nut merchants gather, leaving no requirement to stop by Bainiu village in between. However, change started in 2007, when local residents run into rising e-commerce and opened the first e-stores in Lin'an District selling hickory nut products. Soon, their initial success attracts more local others who graduate or work outside to return and participate, leading 12% of the total 551 households to directly engage e-commerce practices and boosting local annual output from 1 to 21 million pounds in nine years. This achievement not only makes Bainiu village be verified as a Taobao village by Alibaba Group in 2012, but also greatly changed regional hickory nut industry, since the village now becomes a powerful new centre for which upstream and downstream practices actively serve. Overall, this research is the first time that Bainiu village serves as a case study for food supply chain discussion, and the researcher dedicated to developing an understanding of the supply chain evolution in the local context after examining the villages' individual SFSCs.

Figure 23. Location of Bainiu village in relation to regional industry

4.3.2 Basics of local e-commerce enabled short food supply chain

Supply chain structure

The Figure 24 shows the basic steps to process hickory nuts in Bainiu village, and by combining it with the SFSC definition proposed in section 2.5.1, local supply chain structures and the roles played by managers in operation become much clearer. First, for the two managers identified to be fully independent after registering with the two required licenses—i.e., licenses for nut roasting and packaging, they are able to practise all the basic steps hence they are the producers of direct sales and own the simplest SFSC structure that is without intermediary. Second, for another two managers identified to register with the nut packaging license only, they are able to practise all basic steps except nut roasting and it leads them to play the only intermediary in the SFSC structure, relying on upstream supply and operating in the indirect sales form. Third, for those managers identified to fail registering with neither of the two licenses, they should be excluded from nut roasting and packaging but still be able to practise the rest steps, hence they play the only supply chain intermediary and embrace indirect sales. Finally, for those managers who have been no planning for registration and professional long-term operation, they play the only intermediary in the SFSC structure and embrace indirect sales as well; however, they are normally found avoiding practice of any processing step and fully rely on the finished products from upstream.

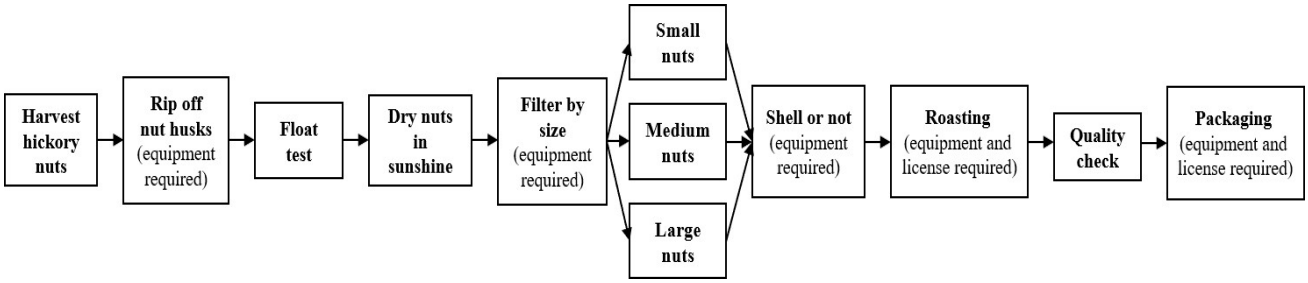

Figure 24. Basic steps to process hickory nuts in Bainiu village

Although both supply chain structures with and without the only intermediary are identified in local managers' operations, operations of the structure without intermediary are found special inside the village as it can significantly affect operations of the rest local majority who play as intermediary. Information suggests this is caused by the rigour requirement of being in hickory nut industry, as registering with either of the two licenses of nut roasting and packaging—the two vital steps composing a complete hickory nut processing—is demanding for investments and land use, which hence leads local majority to often fail both registrations, leaving them to relay on processed nuts supplied by regional licensed plants—such as the plants owned by the two managers of direct sales—with which they establish cooperative relationships. As a result, these relationships not only increase complexity of local context, but also divide operations of the e-commerce enabled SFSC into four groups, and each group displays its unique features in operation (See Table 36).

Table 36. Four groups in local SFSC operations

Group	Manager role	Numbers	Operational features
Operations registered for both roasting and packaging licenses	Producer who is in charge of the direct sale of the SFSC	Two	● Being eligible to perform all steps in hickory nut processing. ● Satisfying land use for online and offline operational practices, such as customer services; work areas for all nut processing equipment; loading and unloading areas; cold storage; warehouses; etc. ● Sufficient investment of finance, techniques and human resources for purchasing, running and maintaining equipment. ● Dedicating to year-round operation. ● Establishing and managing own operational team. ● Being willing to accept cooperation requests from local others, supplying them with finished products or roasted hickory nuts. ● Being applauded as models of the experienced older generation in Bainiu village, and hard-working entrepreneurs. ● Being accused of monopoly and the profiting by quantity that leads to constant price war.
Operations only registered for packaging license	The only intermediary in the SFSC	Two	● Being eligible to perform partially steps in hickory nut processing. ● Partially satisfying land use for online and offline operational practices, such as customer services; work areas for nut packaging equipment; cold storage; warehouses; etc. ● Sufficient investment of finance, techniques and human resources for purchasing, running and maintaining equipment. ● Dedicating to year-round operation. ● Establishing and managing own operational team. ● Being willing to accept cooperation requests from local others, offering rough processing and packaging services. ● Being applauded as models of the experienced older generation in Bainiu village, and hard-working entrepreneurs.

			● Being accused of the profiting by quantity that leads to constant price war.
Operations with neither license and dedicate to long-term operation	The only intermediary in the SFSC	Above 60	● Being able to perform partial steps in hickory nut processing. ● Facing land use pressure, online and offline operational practices are executed within front yard and backyard. ● Insufficient investment and limited equipment. ● Dedicating to peak season operation (from Sept. to 10 days before Chinese New Year each year, approx. five months in total), selling other seasonal forest resources for the rest of the year (no independent cold storage or warehouse to support year-round hickory nut sales). ● Operational team consists of manager and family members. ● Relying on supplied hickory nuts from licensed plants that are roasted and ready for final packaging; trying to perform as many rest processing steps as possible themselves to reduce costs. ● Being described as mostly young, with assistance from parents and regional relatives. ● Being described as backbone in operations of local e-commerce enabled SFSCs.
Operations with neither license and dedicate to short-term operation	The only intermediary in the SFSC	Unknown large number	● No plan for performing any nut processing step. ● Except for the spaces for customer services and storage, no having land use pressure. ● No demand for much investment and equipment. ● Only dedicating to peak season operation (from Sept. to 10 days before Chinese New Year each year, approx. five months in total), leaving off for the rest of the year. ● Operational team consists of manager and family members. ● Relying on supplied finished products from licensed plants. ● Rather flexible and swift operations, even causing difficulty to making statistics of their numbers in the village. ● Being accused of their unprofessional operations that lead to destructive competitions. ● With resources and opportunities provided by mature local industry, they hold potential to convert to long-term operation easily.

Creation of customers' perceived closeness

The below Table 37 displays methods employed by SFSC managers in Bainiu village to create online customers' close feeling towards their hickory nut products or operations. To summarise, local SFSC managers are passionate about practices of improving customers' experiences and fostering customers' loyalty, among which recruiting skilled customer services employees and investing in platform's traffic services to increase frequency of customers seeing own products, these two become important practices to their daily operations and where most of their online operating costs are from. Moreover, managers are found having stressed the role of information embedment in closeness creation, paying constant efforts to explore the best way of transferring prepared information to customers through designs of e-store and product descriptions, which especially involves e-store decoration and product photography that often drive local managers to seek supports from external agencies; forging own skills of decoration and photography; or recruiting professionals to join own operational team. The researcher suggests this could be a result of the feature of processed food since similar industrial processing steps have led to local managers' homogeneous nut products, thus demanding marketing strategies such as the use of extraordinary product images to create individual uniqueness when competing in hickory nut e-commerce for customers.

Table 37. Local methods for closeness creation

Methods	Steps	Examples
Improving customers' experiences	● Quality harvested nuts and professional flavouring when roasting are critical to hickory nut e-commerce. ● Timely and high-quality customer services before and after sales, supported by skilled customer service employees. ● Diversifying product line to offer customers more choices.	● "*Average salary determined for customer services employees is a little higher than other employees' in the village, such as packagers' and order dispatchers'.*" [Bainiu village, interviewee_C]
Fostering customers' loyalty	● Applying targeted strategies, such as word-of-mouth making; decision making from customers' view; building	● "*My strategy is turning some of online customers into agents of my e-store, rewarding them if the given marketing*

	relationships in customer groups; etc. ● Accumulation effect of customer-friendly practices in daily operation. ● Increasing frequency of customers seeing own products or e-store on platform.	*tasks are fulfilled.*" [Bainiu village, interviewee_I] ● "*Website traffic and relationships with customers are important to online operation.*" [Bainiu village, interviewee_C]
Benefiting from collective and own trademarks	● Displaying identity of being in Lin'an district region in product descriptions and on packaging. ● Displaying own trademark on packaging.	● "*Branding helps ensure sustainable profiting.*" [Bainiu village, interviewee_I] ● "*I have been focusing on promoting the influence of my trademark, good influence makes online operation robust.*" [Bainiu village, interviewee_B]
Information embedment	● Professionally designed e-store and product descriptions, transferring prepared information to customers effectively. ● Prepared information is on designed product package, being visible to customers at the first sight. ● By law and regulation, printing license code on product package to indicate guarantee of food quality and safety.	● "*I take product pictures myself when e-store is first set up, but then I find an agency in Lin'an district to help me with professional photography, because I want my customers to receive better visual effect.*" [Bainiu village, interviewee_B]
Inheriting offline methods	● In contrast to customers of neighboring regions, customers of outer regions are fonder of shelled hickory nut products.	● "*Customers of the nearby regions or of Zhejiang Province prefer unshelled roasted nuts, but customers of the other national regions prefer shelled roasted nuts.*" [Bainiu village, interviewee_F]

Interactions with online e-commerce platform

The evidence indicates complexity in between platform and SFSC managers in Bainiu village as platform has been engaging them with its twofold role, which is also strongly perceived by local managers during their SFSC operations. On the one hand, local managers understand that platform is foundation to their e-commerce practices, and it would continue to serve their needs and lead them to more efficient operations via support mechanisms, such as platform customer services; big data; and held online activities. On the other hand, local managers and their SFSC operations receive constant pressures from platform, as the latter has been profiting by charging

them for all possible practices; issuing new regulations that increase demand for operation; and treating the managers differently according to their scales. Moreover, due to the homogeneous feature of hickory nut products and the sensibility of selling processed food that relates to law and regulation requirement, SFSC managers in Bainiu village hold deeper understanding of the pressures given by the first two, which further pushes them to see the investment of platform's traffic services and resolving license registration or upstream cooperative relationships as the two priorities of their everyday practices.

Interactions with offline local context

A variety of interactions between the managers and local context are discovered in the case of Bainiu village, which is also evidence of the rich factors existed in the village that have deeply connected to and shaped the managers' operations of e-commerce enabled SFSCs. First of all, five factors are identified in the material set of Bainiu village, which include quality of available courier services; local transportation conditions; development of accessible allied industries; a critical government institution directly affecting daily operations of local SFSCs; and limited land in terms of geography.

In particular, benefited from profound industrial basis in the district region, essential accessible allied industries such as nut roasting in nearby villages and towns have strongly underpinned local managers' SFSC operations from the beginning, especially for the two managers' licensed plants within the village area, which have monopolised majority local others' upstream supplies. Further to this license issue and its impact, as the government institution carried obligation of inspecting food production, the township Market Supervision and Administration Authority is in charge of local managers' license registrations for legally executing hickory nut roasting and packaging steps, and also inspects their cooperative relationships established upstream, calling operations to stop for further investigation and penalty if inappropriate practices such as using other's license code on finished products are found. Those inspections are rather tricky to local managers, since lots of them have been packaging roasted hickory nuts supplied by upstream plants by themselves, and then printing the plants' packaging license codes on products for law

and regulation requirement. Local managers describe this practice as a no-choice solution to profit squeeze caused by constant price war, because packaging nuts by themselves is a more manageable practice than nut roasting and it cuts operating costs effectively. However, despite being much more manageable, registering for packaging license is still challenging even after local managers' efforts, and one vital reason behind is the limited land of Bainiu village. Since being embraced by the Tianmu mountain, Bainiu village is squeezed into a stripe shape sitting against a river so its land area per capita of the total 551 households drops to a minimum (See Figure 25), making the work areas that local managers could arrange for practising packaging step to often fail meeting the modern industry standard followed by registration. As one of the managers with no license but dedicate to long-term operation, interviewee_E stresses this land issue with own experience:

> "*Land use is the biggest problem. I face a crisis of storage space at present, especially when both my online and offline practices are finished in this house. I have to borrow local others' spaces to store my harvested hickory nuts when peak seasons come. In peak seasons, all processed nuts; myself; my family members; and recruited workers are crowded in here, leaving no space for eating.*" [Bainiu village, interviewee_E]

Figure 25. Limited land of Bainiu village

The similar interrelations and their enabling and suppressing impacts on local managers' SFSC operations are observed in two factors from the spiritual set of Bainiu village—i.e., the previous

norms and values and the existing e-commerce atmosphere. Basically, the previous norms and values represent the abstracts rooted in local living traditions long before e-commerce, such as friendships; neighborships; kinships; unity in community; and also the managers' strong bond to Bainiu village as their home. Abstracts like these enable and facilitate emergence and growth of local e-commerce enabled SFSCs, since they have in effect encouraged active sharing and learning in between the managers from the beginning—for example, learning e-commerce for the first time from neighboring pioneers, or sharing each other accesses to nearby relatives' nut processing plants. Nonetheless, the effect is not always positive as it is sometimes criticised for intensifying price war and other competitions in the village. According to interviewee_B:

> "*I don't think it is appropriate that managers gather in one place as it causes leaks of own business secrets; those employees of different managers often chit-chat when they off work. … Our plans of new packaging; marketing; etc., it becomes difficult to keep them in secret because people are too close to each other and walk around. … Maybe the managers with small scales could gather together as their need of competitiveness is low, but it is definitely not the case with the managers with larger scales.*" [Bainiu village, interviewee_B]

Despite being a double-edged sword, effect of the previous norms and values has been overall appreciated by local managers and affected the existing e-commerce atmosphere. In summary, by standing on the shoulder of the previous effect, hickory nut e-commerce in Bainiu village soon experiences a flourishing development and it produces the even more friendly atmosphere that enables local managers' SFSC operations to continue to grow and mature. The atmosphere develops two important results, the first one is the change to regional hickory nut industry that leads nut processing plants; packaging material production; and courier services to change their offline strategy, thus they now actively serve local SFSC managers. The second is investments from local government after being aware of the huge economic and social benefits generated by SFSC managers in the village, which include improvements to local infrastructure; assisting establishing village-level e-commerce association; finding alternative solution to local land use; organising training sessions; and encouraging more local residences to grow into managers in

hickory nut e-commerce. However, although the results enhance positiveness of the existing e-commerce atmosphere and enrich the material set, they bring modern business competitions as well that greatly suppress local managers' operations of e-commerce enabled SFSCs, such as constant price war and destructive competitions, which are further intensified by the complex relationships between the four groups of operations (See Table 36); limited land; license issue regarding nut roasting and packaging; and even the managers' strong bond to Bainiu village as their home. Again, according to interviewee_B who just complains about own operation being threatened by local business competitions, but deciding not to leave Bainiu village in the future for opportunities:

> "*I think about moving my business to the regional industrial park but finally abandon this idea. … I'm a native of Bainiu village, I know everything here so I don't want to leave.*" [Bainiu village, interviewee_B]

4.3.3 Knowledge possession

The Table 38 summarises knowledge types possessed by the SFSC managers in Bainiu village, among which many of them show clear exclusiveness to certain groups of the managers. The researcher suggests this is a result of the nature of processing hickory nuts in Bainiu village as it usually demands various investments—i.e., investments in land; finance; techniques; human resources; etc., therefore only a few local managers are able to meet them. Nonetheless, instead of seeing own SFSC operations being continuously hindered by the challenging investments, the rest local majority begin to actively seek for alternative solutions in complex local context, which eventually leads to creation of the knowledge of cooperative relationship establishment. In summary, by establishing long-term cooperation with those regional others having sufficient capacity to supply them with semi-processed roasted hickory nuts or finished products, local majority not just accomplish securing their supply chain upstream, but also effectively offset the operational pressures from unavoidable restrictions—such as limited land and the rigorous license registration that follows industrial standard. This cooperative relationship establishment is actually complicated, since it involves a series of managers' comprehensive evaluations on potential suppliers and it is often affected by the previous norms and values in local context—

such as neighborships and kinships. Furthermore, this cooperative relationship establishment is expected to be even more complicated, if managers attempt to settle private agreement with upstream suppliers for using the latter's packaging license codes when packaging roasted nuts by themselves. Interviewee_I explains the establishment of own cooperative relationships:

> "*I work with several suppliers at the same time, each of them supplies me with roasted hickory nuts of a particular flavour … I work with the plant of interviewee_E because it is professional at processing cream flavoured roasted nuts; holds good reputation in the village; and transportation between the plant and my place is convenient. I have long-term agreements with my suppliers, which help secure that my orders are first to be fulfilled when peak seasons come.*" [Bainiu village, interviewee_I]

