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New Metropolitan Perspectives

Knowledge Dynamics and
Innovation-driven Policies Towards
Urban and Regional Transition Volume 2

Smart Innovation, Systems and Technologies

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New Metropolitan Perspectives

Knowledge Dynamics and Innovation-driven
Policies Towards Urban and Regional
Transition Volume 2

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Preface

This volume contains the proceedings for the Fourth International “*NEW METROPOLITAN PERSPECTIVES. Knowledge Dynamics and Innovation-driven Policies Towards Urban and Regional Transition*”, scheduled from 26 to 28 May 2020, in Reggio Calabria, Italy.

The Symposium was jointly promoted by LaborEst (Evaluation and Economic Appraisal Lab) and CLUDs (Commercial Local Urban Districts Lab), laboratories of the PAU Department, *Mediterranea* University of Reggio Calabria, Italy, in partnership with a qualified international network of academic institution and scientific societies.

The fourth edition of “*NEW METROPOLITAN PERSPECTIVES*”, like the previous ones, aimed to deepen those factors which contribute to increase cities and territories’ attractiveness, with both theoretical studies and tangible applications.

When the call for papers of New Metropolitan Perspectives was launched in September 2019, no one could imagine that in a few months we would find ourselves suddenly catapulted into a totally unknown future. And the papers sent in January 2020, of course, could not in any way reflect the dynamics caused by the spread of COVID-19, the outlines of which will all be discovered and deepened in the coming years: it is still too early to fully understand the extent of these changes.

Today, we are still dealing with what appears to be a cataclysm of planetary proportions; it will take time to “historicise” events and interpret their profound meaning and long-term impact, through the multi-level observation—through the interpretation of macro-data and the in-depth investigation of the different realities involved—that the scientific community will be able to develop when the health emergency is over. At that point, the scenarios can begin to be configured with scientific rigour, which are beginning to be intuitively delineated in constant events. It will be possible to appreciate the permanent (real and perceived) effects on the daily life of communities, on the organisation of work and logistics chains and in the system of social relations.

At present, we can only hypothesise scenarios, more or less well founded.

The common thread that linked the different themes from the Symposium in its original conception was technology, in particular the effects produced on the settlement systems by the relationship between man and technology, in two different aspects: the progressive replacement of man with machines in practically all production processes and the spread of ICT.

The pandemic and the policies and practices put in place to contain the infection have brought this issue to the fore with arrogance. The replacement of physical interactions with “virtual” contacts has used consolidated technologies but has accentuated their pervasiveness, generating impacts of a different nature. The next few months will tell us how much of this acceleration will persist in our daily lives and how much it will be a transitory phenomenon.

Permanent changes are conceivable, for example, in the organisation of work, with the adoption of smart working as an ordinary way of carrying out the various tasks, also in areas where until a few months ago it seemed a distant future, such as in teaching.

And these changes will probably also affect other areas, just think of the use of culture, in a broad sense, as the many virtual opening initiatives of museums and sites of cultural interest have shown us in this period.

As well as central issues for democratic systems will be those related to the use of big data and their impact on individual freedoms: the ongoing debate on tracking movements and personal preferences is extremely topical.

However, the data that seems to emerge with greater force from the phase we are experiencing is the progressive loss of relevance of the location factor: the pandemic has made even more evident the fall of many barriers to the global dimension of relationships and exchanges. This change brings with it, as a consequence, a change also on the plane of centre–periphery dualism: what is centre and what is periphery, when the two terms no longer refer to accessibility to physical places but, for example, accessibility to goods and services and, ultimately, to knowledge? And how do you measure accessibility if you can no longer measure in metres or hours?

The other phenomenon on which it will be increasingly necessary to reflect in future is the speed of changes. As already underlined on the occasion of the past edition of the Symposium, while society evolves with accelerations impressed by endogenous and exogenous factors (such as the pandemic COVID-19), the physical dimension of space adapts with extended times.

At the dawn of the studies on the impacts of ICT on the city, the “wired city” studied by the research group of Corrado Beguinot was divided into a system of three cities: stone, relationships and experience. To harmonise the development times of the physical city with the “liquid” city of human relations is, after thirty years, still a priority.

So how will our cities and, more generally, the settlement systems on a planetary level record these changes? Will the trend towards population concentration persist in hyper-equipped and congested metropolitan areas or will we see reflux? New perspectives open up towards what are now considered peripheral areas (such as the inner areas so dear to our Master Edoardo Mollica), in which perhaps some

organisational processes are more easily managed and there are still values that could be appreciated by future generations?

The ethics of research, in the disciplinary sectors that the Symposium crosses, invites us to feed, with scientific rigour, policies and practices that make the territory more resilient and able to react effectively to events such as the pandemic that we are suffering in recent months: we hope to know the outcomes of these courses in the next editions of the New Metropolitan Perspectives Symposium.

