UNIVERSIDAD DE ALCALÁ DE HENARES

FACULTAD DE CIENCIAS ECONÓMICAS, EMPRESARIALES Y TURISMO

Model and management indicators in industrial omnichannel (B2B)

Dissertation submitted in partial fulfillment of requirements for the degree of PhD in economics and business management, at the University of Alcalá.

by

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Alcalá de Henares, November 2021

This thesis is dedicated to my beloved wife María del Mar. Her continuous support, love and affection are the true architects of this thesis, and in general of any achievement that I have been able to reach throughout all these years with her

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To my beloved children, Rubén, Marcos, and Samuel, if in any way this thesis can mean an example for them, in terms of dedication and effort, it serves at least to mitigate the time I have stolen from being with them in so many afternoons of job

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To my dear parents, because being an example, a model and a mirror in which I look at myself forever

A Mar

Acknowledgments

I want to thank my thesis directors, Dr. Federico Pablo-Martí, and Dr. Estela Nuñez-Barriopedro, for their constant support. The thesis and the papers that compose it would not have been possible if it had not been for their continuous advises, revision and patience. Their guidance has allowed me to structure the objectives and schedule the research in a process that we have finally followed together during these five years. Similarly, I want to thank Dr. Javier Carrillo Hermosilla who lit the way for me at the beginning of this research.

I also want to thank the coordinators of the doctoral program in Economics and Business Management, Dr. José A. Gonzalo, and Dr. Olga Cantó Sánchez, for their involvement and the organization that has served me as a continuous motivation.

To the professors of the different courses in these five years of work who have been a source of inspiration for many of the contents of the thesis and for the possible evolution.

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INTRODUCTION

1 Research background – Omnichannel term and strategy

Digital transformation of companies has the final goal of providing a better service to their customers (Deleersnyder, Geyskens, Gielens, & Dekimpe, 2002). With this purpose, new shopping channels are added, such as the Internet. Therefore, there is a greater use of multiple channels by companies and consumers (Neslin et al., 2006; van Bruggen, Antia, Jap, Reinartz, & Pallas, 2010). This movement towards multichannel involves much more than the simple adoption of the Internet. Channels are an integral part of any company's customer management strategy, and many companies have added online channels in an attempt to improve customer profitability (Gensler, Leeflang, & Skiera, 2012; Venkatesan, Kumar, & Ravishanker, 2007)

Multichannel customer management requires not only the introduction of new channels, but also the elimination of ineffective and costly channels (Neslin & Shankar, 2009). As customers increasingly use online channels for the various stages of the buying process (e.g. search, purchase, sales support), companies find attractive the idea of eliminating costly channels like catalogs, even if some customers still they use them (Konuş, Neslin, & Verhoef, 2014).

The management of several channels has been investigated in diverse disciplines, including marketing, the retail industry and information system implementation. The first step in researching these fields is to examine and characterize the new demand, especially the consumer’s perspective, and in particular the characteristics of multichannel buyers and their behavior in all channels (Ansari, Mela, & Neslin, 2008; Venkatesan et al., 2007). A line of research emerges from these studies that focuses on

the internal impact for companies and analyzes the effect of the implementation of online channels compared to traditional ones (Avery, Steenburgh, Deighton, & Caravella, 2011; Pauwels, Leeflang, Teerling, & Huizingh, 2011). In previous research, the key question from a management perspective was whether a company should offer one or more online channels (Brynjolfsson, Hu, & Rhaman, 2013; Chen & Ku, 2013; Neslin et al., 2006; Trenz, 2015). However, in today's digital environment it is accepted that various channels must participate in delivery and customer service, so the question to be solved is how the many channels can be handled uniformly to maximize the consumer experience (Mirsch, Lehrer, & Jung, 2016).

The term omnichannel is quite new. Since its first appearance (Rigby, 2011), the term omnichannel has been referred to in the academic literature in recent years appearing as the main theme or support of several studies. Omnichannel management has been seen as a logical evolution of multi-channel customer service processes and the application of various e-commerce techniques. Today there are many papers that refer to omnichannel management from different points of view. From the definition of the most successful strategies (Simone & Sabbadin, 2017; Trenz, 2015; Verhoef, Kannan, & Inman, 2015), return on investment and possible indicators (Gensler et al., 2012; Hure, Picot-coupey, & Ackermann, 2016); up to the determination of the product price per channel (Breugelmans & Campo, 2016; Harsha, Subramanian, & Uichanco, 2019), going through the study of the different types of customers and their preferences per channel (Gupta, Justy, Kamboj, Kumar, & Kristoffersen, 2021; Konuş, Verhoef, & Neslin, 2008). Omnichannel management is a field of research with increasing interest in recent years and that has been even more accelerated as a result of the Covid-19 pandemic as it

has forced numerous companies to innovate with the start-up of new digital service delivery channels (Hwang, Nageswaran, & Cho, 2020; Zhuang, Fang, & Cai, 2020).

The customer, the end consumer, is increasingly informed and interacts with organizations through various channels during the same process: search, purchase, claim, or return. These changes in consumer habits and the increase in customer expectations force companies to equip themselves with new technologies and processes to improve the provision of their services. This change is more pronounced in all the contact points that companies have for their relationship with customers: physical store, online store, commercial agents or telephone service, among others (Adhi, Burns, Davis, Lal, & Mutell, 2019). As an example of impact, it is useful to review the omnichannel processes for a retailer to perform from the point of view of the salesperson in the store (Alonso-García, Francisco-Javier; Nunez-Barriopedro, Estela; Pablo-Martí, 2020).

Source	Name	Description
Started in the store	Endless aisle	A salesperson (or the consumer himself) shows the company's catalogue on a digital device (a self-service digital kiosk in the case of the consumer), which allows not to be limited to the assortment in the store and allows cross-selling.
	Shop in aisle	The clerk assists the customer on the shelf and can close the purchase by paying by card, redeeming loyalty points, or by other electronic means, without having to go to the cashier.
	Return	Returning an item purchased online

	Loyalty	Customer registration and management of loyalty club benefits
Started online	Reserve in store	The customer reserves (without payment) items to see and / or try in store.
	Click & Collect (and variations like Click & Drive)	The customer buys items and picks them up at the store.
	Ship-From-The-Store	The customer buys items for home delivery. The corporate system determines that the order is assigned to the store instead of the warehouse to optimize logistics costs (last mile). It is therefore a transparent process for the client and that allows the same-day-delivery model (delivery on the day)

Table 1. Omnichannel processes in store from the point of view of the employee.

The table above allows us to figure out some of the transformations that organizations must carry out. The store becomes a logistics center (*darkstores*) and therefore the salesperson must have tools for picking and packaging. But in addition, there are processes that start online and end in the store that require integration at various levels, such as systems (e-commerce, POS, kiosks, and mobile applications), processes (inventory, warehouse, loyalty) and departments (retail, digital, logistics and marketing).

The Omnichannel strategy represents the ideal approach to organizing different channels by implementing the latest available technologies in order to satisfy customer expectations and suit current customer behavior (Beck & Rygl, 2015; Lewis, Whysall, & Foster, 2014; Verhoef et al., 2015; Zhang et al., 2009).

2 Research objectives

Technological changes define a new customer behavior (Omnichannel). This is not only true for final consumers (Brynjolfsson et al., 2013; Carvalho & Campomar, 2014) but also for business clients; i.e. in a company's relationship with its distributor. Since more companies are involved in this type of relationship (Frost & Sullivan, 2015), it should be studied in the light of the Omnichannel concept as extensively, or more than, the companies that only have relationship with end consumers.

The omnichannel strategy aims for a single and unique experience, regardless of the purchasing phase the consumer is in or the channel they use (Brynjolfsson et al., 2013; Rosenblum & Kilcourse, 2013). Thus, omnichannel management is a new capability that all organizations must develop in order to satisfy a new context of demand, and forces companies into a new phase of corporate evolution. Omnichannel management has been defined as "*the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized*" (Verhoef et al., 2015). Based on this definition already prevalent and extending it in its application to the B2B context, it can be concluded that omnichannel management provides synergistic management of all

available channels for communication and contact with industrial buyers (Obal & Lancioni, 2013), with the ultimate goal of optimizing the user experience.

The pandemic situation caused by Covid-19 has accelerated the digitalization of companies in all sectors, but especially in the industrial sphere, where there are many organizations that had remained faithful to traditional distribution channels (Annarelli et al., 2021; Fernández-Rovira et al., 2021; Wengler et al., 2021). Although different strategies may be followed in the digitalization process, one of the ones that have aroused the most interest in the scientific literature in recent years is that related to omnichannel management (Verhoef et al., 2015). However, most of the published papers are limited to the retail field. Several authors have already highlighted the lack of research in the B2B field (Ilchenko et al., 2018; Kembro et al., 2018; Russo & Confente, 2017b; Strojny & Chromińska, 2016).

When it comes to B2B, it should be noted that estimated online sales to retail customers are estimated at $4.4 trillion. While the value of the professional market is estimated at $21trillion. In other words, according to these data, the so-called B2B market is five times larger than the B2C one (UNCTAD, 2020). However, despite the B2B market is much larger than that for B2C, intercompany relationships in omnichannel scenarios have been studied less than relationships with end consumers. Neither has work been done on models in the value chain in general (manufacturers, wholesalers and distributors), or in specific sectors in which this type of management is more generally applied.

