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# **Between Geography and Transport: A Scientometric Analysis of Port Studies in Journal of Transport Geography**

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## **Abstract**

*Journal of Transport Geography* (JTRG)'s scientific production has grown apace in line with the publication trend in general elsewhere, with many researchers of which more or less directly related to geography, who submitting their works to JTRG. Through an investigation of port articles published in JTRG (Group A) and other selected journals categorized into geography journals (Group B), and transport but non-geography journals (Group C) between 2009 and 2018, we strive to answer whether JTRG is more a transport or a geography journal given its double-sided nature. Using a well-defined analytical framework, we analyzed no less than 864 port articles that were categorized in terms of their spatial coverage from global to local, as well as their functional approach in terms of locational, operational, and socio-economic impact nature. Main results reveal that JTRG has a distinct '*from top to bottom*' stable pattern with a preference for global level and operational research. Yet, in relative terms, JTRG remains specialized in regional/national spatial scales and in the spatial (locational) perspective. Such a research contributes to a better understanding of the disciplinary evolution of academic research in the field of spatial studies, transport studies, and beyond.

## **Keywords**

Archival corpus; bibliometrics; categorization; geography; port studies; scientometrics; transport studies

## 1. Introduction

Since its accession to global standards of publishing in 2009, notably the Social Science Citation Index (SSCI), *Journal of Transport Geography* (JTRG)'s production grew apace with the general trend of publication of similar high standard journals. More researchers, including those with a non-geography background, published their research in JTRG as already observed by Ng and Ducruet ((2014). Given the journal's impact factor steady growth in the past decade up to 2.699 in 2017 (cf. Journal Citation Report website, last accessed in October 2018), JTRG is now generally perceived as a first-tier journal in both geography and transport disciplines.

Given its two-sided nature between geography and transport, we use the case of JTRG to analyse how a given journal evolved during that period, focusing on the respective importance of each main pillar it serves. This raises a crucial question on whether JTRG attracted scholars due to its geographical character and/or to its transport character. How has this subtle equilibrium evolved overtime, do we see a specialization or a stable balance? Previous bibliometric analyses (e.g., Pallis et al., 2010; Woo et al., 2011; Ng, 2013; Ng and Ducruet, 2014; Lau et al., 2017) often looked at a corpus of journals to identify general trends underlying the evolution of port geography as a sub-discipline of human geography (Ng and Ducruet, 2014). In fact, very few studies have so far looked at a particular journal's evolution at the crossroads under different influences, of which Notteboom et al. (2013) and Modak et al. (2019). Coincidentally, the 25<sup>th</sup> anniversary of JTRG make it an ideal moment to critically examine the changing character of geography, transport, with wider implications for the analysis of scientific research in general.

In this study, we analyse a large corpus of papers on port studies published in JTRG and other selected journals over the period January 2009 to June 2018. A bibliometric analysis serves to reveal analytical frameworks underlying those articles. In so doing, we investigate the geography/transport nexus of JTRG papers based on the nature of their cited references. The rest of the paper is structured as follows. Section 2 explains the analytical framework, while Section 3 illustrates the main results. Finally, the discussion and conclusion can be found in Section 4.

## 2. Analytical framework

To achieve the stated goals, we selected articles in which port was the major focus of the study (hereinafter called ‘port articles’) from no less than 32 internationally recognized journals published between January 2009 and June 2018. In total, the article sample reaches exactly 864 articles, which we classified as follows: JTRG articles (i.e. Group A, including 1 journal and 98 articles), geography journal articles (i.e. Group B including 21 journals and 69 articles), and transport (but non-geography) journal articles (i.e. Group C including 10 journals and 697 articles) (see Appendix I). All the papers where ‘port’ (including dry port and inland terminals) is the main theme were included<sup>1</sup>, as in itself port research has fuzzy borders and is hard to delineate.

The first step to create the database is the categorization of articles. There has been substantial research trying to categorize port and shipping articles using different types of categorization while focusing on different issues, e.g., the lack of standard terminology, performance, economy, policy, management, geography, as well as the general research trend, evolution, emergence, and gap analysis (e.g., Bichou and Gray (2005), Heaver (2006), Pallis et al. (2010), Pallis et al. (2011), Woo et al. (2011), Talley (2013), Woo et al. (2012), Ng (2013), Woo et al. (2013), Ng and Ducruet (2014), Ng et al. (2014), Vieira et al. (2014), Lau et al. (2017), Ensslin et al. (in press)). When reviewing them, researchers frequently highlighted the difficulty in establishing a commonly approved framework for categorization, although some similarities could be identified from one study to the other.

In this case, this study mainly uses the one proposed by Ng (2013) (and later also used by Ng and Ducruet, 2014) about port geography (Table 1), adding port’s future market (1.3.2) as a new focus of research, and completing the list of issues. The framework was developed based on an in-depth literature review of port and transport papers and strengthened by informal discussions with reputable scholars (see Ng, 2013). In this paper, we added another dimension to such a

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<sup>1</sup> In deciding whether ‘port’ is a particular paper’s main theme, we followed the same verification process undertaken by Ng (2013) and Ng and Ducruet (2014). Of course, we recognized that there might be some articles overlooked due to various reasons (e.g., inability to access them, minor interest given to port-related issues). In our opinion, it is important that the list is comprehensive and representative enough for analysis. Indeed, in this study, some core geography journals were not included as they did not offer strong contributions during the interval of investigation, e.g., *Economic Geography*, *Political Geography*, etc.

framework: the spatial coverage of port articles: global (foreland and maritime space), regional/national (hinterland), and local (port) scales<sup>2</sup>. This facilitates identifying spatial shifts in researches as will be discussed later in Section 3. For illustrative purposes, all the categories have been marked with respective codes (see Table 1) that will be referred to throughout the paper. In addition, categorization with regards to the aforementioned scales have been further followed up in Table 1 by dividing articles as space-related (locational), activity-related (operation) or consequence-related (impact), and then completed by their specific focus of research to minimize subjectivity. During the study process, we recognized that there were articles that included more than one area of focus. Therefore, the weight of an article that consisted of more than one category is equally divided during the investigation, e.g., 0.5 for each category for an article with two categories.

Starting with foreland and maritime space, the focus of research under its locational perspective is summarized in terms of the “port system” (1.1.1), i.e. mainly investigating a group of ports with a certain level of integration within a given regional setting. This is generally addressed as hierarchy or cluster, in which establishment and development of the system are surveyed, but may also remain at the national scale (e.g. the French seaport system). The operation perspective comprises of two subtypes, namely port connectedness (1.2.1) and port choice; competition and cooperation (1.2.2). Port connectedness articles generally discuss the linkages between ports and their international market (e.g., foreland or overseas markets), while port choice is preferably approached in terms of ports’ competency, attractiveness, competition, and cooperation dynamics. The impact perspective also covers two sub-themes: the port’s situation in shipping strategies and networks (1.3.1), and its future market(s) (1.3.2). In 1.3.1, a wide variety of issues are discussed, e.g., the intermediacy of ports (see Fleming and Hayuth, 1994), their ability to get inserted into different types of shipping line networks and supply chains. In 1.3.2, a somewhat new area of research is covered based on recent transformations of the shipping industry, such as ship size, fleet overcapacity, changes in freight rates, alterations in international

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<sup>2</sup> The original framework takes care of two other groups which cannot be easily located based on spatial coverage, namely policy and governance philosophy and epistemology (Ng, 2013). Articles in such groups which have issues in common with the three first spatial units (i.e., those with more than one area of focus) are considered in this study. For the rest of them, they are not included.

rules and regulations, the establishment of new maritime routes, and most of all, the formation of vertical and horizontal alliances.

For the hinterland spatial unit, we mainly consider port functions and expansion in terms of the number of stakeholders and the potential mechanisms employed locally and on the land side. Nowadays, ports are considered as the ‘middle-man’ of trade encountering a wide variety of issues raised by different stakeholders (Ng and Liu, 2014). As a consequence, flexible response to such issues is becoming a critical core competency for ports, yet challenging. However, this community of links, nodes and patterns is fully supported by new concepts and technologies, with studies on new logistic corridors, modal substitution, big data, and simulation (Ducruet, 2017). In light of different practical issues involved in this spatial unit, research is on the rise despite the difficulty accessing hinterland flow data (Guerrero, 2014).

[INSERT TABLE 1 ABOUT HERE]

Research in this area is similarly categorized into three functional perspectives. The first is the locational perspective, where the focus of research is “catchment area and supply chain linkages” (2.1.1). Here, regions which have communication with supply chains through ports are addressed and their evolution is identified. The operation perspective is twofold: port’s intermodal transportation and supply chain (2.2.1) and inland/satellite terminal (2.2.2). The first includes discussions about ports’ inland connections and related logistical patterns (e.g., logistics sprawl, port regionalization, cargo source, shipper and corridors), the planning and optimization of port and shipping activities (e.g., empty container repositioning, synchronomodality and integration). Considering the growing role of inland terminals in such patterns and dynamics (e.g., handling additional port traffic, transloading, servicing regional markets, transshipment), it is separated. Research about the interaction between regional change (e.g., economic development, environmental issues) and port activities are grouped under the “impact” perspective (2.3.1).

For port space, the focus of research in its locational perspective is again twofold: “history” and “location” (3.1.1). It includes ports’ geographical characteristics and their evolution overtime (3.1.2), for instance in terms of port morphology, development stages, analyzed through spatial models and empirical measures. All research mainly addressing port daily challenges and activities are gathered under the “operation” perspective as daily operations (3.2.1). Although it has been conventionally believed that the neighborhood of port and city often generates mutual benefits, the emergence of new concepts in a wide variety of scientific fields (e.g., sustainability, resilience, coupled/synergistic development, port-city ecosystem/interface assessment, optimization of freight distribution patterns, and port-centric logistics) presents new insights and sheds light on overlooked corners. Accordingly, it is believed that the potential role of micro-level studied (e.g., socio-economic role) is either exaggerated or still not correctly perceived. Port expansion, logistic chains, and port externalities<sup>3</sup> are all among the many drivers introducing the necessity of mutual port-city (waterfront) renewal and/or re-development. There are scholars who are trying to get to the bottom of the interaction mechanisms or introduce system drivers, for the sake of re-bridging the link(s) between port and city. Similarly, research is abundant about planning issues in those two areas considering, for instance port-city mutual direct, indirect, and induced effects. Related research is categorized under port-city relationships (3.3.1).