For this edition, meanwhile, approximately 230 papers published allowed us to develop 6 macro-topics, about “*Knowledge Dynamics and Innovation-driven Policies Towards Urban and Regional Transition*” as follows:

- 1 - Inner and marginalised areas’ local development to re-balance territorial inequalities
- 2 - Knowledge and innovation ecosystem for urban regeneration and resilience
- 3 - Metropolitan cities and territorial dynamics. Rules, governance, economy, society
- 4 - Green buildings, post-carbon city and ecosystem services
- 5 - Infrastructures and spatial information systems
- 6 - Cultural heritage: conservation, enhancement and management

And a special section, *Rhegion United Nations 2020–2030*, chaired by our colleague Stefano Aragona.

We are pleased that the International Symposium NMP, thanks to its interdisciplinary character, stimulated growing interests and approvals from the scientific community, at the national and international levels.

We would like to take this opportunity, together with Carmelina Bevilacqua and the CLUDs Lab team, to thank all who have contributed to the success of the Third International Symposium “NEW METROPOLITAN PERSPECTIVES. *Knowledge Dynamics and Innovation-driven Policies Towards Urban and Regional Transition*”: authors, keynote speakers, session chairs, referees, the scientific committee and the scientific partners, participants, student volunteers and those ones that with different roles have contributed to the dissemination and the success of the Symposium; a special thank goes to the “Associazione ASTRI”, particularly to Giuseppina Cassalia and Angela Viglianisi, together with Immacolata Lorè, Tiziana Meduri and Alessandro Rugolo, for technical and organisational support activities: without them, the Symposium could not have place; obviously, we would like to thank the academic representatives of the Mediterranea University of Reggio Calabria too: Rector Prof. Marcello Zimbone; responsible of internationalisation Prof. Francesco Morabito; and Chief of PAU Department Prof. Tommaso Manfredi.

Thank you very much for your support.

Last but not least, we would like to thank Springer for the support in the conference proceedings publication.

Francesco Calabrò
Lucia Della Spina

Cities and Regions Towards Transition

The fourth edition of the New Metropolitan Perspective Symposium took place in a period of global uncertainty that is calling into question the essence of the economic prosperity pursued in the last decades. It is recognised that what is urgently required is a policy shift from a primary push towards ever-increasing productivity and competitiveness goals to one that pursues a “renewed” concept of competitiveness—socially just and environmentally responsible—employing a reformed pan-economic approach. The continuing and progressive changes due to the systemic impact of shocks and stresses at the global level need a convergence of efforts by all countries. This is critical to balance the need to maintain economic prosperity generated by globalisation and to mitigate global crisis like climate change and the ongoing COVID-19 pandemic. The scenario that is emerging these days is similar to a post-war reconstruction economy, alongside climate change and the risks associated with it, the emergency of the pandemic has seriously questioned social stability at the urban level and the confluence of institutions in multi-level governance processes. Concurrently, the main question to be addressed can no longer be confined to how cities and regions can compete in a global context, but rather how they can survive in a world that must face the effects of continuous shocks by ensuring socially acceptable living conditions for everyone.

At European level, this need has been stimulating the debate for the revision of policies designed to build a better Europe for its citizens and a “restructuring process” of EU institutions in the light of anti-European, populist and sovereign political movements. These movements together with far-reaching global crises and shocks are threatening the future of EU and the Cohesion Policy grounded on the virtuous principle to reduce disparities by promoting social, economic and territorial cohesion. In response, the European Commission has recently introduced the European Green Deal, a set of policy initiatives to strive for a green transition based on solidarity and fairness. This marks a novel growth strategy that is comprehensive, ambitious and bold, integrating climate, environmental and social protection goals with economic ones. Such a transformative pathway helps set the stage for policy actions in the upcoming post-2020 programming period of the Cohesion

Policy. Arguably, these days the perspective of the EU mission will be redesigned, through new priorities and new tools launched for Shaping the Conference on the Future of Europe.

In this context, the debate on how to prepare EU territories and cities to address challenges of regional and global implications cannot be more relevant. The current development approaches need to be adjusted to formulate a new development pattern. Such a pattern is characterised by a more flexible approach in allocating investment, a more integrated approach to reach the goal of transition development and a more tailored, place-sensitive approach to regional development. It should facilitate a sustainable transition process towards transforming regional and urban socio-economic and technological systems. This process will be driven with an evolutionary approach in which knowledge and innovation dynamics can break path dependency and promote an effective regional diversification. This pattern should be underpinned by an integrated, multi-scalar and multidimensional approach aimed to enhance the resilience capacity of territories to respond to the various crises and shocks they are exposed to.

