

Rural Supply Chain Management

A Multidimensional Framework for Future Research in Europe

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Document Version

Accepted author manuscript

Published in:

International Journal of Business and Systems Research

DOI:

[10.1504/IJBSR.2021.118784](https://doi.org/10.1504/IJBSR.2021.118784)

Publication date:

2021

License

Unspecified

Citation for published version (APA):

Prockl, G., Williger, B., Tampe, M., Vakulenko, Y., & Hellström, D. (2021). Rural Supply Chain Management: A Multidimensional Framework for Future Research in Europe. *International Journal of Business and Systems Research*, 15(6), 701-726. <https://doi.org/10.1504/IJBSR.2021.118784>

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Rural supply chain management: A multidimensional framework for future research in Europe

Abstract: Innovations affect urban and rural areas differently. Although the supply chain management literature recognizes the interaction between urban and rural areas in terms of flow of products, people and communication, the rural perspective is clearly missing. An inductive approach was applied using an interdisciplinary panel of international experts to explore challenges and opportunities in the integral fields of rural development and SCM. Four key dimensions emerged that deal with rural logistics, policy, community and innovation. The results characterize rural SCM as multidimensional and classify the research field according to the four key dimensions. The resulting holistic framework brings the wide-ranging character of the research field together. The study provides foundations for the future examination of, and theory building in, this emerging research field. It also supports the development of rural markets and businesses in their efforts to cope with challenges that are particularly relevant to retail and service industries.

Keywords: rural, supply chain management, logistics, innovation, policy, community, expert panel.

1 Introduction

Worldwide changes associated with service and technological innovations, social dynamics, political, economic and environmental crises have been reshaping industries, society and academia, with supply chain management (SCM) not being an exception. Traditionally, SCM presents a focal company's view of large enterprises. These are often related to global supply chains operating on a large scale and are dominated by global actors. Related concepts such as city logistics primarily address the challenges of highly populated, metropolitan density areas. These approaches and concepts appear relevant and important. However, about half of the world population (World Bank, 2018) lives not in metropolitan regions but in rural, less populated areas, with less dense offerings for services, shopping and entertainment. This rural context has not been sufficiently treated by previous logistics and supply chain management research. The initial supply chain management research in rural areas is built upon transport and infrastructure optimization (Cheesman, 1990; Makarachi & Tillotson, 1991), and adjusting retail models to the rural lifestyle (Sullivan & Savitt, 1997). Over last three decades, rural studies developed conceptual independence from urban context, while industries realized the value of strategic adjustment to the distinct rural environment. Modest contributions of rural SCM studies conducted hitherto imply high complexity of rural systems and stakeholder interactions. Although no investigation offers a holistic view, the fragmented pool of available studies yields a context-specific set of challenges facing rural communities, businesses and policy makers (Milestad, Kummer, & Hirner, 2017; Othman, Othman, & Yaacob, 2016; Paddison & Calderwood, 2007; Tash, Raeisi, & Mansouri, 2018).

The initial challenge of rural SCM and the research in this domain stems from the lack of widely accepted definition of the core concept. The definition of "rural" varies among regions and relies on a number of variables. Starting with the traditional view of "rural is what urban is

not”, more context-specific definitions are developed based on population size, population density and relationship to cities (Hart, Larson, & Lishner, 2005). Such non-definitive approach can partly explain the fragmented nature of rural SCM research, as findings from a study in rural India might be of low applicability to rural SCM in Austria. Consequently, we could neither identify an established definition of rural supply chain management nor approaches towards a more holistic view of the area which is immanent in modern supply chain management. Such a view does not limit itself to physical challenges and optimization issues within transport or distribution in a rural set-up, but would also addresses topics such as value-(co)-creation and specific opportunities in regards to its business environment and to social and environmental aspects.

Rural SCM research progresses in several streams. One of the main areas of interest comprises agricultural markets and the associated issues and challenges in a different food sectors and countries (Aggestam, Fleiß, & Posch, 2017; Dupré, Lamine, & Navarrete, 2017; Masamha, Thebe, & Uzokwe, 2018; Varchenko et al., 2019). In another line of research, a number of recent studies investigate issues, primarily for developing countries, on regard to technical capabilities, optimization and ICT for the rural context and its specific logistics challenges in contrast to urban areas (Gowda, Murthy, & Muniraju, 2011; Pappa, Iliopoulos, & Massouras, 2018; Sekhar Das & Maitra, 2018). Other points of academic attention concern rural population dynamics (Oeser et al., 2018), rural business conditions (Talib & Yusoff, 2019) and rural consumer behavior (Johnson et al., 2006; Kumar Velayudhan, 2014). While rural SCM knowledge is developing in a somewhat steady, but unstructured manner and the lack of links in between the ongoing research streams places barriers on the holistic understanding of rural SCM for both academia and industry. More importantly, the lack of holistic understanding limits the stakeholders’ access to added value of rural SCM processes and interactions. Such knowledge supports the resolution of issues related to the appropriation of production and

transportation processes in rural contexts, as well as it could support the design of product and service solutions favorable by both rural communities and businesses.

Taking a holistic viewpoint of supply chain management, and thereby addressing the field from different research angles, we started with the initial question of how a rural supply chain could emerge as a relevant field for research to provide a more general understanding of supply chain management. Considering the underdeveloped state of rural SCM business environment, which carries multiple opportunities and challenges for its stakeholders, this study's purpose was to frame a relevant research arena for a rural supply chain management. As it has been identified, the notion of "rural" can vary significantly between different regions, thus, implying a number of generalizability issues with a study that would approach a global perspective for a relatively novel phenomenon. We set the study's focus on rural areas and supply chains in developed countries, and particularly, on the European region. The defined setting is evaluated as highly suitable for the purpose of this study for a number of reasons – (1) it offers a rather diverse set of rural cultures, thus embracing the applicability of the findings to global context, (2) the region has a number of ongoing industrial and academic projects dedicated to rural development, which contributes to richness of knowledge and practices that are worth disseminating, and (3) a handful of studies provides insight into some aspects of rural SCM in Europe, while simultaneously revealing a knowledge gap.