### **3. Empirical results**

To understand the position of JTRG among the three groups of journals, our analysis is divided into three aspects, namely (1) trend of publication, (2) focus of research, and (3) quality and quantity of references.

#### *3.1. Trend of publication*

Table 2 synthesizes the ten-year list of journals within the groups and among the journals. It illustrates that JTRG is the only geography journal that has published port articles continuously throughout the period under investigation. It has also published the highest quantity of port-related

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<sup>3</sup> Externalities are indirect effects that can be passed on to third parties, other interests and the wider environment beyond port firms and investors. They could be positive, e.g., innovation and technological progress, or negative, e.g., environmental degradation (Bichou, 2013).

articles. For Group B (geography journals), *GeoJournal* has the best record of hosting port articles intermittently within seven years with the highest total number of articles in this group.

[INSERT TABLE 2 ABOUT HERE]

[INSERT FIGURE 1 ABOUT HERE]

In addition, some interesting correlations between the number of articles featured in JTRG, *Transportation Research Part A* (TRA) and *Transportation Research Part E* (TRE) can be identified in Table 1. For instance, throughout the study period, JTRG and TRE share highly similar trends. On the contrary, JTRG and TRA have exactly the opposite trends between 2014 and 2016. During this period, while JTRG suffered a decrease in port articles, while TRA experienced the opposite.

When looking at the number of articles presented in JTRG per year, we find similar patterns for a three-year period starting from a minimum and reaching a maximum, for the first nine years of investigation between 2009 and 2011, 2012 and 2014, and 2015 and 2017. Fig. 1 illustrates the trend of publication with the logarithmic scale on the y-axis of the figure to highlight pattern recognition, as the number of articles published in Group C is about seven times higher than those in JTRG and Group B. This periodic trend is interrupted as JTRG hosted 12 articles in the first six months of 2018.

The pattern is different for Group B, where on average about seven articles per year have been published during the study period, while a slightly downward trend could be identified. For Group C journals, there are at least two sub periods – from 2009 to 2011 and from 2015 to 2018. JTRG underwent a similar trend. After passing the first growth period between 2009 and 2011, Group C journals experienced a growing trend (i.e. 65 port articles in the next four years) and between 2015 and 2018, a promisingly stable trend. This result is mainly based on rapid publication growth in two key maritime, non-geography journals: *Maritime Policy & Management* and *Maritime Economics & Logistics*, but hosting geographic approaches to ports.



### 3.2. Focus of research

#### 3.2.1. Spatial unit coverage

We first counted the number of articles featured in each spatial unit for the three journal groups in terms of *normalized number of articles* (left), and *specialization index of spatial unit* (right). Those on the left of Fig. 2 simply show the share of each group in each spatial unit

When looking at the radar diagram of normalized number of articles of JTRG (Group A) in Fig. 2.1, foreland and maritime space has the largest spatial unit discussing global challenges. It has usually been the main scope of articles in this group, among all other spatial units. As the results show, it has the highest number of articles followed by hinterland spatial unit and port spatial unit in the study period, respectively. Here, the share of articles in port unit is highly fluctuating and generally very low when compared with the first two units, while the difference between these two decreased in recent years, starting from 2014.

As noted in the previous sub-section, there is an upward trend in the number of articles published in JTRG from 2015 to 2018, by projecting the result of the first half of 2018 to the second half. This is complemented by harmonized growth of articles in global, regional/national, and local spatial units, in JTRG. Thus, we argue that the growth in articles presented in JTRG per year from 2015 to 2018 is a direct result of a systematic growth of articles in the three aforementioned spatial units. In fact, while there is no harmony within the initial years, a common patterns can be observed' within the last four years. Here, the sudden increase in contribution of local scale articles from 2015 to 2016 could be identified as the main factor for the increase. Overall, this correlation among the growth rates of articles in global, regional/national, and local scales could explain such sustainable growth during this period in which JTRG has offered a balance in attraction. In the meantime, the growth in foreland and hinterland scales is more stable than port scale articles in the last ten years. Although JTRG has grown in terms of port scale articles, still, global and regional/national issues have the two highest shares of research. In fact, we are far from the period of 1950s and 1960s where the focus has been more on single subjects (Ng and Ducruet, 2014). Among the causes of such trends is the growing interest for the worldwide networks of globalizing players such as shipping lines, terminal operators, but also traders, as well as the integration of new methods borrowed from network analysis and complex networks for instance, allowing to

study larger port systems with hundreds of nodes and give port geography a decent place in transport network studies long dominated by landward (e.g., road, rail) but with a growing interest for non-physical networks (e.g., multinational firms linkages, communication networks). One example is the study for the first time ever of the global shipping network in relation with urban hierarchies and functions using graph-theoretical networks, going beyond the sole topological dimension of such a world system, in addition over the last 140 years using untapped and harmonized data on both vessel movements and urban population (Ducruet et al., 2018).

As per the normalized number of articles in Group B (Fig. 2.3), regional/national issues have slightly homogeneous contributions over the past decade in geography journals. Two periods of dominance in featured articles are evident during this period, as the global unit has the majority of articles in the first seven years (2011-2016) substituted by local unit articles for the last three years. It does not contradict the previous finding, as local-level studies keep being of paramount importance to renew the study of micro-linkages, such as studies on start-up development (Witte et al., 2018) or firms' linkages across the port-city interface (Van den Berghe et al., 2018; Hesse, 2017; Debrie and Raimbault, 2016) but also studies of terminal concessions and governance (Daamen and Vries, 2013), some of them fully engaged in wider conceptual frameworks in human geography and beyond (see Jacobs and Legendijk, 2013).

A long-term dominance of local scale articles followed by the simultaneous gradual growth of articles in global and regional/national spatial units is the main characteristic of group C (Fig. 2.5). In other words, it is from 2012 that an increasing trend of articles featuring local unit appeared, followed by global unit and regional/national unit articles, respectively. In the meantime, local scale articles always seem to be the most dominant, followed by global and regional/national scale articles. This is driven by the growing number of articles focusing on local-level activities, often from an operations research perspective on performance, congestion, productivity, and intermodalism.

Overall, JTRG is more “from top to bottom” while Group C is more “from bottom to top” in terms of the frequency of papers published in different spatial units. This seems to be a confirmation of the aforementioned stronger specialization in port operation research of Group C,

such as at the level of terminals and warehouses for instance (e.g. satellite terminals, logistics sprawl, development of inland platforms) such as Venlo in the Netherlands (Raimbault and Jacobs, 2016) but also wider approaches from a conceptual and theoretical point of view (Monios and Wilmsmeier, 2013). There is another point when comparing JTRG and Group C diagrams (Fig. 2.1 and Fig. 2.3). They have both experienced a decrease in articles of their main unit in 2018 considering that the period only includes the first half of 2018 (global unit for JTRG and local unit for Group C), while this is not the case for their second- and third-ranked articles. This pattern is different for Group B in which local and global levels have been almost similarly addressed, thanks to periodic dominance of articles featured in these units over the years (i.e., global unit from 2011 to 2016 and local unit from 2017 to 2018), followed by articles in regional/national level. In other words, smooth patterns cannot be identified here, unlike JTRG and Group C.

Diagrams represented on the right-hand side of Fig. 2 provide a comparative analysis among JTRG, Groups B and C. While the focus of JTRG on regional/national spatial unit is higher than for the two other groups (almost two times higher than Group C), JTRG is specialized on global level studies compared with Group C on local studies. This confirms earlier observations.

*Random specialization* and *balanced specialization* are the main characteristics of Groups B (Fig. 2.4) and C (Fig 2.6), respectively. They are different from earlier results based on the normalized number of articles in these two groups, especially for Group C. Although the share of articles in “local spatial unit” is much higher than the two other spatial units in Group C, the number of articles featured in different spatial units are much higher in Group C than two other groups; resulting in specialization index of spatial units all close to one for Group C. This is perhaps because Group C is not only specialized in local, micro-level studies but is much more diverse than the two other groups as it addressed issues at all scales.

[INSERT FIGURE 2 ABOUT HERE]

### 3.2.2. *Functional perspective coverage*

Analogous to our previous analysis of journals’ trends with respect to spatial unit coverage, it is important to highlight distinctions and similarities in terms of functional perspective (i.e.,

location, operation, and impact) which was defined for global, regional/national and local spatial units. Therefore, functional perspectives are treated as similar to spatial units (Fig. 3).

It can be concluded from the left hand side of Fig. 3 that operation-related articles have the highest share when compared with articles featured in locational and impact perspectives in both JTRG (Fig. 3.1) and Group C (Fig. 3.5), while this is not the same for Group B (Fig. 3.3). In Group B impact-related articles are more dominant. This could be explained by the higher importance of the urban and regional socio-economic (and therefore spatial) dimension to Group B articles, dealing more with waterfronts, industrial clusters, start-ups, and multivariate analyses of the port-region linkage (Ducruet and Itoh, 2016). In the meantime, the difference in the share of articles (with respect to their functional perspective) is higher in Group C when compared to the more homogenous pattern in JTRG. There is a greater balance between locational and impact-related articles in JTRG than Group C where operation-related articles are popular. In this regard, Group B is similar to Group C as the difference between impact-related articles and the two other functional perspectives is high. Here, both location-related and operation-related articles have similar contributions. Such a pattern may result in absolute dominance of their top functional perspective in the near future for these two groups.

By looking at the right-hand side of Fig. 3, we can discuss specialization based on a more comparable scale. For JTRG, its specialization in both locational and functional perspective is evident (Fig. 3.2). Here, its impact and operation specialization indices are very close to each other. Similarly for Group B, the locational perspective is dominant (Fig. 3.4), while its impact perspective has the highest share compared with other groups (Fig. 3.3). Thus, both JTRG and Group B are dominated by the locational perspective (cf. specialization index), while Group C is more specialized in operation-related studies. This confirms the more operational nature of Group C and the more locational nature of Group B and also JTRG under this perspective; in other words, “space” matters more for geography-oriented journals than for pure transport journals.