To substantiate these arguments, the Symposium was also part of the TREnD (Transition with Resilience for Evolutionary Economic Development) research project funded by the European Union's Horizon 2020 Research and Innovation Programme under the Marie Skłodowska Curie Actions – RISE 2018. Considering the above-mentioned unparalleled yet controversial complexity while responding to the European call for the green transition, TREnD proposes a new approach in the design process of place-sensitive, innovation-oriented development policies that can facilitate the regional and urban transition to sustainability while reinforcing resilience to shocks induced by transition economies (e.g. post-carbon economy). TREnD's approach is focused on how to strengthen the regional capabilities to trigger, implement and manage transition strategies towards driving "resilience-building" processes. The scope is to combine Transition with Resilience for Evolutionary Development in different territorial contexts towards a reforming process of Cohesion Policy for the next programming period 2021–2027. The TREnD, therefore, seeks to: 1) identify and examine the factors enabling or hindering the transition strategies at a governance standpoint; 2) assess the territorial characteristics critical to enable a resilience-building process; and 3) unveil the unexploited potentials for "reshaping trajectories" disclosed through the windows of local opportunities due to the external shocks cities and regions are continuously exposed to.

TREnD highlights regional diversification seen more as a process of co-creation of solutions and concepts to solve development problems through the enhancement of the resilience capacity of regions, which can be achieved by implementing tailored place-based innovation policies with a transitional approach. Stemming from the current debates on regional diversification together with the emerging role of the city in pursuing local innovation ecosystem, the aim is to explore new development policy configuration within the evolutionary framework to help different territories effectively respond to continuous shocks. It is expected to gain a sound understanding of the triggering mechanisms conducive to frame a more

inclusive S3 process for the post-2020 Cohesion Policy. This new framework, thanks to resilience-based process and transition management, will help define tailored S3 processes more sensitive to different regional contexts and needs. In so doing, it will reinforce innovation diffusion, facilitate diversification and tighten the linkages between advanced and peripheral areas (at regional and sub-regional levels) through more inclusive approaches.

Considering this vision, the Symposium tried to offer possible solutions to sustainable development as defined by the UN Agenda 2030, focusing on the complex and dynamic relationships between human society and technological development, and the latter's socio-economic, political, institutional and environmental impacts on territorial and urban systems. Indeed, investigating the nexus between the ever-changing societal needs and rapid technological development represents a valuable opportunity to achieve this ambitious goal. The desired shift towards a more sustainable knowledge-based economy and society since the beginning of the 2000s, especially in developed countries, is impeded by several challenges. In Europe, the Smart Specialisation Strategy (S3) represents the strong push to boost economic development through knowledge, research and innovation. The current academic and policymakers' debate is questioning its capacity to break down path dependencies and facilitate economic diversification. The difficulties in implementing and doubts about the effectiveness of this ambitious innovation-oriented policy—especially at regional level—suggest the need to revise the post-2020 Cohesion Policy and the approach beyond Regional Smart Specialisation Strategy (RIS3). Among the rising concerns, the controversial effect of innovation concentration on peripheral areas due to the new geography of knowledge is coming to the fore. The surging discontent shows how policymakers are struggling with continuous mutating scenarios characterised by more complex territorial dynamics. The pillar on which the current policy action seems to rest is represented by the potentials underlying knowledge complexity and innovation in reversing negative trends. However, recent studies have pointed out how such complexity is giving rise to inequalities in both core and lagging regions, making peripheral areas a common issue to tackle. More efforts are needed to address different aspects of inequalities connected with the new geography of knowledge. Therefore, a more inclusive and integrated approach is desirable to advance technological innovation while addressing social issues of health, environment, education and social exclusion.

Accordingly, the Symposium stimulated multidisciplinary discussions on the key elements of the debate on a shift in policy design and implementation, including transition management, resilience, diversification and quality of governance to leverage the potentials of peripheral areas and reshape the trajectory of economic growth for more equitable development. It aims to identify a new and balanced developed pattern, casting light on the multi-scalar and multidimensional analysis of different perspectives, strategies, tools, objectives and impacts of local economic development and innovation processes. Such a pattern needs to be framed within the United Nations 2030 Agenda (TS25) and to reach the Sustainable Development Goals (SDGs).

The sessions have been organised around key elements affecting vertically (multi-level) and horizontally (cross-sectoral and multidisciplinary) the social, economic, institutional, organisational and physical/environmental dimensions of local economic development. The themes of sessions followed the key elements of the debate on a shift in policy design and implementation to drive transition-oriented structural change of regions. This echoes the EU's desirable smart transition that requires an economically prosperous and socially inclusive transition process to promote regional convergence. Sessions TS04T1, TS04T2, TS04T3 and TS04T4 altogether build up the overall theoretical framework of a sustainable transitional development, offering insight into knowledge complexity, transition management, resilience, diversification and quality of governance to leverage the potentials of peripheral areas and reshape the trajectory of economic growth for more equitable development.