To work towards an answer for this question and reach the study's goal, a research group was created and, based on an expert panel's initial thoughts about potential research avenues towards Rural Supply Chain Management (RSCM) have been formulated. This paper presents in condensed form some of the major insights of the panel. The following section positions RSCM within the research discipline of SCM and discusses value creation and actors in RSCM from a theoretical perspective. Next is a description of the methodology used to build the

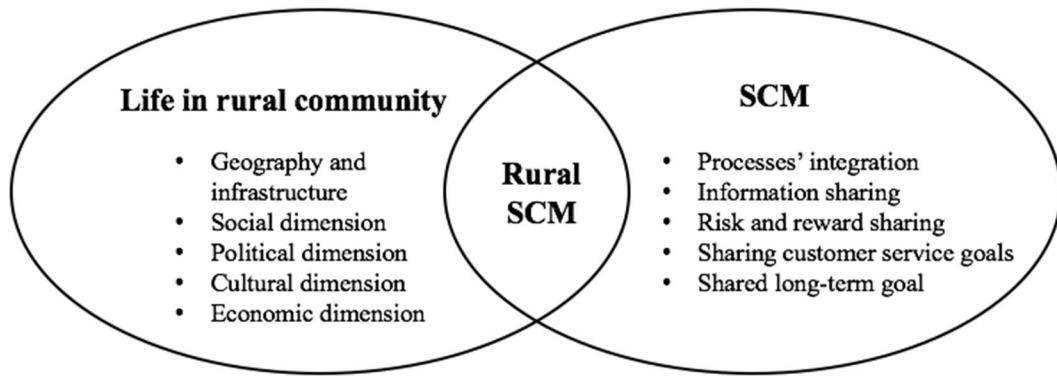
conceptual framework before findings are presented. This is followed by a discussion of future research avenues. Finally, the implications of this work are discussed along with our research limitations.

2 Theoretical background

2.1 Extending the organizational scope of SCM

SCM is a heterogeneous subject, which encompasses a number of different contexts. The subject is not yet a clearly defined discipline with sharp boundaries, and there are many reasons why definitions of SCM differ across authors (e.g. Mentzer et al., 2001). Searching for a commonly accepted understanding of SCM, Halldorsson et al. (2015) identified the “integrative nature” of SCM as a consistent theme within the literature, which would distinguish it from its original fields of logistics, purchasing and operations management. They see SCM further characterized as a boundary spanning interorganizational phenomenon. As a guiding principle, SCM scholars often refer to the holistic view of SCM and that its basic tenets deal with the appropriate allocation of resources and integration of flows in order to create value for a final customer (Prockl et al., 2017). This raises the question about what holistic means in a specific context, such as RSCM. In other words, we can on one hand view RSCM just as a specific subset of such a general SCM or on the other hand we adopt a viewpoint from the specific context of rural community life and thus see (rural) supply chain management as a subset of the related social, political or cultural challenges (See figure 1).

Figure 1 Different viewpoints of RSCM research



Basically, both views imply different restrictions and standpoints. However, it could be argued that one perspective does not exclude the other, and we thus suggest a combination of these two viewpoints, i.e. SCM relating to the specific social context of rural community life. This may be further illustrated in the next section, based on the crucial role of value creation (an intended SCM outcome).

We then accept an operational definition and perceive RSCM as *the management of flow of goods, materials and services, from the point of origin to the point of consumption, where a significant part or entire supply chain, in the form of its activities and/or actors, is embedded in and influenced by the specifics of a rural context.*

2.2 Value creation in a rural SCM

The motives behind the formation of a supply chain arrangement are to improve customer value and satisfaction to achieve competitive advantage. The scope of what defines value is, according to Grönroos and Voima (2013), a specific trade-off between benefits and sacrifices. Depending on the viewpoint of RSCM, it can be argued that the creation of value has different key drivers, which in turn results in other benefits and sacrifices.

If RSCM is viewed as a subset of SCM, it then focuses primarily on aspects of lower availability (sacrifices for consumers) and higher cost of supply to geographically remote

regions with low population levels (sacrifices for providers and in consequence sacrifices for consumers). This concentrates then in the above-mentioned research about the underdeveloped, difficult rural context and focuses on a mitigation of such sacrifices. If RSCM is instead viewed as part of rural community life, then RSCM can be linked to social and cultural aspects of local community life. Availability of products in rural areas is then part of an overall value of living in such regions and is linked to local identity, heritage and homeland, or perceived quality of local food (benefits). The aspects of lower product availability and variety are just some examples of sacrifices. Such a view that puts rural live into the center opens however up for the benefits of value propositions by business model innovation and is linked to areas such as tourism, services, and health care which are typically delimited in the former view as a subset of SCM.

Including aspects of rural community life becomes further relevant, when the provider of the value is considered. Ben Letaifa (2014), with reference to Cova and Salle (2008) and Normann and Ramirez (1993), postulates that value creation is just not a linear economic process taking place in a specific production chain but an emergent process involving multiple actors, including customers and competitors. The focal actor view or dyadic view of SCM appears too restrictive for rural contexts. Value creation is seen as a multilevel experience involving multiple actors in continuous interactions (Payne et al., 2008). This links to our third initial view on the actors who are going to provide the value for RSCM.

2.3 Rural supply chain as business ecosystem

In an inter-organizational context, there are different levels and scopes of interaction among member organizations. There are different degrees of complexity in supply chains, from a “direct supply chain” to the “ultimate supply chain” that includes all the organizations involved in all the upstream and downstream flows of products, services, finances and information from

the ultimate supplier to the ultimate customer (Mentzer et al., 2001). Peripheral actors are often absent in traditional supply chains, e.g. individuals, universities, associations, unions, governments and investors. Yet these actors may have significant implications on supply chain performance. The concept of business and innovation ecosystems (Iansiti and Levien, 2004; Moore, 1996) emphasizes these peripheral actors and goes beyond flows of products, services, finances and information by including the flow of ideas, talent and human capital throughout the system. To capture additional aspects of RSCM there might be a need to extend SCM's immanent focus on a focal actor towards how value propositions emerge in ecosystems based on heterogeneous actor set-ups as the drivers of this emergence.