Table 38. Knowledge possessed by local SFSC managers

		Name	Explanations	Examples
Possessed knowledge	**Explicit types**	Digital literacy	Knowing and mastering how to mobilise ICTs such as Internet and computers, when practising e-commerce; an integration of technical skills and cognitive.	● "*Recall on my first time talking to an online customer, my wife and I have to flip dictionary for word spelling before carefully typing words out using single finger.*" [Bainiu village, interviewee_A]
		General operational practices	Knowing of common and shared operational practices in local hickory nut e-commerce, such as investing in platform's traffic services; cost allocation; and communicating with customers.	● "*Priority of my online operation has always been marketing in recent years; like, how to have the best marketing for my e-store on platform.*" [Bainiu village, interviewee_D]
		Hickory nut knowing	Knowing of various hickory nut aspects, such as forest locations; harvest time; processing steps; needed preparations for harvest and processing.	● "*Harvest of the hickory nut forests in neighboring regions is earlier than that in Lin'an region, which gives an opportunity to start annual operation earlier than local others if nuts are sourced in there.*" [Bainiu village, interviewee_C]
		Nut roasting (exclusive to the two local managers registered for nut roasting license)	Two local managers who register for the license need knowing of the steps of hickory nut roasting; required equipment; work area arrangement; human resource arrangement; and the laws and regulations of food production; etc.	● "*Due to my experience in flavouring, my plant holds a good reputation of hickory nut roasting in the village. Flavouring and temperature control, they are the two keys in nut roasting and also on which I focus.*" [Bainiu village, interviewee_E]
		Nut packaging	Four local managers who register for the	● "*My biggest advantage in comparison with local*

		(exclusive to the four local managers registered for packaging license of processed food)	license need knowing of the steps of packaging processed nuts; required equipment; work area arrangement; human resource arrangement; and the laws and regulations of processed food packaging; etc.	*others is that I sort out land use problem and register the license for packaging processed food since 2014.*" [Bainiu village, interviewee_A]
		Cooperative relationship establishment (exclusive to the majority local managers requiring upstream supply)	For majority local managers who are unable to meet registration requirements of the two licenses, they need knowing of finding and negotiating with those registered for upstream supply; as well as for borrowing their license codes if the managers plan to practise packaging themselves.	● "*A relative of my husband runs a nut processing plant and is where we process our hickory nuts; the relative allows us to use the plant's packaging license code, when we transport roasted nuts home and begin packaging them ourselves.*" [Bainiu village, interviewee_C]
		Team management (exclusive to local managers with institutionalised operations)	For local managers who have more institutionalised operations—such as owning licensed nut processing plant, knowing of team management is essential; for example, recruiting employees for different positions and determining their salaries.	● "*When peak season comes, I quickly expand number of the employees in my company to 40, and at least 20 of them are machine operators in the plant.*" [Bainiu village, interviewee_E]
	Tacit types	Individual agency	Ability to take actions and fulfill intention of oneself, especially when in challenging situations; often related to abstract spiritual contents, such as wills and senses.	● "*Business is about speed; quickly grasping the opportunity; and timing.*" [Bainiu village, interviewee_B] ● "*Young managers nowadays do business less dedicated and cautious than older managers.*" [Bainiu village, interviewee_E]
		Operational philosophy	Forming foundational thinking of how local hickory nut e-commerce and the oneself in it	● "*Good product quality; good customer services; and staying honest, these are the three vital factors*

			are seen, by which later operational practices of oneself are guided; even being a determinant to which stages SFSCs can evolve.	*in operating e-store.*" [Bainiu village, interviewee_A] ● "*I think business is all about being a nice and trustable person, and building relationships with different people*" [Bainiu village, interviewee_F]

4.3.4 Knowledge utilisation

Managerial activities of structuring, bundling and leveraging

The three managerial activities—i.e., structuring, bundling and leveraging—together underpin the everyday knowledge utilisation that contributes to operations of local e-commerce enabled SFSCs; this is the first common opinion reached by most of the interviewed managers in Bainiu village, after recalling on their previous knowledge utilisation experiences. The reason behind can be traced to the nature of local hickory nut e-commerce in practice, that is, the integration of fragmented knowledge components, and it normally reveals in local context as the managers' consistent arrangement and coordination of the knowledge driven practices which seem to be independent from each other but serve shared orientations. For example, hickory nut processing consists of a clear list of oriented steps to lead harvested hickory nuts to finished products, and if the manager cannot fulfill part of them, then created alternatives shall continue to serve the same orientation. This managerial procedure implicates execution of structuring fragmented steps into bundle of a complete hickory nut processing, which would be further leveraged with other bundles such as bundle of marketing to serve the final operational goal in the bottom-up and additive manner (See Figure 26).

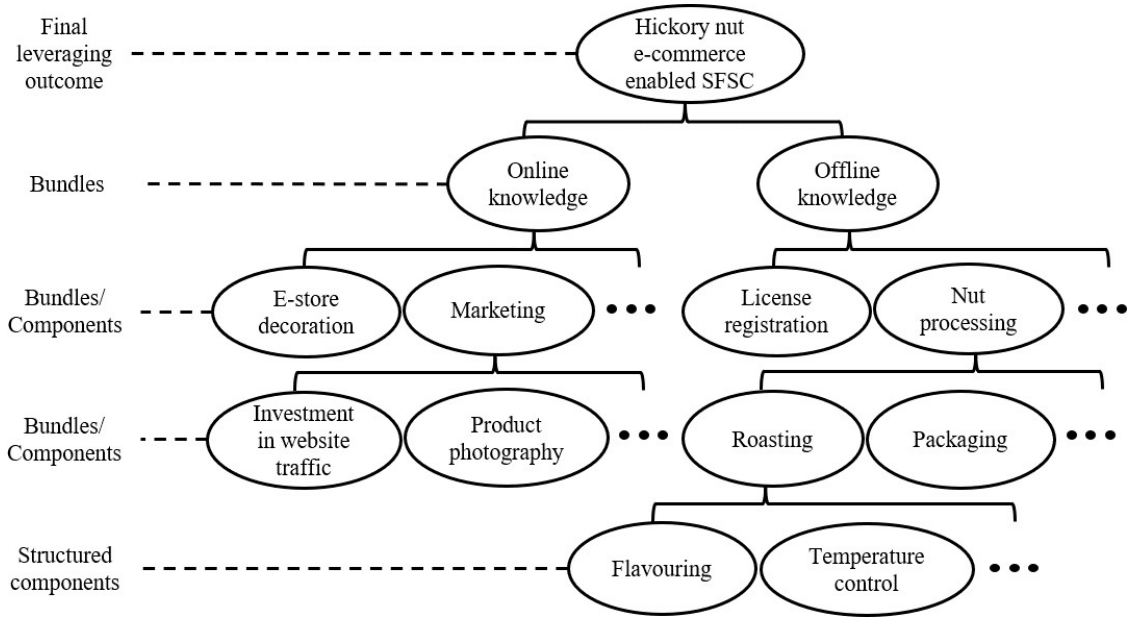

Figure 26. Example of structuring, bundling and leveraging in Bainiu village

Impact of governance and organisational structure

Since hickory nut industry has rigour demand for the license registrations for nut roasting and packaging, operations of the e-commerce enabled SFSCs in Bainiu village are divided into four groups, based on whether the operations are licensed or not and the agency of managers—that are, operations registered for both roasting and packaging licenses; operations only registered for packaging license; operations with neither license and dedicate to long-term operation; and operations with neither license and dedicate to short-term operation. More importantly, the four groups indicate the four different governance and organisational structures that are determined by the degree of institutionalisation, and each corresponds to a particular solution of knowledge utilisation.

Featured by the registered two licenses, managers of **the first group** gain full independence in local context so their operations embrace a highly institutionalised structure. In particular, since managers of the first group early resolve issues regarding investment and the land use for work areas, they are able to execute standardised online and offline practices when in operation, and this further allows them to acquire and possess more advanced knowledge than local others—such as the efficient management of nut processing plant and operational team. Similar features are shared by managers of **the second group**, even though the structure of their operations is less institutionalised because they as large-scale intermediary have to rely on upstream supply and they only own packaging license, leaving the practice of nut roasting—a critical capacity required by the complete processing process and a sign of upstream control—being excluded from their everyday operation.

Although neither license is of the operations of the rest two groups in Bainiu village, managers of **the third group** that dedicates to long-term operation are unique due to their higher agency. Overall, in facing the investment and land use which are challenging to fulfill in local context, managers of the third group choose to achieve a semi-institutionalised structure by integrating enterprising management into their home businesses. This decision leads managers' work areas and living space to overlap, showing their intention of actively balancing between effectiveness

and efficiency when in operation. In consequence, such a semi-institutionalised structure has made the managers more willing to acquire and possess those rather practical knowledge. For example, in the case of Bainiu village, managers of the third group are found keen on flexibly recruiting temporary employees to assist works of family members when in peak seasons; using affordable and simplified processing equipment to upgrade daily SFSC operation; selling other local forest resources in low seasons since their insufficient storage space cannot support year-round hickory nut sales; and establishing cooperative relationships with upstream suppliers and also borrowing suppliers' license codes to perform packaging step themselves.

In contrast to the structure driven by higher agency, a low institutionalised structure is achieved by managers of **the fourth group** and they commit to short-term home business, often causing destructive competitions to local others who dedicate to long-term operation. Managers whose operations are of this low institutionalised structure pursue the knowledge that are simple but effective enough to underpin their basic operations, such as digital literacy; general operational practices; and gaining finished products directly for sale through their cooperative relationships with upstream suppliers. Moreover, evidence suggests this low institutionalised structure is not unchangeable, because it easily grows into semi-institutionalised structure by the time positive changes happen to managers' agency and operational philosophy. According to interviewee_C:

> "*Because the village has good industrial basis, those beginners can easily grow into mature e-commerce managers through the accumulation of experience over time. ... There are lots of beginners in the village, they go straight to processing plants, taking finished products back home and selling them online right away; this is actually a very flexible way of operation.*" [Bainiu village, interviewee_C]

Impact of business model

Because of the SFSC practice's emphasis of the customer side in supply chain, business models of local managers' operations are primarily customer oriented, and it has deeply affected their knowledge utilisation in practice. In summary, local managers made numerous efforts in letting customers perceive closeness to operations and products, which involve improving customers'

experiences by recruiting skilled employees; fostering customer loyalty by investing in website traffic; creating product uniqueness to customers by information embedment; etc. Furthermore, utilisation of these oriented knowledge types not only brings the managers instant benefit, but might also triggers important change to their operations; for instance, interviewee_A who own packaging license explains how communication with customers triggers upgrades to packaging line and parcel packaging method:

> "*Packaging roasted nuts using big packs, this used to the only packaging technique of mine. However, after I know lots of my customers are office workers who like to share snacks with colleagues in leisure time, I add new equipment to packaging line thus I can now produce smaller mini packs for their sharing. … My parcel packing method was simple and caused complains of products arriving damaged when I first started e-commerce, so I visited many packaging material providers myself to learn how to make improvement that led to present method.*" [Bainiu village, interviewee_A]

Impact of innovation

In the adopted theory of resource orchestration, innovation has been theoretically defined as an organisational element that directly boosts knowledge utilisation. In the case of Bainiu village, this is more reflected by how local managers have produced a series of e-commerce practices under diverse challenging circumstances, which are all proved to fit their individual demands and situations, as well as to effectively underpin their operations in complex local context (See Table 39). Also, it is found that strong innovation ability is particularly demonstrated by local managers whose operations are with no license and dedicate to long-term operating, which can be an evidence that comparing with local others, they own higher agency when in operation.

Table 39. Identified innovations in local operations

Innovator	Innovations in local operation
Managers whose operations registered for both/either of the nut roasting and packaging licenses	● Establishing and managing operational team. ● Upgrading processing techniques, such as purchasing new equipment; standardising practices of processing steps; etc.

Managers whose operations are without license and dedicate to long-term operation	● Expanding operation to different platforms for higher profits, also a solution to hickory nut price war. ● Borrowing packaging license code via cooperative relationships for self-practice. ● Harvesting and processing hickory nuts by times to avoid storage pressure caused by local limited land. ● Selling other forest resources in low season to maintain year-round operation.
Managers whose operations are without license and dedicate to short-term operation	● Expanding operation to different platforms for higher profits, also a solution to hickory nut price war.
All local managers	● Updating product line, focusing on processing and sales of shelled hickory nut products to fit preference of the wider customer group. ● Use of the automated order takers in operation. ● Flexible recruitment policy for peak and low seasons.

Synchronisation of all six managerial activities and elements

Although the six managerial activities and elements seem to be independent of each other, they are actually highly interlaced in action, especially after observing how they affect the managers' operations in Bainiu village. For instance, for local managers with the different governance and organisational structures determined by degree of institutionalisation, innovations generated by them are varying as presented in Table 39 and often have customer orientation because of their customer-oriented business models in operation.

The verified interlaced relationship between the six managerial activities and elements reveals powerful effect that they could bring when being synchronised in knowledge utilisation. More importantly, the researcher suggests that the six have respectively represented the premises to the complete operation of e-commerce enabled SFSC, which is reached by the managers when all the six are well synchronised in action. To summarise, the first three managerial activities—i.e., structuring, bundling and leveraging—represent fundamental basis of operation, since they together allow fragmented knowledge components to be integrated by shared orientations, and eventually lead to production of the knowledge driven practices which make daily operation of local e-commerce enabled SFSC possible, such as the practices of nut roasting; packaging; and

the complicated marketing demanding knowing of investment, photography, etc.

Furthermore, the element of governance and organisational structure represents the framework created with the property of being structural, within which the e-commerce enabled SFSC can stably operate passing the time in local context. In the case of Bainiu village, such a property has contributed to divide between the four operational groups that each is institutionalised to a varying degree based on individual structure. As another vital premise, the element of business model is capable of gifting the operation strong orientation and therefore affects priority of the operation's practices. This element of business model is particularly essential to the operation of e-commerce enabled SFSC, since being strongly oriented towards customers is of the latter's theoretical essence. Last but not least, although the element of innovation is known for radically facilitating the operation, it more follows a long-term accumulation path as showed in the case of Bainiu village, in which local managers gradually produce a series of e-commerce practices to underpin the daily operation of e-commerce enabled SFSC in complex local context.

4.3.5 Supply chain evolution

Developed from case discussions in modern industrial world, the supply chain evolution theory defines the four evolving stages in a supply chain lifecycle—i.e., emergence, growth, maturity and decline—and their features. However, the researcher argues if this theory is still effective when it assists interpreting the SFSC evolutions in Bainiu village, considering the challenges brought by complex local context. First, because of local SFSC managers' affective thinking, identifications of the evolving status of local e-commerce enabled SFSC become challenging. Overall, instead of rationally consulting the previous operation and comprehensive operational aspects such as demand level and product flow, SFSC managers in Bainiu village are found preferring to base their judgments of supply chain evolution on perceived in-time situations, or even on some strong personal opinions—for example, despite owning both nut roasting and packaging licenses as well as one of the only two nut processing plants in Bainiu village, the interviewee_B defines supply chain evolution in decline stage only because of the temporary difficulty of recruiting talents for strategic planning and the increased competitions in recent

years. In addition, it is observed that such a phenomenon of being affective thinking has not just influenced local managers' judgments of evolution, but also throughout their operational journey from the beginning, hence it is a unique professionality held by SFSC managers in the village as they are never systematically trained by modern industrial knowledge. Furthermore, the researcher suggests being affective thinking has significance since it enables and facilitates the managers' active perception and reflection in practice. This is vital to local SFSC managers as a self-developed solution to underpin their everyday SFSC operations and eventually drive their SFSCs to evolve, and is often cited as "exploration" by local managers when recalling on previous experiences (See Table 40). As stated by interviewee_C:

> "*All difficulties encountered in operation are solved by exploration, after learning a bit of others' operational experiences.*" [Bainiu village, interviewee_C]

Table 40. Examples of exploration practice in Bainiu village

Operational practices	Examples
Hickory nut harvest	"*Exploration is important in mastering how to pick high quality nuts.*" [Bainiu village, interviewee_G]
Packaging	"*All required packaging cans and labels are self-designed and then produced by providers.*" [Bainiu village, interviewee_C]
Product photography	"*I do photography myself if the needed photos are simple; making photos look clear, real and beautiful, this is key to photography.*" [Bainiu village, interviewee_H]
Website traffic investment	"*I make all online marketing plans myself by exploration.*" [Bainiu village, interviewee_D]
Management of nut processing plant	"*My plant management is learnt by exploration and from the regional others.*" [Bainiu village, interviewee_E]

Besides the challenge from local managers' affective thinking, explanatory power of the supply chain evolution theory is also challenged by factors from the material and spiritual sets in local context. In particular, since limited land of Bainiu village has been a main issue that suppresses local managers' operations, hindering them from executing licensed and standardised hickory nut e-commerce practices such as nut roasting and packaging, local majority have to abandon

control of supply chain upstream and thus act as intermediaries in indirect sales, which further forces them to face a series of uncertainties in operation, such as constant price war; destructive competitions; and the township authority's prompt inspections that could stop their operations anytime when license code borrowing is found. These uncertainties have together made local SFSC operations often fluctuate even if many of the majority have actively sought alternative solutions such as establishing cooperative relationships, hence causing difficulty in accurately identifying the evolving status of local e-commerce enabled SFSC by features defined by the supply chain evolution theory; for example, as the theory defined, identifying the supply chain in growth stage by seeing if there has been "*rapidly growing use of the supply chain along with improvements in the performance and stability of supply chain processes and their enabling technologies*" (MacCarthy *et al.*, 2016, p.1700).