To achieve a smart transition, it is critical to reinforce the resilience of regions at different territorial scales, especially those expected to be more affected, to respond to the shocks that green and digital transitions are likely to trigger. In this regard, the Symposium undertook a multifaceted and multidimensional conceptualisation of resilience, for which sessions TS01, TS25 and TS26 investigated territorial system resilience, urban resilience and sustainability. Session TS07 looked into smart and resilient infrastructures, and sessions TS09 and TS23 investigated urban and built environment with sustainability and resilience. Sessions TS02, TS06, TS10 and TS21 pay close attention to territorial and urban regeneration. Urban and territorial regeneration is considered as a useful tool to facilitate territorial and urban resilience-building processes by promoting positive physical transformations and thereby increasing cities' preparedness and response capacity to crises and shocks. Sustainable urban and territorial regeneration needs to define new economic and territorial strategies within a period of financial constraints. Therefore, session TS21 casts light on the issue of circular regeneration, while session TS03 conducts a critical review of territorial dynamics and urban growth models.

The value-adding of local assets from the urban–rural perspective offers a chance to define alternative development patterns. In this respect, cultural heritage, as potential local assets, needs to be properly leveraged to drive sustainable local development. The Symposium, therefore, highlighted innovative approaches to heritage management. Session TS19 casted light on the enhancement of cultural heritage in fragile areas; session TS20 presents new management strategies for the value-adding of heritage in inner areas; session TS22 relates heritage management to climate change, exploring integrated conservation strategies based on traditional and innovative technologies able to help mitigate the negative effects of climate change. The Symposium equally gives insight into the urban transition towards a post-carbon society, a key element useful for the discussions on the new objectives of the post-2020 Cohesion Policy and new strategies and tools. Accordingly, session TS23 investigated an ecosystem services approach to the evaluation of settlement transformations; session TS12 was focused on green building related to post-carbon transition, and session TS30 furthers session TS12 and proposed eco-design-based strategies and approaches.

As in the past editions, this year's Symposium has received generous support from and will see the participation of a high-quality international network of higher academic institutions and scientific societies. Therefore, it will undoubtedly serve as an important occasion for exchanging and disseminating research findings and stimulating a fruitful debate on global challenges among academics and policy-makers. All in all, the Symposium and the contributions to its different sessions contributed to deepening the discussions on a transition-oriented approach—on which the TREnD project is grounded—while offering insights into how to fill the existing gaps.

Carmelina Bevilacqua

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Managing Logistics and Supply Chain in Rural Areas: A Systematic Analysis of the Literature and Future Directions

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Abstract. Despite half of the world population lives not in metropolitan areas but in sparsely populated zones, the rural contexts have been at the periphery of logistics and supply chain management research. The main aim of this paper is to explore the state-of-the-art of the literature on rural supply chain management using a systematic approach. A sample of 51 papers from different disciplines with a management focus have been retrieved and analysed in details. A literature classification framework based on three different topic areas and related sub-topic areas was proposed. Seven research gaps have been identified that may inspire future research in this area. Interestingly, none of the papers identified has an explicit focus on the link between rural supply chain management and local development. To the best of the authors' knowledge, this study is the first attempting to collect, analyse and classify scientific papers related to rural supply chain management.

Keywords: Rural logistics · Rural supply chain · Literature classification framework

1 Introduction

The supply chain in rural areas is often fragmented due to scattered settlement and production; this leads to high logistics costs, specifically transport cost, and significant environmental impacts. For example, in the context of rural agriculture production the delivery of means of production (such as fertilizer, machinery, collection of produce) is not coordinated, and the load capacity utilization level of vehicles is low and varies between 10% and 95% [1].¹

¹ Due to space limitation, the references in square brackets concerning background or methodological papers have been incorporated in the text. To ensure the transparency of method used, the bibliographical references cited in Sect. 4 have been reported in the text indicating the author/s and the year of publications. However, the full list of the 51 papers included in the final sample is available on request.

From the research point of view, recent trends in rural studies have been predominantly focused on post-productivist rural spaces, agro-industrial development, alternative rural economies inside rural geography, globalization of the countryside [2], and more recently on digital developments [3].

Logistics and supply chain problems in rural areas have been rarely the focus of supply chain management (SCM) research. This is reflected in the large number of studies on transport and logistics issues of (mega) cities that have been conducted over the last decades [4]. One of the main reasons for the poor focus is the low attractiveness and challenges to design efficient value-added chains to the end customer. An interesting example is the case of some postal service providers in Germany, Austria, Denmark and UK, which deliver letters in rural areas only once or twice a week.

In addition, although the subject areas of geography, settlement structure and agricultural sciences are related to rural areas, they often lack to focus on the logistics and supply chain problems in these areas. There is the need to clarify what is the state of the existing research in this field and how rural areas can be supplied with sustainable and economically viable solutions in the future.

The main aim of this study is to review the literature concerning SCM and logistics issues in rural contexts using a systematic approach. More specifically, the objectives of this paper are: a) carry out a systematic and comprehensive literature review in the field; b) provide a framework for classifying the existing literature; and c) identify research gaps and suggest future research directions.