According to Hannah and Eisenhardt (2017), to understand RSCM from a business ecosystem view there are three properties that are of importance. First, business ecosystems are organized around a "final product" such that their components are complementary in a way that firms cannot create value unless all components are present. The connections may be complex and often draw on different capabilities, have distinct economics, and exhibit varying innovation rates. In our context of RSCM this means we should not only view isolated aspects of physical objects but should understand RSCM as organized around the specific value of living and consuming in a rural context. We should thus also include other elements than physical supply which contribute to this specific value.

Second, business ecosystems have bottlenecks, which constrain the overall growth or performance of the ecosystem due to poor quality, weak performance or scarcity of supply and services. These bottlenecks are clearly linked to the aforementioned "value sacrifices" when economies of scale are lacking. However, the identification of such bottlenecks also indicates the need to identify those keystone actors who may reduce such constraints on the ecosystem, thereby facilitating strategic importance and dominance in the ecosystem. By accepting the

business ecosystem perspective in RSCM, more relevant actors and processes can be identified in order to minimize the bottleneck effect and attempt to resolve a number of challenges typical of the rural SCM context.

Third, capturing value in business ecosystems requires a sound balance of competition and co-operation within and across rival business ecosystems (Ben Letaifa, 2014). This refers for example to co-operative investments in infrastructure, sharing of revenue and profits or relationships between logistics networks, service networks or tourism services. The resulting complexity of balancing co-operation and competition by firms within a rural ecosystem may imply different stakeholder interests, governance mechanisms and policies.

3 Methodology

As described earlier, RSCM is a complex system that carries a multidimensional spectrum of challenges. While various scholars have made contributions to the area, its theoretical development is relatively immature. Much of the research endeavor is fragmented and there is little in the relevant literature that offers a holistic approach to the area. In order to develop such a framework, this research was initiated with a literature scoping to identify the ongoing research trends and topics in RSCM, which were then used to identify the types of expertise required from the experts that would be invited to participate in a panel discussion. Following the inductive research process, a comprehensive two-full-day workshop of nine international experts was organized to identify relevant topics and potential research avenues for RSCM, which is presented in form of framework.

3.1 Literature scoping

A literature scoping was conducted in order to identify research streams within research that falls under the conceptual umbrella of RSCM. This review method provided access to relevant

literature and allowed to delimit the topic (Arksey & O'Malley, 2005; Levac, Colquhoun, & O'Brien, 2010). The search platforms Scopus, EBSCO and Web of Science were used to scan journals that were identified as most relevant to the topic of rural studies and SCM. As the number of hits on combination of search words TITLE-ABS-KEY (rural) AND (supply AND chain OR logistics) was insignificant, a targeted journal search was applied. Thus, the most relevant “rural” journals were scanned for publication that contain TITLE-ABS-KEY (supply AND chain OR logistics) and most relevant SCM journals were scanned for publications that contain TITLE-ABS-KEY (rural). The search summary is presented in Table 1. Only articles in English were accepted for review. For that reason, a number of journals were not accessible for initial scanning due to language-related barriers. A number of other journals have been included in the search but did not provide publications.

Table 1 Journal scanning summary

Rural journals		SCM journals	
1	Cuadernos de Desarrollo Rural	1	International Journal of Physical Distribution and Logistics Management
37	Journal of Rural Studies	13	International Journal of Retail and Distribution Management
12	Sociologia Ruralis	2	IUP Journal of Operations Management
7	Rural sociology	3	Transportmetrica A: Transportation Science
1	International Journal of Rural Management	11	European Journal of Operational Research
5	Research in Rural Sociology and Development	9	International Journal of Supply Chain Management
		3	Transportation Research Part E
105	Total		

The article abstracts were scanned for relevance before being accepted for review, and the final literature pool supported the initial impression that the rural context appears as a neglected field for supply chain management and is often only researched from a rather isolated perspective. Most of these papers deal with very specific case studies and logistic challenges in

bottom-of the-pyramid countries, such as poverty related undersupply of food and related distribution challenges associated with low utilization and low spatial density in transport. Only very few of the papers refer to cases in Europe. A significant number of papers are based on mathematical optimization models and focus on rather specific logistics challenges in the rural context. Another set of papers provides empirical evidence for specific rural logistics challenges based on surveys or single case studies. Several technology and e-commerce-related publications discuss new marketing channels and the opportunities presented by using ICT as a supportive instrument to mitigate rural logistics challenges. Some more recent projects address the topic from a technical view, well embedded within the current SCM megatrend of digitalization. At the same time, the majority of rural-specialized journals yielded publications from agriculture-related studies and food supply chains. The entire corpus was used to generate a word cloud, shown on Figure 2, which suggested that while consumer, retail, supply and agricultures seem to be confidently present in the available literature among other terms, logistics and supply chain management do not appear among most frequent topics, thus suggesting an information gap.

Figure 2 Word cloud of identified RSCM research



The identified research steams were then used as an inspiration to compose a panel of professionals for participation in a workshop and a series of discussion on regard of the studied matter. This study’s aim was to provide a frame for future research in RSCM, which could have been done following the academic tradition of conducting a literate review. However, the novelty of the studied phenomena places high risk on the substantiality and quality of a framework synthesized from previous research. Such study would not reveal the knowledge gaps and industrial demands that have not yet been reflected in scientific publications. A panel discussion with experts was found to be a suitable source of data that would address potential gaps and would correspond to the purpose of the study.

3.2 Panel discussion participants

Participants were international experts with knowledge related to rural and supply chain management research. They were chosen using purposeful sampling (e.g. Patton, 2002), i.e. not only being knowledgeable about, or experienced within, the phenomenon of interest, but also

available and willing to participate. They represented different European regions and different research areas, as shown in Table 2. At least one participant covered at least one of the following research areas as introduced during the workshop: supply chain management, operations management, logistics services and sustainable transport, digitalization, ICT, business model innovation, social science, psychology, private and public governance, e-commerce, agriculture, packaging logistics, transport, food production and marketing in relation to quality, safety (including animal welfare), security, sustainability standards with agricultural producers in developing countries, reverse logistics, closed-loop supply chains, environmentally responsible packaging, home care, Internet usage in rural communities, and consumer psychology.

