Mobile shopping behavior: a bibliometric analysis

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Abstract

Frame of the research: *The increase in the penetration rate of smartphones (3 billion smartphone users in 2020), together with the spread of broadband connectivity, represents a driving force for e-commerce that will increasingly be supported by mobile technology. By the end of 2021, 72.9% of global e-commerce sales will be generated via m-commerce and that by 2023 m-commerce will increase by 250% from 1.9 trillion US dollars in 2018 to 4.3 trillion US dollars. In light of these considerations, it is not surprising that, in the last two decades, research on m-commerce and the factors that determine its use has increased considerably*

Objectives*: The work aims to provide a systematization of research on the topic of mobile commerce through a bibliometric analysis of the literature on m-commerce from a consumer behavior perspective in order to identify the most studied and emerging strands, which may represent future areas of research as well as useful directions for manufacturers and retailers that intend to develop m-commerce and omnichannel management strategies.*

Methodology*: The work is based on a bibliometric analysis of the literature on mobile commerce from a consumer behavior perspective analyzing the contributions published from January 2000 to July 2020.*

The research was carried out following two phases: identifying contributions through the online database Web of Science (WoS) and bibliometric analysis through SciMAT.

Findings*: The results of a bibliometric analysis conducted on the research contributions of the last 20 years provide a clear picture of future research directions and the areas on which companies will have to focus in the development of omnichannel business models.*

Through the WoS database, 275 articles were collected, then analyzed with SciMAT in the two time periods 2000–2015 and 2016–2020. In the first period, contributions focused on identifying the antecedents of mobile commerce adoption and its relationships with trust, loyalty and customer satisfaction and its repeated use. In the second period, the focus was on interaction with other channels, with a multichannel and omnichannel perspective.

Research limits: *Although WoS is considered the most suitable data source for most publications, some contributions included in other databases may have been overlooked. In addition, the research does not take into account the contributions of the whole of 2020, which was most impacted by the effects of the COVID-19 pandemic.*

Practical implications: *From a research perspective, it is possible to draw up the evolutionary picture of the topic, identifying the most covered and emerging strands representing valid opportunities for future research. From a managerial perspective, the research systematizes the results of existing studies by providing useful indications on mobile commerce strategies in retailing.*

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Originality of the paper: *With reference to the wide literature on mobile commerce, the research provides a first systematization of the contributions developed in the last 20 years and provides interesting insights for future research and managerial practices.*

Key words: mobile commerce; shopper behavior; bibliometric analysis; digital; SciMAT

1. Introduction and theoretical background

The growing prevalence of mobile devices has not only changed the way individuals interact and communicate, but has profoundly transformed consumers' shopping habits, drawing the attention of consumer behavior scholars.

In 2020, there were over 3 billion smartphone users, a number that is set to increase with the evolution of technology and the impact of 5G on connectivity levels (Statista, 2020a). Mobile devices enable individuals to perform various functions, from a widespread search for information before purchasing a product or service to conducting real commercial transactions, such as buying products and services, and paying bills. The increase in the penetration rate of smartphones, together with the spread of broadband connectivity, represent a driving force for e-commerce that will increasingly be supported by mobile technology.

Mobile commerce (m-commerce) is a major field in the marketing literature; it comprises any research, evaluation or monetary transaction activity related to the purchase of goods or services through mobile or cellular devices connected to the Internet or through the wireless telecommunications network (Clarke, 2001; Ko *et al.*, 2009; Lai *et al.*, 2012). In a broader sense, m-commerce can be considered a service that offers individuals the ability to gather information from multiple sources, check the availability of a product or service, and evaluate special offers and alternatives at any time throughout their customer journey (Lai *et al.*, 2012). According to this perspective, m-commerce is interpreted as an extension of e-commerce and as a separate and autonomous marketing channel capable of creating new value for customers (Kleijnen *et al.*, 2007; Choi, 2018). This is due to its distinctive features of mobility and flexibility, which make it usable anywhere and at any time (Rodríguez-Torrico *et al.*, 2019; Yun *et al.*, 2011).

It is estimated that by the end of 2021, 72.9% of global e-commerce sales will be generated via m-commerce and that by 2023 m-commerce will increase by 250% from 1.9 trillion US dollars in 2018 to 4.3 trillion US dollars (Statista, 2020a). This is a forecast that will probably have to be revised upward following the effects of the COVID-19 pandemic on the purchasing behavior of individuals. The restrictions activated to contain the health emergency, together with individuals' reluctance to make purchases in physical stores and their growing familiarity with smartphones, further accelerated the spread of m-commerce, leading many companies, especially retail, to review their business models. As of

June 2020, global m-commerce traffic reached 22 billion monthly visits, with exceptionally high demand for grocery, apparel and technology items (Statista, 2020b).

In light of these considerations, it is not surprising that, in the last two decades, research on m-commerce and the factors that determine its use has increased considerably (Yang, 2010; Li *et al.*, 2012; Yang and Kim, 2012; Kumar and Mukherjee, 2013). Specifically, research has focused on the adoption and use of mobile technology on the one hand (Wu and Wang, 2005; Kim *et al.*, 2009; Yang, 2012; Agrebi and Jallais, 2015; Groß, 2015) and on the intentions and motivations of mobile shopping on the other hand (Yang, 2010; Li *et al.*, 2012; Yang and Kim, 2012; Kumar and Mukherjee, 2013).