Therefore, to date, no reference models have been found to use in establishing the success factors for omnichannel management with industrial customers. This research fills this research gap by establishing a reference model that collects the factors that influence the omnichannel management of an organization in a B2B context. The research seeks to answer different questions that have not yet been resolved:

- Which traditional processes are most affected in this new omnichannel management?
- How is management efficiency characterized, defined, and measured in a company that assumes continuous adaptation to an increasingly diverse and changing demand?
- When it comes to identifying relevant indicators, the overall Omnichannel performance has yet to be defined first and measured accordingly (Weinberg et al., 2007).

The thesis has a final objective that is to establish the key indicators for omnichannel management and for this it is carried out in sequence:

1. Define omnichannel in a B2B relationship model.
2. Establish a practical model that allows simulating future scenarios and anticipating the impact on management.
3. Define the corporate omnichannel development determinants.

In this way, the thesis as such becomes a practical guide for application in the industrial field that collects the key elements, barriers, and steps to be followed of greater significance in the process and of greater relevance for the outputs considered.

3 Structure of the research

The thesis has been done by compendium of papers. However, the selection and sequence of these papers has followed a traditional research sequence. In this way, the first paper has a double objective. On the one hand, it seeks to highlight the omnichannel management research gap in the B2B field. On the other hand, because of said analysis, it is desired to establish a research agenda, with a special focus on corporate management.

As a result of the research agenda, it's highlighted the importance of "*characterize the organizational model of a company focused on Omnichannel Management. In other words, how should companies be configured (technologically and organizationally) to provide a beneficial basis for Omnichannel Management?*" (Alonso-Garcia et al., 2021a). This research is the one that is approached with the second paper. In other words, once the research gap has been identified, an initial model is built that includes all the processes that are affected for the performance of an omnichannel management in the industrial field, either favoring said management or limiting it. This paper covers the first two objectives of the thesis. The model thus defined is a tool for decision-making since it allows simulation scenarios to be carried out that anticipate the impact on management when modifying the environment variables on an initial starting scenario. In this way, a manager can reinforce those processes that may be most affected by the new conditions.

Once the model and simulation scenarios have been established, the paper itself indicates the further research: "*it is necessary to define which indicators are key to Omnichannel Management for industrial clients and, if possible, how these could be measured. This would make it possible to define strategies in advance and to measure business performance once these strategies have been addressed, in order to facilitate continuous internal analysis and comparison between companies in the same sector"*(Alonso-Garcia et al., 2021c) . In this way, the third paper arises in which the measurement variables of omnichannel management and the determinants that make it up are established. The third paper answers the last objective of the thesis.

The list of papers that make up the different chapters of the thesis is collected below.

Paper	Authors	Journal	Date	JCR	SJR
Omnichannel Management in a B2B context: Concept, research agenda and bibliometric review	J. Alonso-Garcia, F. Pablo-Martí, E. Nunez-Barriopedro	International Journal of Industrial Engineering and Management	March 2021	-	Q2
Omnichannel Management in B2B. Complexity-based model. Empirical evidence from a panel of experts based on Fuzzy Cognitive Maps	J. Alonso-Garcia, F. Pablo-Martí, E. Nunez-Barriopedro	Industrial Marketing Management	May 2021	Q1	Q1
Digitalization in B2B Marketing. Omnichannel Management from a PLS-	J. Alonso-Garcia, F. Pablo-Martí, E.	Journal of Business &	January 2022	Q3	Q1

SEM approach (Work in progress)	Nunez-Barriopedro. P. Cuesta-Valino	Industrial Marketing			

Additionally, during the research, there is attendance at different conferences and various publications in the field of the thesis, highlighting among them:

Paper	Authors	Journal	Date
Digitalization in B2B Marketing. Omnichannel Management from a PLS-SEM approach	J. Alonso-Garcia, F. Pablo-Martí, E. Nunez-Barriopedro. P. Cuesta-Valino	CBIM 2021 International Conference. Center for Business & Industrial Marketing. Georgia State University (Atlanta, USA)	June 2021
La gestión omnicanal como estrategia clave para el bienestar organizacional	J. Alonso-Garcia, E. Nunez-Barriopedro, F. Pablo-Martí	Estrategia de marketing social corporativo: Retos en comunicación y branding en entornos competitivos. Editorial Sindéresis. ISBN 978-84-18206-63-4	December 2020
Management Indicators in Omni-Channel	J. Alonso-Garcia	V Doctoral Colloquium AEMARK	September 2019
Management Indicators in Omni-Channel Innovation.	J. Alonso-Garcia	Eu-SPRI Early Career Research Conference	May 2018

Methodological framework			

4 Methodology

The research has relied on various methodological approaches for each of the published papers and their scope of application.

4.1 First paper. Methodology for a bibliographic and bibliometric review

To carry out the analysis of the research gap, a bibliographic review is carried out. This review seeks both to establish the foundational papers of omnichannel management, as well as to identify the main lines of research.

To collect the information, a method has been proposed that combines the best practices of a review of the scientific literature along with various bibliographic methods. The documents were analyzed and categorized according to their defining characteristics, the methodologies adopted, and topics addressed.

This review process is a method in itself. There are several papers that lay the foundation for a proper review of scientific literature. They establish a sequence of common steps, but different methods and techniques to achieve them. Several approaches to carrying out the research have been integrated that had certain points in common, thus making it possible to generate a more complete and robust method. The process is summarized in the following table and detailed below:

Process steps (Own)	(Webster & Watson, 2002)	(Brocke, Jan vom; Simons, Alexander; Niehaves, Bjoern; Niehaves, Bjorn; Reimer, Kai; Plattfaut, Ralf; and Cleven, 2009)	(Zupic & Čater, 2015)
a. Scope		Definition of review Scope	Research Design
b. Key Concepts		Conceptualization of topic	
c. Literature	Identifying the Relevant Literature	Literature Search	Compilation of Bibliometric data
d. Analysis	Structuring the Review	Literature Analysis and Synthesis	Analysis
e. Visualization			Visualization
f. Interpretation	Theoretical Development	Research Agenda	Interpretation

Table 2. Literature review process

To start the open search, it should be noted that not all intercompany relationships are referred to as B2B. Taking the typical supply chain of any sector (Martel & Klibi, 2016) and collaboration among companies (Barratt, 2004), the search should identify the Omnichannel strategies that a manufacturer, wholesaler and/or distributor have followed before reaching the retailer in the sector. For this reason, searches have been directed to the following terms: RAW; MANUFACT *; WHOLESAL *; SUPPL *. For WOS, this

results in just 15 papers. In any case, according to the results in Table 3, seven of these fifteen still refer to the retail sector. Obviously, the search in the literature leads to a limited subset of papers in the field of research, but this does not guarantee that all of them meet the specific target.

#	Description	WOS Search	Res.	SCOPUS Search	Res.
1	Potential B2B without RETAIL*	(TS=(OMNICHANNEL OR OMNI-CHANNEL) AND TS=(RAW OR MANUFACTU* OR WHOLESAL* OR SUPPL*) AND NOT NOT TS=RETAIL*)) AND LANGUAGE: (English) AND DOCUMENT TYPES: (Article)	15	(((ALL (omnichannel) OR ALL (omni-channel))) AND (suppl*)) OR (((ALL (omnichannel) OR ALL (omni-channel))) AND (wholesal*)) OR (((ALL (omnichannel) OR ALL (omni-channel))) AND (manufactu*)) OR (((ALL (omnichannel) OR ALL (omni-channel))) AND (raw) AND NOT KEY (retail*)) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (DOCTYPE , "ar"))	513
2	(1) without B2B and Omnichannel words in the refs.	n/a	-	#1 - AND NOT REF (b2b OR omnichannel)	226

Table 3. Searches in WOS and SCOPUS

The SCOPUS results are much more numerous. However, a more detailed analysis shows that, for some of the filtered papers, the terms B2B and OMNICHANNEL appear in the references and not in the body of the paper. A refinement is made on the results of SCOPUS to eliminate references from the search (see Table 2 #2). Finally, a direct search on the results of SCOPUS Table 2 #2 of the B2B term provides just one title (Lapoule & Colla, 2016).

Of the fifteen papers collected from WOS in Table 3 #1, only five of them expressly mention the term B2B (Castillo et al., 2018; Li et al., 2015; Wieczerniak & Milczarek, 2019) as shown in Table 3. One of them (Wieczerniak & Milczarek, 2019) is not included in the results of a direct search restricted to papers in the Omnichannel field that contain the term "B2B". It is noteworthy that less of half of the WOS results in Table 2 #1 are found in the SCOPUS search of Table 2 #2 (Lawson et al., 2017; Li et al., 2015; Lo & Wang, 2019; S. Zhang et al., 2019). This highlights the advantage of carrying out literature searches of several data sources, not so much because of the coverage itself, but also because of the results given by each database's different search engine.

Paper	Cluster Own	Supply Chain/ Industry	Cluster Mirsch et al.
(Lawson et al., 2017)	Logistics	Automotive	Further - Conceptualization
(Li et al., 2015)	Management & IT	Several	Transformation towards Omnichannel - Realization
(Russo & Confente, 2017b)	Management	Several	Further - Conceptualization

(Russo & Confente, 2017a)	Management & Logistics	Several	Further - Conceptualization
(Seyedghorban et al., 2020)	Logistics	Several	Further - Realization
(Wieczerniak & Milczarek, 2019)	Logistics	Several	Obstacles and Benefits - Conceptualization
(Zhuang et al., 2019)	Logistics	Several	Transformation towards Omnichannel - Realization

Table 4. Cluster & Industry classification of the B2B papers as Table 2 #1 WOS

An additional review can be performed using bibliometric methods (Zupic & Čater, 2015). As has been described, "science mapping" is based on the quantitative approach of bibliometric research methods and is increasingly used to map the structure and development of scientific fields and disciplines. The objective is to create a representation of the structure of the research area by dividing elements (documents, authors, journals, words) into different groups.