Moreover, the researcher suggests that challenges to the supply chain evolution theory as well involve its lack of explanatory power to assist interpreting a special group of SFSC operations discovered in Bainiu village; that is, operations with neither nut roasting nor packaging license and dedicate to short-term operation. Specifically, operations and their managers of this group are well known for being rather simple but effective in practice, as they commit to purely short-term home business and avoid performing any nut processing step, appearing and disappearing anytime during a certain period of the year and profiting by destructive competitions. Such an operational feature has unexpectedly coincided with both features defined by the theory for the supply chains in emergence and decline stages, which are respectively as the begin of life cycle and facing different optional options that are all possible to be exploited in future, and as facing noticeable decline of supply chain throughput (MacCarthy *et al.*, 2016). Furthermore, similar reflection of this unique overlapping of emergence and decline features is also seen in reply of interviewee_I:

> "*Lots of people have been playing opportunistic in e-commerce. They take advantage of the platform's favourable policy for new users, opening new stores and selling low quality hickory nut products at low prices, and then quickly shutting down stores once their target profits are meet. The repeating of such an unprofessional operation causes*

destructive competitions to us long-term managers. However, customers would realise the difference between them and us in the long run, thus trusting us more than before." [Bainiu village, Interviewee_I]

4.3.6 Knowledge acquisition

When the researcher investigates role and impact of the four knowledge acquisition activities—i.e., identifying; creating; storing; and sharing—in the village (See Table 41), the first emerged finding is that instead of acting individually, these four activities strongly interconnect to each other and act synchronically in practice, serving one another as cause and effect. For instance, to acquire better nut roasting knowledge, local managers owing nut processing plant plan visits to regional others' to share understanding of temperature control and flavouring, during which inspirations are identified and contribute to the created new nut roasting technique that is stored in the managers' minds for future sharing and the knowledge utilisation in operation. In other words, these four activities together enable fragmented knowledge contents to be acquired from local context, and then the acquired contents are fully possessed by local managers after being orchestrated into knowledge types according to different orientations—such as digital literacy and hickory nut knowing. Therefore, knowledge acquisition is tightly connected to knowledge possession in practice.

Table 41. Examples of knowledge acquisition

Activities	Features	Examples
Identifying knowledge	● Essential online and offline techniques to reach operation. ● Superior online and offline techniques to reach better-performed operation. ● Significance of individual agency and operational philosophy.	● "*Customers of the nearby regions or of Zhejiang Province prefer unshelled roasted nuts, but customers of the other national regions prefer shelled roasted nuts.*" [Bainiu village, interviewee_F] ● "*Good product quality; good customer services; and staying honest, these are the three vital factors in operating e-store.*" [Bainiu village, interviewee_A]
Creating knowledge	● Online and offline techniques fitting individual demands and situations	● "*Sun-dried bamboo shoots and sweet potatoes, small and medium managers who choose to*

	when in operation. ● Individual agency and operational philosophy.	*keep operating in low seasons sell these two regional products.*" [Bainiu village, interviewee_C] ● "*Lots of small beginners leave their operations in low seasons, working outside the village and etc.; they don't see e-commerce as their priority in life.*" [Daxing'zhuang village, interviewee_I]
Storing knowledge	● Individuals' mechanism. ● Local traditional mechanism. ● Public sector mechanism. ● Private sector mechanism.	● "*I know hickory nuts since my childhood, I can identify good or bad nuts by just looking at them.*" [Bainiu village, interviewee_B] ● "*My present strategic planning is based on my regular study on other big platform competitors.*" [Bainiu village, interviewee_B]
Sharing knowledge	● Sharing within operation. ● Sharing with local others. ● Sharing with broader industrial participants.	● "*I always visit different spice factories to get information, which helps me design flavouring recipes.*" [Bainiu village, interviewee_E] ● "*I am in an online chat group of village colleagues, in which we often share each other latest news about hickory nuts.*" [Bainiu village, interviewee_H]

Furthermore, connection is also identified in between the four knowledge acquisition activities and knowledge utilisation, especially for the three elements underlined by the latter, that is, the elements of innovation; governance and organisational structure; and business model. Overall, this connection is contributed not only by the fact that creating activity of the four has the same innovative and boosting effect with the innovation element of knowledge utilisation, but also by how elements of governance and organisational structure and business model can affect the four in practice. In specific, because of impact of these two elements, operations of e-commerce enabled SFSCs in the village are customer oriented and related to the four operational groups demonstrating varying degrees of institutionalisation. This impact is furthered on knowledge acquisition, giving strong orientations to local managers when they execute the four knowledge acquisition activities—i.e., identifying; creating; storing; and sharing. As a result, acquisition of the fragmented knowledge contents that are customer friendly and fitting to own demands and situations determined by featured operational groups becomes priority to SFSC managers in Bainiu village, triggering utilisation of a series of relevant knowledge in operation, such as

product photography; plant management; and cooperative relationship establishment.

Although the supply chain evolution theory is questioned for its explanatory power in the case of Bainiu village, the four knowledge acquisition activities are suggested to have been deeply connected with the behind solution that underpins local SFSC operations and eventually drives their evolutions—i.e., the exploration meaning maintaining active perception and reflection by being affective in practice. In brief, serving as the two main actions constituting the exploration at the same time, perception and reflection are core components constructing respective natures of the four knowledge acquisition activities, demonstrate that nature of identifying and sharing is the outward motional activities structured on the managers' perceptions of external contents, and nature of creating and storing is the inward emotional activities structured on the managers' reflections of internal contents. This also helps verify the four knowledge acquisition activities being an indispensable part of local SFSC operations since their fundamental mechanisms have been sharing the same actions, hence achieving higher integration degree when in practice.

4.2.7 Summary of hickory nut e-commerce case

For this case analysis of the Bainiu village hickory nut e-commerce, target is set to understand evolution of the e-commerce enabled SFSC in local context through knowledge management viewpoint, which is supported and guided by the conceptual framework previously generated in the literature review chapter. To fulfill the target, a series of analyses are done on local SFSC basics; knowledge possession; knowledge utilisation; supply chain evolution; and knowledge acquisition, therefore generating findings (See Table 42) that assist interpreting the evolutions happened in local context. In summary, in the case of Bainiu village, reaching of the operation of e-commerce enabled SFSC is marked by synchronisation of the six managerial activities and elements for knowledge utilisation, which allows the SFSC operation to have practices and be customer oriented, and continue to operate within a structural framework in local context. Then, although explanatory power of the adopted supply chain theory is verified to be less effective in assisting interpreting the later evolving status after the SFSC operation is reached in Bainiu village, the researcher observes local managers' primary solution to their SFSC operations, that

is, the exploration meaning maintaining active perception and reflection by being affective in practice. More importantly, this solution is proved to have underpinned local managers' SFSC operations since the reaching, because it enables fragmented knowledge contents to be acquired, possessed and utilised to produce practices that are in fact knowledge driven. Last but not least, the researcher identifies significant impact of the factors of complex Bainiu village context on local SFSC operations, which divides the latter into four featured operational groups and could further restrict their evolutions.

Table 42. Main findings of Hickory nut case analysis

Analyses	Findings
Local SFSC basics	● Supply chain structure without the only intermediary is influential in local SFSC operations, due to the license issue and limited land in local context. ● Cooperative relationships are established between the structures with and without the only intermediary, reflecting divide between the four local SFSC operational groups. ● Local context consists of the material and spiritual sets, of which factors significantly influence local SFSC operations, such as the profound industrial basis; license issue; limited land; and rising competitions in the existing e-commerce atmosphere. ● E-commerce platform both empowers and suppresses local SFSC operations.
Knowledge possession	● Due to divide between the four local SFSC operational groups, lots of possessed knowledge types show clear exclusiveness.
Knowledge utilisation	● Local managers develop a shared mindset of how to understand hickory nut e-commerce in practice, i.e., hickory nut e-commerce represents a complex integration of fragmented knowledge components. ● In Bainiu village, synchronisation of all the six managerial activities and elements means reaching the operation of e-commerce enabled SFSC.
Supply chain evolution	● Current supply chain evolution theory unfits to the discussion, since local managers' SFSC operations are influenced by affective thinking; complex local context; and one unique operational group that owns both emergence and decline features. ● "Being affective" reflects local managers' primary operational solution which also drives their SFSCs to evolve, i.e., the practice of exploration meaning maintaining active perception and reflection by being affective in practice.
Knowledge acquisition	● Synchronisation exists between the four knowledge acquisition activities in practice. ● The four activities allow local managers to acquire fragmented knowledge

contents and then orchestrate them by orientations, hence they form into organised knowledge types for being efficiently possessed.

- The exploration practice in local context enables fulfillment of the four activities in operation.

Chapter 5: Cross-case analysis

After within-case analyses of the three cases are accomplished, this chapter moves on to present their cross-case analysis, summarising and comparing the similarities and differences identified across the findings of individual cases. Moreover, as the analysis is arranged along the lines of initial conceptual framework, this chapter begins with the summary and comparison between basics of the e-commerce enabled SFSCs demonstrated in the three cases. Then, it continues to summarise and compares the similarities and differences between the findings of knowledge possession; knowledge utilisation; supply chain evolution; and finally knowledge acquisition.

5.1 Basics of e-commerce enabled SFSC

5.1.1 Supply chain structure

According to the definition, structure of the e-commerce enabled SFSC falls into two types that are either without or with the only supply chain intermediary between producers and customers, and they respectively show in the forms of either direct sales or indirect sales. When in practice, although these two types of structures are all identified in each of the three cases, nevertheless, it is found that operational outcome of the same structure could vary dramatically in respective of different local contexts (See Table 43). The researcher summarises that this is a direct result of the nature of practising local e-commerce and the impact of local context, as practising local e-commerce includes processing of unique local foods and the contents of local contexts with which operations interact are different from each other. Besides, it is suggested that individual manager's operational philosophy and agency contribute to the varying as well, as operational philosophy is found being able to affect the degree to which operation is institutionalised, while agency can help secure that institutionalisation is met in complex local context.

Table 43. Supply chain structures in three cases

Cases	Supply chain structures	Operational details	Operational features
Yuezhuang village of apple e-commerce	Direct sales	Managers rely on own apple orchards to supply customers.	● Operated by local majority. ● Managers gain full control of supply chain upstream—orchard management. ● Because of the mature and long existing offline apple industry, practising apple e-commerce is less demanding in local context.
	Indirect sales	To supply customers, managers play the only supply chain intermediary and they access the suppliers from broader regions.	● Operated by only a small group of local managers. ● Demand investments and high institutionalisation of operation. ● Managers are more driven and have higher agency. ● Generate greater profits.
Daxing'zhuang village of seafood e-commerce	Direct sales	To supply customers, managers rely on the pre-existing offline industrial base—i.e., own aquaculture field and fishing vessels.	● Operated by only few local managers. ● Managers gain full control of supply chain upstream—management of aquaculture field or fishing vessels. ● Managers are more driven and have higher agency. ● Generate greater profits.
	Indirect sales	To supply customers, managers rely on the shared local offline industrial base—i.e., local harbour and regional fishery market.	● Operated by local majority. ● Practising seafood e-commerce is rather demanding; it requires dedication, hard work, financial and time investments. ● Can be either flexible or enterprising based on manager's agency—i.e., low institutionalised or semi-institutionalised operation.
Bainiu village of hickory nut e-	Direct sales	To supply customers, managers rely on the pre-existing offline industrial base and the	● Operated by the only two local managers. ● Managers gain full control of supply chain upstream and also the vital

commerce		licenses for nut roasting and packaging—i.e., own nut processing plant.	downstream practices—i.e., nut roasting and packaging. ● Meet requirements of investments and land use. ● Generate greater profits.
	Indirect sales	To supply customers, managers rely on capacities of the two nut processing plants in Bainiu village or other regional plants.	● Operated by local majority. ● Practising hickory nut e-commerce is rather demanding; it requires various investments, licences for practising nut roasting and packaging, and land use. ● Can be either flexible or enterprising based on manager's agency. By the degree of institutionalisation, local operations of the structure with the only intermediary are divided into three groups—i.e., operations only registered for packaging license; operations with neither license and dedicate to long-term operation; and operations with neither license and dedicate to short-term operation.

5.1.2 Creation of customers' perceived closeness

The creation of customers' perceived closeness is the other defined essence of the e-commerce enabled SFSC apart from the shortened structure. In the previous discussions, evidence shows that the creation is fulfilled through information embedment and the use of various authoritative resources—such as the Protection of Designated Origin (PDO) and the Protected Geographical Indications (PGI). Although such an evidence is traceable in the three village cases, managers' overall awareness of the importance or methods of creating customers' perceived closeness is found being low, reflecting the fact that their experiences of the e-commerce enabled SFSC are primarily based on self practising rather than modern industrial knowledge—for example, for managers in Yuezhuang village, branding is often seen as an unnecessary investment since the fame of "Great Shahe River" apples is believed to be enough to support their communications with customers.

Moreover, when comparing findings from the three cases, the researcher finds that creation of customers' perceived closeness is affected by the feature of food, and it is mainly demonstrated in the cases of Daxing'zhuang village and Bainiu village. In summary, considering the feature of seafoods that their supply often fluctuates with fishery's output, managers of Daxing'zhuang village are found frequently integrating the strategy of customer loyalty into closeness creation, because fostering and maintaining customers' loyalty would help grow regular customers who can stabilise demand and reduce losses brought by fluctuation. Similar effect of the feature of food is demonstrated in Bainiu village. In consequence of the homogeneous feature of hickory nut products that is caused by identical processing steps, closeness creation of local managers has to include diverse marketing strategies and information embedment that promote individual uniqueness, hence fulfilment of the closeness creation in hickory nut e-commerce is the most costly and complex among the three cases.

5.1.3 Interactions with online e-commerce platform

The e-commerce platform is the vital element that distinguishes the e-commerce enabled SFSC from any other types of the SFSC. Therefore, although this research has no intention to focus

on the SFSC's interactions with e-commerce platform but the SFSC's evolution in local context, summary of the interactions still holds meanings especially when related discussion is limited to social media platform (See Section 2.5.2). Overall, after aligning the information offered by managers from the three cases, a strong sign of duality is found in the interactions between the e-commerce enabled SFSC and its e-commerce platform—i.e., Taobao.com. On the one hand, the platform enables operation of the SFSC in the first place and it continues to serve as services provider and the supervisor of common prosperity. On the other hand, nonetheless, the platform is an independent business entity pursuing its own interests, which include but are not limited to profiting by charging managers from their online activities and continuously updating online regulations due to the platform's planned institutionalisation. As a result, local managers keep receiving enabling and suppressing impacts from the platform when in offline operation.

5.1.4 Interactions with offline local context

The local context is the primary scenario in which operation and evolution of the e-commerce enabled SFSC take place. Through summarising and comparing the contents identified across the contexts of three cases, it is found that local context of Taobao villages consists of two sets of contents—i.e., the material and spiritual sets—and they highly connect with and affect each other in practice (See Table 44). More importantly, for the diverse contents of the material and spiritual sets as well as their in-between connections, they not only increase the complexity of local context directly but also deeply interact with managers' SFSC operations and evolutions, exerting enabling and suppressing impacts.

Table 44. Material and spiritual contents in local context of Taobao villages

Sets	Factors	Contents	Impacts
Material set	Quality of available courier services	e.g., Number of local service points; their speed; prices of their services.	● Affect practices of supply chain downstream. ● Increasing local operations lead to services providers' more investments in improving local courier services. ● Facilitated by favourable e-commerce atmosphere.
	Conditions of local transportation	e.g., Design of regional road system; road quality; level of convenience.	● A determinant to efficient operation. ● Increasing local operations lead to government's more investments in public facilities. ● Facilitated by favourable e-commerce atmosphere.
	Development of accessible allied industries	e.g., Processing plants; packaging material providers; storage renting.	● Enable the complete operation of local SFSC. ● Shape and be shaped by the operation of local SFSC. ● Facilitated by favourable e-commerce atmosphere.
	Core facilities to local SFSC operation	Such as local harbour and markets at where critical operational practices take place.	● Enable the complete operation of local SFSC.
	Critical institutions	Institutions that directly affect operation of local SFSC, such as the authority inspecting regional food productions and selling.	● Directly enable or supress the operation of local SFSC.
	Geographical impacts	e.g. Nature endowment; geographical restrictions.	● Enable the operation of local SFSC—such as the forest that supplies raw materials. ● Suppress the operation of local SFSC—such as limited land resources.
	Previous norms and values	e.g. Kinship, neighborship, unity spirit in	● Enable the operation of local SFSC especially when at

Spiritual set		community.	emergence and growth stages of the operation. ● Suppress the operation of local SFSC—such as the strong bond to local context that hinders managers from seeking external opportunities. ● Contribute to favourable e-commerce atmosphere.
	Existing e-commerce atmosphere	Both favourable and competitive local atmosphere.	● Facilitate the operation of local SFSC. ● Facilitate factors in the material set of local context. ● Suppress the operation of local SFSC since e-commerce competitions increase.

5.2 Knowledge possession

5.2.1 Explicit knowledge

According to the definition, explicit knowledge specifies all knowledge types that are articulate and can be detailed. In the three cases of Taobao villages, difference shows as managers of each case possess the food knowledge types that are unique from one another—such as management of apple orchard; management of aquaculture field; and management of nut processing plant. However, besides this difference caused by **knowing of different local foods**, it is found that rest of the explicit knowledge types required for practising the e-commerce enabled SFSC can be divided into three groups, regardless of the varying contexts of three cases. The first group is **digital literacy** and it includes the knowledge around knowing ICTs when in e-commerce practice—such as basics of Internet and computing. The second group is **general operational practices** and it includes the knowledge around knowing of common and shared practices in operation of local SFSC—such as cost allocation and online customer services. The final third group is **managers' exclusive knowledge** and includes the knowledge around fitting demands and situations of particular managers. For instance, for the managers whose operations are more advanced or evolved than others', knowledge around establishing and managing professional operational team has been exclusive to them in local context.