In particular, in the context of the first strand of research, several theories were used to explain the technological determinants of m-commerce: *Innovation Diffusion Theory* by Rogers (1983, 2010) and Moore and Benbasat (1991), *Technology Acceptance Model* (TAM) by Davis *et al.* (1989), *Theory of Reasoned Action* by Fishbein and Ajzen (1975), *Theory of Planned Behavior* by Ajzen (1991), *Unified Theory of Acceptance and Use of Technology* (UTAUT) by Venkatesh *et al.* (2003) and its extension UTAUT2 by Venkatesh *et al.* (2012).

In terms of the second strand, several contributions showed how purchase motivations change depending on the context and the reference time period (Gupta and Arora, 2017; Madan and Yadav, 2018). Several authors focused on the role of utilitarian factors, such as efficiency, accessibility, perception of utility, ease of use and convenience (Davis *et al.*, 1989; Groß, 2015), while others investigated the influence of hedonistic dimensions, such as the perception of pleasure in the use of mobile devices (Li *et al.*, 2012). Finally, some authors stated that both utilitarian and hedonistic factors contribute to consumers' intentions and motivations to adopt and use smartphones for shopping activities (Yang and Kim, 2012).

Despite the increasing attention paid to m-commerce and the proliferation of studies on the topic, there are few qualitative and quantitative reviews or systematizations of the m-commerce literature (Zhang *et al.*, 2012; Groß, 2015; Natarajan *et al.*, 2017). Given this, in the context of the relevance and dynamism of m-commerce, a systematization of research contributions on this topic would update and expand knowledge of purchasing behavior in the digital context and would orientate future research and managerial practices.

The present work aims, therefore, to carry out a bibliometric analysis of the literature on m-commerce from a consumer behavior perspective by examining relevant articles published in the last 20 years (from January 2000 to July 2020). Bibliometric analysis enables the tracing of an evolutionary framework for a topic to identify the most studied and emerging strands, which may represent future areas of research. From a managerial point of view, the results of this research can provide useful information for manufacturers and retailers intend to develop m-commerce and omnichannel management strategies.

2. Methodology

In order to analyze the literature produced so far on the topic of m-commerce from a consumer behavior perspective, a quantitative approach based on bibliometric analysis was adopted. Founded in the 1920s, the methodology for bibliometric analysis has recently developed as a result of the greater availability of large online databases that allow the archiving of a large number of scientific publications (Gutiérrez-Salcedo *et al.*, 2018). Bibliometric analysis allows a systematic and orderly review of the existing literature on a subject; it can be divided into two macro-areas: performance analysis and scientific mapping analysis (SMA) (Noyons *et al.*, 1999). The first, through the use of bibliometric indexes based on citations and publication data, aims to evaluate from a descriptive point of view the characteristics of the contributions (e.g., typology, journal, citations, country) (Narin and Hamilton, 1996); the second (SMA) focuses on the monitoring of a scientific field and on the definition of research areas in order to identify, through an analysis of the contents, the structural and evolutionary aspect of the phenomenon under consideration (Noyons *et al.*, 1999; Börner *et al.*, 2003). Bibliometric mapping is a spatial representation of how disciplines, research strands and contributions or authors are related to each other (Cobo *et al.*, 2012; Martínez *et al.*, 2015).

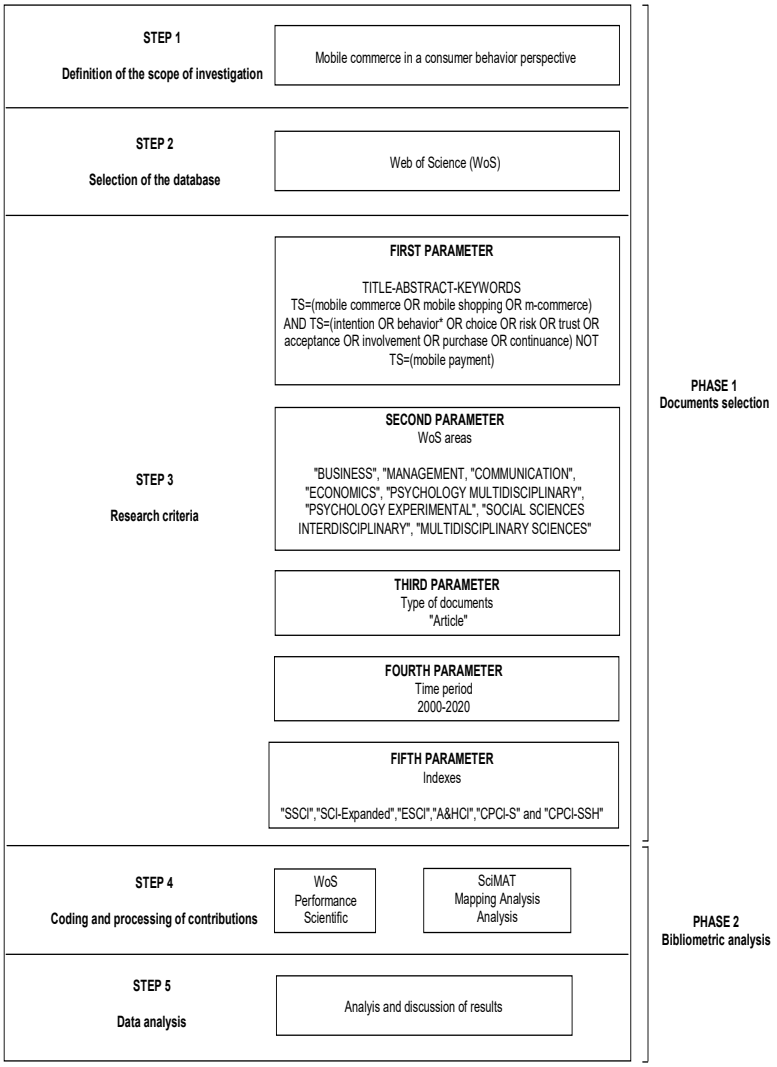
For this research, the performance analysis was carried out using the online database Web of Science™ (WoS), while the open source bibliometric software SciMAT 1.1.04 was used to develop a longitudinal analysis of scientific mapping based on co-word analysis: a consolidated content analysis technique used for the study of co-occurrences of keywords in order to obtain a graphical visualization useful for data analysis (Callon, 1983; Cobo *et al.*, 2012; Batagelj and Cerinsek, 2013). Moreover, SciMAT enables identification of the associations and interactions between the various lines of research in order to identify mature and emerging lines and trace their temporal evolution (Callon *et al.*, 1991). In this way, analyses carried out through SciMAT, combining both performance analysis tools and scientific mapping tools, allowed the researchers to analyze all aspects of m-commerce through an analysis of contributions held in specific online databases; in particular, analyses allowed the detection and visualization of the conceptual topics or general thematic areas of m-commerce and its thematic evolution (Cobo *et al.*, 2012).