[INSERT FIGURE 3 ABOUT HERE]

By implementing both *normalized number of articles* and *specialization index* we can investigate journals both locally (i.e., within-group analysis), and globally (i.e., between-group analysis). In this regard, we can combine findings of sections 3.2.1 and 3.2.2, as follows:

- Within-group analysis shows that JTRG has a distinct ‘*from top to bottom*’ stable pattern (i.e., global level articles on the top followed by regional/national and local ones generally in all years under investigation), with a dominance of operation-related articles, followed by a balance between locational and impact / functional perspectives. Group B is less specialized, although it is somewhat dominated by the impact / functional perspective. Group C is dominated by the local spatial unit, mainly due to its overwhelming operation functional perspective. Considering the inclination of functional perspective patterns identified in Groups B and C, they are in fact dominated by impact and operational perspectives, and this is likely to continue in the near future.
- Between-group analysis shows that JTRG is more specialized in regional/national spatial unit with greater emphasis on the locational perspective. Group B has no specific spatial unit specialization but an emphasis on the locational perspective. Group C exhibits a more balanced specialization in terms of spatial unit, with, again, more emphasis on operational perspectives. This again confirms that JTRG and geographic journals (Group B) give more importance to location and space than Group C which is more focused on operational research.

### 3.2.3. *Intersection of spatial units and functional perspectives*

Here it is important to investigate whether the stated recognized trends also apply to the different spatial units (global, regional/national, and local), say, if there is a similarity in share of locational-related, operation-related, impact-related articles in JTRG when investigating the case in each spatial scale. Further work needs to be done to investigate if all spatial units have been treated similar to each other, or whether the trend is different from one spatial unit to another in the three groups of journals. Marei and Ducruet (2015), however, calculated that based on the work of Ng and Ducruet (2014) covering 399 papers about ports in geography journals between 1950 and 2012, that a majority 48% of this corpus focussed on a single port, 22% on the country level, 10.3% on subnational studies, 13.5 % on transnational studies, less than 1% encompassing entire maritime basins or regions, and only 5.5% on the world scale.

Thus, after this assessment of journals in terms of spatial unit and functional perspective, it appears necessary to combine them together. This will help us to identify the share of each functional perspective under different spatial units. Starting from foreland and maritime space articles, the results are illustrated in Fig. 4.

As per Fig. 4, there are some distinct patterns over the last ten years in JTRG, starting with impact-related articles being the majority for the first three years (2009-2011), which includes two research focuses (1.3.1 and 1.3.2 in Table 1). Among the presented topics in Table 1, the impact of technological improvements on ports is less considered in JTRG, while the dynamics between shipping networks and port networks, inter-industry partnerships and integrations, spatial polarizations, port scope expansion and opportunities in bunkering markets were among the main impact-related topics. A similar pattern is observed in Group B, with a one-year delay (2010-2012). The spatial approach is again dominant in those two groups compared with Group C.

Locational-related articles dominate the following four years (2012-2015) which is also obvious in Group B with a longer delay than the first case (2015-2017), so the aforementioned trend is prolonged. During this period, emergence, shift, and evolution of international port ranges, as well as identification and monitoring of hierarchies were covered as locational-related topics. It is important to mention that transnational studies at the level of entire maritime ranges or basins started to become relatively common in geography, planning, and regional science (Arvis et al., 2019).

This periodic dominance of individual perspectives (i.e., impact-related perspective from 2009 to 2011 and locational-related perspective from 2012 to 2015) was no longer the case over the last three years, as there is more balance among all the functional perspectives in JTRG. For Group C, the trend is completely different from the swinging dominance of perspectives as understood for JTRG and Group B. The shares of impact-related articles grew continuously over the last ten years with dominance of impact-related articles discussing foreland and maritime space. The specialization of Group C on the more local scale is emblematic of its main focus on intra-port issues (operations) such as the level of terminals looking, among other topics, at ship

turnaround time, productivity, intermodalism, infrastructures, and management. Therefore, within port research, we can conclude that JTRG has been the leader in taking care of impact-related articles and at the global scale, such a trend being somewhat followed in subsequent years by both Group B and Group C. The periodic dominance of functional perspectives in JTRG can be interpreted as a synergetic dynamic among scholars who have published articles on the global scale over the past decade.

[INSERT FIGURE 4 ABOUT HERE]

Also, JTRG is among the very first journals to address the future market opportunities for ports within the period of investigation with support of trend analysis, simulation, interviews, and scenarios including complex factors, such as the effect of the inter-play among stakeholders at present and in the future. On the other hand, operation-related articles in the global space have always had the lowest rank in JTRG compared to the other two perspectives, which have the majority of articles in total (e.g., in 2009, 2011, 2014, 2016, 2017) (Fig. 3). Hence, operation-related articles are apparently the main focus of JTRG either at the regional/national unit or at the local unit, or both, but not at the global one, which is more related to an increasing number of studies on global networks with both locational and impact perspectives (e.g. Frémont, 2007), but using more advanced tools such as complex networks (e.g. Gonzalez Laxe et al, 2012), like in Group C that underwent a growing interdisciplinary composition of the authors, from physics to computer science, economics, and operations research (e.g., Kaluza et al., 2010 for an example outside our study sample). The more local scale of Group C is still confirmed nowadays with works on micro-communities for instance (Viljoen and Joubert, 2019).

When analyzing the share of functional perspectives in the hinterland spatial unit as illustrated in Fig. 5, it is obvious that operational issues have the highest attraction in all groups. Although operation and non-operation perspectives are different in nature, it is the biggest focus for the JTRG group. Articles featured in regional/national space have been more prone to focus on operational aspects rather than locational and impact challenges, over the last ten years. Here it is evident that the place between impact-related and locational-related articles has changed over the years, in which recent years belong to locational-related articles (2015-2018) while it has been

occupied by impact-related articles in the first six years (2009-2014). This is completely different for Group B that was dominated by operation-related articles at the beginning, and later substituted by impact-related articles. So, we can conclude that impact-related articles firstly featured in JTRG when compared to all other geography journals. Thus, JTRG maintains a keen interest for spatial aspects but at the same time, developed an operational dimension like in transport journals. When analyzing Group C's radar diagram in Fig. 5, a balance between impact and operation perspectives was formed in recent years with a decreasing share of operation perspective from 2009 to 2014. Here, the share of locational-related articles is very low in Group C, especially when compared to the emergence of such articles in JTRG in recent years. Finally, the balance between 2.2.1 and 2.2.2 is similar in JTRG and Group C as one-fourth of operation-related articles discuss inland/satellite terminals over the ten years (e.g. Ng et al., 2013), while this ratio is about one-third in Group B.

Here it is interesting to compare this pattern of JTRG in regional/national space (Fig. 5) with that of the global space (Fig. 4). The radar distribution of JTRG in both spatial units have something in common, as they both have periods of dominance. While operation-related articles are always the minority in the global unit and the majority in the regional/national unit, there are still two periods in both of them which first focus impact-related articles and then locational-related articles with a similar sequence, although the share is not comparable.

[INSERT FIGURE 5 ABOUT HERE]

At the same time, during this period, the role of ports in the development of multimodal transport and logistics has been less considered among operation issues. For the other issues, they have been investigated in terms of supply chain integration, inland transport capacity, constraints and trip generation, modal substitution and freight allocation, and more frequently, spatial patterns identification and optimization. Although one could find some sort of similarity when investigating journals in the hinterland spatial unit, it is difficult to find them in the local spatial unit. Articles on port-city relations (3.3.1 in Table 1) and the impact-related research focus concentrate the majority among geography journals (both JTRG and Group B), although the share of such articles is higher in Group B than in JTRG (see Fig. 6). Other functional perspectives have been frequently



discussed over the past decade but they have rarely reached a majority of articles in these two groups. In fact, it should be remembered that articles related to the local unit have the lowest share in JTRG, when compared to other spatial units. This is completely different for Group C in which daily operations (3.2.1) as the operation-related focus of research is the most important one, covering a wide variety of issues and more generally, local space articles have the highest share of all articles published in Group C. Indeed, the most important issues addressed in JTRG are about identification of complexities at the interface of port and city, and integration of port and city planning to minimize conflicts and maximize port-city relation bilateral benefits (e.g., FDI attraction and start-up establishments), while Group C is more about, as mentioned above, terminal performance and port efficiency.

[INSERT FIGURE 6 ABOUT HERE]

#### *3.2.4. Interrelation among articles*

There are always papers addressing more than one issue. So, using frameworks may not result in a complete picture. As mentioned earlier, to address this issue, we weighted articles , resulting in co-occurrence linkages. Our investigation showed that about 10% of articles in our database belong to more than one category. This is represented in Fig. 7 with support of Gephi software (Bastian et al., 2009) Here, operation-related articles in the foreland and maritime space have the highest frequency (i.e., 1.2 in Table 1), connecting to 36 articles in 7 categories. This is approximately the same for operation-related articles in the hinterland spatial unit (i.e., 2.2 in Table 1) in terms of the number of connections, but this category has a higher degree, connecting to all 8 remaining categories, with a more balanced pattern. Looking at articles in different spatial units in terms of the number of connections, there are global spatial unit articles on the top, followed by regional/national and port unit articles. This means that global-level studies have become prominent, following the study of global shift, global production networks, and global commodity and value chains in the mainstream literature (Jacobs et al., 2010).

[INSERT FIGURE 7 ABOUT HERE]

#### *3.2.5. General coverage*

By counting the number of rows in the third column of Table 1 (focus of research), articles featured in the three groups are categorized into 13 distinct disciplines. So, it is possible to compare JTRG, Groups B and Group C in terms of the number of disciplines covered per year, during the past decade (Fig. 8). JTRG is between Group B and Group C, with three lowest scores in 2009, 2012, and 2015. So, we can conclude that articles are growing for JTRG in line with the number of covered disciplines that can result in presenting a wide variety of challenges mostly related to renewed approaches through interdisciplinary collaboration and a growing importance of the global scale. This is an interesting uniqueness of JTRG considering its total number of articles compared with those of Group B (including 23 journals), and Group C (including 10 journals).

