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Citation for published version:

Lacka, E, Chan, HK & Wang, X 2020, 'Technological advancements and B2B international trade: A bibliometric analysis and review of industrial marketing research', *Industrial Marketing Management*, vol. 88. <https://doi.org/10.1016/j.indmarman.2020.04.007>

Digital Object Identifier (DOI):

[10.1016/j.indmarman.2020.04.007](https://doi.org/10.1016/j.indmarman.2020.04.007)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

Industrial Marketing Management

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Technological advancements and B2B International Trade:

A bibliometric analysis and review of industrial marketing research

Abstract

In the current business and political climate, deliberations concerning international trading agreements and their importance to B2B firms are increasing. Although the volume and value of international exchanges are growing, this study reveals that literature exploring issues concerning B2B international business, and particularly the role technological advancements play supporting B2B cross-border trade, is limited. This paper provides an overview of research contributions published in the *Industrial Marketing Management* (IMM) journal in order to reveal the current state of knowledge, identify research gaps, and propose further research directions. Following a two-stage approach, we reveal that although ‘trade’ is at the heart of IMM research, there is a scarcity of empirical studies examining technological advancements and B2B international, as well as local, trade; some attention, however, has been placed on the exploration of B2B international trade issues. Building on our findings, we propose future research directions.

Keywords: International trade; B2B; technological innovation; bibliometric analysis; systematic literature review

1. Introduction

According to the International Trade Centre (www.intracen.org), the value of B2B international exchanges is growing. This growth is directly related to opportunities deriving from international trade initiatives such as the North American Free Trade Agreement

(NAFTA), the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), as well as the Belt and Road Initiative (BRI). As Lacka *et al.* (2019) point out, however, ‘in order for the initiatives, such as NAFTA, CPTPP, BRI, among others, to have a meaningful impact on 21st century global economy, effective and efficient cooperation of businesses of all types and sizes in regional as well as international trade is required’. This has not been fully explored thus far, and Lacka *et al.* (2019) therefore call for research to examine issues concerning B2B international trade, particularly explorations of the role of technological advancements in B2B cross-border trade, as previous research points out that technological innovations can support businesses and international trade growth (Weerawardena *et al.*, 2019; Gregory *et al.*, 2019). Responding to Lacka *et al.* (2019)’s call, this study sets out to provide an overview of research contributions concerning B2B international trade, and the role technological innovations play supporting businesses in those efforts. By doing so this papers aims to contribute to the literature at two levels. First, it aims to provide a holistic overview of research contributions published in Industrial Marketing Management (IMM) journal. Second, it aims to identify research gaps and proposes future research directions to advance knowledge and understanding of the role of technological innovations in B2B international trade.

To fulfil this aim a two-stage approach is adopted, consisting of a bibliometric overview of research contributions published in IMM, which then informs a systematic literature review based on which key publications are discussed and future avenues of research are suggested.

The bibliometric analysis reveals that, although ‘trade’ is located at the heart of IMM research, it is one of the least researched themes. Further analysis also shows that there is a scarcity of research concerning technological innovation and B2B trade-related activities. It appears that research attention has been devoted to issues concerning B2B international trade, whereas the role of tools such as Internet-of-Things (IoT), Artificial Intelligence (AI), and blockchain, as well as manufacturing technologies have been ignored. Moreover, although

international B2B exchanges have been examined to an extent, the context of specific trading initiatives has not been fully explored. Considering the importance of B2B international trade, it is of vital importance to explore the role of technological advancement in B2B international exchanges and advance current state of knowledge. Based on the overview of IMM contributions, a number of research gaps are identified and recommendations for further research are made.

This paper is structured as follows. First, we conduct bibliometric analysis of research contributions published in IMM. We use the results of the analysis as a framework guiding subsequent systematic review of the literature. The systematic literature review is structured according to three themes including; technological innovation in international trade, international trade and technologies in local trade. We conclude the paper highlighting the need for research, which will advance our understanding of the role technological innovation plays in B2B international trade.

2. Bibliometric Methods

Bibliometric methods are effective ways of evaluating and monitoring dynamic changes in research topics in a given field of study (Wang *et al.*, 2019; Ghadmi *et al.*, 2019). They have commonly been applied to specific journals to understand leading trends that have been of interest to the academic community. Bibliometric methods have been previously applied to the Journal of Management (see Van Fleet *et al.*, 2006), European Journal of Operational Research (see Laengle *et al.*, 2017), and most recently Industrial Management & Data Systems journal (see Wang *et al.*, 2019). To the best of our knowledge, however, such analysis has not been carried out for IMM - a top-tier journal that publishes high quality and rigorous theoretical, empirical, as well as case-based research in the area of industrial and B2B marketing. Since

IMM issued a call for papers this article responds to, it deemed appropriate to focus on work published in the journal, and understand how issues concerning trade map against a range of themes explored by IMM's authors.