2 Review Method

The systematic literature review is selected as the research method for this study because of the nature of the research objectives, which aim at understanding trends and detecting existing gaps in the scientific debate. This review is based on clearly formulated research objectives, identifies relevant studies, appraises their quality and summarizes the evidence by the use of explicit methodology [5] overcoming the weaknesses of a narrative review [6]. The methodological approach adopted in this paper has been adapted from the works of [6] and [7]. In particular, it has been organised into the following three steps:

Step 1. Search Strategy and Materials Retrieval. In this step, on the basis of some existing papers and the researchers' experience, the following set of relevant keywords have been identified: "Rural supply chain management", "Rural distribution", "Rural logistics" and "Rural market". Such keywords have been applied in combination on the Scopus and Web of Science (WoS) databases. The two databases were selected because they provide a broad and excellent coverage of the existing literature and allow retrieving papers belonging to different disciplines but having a focus on management issues. 280 documents in total were initially identified using the above keywords in the title, abstract and keywords of documents (see Table 1). The outputs obtained from the two databases were compared and this allowed the elimination of 43 duplicates. In order to reduce the degree of subjectivity in the process (e.g. include irrelevant documents or exclude appropriate documents) and increase its reliability, the analysis of abstract and

full text were conducted separately by the authors. The results were discussed, and the authors jointly resolved different views and evaluations. In a further step, two inclusion/exclusion criteria were established. The first criterion relates to the inclusion of documents having linkages with logistics and SCM in rural context. The second criterion concerns the inclusion of documents with a management focus only (e.g. articles with a focus on technical or political aspects were not included). After applying the two above criteria, the final sample consisted of 51 documents. It comprises 37 journal articles, 11 conference papers and three book chapters. The final sample was satisfactory enough in terms of variety of disciplines involved and methodologies used.

Step 2. Descriptive Analysis. The selected material has been analysed for outlining formal characteristics of the final sample in terms of distribution of papers over time, distribution of papers across different disciplines and research methods adopted by the studies considered.

Step 3. Identification of Relevant Topic Areas and Content Analysis. In this step, three relevant topic areas have been identified. To identify the topic areas, it was used a mixed method based on a deductive and inductive approach [8].

Table 1. Phases and outputs of the search strategy

	Scopus	WoS
Documents retrieved	101	179
Duplications within each database	20	14
Net of duplicates within each databases	81	165
Duplicates between the two databases	–	9
Net of duplicates between the two databases	81	156
Papers out of the scope (first and second criterion)	48	138
Final sample of papers	33	18

The potential topic areas have been identified before analysing the papers in-depth (deductive approach). In this step, abstract, keywords and introduction of each paper have been considered. To obtain a more reliable and therefore more valid output, each author identified several potential topic areas in isolation. Subsequently, the potential topic areas identified have been further scrutinised and revised on the basis of a more extensive analysis of each paper selected (inductive approach). In this phase, each paper was assigned to one topic area only on the basis of the prevalent focus related to its main purpose. Through a number of meetings, the authors discussed and achieved a consensus on the topic areas to consider for grouping the papers. This allowed focusing on three main topic areas. Furthermore, the papers assigned to each single topic area have been clustered on the basis of other common themes within that topic area. This allowed further classifying the papers in homogeneous sub-topic areas. Finally, the papers included in each topic and sub-topic area have been in-depth analysed. The aim was to detect relevant issues and to build the basis for interpreting results. The following two sections provide details about the results of both descriptive and content analysis.

3 Results of the Descriptive Analysis

Formal characteristics of the selected papers have been analysed to identify some key features of the final sample. In relation to the distribution of the papers over time (see Fig. 1), two different phases may be identified. The first phase (from 1997 until 2009) is characterised by a relative low interest in this research area. In the second phase (from 2010 onward), the number of publications increased significantly even if only one paper was published in 2018. About the distribution of the papers published across different scientific disciplines, the following six disciplinary groups have been identified: i) Transport/Logistics/SCM; ii) Business and Management; iii) Information systems; iv) Agricultural science; v) Rural and regional studies, and vi) Geography. Such categories have been identified jointly considering the main specialisation of journals publishing the articles (for journal articles), the main focus of conferences (for conference papers) and books (for book chapters). The results indicate that most of the papers were published in the transport/logistics/SCM and business/management area. In relation to the research methodology adopted, the vast majority of the selected papers used quantitative or qualitative methods.

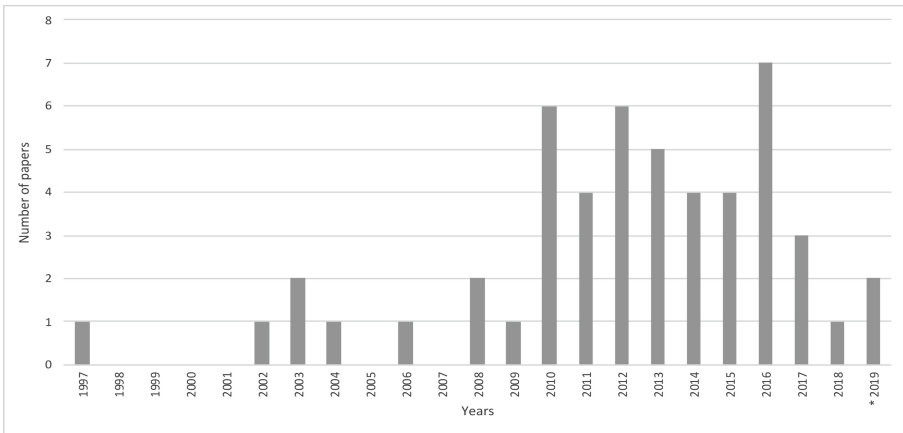


Fig. 1. Distribution of papers over time (N = 51); * The year 2019 includes the first quarter only.