Compared to other scientific mapping software, SciMAT has three key features: first, it allows a powerful pre-processing that leads to data reduction (it detects duplicate elements and spelling errors), which is useful for cleaning raw bibliographic data; second, it makes it possible to carry out scientific mapping studies using a longitudinal framework (Price and Gürsey, 1975; Garfield, 1994) and build scientific maps enriched with bibliometric indexes such as the sum, maximum, minimum or average number of citations received, rather than more robust analyses and indices such as the *H index* (Hirsch, 2005; Alonso *et al.*, 2009, 2010) and *co-word analysis* (Callon *et al.*, 1983); third, it includes a wizard that allows the user to configure the different stages of scientific mapping.

The present work has been structured in two phases consisting of: (1) the identification of the scientific contributions of interest (from January 2000 to July 2020) through the WoS database and (2) the bibliometric analysis through SciMAT, starting from the necessary process of standardization of documents and keywords. Specifically, according to a consolidated approach given in the literature (Castillo-Vergara *et al.*, 2018; Capobianco-Uriarte *et al.*, 2019), the research followed the following steps (Fig. 1):

- for phase 1, (1) definition of the scope of investigation, (2) selection of the database, (3) definition of search criteria;
- for phase 2, (4) coding and processing of contributions, (5) data analysis.

Fig. 1: Bibliometric analysis process



Source: authors' elaboration

2.1 Phase 1 - Documents selection

First, the scope of the research was defined (step 1): m-commerce according to a consumer behavior perspective. Subsequently, WoS was selected as a bibliographic research platform for the research of scientific contributions (step 2). We chose WoS because it is a particularly appropriate database for conducting bibliometric studies since it is the most complete with reference to social science studies and makes available several citation indexes (Norris and Oppenheim, 2007; Waltman, 2016).

The selection of the documents took place in July 2020 through the definition of the search criteria (step 3). In particular, the search for scientific contributions was carried out through the use of a precise query that included some keywords that the documents had to express. The time horizon (2000-2020), the type of contribution requested and the research areas within which to search for compatible documents were also set. The final query was as follows: TS=(mobile commerce OR mobile shopping OR m-commerce) AND TS=(intention OR behavio* OR choice OR risk OR trust OR acceptance OR involvement OR purchase OR continuance) NOT TS=(mobile payment) in "TITLE-ABSTRACT-KEYWORD". To refine the research, the categories "BUSINESS," "MANAGEMENT," "COMMUNICATION," "ECONOMICS," "PSYCHOLOGY MULTIDISCIPLINARY," "PSYCHOLOGY EXPERIMENTAL," "SOCIAL SCIENCES INTERDISCIPLINARY" and "MULTIDISCIPLINARY SCIENCES" for the period 2000-2020 were selected. Contributions were also requested from multidisciplinary databases: Social Science Citation Index (SSCI), Science Citation Index Expanded (SCI-Expanded), Emerging Sources Citation Index (ESCI), A&HCI, CPCI-S and CPCI-SSH. For the type of document, the category "ARTICLES" was taken into account.

The search identified 890 publications from January 2000 to July 2020, of which, following further skimming on the basis of the topic covered, 275 publications were selected for analysis.

2.2 Phase 2 - Bibliometric analysis

As suggested by previous research (Noyons *et al.*, 1999), bibliometric analysis (step 4) was divided into two macro-areas: first, a performance analysis was conducted and second, scientific mapping (SMA) was developed.

With regard to performance analysis, the characteristics of the contributions (citations, country) were evaluated through WoS from a descriptive point of view (Narin and Hamilton, 1996). Specifically, all the trends of publications over time (2000-2020), the number of publications by country and the ranking of the most cited articles in the literature on the subject were studied through bibliometric indexes based on citations and data relating to publications.