Table 2 Panel participants

Participant N & Gender	Present occupation (most relevant to panel)	Main country of professional activity	SCM, operations management	Social science and psychology	(Logistics) Service management	ICT & Digitalization	Business model innovation	Private and public governance	Retail, e-commerce	Packaging design and logistics	Sustainability, standards	Quality, safety management	Home care, Consumer psychology	Digitalization in rural communities	Agriculture. Production, marketing	Agriculture in developing countries	Urban or Rural communities
1. F	Chief Scientist	Germany		x	x	x		x	x				x	x			x
1. M	Associate Professor	Sweden	x		x	x	x		x	x	x	x		x			
2. M	Associate Professor	Denmark	x		x	x	x		x		x						x
3. M	Associate Professor	Italy	x		x	x	x		x		x						
5. M	Professor	Germany	x		x		x										x
6. F	Assistant Professor	Spain		x				x			x			x			x
7. M	Professor	Germany	x		x	x	x		x		x	x		x			x
8. M	Professor	Sweden	x		x				x	x	x				x	x	x

9. F	Project Director	Germany	x			x							x	x			x
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3.3 *Research setting and data collection*

The study methodology featured an expert-panel workshop for a number reasons. Because the study is built around rather novel phenomenon, the panel discussions with experts were found suitable to provide directions for future research. The selected experts possess expertise in the domains that are most relevant to the sustainable rural SCM development. The results of such discussions are taken far beyond the scope of traditional information exchange between the professionals, and are utilized as source of insight to emerging knowledge demands. Such insights are without a doubt a valuable source of knowledge for both academics and industry representatives.

The experts were identified based on their specific publications and research projects. In a letter they were informed about the workshop concept and invited for participation. After accepting the invitation they have been prepared with further information about the detailed agenda and assignments for the workshop. To inspire and guarantee full participant engagement in the workshop it was carried out in “joint isolation” at a research campus located in a rural environment. This campus is located within about an hour drive away from a major metropolitan area in a typical rural region of Europe and specifically designed for this kind of “breeding” event. With hardly any public transport available, accommodation at the same location, joint meals and activities of the kind, ensured participants’ attention on the topics being discussed.

The two-full-day workshop ran in three different sessions which were moderated by one or two of the hosting participants.

Methodologically, the benefits of a Group Delphi approach (Webler et al. 1991) were combined with that of Nominal Group Technique (NGT) (Delbecq, Van de Ven, Gustafson, 1975) Researchers acted as key informants about their respective disciplines. The workshop structure represented the required phases of a NGT: preparation, silent generation, round robin, clarification, rating and ranking (Delbecq, Van de Ven, Gustafson, 1975). In the first session, the research objectives of the different participants were aligned, and the participants were confronted with the purpose of the study (i.e., exchanging knowledge and expertise in the area of RSCM, generating up-to-date perspective in regard to the topic in focus, mapping future research paths, which meant to be disseminated in industrial and academic communities). The different experts presented individually prepared show cases of projects and approaches that link to a rural context from their specific points of view (silent generation). Subsequently, the participants discussed different scientific and industrial projects and cases, common RSCM practices, trends and challenges, and recent scientific studies (clarification). The second session contained open paper-based brainstorming about potential and specific research contents that link the rural topics between each other and to the SCM trends and demands (silent generation). These ideas were collected and discussed one by one among the participants (clarification). Additional ideas could be added (round robin).

For brainstorming and documentation of discussions brown paper methods and flip charts were used. Discussion results were documented for further analysis. The notes and presentations were also included in the material collection for complementing the findings from the discussions.

3.4 Analysis and framework development

It was accepted that panel discussions and workshops with experts can provide valuable insights into the emerging topic of RSCM. Several options were available for the format of presentation

and dissemination of the findings. Among these, a research agenda in the form of framework appeared the most efficient and suitable in accordance to the study’s purpose.

In a third sequence, the different essential contributions were collected (silent generation) and then together grouped around different theoretical lenses for a supply chain management (round robin). Based on the discussions associated with the grouping, the participants rephrased and added research topics (round robin). Finally, the third session’s topics were further consolidated and grouped to define different areas and avenues for research (clarification). The different experts then individually rated and ranked the topics (ranking and rating) which was followed by further discussions for clarification (optional phase of discussion).

Thus, most of the framework development was conducted by the expert themselves. At the final stage of the data analysis and the framework development, the authors have reviewed and optimized the appearance of the framework in order to exclude redundancies and make the framework conceptually sound.

4 Results: emerging RSCM trends and challenges

A number of trends and challenges in RSCM have been identified during the panel workshop and discussions. These were synthesized into themes according to their relation to one another in line with the panel discussions. Table 3 summarizes the main research topics and classifies them according to four dimensions in rural research domain – logistics, policy, community, and innovation. The ongoing trends and the future research propositions are discussed further.

Table 3 Dimensions of RSCM and related research topics

Dimensions	Value scope of RSCM (benefits, sacrifices)	Bottlenecks, constraints of value-co-creation	The value-creation ecosystem
Rural Logistics: the physical flows lens	<ul style="list-style-type: none"> • Cost drivers of rural transport – from volume towards 	<ul style="list-style-type: none"> • Financing and ownership of infrastructure; 	<ul style="list-style-type: none"> • Collaboration to consolidate and bundle shipments;