4 Results of the Content Analysis

Table 2 provides the distribution of the 51 selected papers by topic and sub-topic areas.

4.1 Rural Retail and Distribution

This topic area includes 22 papers analysing retail and distribution issues in rural areas. It has been organised in the following three sub-areas: shopping and out-shopping behaviour, distribution and transport, retail strategy.

The first two papers relate to consumer shopping behaviour in rural areas of U.S. and India. The work of Miller and Kean (1997) focused on analysing consumer in-shopping behaviour through a number of factors affecting consumer out-shopping in the Midwest area of US. Among other factors, the authors found that the low importance attributed to customer service in consumer in-shopping behaviour. The paper of Venugopal (2012) investigated the out-shopping behaviour of rural consumers in India and identified that the decision concerning what and where to buy could be influenced by the urban orientation of consumers.

Table 2. Categorisation of papers by topic area and sub-topic area

Topic areas/sub-topic areas	# papers	
TA.1 - Rural retail and distribution	22	
Shopping and out-shopping behaviour		2
Distribution and transport		13
Retail strategy		7
TA.2 - Digitalisation and ICT in rural areas	19	
Implications of online shopping		3
E-commerce		6
ICT and platforms		10
TA.3 - Supply chain models and capabilities in rural areas	10	
Operational issues in managing rural supply chain		3
Supply chain capabilities		4
Supply chain models		3
Total	51	

The second sub-topic area deals with distribution and transport issues in rural context. Different issues have been analysed by several authors. A number of papers focused on China to address the problem of minimising logistics costs and optimise distribution networks in rural areas. To achieve this, simulation tools have been used as in the case of the studies of Nie et al. (2010), that proposed a two-direction logistics system model focused on agricultural products, and Huang (2012a), who suggested a model for the optimal location of rural logistics distribution centre. Similarly, Zhang et al. (2015) suggested a planning approach for rural distribution networks. Considering the diversification of loads, the work identifies a model that is able to provide economic and environmental benefits. Other issues investigated relate to strategies for improving post logistics network in Henan region (Haoping 2010) and forward and reverse logistics network design proposed by Zhuang et al. (2016), that used the Pinggu district of Beijing as an example. The benefits of co-distribution strategies in rural areas have been addressed by the work of Hageback and Segerstedt (2004). The authors discovered that companies receive and distribute goods with a low frequency and the loading capacity of vehicles is often less than 50%. This implies that co-distribution services are necessary to reinforce the competitive abilities of companies in Pajala (Sweden). Bosona et al. (2013) stressed that in rural areas, food supply chains can be improved

through coordination and optimization of logistics operations. This includes optimized food outlet locations, coordinated resource utilization, organized selling ways or products, and optimized goods transport. For example coordination and optimization of food collection from local producers and distribution in the same area (within radius of about 250 km) in Sweden resulted in reduction of number of trips, transport distance and time as emerged from the studies of Bosona and Gebresenbet (2011). Nordmark et al. (2012) concluded that food distribution activities in rural areas can be influenced by travel distance, type of food and its packaging, road network, availability of facilities (such as collection and distribution centres, local groceries, and supermarkets), spatial variation in population settlement, and environmental conditions. On the other hand, Ramirez et al. (2016) argued that to facilitate the accessibility to healthy food in rural areas, innovative strategies based on site selection, product selection, and designing of distribution models. In addition, it is necessary to involve local communities in decision-making processes.