Bibliometric methods focus either on an activity, therefore putting an emphasis on impact, or on an exploration of themes and topics, revealing relationships between them (Ramos, 2014). Since the present study aims to reveal research contributions concerning research themes, it is appropriate to use bibliographic data to identify core topics and themes, and the interrelationships between them in a network structure (Boccaletti *et al.*, 2006; Zupic and Cater, 2015). To accomplish this goal, for the purpose of this study, VOSviewer software was used to conduct bibliometric analysis, as it provides a network visualisation of the clustered themes and their relationships. To develop clusters, a binary counting of themes have been employed which allowed to identify key terms occurring in the dataset, as well as their binary relationships. Terms, which occurred minimum of 10 times, have been used for analysis, the default software setting. The size of individual clusters depends on the frequency of themes occurrence (i.e. frequently occurring terms form bigger cluster). The number of themes identified and their co-occurrence determine the number of clusters.

To fulfil the objectives of this study, IMM contributions published during the last 50 years (from 1970 to 2020) indexed on Web of Science were analysed. The data from Web of Science was used to develop bibliometric analysis in recognition of its high quality in the major bibliometric databases (Jacso, 2015). Since the aim of the bibliometric analysis was to evaluate key themes explored by IMM researchers, and identify cluster which includes terms related to technologies in B2B international trade it was vital to develop a holistic overview of IMM themes. Thus, the bibliometric analysis has been conducted on all published within last 50 years IMM articles.

Figure 4. Within cluster analysis

Cluster	Terms
Cluster 1 (22 terms)	Advertising; Attribute; Business practice; compatibility; consumer needs; e-commerce; economic; electronic marketplace; globalization; information systems; international business; internet; logistics; marketing management; marketplace; preference; purchasing manager; reaction; scm; small firms; supply chain management; threat
Cluster 2 (18 terms)	Business model; Business service; Buying firm; Competitive position; Contract; Integrated solution; Interrelationship; Market actor; Product development; Professional service; Provider; Provision; Radical innovation; Rationale; Servitization; Solution; Supplier involvement; Transformation
Cluster 3 (13 terms)	Customer service; Consumer value; Distinction; Market share; Offering; Price; Pricing; Product life cycle; Profit; Revenue; Service offering; Survival; Vendor
Cluster 4 (12 terms)	Business customer; Distribution; Industrial customer; Industrial marketer; Industrial sector; Market segmentation; Producer; Product quality; Reliance; Segment; Service quality; Trade
Cluster 5 (11 terms)	B2B branding; B2B context; B2B market; brand; brand equity; branding; customer; customer market; Industrial buyer; Retailer; Sustainability
Cluster 6 (9 terms)	Exporter; Export; Foreign Market; Importer; Industrial product; International market; Manufacturer; Segmentation; Supplier customer relationships

Table 1. Cluster terms

The bibliometric analysis reveals that ‘trade’ is a frequently occurring theme in IMM publications, and in fact it is located at the heart of IMM research (see Figure 2). The analysis, however, does not distinguish ‘international trade’ as a core and separate research topic. Since the focus of this review is on B2B international trade issues, it became important to review and dissect literature concerning ‘trade’ in general, in order to identify specific contributions exploring B2B international trade. Furthermore, since the focus of this paper is on research contributions concerning technological advancements in B2B international trade, and the bibliometric analysis does not reveal any direct and exclusive relationship with the ‘technology’ theme, it was vital not only to identify papers exploring international trade, but also to assess the role of technologies in those research endeavours.

Informed by the results of bibliometric analysis, the detailed review of research contributions (section 3.1) is structured according to three distinct categories, developed based on a scoring exercise (see section 3), and is presented in accordance of their relevance to this study aim. Finally, as presented in Figure 4, as ‘trade’ has network relationships with other themes in the cluster, the themes identified and listed in Table 1 serve as a basis for inclusion criteria of trade-related research in a follow-up review, the methodology of which is discussed next.

3. Systematic Literature Review

Informed by the results of the bibliometric analysis, the systematic literature review follows the approach introduced by Tranfield *et al.* (2003), which has been recently applied by Lu *et al.* (2018) as well as Marikyan *et al.* (2019) in their efforts to synthesise research contributions concerning digital tools use. According to Tranfield *et al.* (2003), systematic literature reviews

consist of three sequential stages, including (1) planning and review, (2) conducting a review, and (3) reporting and dissemination.