The present research, rather than relying on only one method, has used two:

- Co-citation. This method connects documents, authors or journals on the basis of joint appearances in reference lists (two papers are cited together). This is the most frequently used and best validated bibliometric method. The connection of documents, authors or journals though co-citations has been proven to be reliable (Börner et al., 2005; Boyack & Klavans, 2010).

- Bibliographic coupling. This connects documents, authors or journals based on the number of shared references. It can be used for new publications that have not yet been cited, emerging fields and smaller subfields, such as Omnichannel.

A double analysis is performed by applying both methods to the results of Table 2 #1 of SCOPUS (513 papers), i.e. on a set of papers potentially based on B2B. Both studies aim to identify the papers from the same field of research that share the same references (Bibliographic coupling). At the same time, the intention is to review the set of papers referenced in this field of research (Co-citation), and therefore those that can be considered foundational or fundamental in the Omnichannel field.

Bibliographic coupling analysis gives low values. A threshold of 25 citations of a document, results in 26 papers, only 24 of which are related to each other. The table below lists only those papers that are not limited to the Retail field. It is reasonable to consider that, for a research area that is only nine years old, the threshold number of citations should be reduced to twenty-five papers in order to find more than twenty papers.

Paper	Cluster Own	Supply Chain / Industry	Citations	Total link strength
(Ailawadi & Farris, 2017a)	Management	Suppliers & Retailers	87	19
(Brusset, 2016)	Logistics	Several	41	2
(Carbone et al., 2017)	Logistics	Several	34	11
(J. Chen et al., 2017)	Management & Logistics	Manufacturer	81	15

(Gessner & Snodgrass, 2015)	Logistics	Several	28	2
(Marchet et al., 2018)	Management & Logistics	Manufacturers & Retail	25	39
(Modak & Kelle, 2019)	Management & Logistics	Manufacturers	50	7
(Roblek et al., 2016)	Management & IT	Several	224	1
(Savelsbergh & Van Woensel, 2016)	Management & Logistics	Several	140	1

Table 5. Omnichannel Management in B2B papers by Bibliographic Coupling

The co-citation analysis requires an even lower threshold. A minimum of 12 co-citations is applied to a total of 33,430 references, in order to give a significant number of papers, namely 21. Once again, the table below lists only those papers that are not limited to the Retail field. It should be noted that there is an paper that appears in both tables (Lemon & Verhoef, 2016),

Paper	Cluster Own	Supply Chain / Industry	Citations	Total link strength
(Ajzen, 1991)	Management	Several	12	25
(Barney, 1991)	Management	Several	14	14
(Fornell & Larcker, 1981)	Management	Several	26	38
(Lemon & Verhoef, 2016)	Customer Journey	Several	19	58

(Neslin et al., 2006)	Channels & Touchpoints	Several	21	94
(Vargo & Lusch, 2004)	Marketing	Several	12	26

Table 6. Basic papers for Omnichannel Management in B2B by co-citation analysis

Finally, in this first paper, bibliometric methods have been used to construct a scientific map. These maps are a quick way to identify the structure of the research field and also add rigor to the literature review (van Eck & Waltman, 2010; Zupic & Čater, 2015).

4.2 Second paper. Techniques and method for modeling and simulation

The theoretical framework is intended to be defined based on specific cases. Build the customer-company relationship (network) map using a Fuzzy Cognitive Map following three phases:

- Nodes, Key Concepts. Expert panel.
- Map, cause-effect relationship in each of the arcs and network graph
- Model, numerical values and computational simulation

To identify the nodes, the map and the model, a Delphi process was followed from a panel of experts that is described in the paper itself. The technique chosen for modelling, and simulation consists of a Fuzzy Cognitive Map (FCM). FCM is a flexible computing technique that allows modeling the properties of the variable sought (Omnichannel Management) based on expert knowledge and determining possible future states and instabilities of the company's network (De Maio et al., 2015). The

FCM is intended to provide a useful and formal description of the perception of a group of experts in the industry (A. J. Jetter & Kok, 2014).

The weights in the matrix are based on a Likert scale with five different levels of force (von der Gracht, 2012). The numerical values of the weights indicate the degree of influence between components (or concepts). Similarly, in the adjacency matrix are the signs of the causal relationships between the components of Omnichannel Management.

Once the omnichannel management model has been formulated, subsequent simulation tasks or what-if scenarios (Hester, 2015), were carried out on assumptions that modify the input variables (Value Repositories and Constraints), to see what impact Omnichannel Management has on performance.

4.3 Third paper. Determinants from a PLS-SEM approach

PLS-SEM is a variance-based method that estimates composites representing latent variables in path models (Hair et al., 2016). PLS-SEM has been chosen because the objective of the research is oriented towards prediction, that is, it is intended to verify the predictive power shown by the model with respect to omnichannel management (Wynne W Chin, Marcolin, & Newsted, 2003). Likewise, PLS-SEM is prescriptive when, as in this research, the hypotheses are derived from a macro-level theory of which not all the relevant or outstanding variables are known (Barclay, D., Thompson, R., dan Higgins, 1995; Wold, 1980). In other words, the theory is not solidly developed (Alonso-Garcia et al., 2021a), and the manifest variables present different levels of measurement. In addition, the fact that the measures are not fully developed because they come from Delphi experts and the sample is not very large, again indicates that

PLS-SEM is more suitable than other types of techniques more oriented to confirmatory research, such as – for example – MBC (Richter et al., 2016; Vinet & Zhedanov, 2011). To perform the analysis, SmartPLS has been selected from the different software packages available (Hair et al., 2016).

5 Structure of the thesis

As described above, the thesis is structured according to a classical research (Goodwin & Graebe, 2017):

1. Introduction and methodology.
2. Bibliographic review, research gap and research agenda (Paper 1)
3. Results and discussion (Paper 2 - with the Delphi results and the construction of a B2B model that allows simulating what-if scenarios)
4. Validation and evaluation (Paper 3 - contrasting again with another Delphi and elaborating the omnichannel determinants from a PLM-SEM approach)
5. Conclusions and future studies.

It should be noted that a specific methodology section has not been included, since each paper has followed different methods for its purpose. Thus, bibliometric methods, Delphis, FCM modeling and simulations have been used; and finally, PLM-SEM. The methodology is described and referenced in each of the papers that make up the thesis.

It is also noteworthy that the research work for each paper has led to a more extensive work that, due to the paper synthesis and publication procedure itself, has not been included in them. Both the limitation at the level of extension of the publications, as

well as the need to be very concise in the contribution of academic value, has left some aspects that are not core, but tangential and of academic interest, which are summarized in the conclusions of the thesis. For example, the research agenda published in paper 1 had to necessarily focus on the organizational management cluster, but there are other clusters with great capacity for evolution and future research, which are indicated in the conclusions section of the thesis.

Finally, and in order to guarantee the reproducibility of the research, information not included in the papers has been attached, such as the Delphis questionnaires carried out in papers 2 and 3.

CHAPTER 1: Omnichannel Management in a B2B context:

Concept, research agenda and bibliometric review

CHAPTER 1

Omnichannel Management in a B2B context: Concept, research agenda and bibliometric review

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(International Journal of Industrial Engineering and Management - http://doi.org/10.24867/IJIEM-2021-1-275)

Omnichannel Management in a B2B Context: Concept, research agenda and bibliometric review

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Abstract: *The COVID-19 pandemic has driven increases in the provision of services through digital channels, even by more traditional companies. An Omnichannel model of service provision poses new management challenges for companies. This research reviews the literature on Omnichannel Management by companies whose clients are other companies (B2B) and classifies the different areas of research to date. The principal finding is that, despite considerable academic interest in Omnichannel management, there have been few studies of Omnichannel in the B2B field. This emphasizes a significant research gap to address. We have also outlined the Research Agenda to highlight future lines of research.*

Keywords: Omnichannel Management; B2B; Digital Transformation; Literature review; Bibliometric methods; Research Agenda.

CHAPTER 1

Omnichannel Management in a B2B context: Concept, research agenda and bibliometric review

1 Introduction

Studies have been carried out of the management of several channels in sectors as diverse as marketing, the retail industry, and information system implementation. A line of research emerges from these studies that focuses on the internal impact for companies and analyzes the effect of implementing online channels compared to traditional ones [1]. In previous research, the key question from a management perspective was whether a company should offer one or more online channels [2]. However, in today's digital environment it is accepted that several channels must be involved in delivery and customer service, so the question to be solved is how the many channels can be handled uniformly, in order to maximize the consumer experience [3].

The Omnichannel strategy seeks to provide a seamless and improved experience regardless of the purchase phase and the channel the customer is using (customer journey) [4, 5]. Since its first appearance [6], Omnichannel has been mentioned in academic literature and is the main or supporting topic of many studies. The earliest academic papers on Omnichannel [7] highlight the impact that Omnichannel management will have on companies that offer products and services to end consumers, but also on manufacturers and wholesalers, i.e. in the field of trade between companies (B2B).