Moreover, with regard to SMA, the structural and evolutionary aspect of the field of investigation was identified through content analysis (Börner *et al.*, 2003). Specifically, to perform the scientific mapping, SciMAT software

was used by dividing the contributions into two time periods: 2000-2015 and 2016-2020. This division reflects a technological criterion according to the intuition that the evolution of technology has driven the advent and spread of shopping through mobile devices. Specifically, the period from 2000 to 2015 sees the gradual transition from "traditional" to "modern" technologies, characterized by the advent of iPhones, smartphones and 4G; the years from 2016 to today see the proliferation of mobile applications, the advent of a new generation of mobile devices and 5G connection, and the creation of websites optimized for mobile browsing. The first period (2000-2015) is longer than the second because, as suggested by previous research (Cobo *et al.*, 2011), in longitudinal studies applying *co-words analysis*, the first period of time analyzed should generally be longer than the others in order to collect a sufficient number of published scientific contributions. The last period can be shorter and is useful for providing interesting indications for the identification of future research opportunities (Cobo *et al.*, 2011).

On the basis of the established periods, the bibliometric analysis was conducted in which co-occurrences were analyzed taking as a reference unit the keywords "Authors' Word," "Source's Words" and "Added Words" (respectively, keywords indicated by the authors, the journal and WoS). The *equivalence index* (Callon *et al.*, 1991) was chosen as the measure of similarity for normalization and *the simple centers algorithm* as the aggregation algorithm to extract the clusters. To derive the relevance of the words, the number of citations and the *H-index* were chosen (Hirsch, 2005; Alonso *et al.*, 2009, 2010), taking into account the "*Core documents*". Finally, the *Jaccard index* (Peters and Van Raan, 1993) and the inclusion index were used as measures of evolution and overlap of topics, respectively.

The results of the analysis (step 5) based on the output of SciMAT are discussed in the next section.

3. Results

3.1 Descriptive analysis

Starting the descriptive analysis with the number of published journal articles per country, China is the most productive country with 57 publications (equal to 21% of the total), followed by the United States with 52 publications (equal to 19% of the total). Taken together, the two nations account for more than a third of the total contributions published in the period under review. In third place we find Taiwan (with 33 publications), followed by India (with 30 publications) and Great Britain (with 22 publications). The latter is, therefore, in first place among European countries, followed by Germany (with 21 publications).

Table 1 shows the *top ten* of the most cited articles published in the period 2000-2020. This is a particularly useful analysis as it allows us to understand the influence of publications in the scientific community.

The work of Wu and Wang (2005) is the most cited, both for the total of the period (since it is among the contributions published for the longest

time) and as an annual average of citations. Specifically, Wu and Wang (2005) studied the intention to use a mobile channel for purchases through the application of an extended version of the TAM.

The second most cited article, albeit with a significantly lower number of citations, was by Lin and Wang (2006); they developed a model of customer loyalty in the mobile context.

Tab. 1: Citation analysis

Title	Authors	Year of publication	Number of citations 2000-2020	Average annual citations
What drives mobile commerce? An empirical evaluation of the revised technology acceptance model	Wu and Wang	2005	981	61.31
An examination of the determinants of customer loyalty in mobile commerce contexts	Lin and Wang	2006	375	25.00
Design aesthetics leading to m-loyalty in mobile commerce	Cyr *et al.*	2006	303	20.20
Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia	Chong *et al.*	2012	203	22.56
What drives Malaysian m-commerce adoption? An empirical analysis	Wei *et al.*	2009	198	16.50
A meta-analysis of mobile commerce adoption and the moderating effect of culture	Zhang *et al.*	2012	189	21.00
Factors affecting purchase intention on mobile shopping websites	Lu and Up	2009	179	14.92
Increasing trust in mobile commerce through design aesthetics	Li and Yeh	2010	172	15.64
On the go: how mobile shopping affects customer purchase behavior	Wang *et al.*	2015	149	24.83
A two-staged SEM-neural network approach for understanding and predicting the determinants of m-commerce adoption	Chong	2013	126	15.75

Source: authors' elaboration

3.2 Evolutionary analysis

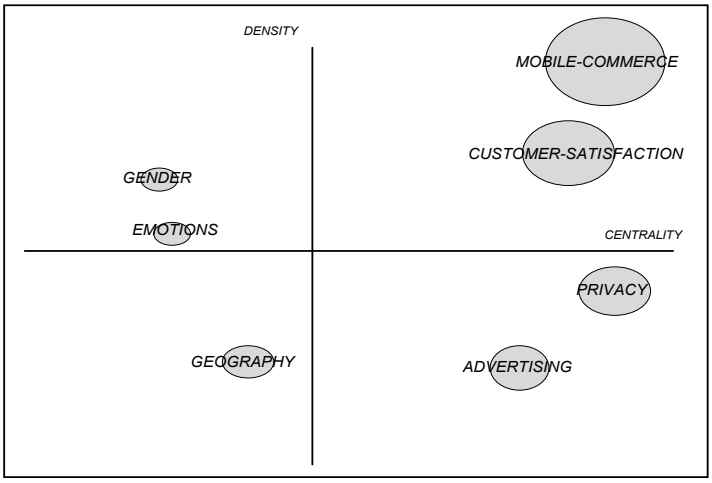
Before proceeding with the evolutionary analysis generated by the SciMAT software, a process of de-duplication of keywords was carried out to avoid the presence of duplicates (which can result from the use of plurals, separators and synonyms) and thus improve the quality of the data and the results produced.

Through the strategic diagrams (Fig. 2 and Fig. 3) it is possible to identify the topics covered in the two periods examined, their weight and their relevance. In particular, within the four quadrants are distinguished:

(1) the central themes - *mother theme* (top right quadrant); (2) the basic and transversal themes - relevant but still poorly developed themes (lower right quadrant); (3) emerging or declining themes (lower left quadrant); and (4) marginal themes (upper left quadrant).