5.2.2 Tacit knowledge

In contrast with explicit knowledge, tacit knowledge specifies all knowledge types that are less tangible and difficult to encapsulate, hence they are often saved in individuals' mind and learnt through reacting to certain situations. By summarising the tacit knowledge identified from the three cases, it is found that they can be categorised into two groups regardless of different local contexts. The first group is **individual agency** and it includes knowledge types that can affect managers' ability to take actions and fulfill intention especially when in complex local context. The second group is **operational philosophy** and it includes knowledge types that contribute to managers' fundamental thinking of how the operations in local context and the one's in them are seen, by which their own operations would be guided. Overall, it is suggested that the tacit

knowledge types included by the two groups could determine quality of managers' operations and further leads to varying operational outcomes. For example, in the third case of the Bainiu village of hickory nut e-commerce, although most managers share the experience of failing to register with nut roasting and packaging licenses, outcomes of their SFSC operations are still varying because of the level of individual agency, which further leads their operations to be divided into featured groups.

5.3 Knowledge utilisation

5.3.1 Managerial activities of structuring, bundling and leveraging

In the resource orchestration theory, conduction of the three managerial activities of structuring, bundling and leveraging is defined as managers' priority when utilising possessed knowledge for value creation. During reviewing replies from the three cases of Taobao villages, it is found that this definition is widely supported by interviewed local managers, which is also a reflection of their shared experience of practising the e-commerce enabled SFSC. To summarise, as long-term engaging in the SFSC, local managers develop a common mindset that nature of the SFSC is the utilisation of fragmented knowledge components. Hence, to fulfill the effective utilisation that ensures positive outcome, the procedure of structuring fragmented knowledge components into oriented bundles for later leveraging is required, and it is carried out in the bottom-up and additive manner (See Figure 21, Figure 22 and Figure 26). Furthermore, the researcher suggests that this procedure also interprets how operation of the SFSC is formed by individual practices in local context, as each of the individual practices that requires local managers to execute can be defined as an oriented bundle of smaller knowledge components, hence the final reach of complete SFSC operation is simultaneously the leveraging outcome of oriented bundles. For example, as a vital practice to form complete operation of the SFSC in the Yuezhuang village of apple e-commerce, orchard management is a bundle of diverse and interrelated knowledge types including apple tree caring, equipment arrangement, etc. Overall, Figure 27 demonstrates the relationship of the three managerial activities—i.e., structuring, bundling and leveraging—when they take effect and produce the individual practices required by the SFSC operation in

local context.

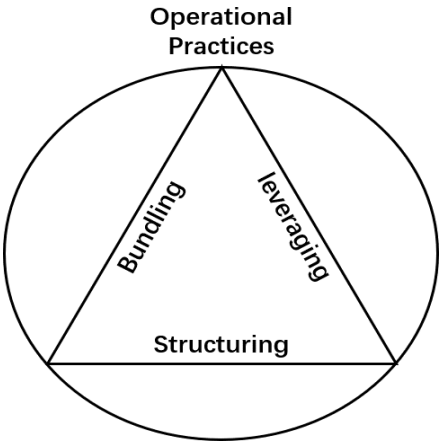

Figure 27. Production of operational practices

5.3.2 Impact of governance and organisational structure

In addition to the three managerial activities, the theory of resource orchestration defines that as a key organisational element, governance and organisational structure has critical impact on managers' knowledge utilisation within the organisation. This definition is verified across the three cases of Taobao villages, and the governance and organisational structure is found playing a new role as the framework within which the SFSC is allowed to stably operate passing the time in local context. In this regard, Table 45 summarises all three types of the governance and organisational structures that are identified from local SFSC operations, showing the feature of being institutionalised to different degrees.

Table 45. Three types of structures in Taobao villages

Structures	Contents	Examples
Institutionalised structure	● The structure is highly stabilised and is supported by advanced equipment, practices, process and the team management arising along with supply chain segmentation. ● Its managers are with high individual agency; professional operational philosophy; and the strong capability to support fulfilling agency and philosophy.	● Local managers who run the long-term and enterprising operation that is with independent workplace and operational team.

Semi-institutionalised structure	● The structure is stabilised and is supported by reliable equipment, practices and process; the structure is testified to long-term operation. ● Its managers are with high individual agency and professional operational philosophy.	● Local managers who run long-term and enterprising home business.
Low institutionalised structure	● The structure is newly established or remains to be stabilised, facing the multiple operational options that can all be explored in future.	● Local managers who run short-term home business or just begin operation.

5.3.3 Impact of business model

Besides the governance and organisational structure, the resource orchestration theory defines the business model as another organisational element that exerts critical impact on managers' knowledge utilisation within the organisation. As committing to emotional proximity through creation of customers' perceived closeness is a main theoretical essence of the SFSC, the role of business model is bound to be key and customer-oriented in operation of the SFSC, and it is verified across the three cases of Taobao villages. To summarise, plenty of evidence shows that numerous and constant efforts are paid by managers to improve customers' experiences—such as recruiting skilful services team; applying customer-friendly policies; etc., making customer related practices a vital part of everyday operation. Such a result not only leads local managers' business model to continuously be customer-oriented but also affects knowledge utilisation and triggers changes to the operation in local context. For instance, customers' feedbacks regarding product quality could lead a manager to improve the original production line or even introduce management of quality control team, hence triggering institutionalisation of the operation.

5.3.4 Impact of innovation

As defined by the resource orchestration theory, innovation is the third organisational element that exerts impact on managers' knowledge utilisation within the organisation. By comparing information of the three cases of Taobao villages, it is found that rather than being independent and radical, innovations taken effect in local managers' operations are primarily adaptive and accumulative. For instance, when operating the SFSC in the Daxing'zhuang village of seafood

e-commerce, local managers are found innovating packaging methods according to the type of seafood and also the season, during which the regional accessible packaging materials and the summary of past experiences play two critical determinants. Similarly, in the Bainiu village of hickory nut e-commerce, due to the difficulties to register with the licenses of nut roasting and packaging, local managers who fail the registration but seek to maintain enterprising operation innovate various strategies to square with the difficulties—such as using simplified processing equipment; selling other local products in low seasons; and cooperating with suppliers. Overall, it is summarised that for innovations taken effect in local managers' operations, they not only bring improvements to operational outcome of the e-commerce enabled SFSC, but also have the significance of stabilising operation of the e-commerce enabled SFSC in local context.

5.3.5 Synchronisation of all six managerial activities and elements

According to the theory of resource orchestration, although each of the six managerial activities and organisational elements is able to take effect alone, potential is fully unleashed when these six are synchronised in practice. The researcher finds that this definition particularly works in the context of Taobao villages where the e-commerce enabled SFSC operates, as reaching the synchronisation in Taobao villages at the same time means local managers reach the complete SFSC operation in local context.

In summary, through local managers' perspective, the first concept that they understand about the e-commerce enabled SFSC is the necessity to produce the fundamental practices that form up the complete operation, and it is enabled via conduction of the three managerial activities—i.e., structuring, bundling and leveraging, during which required knowledge components would be programmed into effective utilisation. Nonetheless, conduction of the managerial activities can only be counted as a beginning, because the formed operation then faces test of the diverse material and spiritual contents reserved in local context, hence it becomes necessary to achieve the framework within which the operation stably operates passing the time in local context. In the cases of Taobao villages, such the framework is achieved via local manager's adoption of the governance and organisational structure that best fits individual demands and situation. For

example, when facing constraint of local limited land, many managers of Bainiu village choose to adopt the structure of home business via which they integrate operation into living space for securing management. Also, it is found that managers' customer-oriented business model and operational innovations participate in the formation and stabilisation of the SFSC operation in the local context of Taobao villages, and they have the capability of facilitating this process.

5.4 Supply chain evolution

5.4.1 Theoretical limitation

Although the supply chain evolution theory is previously justified as suitable to underpin this research in interpreting the SFSC evolution in local context, however, evidence shows that the theory's explanatory power and problem-solving capacity reduce after data collected from the three cases are attached to it. In other words, supply chain evolution theory and its four-staged supply chain lifecycle—i.e., emergence, growth, maturity and decline—are found insufficient to assist this research in understanding the SFSC evolutions identified in Taobao villages, and it could be a consequence of two causes. **First**, since local managers have not received training about modern industrial knowledge and been accustomed to their own affective thinking when in operation, it is common that their supply chain operations are often affected and lead to the varying outcomes that break the law of supply chain evolution theory. For instance, operation of the e-commerce enabled SFSC might suddenly be in decline stage in Taobao villages, only because its manager decides to temporally leave or stop the operation for dealing family issues. Additionally, being accustomed to affective thinking means that local managers are unfamiliar with objectively consulting previous details—such as demand level, product flow, etc.—when judging their present operations, thus it brings challenges to identifying the evolving status of their SFSCs. **Second**, besides local managers' affective thinking, challenges are found coming from impact of the complex local context. In particular, for the e-commerce enabled SFSCs in Taobao villages, it is found that their operations are seriously affected by the diverse material and spiritual contents of local context, which include but not limited to the nature of practising local e-commerce; inspection of local authority; the existing e-commerce atmosphere; and the

previous norms and values. For instance, due to having strong bond to village, a manager from the Bainiu village of hickory nut e-commerce gives up the opportunity to move to the regional industrial park that could help the manager gain better business development and operational outcome.

5.4.2 Driving local operation and evolution

Despite challenges, difference between the supply chain evolution theory and the situations in Taobao villages triggers the discovery of local managers' self-developed solution to the SFSC operation in local context, and it drives the SFSC to evolve passing the time—i.e., maintaining active perception and reflection by being affective in practice. During interviews, this solution is frequently referred as the term "exploration" by managers of all three cases, showing the fact that since not being trained with modern industrial knowledge, local managers strengthen the role of affective thinking to facilitate their perception and reflection of the diverse contents of local context, therefore it assists them in producing and continuously improving the practices required by the operation. Overall, the researcher suggests that this self-developed solution is competitive to the modern industrial one as it proves its efficiency by long-term underpinning the SFSC operations in Taobao villages.

5.5 Knowledge acquisition

In the initial conceptual framework, the four knowledge management activities of Chaffey *et al.* (2015)—i.e., identifying, creating, storing and sharing—are introduced to explain managers' knowledge acquisition happened in local context, which is then verified after data of the three cases of Taobao villages are attached back to the framework. Also, when comparing managers' experiences from the three cases, a procedure is found that connects knowledge acquisition and knowledge possession, and it includes two basic steps: first, by the four activities of identifying, creating, storing and sharing, managers are allowed to acquire fragmented knowledge contents from local context—such as last generations' experiences about apple trees and professionals' suggestions of fertilising; then, the acquired fragmented contents are orchestrated into varying

knowledge types that have different orientations—such as apple tree planting and pruning, thus they are easier to be effectively possessed and managed for later utilisation.

Moreover, when comparing managers' experiences from the three cases, the four activities that explain knowledge acquisition are found connected with managers' self-developed solution for the SFSC operation and evolution in local context of Taobao villages—i.e., maintaining active perception and reflection by being affective in practice. To summarise, the four activities share the two fundamental actions with the self-developed solution—i.e., actions of perception and reflection. Considering nature of the four activities, identifying and sharing mean the outward motional activities structured on managers' perceptions of external contents, while creating and storing mean the inward emotional activities structured on the managers' reflections of internal contents. Such a definition shows how the four activities have highly integrated with managers' operation of the e-commerce enabled SFSC in local context, which is also the main reason that managers have been executing knowledge management in Taobao villages without noticing.

5.6 Summary of cross-case analysis

Before entering the next discussion chapter,

Table 46 demonstrates the summary of this cross-case analysis of the three cases—i.e., Yuezhuang village of apple e-commerce; Daxing'zhuang village of seafood e-commerce; and Bainiu village of hickory nut e-commerce, which benefits addressing the three research questions and proposing research propositions.

Table 46. Summary of cross-case analysis

Contents	Elements	Yuezhuang village of apple e-commerce	Daxing'zhuang village of seafood e-commerce	Bainiu village of hickory nut e-commerce	Summary
Basics of e-commerce enabled SFSC	Supply chain structure	● Direct sales is in the majority.	● Indirect sales is in the majority.	● Indirect sales is in the majority.	The nature of practising local e-commerce; impact of local context; and manager's operational philosophy and agency, these factors affect operational outcome of the same structure but in different local contexts.
	Creation of customers' perceived closeness	● Direct communications and brand effect.	● Direct communications and brand effect. ● Growing regular customers.	● Direct communications and brand effect. ● Information embedment.	The feature of food affects creation of customers' perceived closeness.
	Interactions with online e-commerce platform	● Platform enables and suppresses operation.	● Platform enables and suppresses operation.	● Platform enables and suppresses operation.	Professional e-commerce platform shows duality when interacting with managers' operations.
	Interactions with offline local context	● Local context consists of material and spiritual sets.	● Local context consists of material and spiritual sets.	● Local context consists of material and spiritual sets.	Contents of the material and spiritual sets highly connect with and affect each other; they are the reason for complex local context, and they exert enabling and suppressing impacts on the SFSC.
Knowledge possession	Explicit knowledge	● Four groups are found in possessed explicit	● Four groups are found in possessed explicit	● Four groups are found in possessed explicit	Knowing of local foods; digital literacy; general operational practices; and

		knowledge.	knowledge.	knowledge.	particular managers' exclusive knowledge, these are the four groups of explicit knowledge possessed by local managers.
	Tacit knowledge	● Two groups are found in possessed tacit knowledge.	● Two groups are found in possessed tacit knowledge.	● Two groups are found in possessed tacit knowledge.	Manager's agency and operational philosophy, these are the two groups of tacit knowledge possessed by local managers.
Knowledge utilisation	Managerial activities of structuring, bundling and leveraging	● Directly support formation of the operation.	● Directly support formation of the operation.	● Directly support formation of the operation.	Structuring, bundling and leveraging knowledge, execution of these three activities produces the practices required by the operation in local context.
	Impact of governance and organisational structure	● Operations with institutionalised structure. ● Operations with semi-institutionalised structure.	● Operations with institutionalised structure. ● Operations with semi-institutionalised structure.	● Operations with institutionalised structure. ● Operations with semi-institutionalised structure. ● Operations with low institutionalised structure.	The governance and organisational structure enables the framework within which the operation can stably operate passing the time in local context. A total of three types of structures are found, and they are institutionalised to different degrees.
	Impact of business model	● Customer-oriented business model.	● Customer-oriented business model.	● Customer-oriented business model.	Business model of the operations in Taobao villages is customer-oriented. Customer-oriented business model affects the operation, leading it to be customer focused.

	Impact of innovation	● Innovation has positive impact on operation.	● Innovation has positive impact on operation.	● Innovation has positive impact on operation.	Innovation improves and stabilises the operation.
	Synchronisation of all six managerial activities and elements	● Synchronisation leads to the operation in local context.	● Synchronisation leads to the operation in local context.	● Synchronisation leads to the operation in local context.	For the synchronisation of managerial activities and impacts of organisational elements, it means reaching the complete operation in local context.
Supply chain evolution	Theoretical limitation	● The theory is found insufficient when in the case.	● The theory is found insufficient when in the case.	● The theory is found insufficient when in the case.	Managers' affective thinking and impact of complex local context, these two factors cause reduce of the explanatory power and problem-solving capacity of the supply chain evolution theory.
	Driving local operation and evolution	● Being affective is important in operation.	● A self-developed solution to the operation.	● A self-developed solution to the operation.	Maintaining active perception and reflection by being affective in practice; this is managers' self-developed solution to the operation in local context.
Knowledge acquisition	Identifying, creating, storing and sharing knowledge	● The four activities explain knowledge acquisition in the case.	● The four activities explain knowledge acquisition in the case.	● The four activities explain knowledge acquisition in the case.	Knowledge acquisition consists of two basic steps in local context: execution of the four activities and then orchestrating acquired knowledge into oriented types for possession. The four activities and the self-developed solution are highly integrated when in practice.

Chapter 6: Discussion

By reflecting on the summary of cross-case analysis, this chapter moves on to address the three research questions designed at the beginning, that are, "*How does knowledge management help to explain the evolution of the e-commerce enabled SFSC?*"; "*How do knowledge management activities affect the evolution of the e-commerce enabled SFSC in a local context?*"; and "*How could findings from case studies in Taobao villages contribute to SFSC research?*". In doing so, this chapter first refers to the local mechanism of supply chain operation and evolution that emerges from the three cases to address the first question. Then, to address the second question, it discusses the effect of knowledge acquisition activities on the operation and evolution of the SFSC in local context, hence revealing the shaping and being shaped relationship between the SFSC and the diverse contents of complex local context. Last but not least, through underlining the spatial and temporal concepts embodied in case interpretations, the researcher proposes the potential topic of interpreting supply chain from the lens of space and time, which at the same time addresses the third question.

6.1 local mechanism of supply chain operation and evolution

In this research, introductions of the perspective and theories of knowledge management have allowed the researcher to interpret the knowledge management activities happened in the three cases of Taobao villages, which hence causes a local mechanism of supply chain operation and evolution to emerge to the surface, and understanding of this mechanism will address the first research question, that is, "*How does knowledge management help to explain the evolution of the e-commerce enabled SFSC?*".

First, structure of this mechanism is found being well in line with the value creation process of the knowledge-based view (KBV), since it demonstrates the same route of possessing and then utilising knowledge that ends with the created operational value of the SFSC. In reality, such a structure originates from the process that after the disruptive e-commerce enters local context, local residents who are encouraged by profits quickly transform themselves into managers and

begin committing to their SFSC operations, during which a number of managers' managerial activities and the organisational elements of supply chain would take effect, thus they play the critical part of the mechanism. These activities and elements are found highly overlapping the ones defined by the resource orchestration theory, which include the three managerial activities of structuring, bundling and leveraging knowledge that work coherently in practice, as well as the three organisational elements that exert impacts on securing the SFSC operation in complex local context—i.e., governance and organisational structure, business model and innovation.