During the planning and review stage, the three authors of this paper formed a review panel and developed a review protocol. In line with Tranfield *et al.* (2003), we clearly articulated the study aim: '*informed by the results of bibliometric analysis, critically synthesise academic articles with the view to identify research gaps and propose new research avenues*'. In line with the bibliometric analysis, we restricted the scope of the review to papers published in IMM and focused on research contributions concerning 'trade' published within the last 50 years.

With the restrictions assigned, we utilised an advanced search feature to search the database and identify relevant articles. As suggested by Tranfield *et al.* (2003), we commenced our search using the generic keyword 'trade'. Following the results of the bibliometric analysis, we retained articles that relate to the list of terms listed in Table 1. We excluded all articles that were not related to the list of topics from Table 1, for example articles exploring 'trade shows' or 'trade fairs', as they were beyond the scope of this review. Finally, we included review articles as well as empirical qualitative and quantitative research papers into our review, and excluded other contributions such as book reviews and editorials, etc. The search included all articles published in English available on the IMM webpage up to July 2019.

Based on the initial search of the database, we identified 1,693 articles. Applying inclusion and exclusion criteria, we narrowed down the search results to 94 papers, which included 85 themes identified and presented in Figure 3. Next, we assigned a score to each article identified, which is in line with Lu *et al.* (2018) and Marikyan *et al.* (2019). All articles related to technological innovation and international trade were scored 1; articles which focused on international trade but did not consider technological advancement were scored 2; and papers

on digital tools used for local trade rather than trade in international markets were scored 3. All other articles were excluded from further review. We provide an overview of articles assigned to each category in the three separate sections below.

3.1 Technological innovation and international trade

Following the scoring exercise, we noticed that only a handful of papers explored technological advancements and their application to B2B trading activities at the international level. These studies include terms identified by bibliometric analysis and grouped in Cluster 1 (Table 1). Among those few contributions, one explores supply chain innovation (Bello *et al.*, 2004), and the rest examine how digital tools, including the Internet and e-commerce, support business partners in their efforts to conduct trade-related activities across borders (Walters, 2008; Berthon *et al.*, 2008; Gregory *et al.*, 2019).

Supply chain innovations ‘combine developments in information and related technologies with new logistic and marketing procedures to improve operational efficiency and enhance service effectiveness’ (Bello *et al.*, 2004, 57). They include efficient consumer response, continuous replenishment, automated ordering and other relevant technology-enhanced processes and procedures in the supply chain. Bello *et al.* (2004) recognise that although supply chain innovations can improve cross-border supply chain efficiency, institutional differences between industrial trading partners can hinder the success of this costly investment, its implementation, and use. Their assessment of supply chain innovations between global trading partners and the US reveals constraints disclosing international partners’ ability to invest and use supply chain innovation. Those constraints are associated with the institutional environment including its regulatory, normative and cultural-cognitive aspects, all of which have been found to impact international trading partners’ ability to participate in supply chain

innovation. To overcome those challenges, Bello *et al.* (2004) recommend the introduction of safeguards and guarantees, which they believe will ensure successful implementation and management of technology in a global marketplace.

Shifting the focus from supply chain efficiency, and recognising the value of effective communication between B2B trading partners, Holden (1991) and Waters (2008) examine how digital technologies can support businesses in those efforts. Holden (1991) is perhaps the first scholar to examine how computer mediated communication can aid international trade. His case study research demonstrates how computer-messaging systems can address and further enhance the information and communication needs of small exporting firms. Building on Holden's (1991) work, Waters (2008) further explores how the Internet, rather than computer application, can facilitate communication between internationally trading partners. Their research shows the value of the Internet as a communication channel, which aids information dissemination and enables business partners to maintain information-rich relational exchanges despite physical distance.

In addition to communication, research also shows that digital tools can be effectively used to support business relationships (Cluster 6), which are crucial in B2B cross-border exchanges (Voldnes *et al.*, 2012). Here specifically, Berthon *et al.* (2008) examine how trans-national B2B relationships are developed and maintained online via e-commerce platforms. Narrowing down the scope of the research to an examination of the impact of country-level factors on trading partners' intention to engage in e-business, the authors find a direct link between a country's cultural values as well as its ability to promote and support digital business (e-business), and its willingness to engage in the online development of B2B relationships.

Most recently, Gregory *et al.* (2019)'s study aims to extend the capabilities–effectiveness–performance model by including e-commerce marketing capabilities in the B2B sector.

Through mixed research methodology, they reveal that e-commerce marketing capabilities directly increase firms' distribution and communication efficiency, which subsequently leads to enhanced export venture market performance.