When referring to the B2B field, it should be borne in mind that, according to the United Nations Conference on Trade and Development [8], the volume of trade between companies (B2B) is much larger than the amount of business to end customers (B2C).

If, for example, we consider the field of electronic commerce, the B2B market is four times larger than that for B2C, “the value of global B2B e-commerce represents 83% of all e-commerce” [8]. Given that Omnichannel Management is a new area of special interest, as shown by the number of studies published, and considering “that the value of global B2B e-commerce was $ 21 trillion” in 2018 [8], we would expect that many of these papers would have studied the impact of Omnichannel Management in manufacturers and/or wholesalers. However, most of the published research focuses on the study of the end consumer in the retail field.

To date, as demonstrated later in the paper, Omnichannel Management has been mainly studied in the B2C context, whether at the level of operations [9], inventory management [10], or pricing strategy [11, 12]. The interest of this study is focused on the industrial buyer, whose nature, purchasing decisions, and evaluation criteria are quite different from those for end consumers [13]. Technological changes have facilitated new customer behaviors (Omnichannel) and this must also be the case for business clients (industrial buyers), i.e. in a company’s relationships with its distributors.

The principal objective of this document is therefore to identify the gaps in the relevant literature and consequently propose an agenda to boost research into B2B Omnichannel Management. To achieve this goal, the paper first defines a literature review method so that the results can be replicated. Based on this method, the results of the review are presented, and then discussed in a subsequent section in which a future research agenda

is proposed. Finally, the main findings, limitations, and possible lines of research are brought together in the conclusions section.

2 Literature Review Method

To date, several papers have reviewed the literature dealing with this field, with different purposes [3, 14, 15, 16, 17, 18, 19, 20, 21]. Some of these reviews are more general in scope, while others serve as a basis for identifying gaps in a specific scope of study. In any case, although they start from a common theme (Omnichannel), only eighteen papers are cited more than once, and just one is cited more than three times [7]. It is therefore concluded that the reviews of the existing literature have limited overlap. This reveals one of the principal problems of any literature review, namely the author's subjective interpretation of the papers reviewed.

The method followed adheres to the cyclic process that has previously been defined for reviewing literature [22]. Once the search itself has been completed, a process of synthesis is required, which may well rely on a concept matrix [23].

For a review to be rigorous, it is not enough to describe its method and conceptual structure. It must also complement both the traditional qualitative approach of literature reviews and the quantitative meta-analysis approach, by applying new techniques such as "science mapping" [24]. This technique consists of a combination of classification and network visualization. Bibliometric methods may be used to build a scientific map. Such maps are a fast way of identifying the structure of the research field and also add rigor to the literature review.

Applying bibliometric methods does not replace reading and synthesizing the papers; it is used in this paper as a supplementary tool to weight the importance of research papers on Omnichannel Management.

A literature review is "a summary of a specific area that supports the identification of specific research questions" [25]. These questions will focus on specific aspects not covered by the set of papers that develop a given topic. The method proposed therefore starts by combining the initial steps of both of the methods described above [22, 24] in order to establish an initial question that sets the scope of study.

The research question that justifies this paper is: “How has Omnichannel Management been studied in the scientific literature regarding relationships and transactions between companies?”

The bibliographic method to be used must also be identified. In this case, co-citation analysis will be used to determine the foundational and reference papers in the field of study. However, bibliographic coupling will be used for refining the search for papers on the research subject [24].

As a first step, the key concepts must be defined. For this purpose, concept mapping is proposed [22]. This technique is a means and not an end in itself, i.e. it aims to be an aid to the researcher [25]. Rather than a comprehensive map – which would depend on the knowledge that the researcher has of the field – this is a basic tool for documenting the process. It is a simple way of identifying and relating similar keywords that may appear

in the subsequent literature search. The search re-uses the keywords already proposed in the literature review in a previous paper [3].

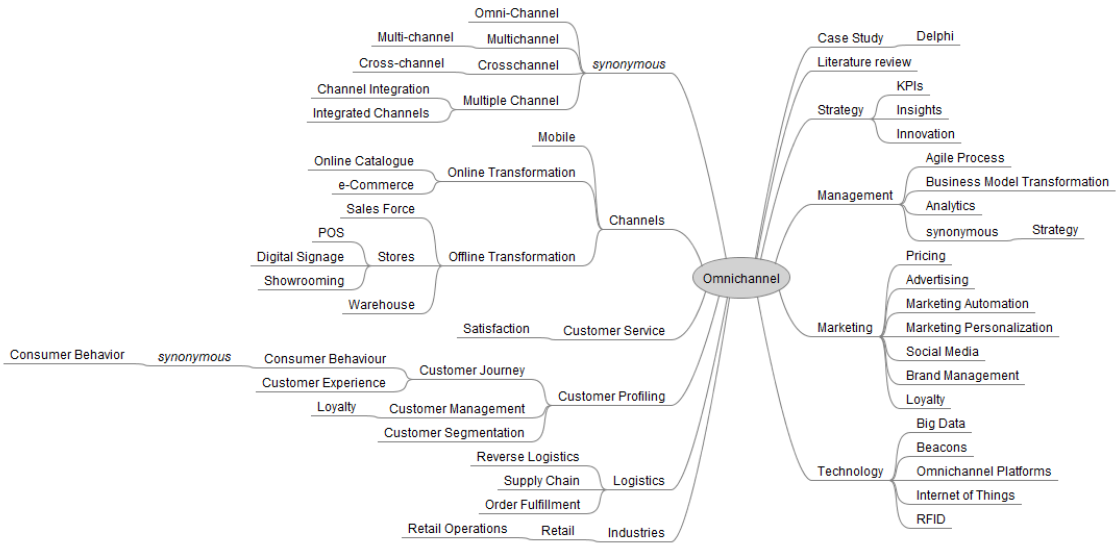

Figure 1. Concept mapping. Keywords

Based on these references, the most relevant papers will be searched for. Once the key papers have been identified at the Omnichannel level, a backward search can be performed, to find the most referenced papers. A forward search is then performed on the most common bibliographic sources [23]. The study starts with the Social Science Citation Index (SSCI), which can be accessed online through the Thomson Reuters Web of Science (WOS). Although there are other alternatives, this is used because it is one of the most commonly used bibliographic sources.

3 Results

An initial search in the Web of Science (WOS) on the terms "Omnichannel" or "Omni-channel" shows that the number of papers is not very large (309) because —as stated earlier— the term "Omnichannel" appeared for the first time in 2011 [6]. However, there is considerable year-on-year growth, due to the interest that this area arouses.

In order to refine the key concepts of the previous "concept mapping", the keywords of the papers found are analyzed. For this, we rely on the VOS Viewer tool [26]. For all the results referred to above, keywords with a co-occurrence below 15 times were filtered out [24]. A thesaurus is applied following the same criterion used in the concept mapping. This reduces the sensitivity to a co-occurrence level (minimum number of occurrences) of 20 keywords, resulting in 18 keywords.

Given the small number of relevant papers in WOS, the keyword review is extended to SCOPUS. Using the same search previously carried out in WOS, 602 papers are collected from SCOPUS. The same thesaurus is applied to these papers and, for a co-occurrence level of 15 times, 27 keywords are obtained, which are grouped into 4 clusters.

Having analyzed both bibliographical databases, the following grouped clusters are identified:

Table 1. Clusters by Keywords.

Cluster	WOS Keywords	SCOPUS Keywords

Customer Journey	Behavior	Consumer Behavior, Consumption Behavior, Decision-Making
Channels & Touchpoints	e-Commerce, Cross, Internet, Integration, Online	Channel Integration, e-Commerce, Internet, Physical Stores, Retail Stores, Social Media
Management & Operations	Design, Management, Model, Omnichannel, Omnichannel Retailing, Retail, Special-Issue	Commerce, Competition, Costs, Omnichannel, Omnichannel Retailing, Optimization, Profitability, Retail, Sales
Marketing	Impact, Satisfaction	Customer Experience, Customer Satisfaction, Marketing
Logistics	Supply Chain, Logistics	Logistics, Supply Chain, Supply Chain Management
Technology and tools	Technology	Big Data, Human-Computer Interaction, Information Systems

In order to classify the results of the literature review and thus facilitate creating the research matrix, the main areas of study have been grouped into clusters [3], identifying the papers that focus on each of the following areas:

1) Challenges, management models and issues associated with implementing an Omnichannel strategy: channel integration, new skills, new business models,

new products (especially considering changes in quality, price, and expansion to third-party products); objective metrics management; personnel management and cultural barriers [Management and Operations]

2) Alternatives to distribution and logistics: alternatives to the traditional supply chain, distribution points such as warehouses, distributed order management, and unification of online and offline channels [Logistics]
3) Characterization of the Omnichannel buyer: defining the principal purchase drivers for procurement professionals (purchasers) in order to assess the impact of an Omnichannel strategy, studying hedonic and utilitarian purchase value, habit changes with multiple channels [Customer Journey].
4) Specific channels: new sales or relationship channels with business customers, coordination and integration among channels, service levels by channel, implementation processes, and effect by sector. In Omnichannel papers, both physical stores and mobile devices especially stand out as very significant channels [Channels]
5) Technological solutions and innovations that support and permit Omnichannel practices. Big Data, Artificial Intelligence, and the Internet of Things all stand out as important in several papers. However, inter-company networks and new types of devices —both in relation to customers and for the firm's internal management— are also relevant. [IT]
6) Marketing strategies consistent with Omnichannel implementation, highlighting the new personalized customer communication strategies, measuring the

effectiveness of actions per channel (attribution) and Omnichannel customer loyalty, among others [Marketing].