[INSERT FIGURE 8 ABOUT HERE]

### *3.3. Referencing analysis*

#### *3.3.1. Number of references*

Investigating the number of references in a specific discipline is an interesting subject with lots of applications. To this end, regarding the number of reference citations in journals, generally, there is no specific number or range that is considered as normal or standard by scientific experts. However, there can be a measure to determine the level of originality as long as the similarity of disciplines under investigation is identified and comparable across journals and across groups. Likewise, it can be used to assess the complexity of articles, e.g., for those which combine more than one subject.

To shed light on this issue in the field of port articles, nominated papers extracted in JTRG and Group B were investigated in terms of the average number of references per article. As illustrated in Fig 9, the number of references investigated in JTRG articles is normally in the range of 40 to 60 references while this is from 60 to 80 for Group B (more theoretical), although they are occasionally close to each other (e.g., in 2015 and 2016). Although this number could be interpreted as a level of originality, it could also be that Group B consists of “core geography” journals and so reviewers and editors are more demanding in terms of including “core geography theories and concepts”. While in JTRG, authors may only need to review “transport geography/transport papers”, yet to get published in Group B journals, authors need to review both

“transport geography/transport papers” and “geography (not directly related to transport) papers”. All in all, this is only a recent trend and it is perhaps too early to draw definitive conclusions.

[INSERT FIGURE 9 ABOUT HERE]

### *3.3.2. Distribution of references*

Another approach to analyze referencing is the count of how many times JTRG articles cite each article group (A, B, and C) over time. The distribution and proportion is a good proxy to studying the nature of the influence on JTRG articles. As mentioned earlier and as studied by Ng and Ducruet (2014) across a large sample, port geography up to 2012 exhibited a fading influence from “core geography” due to its stronger attraction towards transport journals and thus more focused on operational issues or other specialized research. Zooming on JTRG only, and extending the covered period back to 1994 (Fig. 10) allows us to discuss a wider trend and verify the applicability of this indicator to JTRG.

Our findings show that 2009 had been a turning point in JTRG’s production as reflected in the sudden absolute growth of references for the three groups including Group A. The relative distribution of references or citations exhibits several interesting trends. First, except from the exceptional values of 1999 and 2002, the share of JTRG’s self-citations has grown apace across the period, with a faster increase since the late 2000s up to the present. This evolution is all but a confinement since the three shares lean towards a balance in early years. Secondly, the number and share of Group B references also increased steadily, meaning that “core geography” had regained its loss to Group C. JTRG articles revived their interest for human geography (including economic and urban geography, but also spatial planning and regional science) or “space” in general after a period of decline. In fact, specialized transport research (i.e., operations research, management), which dominantly influenced JTRG articles in the mid-2000s, had become integrated - rather than separated from - geographical and spatial issues as geographers and other scholars felt the need to reassemble fundamental and applied research through this specific journal that offers both approaches.

Yet, this trend is only partially true since individual JTRG articles often remain influenced by one specific group, B or C (Fig. 10). In fact, only 6 Group A articles cite JTRG for over 50% of their reference list, while all the JTRG articles citing Group C for more than 50% of their reference list barely cite Group B, i.e. 4.3% on average (of which 20 articles with no reference to Group B), against 20.3% for Group A (JTRG). Therefore, the analysis of JTRG citations offers mixed evidence, as geography kept and increased its influence alongside transport studies, but the two latter groups remain less dominant. Overall, such an analysis still means that JTRG's production had managed to overcome too much transport specialization by welcoming mainstream influences from human geography, among others. However, transport specialization remains essential but not any more dominant so that the spatial character of the journal remains strong.

[INSERT FIGURE 10 ABOUT HERE]

In the middle of the figure, several articles keep a relative balance between Group C and Group B, while their references to JTRG articles remain lower than the latter two, respectively. Their choice to publish in JTRG can thus be explained by their will to integrate separate worlds, often through a strong methodological focus such as network analysis for instance. This latter trend is crucial as it shows to what extent Journal of Transport Geography had become a “laboratory” of transdisciplinary approaches in relation to transport but also emerging methodologies and research foci, beyond transport itself. In the same vein, Group B specialization often translates a new approach to classical concepts about urban and regional geography, such as cities, hinterlands, and corridors, revisiting the port-city interface and port-region linkages through novel methodologies and increased ties with mainstream urban geography and urban studies. Group C specialization makes strong use of modeling from various angles such as econometrics, Geographical Information Systems, Agent-Based Models, and simulation, for mainly quantitative analyses of transport chain actors and their performances. Many Group C articles do not mention geography journals at all, while only 3 articles belonging to Group B do not use Group C articles as their reference.

[INSERT FIGURE 11 ABOUT HERE]

The aforementioned transport specialization amongst JTRG articles thus stands apart, with a much more imbalanced distribution of citations than other groups. On the one hand, this specialization is necessary as it keeps strong ties with what is going on in (mainstream and applied) transport studies, but does not influence geography. On the other, the same trend can be explained by the fact that transport geographers keep geography as their core interest while Group C specialization is the outcome of non-geographers mostly, having a “affinity for space” when publishing in JTRG but not being aware of or concerned by mainstream geographic issues. This is because their goal is mainly to push further transport studies on its operation side. In terms of publication strategies, JTRG might have become a fruitful outlet for transport specialists to publish their work in a highly ranked journal without suffering from the burdens imposed by “pure” transportation journals.

Further research shall undertake a comparable citation analysis of Group B and Group C to verify whether such articles are to some extent connected. In any case, our analysis demonstrates that JTRG offers a common ground to a variety of scholars from all horizons, whether they are geographers or not, thereby fostering even more transversal and transdisciplinary dialogues among them.

#### **4. Discussion and conclusion**

*Journal of Transport Geography* (JTRG)’s scientific production has grown apace in line with the general trend of publications emerging in the past decade, with many researchers, including those with backgrounds not directly related to geography, submitting their works to JTRG. Through the categorization of 864 port articles published in JTRG (98 articles), core geography journals (Group B including 21 journals and 69 articles), and (non-geography) transport journals (Group C including 10 journals and 697 articles), between 2009 and June 2018, we attempted to answer whether JTRG created uniqueness as a transport/geography journal while such a study may improve our understanding of the general mechanisms of publications in academia.

We believe that our analysis could be a useful contribution to the current literature where there is a tension between specialization and transversality (or transdisciplinary studies). We thus used JTRG as an interesting case study actively torn between “transport” and “geography” to

examine to what extent these two worlds have been or not interlinked overtime, and especially after the journal became SSCI, i.e., in some way more attractive to a wider audience and authors than in the past. We test the degree and nature of this interplay throughout the paper, which is our main contribution.

Our investigation based on the *normalized number of articles*, and the *specialization index* applied to within-group and between-group analysis, respectively, demonstrated that JTRG experienced a distinct pattern over the past decade compared with other journals. There were always foreland and maritime space articles on the top followed by those addressing hinterland and port spatial units. In terms of functional perspective of such articles, we can see the dominance of the operational perspective. For Group B, it is a random pattern, while for Group C, the absolute dominance of port spatial unit articles is obvious. When compared with Group B and C, we can highlight JTRG for its specialization about hinterland articles with more emphasis on the locational perspective. Again, Group B offers a random pattern in spatial units, with also a dominance on the locational perspective. Such a distribution could reflect equal contribution of geography into all spatial units at least for the last ten years. In the meantime, similarity in dominance of functional perspective between JTRG and Group B could be a sign of completion/complementing between them. For Group C, it is a well-balanced specialization in terms of articles featured in different spatial units, while they have been more prone to address operational perspectives.

As there are always papers contributing to more than one category, it provided a great chance to see how they are interrelated. In other words, it was important to verify whether any strong alliance among different spatial units exists, as for functional perspectives. Our investigation shows that from top to bottom, foreland and maritime space articles have the highest contribution into multidisciplinary studies, followed by those addressing hinterland, and port spatial units. Additionally, among different functional perspectives, we can mark operation-related articles as those with the highest contribution in multidisciplinary studies. Considering within-group analysis, we can argue that papers featured in JTRG had more contribution into multidisciplinary studies compared to those featured in the two other groups.

Analyzing the number of publications shows that there are some correlations among JTRG and transport journals (e.g., TRA and TRE). This raises the question: is JTRG competing/complementing such mainstream transport journals? This is of great importance when looking at fluctuations in the number of port-related articles featured in JTRG over the past ten years. To answer this question comprehensively, perhaps further research also needs to investigate *submitted* papers rather than just *accepted/published* ones.

By investigating the number of covered disciplines, we can conclude that JTRG is between Groups B and Group C, with bottom limit and upper limit over the past decade, respectively. This number has experienced fluctuations over previous years. In-line with stability in the number of areas covered by JTRG articles in recent years, a stable trend of port articles published per year is evident. Therefore, it is important for managers of JTRG (e.g., its editorial board) to attract more interdisciplinary research.

Further, referencing analysis of JTRG shows a balance between the share of transport and geography references. However, transport specialization remains essential but not anymore dominant so that the spatial character of the journal remains strong. Nevertheless, there are still questions to answer, for instance, whether short and long-term data analysis at various spatial scales and functional perspectives can be further addressed. As a complementary analysis, further studies can be proposed to investigate co-authorships for instance. Another research pathway is the analysis of keywords overtime. Following the idea of investigating interrelations among different categories, we can monitor the evolution of such articles overtime. The analysis of references could be pushed further to introduce measures of originality/complexity and look at the other side of the coin, i.e., how other journals are influenced by JTRG over time.