To summarise, in local contexts of Taobao villages, execution of the three managerial activities of structuring, bundling and leveraging knowledge is found indicating the production of each of the individual practices required by the complete SFSC operation in local e-commerce. This is because the nature of committing to the SFSC operation involves a series of the utilisations of fragmented knowledge components, and execution of the three managerial activities helps accomplish the utilisations in the bottom-up and additive manner. Nonetheless, simply forming up the complete SFSC operation using produced practices does not mean that the SFSC is now testified to long-term operation and evolution, especially when it has to from time to time face with the enabling or supressing effect of the complex material or spiritual contents reserved in the context of Taobao village. Therefore, achieving a framework within which the SFSC stably operates passing the time in local context is essential to managers, and such a framework can be achieved by having the governance and organisational structure that fits different demands and situations. Also, business model and innovation are the other two organisational elements that are found essential to securing the long-term operation and evolution, since having a clear customer-oriented business model can help the SFSC operation retain its theoretical essence of creating customers' perceived closeness, and innovations can not only bring improvements to the operation but also stabilise it by helping tackle difficulties and challenges. Overall, similar to another definition of the resource orchestration theory, only until these managerial activities and organisational elements synchronously take effect in operation, the SFSC is both complete and prepared to operate and evolve in the context of Taobao villages. Following this conclusion, the researcher proposes the first two propositions in this discussion chapter:

Proposition 1*: For operation and evolution of the e-commerce enabled SFSC in complex local context, it demonstrates the value creation process underpinned by manager's possession and utilisation of knowledge.*

Proposition 2*: The e-commerce enabled SFSC becomes testified to the operation and evolution in complex local context, after manager's managerial activities and organisational elements of supply chain synchronously take effect in operation.*

Apart from the verified knowledge possession and utilisation, local mechanism and its working are found being highly associated with managers' self-developed solution to the operation and evolution of the SFSC, as well as with managers' individual agency and operational philosophy. First of all, because managers of Taobao villages have not be trained by any modern industrial knowledge from the beginning, their executions of knowledge possession and utilisation during operation and evolution are primarily driven by a self-developed solution instead of knowledge management theories. This self-developed solution originates from managers' shared summary of the day-to-day experiences of participating in the e-commerce enabled by Taobao.com, and it is frequently referred as the term "exploration" by managers. Based on the evidence collected from the three cases, the researcher attempts to capture essences of the self-developed solution and proposes its definition as "maintaining active perception and reflection by being affective in practice." In this definition, essences are presented as "perception", "reflection" and "being affective", among which "perception" and "reflection" are the two fundamental behaviours to form the solution whilst "being affective" describes the way to practise it. This definition shows strong connection with knowledge possession and utilisation, as execution of either of the latter two requires managers to first perceive the surrounding contents of complex local context and reflect on own demands and situations. Such a connection also explains why some of the SFSC operations are easily disturbed by managers' need of dealing with family issues and hence stop following the four-staged lifecycle of the supply chain evolution theory, as family issues have been one of the important contents of Taobao villages that managers would affectively perceive and reflect when in operation.

While knowledge possession and utilisation are driven by managers' self-developed solution and therefore allow the SFSC to have complete operation and evolve in complex local context, it is then identified that managers' individual agency and operational philosophy play the two influential determinants of this value creation process, which makes them another critical part of local mechanism. To summarise, the researcher defines managers' individual agency as the ability to take actions and fulfil operational intention especially when in complex local context, and its effect takes place since managers decide to commit to the SFSC operation and it would continue throughout the SFSC operation and evolution. For managers' operational philosophy, the researcher defines it as the fundamental thinking of how the operations in local context and the one's in them are seen, hence it brings the effect of enabling managers to generate the big picture thinking by which the SFSC operation and evolution are guided. As a result, following conclusion of managers' individual agency and operational philosophy, the third proposition is proposed below:

Proposition 3*: For operation and evolution of the e-commerce enabled SFSC in complex local context, managers' individual agency and operational philosophy are the two determinants of its outcome.*

For the local mechanism of supply chain operation and evolution, having the evaluation method that allows the operational and evolving outcomes to be evaluable in practice is the most critical part that shall be included. Although the introduced supply chain evolution theory and its four-staged lifecycle are found insufficient to assist understanding such a method in the context of Taobao villages, the theory's adoption in case interpretations not only triggers the discovery of managers' self-developed solution to the SFSC operation and evolution, but it also helps define a potential evaluation method using the stage thinking. In consequence, based on the evidence collected from the three cases, the researcher defines that while being in the context of Taobao villages, operational and evolving outcomes of the SFSC can be classified by the stage to which the SFSC operation is institutionalised, and it includes the low institutionalised stage; the semi-institutionalised stage; and the institutionalised stage. To summarise, for the SFSCs in the first low institutionalised stage, their operations are often newly formed in local context and their

managers face diverse evolving options that can all be exploited in future. Then, for the SFSCs evolved to the second semi-institutionalised stage, their operations become much more stable and mature in local context and their managers are featured by higher individual agency and enterprising operational philosophy. Next, for the SFSCs evolved to the third institutionalised stage, their operations become most advanced in local context and their managers are featured by highest individual agency and professional operational philosophy. By referring to the three defined evolving stages, the researcher proposes the fourth proposition as followed:

Proposition 4*: In the context of Taobao villages, operational and evolving outcomes of the e-commerce enabled SFSC include three stages: the first low institutionalised stage; the second semi-institutionalised stage; and the third institutionalised stage.*

6.2 Knowledge acquisition activities in local context

Along with the local mechanism of supply chain operation and evolution, effect of knowledge management activities on communicating supply chain and local context as well emerges from the case interpretations. In particular, it is found that the four introduced knowledge acquisition activities—i.e., identifying, creating, storing and sharing—have been enabling the shaping and being shaped relationship between the diverse contents of complex local context and the SFSC operation and evolution. All in all, understanding of this relationship helps address the second research question—i.e., "*How do knowledge management activities affect the evolution of the e-commerce enabled SFSC in a local context?*"

The four knowledge management activities of Chaffey *et al.* (2015)—i.e., identifying, creating, storing and sharing—are introduced to this research due to the demand of explaining managers' knowledge possession in the SFSC operation and evolution. In consequence, not only their role in allowing knowledge to be possessed is verified in the three cases, their effect of enabling the shaping and being shaped relationship between the contents of local context and the SFSC is also found. In summary, for the relationship of the contents of local context shaping the SFSC, it arises when managers execute the four activities to acquire fragmented knowledge contents from local context and orchestrated them into oriented knowledge types for possession, during

which the diverse material or spiritual contents of complex local context will largely determine the result of managers' knowledge possession and utilisation, and hence they further shape the outcome of SFSC operation and evolution. Then, the shaped outcome of SFSC operation and evolution would trigger impacts on the material or spiritual contents of complex local context, adding new contents or changing the existing ones—such as new material techniques or more favourable local spiritual atmosphere, which hence leads to the relationship of the contents of local context being shaped by the SFSC. Overall, following this conclusion of relationship, the researcher proposes the fifth and sixth propositions as below:

Proposition 5*: In complex local context, managers' execution of knowledge acquisition enables contents of local context to shape operation and evolution of the e-commerce enabled SFSC.*

Proposition 6*: In complex local context, managers' execution of knowledge acquisition enables operation and evolution of the e-commerce enabled SFSC to shape contents of local context.*

Besides the shaping and being shaped relationship, another important conclusion about the four knowledge acquisition activities is their strong connection or integration with managers' self-developed solution to the operation and evolution of the SFSC when in practice. To summarise, while reviewing definition of managers' self-developed solution—that is, "maintaining active perception and reflection by being affective in practice.", it is found that the four activities of knowledge acquisition and the solution share the same fundamental behaviours as "perception" and "reflection", because the nature of identifying and sharing activities can be understood as the outward motional activities structured on managers' perceptions of external contents, and the nature of creating and storing activities can be understood as the inward emotional activities structured on the managers' reflections of internal contents. In consequence, by combining this conclusion with the previous conclusion about managers' self-developed solution (see after the Proposition 2), the researcher proposes the seventh proposition as followed:

Proposition 7*: In the context of Taobao villages, executions of the acquisition, possession and utilisation of knowledge are driven by the managers' self-developed solution to operation and evolution of the e-commerce enabled SFSC.*

6.3 Spatial and temporal concepts in Taobao village cases

In this research, three cases from Taobao villages are chosen to serve understanding evolution of the e-commerce enabled SFSC in local context. Nonetheless, apart from serving fulfilment of research goal, it is found that findings from the three cases could reveal a broader topic about how to rethink the SFSC from the perspective of space and time, and it helps address the third research question, that is, "*How could findings from case studies in Taobao villages contribute to SFSC research?*". Essentially, despite adoption of the knowledge management perspective, the generated findings have led the researcher to pursue the deeper rethinking of the essence of SFSC, which could benefit preparing the future discussion regarding theorisation.

In summary, after reflecting on the operations and evolutions in the three cases, it is found that committing to the SFSC first requires managers' mobilisation of the diverse pre-existed spatial contents which are featured by being static and material in local space—such as apple orchard, fishery and forests. In other words, once the pre-existed contents are mobilised by the intention of managers, meaning of the SFSC is conceived and thus the establishment of SFSC operation in local space. Then, moving to the temporal aspect, during managers' mobilisation of the static and material spatial contents, a series of motive activities are required to take effect in practice. These motive activities are featured by being produced through temporal accumulations—such as apple orchard management, seafood sourcing and cooperative nut processing, during which managers continue perceiving and reflecting on their day-to-day experiences and surroundings passing the time in local space. In conclusion, the researcher suggests that for such a rethinking of the SFSC from the perspective of space and time, it has provided a more independent base on which the future discussion regarding the theorisation of SFSC can be structured, therefore reducing the negative impacts existing in supply chain research that the practice of supply chain is long-term interpreted as the hybrid of cross-disciplinary knowledge (Halldórsson *et al.*, 2007; 2015).

6.4 Revised conceptual framework

Finally, based on the proposed seven propositions, the researcher revises the initial conceptual framework (See Figure 14) and transforms it into the framework displayed in the Figure 28. To summarise, the revised framework not only verifies the value creation process underpinned by managers' possession and utilisation of knowledge in local context (P1 and P2), but also defines the two managers' factors affecting the SFSC operation and evolution (P3); the three potential evolving outcomes of the SFSC operation in local context (P4); the shaping and being shaped relationship between the contents of local context and the SFSC operation and evolution, which is enabled by activities of knowledge acquisition (P5 and P6); and the managers' self-developed solution to the SFSC operation and evolution in local context (P7). Overall, these demonstrated activities, factors, the relationship and the operational solution and outcomes together comprise a local mechanism of supply chain operation and evolution.

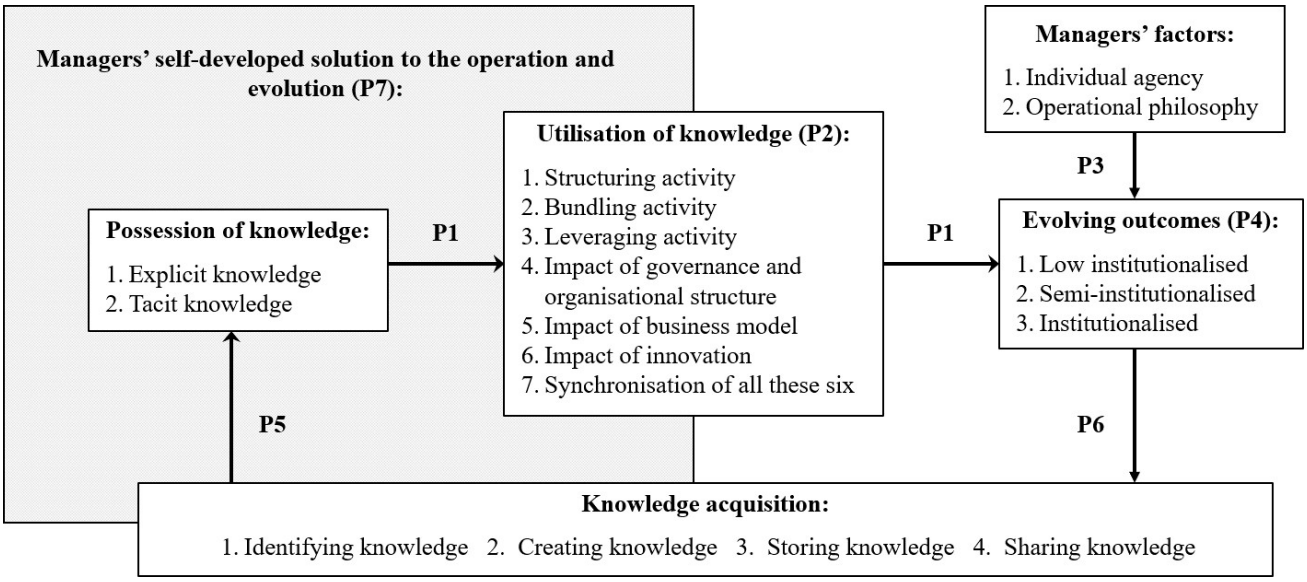

Figure 28. Revised framework of local operation and evolution mechanism

Chapter 7: Conclusion

In this conclusion chapter, the primary theoretical and practical contributions of this research are introduced, which is then followed by the presentations of limitations and the suggestions for future research.

7.1 Contribution to theory

This research first makes notable contributions to the theory of SFSC because it offers a new SFSC definition; facilitates discussion of the e-commerce enabled SFSC—a particular type of the SFSC; and helps theorise the experiences in China for the more comprehensive theoretical development of the SFSC. Overall, as being created to reflect a variety of social meanings or criteria (Jarzębowski and Bezat, 2018), the confusion of how to define the SFSC arises and is identified during literature review. In response, based on the reviewed literature, the researcher investigates initial creation of the SFSC concept and therefore discovers and defines the dual proximity as the SFSC essence—i.e., the supply chain and emotional proximities, after which it is combined with the reflection on previous definitions and enables a new SFSC definition to be designed and proposed (See Section 2.5.1). Further to the literature review of SFSC, as it is discovered that only ten out of the total 151 papers refer to the e-commerce enabled SFSC, this research intends to make contribution to the discussion of e-commerce enabled SFSC, and hence providing interpretation and understanding of a local operation and evolution mechanism of the e-commerce enabled SFSC. Also, in contrast to the previous theoretical development of the SFSC that is grounded in the cases from developed European countries, this research sheds light on the experiences of Taobao villages from China, which then enables an insight into the difference between the contents of developed countries and that of developing countries.

The research of Taobao villages is another topic to which this research makes contribution, and it includes promoting supply chain discussion; identifying impact of managers' factors on local operation and evolution; and identifying the relationship of shaping and being shaped between contents of local context and local operation and evolution—although the possible relationship

between the villages and local context is referred in the report of Alibaba Group (Aliresearch, 2020), no previous effort is found being made by neither the Alibaba Group nor researchers to further study and summarise it. In this research, based on findings from the three village cases, it is then identified that managers' execution of the four knowledge acquisition activities—i.e., identifying, creating, storing and sharing—is the main reason to the shaping and being shaped relationship between local context and the operation and evolution in Taobao villages.

Furthermore, this research contributes to the theoretical development of the knowledge-based view (KBV) because it summarises and provides solutions to limitations of the latter. Through performing literature review of the KBV, it is found that apart from the lack of the explanation on how managers' possessed knowledge is utilised in practice (Sirmon *et al.*, 2011), the KBV faces two other limitations and they include the lack of defining the knowledge to be possessed and the lack of explaining how possessed knowledge is acquired in the first place. In response, the work of Chaffey *et al.* (2015) from the knowledge management field is introduced to assist solving the limitations, which then leads their four knowledge management activities—that are, identifying, creating, storing and sharing—to be referred to assist explanation of the managers' knowledge acquisition. As a result, the researcher not only verifies effect of the four activities on enabling managers to acquire fragmented knowledge contents from local context and then orchestrate them into oriented knowledge types for possession, but also finds that knowledge storing could take effect via individuals' mechanism; local traditional mechanism; public sector mechanism; and private sector mechanism, while knowledge sharing could take effect when managers communicate with local others; with broader industrial participants; and within own operation.

In addition to the above contributions, the most important contribution of this research is made to the supply chain evolution theory, after which the researcher reflects on the three cases and therefore finds that the theory's explanatory power and problem-solving capacity reduce when facing the complex context of Taobao villages. Overall, when in previous analyses of the three cases, the researcher finds that for the supply chain evolution theory that has been grounded in

researchers' case study experiences of modern industries (MacCarthy *et al.*, 2016), its defined four-staged lifecycle—i.e., the four stages of emergence, growth, maturity and decline—faces limitation when assisting identification and interpretation of the SFSC evolutions happened in Taobao villages, and it is mainly caused by two reasons. **First**, as local managers have not be trained with modern industrial knowledge from the beginning, operation and evolution of the SFSC in Taobao villages are easily affected by managers' affective thinking. **Second**, because of the suppressing effect of the material or spiritual contents of the context of Taobao villages, operation and evolution of the SFSC are often hindered from regularly evolving. In this regard, after further summarising findings of case analyses, the researcher proposes that in the context of Taobao villages, operational and evolving outcomes of local SFSC can be classified by the degree to which operation is institutionalised, including the first low institutionalised stage; the second semi-institutionalised stage; and the third institutionalised stage.

7.2 Contribution to practice

The practical contribution of this research shows in two levels, that are, the manager level and the policy maker level. For the manager level, this research not only informs managers of the significance of supply chain management in everyday operation, but also allows them to realise the impacts that the material or spiritual contents of local could have on their operations, hence inspiring them to solve operational issues from different angles. Also, findings of this research provide managers with a local mechanism of supply chain operation and evolution which they can consult in practice; for example, managers can adopt the knowledge management activities and the self-developed operational solution that comprise the local mechanism directly in their supply chain operations. Furthermore, as the findings disclose the important roles of individual agency and operational philosophy in practice, this research as well allows managers to realise the significance of committing to long-term self-development when in operation.