On the basis of the papers identified in the previous search, the search in the Omnichannel field is refined to meet the research objective, and the results are displayed visually to facilitate further analysis.

Now that all the literature relevant to the field of study has been collected, the next step is to analyze and synthesize the results of the search [23]. VOSViewer was used to make a visual analysis of the bibliographic coupling, as shown in Figure 2. This visual analysis gives us three main groupings. There is a central group consisting of 10 papers, represented by the red and green clusters, which focuses mainly on the "Customer Journey". The papers in the green cluster have in common that, in addition to analyzing the journey, they focus on characterizing the Omnichannel client. On the other hand, the four clusters on the left (purple, yellow, light blue, and dark blue) revolve around logistics, with different points of interest. For example, the dark blue cluster consisting of four items in the lower left, focuses on Crowd-Logistics; while the papers in the purple cluster, in the upper left, share what can be called " supply chain optimization: service, quality, and price". Lastly, the only two papers on the right (orange cluster) address a general management area, especially linked to innovation and new technologies.

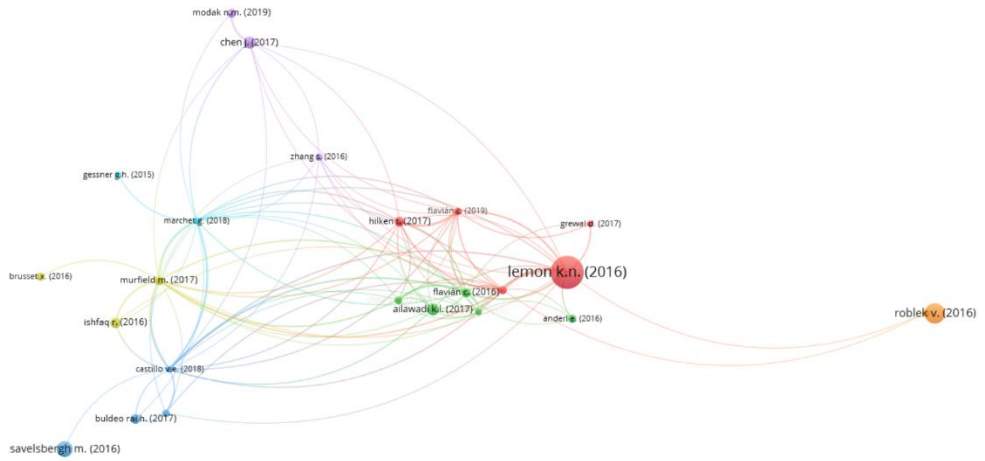

Figure 2. Bibliographic Coupling. Network visualization.

The review of Omnichannel Management papers in B2B papers by bibliographic coupling shows that, of the total of 24 papers which, according to the searches, were expected to address the question to be answered by this study, only five fulfill this requirement [27, 28, 29, 30, 31].

Similarly, the visual co-citation analysis is shown in Figure 3:

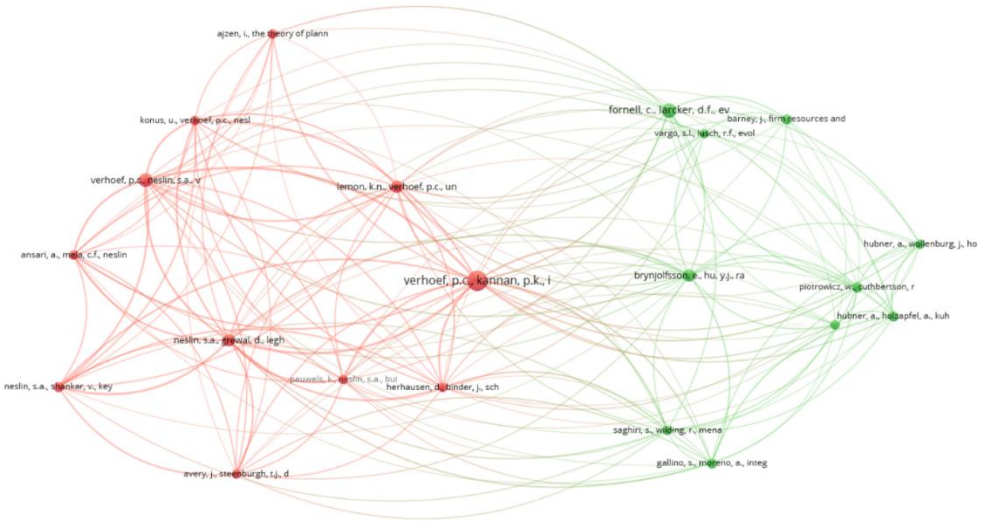

Figure 3. Co-Citation. Network visualization.

The papers collected in Figure 3 are understood to be the foundation for the set of papers resulting from the search, i.e. they should be the reference papers of the subset of papers focused on managing Omnichannel B2B commerce. While it is clear that not all those papers lie within the scope of this study, the results are considered good enough, although a more refined search could probably add to them, or indeed exclude some of them. The visual analysis organizes these reference papers into two groups, with a backbone [32]. On the one hand, the cluster on the right (green) brings together the papers focused on management in multichannel environments, most of which address the retail field, except for [33, 34, 35], all of which are grouped in the upper right-hand part of the image. The rest are grouped in the red cluster on the left. The papers in this group, many of which are Neslin's works, mostly address multi-channel client characterization. In fact, Neslin is the first author or a co-author of 4 of the 11 papers. Similarly, of these foundational papers, Verhoef stands out as co-author of 4 of the 12 papers. Shankar, Hübner and Holzapfel are the other authors who worked on more than one of these foundational papers, being co-authors of two of them.

4 Discussion

This analyzes the findings obtained following the classification of the clusters listed above. After the analysis, a research agenda focused on Omnichannel Management is drawn up since it is the main objective of the study.

Based on the results of the previous section, the basic, foundational papers on Omnichannel Management for B2B can be defined. These are the ones obtained from the co-citation analysis. Similarly, the principal papers currently dealing with this research area are identified through bibliographic coupling.

Regarding the foundational papers, it can be concluded that the study of B2B Omnichannel Management should start from the eleven foundational papers listed in Table 2. These were defined by the co-citation analysis shown in Figure 3 and were all written after the definition of the Omnichannel concept. Although most of them focus on the retail field, they establish the principles to be taken into account for adequate Omnichannel Management in a broad sense. These papers must be studied if one wishes to identify the main processes affected in an organization and how they are impacted.

It should be noted that, to identify the papers that establish the research base, the search method described above has been followed. This implies that the scope has been restricted to research work in B2B Omnichannel Management. This approach assumes that, if the scope of the study is modified, new papers could also be added to those listed below as "foundational for the study of Omnichannel Management".

Table 2. Foundational papers for the study of B2B Omnichannel Management (in chronological order)

Reference	Main contribution	Applicability for B2B
[7]	It is the most frequently referenced paper as shown in the analysis above	This paper describes various strategies to be followed by a company regarding

	and also according to the other literature reviews to date. Examines how technology is accelerating the shift to Omnichannel and presents strategies to be followed in the short and long term, depending on the type of company.	omnichannel implementation in retailers. These strategies are equally applicable to the B2B field with some caveats.
[36]	This paper considers the impact of an Omnichannel "buy-online, pick-up-in-store" process, especially from shared inventory management.	The most direct application to B2B is for those wholesalers with physical points of sale. More generally, conclusions can be drawn for inventory information when various channels are present.
[4]	The paper discusses the role of information technology in retail and the changes to be made as a result of an Omnichannel strategy.	All the transformation drivers that derive from the application of technology are applicable to a B2B environment, but are less important to physical stores and social networks.
[37]	This paper studies the impact on sales when addressing an Omnichannel strategy and cannibalization in the physical channel.	The conceptual model presented in this study can be considered fully applicable to the B2B field, with the selection of the channels that are most relevant to a company or a particular industry.

[38]	The paper includes a study of offline-online integration which shows that synergies prevail over the cannibalization of channels	The application to the B2B field can be established from the conclusions regarding frequent customers who may have a pattern of behavior more similar to that of industrial customers.
[39]	This paper shows how cannibalization due to the opening of new channels does not have the same effect on all of them.	With certain changes, the multichannel framework and the method for studying the impact between channels can be applied to the B2B environment
[32]	These authors review the main concepts about Omnichannel and sets a research agenda	The research agenda remains relevant for the B2B field, in all topics: the performance of the channels, the behavior of the industrial buyer and the Omnichannel marketing mix.
[40]	This paper studies the models for an integrated fulfillment in an Omnichannel scenario.	The transition framework from multichannel to Omnichannel logistics that it describes is applicable to the B2B field, saving the differences in the picking and packaging processes that are common to the retail channel.
[41]	These authors collect how the distribution system should be established in an Omnichannel model	Regarding the B2B field, it does consider both suppliers but under a direct-to-consumer model at the request of the retailer. However, based on this

		retail-centric model, it can be interpreted how the Omnichannel distribution model affects higher up the supply chain.
[42]	This paper describes the customer experience and the Omnichannel customer journey.	Based on the characterization of the customer journey, it provides research ideas that can be applied to the B2B field and, especially interesting in the Omnichannel Management field, the new organizational models that emanate from this practice.
[43]	This paper proposes a conceptual framework for Omnichannel systems based on considering Omnichannel as a complex adaptive system.	The paper is already applicable to the B2B field because it takes into consideration various dimensions of the channel, including the agent; and for the types of agent, the study considers manufacturers as well as the retailer.