	<p>coverage, availability;</p> <ul style="list-style-type: none"> • The “food mile” discussion in a rural context; dominant designs in current SCM and applicability in rural contexts. 	<ul style="list-style-type: none"> • Scalability and de-centrality of infrastructure; • Utilization in RSCM; • “Industrialization” potentials in a low-scale rural environment. 	<ul style="list-style-type: none"> • Business Model owners for rural supply models; • Asset and risk sharing.
<p>Rural Policy: the institutional lens</p>	<ul style="list-style-type: none"> • Scope of rural supply chain “products” (goods and services, private, public); • Measurement schemes for “Value” in a rural context; • Definition(s) of “Rural” and related key value propositions; • Pricing and revenue mechanisms for rural services. 	<ul style="list-style-type: none"> • Regulation and Funding of Rural Life; • Start-ups outside the urban tech centers; • Sustainable Business Model implementation • Entrepreneurship; • Revenue and cost models for the specific context. 	<ul style="list-style-type: none"> • Stakeholder interests, agency, alignment; • Definition and types of rural contexts (Poverty, Tourism, Suburbia); • Contingencies and risks for rural ecosystems; • Involvement of financial service providers.
<p>Rural Community: the social lens</p>	<ul style="list-style-type: none"> • “Value drivers” in a Rural Context; • “Quality of the local” impact of service availability, such as mobility, health and care on quality of life in rural areas; • Consumer movement: How affect rural supply chains social outcomes. 	<ul style="list-style-type: none"> • Requirements of homogeneous within but heterogeneous across communities; • Restrictive consumer patterns due to cultural differences (i.e., independent versus interdependent cultures). 	<ul style="list-style-type: none"> • Identity: rural compared to urban; • Standardization and “Industrialization” vs. local heterogeneity; • Incentives for, and acceptance of, services and commitment to communities; • Acceptance of third parties.
<p>Rural Innovation: the technology lens</p>	<ul style="list-style-type: none"> • Business model innovation; • Application of modern technologies such as UAV or Clouds. 	<ul style="list-style-type: none"> • Maturity of digital infrastructure (digital divide); • Technology diffusion and acceptance (individual differences, i.e., digital competence, personality, health). 	<ul style="list-style-type: none"> • Digital community vs. open community (hands on community); • Role models within the RSCM IT ecosystem.

4.1 A physical challenge of scales and availability vs. benefits of local food and rural community life

Existing research on the physical aspects of an RSCM or rural logistics typically focuses on the challenges associated with difficult rural contexts in contrast to larger scale actors and activities, for example global supply chains of manufacturers (Wilkinson, 2002) or the placement of small rural producers in global supply chains and markets (Grivins & Tisenkopfs, 2018). The majority of the research refers to developing countries or so-called bottom-of-the-pyramid locations (Kaliyev, Sabirova, Akimbekova, Glushan, & Zhildikbaeva, 2019; Nhantumbo, Dent, & Kowero, 2001; Singh-Peterson & Iranacolaivalu, 2018), while research related to benefits of prospering rural contexts has been generally ignored aside from some publications on rural SCM matters in UK and the USA (Graddy-Lovelace & Diamond, 2017; Ilbery, Maye, Kneafsey, Jenkins, & Walkley, 2004; Urquhart & Acott, 2013). With regard to value creation it is no coincidence that most research focuses on the reduction of sacrifices linked to logistics in a rural context. A striking example is the emphasis on the challenges associated with low volumes in combination with longer driving distances between dispersed stops.

Naturally, expert participants highlighted that one of the central aspects of RSCM is the cost linked to the resulting diseconomies of scale. Another one is availability, which is a consequence of the cost issue. The experts' experiences of typical approaches and show cases for improvements and better solutions are roughly grouped into three areas: (1) Clustering and Consolidation, (2) Co-operation and Co-ordination and (3) Decoupling of drop-off locations (see also Bosona, 2013).

1. *Clustering and Consolidation* aim at an increase in volumes and thus a reduction of diseconomies of scale. In the case of Hindustan Unilever Limited (HUL), existing large retail stores have been recruited as sub-distributors for example (Mahajan, 2016) in

order to consolidate volumes. This also enabled distribution via housewives who acted as sales agents in sparsely populated areas. Bosona (2013) discusses a number of optimization approaches, i.e. for location of slaughterhouses or route planning in local food transport.

2. German parcel service providers *co-operate* in certain rural areas on the last mile of parcel distribution and Swedish logistics service providers offer transport services to sparsely populated areas in northern Sweden by collecting loads from different senders in the area (see, e.g. Hageback and Segerstedt, 2004). A key element of the service is simple *co-ordination* of load volumes and delivery dates which resembles the business model of a co-operative or even a kolkhoz (i.e., communal farm ownership and operation). Beyond that, a number of similar “grass roots strategies” (Mahajan, 2016) for the rural context may be found in different case studies around the world, and have been discussed during the workshop.
3. Other attempts related to rural logistics approach the challenge of volumes vs. availability through a *decoupling of transport and storage* using specific technology and infrastructure. For example, parcel lockers which are common standards in urban areas may be also used in a rural context. However, this creates new challenges of interoperability, maintenance and location planning, and in the end, there is again the basic problem of utilization of this infrastructure, which comes finally back to the problems of volume and scale. Further research may investigate the functional, social, emotional or financial customer value of parcel lockers in rural environments (Vakulenko et al., 2018).

During the expert workshop sustainability in global supply chains was discussed, in particular, related to food. Under the heading of what is known as the “food-mile wars” there is an ongoing discussion about the sustainability of global food supply chains. While the above-

mentioned challenges mostly refer to the distribution function in the supply chain, this aspect refers more to the sourcing function. The related question of whether locally grown food is more environmentally sustainable than food grown and transported on a global scale is, however, a controversial one. Based again on scale effects locally produced food may also present disadvantages in regard to sustainability (De Cara et al., 2017).

There is also, however, a potential shift, at least in consumer perception and to some degree, away from the “industrialized and conventional food sector towards a re-localized food and farming regime” (Sonnino and Marsden, 2006). After to efficiency and availability this points more to the benefits of rural products, thus highlighting the aspect of quality. In contrast to the logic of bulk commodity production, these “alternative food networks” promise a “different and competing definition of quality” (Sonnino and Marsden, 2006: 186) which is associated with local farming, trust, rural nature and heritage (Eden, Bear, & Walker, 2008).

Miele and Murdoch (1999: 469-470) mention a bifurcation into two main zones, one with standardized, specialized production processes responding to economic standards of efficiency and competitiveness, and another process competing on the basis of environmental, nutritional or health qualities (Sonnino and Marsden, 2006). However, the same authors also clarify that the boundaries between these different “food products” may be blurry. Modern assortments of big retail chains, which today also offer local or organic brands, may be seen as confirmation of the complementarity of the different production processes.