Our review of the above studies leads us to some reflections. First, we observe a scarcity of research examining the role of technological advancements in support of international trading activities between B2B firms. Considering the pervasiveness of technologies in the current business environment, as well as the growing value of international trade, it is somewhat surprising that only a few papers address how various technologies can support B2B firms' international exchanges. Lacka *et al.* (2019)'s call for papers is therefore timely and relevant; it exposes the research gap, which needs to be urgently addressed.

We observe that the articles reviewed above identify the positive role of technological innovations in various international trade-related aspects of B2B exchanges. Here, Internet-enabled tools were found to be particularly useful to enhance communication streams between trading partners and aid B2B relationship development. As revealed through the bibliometric analysis and subsequent literature review, however, our understanding of the role of technologies in international trade is limited to a handful of tools including the electronic marketplace, the Internet, and supply chain innovation (Cluster 1, Table 1). We would like to encourage further research exploring online communication tools and their role in B2B exchanges. For example, we would like to see research on social media and how Web 2.0 can enhance active two-way communication between internationally trading B2B firms, as well as research on the role of social media in B2B cross-border relationships. Here, insights obtained from data being a result of online communication would be particularly useful. Finally, research exploring the role of technologies in B2B international trade seems to be limited to Internet-enabled technologies, we encourage future work which will examine the role of manufacturing technologies in B2B international exchanges.

We note that, with the exception of work by Voldnes *et al.* (2012) and Berthon *et al.* (2008), topics concerning the role of technologies in international trade are limited to one cluster (i.e. Cluster 1), and therefore we encourage cross cluster research. For example, we would like to see how digital technologies enhance service provision (Cluster 2) between international B2B firms, and how they contribute to the revenue growth (Cluster 3) of internationally trading partners.

Finally, in addition to online communication tools, we would like to encourage authors to explore both hardware and software, and extend the present research. For example, building on Bello *et al.* (2004)'s work, future research could examine how artificial intelligence, the Internet of things, and blockchain technologies can improve supply chain management in the global marketplace. Here specifically, studies exploring the adoption of those technologies, as well as the challenges and opportunities to internationally trading B2B firms deriving from the use of those tools, are much needed.

3.2. International trade

Despite somewhat limited interest in the role of technology in B2B international trade, the systematic literature review reveals that a significant amount of research has focused on exploring international trade. This implies that scholars recognise the importance of trading activities across borders, but are perhaps unable to identify how technological innovations can support B2B firms in those efforts. Within an extensive body of research on international trade, a number of issues are examined, including attitudes towards, and relationships between, internationally trading B2B firms.

Early research by Chiesl and Knight (1981) and Kaynak (1989) examines behavioural attitudes of buyers towards foreign suppliers of industrial products, revealing overall positive

attitudes towards foreign suppliers. Equally, Katsikeas (2000), drawing on transaction cost theory, examines the behaviour of overseas exporters trading in foreign markets. This study specifically focuses on the examination of behavioural factors influencing the level of import development.

Extending the behavioural research stream, scholarly attention later turned towards cross-border B2B relationships (Voldnes *et al.*, 2012). Recognising the importance of B2B relationships, Katsikeas and Kaleka (1999) examine forces driving import decision-making processes and a degree of import involvement in the US-UK context. Through their empirical research, they notice different motivations of both partners, which impact the extent to which they are involved in cross-border exchanges. Exploring this specific context further and adding additional insights into cross-border relationships, Skarmeas and Katsikeas (2001) assess factors and conditions, which facilitate successful importer-exporter relationships. They note the importance of interdependence, transaction-specific investments and rationalism. They also reveal the key role of trust between partners, which becomes a factor underlying further research (e.g. Lohtia *et al.*, 2009; Yen and Barmes, 2011).

Trust, as an attitudinal measure, plays a key role in developing and sustaining B2B relationships, and is particularly important in international trade and international B2B exchanges (Skarmeas and Katsikeas, 2001; Metha *et al.*, 2006). Its importance has been recognised in a number of contexts, including UK-US (Skarmeas and Katsikeas, 2001), US-Japan (Lohtia *et al.*, 2009), Russia-Norway (Voldnes *et al.*, 2012), UK-China (Yen and Barmes, 2011), and China-Israel (Berger *et al.*, 2015). Trust development, however, is challenging, and as the research reveals, it requires cultural sensitivity as well as demonstration of trust-building efforts (Metha *et al.*, 2006; Lohtia *et al.*, 2009; Voldnes *et al.*, 2012; Berger *et al.*, 2015). Yen and Barmes (2011)'s work clarifies that relationships and trust building require active communication and cooperation, as well as culture-specific social bonding and

‘face saving’ (i.e. *mianzi* in a Chinese context). The importance of recognising the role of culture in B2B exchanges is further highlighted by Voldnes *et al.* (2012), who demonstrate the impact of culture on satisfaction in buyer-seller relationships. Although research highlights the role of cultural sensitivity in B2B relationships, Ramstrom (2008) remarks that international trading relationships are not country- or culture-specific. Trading partners form unique relationships in which both parties draw from their native behaviour, forming a new type of relationship that evolves as the exchange parties interact.