It can be said that different approaches have been followed in identifying "How the research literature has disseminated knowledge of Omnichannel Management for B2B".

4.1 Management and Operations

In summary, it can be said that different approaches have been followed in identifying "How the research literature has disseminated knowledge of Omnichannel Management

for B2B". Although the Omnichannel field of research is very new, it is clear that the topic defined as "Management and Operations" is one of the most active areas within it. However, a direct search for the terms Omnichannel and B2B yielded few papers from the two largest reference databases. The study has conducted several searches. In the first, of the B2B papers found in WOS, despite the successive filters applied to the databases, half study retail companies, and only three papers can be considered to study Omnichannel Management in a way that is more generally applicable to the supply chain [44, 45, 46]. When a bibliographic method is used, of the Omnichannel Management papers, only ten are applicable to the general field of study, and only five of these are applicable to the specific scope sought [27, 47, 48], with none matching with the WOS search. Similarly, of the papers that can be considered foundational to the study of Omnichannel strategies for B2B (co-citation analysis), only six address areas outside retail.

It is significant that, despite the method and search process followed, there are not very many current papers in the B2B field in general or on B2B Omnichannel Management in particular. This implies that the foundational papers which are cited (co-citation) are within the Multichannel field (Multichannel being the precursor of Omnichannel), but do not specifically address B2B because most are studies of the retail sector. This is clearly not because, historically, aspects of inter-company purchasing have not been studied for each of the research topics (a direct search of WOS yields 4,312 papers), but rather because there are not many current research papers in the Omnichannel field that

address the B2B environment, and hence the papers they refer to do not lie within that field.

Finally, there are two papers by the same authors —included in the same book— that offer a holistic image of the customer loyalty framework. Both papers emphasize the B2B context, particularly in the context of global supply chains. The main relevance is that they revolve around the scope of this study: Omnichannel Management in a B2B context. Thus, the first paper [45] describes the main barriers that consumers face when buying online, having such barriers a heavy impact on B2B operations and summarizes the requirements for digital change. The second paper [46], also from a generic point of view, but again focused on Omnichannel in B2B, summarizes the new issues for supply chain operations.

In short, few papers were identified as addressing the field of inter-company Omnichannel Management. Among those cited, the guidelines [45, 46], indicators [27] and goals [44] described should be taken into consideration, but the studies themselves emphasize the need to go more deeply into this field, and suggest many lines of research that should be developed, as stated in the Research Agenda below.

4.2 Logistics

Of the eight papers falling within the management area that tackle Omnichannel scenarios, four address Omnichannel Management and its implications from a logistical point of view. It is interesting to highlight three papers that address the dual-channel supply chain from different types of approach, especially because, during the recent

Covid-19 pandemic, many manufacturers have reinforced the Direct-to-Consumer strategy in their Omnichannel approach. It is therefore worth noting the research on the effect of uncertain demand on the optimal pricing and ordering policy for a dual-channel business with price and lead-time dependent demand [30]. Research [47] complementing the latter paper investigates three channel structures (including direct-to-consumer and dual-channel supply chain), and describes how to model price and quality decisions in each channel structure for centralized and decentralized system environments. The third study, from another optic, also analyzes the challenges and opportunities that this D2C (among others) must contemplate from the logistical point of view within a city.

Rounding out this review from the logistical point of view, an interesting paper provides a general classification model and an empirical supply chain study involving 11 logistics variables. This research [29] discusses four business logistics models, differing in terms of both business sector and Omnichannel maturity. A broad empirical investigation shows the choices made by companies when implementing an Omnichannel Management strategy.

Work on multi-omni-channel distribution management [27] is linked to this specific marketing field and addresses the supplier-retail relationship, in order to offer a set of metrics on distribution effectiveness. This paper should, however, be taken into account when defining an Omnichannel strategy because, based on the metrics offered, a corporate strategy can be identified that maximizes the panel of target indicators. It also establishes several lines of research into the amplitude, dispersion, and depth of

distribution. The authors state that the heterogeneity of the client conditions the Omnichannel strategy for distribution. The paper therefore emphasizes the need to characterize the buyer, especially when the latter acts through intermediaries.

4.3 Customer Journey

Special attention should be paid to the Customer Journey issue. There is abundant published scientific literature characterizing the final consumer, but little on the professional buyer (Procurement Officer). There are some studies of this area [49, 50], but buying is one of the areas that has developed most rapidly and is the pillar for the rest of the research areas on this subject-matter. Only by properly characterizing the demand will it be possible to enable the necessary channels, adapt the logistic processes and redefine the management models and tools that make it possible. It is therefore suggested that the concept of consumer experience, which is so vital for Omnichannel processes, be renamed to reflect the eXperience of the professional buyer (PX: Procurement eXperience), to underline further that we are addressing a professional buying scenario. It should be noted that only one paper on the characterization of the professional Omnichannel buyer has been found [51].

4.4 Channels

Channels issue has been studied in depth in the retail field, especially in the relationship between the physical store and the online channel. However, in analyzing the B2B papers, no papers were found that specifically developed the strategy in new channels. This would be one of the areas with the greatest potential for development at the

research level. However, it should be noted that this issue includes a paper that can be referred to as foundational [2] according to the co-citation analysis for the subset of B2B papers found.

4.5 IT

Only one of the papers that deal with the B2B field can be assigned to the topic of IT. The study of business interrelation networks [44] is not solely applicable to the IT field. In fact, several scenarios are offered to address an Omnichannel implementation from a strategic point of view, establishing the interdependencies to be considered between the product life cycle, marketing and the necessary level of integration. This paper reviews the extended supply chain model and, based on a typical customer's journey through various channels, how information must travel outside the organization itself. The paper does tackle aspects of technical details and an actual usage case. However, in our opinion, the initial sections of the paper constitute one of the best reviews of the general aspects of Omnichannel, not only from the point of view of management and strategy, but also when considering marketing and logistics.

4.6 Research Agenda

Although these papers contribute to and develop the area to which they belong, the research to date leaves many questions open. The following table contains the research questions in the papers in the Omnichannel Management issue. These have either been directly extracted from the papers cited or have been contributed by the authors of this study after the literature review had been completed.

Table 3. Research Agenda for Management & Operations (OC – Omnichannel; PX – Purchase Officer Experience or Purchaser Experience)

Topic	Research Questions	References
Strategy and value.	How different are the approaches to the transformation towards managing OC both online channels, such as channels offline (for manufacturers, wholesalers, or distributors)?	
	How does the type of industry, company, or product influence the OC strategy?	
	How can OC management increase customer loyalty (when the customer is a company's purchasing manager)?	[3, 32]
	When should companies strive for OC management? Is OC management (always) desirable?	
	Do the benefits of an OC strategy outweigh the costs?	
	How should an OC setting be configured (company and purchasing manager perspectives)?	
Metrics	How should channels in an OC strategy be evaluated?	[27]
	How can the overall OC performance be measured?	
Organization	How should companies be configured (technologically/ organizationally) to provide a beneficial basis for OC management?	[3]
	How should third party channels be managed within an OC environment?	
Customer experience management	Should purchasing managers be steered through the OC environment based on revenue (or different drivers)?	[4, 17, 32, 42]
	How should organizations be structured in order to successfully manage the purchasing experience?	(Own)

	How can PX management be measured, and what is the effect of PX management on business performance?	
	What are the effects of specific capabilities and mindsets on PX management? How do the distinctions between disciplines (functions) within firms impede or enhance the success of PX initiatives?	
	How do organizations need to adapt to the complexity of the customer journey? How can firms effectively use technology in PX management?	
	How can companies achieve a unified view of the customer across channels?	
Multiple Products. Price & Quality	If a purchaser has different tastes regarding supply-chain channels, should a manufacturer deliver different products with different quality levels through dual channels?	[11, 12, 30, 47] (Own)
	OC Models to define which kinds of product should be sold through a direct channel while others are delivered via the retail channel. Strategic decisions on product quality and capacity.	
Distribution. Cannibalization & Competition Effects	How Much Distribution Breadth Should a Brand Have? How Does Breadth Affect Depth?	
	How may the inter-channel competition effect and the intra-cannibalization effect differ according to market power? How does this affect the online retail channel strategies of manufacturers and retailers?	[10, 27, 38, 47]
Adapting Operations	How can the operational issues caused by channel integration be resolved?	[4, 3, 9, 17, 18, 29, 32, 47]
	How should an OC setting be configured (company and purchasing manager perspectives)?	(Own)

How can operational issues of channel integration be resolved?

How should the receiving operation and activities be designed to support combinations of flows that move either into storage or directly to packing and shipping?

To what extent do OC (Manufacturers/ Wholesalers/ Distributors & Franchises) pool and balance workforce and capacity for different flows in the receiving operation?

How does the expected increase in returns impact the requirements on staff competencies?

How should OC (Manufacturers/ Wholesalers/ Distributors & Franchises) approach the integration or separation of activities related to customer returns and incoming goods from suppliers (e.g. utilizing time windows)?

What warehouse operations and activities are required in the various MH nodes, and what KPIs should be used given their different roles, operations and activities?

How do OC (Retailers/ Wholesalers/ Distributors & Franchises overcome the challenges of increasing and decreasing warehouse capacity in a short- and long-term perspective?