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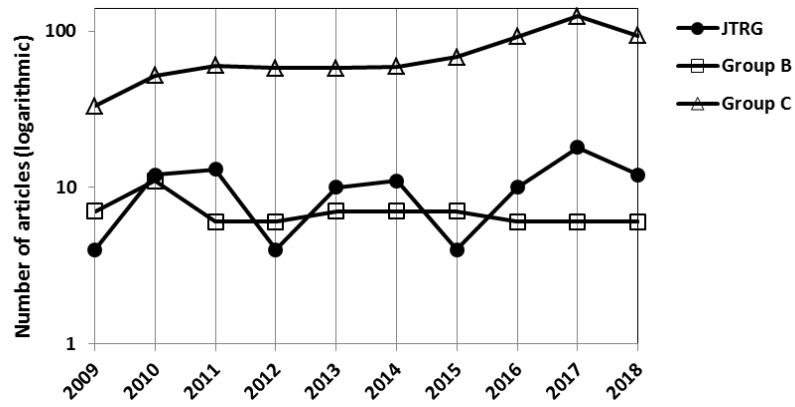
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**Table 1** Categorization framework of port articles featured in journals (Ng (2013) with slight modifications)

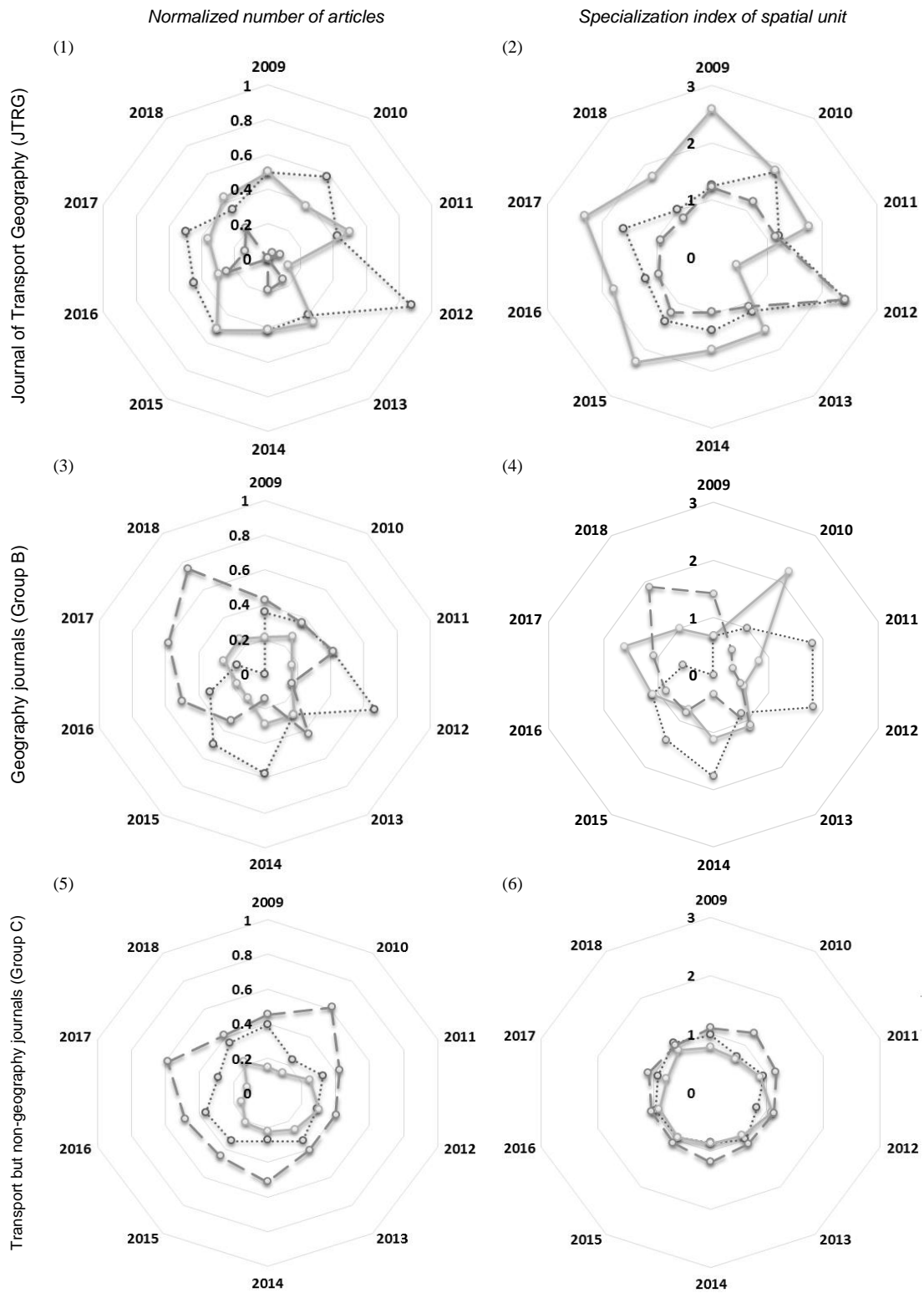
<b>Spatial Unit</b>	<b>Functional perspective within the maritime industries</b>	<b>Focus of research</b>	<b>Issues</b>
Foreland and maritime space (global) (1)	Locational (1.1)	Port system (1.1.1)	Port hierarchy; development of international/ national port.
	Operation (1.2)	Connectedness (1.2.1)	Connections of ports with foreign markets.
		Competition and cooperation (1.2.2)	Port choice; port attractiveness; inter-port relation.
	Impacts (1.3)	Port's place in shipping strategies and networks (1.3.1)	Concentration and deconcentration; hub development; impacts of technological improvements on ports; relation between ships and ports; impacts of shipping line and shipowners strategies on ports.
Port's future market (1.3.2)		Future opportunities; port adaptation.	
Hinterland (regional/ national) (2)	Locational (2.1)	Catchment areas and supply chain linkage (2.1.1)	Shrinking hinterland; evolution over time.
	Operation (2.2)	Port, intermodal transportation, and supply chain (2.2.1)	The role of ports in the development of multimodal transportation and logistics; Port's inland connection; relation between ports and cargo sources/ shippers.
		Inland/satellite terminal (2.2.2)	Functions and operations of inland terminals, and their relations with ports.
	Impacts (2.3)	Port and regional development (2.3.1)	Feasibility studies, impact assessments of port projects and intermodal facilities on regional and nonurban surroundings, including port development, climate change and environment issues, port and international trade; impacts of economic development on ports.
The port (local) (3)	Locational (3.1)	History and location (3.1.1)	Geographical characteristics, cost-benefit analysis in port site selection; History of port international trade.
		Evolution over time (3.1.2)	Composition of the port community; stages of port development; port morphology.
	Operation (3.2)	Daily operations (3.2.1)	Resource allocation; port planning and marketing; port performance, efficiency, service quality; port pricing; safety, security, sustainability and environmental issues; information for port planning and operation; maintenance.
	Impact (3.3)	Port-city relation (3.3.1)	Water front redevelopment and port-city relational geography, business and economy; spatial projects and land use conflicts; port and transport labor issues; sustainability and environmental issues.

**Table 2** List of journals in three different groups featured port articles together with distribution of articles during the period between 2009 and June 2018

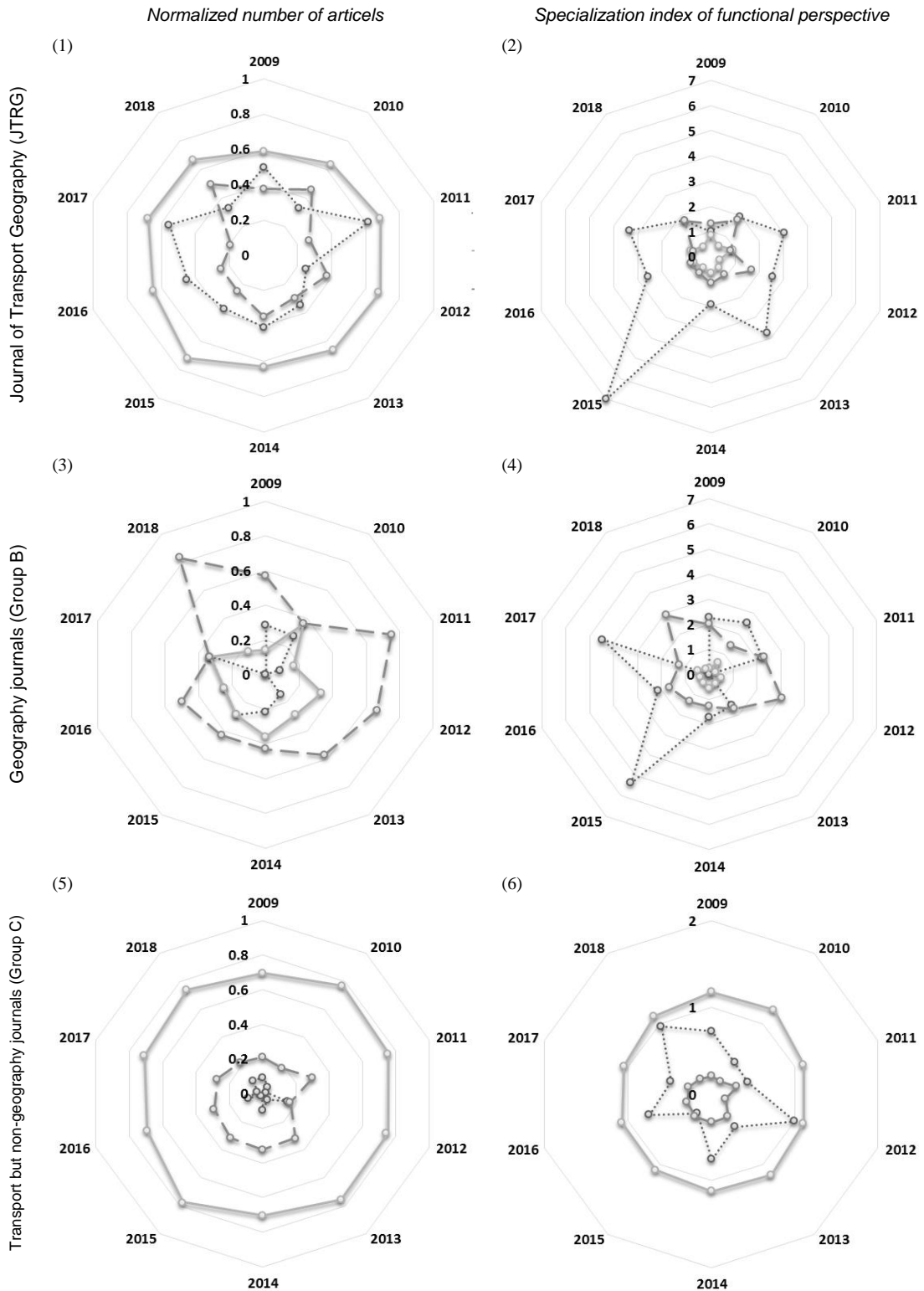
<b>Journal</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>Total</b>
<b>Group A (JTRG)</b>											
<i>Journal of Transport Geography</i>	4	12	13	4	10	11	4	10	18	12	<b>98</b>
<b>Group B (geography journals)</b>											
<i>The Annals of Regional Science</i>		1			2						3
<i>Annals of the Association of American Geographers</i>		1	1				1				3
<i>Applied Geography</i>	1	1			1						3
<i>Area</i>						1					1
<i>Asia Pacific Viewpoint</i>				1							1
<i>Australian Geographer</i>	1		1								2
<i>Environment and Planning A</i>	1	1					1				3
<i>Environment and Planning C</i>								1		2	3
<i>Environment and Planning D</i>						1			2	1	4
<i>Eurasian Geography and Economics</i>	1	1									2
<i>European Planning Studies</i>				3					1		4
<i>Geoforum</i>										1	1
<i>Geografiska Annaler – Series B: Human Geography</i>									1		1
<i>GeoJournal</i>	2		1		1	2	2	2	1		11
<i>Global Networks</i>		3		1		1					5
<i>International Journal of Urban and Regional Research</i>			2		2		1			1	6
<i>Tijdschrift voor Economische En Sociale Geografie</i>			1		1	1		2	1	1	7
<i>Papers in Regional Science</i>							1	1			2
<i>Regional Studies</i>		2		1		1	1				5
<i>The Professional Geographer</i>		1									1
<i>Urban Geography</i>	1										1
<b>Group B Total</b>	<b>7</b>	<b>11</b>	<b>6</b>	<b>6</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>69</b>
<b>Group C (transport but non-geography journals)</b>											
<i>Maritime Economics &amp; Logistics</i>	11	13	11	13	12	12	12	13	34	15	146
<i>Maritime Policy &amp; Management</i>	6	21	22	20	17	17	23	33	33	32	224
<i>Shipping and Trade</i>								7	2	3	12
<i>Journal of Transport Economics and Policy</i>	3	2	3	1	1						10
<i>Transport Policy</i>	2	1	3	5	7	8	4	4	5	5	44
<i>Transportation Research Part A</i>	1		1	3	4	4	9	5	12	7	46
<i>Transportation Research Part B</i>	1		1	2	1		2	8	7	5	27
<i>Transportation Research Part D</i>	1	2		3	8		4	2	12	13	45
<i>Transportation Research Part E</i>	5	8	16	4	8	13	12	17	17	8	108
<i>Transport Reviews</i>	3	5	3	7		5	3	3	2	5	36
<b>Group C Total</b>	<b>33</b>	<b>52</b>	<b>60</b>	<b>58</b>	<b>58</b>	<b>59</b>	<b>69</b>	<b>92</b>	<b>124</b>	<b>93</b>	<b>697</b>