Regardless of culture and its impact, trust remains particularly important in relationships that venture beyond the short-term (Yen and Barmes, 2011). Subsequent research therefore examines how B2B relationships can be maintained over longer periods of time (Elg *et al.*, 2011; Gu *et al.*, 2019), including strategies aimed at ensuring the strength and length of relationships (Leonidou *et al.*, 2019). Here Giannakis *et al.* (2012), for example, highlight the key role of the social control aspect of the governance structure of supplier relationships, and Gu *et al.* (2019) reveal the key role of sales representatives in the maintenance of B2B relationships, and particularly their commitment, which is also confirmed by Metha *et al.* (2006)’s earlier work.

Finally, Handfield and Nichols (2004) acknowledge the challenges of relationship building between buyers and suppliers located in different countries. Due to various obstacles encountered, as well as nature of the sector in which B2B firms operate, it is noted that some relationships may not be exploited to their full potential (Abrahamsen and Hakansson, 2015). Furthermore, relationship development can be hindered by relationship insecurity, defined as ‘a parent firm’s concern about the continuance of the alliance arrangement and its partner’s future provision of need satisfaction’ (Robson *et al.*, 2006; 556). Such insecurity reduces the performance, and has further negative consequences on overall performance, of trading

partners. In view of those obstacles, Handfield and Nichols' (2004) work highlights key issues which B2B trading partners should consider when managing global supply chain relationships.

To summarise, extensive research confirms that trusting relationships are key in B2B international trade. This is because of the nature and volume of B2B transactions, which are a result of trusting relationships between trading partners. Cluster 6 of our bibliometric analysis (Table 1) contains supplier consumer relationships, while issues concerning trust align with Cluster 1, although specific technologies listed in this cluster are not considered. As indicated in Section 3.1, some early studies have already recognised how technologies can support firms' efforts to build and maintain relationships. We encourage future work focusing on trust between B2B firms and the role of the computer-mediated environment in trust building. We encourage research assessing how trust can be formed and reinforced via online communication channels. Finally, the research recognises that building B2B trust and relationships is a challenging task. To support businesses, future exploratory as well as explanatory research should guide B2B firms in their efforts to reduce perceived risk and enhance the value of B2B relationships through digital tools use.

Internationalisation of Small and Medium Enterprises (SMEs) in both developed and emerging economies is yet another stream of research identified through the review, and identified in Cluster 1 of the bibliometric analysis. In this research stream, Kaikati (1999) is one of the first to recognise the importance of SMEs internationalisation, which is directly related to the growing opportunities to those firms deriving from international trade. This is further confirmed by Ibeh and Jasen (2011), who highlight the importance of SMEs expansion into international markets. Both papers, however, note that the internationalisation decision has to be underpinned by strategic market selection (Kaikati, 1999; Ibeh and Jasen, 2011), as SMEs have been shown to face a number of problems conducting export-trading activities with overseas firms (Morgan and Katsikeas, 1998).

To guide SMEs, Tain *et al.* (2018) examine ‘international take-off episodes’. They assess the pre-internationalisation of SMEs and map individual stages of the internationalisation process. Their research is further supplemented by work by Lindsay *et al.* (2017), who examine resources utilised by SMEs as well as institutional influences of host and home country during the market entry phase. Their research extends the existing literature on SMEs internationalization by identifying different resource-institutional configurations associated with various foreign market entry modes. Most recently, Hughes *et al.* (2019) examine the role of network-based and knowledge-based factors on SMEs international performance, configurationally mapping paths that lead SMEs to high performance, and Genc *et al.* (2019) explore the impact of internationalisation on innovation performance of SMEs in emerging economies, showing that internationalisation positively affects innovation performance; this relationship is further mediated by market and entrepreneurial orientation of SMEs.

SMEs play an important role in the global economy (Kaikati, 1999), and they are an important theme of Cluster 1 of our bibliometric analysis. At the same time, however, they face a number of obstacles while trading across borders (Morgan and Katsikeas, 1998). Technological advancements can assist SMEs in their internationalisation efforts, yet those have not yet been explored. We therefore encourage further research into SMEs internationalisation with a focus on technologies, which can help B2B SMEs across the stages of internationalisation mapped by Tain *et al.* (2018), and listed in Table 1, Cluster 1. For example, research could explore how the electronic marketplace and the IoT support SMEs internationalisation and trading across-borders, or how e-business activities facilitate SMEs internationalisation. Among available research methods, ethnographic methods might be particularly useful here.