The value propositions of business models for RSCM are not only affected by cost and efficiency; they are on the one hand also affected by aspects, which may be summarized under the term “localized” and refer to political association, governance or geographical and social properties (Brinkley, 2017). On the other hand, “localized” food also needs to follow the conventional systems’ rules of cost and efficiency. Sonnino and Marsden (2006) frame this

mutual dependence under the concept of embeddedness. Findings from the workshop are consistent with this. Embeddedness is highly relevant in RSCM and refers not only to social aspects but requires a more holistic view involving many different aspects such as governance (Higgins, Dibden, & Cocklin, 2008). This position leads us to the next dimension.

4.2 A policy challenge of embeddedness

Sonnino and Marsden (2006) postulate that for a sound analysis of alternative food networks it is necessary to “... integrate the analysis of the wider institutional and governance system in which alternative food systems carve and maintain their space.” It requires also bottom-up considerations of local conditions and links to the concept of agency. While the embeddedness-focused research refers mostly to different forms of “food products” (Chiffolleau, 2009; Sage, 2003), our expert participants argue that such embeddedness is highly relevant to RSCM in general, such as territory development (Bowen, 2010) and supply chain dynamics (Bowen, 2011).

An example of how local agency can interact fruitfully with wider institutions comes from the wine-producing Arezzo region in Tuscany, Italy (Lenzi, 2013). There, two research projects, one on zoning land and one on wine production techniques, initiated a 15-year long process of learning and upgrading of local wineries. Wineries which embraced the external knowledge impulse were able to overcome their peripheral industry position and upgraded into supplying demanding niche quality markets. Similar collective learning processes have also been observed in other contexts, such as cheese production in Nicaragua (Perez-Aleman, 2011) where local producers translated an externally provided opportunity to deliver higher-quality products into transforming their production processes. However, such institutional change processes are not without risks since local actors might become over-embedded and develop networks that are closely knit (Grivins, 2016), but come at the expense of innovation and

learning (Crespo et al., 2012; Tampe, 2018). An important question is therefore what conditions enable success or failure of institutional change.

Related topics of governance and agency became also visible in the discussion of cases suitable for a RSCM. From the different showcases, the experiences from the expert participants suggest that it is often the personal engagement of single politicians such as city mayors that act as the engines for the development of rural projects, while the research in the rural domain is dedicated to investigations of overall governance impact on rural supply chains and various governance dimensions (Kirwan, Maye, & Brunori, 2017; Mishra & Dey, 2018). The key actors lobby stakeholders in the rural context, thus aligning the stakeholders' positions and exploring opportunities. They often have to balance the needs of different interest groups. For instance, in tourist rural areas there is a classic conflict between those citizens who benefit from the local tourism business while other citizens only live in the area and suffer from rising rents and prices due to the higher demand in peak seasons. The first group is frequently very open to new ideas and service offerings as they expect benefits for their business, while the latter group might prefer to keep the status quo.

Rural areas are only partly autonomous entities. They do not exist in an isolated space. There are often close political or community connections to other communities or to large urban areas in the neighborhood. Villagers often commute to big cities for work but live in a rural area (Dargay, 2002). This creates not only a competitive situation between urban and rural retail but also raises the question of mutual dependencies, for example in terms of regulations or funding of projects. The urban context thus also becomes an influencing actor and stakeholder for decisions relating to the rural area. Laws and policies are accordingly developed on different levels, such as county and village which also overlap. This may provide a complex conglomerate of power, agency and policies.

Such matters of governance and agency also appear relevant when it comes to the development of business models and their sustainable implementation in a rural context. Public development projects are often planned on a top-down basis but are not sustainable after funding is reduced. Bottom-up developed business models do not get enough momentum and local actors are often on the brink of failure. Successful projects seem often to follow a bottom-up approach of ideas and top-down funding. According to the expert participants, best practices and process excellence for the sustainable implementation of rural business models does not appear to have been sufficiently researched. This opens a number of avenues for further research in the institutional context of RSCM.

4.3 A challenge for shrinking and ageing communities

When considering the social lens of RSCM, it is essential to understand the social prerequisites and population of rural areas. In 2015, 28% of the European population lived in a rural area. There are a number of advantages which may attract people to live in rural areas: lower housing and living costs, more space, a better social fabric, less pollution, closer proximity to nature, or a less stressful lifestyle. Additionally, to date there are almost no differences with regard to health infrastructure and employment rates between rural and urban areas in developed countries (Eurostat, 2017).

On the other hand, rural societies face two central challenges. The rural population is shrinking and growing older, with vast differences between differing European countries. Overall studies predict a decrease in Europe's rural population from 100 million in 2000 to 75 million in 2030 (Burholt and Dobbs, 2012). Rural shrinkage is more prevalent in central and eastern Europe (i.e., Lithuania, Estonia, Bulgaria, Latvia, Hungary, Germany) with approximately 60% of regions experiencing depopulation, while in western Europe around 35% of rural regions are shrinking (EPSON, 2017). At the same time, the proportion of older people

in rural areas compared to urban areas will be greater due to the out-migration of younger people and the in-migration of pensioners (Klijn et al., 2005). For example, from 2001 to 2006, the share of the youngest age group (0 to 14 years old) declined noticeably in the newer European member states (i.e., Estonia, Bulgaria, Romania), whereas the share of the oldest age group (65 years and older) increased the most in the EU15 member states (i.e., Germany, Greece, Italy; Goll, 2010).

Ageing and depopulation will affect the viability of rural communities and rural supply chains, innovative solutions are therefore needed in order to maintain the attractiveness of rural communities. The project “Digitale Dörfer” (Rheinland-Pfalz, Germany) is developing innovative solutions to improve the rural supply chain with new technologies, as well as civic engagement. The core idea is that more mobile citizens deliver food and goods of regional retailers to less mobile citizens on the day of order. For example, commuters can deliver packages on their daily routes to work or on their way home. A digital business platform which includes an online shop co-ordinates orders as well as delivery of goods. The solution is supposed to strengthen regional businesses as well as community life in bringing citizens and retailers together. A first pilot of the platform has already been evaluated in two municipalities and gained a lot of attention from citizens and retailers (Fraunhofer IESE, 2016).