**Fig. 1.** Time history of port articles featured in three journal groups between 2009 and June 2018 (JTRG: Journal of Transport Geography; Group B: geography journals; Group C: transport but non-geography journals)

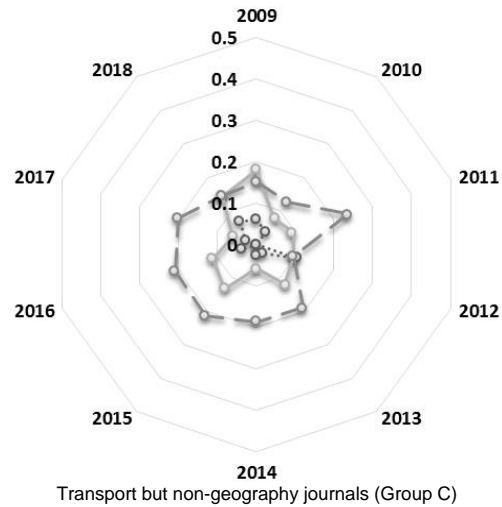
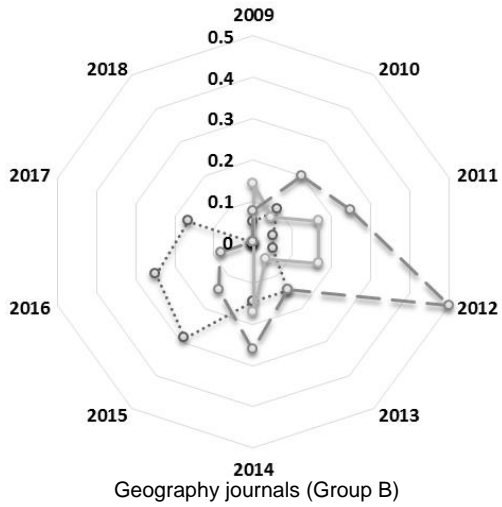
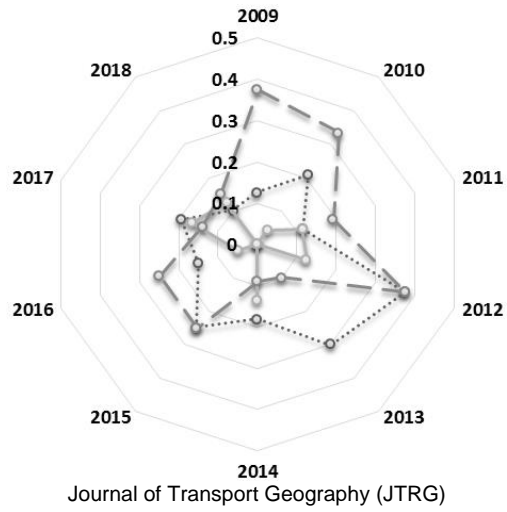


**Fig. 2.** Radar distribution of articles in each spatial unit in three journal groups between 2009 and June 2018; Round dot: Foreland & maritime space (1), solid: Hinterland (2), dash: Port (3)

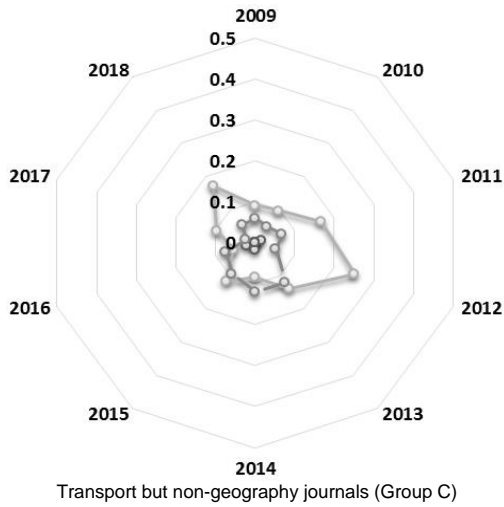
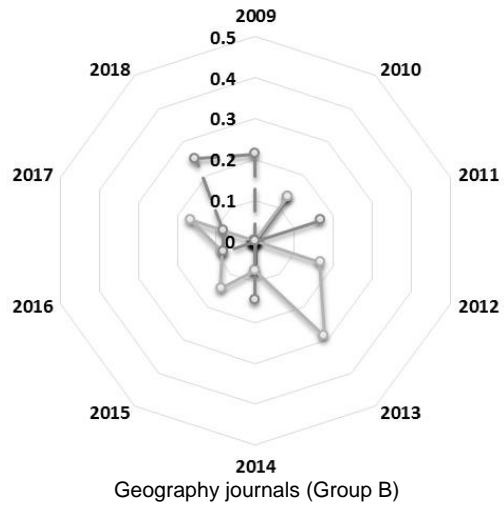
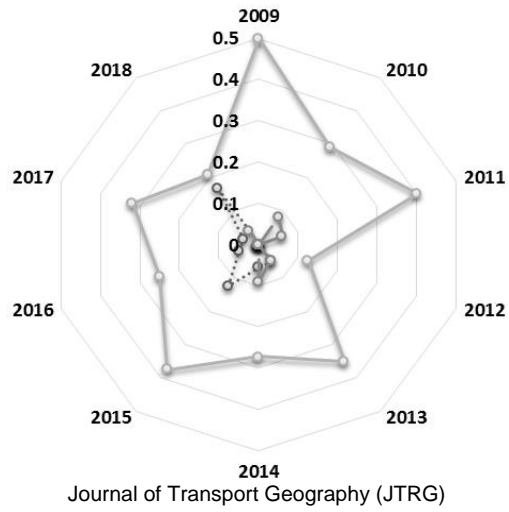


**Fig. 3.** Radar distribution of articles in each functional perspective in three journal groups between 2009 and June 2018;  
 Round dot: Locational (1.1+2.1+3.1), solid: Operation (1.2+2.2+3.2), dash: Impact (1.3+2.3+3.3)