Moving on to the policy maker level. For those policy makers who face challenging governance of local e-commerce, this research not only introduces to them the e-commerce enabled SFSC as an effective practice that can be locally promoted to facilitate e-commerce development, but

it also allows them to achieve a deeper understanding of how diverse contents of local context and managers' operations can shape and be shaped by each other and hence deliver positive or negative outcomes, which would then support policy makers' policy making and assist them in making accurate and focused policies for solving faced challenges. Additionally, for the policy makers who pursue the more active and efficient governance over local operations, they would benefit from learning a series of practical insights specified in this research. For example, when verifying role of the four knowledge acquisition activities—i.e., identifying, creating, storing and sharing—in enabling shaping and being shaped relationship, this research further specifies that when in practice, storing knowledge could be processed in individuals' mechanism; local traditional mechanism; public sector mechanism; and private sector mechanism, while sharing knowledge could take place within the operation; with local others; and with broader industrial participants.

7.3 Limitations

Apart from the theoretical and practical contributions, this research has limitations in its design and practice stages, as well as in its theoretical discussion. **First**, considering the confusion and debates arose in the past theoretical development of the SFSC—such as changes of terminology; definition confusion; and non-English literature, it becomes challenging for the researcher to capture the literature of SFSC thoroughly and comprehensively, therefore it causes unavoidable effects when constructing the theoretical discussion on which the essence and definition of the SFSC are identified and proposed. **Second**, because of being designed to adopt interpretivism and case study methodology, this research inherits their primary limitation as being subjective and having bias on behalf of either the researcher or the interviewed local managers from who data are collected for interpretation. In consequence, although this research in the end proposes a local mechanism of supply chain operation and evolution, it is suggested that the mechanism remains to be examined for its potential generalisation, hence this research is still about raising research awareness of the SFSC and facilitating its future discussion. **Third**, conduction of this research has the limitation caused by external pressures since it is conducted in the time of the COVID-19 pandemic, and it as well faces several changes of supervisory team; research topic;

complementary theories; and case sampling during the researcher's third-year PhD study. All in all, the COVID-19 pandemic and its caused lockdowns and travel restrictions have together hindered the researcher from developing skills and experiences through the planned in-person fieldwork and observations, and all those unexpected changes happened in the third year have caused the researcher's pressures to accomplish this research on a limited timescale.

7.4 Future research

In this research, a number of opportunities for future discussions emerge. **First**, it is found that despite the debates and confusion arose in the past development of SFSC, the flourishing SFSC practices have encouraged enthusiasm of European developed countries and made them view the SFSC as a key solution to integrate food provision with sustainability. Such an imbalance observed between theoretical and practical developments of the SFSC has indicated an urgent demand of strengthening the theoretical discussion of SFSC, which could be solved by a joint research project of literature review that comprehensively reviews literature of the SFSC from its beginning—including the non-English literature, clarifying the theoretical route of SFSC so that helps researchers and policy makers to forecast or plan future research directions. **Second**, for the local operation and evolution mechanism proposed in this research, although it has no intention to be representative due to influence of the adopted stance of interpretivism, however, the researcher suggests that such a mechanism grounded in analysis of first-hand data is still eligible to examinations, especially when it is capable of enabling a framework that consists of the activities and solution to facilitate research discussion.

Third, although this research has focused on understanding the relationship between complex local context and the operation and evolution of the e-commerce enabled SFSC, it is found that contents of e-commerce platform have critical impacts on the SFSC operation and evolution as well, which could be observed in the platform's ability to both enable and suppress managers' operation. In this regard, future researchers can continue to discuss and reveal how contents of e-commerce platform affect managers' operation. **Fourth**, when analysing the three cases, it is found that the spatial and temporal concepts emerged from case interpretations could reveal a

broader topic about how to rethink the SFSC from the perspective of space and time. On the one hand, operation and evolution of the SFSC can be viewed as the outcomes after managers mobilise the diverse static and material contents of local space, such as the contents of resource endowment, public infrastructures and equipment. On the other hand, to mobilise local spatial contents, managers need to execute the motive activities that can be viewed as the products of temporal accumulations, such as the activities of innovating, establishing cooperative relations and practising techniques. As a result, this research calls for the researchers who are specialised in spital and temporal discussion to develop exclusive in-sight into nature of the operation and evolution of the SFSC, which could lead to a more independent SFSC research in future.

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Appendix

Appendix A. Examples of secondary data

Information on local government website

数据平台PC 端及“丰县农务通”APP

目前，丰县智慧农业大数据已建成丰县农业大数据门户网站、丰县智慧农业大屏数据分析平台、生猪产业大数据分析平台、丰县农业资源数据概览云图、丰县农业经营主体云图，并实现了系统之间的共享互通，为丰县农业科技创新、产城融合发展提供了科学的数据支持。除此之外，县级层面还创建了“丰县智慧农业综合管理服务平台”，为“三农”提供专业服务、公共服务和综合支撑。

Materials provided by local e-commerce association

Provided photo of a local hickory nut plant

Appendix B. Examples of ethics plan

THE UNIVERSITY of York

ELMPS Ethics Committee
SUBMISSION FORM
(Version as of 1 July 2018)

This form is intended to enable you and the Committee to ensure that your proposed research is compliant with the relevant codes of practice and ethical guidelines. The University recognises its obligation to the wider research community and to society as a whole to uphold the integrity of academic research. The University also has a responsibility to ensure that the funds it receives are spent in accordance with the legitimate expectations of the funding providers and the law and in the public interest. The University formally endorses the UUK Concordat to Support Research Integrity (2012).

Please ensure that you are familiar with the University's Code of Practice on Research Integrity and the University Data Management Policy as well as any relevant professional guidelines for your discipline (e.g. the Statement of Ethical Practice for the British Sociological Association) or funding organisation (e.g. ESRC Framework for Research Ethics). Useful links include:

https://www.york.ac.uk/staff/research/governance/policies/ethics-code/
https://www.york.ac.uk/staff/research/governance/policies/research-code/
http://www.esrc.ac.uk/about-esrc/information/framework-for-research-ethics/
http://www.britsoc.co.uk/about/equality/statement-of-ethical-practice.aspx
http://www.york.ac.uk/about/departments/support-and-admin/information-directorate/information-policy/index/research-data-management-policy/

Please ensure, **prior to your submission of this form**, that you have consulted the University's guidance on data protection and the General Data Protection Regulation, available at: http://www.york.ac.uk/recordsmanagement/dp/

Internet research may involve new and unfamiliar ethics questions and dilemmas. A good place to start is with the Association of Internet Researchers 2002 Guidelines and the BPS 'Conducting Research on the Internet: Guidelines for ethics practice in psychological research online (2007)'.
Note: If you are collecting data from NHS patients or staff, or Social Service users or staff, you will need to apply for approval through the Integrated Research Application System (IRAS) at https://www.myresearchproject.org.uk/Signin.aspx If you are a staff member please fill in the IRAS form NOT this one. When your IRAS application has been approved you should then send your completed IRAS form to ELMPS. Masters and Undergraduate student applications for approval through IRAS should normally be pre-reviewed by department level ethics committees.

Cover of ethics plan

SECTION 3: DATA PROTECTION

Please ensure you have read the information on data protection at:
https://www.york.ac.uk/records-management/dp/ *before you complete this section*

3.1 Does your project involve personal data (as defined by the General Data Protection Regulation): Yes/No. If yes, please provide a description of the data and explain why you need to collect this data.

Yes, some private data of my research participants are collected for analysis reason. Those data involve the information of their business history, business strategy, and daily business routine. The project needs them to find the social factors that have influenced the evolution of local SFSCs.

3.2 Does it involve special category personal data (as defined by the General Data Protection Regulation): Yes/No. If yes please provide a description of the data:

No special category personal data is required in my research, which include information about participants' health, racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, etc.

3.3. If the research will involve any of the following activities please indicate so and provide further details. Explain how this will be conducted in accordance with the General Data Protection Regulation and the Data Protection Act (and/or any international equivalent)

Electronic transfer of data in any form	Data collected by notes in interviews will be transferred into digital forms and then saved in my laptop (protected by passwords), as well as being transferred to the filestore provided by the UoY secure server for future analysis. All written notes will be scanned and stored electronically as soon as practically possible; after that, hard copies are destroyed by researcher. In all cases, any electronically data stored will be encrypted and password protected and that all data is transferred to the UoY secure server as soon as possible. The supervisory team of mine would access to those data as well to supervise my research. According to the RDM policy, all data including written notes, audio recordings and their transcriptions are

Data protection method

funder

Funder (if applicable):

4. Other Jurisdictions:

Please indicate whether your proposal has been considered by any other bodies:

☐ External Sponsor

☐ Another University of York Ethics Committee

☐ NHS Research Ethics Committee

5. Declaration:

I confirm that I have read and understood:

√ ☐ the ELMPS guidelines on consent; and

√ ☐ the ELMPS information sheets for researchers working with human subjects;

and

√ ☐ the University of York data protection guidelines.

Signature of applicant: JIN CHEN
(Type name if submitting electronically)

Date: 07/09/2020

I confirm that the applicant and myself have read and understood the ELMPS guidelines on Consent and Data Protection)

Signature of Research Supervisor (if appropriate):
(Electronic signature required)

Bdo. Doherty

Date: 09/09/20

Signatures of supervisory team for ethics plan

Appendix C. A list of agricultural Taobao villages

附表三：农产品百强淘宝村名单

省	市	区	镇/街道	村/社区	主要产品
江苏	宿迁市	沭阳县	颜集镇	堰下村委会	花卉、绿植
江苏	徐州市	丰县	凤城街道	史店村委会	苹果、番薯
江苏	苏州市	相城区	阳澄湖生态休闲区	新泾村委会	大闸蟹
江苏	苏州市	相城区	阳澄湖镇	消泾村委会	大闸蟹
江苏	苏州市	相城区	阳澄湖镇	车渡村委会	大闸蟹
江苏	宿迁市	沭阳县	新河镇	新槐居委会	花卉、绿植
浙江	温州市	鹿城区	藤桥镇	潮济村委会	肉干肉脯
江苏	苏州市	相城区	阳澄湖镇	戴溇村委会	花果茶、大闸蟹
浙江	杭州市	余杭区	仓前街道	连具塘村委会	粽子、大米
浙江	杭州市	临安区	昌化镇	白牛村委会	核桃仁、山核桃
河南	许昌市	长葛市	佛耳湖镇	尚庄村委会	蜂产品
广西	玉林市	北流市	北流镇	新城村委会	桔子、芒果
浙江	杭州市	西湖区	西湖街道	梅家坞村委会	西湖龙井
福建	泉州市	安溪县	城厢镇	过溪村委会	普洱、铁观音
江苏	宿迁市	沭阳县	新河镇	周圈村委会	花卉、绿植
河南	商丘市	夏邑县	何营乡	王营村委会	混合坚果、枣制品
广东	潮州市	饶平县	钱东镇	上浮山村委会	肉干肉脯
江苏	宿迁市	沭阳县	新河镇	沙河村委会	花卉、绿植
江苏	连云港市	赣榆区	海头镇	大兴庄村委会	冻虾、贝类制品
福建	泉州市	安溪县	城厢镇	砖文村委会	铁观音、花果茶
广东	广州市	番禺区	南村镇	里仁洞村民委员会	天然粉粉食品
江苏	宿迁市	沭阳县	新河镇	堰头村委会	花卉、绿植
河南	许昌市	长葛市	大周镇	和尚杨村委会	蜂产品
山东	临沂市	郯城县	马头镇	爱国西村委会	炒花生、豆制品
湖南	岳阳市	平江县	汉昌镇	天岳村民委员会	豆腐干
江苏	宿迁市	沭阳县	新河镇	大营村委会	花卉、绿植

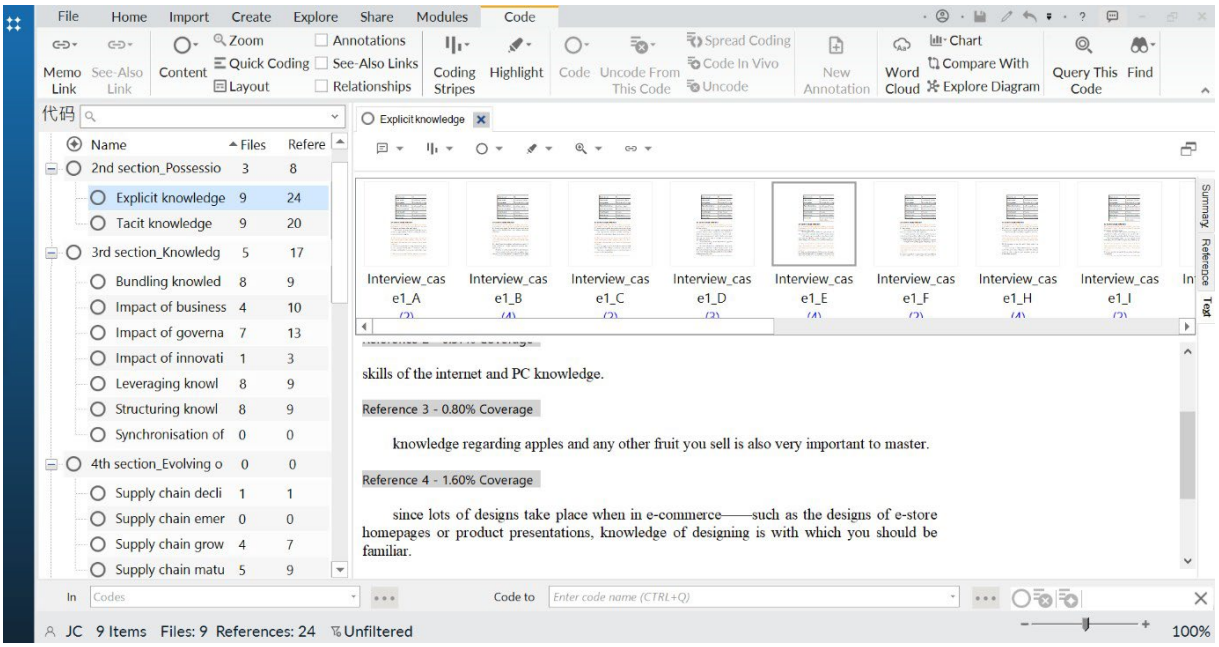
Examples from the list provided by Aliresearch (2020)

Appendix D. Provided table of knowledge utilisation explanation (English version)

Activities and elements	Explanations
Structuring	Knowledge types are acquired, accumulated and divested to form knowledge portfolios. For instance, you form up a set of own processing or production technics by integrating the knowledge types that are acquired from your parents; accumulated from your previous experience; and divested from others' technic sets.
Bundling	Knowledge portfolios are stabilised, enriched and pioneered to form the bundled capabilities of making changes. For instance, after you form up a set of own processing or production technics, you further stabilise, enrich and pioneer this

	set by frequently testing; adding new contents to; and introducing advanced equipment to underpin the set, thus enabling bundled capabilities.
Leveraging	Bundled capabilities are mobilised, coordinated and deployed to form advantages that benefit organisational performance. For instance, you mobilise, coordinate and deploy the enabled bundled capabilities of your technic set for promoting the development of your supply chain.
Governance and organisational structure	Besides the previous three interrelated activities, the governance and organisational structure can directly affect the knowledge utilisation by organisation. For instance, if the governance and organisational structure of your supply chain relay on household processing or production, you could receive timely responses from the participated relatives that might trigger the creation of new knowledge, which is facilitated by your close kinship.
Business model	Similar to the governance and organisational structure, the business model of organisation directly affects the knowledge utilisation as well. For instance, if your business model is consumer-oriented, the feedbacks from Taobao consumers would be the primary source of your knowledge.
Innovation	Innovation is another element that is able to directly affect—or directly trigger—the knowledge utilisation. For instance, you promote your own technic set by innovating new processing or production equipment.
Synchronisation of all six activities and elements	The synchronisation of all the above six activities or elements can significantly unleash the potential of knowledge utilisation. For instance, you synchronise all these exampled activities regarding the formation and promotion of technic set, hence the more significant outcome to your supply chain development.

Appendix E. Data coding using NVivo 12



Coding process

Appendix F. Participant information sheet (English version)

Participant Information Sheet

Background

The University of York would like to invite you to take part in the following research project—"Evolution of the e-commerce enabled short food supply chain (SFSC) in local context: A knowledge management perspective".

Before agreeing to take part, please read this information sheet carefully and let us know if anything is unclear or you would like further information.

What is the purpose of the study?

The study is designed to explore the evolution of e-commerce-enabled short food supply chains (SFSCs) and it involves activity analyses of SFSC participants. The study chooses Taobao villages as research object and it sheds lights in SFSC research, rural governance and information management.

Why have I been invited to take part?

You have been invited to take part because you are identified as an outstanding participant who plays an important role in local SFSCs, which means your business is praised by other locals and you have contributed a lot in local community construction.

Do I have to take part?

No, participation is optional. If you do decide to take part, you will be given a copy of this information sheet for your records and will be asked to complete a participant information form. If you change your mind at any point during the study, you will be able to withdraw your participation without having to provide a reason. You can withdraw your participation up to 3 months after the interview.

On what basis will you process my data?

Under the General Data Protection Regulation (GDPR), the University has to identify a legal basis for processing personal data and, where appropriate, an additional condition for processing special category data.

In line with our charter which states that we advance learning and knowledge by teaching and research, the University processes personal data for research purposes under Article 6 (1) (e) of the GDPR:

Processing is necessary for the performance of a task carried out in the public interest

Special category data is processed under Article 9 (2) (j):

Processing is necessary for archiving purposes in the public interest, or scientific and historical research purposes or statistical purposes

Research will only be undertaken where ethical approval has been obtained, where there is a clear public interest and where appropriate safeguards have been put in place to protect data.