In the first analysis period (2000-2015), seven main themes emerge (Fig. 2).

Fig. 2: Strategic diagram for the period 2000-2015



Source: authors' elaboration

These are the years in which interest in m-commerce began to emerge. For this reason, studies focused on the selection of a mobile channel for the purchase of products and services. The presence in the quadrant of the mother themes of *mobile-commerce* and *customer-satisfaction* keywords confirms this trend.

Analyzing in detail the *mobile-commerce* theme, we find links with the keywords *adoption, determinant* and *technology acceptance model.* The main focus of this period is centered on the identification and study of the antecedents of the intention to use a mobile channel in the purchase process. In particular, the concept of intention refers to the first time an individual considers the use of a technology or channel; therefore, it represents the motivational components of an individual's behavior, a measure of the strength of their intention to perform a specific behavior and the degree of conscious effort exerted to perform it, namely to make future purchases through the mobile channel (Davis *et al.*, 1989; Fishbein and Ajzen, 1975). The theory most used for this purpose was the TAM, which was developed by Davis (1989) to study the adoption of new technologies. Wu and Wang (2005) proposed an extended version of TAM. In addition to adding new variables, Wu and Wang (2005) demonstrated the negative action of the perceived cost related to the use of m-commerce (equipment costs, access costs and transaction fees) and the positive action of compatibility (perception of a consistency between a purchase via a mobile and one's values, experiences and needs) on purchase intention through a mobile

channel. Shih and Chen (2013) in turn expanded the TAM through the integration of the *Task-Technology Fit* model and demonstrated the greater explanatory strength of this integrated model compared to the two individual models. The use of TAM to explain the intention to use mobile devices to make purchases has continued over the years focusing on specific countries (e.g., China, Sun *et al.*, 2010; Singapore, Yang *et al.*, 2015; India, Goyal *et al.*, 2013) and cross-cultural comparison (e.g., Chong *et al.*, 2012; Dai and Palvi, 2009).

The second mother theme of the period is *customer-satisfaction,* which is strongly related to the issues of *loyalty* and *continuance intention.* Researchers' attention, in this case, was no longer directed to the determinants of the selection of a mobile channel, but to customer satisfaction following the use of the channel itself; satisfaction that turns out to be decisive in the decision to continue to use the mobile channel. Satisfaction is defined as a psychological or emotional state resulting from a cognitive assessment of the gap between expectations and actual performance following an experience with a product or service (Anderson and Srinivasan, 2003; Falk *et al.*, 2007; Oliver, 1981). In this context, satisfaction refers to the emotional response that follows an m-commerce experience (Agrebi and Jallais, 2015; Groß, 2018; Yang and Lee, 2016). Numerous studies showed that the more satisfied consumers are, the greater their confidence in the channel and the likelihood of continuing to use m-commerce in the future (Bhattacherjee, 2001; Chen and Demirci, 2019; Rodríguez-Torrico *et al.*, 2019).

TAM was also used in studies of customer loyalty to m-commerce; Cyr *et al.* (2006) expanded the model by adding the hedonic component of fun, already used to study purchasing behavior in the online context but never with reference to the mobile context. The results provided by Cyr *et al.* (2006) demonstrated the direct and positive influence of fun on fidelity and the importance of the aesthetic component of the mobile interface as an indirect determinant of loyalty.

Lin and Wang (2006) developed a customer loyalty model and noted the positive influence of the degree of satisfaction on customer loyalty; both variables are in turn positively determined by trust in the *m-vendor.* Choi *et al.* (2008) studied the factors that determine customer satisfaction and loyalty by comparing the context of m-commerce with that of e-commerce. They noted a partial similarity between the factors determining satisfaction and loyalty for the two channels but, at the same time, they also identified unique factors with respect to the contexts. For example, the reliability of the content and the purchase process were determining factors for m-commerce.

Continuing the analysis of the various phases within the customer journey, Zhou (2011) focused on the post-adoption phase, in which the consumer must choose whether to continue and, therefore, reuse the channel for subsequent purchases, recommend the channel or whether to complain about a negative event. The confirmation of expectations, the perceived ease of use and usefulness, and the cost of use are determining factors of satisfaction which, in turn, increase the likelihood that the customer will use the channel again (*continuance intention*) for future

purchases. Continued intention concerns, therefore, the intention of customers to continue using m-commerce services after a first initial use (Andrews and Bianchi, 2013; Chang and Chou, 2011; Rodríguez-Torrico *et al.*, 2019). Gao *et al.* (2015) studied continuance intention: in addition to the degree of satisfaction and trust, they also identified as a significant driver what is called "flow" or a temporary experience in which the consumer is amused and fully focused on the event.

Already in the first period of analysis of m-commerce an interest emerges not only in the first phase of the purchase process, namely that of an approach to the channel and intention to use (relevant since it is a new channel that a user is unlikely to have experienced before), as well as toward its determinants, but also toward the subsequent phases that make up the customer journey (*satisfaction, continuance intention, loyalty*).

Moving the analysis to the second quadrant of the strategic diagram (Fig. 2), the one containing the relevant but still poorly developed themes in the period under review, we find the keywords *privacy and security* and *advertising*. Privacy and security are relevant and sensitive issues that are beginning to emerge in this timeframe. Foresight and confidentiality in the sharing of personal data can, in fact, represent a deterrent to the use of a mobile channel, especially when the advantage gained is marginal.