As pointed out by Kaikati (1999) and Ibeh and Jasen (2011), strategic orientation is key in the international trading activities of SMEs (Cluster 1). It is also important to large B2B firms. Strategies obtained by B2B partners operating in international markets were initially explored by Silver and Schwartz (1977). Adding further insights, Hill and Allaway (1993) reveal that multinational B2B sales management adopt evaluation measures of their sales performance within the market in which they trade, which they refer to 'do as Romans do' strategy.

Initial work by Piercy (1981) provides insights into the segmentation (Cluster 6) of international trading markets and review pricing strategies of exported products. His research is supplemented by Mentzer *et al.* (2004), who argue that logistics service quality (LSQ) components can be used to identify global, horizontal, and vertical segments of logistics services customers, and that cultural and organizational characteristics may modify the LSQ–customer satisfaction relationship. Finally, segmentation is also a subject of investigation in Shankarmahesh *et al.* (2005)'s research. They develop a framework, which can be used to improve selection of export offering to global markets.

In this strategic marketing stream underpinned by themes identified in Cluster 2, Min *et al.* (1994) discuss challenges of foreign supplier selection, which include cross-cultural negotiations (Gulbro and Heibig, 1996). Recognising challenges, Kotabe and Murry (2004) also examine global sourcing strategies adopted by firms in order to ensure their appeal in increasingly competitive marketplaces. The authors explore potential limitations and negative consequences of outsourcing on a global scale. Finally, Chen and Hsu (2010) examine resource allocation on firm performance in an effort to enter international markets, which links back to the 'performance' themes of Cluster 1. They argue that the role of resource allocation in determining firms' international growth is key.

The importance of the strategic approach to international trade is undisputed. Existing research, however, needs to be supplemented by studies which acknowledge the role of technology in strategy development. The themes listed in Cluster 1 therefore have to be fully explored. For example, international markets can be divided in accordance to technology availability and willingness to use tools such as e-commerce (see Cluster 1). Furthermore, research exploring how tools such as Artificial Intelligence (AI) can overcome the challenges to global sourcing strategies identified by Kotabe and Murry (2004) would be beneficial.

Marketing and procuring component parts in the global marketplace can pose significant trading hazards (Cluster 2 and 3). Bello and Zhu (2006) identify the design, fabrication and delivery of component parts as key forces influencing the institutional designs that best safeguard exchanges between international trading partners for industrial tasks. Bello and Zhu (2006)'s work, however, is the only one examining procurement of industrial products, and thus further research is much needed. We particularly encourage research on technologies such as blockchain and its role in industrial product procurement across international markets.

Finally, the research recognises the importance of international arrangements in international trade. Here, Planner *et al.* (1978) discuss successful cases of trading with East European countries. Saghafo *et al.* (1995) execute a survey of industrial firms regarding the expected outcomes of the single European market and the US. Although a few differences were found, the study revealed a high level of optimism regarding the potential effects of the single market, with expected outcomes including increased competitive activity (Cluster 2), strong reliance on product quality (Cluster 2), increased market segmentation (Cluster 6) and product differentiation, as well as more standardised products (Cluster 3), equalised prices (Cluster 3), and efficient distribution (Cluster 4).

Related to the topic of international arrangements, countertrade refers to a variety of trade arrangements in which a seller provides a buyer with products and agrees to a reciprocal purchasing obligation with a buyer (Paun, 1997). This has been recognised as a means of achieving and sustaining competitive advantage in a trade worldwide (Cluster 2). Here, specifically, the early review paper by Reisman *et al.* (1988) identifies advantages deriving from countertrade, while Shipley and Neale (1987) verify them empirically. Palina (1992; 1993) and colleagues issued a series of articles exploring countertrade practices (Paun 1997; Palia and Lisch, 1997, and Palia and Yoon, 1994; Okoroafo, 1994). This research stream reveals that compensation was the most frequently used form of countertrade. Finally, the most recent paper on countertrade by Keillor *et al.* (2000) examines the level of trade barriers that firms trading internationally face, and the tactics they use to overcome them. They reveal that the tactics used to overcome political barriers are vital.