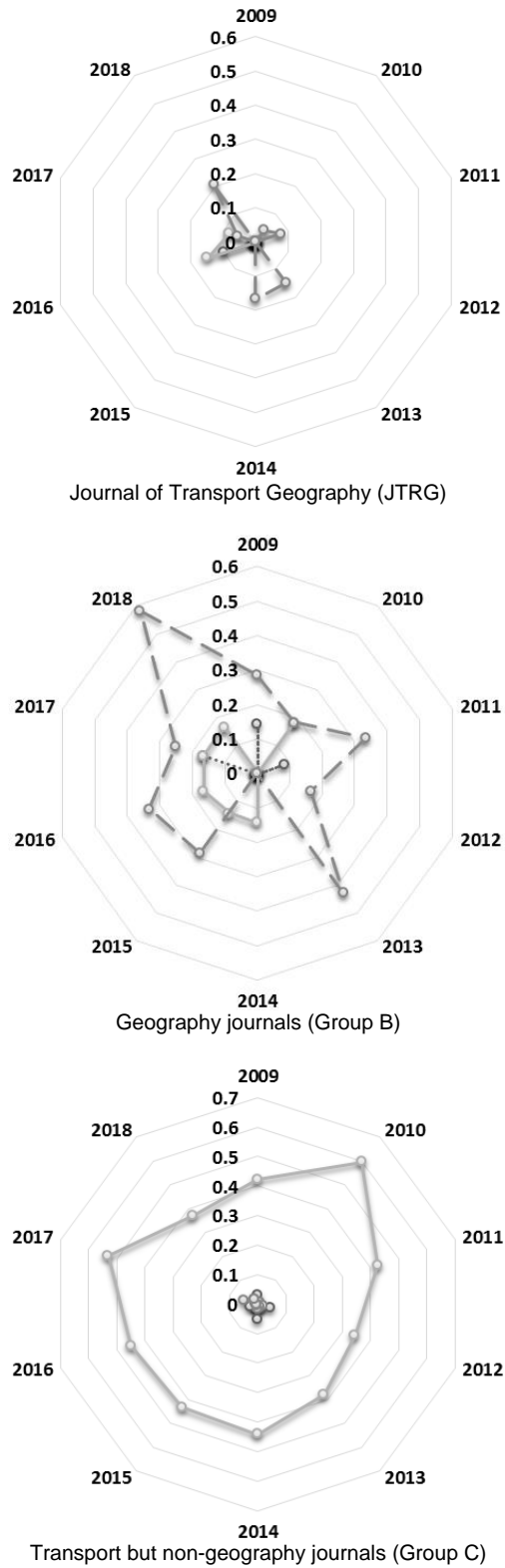




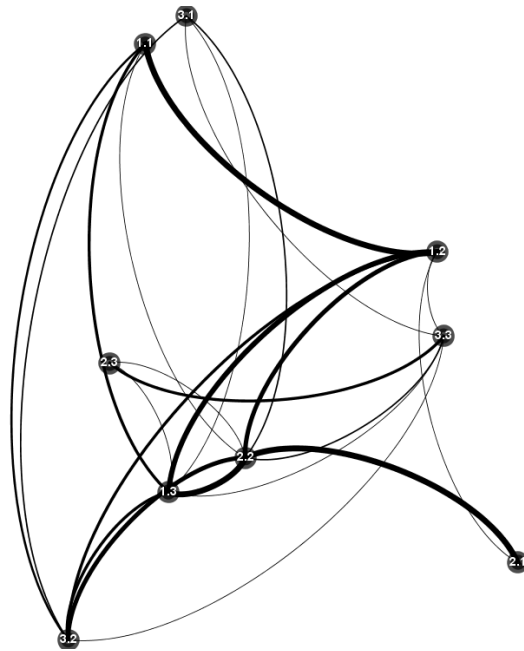
**Fig. 4.** Radar distribution of the normalized functional perspective of articles in global unit in three journal groups between 2009 and June 2018;  
Round dot: Locational (1.1), solid: Operation (1.2), dash: Impact (1.3)



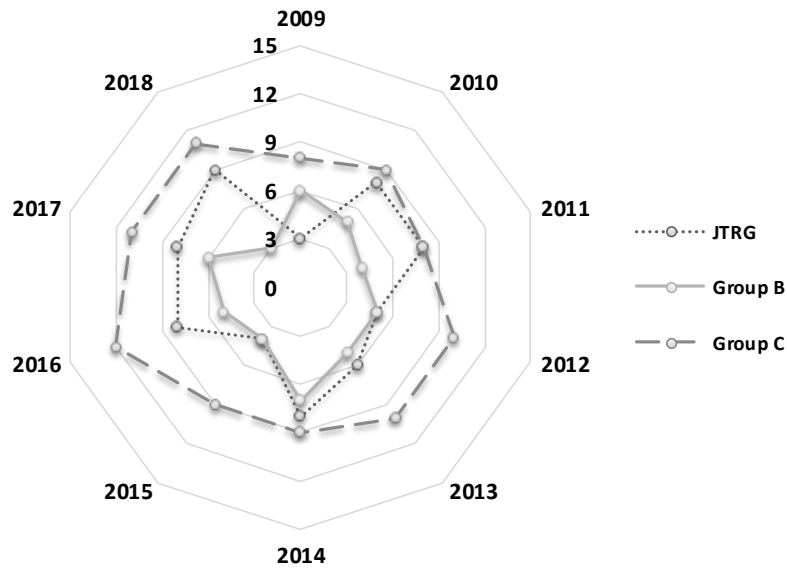
**Fig. 5.** Radar distribution of the normalized functional perspective of articles in regional/national unit in three journal groups between 2009 and June 2018;  
Round dot: Locational (2.1), solid: Operation (2.2), dash: Impact (2.3)



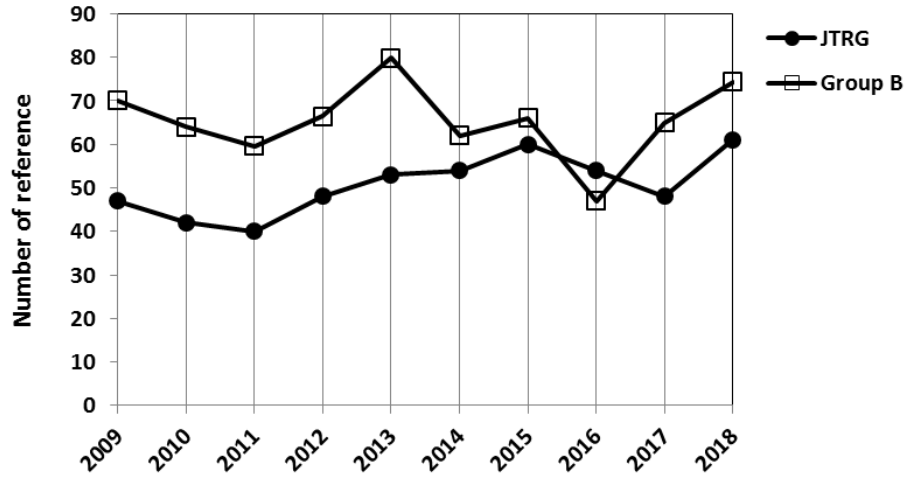
**Fig. 6.** Radar distribution of the normalized functional perspective of articles in local spatial unit in three journal groups between 2009 and June 2018; Round dot: Locational (3.1), solid: Operation (3.2), dash: Impact (3.3)



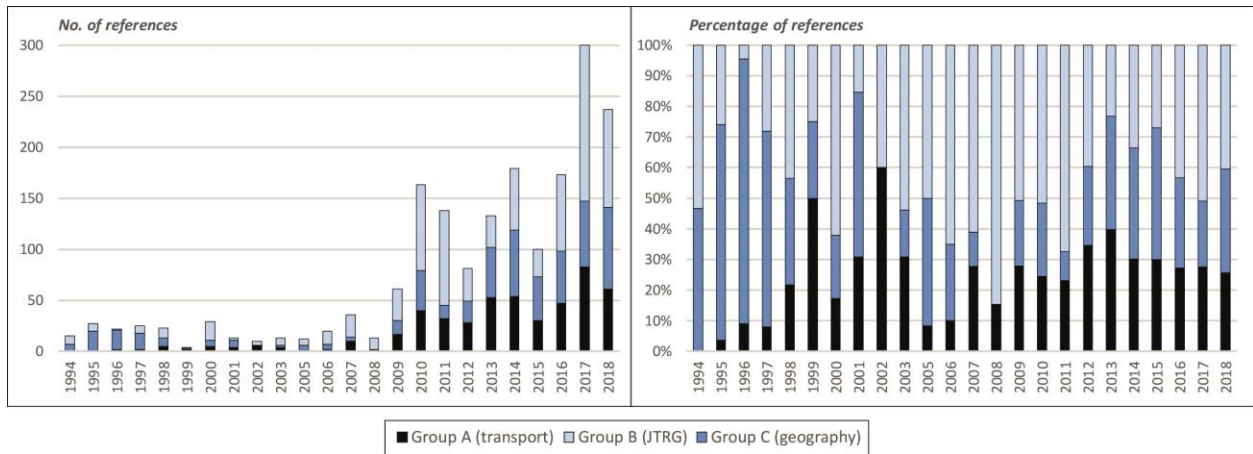
**Fig. 7.** Interrelation among articles featured in different spatial units and functional perspectives



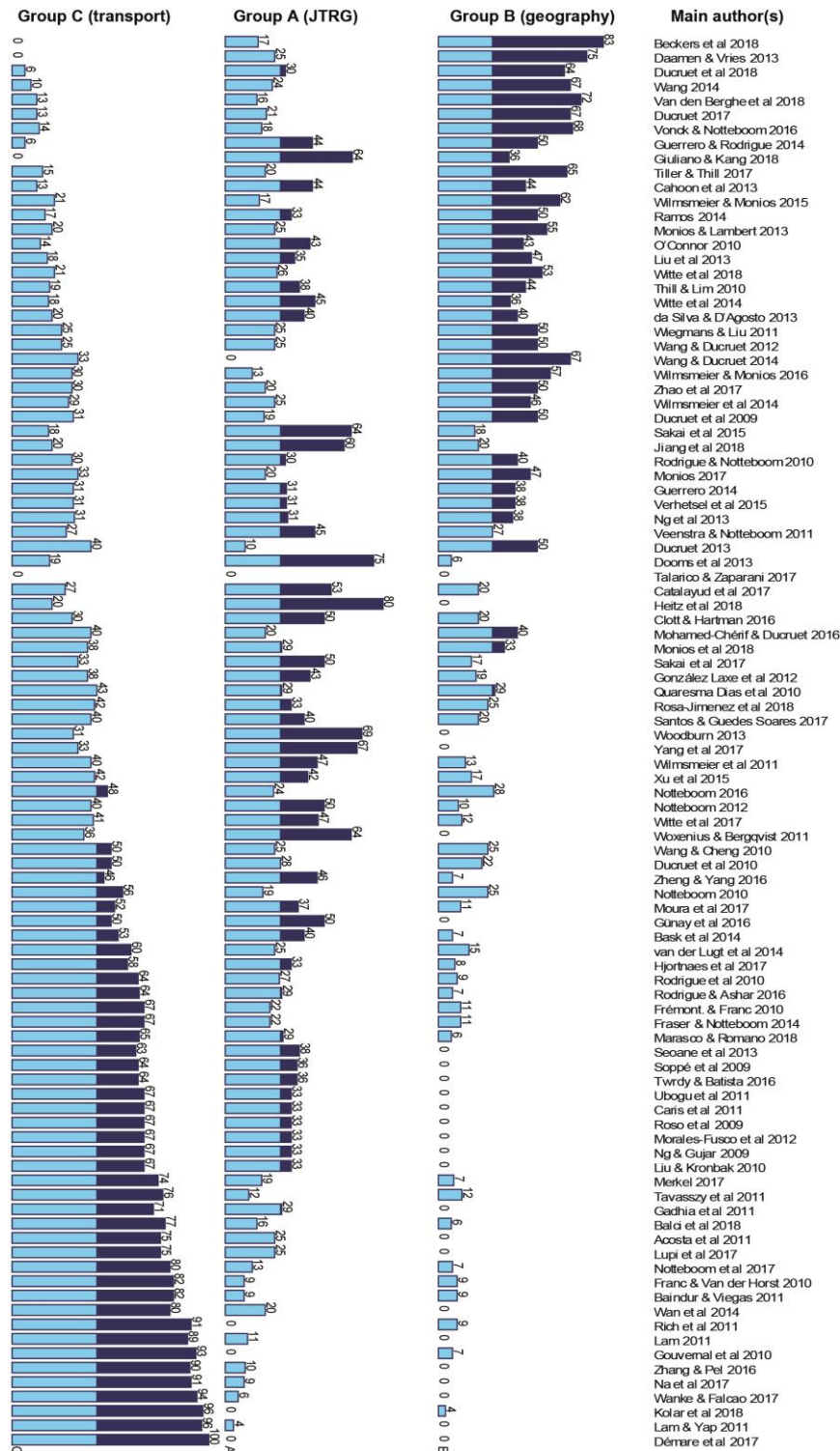
**Fig. 8.** Radar distribution of the total number of areas covered by three journal groups between 2009 and June 2018 (JTRG: Journal of Transport Geography; Group B: geography journals; Group C: transport but non-geography journals)