In line with ethical expectations and in order to comply with common law duty of confidentiality, we will seek your consent to participate where appropriate. This consent will not, however, be our legal basis for processing your data under the GDPR.

How will you use my data?

Data will be processed for the purposes outlined in this notice.

Will you share my data with 3rd parties?

No. Data will be accessible to the project team at York only.

Anonymised data may be reused by the research team or other third parties for secondary research purposes.

How will you keep my data secure?

The University will put in place appropriate technical and organisational measures to protect your personal data and/or special category data. For the purposes of this project, we will store data in researcher's laptop and the filestore offered by university platform which are encrypted and password protected. Moreover, all related data will be destroyed as soon as practically possible once you inform researcher of your withdraw.

Information will be treated confidentiality and shared on a need-to-know basis only. The University is committed to the principle of data protection by design and default and will collect the minimum amount of data necessary for the project. In addition, we will anonymise or pseudonymise data wherever possible.

Will you transfer my data internationally?

Possibly. The University's cloud storage solution is provided by Google which means that data can be located at any of Google's globally spread data centres. The University has data protection compliant arrangements in place with this provider. For further information see, https://www.york.ac.uk/it-services/google/policy/privacy/.

Will I be identified in any research outputs?

Names of the interviewees are represented by Arabic numerals, thus making them be labelled as interviewee A, B, C, etc. This anonymity is offered to all of the participants to replace their real names in all data collection and analysis materials. Also, no other identifying material will be used.

How long will you keep my data?

Data will be retained in line with legal requirements or where there is a business need. Retention timeframes will be determined in line with the University's Records Retention Schedule.

What rights do I have in relation to my data?

Under the GDPR, you have a general right of access to your data, a right to rectification, erasure, restriction, objection or portability. You also have a right to withdrawal. Please note, not all rights apply where data is processed purely for research purposes. For further information see, https://www.york.ac.uk/records-management/generaldataprotectionregulation/individualsrights/.

Questions or concerns

If you have any questions about this participant information sheet or concerns about how your data is being processed, please contact Jin Chen, his supervisors (Prof. Bob Doherty and Dr Luisa Huatuco) or the Economics, Law, Management, Politics and Sociology Ethics Committee (ELMPS) in the first instance. If you are still dissatisfied, please contact the University's Acting Data Protection Officer at dataprotection@york.ac.uk.

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Right to complain

If you are unhappy with the way in which the University has handled your personal data, you have a right to complain to the Information Commissioner's Office. For information on reporting a concern to the Information Commissioner's Office, see www.ico.org.uk/concerns.

Appendix G. Participant consent sheet (English version)

PARTICIPANT CONSENT FORM

Evolution of the e-commerce enabled short food supply chain (SFSC) in local context: A knowledge management perspective

This form is for you to state whether you agree to take part in the study. Please read and answer the following questions by ticking the response that applies. If there is anything you do not understand, or if you want more information, please ask the researchers.

	Yes	**No**
1. Have you finished the form of vulnerability indication and understand that this research has no intent to involve participants who are of vulnerable group?		
2. Have you read the Information Sheet for this study and known the details of the study explained to you?		
3. Can you confirm that the questions about the study have been answered to your satisfaction and you understand that you can ask questions about the study?		

4. Do you understand that you are free to withdraw your participation up to 3 months after the interview?		
5. Do you agree to take part in the study after you understand the project through Information Sheet and the explains from the researchers?		
6. Do you agree to provide information to the researchers under the conditions set out in the Information Sheet?		
7. Do you understand that the information you provide might be used in future study once information has been anonymised (so that you cannot be identified)?		
8. Do you know that the interview will be recorded only after the researcher acquire your consent? and methods adopted by the researcher include voice recording and written notes.		

Participant's Name (in BLOCK letters):_____

Participant's Signature: _____

Date:_____

Researcher's Signature: _____

Appendix H. Apple e-commerce interviewee_B

Interviewee:	B
Case name:	Yuezhuang Taobao village
Occupation:	E-retailer/SC manager
Date of interview:	11st Nov, 2021
Interview method:	Online interview
Time length:	32mins
Interviewer:	The researcher
Keywords:	Unprocessed fresh apples; direct sales

1.0 Supply chain basics

1a. Considering roles of producer; processor; and intermediary in local industry, which role is played by you in practice?

B: I have grown apples for around 30 years and have run Taobao business for seven or eighty years. Requirements from offline consumers are the reason to my online operations.

1b. How do you establish relationships with downstream and upstream supply chain participants?

B: I don't have downstream and upstream supply chain participants. I manage my apple orchard by myself, practising routines such as feeding, spraying, pruning, bagging, etc.

Besides, I am also responsible for apple packaging and online operation.

I don't supply local others with my apples; they are for my own business, and the capacity of my apple orchard is around 35 or 40 thousand kg apples per year.

Locals normally have fixed relationships with the fertilizer companies fertilizers that provide them with fertilizers and other agricultural chemicals. Staffs of those companies often travel here to listen to our feedbacks and they offer us guidance as well. We maintain good relationships with them and are satisfied by their products and services.

1c. How do you enable online customers to perceive the closeness to your food processing or production so they are more willing to purchase? Such as use of origin protection logo or geographical indication.

B: Our local "Great Shahe River" apple is a unique variety and holds fames in market; although its appearance might be less pretty than the others (which has been caused by local soil and weather), local apples stay longer in trees and therefore taste better than the others. Overall, my apples have won public recognitions from consumers in the first place.

Online promotion is another solution. Lots of my new consumers come to my business due to the photos and pictures uploaded by me, which record the vivid details regarding my apple orchard management.

I run offline agritourism and often organising online consumers to come to my orchard to pick fresh apples by themselves, fostering their close feelings and making them further recommended my apples to others.

Comparing with using different brands or logos on boxes, I think the use of the term "Great Shahe River" is more important, which makes consumers trust the quality of my apples.

1d: How does your supply chain be affected by the factors on platform? Such as impact of platform regulations or online customers' characteristics.

B: Taobao is a good platform, it is a precondition to me getting in touch with consumers.

I don't think my operations are greatly impacted by Taobao.

I supply my consumers with high quality apples and therefore make higher pricing; their quality is little higher than the quality of the apples prepared for offline markets.

1e: How does your supply chain be impacted by the factors in local context? Such as impacts of infrastructure; local traditions; local others; and authorities.

B: The courier service plays an important role in offline factors. I have cooperated with

several service providers and qualities of their services satisfy me. However, parcels are often delayed when in big online shopping festivals since they all face huge loads of orders; it is unavoidable and brings problems to my operations.

Backlog of orders causes service providers to delay collecting my apples, and also causes consumers to fail tracking their parcels since orders are piled high in providers' warehouses.

Local offline infrastructures are very good, including the quality road systems and lots of courier service points.

I don't have warehouse, apples are picked and dispatched after I see consumers place orders.

2.0 Supply chain evolution

2a. If there is a list indicating the stages of supply chain evolution—i.e., emergence, growth, maturity and decline, in which stage your supply chain is and why? Or would you think yours is out of these four stages?
B: Growth stage. I'm still learning about improve my current operations, hence collecting consumers' feedbacks regarding various aspects, such as packaging.

2b. What do you learn from supply chain evolution and how do you apply the learnt?
B: I'm satisfied with what I have gained from business running. My business isn't big but is enough for me.

I doubt whether I can do more at this age, but want to put efforts into improving the quality of my apples, which is related to the promotion of orchard management.

3.0 Knowledge possession

3a. Based on your experiences, what knowledge types are rated by you as important or must-have to your supply chain?
B: First, you need to master computer and internet knowledge. To be honest, my computer and internet skills are generally lower than the skills I mastered for orchard management.

Knowledge of orchard management and apple growing is essential; even now, I actively search for opportunities to update my apple knowledge.

Knowledge of marketing or promotion is important as well, at which I am weak.

3b. Based on the knowledge types rated by you, please specify which of them are easy to be expressed; learnt; and applied, while which of them are not?
B: Knowledge of marketing or promotion. I feel it is rather difficult for me to master comparing with the knowledge regarding orchard management and apple growing. I don't understand how to practise proper and advanced marketing or promotion.

3c. Please introduce to me your experience of reflecting on the knowledge types that you learn, which then leads to changes to the learnt knowledge types or creation of new ones.
B: I have been focusing more on "doing" since I realise that my "business ability" and

promotional skills are weaker, which hence helps foster my accumulation of solving particular problems when in practise.

I have been concentrating on improving the quality of my apples, to make them grow bigger and sweeter.

I learnt how to explain why there are "scars" on apple surfaces when this issue has been often questioned by consumers—sometimes the surface scars are caused by too much sugar contained in apples. Finding "crystal candy heart" when eating apples is another frequently asked question, which is a result of too much sugar in apple as well.

My solutions to solving consumers' complains of damaged parcels is developed based on my "doing" experiences, which include the steps of judging whether the problems are caused by courier service providers during shipments; of timely communicating and negotiating with consumers regarding the happened situations; and of preparing different compensation plans for consumers to choose.

4.0 Knowledge utilisation

4a: Reflecting on the provided table of knowledge utilisation activities, how do the seven activities fit your situation so that knowledge can better underpin your supply chain?
B: Online apple business require the integration of online and offline operations, which further involves detailed steps such as apple orchard management, hence the overall business is a leverage of a number of knowledge pieces.

I have run business based on my household, my wife and son are in charge of online operations after our negotiations—as they know computer and internet more than I do, thus allowing me to fully focus on the apple orchard (*business model*).

4b. Please introduce to me any of your experiences that you gain new knowledge when practising knowledge utilisation activities.
B: My experiences of orchard management make me realise the importance of continued learning.

In addition to my previous knowledge, I am planning on learning how to arrange new trickle irrigations for my apple orchard; to better maintain the balance in between watering and feeding apple trees; to ensure branches to reach certain growth level that help produce quality apples; to know whether the trees lack microelement nutrition by looking at their appearances.

Effects are achieved after I learn and practise these new knowledge.

5.0 Knowledge acquirement

5a: Where and how do you learn the knowledge types that are previously rated by you as important or must-have to your supply chain?
B: I acquire new knowledge by reading books and reflecting on previous practises and experiences.

I also travel to colleagues' apple orchards in the neighbour province to explore and learn from their apple industrial solutions. I seldom learn from the internet contents but conduct

fieldworks and face-to-face learning.

There are county level training sessions organised by governments, however, its learning contents are designed for general public, which hardly satisfies my personal demands.

County government organises learning trips or invites professionals to come to us for training purpose.

I joined several online social media groups in where I and local colleagues communicate with each other for learning.

5b. If there is a list indicating the activities of knowledge acquisition—i.e., identifying; creating; storing; and sharing knowledge, how do your experiences fall into these four? Please answer this with examples.

B: Creating knowledge is important. I am the first local people who upgrades the local bagging technique after reflecting on the learning trip to the neighbour province. Due to the unique local weather conditions, I add plastic bags to the bagging process besides using paper bags to apples, which help prevent the apple rust happened after only using paper bags, making local apples have more beautiful appearances.

Sharing knowledge is important as well and I often learn from colleagues by fieldworks. Although I only went to middle school before, I train my practising ability and value the role of identifying new knowledge in everyday operations.

Appendix I. Apple e-commerce interviewee_D

Interviewee:	D
Case name:	Yuezhuang Taobao village
Occupation:	E-retailer/SC manager
Date of interview:	12nd and 25th Nov, 2021
Interview method:	Face-to-face interview; online interview
Time length:	1hour13mins
Interviewer:	Local team and the researcher
Keywords:	Unprocessed fresh products; intermediary

1.0 Supply chain basics

1a. Considering roles of producer; processor; and intermediary in local industry, which role is played by you in practice?

D: Intermediary.

I was one of the first e-retailers staring agricultural e-commerce on Taobao. I got to know Taobao when I graduated from secondary school and soon felt interesting about commencing e-commerce on it, which might be the result of me dreaming of becoming a businessman. I didn't think e-commerce is a difficult thing at the time, and you can easily

start it as long as you have suppliers who supply you with agricultural products.

I have been selling "Great Shahe River" apples since it is the local speciality, and it is sold well on Taobao.

My parents helped me with the daily operations when I first started e-commerce, packaging my apples for online consumers. My e-commerce expanded very quick in the first and second year and it attracted consumers all over the nation. It was also the time when I began purchasing apples from local others instead of relying on mine due to the growing demands.

I didn't expect my e-commerce to expand so quick and I began recruiting staffs from outside to establish my own operation teams for customer services; website design; offline operations; etc. I began purchasing apples from the outer regions as well—such as from Shanxi province, in order to satisfy my demands.

1b. How do you establish relationships with downstream and upstream supply chain participants?

D: Sourcing from outside is now the only way from which my apples come.

My business has become a platform; my team sources apples national wide and dispatches them to online consumers after packaging.

The purchasing agents in my team are responsible for finding strong suppliers and I set performance assessments for them.

My business looks for the suppliers who are particularly professional and have adequate experiences about apples—and they also need to be well financially supported, which is important when facing cash-flow problems. Being professional means the suppliers know how to produce quality apples on which my business advantages would be based. Being with adequate experiences means the suppliers have been familiar with the apple industry and therefore are more mature to be cooperated with—"you are a part of agri-fruit business only after you practise it for at least three years", this is what I often hear in the industry.

Our business relationships are getting better and better because many of them have long-term cooperated with us and the reputation and scale of my business have grown into a level that makes people more willing to trust. A win-win prosperity is what we have dedicated to.

1c. How do you enable online customers to perceive the closeness to your food processing or production so they are more willing to purchase? Such as use of origin protection logo or geographical indication.

D: Ensuring the qualities of sold apples and offering good customer services, I think these two are the solution to both business success and closer relationships with online consumers. As one of the first e-retailers staring agricultural e-commerce on Taobao, my business has become experienced in doing these two.

My business has been exploring how to offer better apples and services to customers, which makes other e-retailers learn from us.

Good purchasing experiences make online customers like the products.

I have my own brand, and I also label the sold apples according to their different origins. For instance, local apples would be labelled as "Great Shahe River". I think labelling apples is important because some customers like the apples from specific origins, such as the apples

from Shandong province.

1d: How does your supply chain be affected by the factors on platform? Such as impact of platform regulations or online customers' characteristics.
D: I don't see impact from Taobao on my business development.

My business has grown with the development of Taobao.
I can't tell the speciality of Taobao now since many similar e-commerce platforms are rising nowadays, and these new platforms are competing with Taobao over website traffic.

1e: How does your supply chain be impacted by the factors in local context? Such as impacts of infrastructure; local traditions; local others; and authorities.
D: Online businesses will be affected if apple selling goes very well in offline market. Pricing is important to online businesses, and it would raise with the pricing in offline market.

The solution to the impact of offline mark is learning making timely adjustments, or simply selling apples as usual without too much pressure.

Local carrier services are convenient, and their pricings are acceptable to me; it is also nice to see their pricing policies become more transparent to locals in recent years.

Land resources have satisfied our demands. I have my own plant and warehouse.

2.0 Supply chain evolution

2a. If there is a list indicating the stages of supply chain evolution—i.e., emergence, growth, maturity and decline, in which stage your supply chain is and why? Or would you think yours is out of these four stages?
D: Mine is in mature stage. The present operations are very stable.

2b. What do you learn from supply chain evolution and how do you apply the learnt?
D: Old customers and suppliers are very important to my business, and they are the primary reason to my business development.

Current achievements satisfy me.

I hope a further growth for my business in the future, but I have not began finding clues for planning. Doing my best is what I have been doing when in businesses; I wish I can do good in e-commerce.

3.0 Knowledge possession

3a. Based on your experiences, what knowledge types are rated by you as important or must-have to your supply chain?
D: Knowledge about offering quality apples and good services is important; not just for Taobao e-commerce, but also for any other businesses.

Knowledge about apples is the basis. As I said, you should be professional about apples and practise at least three years in apple industry in order to accumulate enough experiences.

Team management is also important as my business now contains different teams recruited by me for different business purposes; they must cooperate with each other to reach

business goals.

3b. Based on the knowledge types rated by you, please specify which of them are easy to be expressed; learnt; and applied, while which of them are not?
D: I don't think any of them is difficult, properly because I have gone through all of them and therefore have accumulated enough experiences in solving them.

3c. Please introduce to me your experience of reflecting on the knowledge types that you learn, which then leads to changes to the learnt knowledge types or creation of new ones.
D: Reviewing the past of my business journey, I think exploration and innovation is very important and it is which I and my teams have been focus as well. Focusing on how to offer better quality and services to customers in comparison with the others on platform, you need to have this intention in the first place.

4.0 Knowledge utilisation

4a: Reflecting on the provided table of knowledge utilisation activities, how do the seven activities fit your situation so that knowledge can better underpin your supply chain?
D: I'm interested in this fourth activity named 'impact of governance and organisational structure' as managing teams is what I have been doing for my business.

In my business, teams are established regarding company finance; human resource; daily operations such as purchasing, selling and customer services; and designing. Although these might be barely comparable to those of the bigger companies, my established teams cover the most aspects required by a company.

I set tasks and performance examinations for my teams; for example, the task for my staffs of purchasing team is to find and get in touch with new products and their suppliers every month. Accordingly, I set different salary levels based on their performances including basic salary and bonus.

4b. Please introduce to me any of your experiences that you gain new knowledge when practising knowledge utilisation activities.
D: Based on my experiences regarding Taobao e-commerce, purchasing and selling teams are the most important ones among all the teams.

Typing speed is what you want to focus when recruiting staffs for customer service team, especially when your business often faces big sales volume. I always recruit young people from county for my customer service team, as they are more familiar with digital equipment and internet knowledge, as well as with typing.