Although it is encouraging to see previous research recognising the importance of trading agreements between countries, and particularly the computerized advantage deriving from them (Cluster 2), the literature exploring specific trading initiatives is limited and outdated. This reinforces Lacka *et al.* (2019)'s call for papers which would account for various trading agreements, and how technological advancements can support industrial firms in their international trading activities. Furthermore, countertrade has not received scholarly attention for over two decades now, and considering the recent move towards international trading arrangements, research into those practices is required. It is particularly important to examine the role of policy (Keillor *et al.*, 2000) and technological innovations in countertrade. Here, examination of the trade arrangements concerning e-business and e-commerce would be particularly beneficial. Those studies can be based on the analysis of policy documents, and assess whether technologies can overcome barriers to countertrade, and explore the benefits of those digital tools to internationally trading B2B firms. Furthermore, studies exploring current

issues such as Brexit and trade disputes between the major economies, their impact on internationally trading firms, and how e-business can assist firms in overcoming these challenges, are needed.

To summarize, based on the results of the literature review mapped against the core themes identified in Table 1, it is evident that research on international trade has flourished. Research published in IMM on international trade appears to explore issues from each cluster identified. Those research contributions, however, need to be extended, and specific technological innovation should be considered when examining cluster themes.

3. 3. Technologies in local trade

Finally, through the articles scoring exercise, we have identified a few papers that explore technological innovations in local, rather than international, trade. On one hand, these articles explore e-commerce, its adoption and use (e.g. Deter *et al.*, 2002; Min and Galle, 2003; Rao *et al.*, 2017), a theme found in Cluster 1, Table 1. Here, Deter *et al.* (2002) assess the impact of the Internet on industrial purchase decisions in industrial markets. They focus on the attitudes of purchasing professionals towards the usefulness of the Internet, and how it is used for communication purposes. Min and Galle (2003) examine the adoption of e-commerce for B2B purchasing, and compare adopters to non-adopters. Rao *et al.* (2017) assess buyer's use of e-commerce and accounting for perceived risks and benefits deriving from e-commerce use.

On the other hand, other research examines the performance of firms engaging in e-commerce (Eng, 2004). In his empirical research conducted in the UK, Eng (2004) assesses the impact of electronic marketplaces on supply chain management. The research reveals that e-marketplace supply chain applications enable firms to automate transaction and procurement processes, but not strategic supply chain activities. Finally, Lai *et al.* (2010) examine use of IT

in logistics performance. Their study, carried out in Hong Kong, shows that firms with more extensive digitized logistics activities bundles and who utilize them more intensively achieve better logistics performance.

Although these papers align with Cluster 1 themes, we recommend extending the research to international markets. Specifically, scholars could draw from international trade literature (see. 3.2) and assess the approaches of internationally trading firms to technology adoption and use, as well as the impact of such technology on performance in the international markets. We also encourage authors to explore other technologies while considering international trade issues and to assess their impact.

4. Conclusion

Bibliometric methods are effective in identifying core themes and their networked relationship in a given journal. Coupled systemic literature reviews, regarded as a ‘fundamental scientific activity’ (Mulrow, 1994), can identify and evaluate key research contributions (Tranfield, *et al.*, 2003), and identify research gaps and propose further research directions (Tranfield *et al.*, 2003; Marikyan *et al.*, 2019).

The bibliometric method reveals that although trade is at the heart of IMM research interests, limited attention has thus far been placed on investigating trade-related issues. There are a handful of papers that examine the impact of technological innovation in B2B international trade, or the role technological advancement plays in local trade. Research exploring how various technologies can support B2B firms’ international exchanges is much needed. As discussed in Section 3.1., these contributions explore Cluster 1 themes and they focus on the Internet-enabled technologies; it would be useful to explore themes from other clusters as well various technologies including communication tool as well as manufacturing

technologies and their role in B2B international trade. Research efforts appear to be devoted towards the exploration of issues concerning international trade only (see Section 3.2.). While it is encouraging to see research interest in B2B international trade issues, which spreads across clusters (Table 2), it is vital to acknowledge technological advancements and the role they play in supporting cross-border trade. Future research should explore the role of technologies in various B2B trade-related activities including B2B relationship building, strategic orientation of SMEs, and large organisations engaging in trade across international borders, all of which are highlighted in Section 3 of the paper.

Finally, echoing Lacka *et al.* (2019)'s call for papers, research exploring the context of trading arrangements is much needed. Although previous research explores issues concerning countertrade (e.g. Okoroafo, 1994; Keillor *et al.*, 2000) and other trading agreements (e.g. Saghafo *et al.*, 1995), this literature stream seems to be out-dated. It is vital to understand how B2B firms of different sizes operating in developed and emerging economies can benefit from those initiatives, identify the obstacles they face, and how technological advancements can support internationally trading B2B firms in those efforts.