The papers dealing with retail strategy tried to fill the gap concerning the lack of specific academic studies in rural retailing. Possible strategic alternatives for retailers in rural areas have been studied by Byrom et al. (2003) that used the Scottish islands as an example. Factors affecting retailer preference and related problems in managing distribution channels in the rural market of India have been analysed by Jasim and Vinoth (2017). In rural areas, access to food and spatial characteristics of local food system have attracted attention of scholars in recent years. In this case, 'food deserts' and possible grocery closure are a societal concern as stressed by Yeager and Gatree (2014). In rural areas, food can be accessed via nearest supermarkets, big box stores, and local food systems. However, the scattered settlement and limited transportation further complicate the access to healthy food. In Europe, there is a growing consumer demand for local food [11, 12]. Currently, about 15% of EU farms have direct contact with consumers. The distribution of local products is carried out through local farmers' markets, directly at the farm, through basket/box delivery systems or other community-supported agriculture schemes. In areas of dispersed population settlement, in order to facilitate access to food, consumers and retailers can be clustered and each cluster should be represented with a geographical point. The availability of supermarkets and/or other food outlets nearby the centre of clusters improve the food accessibility and provide benefits for the environment. For instance, Bradley (2016) studied environmental impact of retail businesses and their products based on geographical locations of retailers in the U.K. He found that the environmental impact can be affected by the availability of alternatives in food supply and seasonal and price variation of food products. Anania and Nistico (2014) highlighted that spatial variation of retail also causes price variation of the product. Assessment of access to healthy food also depends on the definition of term 'access'. For instance, it can be defined in terms of distance between food outlet and centre of cluster of rural population or in terms of availability of transport infrastructure and means of transport. Yeager and Gatree (2014) evidenced that in USA a distance between food outlets and consumers may range from 10 to 500 miles. On the other hand, Nilsson (2009) and Bosona and Gebresenbet (2013) noted that in Sweden, food produced and supplied within the road distance up to 250 km is often considered 'local' food. Distance calculation methods can also affect the access to healthy food. Rather than depending on Euclidean distance,

real road distance based analysis could result in more reliable distance estimation. Haynes-Maslow et al. (2018) studied rural corner store owners' perceptions of stocking healthier foods in U.S. and recommended that such facilities in rural areas need help from policy makers promoting the access to healthy food. A similar study carried out by Paluta et al. (2019) pointed out that healthy corner store initiatives offer promising food access strategies in U.S.

4.2 Digitalisation and ICT in Rural Areas

This topic area has been organised in the following three sub-areas: implications of online shopping, e-commerce, and ICT and platforms.

Three papers address the sub-topic area "Implications of online shopping" with regard to residents and retailers of island communities. An empirical study by Calderwood and Freathy (2014) reveals that online shopping has modest potential to reduce shopping related travel of residents. In a more recent study, Freathy and Calderwood (2016) illustrate that online shopping is a competitive threat to the local retail economy, and that retailers need react to such developments. The threat of online shopping for local retailers is also the subject of the paper by Schiffing et al. (2015) that reveal strategies for the economically sustainable operation of local retail shops.

The papers belonging to the sub-topic "e-commerce" deal with general concepts and solutions for rural e-commerce activities, collaboration of SMEs via internet portals, and the application of e-commerce to the agricultural sector. Leong et al. (2016) present a case study with two e-commerce villages in rural China. The authors identified critical actors in a rural e-commerce ecosystem, the use of ICT, as well as three unintended consequences of e-commerce in rural areas. Sun (2017) summarised the research on rural e-commerce in China, where rural areas are seen as consumption market for e-commerce and e-commerce has a great development potentials in rural areas. In one of the earliest studies in this topic area, Sanders et al. (2010) explored the use and the effectiveness of private and public/charity managed internet portals in rural SMEs e-commerce activities. The study reveals that there were no perceived differences between the types of internet portals. Andreopoulou et al. (2011) discussed the website features to be accounted when designing a collaborative website for e-commerce purposes. Therefore, the authors analysed 44 websites of rural enterprises and identified the optimum group that can be used as a benchmark for other e-commerce websites. Carr et al. (2013) explored factors influencing the willingness of SMEs to share knowledge online in business networks in rural areas. They discovered that the main factors associated with willingness to share knowledge online were the willingness to share knowledge face-to-face and the intensity of Internet use. Wang et al. (2016) investigated e-commerce with a special focus on the agricultural sector. The authors performed a game analysis on the cooperation between farmers and other stakeholders, and concluded that farmers need to dynamically adjust the cooperative relationships with other stakeholders.

The sub-topic area "ICT and platforms" includes papers illustrating how the use of ICT and information platforms can change the rural supply chain. Nordmark et al. (2012) argued that introducing IT systems for facilitating electronic trade and virtual relationships between food producer and consumers enables the coordination of food

logistics performance in rural areas. Retail structures and logistics facilities for food distribution may vary not only from region to region but also from country to country. Javid and Parikh (2006) addressed the potential of technology-based solutions to optimize distribution routes and reduce inefficiency of rural supply chains in rural India, discussing the potential of technologies to determine a user's location via a mobile device. Sharma et al. (2008) proposed a low-cost security solution that can prevent theft and fraud in rural supply chains in developing countries. The work of Velaga et al. (2012) examined accessibility and connectivity in rural areas highlighting key transport and technology challenges. It also explored barriers and facilitators that may provide transport and technology solutions to enhance rural accessibility and connectivity. Gao (2015) investigated how the Internet of things may improve the quality of the agricultural supply chain on a conceptual level. Deichmann et al. (2016) proposed a framework for the benefits of ICT in the agriculture sector of developing countries. They subsumed that the benefits do not show in practice to the extent that might be expected so far. The paper by Yiming and Jia (2016) highlights the potentials of information platforms for urban and rural logistics. The paper presents functional requirements as well as implications for the functional overall structure of these platforms.