From these and other projects, expert participants put forward a path for researchers’ perusing to enrich the rural community dimension of RSCM. In a first step, there is a need to understand how to make use of the community for rural supply chains. As shown in the use case, citizens and civic engagement can play critical roles in providing rural areas with goods and services (i.e. sharing economy, own currency in the community). In a second step, further research should focus on how social factors predict or facilitate rural supply chains. One hypothesis is that there are cultural differences (i.e., independent versus interdependent

cultures), as well as individual differences (i.e., digital competencies, personality, health) which need to be considered when new solutions for rural areas are implemented. Third, the experts are interested in how rural supply chains affect social outcomes. For example, availability of services, such as for mobility and health care, might improve the quality of life in rural areas. Such services, crucial for human development, are also correlated to levels of economic growth, as shown in a large-N study on country-level trajectories of human development and economic growth (Suri et al., 2011).

4.4 A divide in the new world of digitalization

Digitalization in terms of ICT and Internet usage is increasing in all life domains, such as industry, work life, health, education, housing and mobility (Davies, Dolega, & Arribas-Bel, 2019; Lee et al., 2001; Singh & Dubey, 2012). At the same time, Eurostat data (2017) shows that differences in Internet usage and application of technology-enabled solutions are growing, especially between urban and rural areas. In 2016, 62% of the European population living in rural areas used the Internet daily; whereas 72% of the people living in towns and 75% of the population in cities accessed the Internet on a daily basis. However, there are vast differences between European countries, with western and northern countries (i.e., Luxembourg, Denmark, the United Kingdom, the Netherlands, Finland, Sweden) reporting higher Internet usage than eastern and southern countries (i.e., Greece, Poland, Bulgaria, Romania).

Differences in internet usage may be attributed to a lack of infrastructure in rural areas: in particular, high-speed connectivity is often restricted to more populated areas. Additionally, factors like general literacy levels, levels of education, computer and language skills may explain the differences between rural and urban areas in internet usage (Eurostat, 2017; Saleminck, Strjker and Bosworth, 2017). This phenomenon is known as the digital divide or urban-rural divide (Townsend et al., 2013).

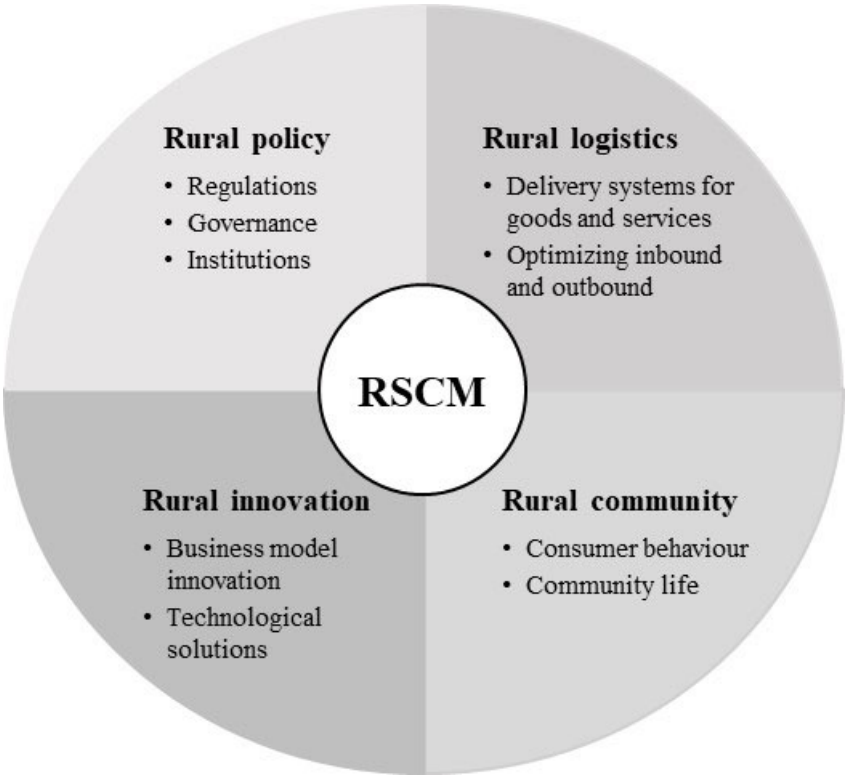
Nevertheless, digitalization represents great potential for rural areas and the rural supply chain. For example, Internet and ICT availability were found to positively relate to production gains (Tu and Sui, 2011) and economic growth (Van Gaasbeek, 2008). The project “Digitales Dorf Steinwald-Allianz” makes use of ICT in order to maintain local supply chains with food and goods in a rural area in north-eastern Bavaria (Germany). The main idea is that a mobile lorry shop weaves through villages with supply, providing them with convenience goods from mainly regional producers. The mobile lorry shop is complemented by a digital platform in order to raise its sustainability and efficiency. The platform consists of (1) an online shop with an extended selection of goods, (2) intelligent route scheduling for the lorry, (3) a communication platform for the driver of the lorry shop, the food producers, a connected village shop as well as the citizens. With the help of the platform, a new ecosystem for local supply of food and goods is established which allows new business models for RSCM. The pilot will be implemented in summer 2018 and will be continually tested and improved within the next two years (Williger and Wojtech, 2018).

From these and other use cases, the expert participants suggested the following research areas for the technology lens of RSCM. As a first step, there is a need to understand how ICT and digitalization can improve RSCM (i.e., information flows, delivery of goods and services) and meet customers’ needs more directly (i.e., demand forecasting, continuous replenishment of standard goods). Additionally, ICT and digitalization make it possible to bring different actors of the supply chain (i.e., producers, retailers, service providers, citizens) together. This leads to questions as to how these new ecosystems are constituted and how they result in new business models for the rural supply chain. Finally, further research in the innovation dimension should focus on how to overcome the digital divide between urban and rural areas, for example, in terms of bandwidth coverage as well as with regard to citizens’ digital competence.