5.0 Knowledge acquirement

5a: Where and how do you learn the knowledge types that are previously rated by you as important or must-have to your supply chain?
D: I often communicate with others from apple industry regarding latest information of markets; suppliers; apple origins; pricing; weather and meteorologic disasters; etc.

It is very important to communicate for information, and this is also the shared feature with offline apple business.

Sometimes you need to know the price fluctuations of the apples from certain origins happened in months, sometimes you only need to know the latest fluctuations happened in days. If the fluctuations are dramatic, I make two calls in a day to communicate with my suppliers.

The trust between you and suppliers needs to reach a certain level, which ensures the reliability of received information. You and suppliers should realise it is about business cooperations; about pursing a shared prosperity; and, about you and suppliers see the same problems but from the different views of each other.

As long as you received latest information, you can make timely plans faster than others—like a night before business starts, and thus gaining advantages in comparison with others.

I would say the role of information takes up to 80% in my business success. It is all about information in the whole agri-fruit industry, especially for us running e-commerce.

Evaluating and forecasting information is essential, they allow you to prepare ahead of any good or bad changes; it is too late to react when you see the rising or declining of prices happens.

5b. If there is a list indicating the activities of knowledge acquisition—i.e., identifying; creating; storing; and sharing knowledge, how do your experiences fall into these four? Please answer this with examples.

D: Based on what I just said, I say the sharing of knowledge is very important.

Creating knowledge is also important as I and my teams have created the strategies of maintaining good quality and services that are often followed by others.

Appendix J. Seafood e-commerce interviewee_B

Interviewee:	B
Case name:	Daxing'zhuang Taobao village
Occupation:	E-retailer/SC manager
Date of interview:	01st Mar, 2022
Interview method:	Online interview
Time length:	66mins
Interviewer:	The researcher
Keywords:	Unprocessed frozen products; Intermediary

1.0 Supply chain basics

1a. Considering roles of producer; processor; and intermediary in local industry, which role

is played by you in practice?
B: Intermediary.

I sell freshly frozen prawns, shellfishes and yellow croaker (fish).

I focus on selling local seafoods. I sell oysters when oyster seasons arrive and sell crabs when crab seasons arrive.

Local seafoods can't always well supply my business, especially at the time when local fishing boat reduce fishing activities.

1b. How do you establish relationships with downstream and upstream supply chain participants?
B: I know my suppliers long time ago, when I went to local seafood markets to source products for my newly opened e-store.

Our relationships are the results of accumulation effect over time.

1c. How do you enable online customers to perceive the closeness to your food processing or production so they are more willing to purchase? Such as use of origin protection logo or geographical indication.
B: Online and offline customers should be treated the same. Faithful production information shall be given, even if online customers can't see and touch the products before receiving them.

Knowing the vulnerability of online customers and help them buy with confidence by ensuring the qualities of products—this is what a seafood e-retailer shall do, and it is also a method to grow regular customers.

All in all, my solution to shorten the distance between customers and products is being faithful. I shall not cheat my customers as they are the ones who give me business opportunities by being willing to buy my products.

Faithful introductions of product information is important. I always integrate pictures, videos and words to fully present my products, making sure customers receive the same products as what they see online.

I also provide the information about how to tell whether seafoods are fresh; how to distinguish the seafoods in different qualities; and how to cook seafoods.

I don't use brand on my products because I think the geographical location where my business is based has been the most effective promotion to my products—closing to the harbour. Fresh seafoods such as oysters are transported to harbour by boats every day, waiting for me to buy and dispatch them to my customers—this is not like any other products that can be stored for future selling.

1d: How does your supply chain be affected by the factors on platform? Such as impact of platform regulations or online customers' characteristics.
B: I don't think there is great impact from the platform as our relationships have been normal and followed the regulations. I can see platform's management improves over time; it is good to see so because we rely on and are benefited from each other

Platform stands in between I and customers, and it works as an access and mediator.

I have not considered about expanding my business to different platforms because my

strength has limit.

1e: How does your supply chain be impacted by the factors in local context? Such as impacts of infrastructure; local traditions; local others; and authorities.
B: Local infrastructures have been maintained to satisfaction.

Courier services offered by S.F. Express and JD express are very well and make our dispatchment easy (the only two courier service providers that are professional and qualified in cold chain transporting).

Local places where I can source seafoods or apply for cold storage spaces are more and more developed.

Packaging materials are easy to access. Our region has been famous for seafoods long time ago and hence owned rich offline resources. Before the raise of e-commerce, local packaging materials factories produce the polystyrene boxes that particularly fit the long-distance transportations by lorries or coaches (small buyers from other regions used to travel by coaches). After seeing the increasing demands from local e-retailers, the factories changed the moulds and started to produce the polystyrene boxes in diverse sizes. Later, they also began the productions of ice bags that help to maintain the low temperature inside the boxes, and they soon updated this products by replacing ice bags with dry ice bags that won't easily wet boxes—this is a very helpful update. Those factories are mainly located in town area instead of in this village. Prices of local packaging materials used to be expensive but then they drop to a cheap level.

To local e-retailers, a basic packaging process including the steps of putting a layer of insulation materials inside the boxes to prevent heat from coming in; putting dry ice bags at box bottom; placing seafoods on the bags; sealing the boxes and dispatching. This process ensures that seafoods can arrive very fresh within two or three days of transportation.

Cold storage is also key to seafood e-retailers. Since my business is not very big, there are enough rooms in my house where I can put chest freezers to satisfy my cold storage demand. In most situations, I source and dispatch customers' orders on the same day or a day after, hence I don't need big, independent and professional storage spaces or equipment.

Others who run bigger businesses can rent spaces in local professional companies. There are lots of big local companies running cold storage businesses. Those companies used to produce ice or provide spaces for finishing boats to store caught seafoods, but many of them slowly transform into the temperature-controlled storage company that best meet local e-retailers' requirements.

2.0 Supply chain evolution

2a. If there is a list indicating the stages of supply chain evolution—i.e., emergence, growth, maturity and decline, in which stage your supply chain is and why? Or would you think yours is out of these four stages?
B: I would say mine is in decline stage since I have faced a lot of problems.

Prices of seafoods are rising—this is a very big problem caused by diverse reasons, including the reduce of local marine resources and the new regulations of finishing boat management. Online customers sense the rising of seafood prices, so their shopping wills

drop which brings impacts on us.

Moreover, seafood businesses have high and low sales seasons, which sometimes follow the life cycles of marine resources; we can't ensure the businesses always run smoothly.

2b. What do you learn from supply chain evolution and how do you apply the learnt?
B: First, being faithful is very important to our business running; one's business cant run long if he or she ignores the importance of faithful business running in e-commerce industry.

In e-commerce industry, customers can't see or touch the products until receiving them, which leads to an important role in being faithful.

Second, website traffic is also important, I hope that my business can find a way to attract more customers in the coming future. Website traffic or click rate is essential to e-commerce, however, lots of difficulties needed to go through before finding a good solution of gaining them.

3.0 Knowledge possession

3a. Based on your experiences, what knowledge types are rated by you as important or must-have to your supply chain?
B: My reflection is that you need to be true and faithful to yourself and your business, being practical and having the long-term vision that help you prevent troubles caused by being short-sighted.

Good psychological quality is also fundamental.

The mistakes made by one e-retailers can lead the whole e-retailer group to an untrusted situation, so understanding the responsibility of doing seafood business and the connections with the others in this industry become important.

3b. Based on the knowledge types rated by you, please specify which of them are easy to be expressed; learnt; and applied, while which of them are not?
B: I don't think there is difficult knowledge. You can always master different knowledge types by researching them and it is just a matter of time, not to mention that study opportunities and resources have become plenty nowadays.

Skills like how to use PC and e-commerce can be found on Internet, you can learn it by following the instructions.

3c. Please introduce to me your experience of reflecting on the knowledge types that you learn, which then leads to changes to the learnt knowledge types or creation of new ones.
B: I haven't run into such situations. Many locals just focus on selling local seafoods; we even seldom considering selling the seafoods from other places; it's like, we catch a strange feeling about those seafoods since they are not locally caught, we would worry about their qualities even more.

4.0 Knowledge utilisation

4a: Reflecting on the provided table of knowledge utilisation activities, how do the seven

activities fit your situation so that knowledge can better underpin your supply chain?
B: They all very important in operations.

Attentions shall be paid on business model as online seafood business is different from the offline one. Online seafood business faces a wider range of customers and high transportation cost (including packaging cost) while it is opposite to offline one.

4b. Please introduce to me any of your experiences that you gain new knowledge when practising knowledge utilisation activities.
B: Competitions exist in different industries. If I stop doing e-commerce one day, I might choose to do offline seafood business.

5.0 Knowledge acquirement

5a: Where and how do you learn the knowledge types that are previously rated by you as important or must-have to your supply chain?
B: We grow up by the sea and eat local seafoods since childhood. We were born with the knowledge regarding local seafoods.

After starting e-commerce, I learn even more about seafoods when communicating with my suppliers. I remember the skills they told me and put them into practices; for example, they told me about how to know whether seafoods are fresh and meaty.

Some of the local old generations know seafoods better than e-retailers, so we seldom travel to other places to learn seafoods.

Platform offers learning opportunities to us, and often inform us of latest learning activities via system.

5b. If there is a list indicating the activities of knowledge acquisition—i.e., identifying; creating; storing; and sharing knowledge, how do your experiences fall into these four? Please answer this with examples.
B: Sharing knowledge is important and you can always learn a lot from others while communicating.

Appendix K. Seafood e-commerce interviewee_J

Interviewee:	J
Case name:	Daxing'zhuang Taobao village
Occupation:	E-retailer/SC manager
Date of interview:	04th Mar, 2022
Interview method:	Online interview
Time length:	58mins
Interviewer:	The researcher

Keywords:	Unprocessed frozen products; Producer

1.0 Supply chain basics

1a. Considering roles of producer; processor; and intermediary in local industry, which role is played by you in practice?

J: Producer. I run my aquaculture fields while my wife dedicates to online operation.

We sell local prawns and the processed crayfishes sourced from Hunan and Hubei provinces.

Many local e-retailers source my prawns.

Before the e-commerce now run by my wife, my family has been running seafood wholesale business based on the aquiculture fields.

1b. How do you establish relationships with downstream and upstream supply chain participants?

J: Many of them are my local friends or are introduced to me by my friends. My ordered seafoods are often promised to be more quality due to these relationships.

I travel to Hunan and Hubei provinces to check crayfish industry and then sign contracts with those big plans for stable supplies.

Suppliers from other places like to come to us to settle agreements on supplying their products, since e-retailers of this village have been famous and influential on platform as well as in national seafood e-commerce industry, which could be a good way of promotion to their products.

1c. How do you enable online customers to perceive the closeness to your food processing or production so they are more willing to purchase? Such as use of origin protection logo or geographical indication.

J: Quality is the key. Customers who receive quality products and hence leave positive feedbacks can help boost the grade of e-store. Many customers prefer and trust the e-stores with higher grades.

To be honest, most local e-retailers didn't receive proper education, so they don't like the practices requiring extra efforts but no instant returns, which is also the reason that very few locals value branding.

It is awkward if you sell suppliers' seafoods with suppliers' brands on them.

1d: How does your supply chain be affected by the factors on platform? Such as impact of platform regulations or online customers' characteristics.

J: I don't think online customers have impacts on my business running. Customers prefer the products that achieve balance in between pricing and quality.

Platform has been improving their management by various actions such as the rise of new regulations. They are help customers control the qualities of e-retailers' products.

Professional e-retailers or e-retailers who see e-commerce as career wont risk selling low quality products to customers, as we demand to maintain high repurchase rate. Regular customers soon give up loyalty after they receive one bad experience from purchasing.

Overall, quality control is very essential to e-retailers' operations.

Processed crayfishes own very high repurchase rate and that is why lots of local e-retailers sell this off-region products. Prawns is next to processed crayfishes.

Local e-commerce industry becomes a best promotion method for offline products.

1e: How does your supply chain be impacted by the factors in local context? Such as impacts of infrastructure; local traditions; local others; and authorities.

J: My family have started run aquacultural fields long before e-commerce emerges, which provide a strong basis for us to operate e-store.

Reasons to the success of this village involve its close location to a national level seafood market, a variety of seafoods from both local and national other places are gathered here for flourishing offline business. Prices are much lower in that market comparing with other places selling seafoods.

Pandemic has impacts on local seafood selling since there have been cases which virous was found on the packages of frozen seafoods.

Door-to-door Services provided by local courier service points are very nice.

Harbour management is friendly to e-retailers' business activities as well.

Local fishermen like e-retailers as the latter can lift the prices of seafoods in offline market as well when they source for online customers. Prices of seafoods can widely fluctuate within one day offline.

With governments' supports, local road system has been maintained to high level. local governments also published lots of policies to support e-retailers' development.

Local big e-retailers often have their own independent workplaces, warehouses and own or rented cold storages, while other e-retailers solve their operations all in their own houses—these e-retailers doesn't set long or broad goals but run business as they can day in and day out.

Investment on having own cold storage is high, many choose to rent storage spaces from professional companies.

Other seafood regions are learning from us and foster their local e-commerce industries, which do affect our businesses on platforms.

If you run big and strong offline business, then it is very easy for you to begin e-commerce and you might easily earn a lot from the beginning.

Very few locals choose to do finishing and e-commerce altogether; you won't have that time and enough to participate in both offline and online seafood industry, not to mention building independent workplace, warehouse, cold storage, etc.

Local who run offline fishing, online e-commerce and cold storage make their own money from cooperations, which is really good.

Requirements for producing and packaging processed seafoods are high and coud easily cause food safety issues, therefore very few locals can or are willing to manage doing it.

Although my family businesses are in big scale, I won't think about developing processed products as well due to the lack of energy and time.

Lots of local fishing men also run e-commerce on platform, but many of them choose to stop finishing or sell out their boats and begin sourcing seafoods from others. Or, they only run e-commerce in close seasons and stop it when fishing is allowed again. Moreover, they

could run e-commerce for some time but soon back to offline fishing if they loose interests of running e-commerce. You can see the flexibility in these local activities. Offline finishing is actually as profitable as running e-commerce.

My family runs both offline and online businesses because the online business can be run by my wife and several recruited staffs alone, which leaves me to be focus on running the offline business inherited from last generations.

My wife was a teacher in school before beginning e-commerce. I always tell her that she can give up e-commerce and go back to teaching anytime she wants. My offline earning can support the family as well.

Every local e-retailers has his or her own situations and reasons to e-commerce or many operational choices, so I can't make any sum like "every local joins e-commerce and leaves offline industry".

2.0 Supply chain evolution

2a. If there is a list indicating the stages of supply chain evolution—i.e., emergence, growth, maturity and decline, in which stage your supply chain is and why? Or would you think yours is out of these four stages?

J: Decline stage.

I feel like many local e-retailers are in decline stage like me. Website traffic is a big problem, and everyone suffers from thinking of the way to foster their own e-stores' traffic.

Investments on buying traffic from platform can be huge, which presses down the final profits.

2b. What do you learn from supply chain evolution and how do you apply the learnt?

J: Website traffic issue can't be solved by e-retailers alone. Lucky the offline business I run is stable and able to support family.

Platform has its own difficulties and considerations as well.

Being water and going with flow, this is probably the best attitude one local e-retailer shall have when in operations.

3.0 Knowledge possession

3a. Based on your experiences, what knowledge types are rated by you as important or must-have to your supply chain?

J: Knowledge of good quality control, and knowledge of attracting and getting close to customers. The second one requires your personalities.

Knowledge varies according to different seafoods and can be very deep when you dive into learning all of them, so it is more important and practical to first ensure the good quality controls for your sold seafoods.

Good quality brings good feedbacks and higher grade for your e-store, which then attracts more customers and high repurchase rate.

Knowledge of money is also essential. You shall always be clear about how much money is spent on operations; where is the money come from; how much others are owing

you and when will they pay you back; etc.

3b. Based on the knowledge types rated by you, please specify which of them are easy to be expressed; learnt; and applied, while which of them are not?
J: The second one is difficult to master. It is a display of comprehensive abilities and personalities; you can't achieve it if you only have either abilities or personalities. Somebody might be good at talking but it is useless if no one wants to stay and listen to you.

In this information era, learning is not a difficult thing.

3c. Please introduce to me your experience of reflecting on the knowledge types that you learn, which then leads to changes to the learnt knowledge types or creation of new ones.
J: None of them is too difficult to learn. Mastering well these three knowledge pieces and you have good operations.

4.0 Knowledge utilisation

4a: Reflecting on the provided table of knowledge utilisation activities, how do the seven activities fit your situation so that knowledge can better underpin your supply chain?
J: Structuring, bundling and leveraging knowledge are the basis to operations, especially for e-commerce that contains offline and online operations, hence more knowledge pieces shall be integrated.

Business model is important, local e-retailers dedicate to those seafoods which can survive long distance shipment since they have targeted at national market. Seafoods that can easily survive three or four days of shipment without going dead or bad best fit e-commerce. It is also why most e-retailers sell fresh frozen seafoods instead of lived ones, but you can still choose to sell local octopuses online since they are not easy to die in transportation.

4b. Please introduce to me any of your experiences that you gain new knowledge when practising knowledge utilisation activities.
J: Scallops, oysters and prawns are the best seafoods for both local raising and online selling.

5.0 Knowledge acquirement

5a: Where and how do you learn the knowledge types that are previously rated by you as important or must-have to your supply chain?
J: Platform's training sessions, asking platform's customer service staffs, learning from practising and previous experiences (regarding processed seafoods from other places),

5b. If there is a list indicating the activities of knowledge acquisition—i.e., identifying; creating; storing; and sharing knowledge, how do your experiences fall into these four? Please answer this with examples.
J: Creating knowledge is essential. My wife knows nothing about e-commerce at the beginning but starts to learn all of it during explorations and practising. She learns from experiences and hence comes up with the management methods that fit her well.