4.3 Supply Chain Models and Capabilities in Rural Areas

This topic area includes ten papers concerning operational issues in managing rural supply chain models and related capabilities in rural areas.

Three papers relate to operational issues in managing rural supply chain. The paper of Stanton and Burkink (2008) investigated strategies to facilitate small farmer participation in international supply chains for fresh products. The results indicate that U. S. importers are not uniformly pessimistic about the ability of small farmers to meet their demands. In general, importers are interested in transactions in which the product meets consumer and government expectations and it has been grown on the buyer's terms; such as the grower is reliable over time, the transaction is simplified, and the grower handles transportation. Xu et al. (2013) applied the Six Sigma method to rural logistics to optimise agricultural processes. The case study of Shouguang in the Shandong province of China illustrates how the application of the Six Sigma method allows reducing logistics costs and streamlining vegetable logistics.

Supply chain capabilities in rural areas are another topic that has been investigated in the extant literature. The work of Liu and Fu (2015) provides a good example as it adopted the fuzzy matter-element approach to build an index system including rural economic environment, logistics capability and logistics potential. The authors provided a comprehensive evaluation of logistics capability in Hebei province (China) through a quantitative survey using data from 2006 to 2013. The results show that in rural logistics, logistics capability is rising rapidly.

Three papers addressed the sub-topic area "Supply chain models" through developing statistical models or algorithms, and building up conceptual frameworks on the rural supply chain. Using the example of China's agriculture, Jiang and Yang (2009) developed a new algorithm for improving rural logistics construction. Kumar and Babu (2013a) identified factors that might influence the rural supply chain in India. Main factors relate to the scarcity of transport infrastructures, inefficient warehouse networks

and inadequate communication between different supply chain levels and actors. In a second step, they modelled and categorised the relationships between these factors in order to derive implications for the management of rural supply chains. The paper of Kumar and Babu (2013b) studied whether marketing and supply chain in rural areas differ from traditional approaches known in the field. The authors built up a conceptual model for a better rural SCM.

5 Discussion, Research Gaps and Future Research Directions

This section discusses the results of the literature review in order to identify a number of research gaps and suggest some future research directions.

Some other interesting elements can be drawn from the analysis. Firstly, it emerges a lack of studies comparing rural SCM practices in different countries (research gap 1).

In addition, different perspectives may be considered in relation with rural SCM research. It is well known that customer service is a fundamental component of logistics and SCM. One of the main characteristics of rural areas is the sparse population in very large (remote) areas. This poses inevitably the problem on how to provide a satisfactory level of customer service in rural areas and what are the most relevant implications on the management of logistics and supply chain in those areas. This specific aspect appears under-researched in the extant literature (research gap 2).

Similarly, there is the need to investigate more in depth the trade-off between customer service and logistics costs in rural areas (research gap 3). In fact, logistics in rural areas is often more costly due to the small-scale of manufacturers and the scattered settlement and production. The provision of a satisfactory customer service is then a challenge, which leads to higher logistics, particularly transport costs.

Considering the above issues, the collaboration between logistics service providers in rural areas is necessary for co-distribution aimed at reducing the higher costs of logistics. Co-distribution in rural areas has been another issue that has not received a great attention in the current literature on rural SCM (research gap 4).

Managing logistics and supply chains in rural context requires specific knowledge and capability. Very few studies addressed this point (research gap 5).

Besides, ICT and digitalization have been found to be an emerging topic in the field of rural SCM. This is not surprising, as empirical studies suggest that Internet and ICT availability positively relates to production gains [9] and economic growth [10]. Most papers in this topic area have been published later than 2010. In these years, the internet 2.0 made available new forms of cooperation and communication via e-commerce. The relatively high share of papers dealing with e-commerce (about 12%) shows that e-commerce has high potential for customers as well as retailers in rural areas. On the other hand, the current literature on this topic missed to analyse the impact of new technologies (e.g. Internet of things, big data analytics, cloud technology) for managing supply chains in rural areas (research gap 6).

All the papers analysed lack a definition of rural SCM (research gap 7). This may be the result of the lack of theoretical foundations in this area. In fact, the analysis of selected papers reveals a very limited use of theories and theoretical discussions.

The results achieved allow addressing the three research objectives of this paper. In relation to the first research objective, the methodology adopted allowed to select a sample of papers that was satisfactory enough in terms of variety of disciplines involved and methodologies used. The paper suggested a classification approach of the existing literature based on three topic areas and additional sub-topic areas. This allowed achieving the second objective of the work. In relation to the third research objective, a number of knowledge gaps and related future research directions have been derived.

Finally, the main contribution of this review is to increase the understanding of existing research on rural SCM issues and to offer a systematization of the literature in this field. A conclusion of this work is that rural SCM is an immature research stream, even if it is gaining interest over time. Further research efforts are needed to investigate this issue more in-depth. The hope is that this paper may be a useful source inspiring further research in this field.

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