5 RSMC research framework and discussion

The challenge in setting up a research framework is to address the many aspects and topics related to RSCM research. Although the literature covered a range of facets pertaining to RSCM, it was found that there were few contributions providing a holistic view of the aspects involved. We contend that our inductive approach allows us to address key research components of RSCM, and to create a foundation for further discussion about RSCM. The main findings from this study and their translation into future research agenda are broad, multidimensional and in many cases interconnected. As revealed in the result section, four interconnected dimensions emerge, which are – rural logistics, rural policy, rural community, and rural innovation. Each dimension is a lens through which one can study RSCM. Figure 3 offers graphical presentation of the proposed framework with the four research areas for RSCM and its key subtopics.

Figure 3. Research framework for RSCM



The many aspects of four-dimensional RSCM clearly imply that the field requires an integrated approach to tackle the multi-faceted challenges of rural spaces in a holistic and interdisciplinary manner. The interconnectedness of the proposed topics is demonstrated through ongoing industrial and communal projects in different European regions, thus suggesting and promoting links between the four dimensions and the topics within. Researchers have numerous opportunities to make a meaningful contribution to the body of knowledge within the broad domain of RSCM. The following subsections discuss the heterogeneity of rural context and present a foundation for future research endeavors.

5.1 Rural diversity and definitions

Notably, “rural is not rural”: there is a need to be cognizant that there is significant heterogeneity across rural spaces. It will therefore be necessary to develop context-specific definitions of what constitutes a “rural” region and to map the specific challenges of these different spaces within rural ecosystems. Needless to say, rural supply chain actors in bottom-of-the-pyramid countries may be confronted with different issues and needs compared to those in industrialized countries. Remote regions may grapple with an under-provision of public goods while tourist regions near major cities may deal with challenges stemming from intense seasonal fluctuations. Nevertheless, we propose that applying our framework to understand these region-specific challenges may be of use to a wide group of scholars and policymakers and, in addition, may help to identify overlapping themes.

5.2 RSCM and rural logistics

Rural logistics remains a topic with remarkable limited research. There is a need to delve deeper into the supply of goods and services into and out of rural environments. This physical lens of a RSCM highlights the challenges revealed by the expert participants such as the above-

mentioned issues of scales, low stop density or in general, the specific configuration or design of logistics networks in a rural context. Appropriate methods thus draw from operations research, including optimization, simulations, best practice analysis or logistics network analysis. Methods from engineering and design sciences may also be relevant, particularly in regard to parcel locker systems for rural environments or the applicability of unmanned autonomous vehicles.

5.3 RSCM and rural policies

The paper suggests that researchers turn their attention to rural policy and to how specific local history and context shape actions through policies, public regulations, or private governance constellations. Researchers need to map multiple actors and stakeholders; how they relate to each other, what spaces they have or use to communicate and negotiate with each other, what patterns of behavior become evident in their interactions, what goals they pursue with their policies, and whether these are competing or mutually reinforcing goals. Promising methods for studying the institutional context are often qualitative in nature and include interviews, participant-observation, and process tracing, which have been used in several disciplines including sociology, political science, management and business studies, and anthropology. Archival methods can be helpful particularly for large-scale projects which have been documented using a range of sources.

5.4 RSCM and rural community

The dimension of rural community invites studies of what citizens and consumers demand from rural supply chains and what opportunities and bottlenecks arise in the delivery of such flows and services. These services include those crucial to human development and quality of life, such as those relating to education, health, sports and the arts. Closely related are the questions

of *whether* and *how* citizens and consumers interact with policymakers, regulators and firms to obtain access to desired goods and services. Beyond this, the dimension of rural community also raises the question of how rural dwellers define their identity in relation to their community, the wider region and the nation-state, given that cleavages in identity politics have become apparent in urban and rural spaces in various countries, both in advanced and in developing economies. Consequently, in broad terms the following question is posed, “*How does daily life in a rural context become better?*”. A careful tracing of actors and assemblages, such as proposed by the social science method of Actor-Network-Theory, can be particularly useful for research in this RSCM dimension.

5.5 *RSCM and rural innovation*

Research under the dimension of rural innovation will benefit from studies of how information technology may be a key enabler for RSCM. However, technology cannot be studied in isolation since, to be enacted usefully, it needs to be constituted in innovative business models, including digital start-ups or social entrepreneurship projects and appropriate infrastructure. Such research on rural innovation may adopt methods from disciplines such as business model innovation and design sciences. It could also usefully link to newer fields such as machine learning and data mining, where opportune.

6 Concluding remarks

Maintaining or revitalizing rural spaces as attractive sites for living and working are major challenges which many countries face; ones to which researchers in and beyond the discipline of supply chain management can contribute. To meet this challenge, this paper presents an interdisciplinary view on what constitutes RSCM, and attempts to develop a holistic understanding of the field and of how this translates into research practice. This paper clearly

shows that more research is needed on rural supply chains. Significantly, this paper provides an initial framework, underpinned by an empirical study, which presents four dimensions of RSCM, i.e. logistics, policy, community and innovation. Our contention is that the four dimensions reinforce each other and therefore, research into/on just one of the dimensions, ignoring the effects on the other dimensions, would be suboptimal. This work furthermore provides an important foundation for future examination and for building theories in the area, and highlights a significant number of opportunities for further research which awaits scholars from various disciplines.

From a managerial and societal point of view, this paper reveals the complexity of RSCM and highlights challenges which need to be addressed. The proposed framework displays four interrelated dimensions with various aspects. Decision-makers need to consider these dimensions in their attempt to improve customer value and satisfaction. The paper can furthermore support discussion on the status of creating value in rural supply chains and assist in developing areas outside metropolitan areas for the future. The framework thus provides an initial integration and extension of all of the four dimensions into a managerially relevant conceptualization.

To conclude, as with any work, the present research has limitations. While the panel of experts provide rich insights and collective understanding of the field, there are methodological considerations which need to be acknowledged, particularly the sampling of participants and the generalizability of findings drawn from panel discussions. In this sense, it is fair to mention that the insights are drawn from the European context and are expected to be of high applicability to rural contexts in developed regions. With that said, the experts and their professional and academic expertise suggested high awareness of challenges and trends in rural contexts of counties with different degrees of economic development, making this study's

findings relevant to RSCM in different contexts. Future work needs to improve our framework, for example, by taking a closer look at the particular dimensions, reviewing specific issues and complementing the investigation scope with other methodologies. This might allow specific facets of RSCM to be identified in greater detail.

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