Cluster	Terms	Technological innovation and international trade	International trade	Technologies in local trade
Cluster 1	Advertising; Attribute; Business practice; compatibility; consumer needs; e-commerce; economic; electronic marketplace; globalization; information systems; international business; internet; logistics; marketing management; marketplace; preference; purchasing manager; reaction; scm; small firms; supply chain management; threat	<p>Bello <i>et al.</i> (2004); Holden (1991); Waters (2008); Berthon <i>et al.</i> (2008); Gregory <i>et al.</i> (2019)</p> <hr/> <p>Total: 5 papers</p>	<p>Chiesl and Knight (1981); Kaynak (1989); Katsikeas (2000); Lohtia <i>et al.</i> (2009); Yen and Barmes, (2011); Lohtia <i>et al.</i> (2009); Voldnes <i>et al.</i> (2012); Yen and Barmes, (2011); Berger <i>et al.</i> (2015); Gu <i>et al.</i> (2019); Metha <i>et al.</i> (2006); Robson <i>et al.</i> (2006); Kaikati (1999); Ibeh and Jasen (2011); Kaikati (1999); Ibeh and Jasen (2011); Tain <i>et al.</i> (2018); Lindsay <i>et al.</i> (2017); Hughes <i>et al.</i> (2019); Genc <i>et al.</i> (2019); Morgan and Katsikeas (1998); Kaikati (1999); Ibeh and Jasen (2011); Silver and Schwartz (1977); Hill and Allaway (1993); Chen and Hsu (2010)</p> <hr/> <p>Total: 26 papers</p>	<p>Deter <i>et al.</i> (2002); Min and Galle (2003); Rao <i>et al.</i> (2017); Eng (2004); Lai <i>et al.</i> (2010)</p> <hr/> <p>Total: 5 papers</p>

Cluster 2	Business model; Business service; Buying firm; Competitive position; Contract; Integrated solution; Interrelationship; Market actor; Product development; Professional service; Provider; Provision; Radical innovation; Rationale; Servitization; Solution; Supplier involvement; Transformation		Genc <i>et al.</i> (2019); Min <i>et al.</i> (1994); Gulbro and Heibig, (1996); Kotabe and Murry (2004); Bello and Zhu (2006); Planner <i>et al.</i> (1978); Saghafo <i>et al.</i> (1995); Paun, (1997); Reisman <i>et al.</i> (1988); Shipley and Neale (1987) <hr/> Total: 10 papers	
Cluster 3	Customer service; Consumer value; Distinction; Market share; Offering; Price; Pricing; Product life cycle; Profit; Revenue; Service offering; Survival; Vendor		Bello and Zhu (2006); Planner <i>et al.</i> (1978); Saghafo <i>et al.</i> (1995) <hr/> Total: 3 papers	
Cluster 4	Business customer; Distribution; Industrial customer; Industrial marketer; Industrial sector; Market segmentation; Producer; Product quality; Reliance; Segment; Service quality; Trade		Kaikati (1999); Ibeh and Jasen (2011); Planner <i>et al.</i> (1978); Saghafo <i>et al.</i> (1995) <hr/> Total: 4 papers	
Cluster 5	B2B branding; B2B context; B2B market; brand; brand equity; branding; customer; customer market; Industrial buyer; Retailer; Sustainability		Kaikati (1999); Ibeh and Jasen (2011) <hr/> Total: 2 papers	

Cluster 6	Exporter; Export; Foreign Market; Importer; Industrial product; International market; Manufacturer; Segmentation; Supplier customer relationships	Voldnes <i>et al.</i> (2012); Berthon <i>et al.</i> (2008) <hr/> Total: 2 papers	Katsikeas (2000); Katsikeas and Kaleka (1999); Skarmeas and Katsikeas (2001); Lohtia <i>et al.</i> (2009); Yen and Barmes (2011); Metha <i>et al.</i> (2006); Lohtia <i>et al.</i> (2009); Voldnes <i>et al.</i> (2012); Yen and Barmes (2011); Berger <i>et al.</i> (2015); Ramstrom (2008); Elg <i>et al.</i> (2011); Gu <i>et al.</i> (2019); Leonidou <i>et al.</i> (2019); Giannakis <i>et al.</i> (2012); Gu <i>et al.</i> (2019); Handfield and Nichols (2004); Abrahamsen and Hakansson (2015); Robson <i>et al.</i> (2006); Handfield and Nichols (2004); Lindsay <i>et al.</i> (2017), Piercy (1981); Mentzer <i>et al.</i> (2004); Shankarmahesh <i>et al.</i> (2005); Planner <i>et al.</i> (1978); Saghafo <i>et al.</i> (1995) <hr/> Total: 26 papers	
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Table 2. Themes and their core contributions.

Acknowledgement

The authors are grateful to the financial support for this work from the Major Collaboration Programme 2017 funded by the Ningbo Science and Technology Bureau (reference number: 2017D10032).

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