**Fig. 9.** Time history of the average number of references per article featured in two journal groups between 2009 and June 2018 (JTRG: Journal of Transport Geography; Group B: geography journals)



**Fig. 10.** Distribution of JTRG articles' references per journal groups between 1994 and June 2018 (JTRG: Journal of Transport Geography; Group B: geography journals; Group C: transport journals)



**Fig. 11.** Distribution of JTRG articles' references per article and journal groups between 2009 and June 2018 (Unit: %)

*N.B. dark colors refer to percentages higher than column average; each line equals to 100%*

**Appendix I: List of Port Articles from 2009-June2018 in three groups (Journal of Transport Geography (JTG/ Group A), geography journals (Group B) and transport but non-geography journals (Group C))**

**Group A**

- Acosta, M., Coronado, D., Cerban, M.D.L., 2011. Bunkering competition and competitiveness at the ports of the Gibraltar Strait. *J. Transp. Geogr.* 19, 911-916.
- Baindur., D., Viegas, J.M., 2011. An agent-based model concept for assessing modal share in inter-regional freight transport markets. *J. Transp. Geogr.* 19, 1093-1105.
- Balci, G., Cetin, I.B., Esmer, S., 2018. An evaluation of competition and selection criteria between dry bulk terminals in Izmir. *J. Transp. Geogr.* 69, 294-304.
- Bask, A., Roso, V., Andersson, D., Hämäläinen, E. 2014. Development of seaport–dry port dyads: Two cases from Northern Europe. *Journal of Transport Geography*, 39(July 2014), 85-95.
- Beckers, J., Vanhoof, M., Verhetsel, A., Returning the particular: Understanding hierarchies in the Belgian logistics system. *J. Transp. Geogr.* In press.
- Berghe, K.V., Jacobs, W., Boelens, L., 2018. The relational geometry of the port-city interface: Case studies of Amsterdam, the Netherlands, and Ghent, Belgium. *J. Transp. Geogr.* 70, 55-63.
- Cahoon, S., Pateman, H., Chen, S.L., 2013. Regional port authorities: leading players in innovation networks? *J. Transp. Geogr.* 27, 66-75.
- Calatayud, A., Mangan, J., Palacin, R., 2017. Connectivity to international markets: A multi-layered network approach. *J. Transp. Geogr.* 61, 61-71.
- Caris, A., Macharis, C., Janssens, G.K., 2011. Network analysis of container barge transport in the port of Antwerp by means of simulation. *J. Transp. Geogr.* 19, 125-133.
- Clott, C., Hartman, B.C., 2016. Supply chain integration, landside operations and port accessibility in metropolitan Chicago. *J. Transp. Geogr.* 51, 130-139.
- Daamen, T.A., Vries, I., 2013. Governing the European port–city interface: institutional impacts on spatial projects between city and port. *J. Transp. Geogr.* 27, 4-13.
- Da Silva, M.A.V., De Almeida D’agosto, M. 2013. A model to estimate the origin–destination matrix for soybean exportation in Brazil. *Journal of Transport Geography*, 26, 97-107.
- Démare, T., Bertelle, C., Dutot, A., Lévêque, L., 2017. Modeling logistic systems with an agent-based model and dynamic graphs. *J. Transp. Geogr.* 62, 51-65.
- Dooms, M., Verbeke, A., Haezendonck, E., 2013. Stakeholder management and path dependence in large-scale transport infrastructure development: the port of Antwerp case (1960–2010). *J. Transp. Geogr.* 27, 14-25.
- Ducruet, C., 2013. Network diversity and maritime flows. *J. Transp. Geogr.* 30, 77-88.
- Ducruet, C., 2017. Multilayer dynamics of complex spatial networks: The case of global maritime flows (1977–2008). *J. Transp. Geogr.* 60, 47-58.
- Ducruet, C., Cuyala, S., El Hosni, A., 2018. Maritime networks as systems of cities: The long-term interdependencies between global shipping flows and urban development (1890–2010). *J. Transp. Geogr.* 66, 340-355.
- Ducruet, C., Rozenblat, C., Zaidi, F., 2010. Ports in multi-level maritime networks: evidence from the Atlantic (1996–2006). *J. Transp. Geogr.* 18, 508-518.
- Ducruet, C., Roussin, S., Jo, J.C., 2009. Going West? Spatial polarization of the North Korean port system. *J. Transp. Geogr.* 17, 357-368.
- Franc, P., Van der Horst, M., 2010. Understanding hinterland service integration by shipping lines and terminal operators: a theoretical and empirical analysis. *J. Transp. Geogr.* 18, 557-566.

- Fraser, D., Notteboom, T., 2014. A strategic appraisal of the attractiveness of seaport-based transport corridors: the Southern African case. *J. Transp. Geogr.* 36, 53-68.
- Frémont, A., Fran, P. 2010. Hinterland transportation in Europe: Combined transport versus road transport. *Journal of Transport Geography*, 18(4), 548-556.
- Gadhia, H.K., Kotzab, H., Prockl, G., 2011. Levels of internationalization in the container shipping industry: an assessment of the port networks of the large container shipping companies. *J. Transp. Geogr.* 19, 1431-1442.
- Giuliano, G., Kang, S., 2018. Spatial dynamics of the logistics industry: Evidence from California. *J. Transp. Geogr.* 66, 248-258.
- Gouvernal, E., Slack, B., Franc, P., 2010. Short sea and deep sea shipping markets in France. *J. Transp. Geogr.* 18, 97-103.
- Guerrero, D., 2014. Deep-sea hinterlands: Some empirical evidence of the spatial impact of containerization. *J. Transp. Geogr.* 35, 84-94.
- Guerrero, D., Rodrigue, J.P., 2014. The waves of containerization: shifts in global maritime transportation. *J. Transp. Geogr.* 34, 151-164.
- Günay, G., Ergün, G., Gökaşar, I., 2016. Conditional Freight Trip Generation modeling. *J. Transp. Geogr.* 54, 102-111.
- Heitz, A., Dabanc, L., Olsson, J., Sanchez-Diaz, I., Woxenius, J., Spatial patterns of logistics facilities in Gothenburg, Sweden. *J. Transp. Geogr.* In press.
- Hjortnaes, T., Wiegman, B., Negenborn, R.R., Zuidwijk, R.A., Klijn, R., 2017. Minimizing cost of empty container repositioning in port hinterlands, while taking repair operations into account. *J. Transp. Geogr.* 58, 209-219.
- Jiang, Y., Lu, J., Cai, Y., Zeng, Q., Analysis of the impacts of different modes of governance on inland waterway transport development on the Pearl River: The Yangtze River. *J. Transp. Geogr.* In press.
- Kolar, P., Schramm, H.J., Prockl, G., 2018. Intermodal transport and repositioning of empty containers in Central and Eastern Europe hinterland. *J. Transp. Geogr.* 69, 73-82.
- Lam, J.S.L., 2011. Patterns of maritime supply chains: slot capacity analysis. *J. Transp. Geogr.* 19, 366-374.
- Lam, J.S.L., Yap, W.Y., 2011. Dynamics of liner shipping network and port connectivity in supply chain systems: analysis on East Asia. *J. Transp. Geogr.* 19, 1272-1281.
- Laxe, F.G., Seoane, M.J.F., Montes, C.P., 2012. Maritime degree, centrality and vulnerability: port hierarchies and emerging areas in containerized transport (2008–2010). *J. Transp. Geogr.* 24, 33-44.
- Liu, L., Wang, K.Y., Yip, T.L., 2013. Development of a container port system in Pearl River Delta: path to multi-gateway ports. *J. Transp. Geogr.* 28, 30-38.
- Liu, M., Kronbak, J., 2010. The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe. *J. Transp. Geogr.* 18, 434-444.
- Lupi, M., Farina, A., Orsi, D., Pratelli, A., 2017. The capability of Motorways of the Sea of being competitive against road transport. The case of the Italian mainland and Sicily. *J. Transp. Geogr.* 58, 9-21.
- Marasco, A., Romano, A., 2018. Inter-port interactions in the Le Havre-Hamburg range: A scenario analysis using a nonautonomous Lotka Volterra model. *J. Transp. Geogr.* 69, 207-220.
- Mengqiao, X., Zhenfu, L., Yanlei, S., Xiaoling, Z., Shufei, J., 2015. Evolution of regional inequality in the global shipping network. *J. Transp. Geogr.* 44, 1-12.



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## **Group B**

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