Benou *et al.* (2012) assessed the benefits and risks of using additional information elements to provide more services to consumers: while the request for more information allows a company to provide superior and personalized services, it also generates concerns in the user regarding the guarantee of privacy and security.

Banerjee and Dholakia (2013) pointed out that the increasing diffusion of the wireless network has eliminated one of the barriers to the use of mobiles as a purchase channel, namely, connection costs. They identified different consumer segments based on mobile shopping behaviors and reported that privacy care was a key variable in this segmentation. Privacy-conscious individuals were more inclined to use mobile devices to make purchases when they were within the walls of their home, in a "protected" context, whereas less privacy-conscious individuals use mobile devices to make purchases anytime and anywhere. Chorppath and Alpcan (2013) studied the motivations that push users to provide data on their location when using mobile apps, allowing companies to offer location-based services. The risks perceived by users and the benefits offered defined the level of granularity of the information they shared about their location. Finally, Lai and Lai (2014) identified users' concern for their privacy as a deterrent to the use of m-commerce.

In the associative network identified around the keyword *advertising*, we find the terms *mobile marketing* and *involvement*. The effectiveness of mobile advertising is an important tool to increase the intention to m-commerce. In this context, Varnali *et al.* (2012) investigated consumer responses to SMS-based mobile advertising campaigns and, in particular, the effect exerted by the characteristics of the message (incentives offered and prior authorization by the user) and the effects of the consumer's perception of the message (attitude toward the campaign, involvement, intrusiveness of the message and past experience) on the outcome of the

advertising. The results of their study showed that perceived intrusiveness and attitude have a greater influence on the consumer's reaction to the advertising than incentives and the prior authorization required. Rau *et al.* (2014) studied the relation between the repetition of a message and the level of time pressure with reference to SMS-based mobile advertising campaigns: they reported that if the effectiveness of advertising on mobile devices is greater in a context characterized by low time pressure, then it is desirable to minimize the disturbances caused to users, limiting the daily amount of ads. Finally, Lin and Chen (2015) showed that the credibility of a message acts positively on attitude toward m-commerce (driver of intention), while irritation generated by a message acts negatively.

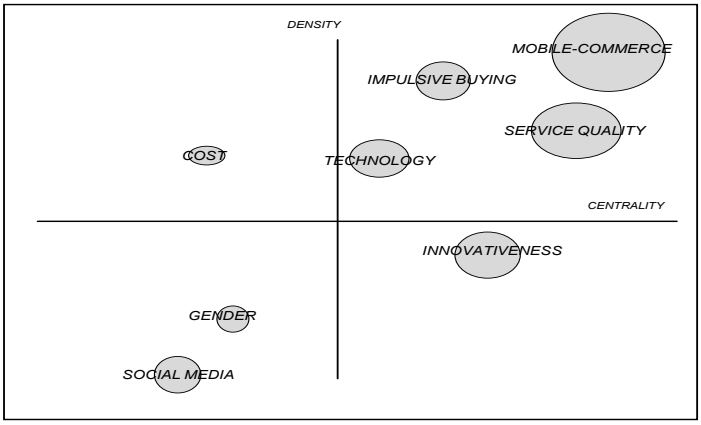
In the third quadrant, which groups the emerging or declining themes, the term *geography* is positioned, which lacks sufficient density and centrality to be able to represent a relevant theme of the period. This term, in reality, does not reflect a line of study in the mobile context but, simply, highlights that several studies were carried out with reference to a specific country, as also emerged during the analysis of other keywords. Therefore, we cannot speak of an emerging theme or a declining theme, but of a mode of analysis transversal to all the themes.

The fourth and last quadrant contains the marginal themes in which we find the keywords gender and *emotion*. Gender refers to studies that investigated possible differences in mobile shopping behaviors between men and women (e.g., Banerjee and Dholakia, 2013; Okazaki and Mendez, 2013; Chung, 2014). Emotion recalls the importance of the emotional component in decision-making processes in the mobile context. M-commerce services are often used by users to have fun experiences and, for this reason, companies that use mobiles as a sales and/or communication channel must try to increase the sense of fun experienced by the user. To do this they must invest in the: (1) content of the message and the service offered; (2) social orientation of the user, since shopping, even if "virtual," is experienced as a moment of sociality (social experience is one of the hedonic reasons for shopping); and (3) self-orientation (another hedonic motivation for shopping), that is, m-commerce services must become an integral part of the user's lifestyle (Davis, 2010). The importance of the hedonic dimension in m-commerce has also been demonstrated by Ono *et al.* (2012) in a study comparing the reasons for choosing a mobile channel over a physical one.

In summary, in the period 2000-2015 the literature in the m-commerce field focused on the identification of the determinants of the choice of channel, on the link between trust, loyalty and customer satisfaction and on to the continuous intention defined as the repeated use of the channel. Finally, over time the hedonic and emotional components linked to purchases also became important even in the digital context.

The strategic diagram for the second analysis period (2016-2020) identifies eight relevant themes (Fig. 3). Although the number of reference years is lower than in the previous period, the topics that emerge from the analysis are numerous and appear to be growing.