For what types of flows is it possible to use cross-docking and what factors impact the decision?

The lines of research suggested by the cited papers have mostly been followed, but each line could be replicated per actor in the supply chain. Where a line of research refers to manufacturer or brand, the same analysis could also be applied to distributors and wholesalers. Similarly, these lines of research could be pursued for a specific industry and/or type of product/service.

5 Conclusion

In recent years, Omnichannel Management has been studied as a new capacity that every organization must develop to satisfy a new context of hyperconnected demand [7]. This demand is expressed by end consumers [52], but also by professional/industrial clients, i.e., in a company's relationship with its distributors.

As stated in the introduction, according to various studies [53, 54] and the United Nations Conference on Trade and Development [8], trade between companies (B2B) is much greater than trade to individuals (B2C). Despite this, as we have seen, intercompany relationships in Omnichannel scenarios have been studied less than relationships with end consumers, as highlighted in other previous studies in the same field [18, 34]. Neither has work been done on models in the value chain in general (manufacturers, wholesalers and distributors), or in specific sectors in which this type of management is more generally applied.

To confirm this lack of papers on Omnichannel Management in the B2B field, a method has been proposed that combines the best practices for reviewing the scientific literature along with various bibliographic methods. However, as has been shown, very few

papers have been found. Given this small number of papers, the search criteria were relaxed to refine the analysis; however, even this only yielded a few more studies. Out of a total of 513 papers in SCOPUS, and with some difficulty, 13 papers (just over 2.5%) were found after the different types of searches had been performed. This is despite the fact that market activity and United Nations reports indicate that between 65% and 75% of all companies are dealing with Omnichannel strategies.

It might be thought, given the small number of papers on which the research matrix is based, that the procedure described is not complete. Additionally, its effectiveness could be questioned, given that the results collect papers in the retail field and not strictly in the B2B field. Regarding the final number of papers, the authors do not consider the search to have been erroneous, but rather that this is a less-studied area. Concerning the effectiveness of the search and the fact that its results include papers that a priori have been excluded (retail), it could be argued that the method developed is not in itself effective. However, rather than questioning the sources from which the procedure was developed, it could be verified by applying it to more developed areas of study and checking its effectiveness in that way. In this case, the present study is again biased by the lack of research into this field. Finally, the subjective interpretation of the researcher should be considered – as in any other traditional literature review – [55], but this time for the more limited subset that is the result of applying the method described.

The main question for discussion, having demonstrated that there is not much literature on the subject, is why this should be the case, given that it is a more extensive field than the retail industry. Perhaps this is the case because the type of client depends

considerably on the type of industry/sector, i.e. it is more difficult to standardize or characterize the professional buyer than when talking about the final consumer. It should also be borne in mind that many of the B2B strategies are implemented through private networks (extranets), which are difficult for an outside researcher to access. That is to say, the client in this type of platform is a customer that buys on financial credit after a prior approval process. Such processes may therefore, be impossible to analyze in an external study. Omnichannel Management strategies therefore exist in this field, but access is private or restricted.

However, it can clearly be concluded that there is an important gap in the literature, and we recommend that research into this field continues. Work should be done on the models of the value chain in general: manufacturers, wholesalers and distributors; and on specific sectors. These sectors could be, in order of importance: consumer goods, consumer services, technology, multimedia content, and construction [56]. We suggest, as an initial hypothesis for subsequent investigations, that relationships between companies (manufacturer-distributor) are also being affected by the new Omnichannel paradigm. The expectations that characterize the demand of a business client towards its supplier are also influenced by the context of the move to digital that has obliged retailers to undertake Omnichannel strategies.

On this premise, it can be inferred that, when they recognize this new demand, organizations modify their internal processes. This not only affects those processes related to the client (professional in this case) —all the organization’s processes are affected. Especially significant will be the impact on those processes linked to

marketing and commercialization, given the greater and better knowledge of the client. The impact of the predictive demand analysis provided by new technologies will also be considerable. But equally, a more extensive study could look into the ways the entire production process is affected, and, assuming that to be the case, whether this can affect an organization's traditional value proposition (products and services), as well as the relationship with the suppliers of the organization undergoing this transformation, among other questions.

The objective of future research may therefore be to characterize the organizational model of a company focused on Omnichannel Management. In other words, how should companies be configured (technologically and organizationally) to provide a beneficial basis for Omnichannel Management?

Finally, as has been argued throughout the paper, and as noted by the studies that are limited to inter-company Omnichannel Management, it is worth emphasizing the need to investigate how to characterize the professional buyer, as the basis for any management strategy. That is why a new concept of Procurement Officer Experience (or Purchase Experience) is proposed, which will be a counterpart to the already extensively studied Customer Experience, which in general refers to the final consumer, who is served mainly by retailers.

6 Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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CHAPTER 2: Omnichannel Management in B2B. Complexity-based model. Empirical evidence from a panel of experts based on Fuzzy Cognitive Maps

(Industrial Marketing Management - https://doi.org/10.1016/j.indmarman.2021.03.009)

Omnichannel Management in B2B. Complexity-based model. Empirical evidence from a panel of experts based on Fuzzy Cognitive Maps

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Abstract

In recent years, academics and professionals have proposed omnichannel management as the best approach to offering multiple channels to end customers. This approach has been reinforced by the recent crisis caused by Covid-19 and the consequent demand for digital channels. In the current literature there is an evident gap in the study of omnichannel management for manufacturing or wholesale companies and their relationships with other companies, which typically use B2B models. This article

includes a model that permits the identification of causal characteristics in omnichannel management based on fuzzy cognitive maps (FCM), the simulation of possible scenarios and the impact that changes in the environment or in the organization's internal activities may have on omnichannel management.

From the results of a Delphi process based on an international Panel of Experts and using complexity theory, a Fuzzy Cognitive Map (FCM) was built that can serve as a reference for B2B omnichannel management. The main value of the research is provided by the practical model that allows simulating what-if scenarios, that is, with the modification of the input conditions with respect to a base scenario and thus favors directing the omnichannel strategy to be followed in a B2B field.

Keywords: Omnichannel Management, B2B, What-if, Fuzzy Cognitive Maps.

Highlights

- Despite growing academic interest in the study of Omnichannel management, few articles have been found in the B2B field.
- From the results of a Delphi process based on an international Panel of Experts and using complexity theory, a practical model is provided to simulate what-if scenarios on Omnichannel Management.
- Various scenarios are analyzed by varying the input conditions of the model to collect both the theoretical and methodological implications and the management implications in a B2B field.

CHAPTER 2

Omnichannel Management in B2B. Complexity-based model. Empirical evidence from a panel of experts based on Fuzzy Cognitive Maps

1 Introduction

Omnichannel Management has been defined as the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized" (Verhoef et al., 2015). The omnichannel strategy aims to provide a unique and enhanced experience regardless of the purchase phase and the channel the customer is using (customer journey). This strategy has been being created since the adoption of new channels for the provision of services, mainly digital, and as this process has become generalized to practically all companies and industries. In fact, demand for an Omnichannel Management strategy is increasing, due to the recent crisis caused by Covid-19 and the necessary digitalization of manufacturing and wholesale companies that had remained faithful to their traditional channel of sales to distributors and retailers.

However, research on Omnichannel Management is very recent and has especially focused on the retail industry context. To date, it has rarely been the subject of studies in the area of relationships between companies (B2B). There are several authors who, in recent works, have pointed out the lack of research into Omnichannel in areas, such as wholesalers, that lie outside pure retail (Ilchenko et al., 2018; Kembro et al., 2018; Russo & Confente, 2017b; Strojny & Chromińska, 2016).

The objective of this article is to establish a practical model that allows describing and simulating what actions companies with Omnichannel Management take to increase the value they create and guarantee their competitiveness.

The model to be created is subject to the scope of trade between companies (B2B). This study, therefore, focuses on manufacturers and wholesalers who reach their clients (purchasing managers) through different channels (for example, through both e-commerce and their sales force).

A practical model is pursued because it allows the researcher to simulate what-if scenarios about the context in which the company is going to develop and the impact that a change in the environment will have on Omnichannel Management. This facilitates appropriate decision-making in the omnichannel strategy to be followed in a B2B environment In other words, makes it possible to anticipate the effects on an organization—in terms of Omnichannel Management—when the input conditions are modified with respect to an initial base scenario.

This article is organized as follows. The first section reviews the literature, first on the B2B field, and then on Omnichannel Management in general and its relationship with B2B in particular. The next section reviews the complex theoretical model and the chosen fuzzy cognitive mapping technique. Section 3 describes the theoretical model resulting from the survey of an international panel of experts, along with the different simulation scenarios as practical examples for decision making. The results of these scenarios and the map itself are then discussed. Section 6 brings together the conclusions, with their theoretical and practical implications, as well as the limitations of the study and suggestions for future research along these lines.