Fig. 3: Strategic diagram for period 2016-2020



Source: Authors' elaboration

Among the mother themes we find, of course, *mobile-commerce,* the topic of our research. The main interest in this period is in user satisfaction derived from the use of m-commerce. In particular, on the one hand, its determinants are studied and, on the other, the role it plays within the customer journey. Marinkovic and Kalinic (2017) identified trust and mobility as the main drivers of satisfaction, but the effect of these drivers is moderated by the personalization of the website (an effective tool to meet users' expectations). From a managerial point of view, they emphasized the advantages offered by m-commerce in terms of mobility, and highlighted the need to communicate more to users the benefits brought by this channel. Mobility is defined as the set of benefits deriving from access to and use of a product/service without space or time limits. Not least is the role of personalization: m-commerce services must be as consistent as possible with the needs, values and lifestyles of users. In the model proposed by Groß (2018), user satisfaction is included as a direct determinant, together with behavioral intention, of the actual behavior achieved, further supporting its importance within the customer journey. Finally, Jimenez *et al.* (2016) reported that satisfaction acts positively on both trust and loyalty to the channel, whereas Thakur (2018) stated that satisfaction is an important determinant of continued intention.

Another central theme of the period is *service-quality*. According to Yang *et al.* (2017), the integration of online and mobile channels by the retailer has a positive effect on the quality perceived by the user with reference to both contexts, which has a positive impact on their overall satisfaction and, consequently, on repurchase intention. Also in the field of multichannels, Moon and Armstrong (2019) developed a model aimed at studying intention to revisit a store in the online-to-offline environment. In particular, they focused on the business model that is developed in order to lead online customers to the physical store: users search for information, order products/services and pay on both the online and mobile channels but collect the product within the physical point of sale. In this particularly

complex context, the perceived quality of service, which acts positively on trust and negatively on perceived risk, is determined by both tangible and intangible factors that affect both environments (physical and virtual). It is, therefore, a construct whose evaluation depends on a multitude of factors associated with the context.

Noteworthy is the attention paid to a new theme in the mobile context: impulsive-buying. Extensively investigated in the physical context and in the online one, impulse buying begins to be studied with reference to m-commerce only in this second time period. This new channel seems, in fact, to increase impulse purchasing behaviors and for this reason it is of interest to identify its determinants. Zheng *et al.* (2019) pursued this goal through the development of a model based on the stimulus-organism-response model. They demonstrated a direct effect of hedonic motivations of mobile navigation on impulsive buying and an indirect effect (moderated by hedonic motivations) of utilitarian motivations. Chen and Yao (2018) also studied impulse buying behavior but with reference to mobile auction platforms. In this context, the tendency to make impulsive purchases, the regulatory assessment of the opportunity to make a purchase and the positive emotion generated by the situation act positively on the realization of an impulse purchase. So, although several studies have shown that the mobile channel has increased this type of behavior, it is equally true that a personal predisposition toward impulsive actions is a relevant driver. To this, of course, is also added the context that can arouse positive feelings that can lead to the development of high expectations.

The last keyword placed in the quadrant of mother themes is *technology*. In particular, reference is made to the impact exerted by the technological evolution of mobile devices on consumer purchasing behavior. The contribution published by Pantano and Priporas (2016) set itself precisely this objective: to understand the extent to which mobile technologies have changed purchasing behavior in the retailing sector. The results demonstrated the importance of the advanced technology and services offered by m-commerce to move consumers toward this channel, both to carry out all the steps of the purchasing process and to integrate it with other existing channels (online and offline). The qualitative research conducted by Fuentes and Svingstedt (2017) highlighted the contribution of smartphones to the redefinition and transformation of consumer buying behavior. Through a mobile phone it is possible to collect, process and share information in a new way, as well as live new shopping experiences. Surely these are positive consequences for the consumer, but they are, however, also accompanied by negative implications, such as greater anxiety and a greater level of stress. This new technological advance pushes more and more users to move from the online channel (which involves the use of personal computers) to the mobile one (which involves the use of mobile devices) to make their purchases. According to Tang *et al.* (2016), the elements that favor this migration, in addition to the perceived usefulness and perceived ease of use of mobile devices (in accordance with TAM), are the perceived security of the channel and some limitations related to the tools connected to e-commerce: the space and time constraints and the size of the personal computer.

In the light of this first examination, it is noted that in this second period of analysis, attention is not only directed to the mobile channel as limitless compared to the other channels, but scholars also began to increase their study of its interaction with other channels, in a multichannel and omnichannel perspective.

Innovativeness is the only cross-cutting theme that emerges from the analysis. Among the drivers of channel choice, greater importance is placed on the innovativeness of the consumer, a trait that is independent of the context. When we talk about innovativeness we refer to an individual's predisposition to search for novelties or to be receptive to new ideas (Goldsmith, 2001). For this reason, those who are more inclined to innovation will be more likely to try new products, new services, new channels and, therefore, are more likely to adopt m-commerce. However, the relationship between innovativeness and intention to use m-commerce is not entirely clear. Chang (2019) demonstrated a direct and positive relationship between innovativeness and trust in mobile technologies and the intention to use m-commerce, whereas Sun and Chi (2018) noted an indirect relationship: innovativeness acts on intention through perceived usefulness and perceived ease of use.

In the quadrant of emerging themes are the keywords *gender* and *social media*. Gender is a variable increasingly frequently inserted in models of analysis of mobile consumer behavior as a driver of behavior or as a moderator of some relationships. In the tourist context, Tan and Ooi (2018) supported the hypothesis of such moderation on the relationship between trust and behavioral intention. However, Marinković *et al.* (2020) noted a different attitude toward the channel between men and women. In general, the role played by socio-demographic characteristics gathers the interest of the research community because it is important, also for managerial purposes, to understand how these act on individuals' selection of a channel.

The theme of social media and social m-commerce is the real emerging theme of the period that is given ample space for in-depth study in the literature. Hew *et al.* (2016) proposed a model to study the impact of mobile social commerce on brand loyalty and demonstrated that social media users are actually inseparable from their use of social media, which have become an integral part of their daily lives, and not even the concern for the privacy of one's information seems to be able to prevent their use. According to Hew *et al.* (2019), being a mobile social media user increases the likelihood that the individual will use mobile social commerce; barriers to use seem to be disappearing. In contrast to most of the literature that claims that social media is a very important tool for retailing, Parker and Wang (2016) reported that consumers actually prefer to communicate with others in a more traditional interpersonal way rather than publicly share their shopping experience on social media.

Costs is the only keyword to occupy the quadrant of marginal issues; it comprises all the studies that investigated the impact of transaction costs on the use of a mobile channel (e.g., Tang *et al.*, 2016; Luo *et al.*, 2020). Although there are recent studies that investigated and analyzed this issue, it is actually a topic that is no longer particularly current, since the use of

m-commerce has now become an increasingly widespread practice and, consequently, users no longer consider transaction costs to be important.

4. Conclusions

The present work has pursued the goal of providing a systematization of research contributions on the topic of m-commerce in light of its growing relevance in the global economic scenario, further accelerated by the health emergency situation caused by COVID-19. The results of the bibliometric analysis conducted on the research contributions of the last 20 years provide a clear picture of what the future directions of research should be and the areas on which companies will have to focus in their development of omnichannel business models.

First of all, it seems necessary to observe that the topic of m-commerce has not lost its centrality over the decades. The unaltered positioning of mother themes in both strategic diagrams underlines that the topic continues to be researched, in order to produce useful knowledge for operators already present in the digital market and for companies that are reviewing their business models from a multichannel perspective and as a response to the emergency context.

Over the last 20 years, with the evolution of technology and the consequent greater familiarity of users with technology, the attention of scholars has shifted from the antecedents of the intention to adopt mobile as a purchase channel to the reasons for the repeated use of the mobile channel. The result is a rather exhaustive cognitive framework that seems useful to guide the strategies of all operators, regardless of in which phase of the life cycle of m-commerce adoption they are.

Newcomers to m-commerce can draw on the wide wealth of research contributions on purchase intention, and find out the factors, mainly of a utilitarian nature, that reduce barriers to the use of the mobile channel. Companies that have been operating in the digital market for longer, can benefit from the latest knowledge on the antecedents of continuance intention and on the determinants of satisfaction, loyalty and trust. It is certainly very interesting to learn that these aspects are affected by the hedonistic dimension and the aesthetic component of the mobile interface, in addition to factors of convenience, such as ease of use and perceived usefulness. The utilitarian dimension and the emotional dimension, therefore, intertwine creating the necessary and sufficient conditions to increase consumer satisfaction, which ultimately increases the likelihood that the consumer will continue to use m-commerce for future purchases.

It is precisely on these issues that research in recent years has focused. The key to the success of m-commerce increasingly lies in its ability to meet consumer needs throughout the customer journey through different physical and digital touchpoints. Empirical evidence on the relationship between channel integration, perceived quality and satisfaction progressively shifts the attention of scholars from the mobile channel alone to its interaction with other channels, in a multichannel and omnichannel perspective.

In this context, the importance of a key feature of the mobile channel stands out, which is mobility. Mobility (i.e., the set of benefits deriving from access to and use of a product/service without space and time limits) represents, in fact, an important driver of satisfaction because it offers a unique advantage to the consumer. It can therefore be concluded that the key to success for companies that intend to implement m-commerce strategies seems to be increasingly linked to the ability to meet the needs of the consumer throughout the customer journey in a multichannel and omnichannel perspective.

Thus, it is reasonable to expect further growth in research contributions to investigate the multichannel behaviors of consumers and the roles they attribute to different touchpoints within the customer journey.

To this the interest of companies in the phenomenon of impulse buying is certainly added, widely investigated in the physical context but for which there still seems to be room for in-depth analysis in the digital context, in general, and in the mobile one, in particular. The mobile channel seems, in fact, to increase impulse purchases and therefore the attention of companies should focus on the determinants of this specific behavior in the mobile scenario.

In this context, the understanding of consumer behavior becomes more complex because new variables and their relationships come into play from which new ways of interaction and purchase arise. The study of the hedonistic and utilitarian components in the use of the different touchpoints, as well as the factors and methods of interaction that more than others can determine impulse purchases, seem relevant, without neglecting the role played in this context by the app and social media as important channels of interaction and purchase. It is in this scenario that the real emerging theme of the coming years, which companies will have to learn to confront, appears: mobile social commerce. In particular, companies will necessarily have to consider that social media users are actually inseparable from their social media, which have become an integral part of their daily lives, and there seem to be no privacy and security barriers to social media use.

Therefore, the topic of m-commerce from the consumer behavior perspective is enriched with new content, fueling research and managerial interest in the emerging themes of social m-commerce, without neglecting the dimensions of service quality that in the omnichannel scenario become even more articulated.

The availability of the Internet anytime and anywhere, the sharing of experiences, and the virtuality that increases interactions with the customer must necessarily stimulate companies to consider mobile devices at the center of their growth strategy. The future, in fact, still holds new mobile shopping experiences. For example, quality and increasingly realistic content enabled by virtual reality technologies, artificial intelligence, digital voice assistants and smart speakers will influence the next trends in the m-commerce world.

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