2 Literature review

2.1 B2B

The study of management in the area of trade between enterprises has not been restricted to the field of e-commerce, and dates back to the late nineteenth and early twentieth centuries. However, the principal developments in the study of the theory of marketing in B2B have been made in the last four decades (Hadjikhani & LaPlaca, 2013; Vargo & Lusch, 2011). In fact, Industrial Marketing Management—one of the first journals in the field and still a key reference—was launched in 1972. Technological advances, changes in consumption habits, and the consequent digital transformation of companies, all combine to make this a trending field of study today. A search on the term B2B in SCOPUS, when restricted to the business or economic field, returns about 2,000 articles. Due to the maturity of this area of research, the published studies occupy the entire value chain of an organization. For the present study, the studies that address the following matters are relevant: impact on the ROI of companies of the different marketing strategies applied (Palmatier et al., 2006); B2B branding (Leek & Christodoulides, 2011a); and way traditional manufacturers are turning towards complementing their offer with services (Buratti et al., 2018; Nezami et al., 2018). However, several of the authors cited here emphasize that there is still a significant gap in the study of marketing in the context of B2B when compared with the abundant literature on B2C and the retail channel. In general numbers, this is clearly a failing, because, according to United Nations estimates, the market for business-to-business (B2B) electronic commerce is $ 21 trillion, which is equivalent to 83% of global electronic commerce (UNCTAD, 2020).

2.2 Omnichannel

The omnichannel concept initially appears in generalist articles (Brynjolfsson et al., 2013; Rigby, 2011) that confirmed that this was a new trend in companies resulting from the adoption of new technologies. Scientific studies to date have been working on different aspects of companies' multichannel strategies and even the "cross-channel" impact between channels (Avery et al., 2013; Konuş et al., 2014; Neslin et al., 2006). It should be taken into account that the new digital channels already required a change in strategy and corporate skills (Leeflang et al., 2014). Scientific studies of the omnichannel strategy itself began with articles that were limited to the retail field (Gallino & Moreno, 2014; Piotrowicz & Cuthbertson, 2014), one of which is the source of the formal definition of Omnichannel Management included in the introduction (Verhoef et al., 2015). Thus, there have been important articles that explore the impacts of Omnichannel Management on five main areas in B2C commerce: the characterization of the omnichannel customer, their behavior and expectations (CU in Table 1); the inclusion of new channels and their differentiated strategy (CH); the impact on logistics and derived models (LO); the application of technologies in the omnichannel B2B field (IT) and finally, the omnichannel corporate management strategy in general (MG). Table 1 shows the main articles published in each of these fields of study.

2.3 Omnichannel in the field of B2B

Before the omnichannel concept was developed, there had been various studies on the impact that the use of new channels and a multichannel strategy can have in the B2B

field (Chung et al., 2012), as well as the application of disruptive technologies in the B2B field (Obal & Lancioni, 2013). The first article on omnichannel strategy already predicted its impact on manufacturers, including the fact that they would be forced to produce differently (Brynjolfsson et al., 2013). As mentioned above, papers on omnichannel have mainly focused on the retail field. However, companies that occupy a position higher up in the supply chain, such as manufacturers, distributors and wholesalers, i.e. those that typically carry out these B2B transactions, are equally affected by the changes in consumption habits of buyers (in their case, the industrial/ professional buyer). Such companies have also been impacted by the obligatory adoption of digital channels. Even with the low number of articles, several lines of study have already been started (Alonso-Garcia et al., 2021a). Based on the five areas described in the previous section that characterize omnichannel research lines in general, the relevant articles that are applicable in the B2B field have also been included in Table 1. The characterization of the client therefore refers to the professional client. Studies on channel strategy are particularly relevant to studies on price policies. And finally, corporate management especially reflects the impact on the sales force of the industrial customer's behavior.

Table 1. Literature review

Scope	Field	Year	Authors	Article	Journal
CU	Retail	2016	Chou, S., Shen, G. C., Chiu, H., & Chou, Y.	Multichannel service providers' strategy: Understanding customers '	Journal of Business Research

				switching and free-riding behavior	
CU	Retail	2016	Lemon, K. N., & Verhoef, P. C.	Understanding Customer Experience Throughout the Customer Journey	Journal of Marketing
CU	B2B	2016	Pawłowski, M., & Pastuszak, Z.	B2B Customers Buying Behavior	International Journal of Synergy and Research
CH	Retail	2015	Beck, N., & Rygl, D.	Categorization of multiple channel retailing in Multi-, Cross-, and Omni-Channel Retailing for retailers and retailing.	Journal of Retailing and Consumer Services
CH	Retail	2015	Cao, L., & Li, L.	The Impact of Cross-Channel Integration on Retailers' Sales Growth	Journal of Retailing
CH	Retail	2015	Herhausen, D., Binder, J., & Schoegel, M.	Integrating Bricks with Clicks : Retailer-Level and Channel-Level Outcomes of Online – Offline Channel Integration.	Journal of Retailing
CH	Retail	2015	Pauwels, K., & Neslin, S. A.	Building With Bricks and Mortar: The Revenue Impact	Journal of Retailing

				of Opening Physical Stores in a Multichannel Environment.	
CH	Retail	2017	Gao, F., & Su, X.	Omnichannel Retail Operations with Buy-Online-and-Pick-up-in-Store	Management Science
CH	Retail	2018	Zhang, J., Xu, Q., & He, Y.	Omnichannel retail operations with consumer returns and order cancellation.	Transportation Research Part E: Logistics and Transportation Review
CH	B2B	2018	Kim, J. C., & Chun, S. H.	Cannibalization and competition effects on a manufacturer's retail channel strategies: Implications on an omni-channel business model	Decision Support Systems
CH	B2B	2019	Modak, N. M., & Kelle, P.	Managing a dual-channel supply chain under price and delivery-time dependent stochastic demand.	European Journal of Operational Research
LO	Retail	2016	Bernon, M., Cullen, J., & Gorst, J.	Online retail returns management: Integration within an omni-channel distribution context	International Journal of Physical Distribution & Logistics Management

LO	Retail	2016	Hübner, A., Kuhn, H., & Wollenburg, J.	Last mile fulfilment and distribution in omni-channel grocery retailing: A strategic planning framework.	International Journal of Retail and Distribution Management
LO	Retail	2016	Ishfaq, R., Defee, C. C., & Gibson, B. J.	Realignment of the physical distribution process in omni-channel fulfillment	International Journal of Physical Distribution & Logistics Management
LO	Retail	2018	Castillo, V. E., Bell, J., Rose, W., & Rodrigues, A.	Crowdsourcing Last Mile Delivery : Strategic Implications and Future Research Directions	International Journal of Production Economics
LO	Retail	2018	Galipoglu, E., Kotzab, H., Teller, C., Yumurtaci Hüseyinoglu, I. Ö., & Pöppelbuß, J.	Omni-channel retailing research – state of the art and intellectual foundation.	International Journal of Physical Distribution and Logistics Management
LO	Retail	2018	Kembro, J. H., Norrman, A., & Eriksson, E.	Adapting warehouse operations and design to omni-channel logistics	International Journal of Physical Distribution &

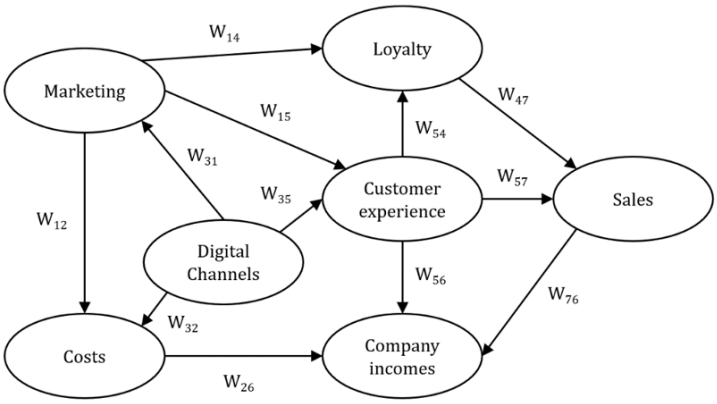
					Logistics Management
LO	Retail	2018	Lim, S. F. W. T., & Srai, J. S.	Examining the anatomy of last-mile distribution in e-commerce omnichannel retailing: A supply network configuration approach	International Journal of Operations and Production Management
LO	Retail	2018	Melacini, M., Perotti, S., Rasini, M., & Tappia, E.	E-fulfilment and distribution in omni-channel retailing : a systematic literature review.	International Journal of Physical Distribution & Logistics Management
LO	Retail	2018	Wollenburg, J., Hübner, A., Kuhn, H., & Trautrims, A.	From bricks-and-mortar to bricks-and-clicks: Logistics networks in omni-channel grocery retailing.	International Journal of Physical Distribution and Logistics Management
LO	B2B	2018	Marchet, G., Melacini, M., Perotti, S., Rasini, M., & Tappia, E.	Business logistics models in omni-channel: a classification framework and empirical analysis.	International Journal of Physical Distribution & Logistics Management

LO	B2B	2019	Wieczerniak, S., & Milczarek, J.	Concept for identifying problems in supply chains in omni-channel systems.	Logforum
IT	Retail	2014	Piotrowicz, W., & Cuthbertson, R.	Introduction to the Special Issue Information Technology in Retail: Toward Omnichannel Retailing	International Journal of Electronic Commerce
IT	Retail	2017	Saghiri, S., Wilding, R., Mena, C., & Bourlakis, M.	Toward a three-dimensional framework for omni-channel	Journal of Business Research
IT	B2B	2017	Aichner, T., & Gruber, B.	Managing customer touchpoints and customer satisfaction in B2B mass customization: A case study	International Journal of Industrial Engineering and Management
MG	Retail	2015	Hansen, R., & Sia, S. K.	Hummel's Digital Transformation Toward Omnichannel Retailing: Key Lessons Learned.	MIS Quarterly Executive
MG	Retail	2017	Ailawadi, K. L., & Farris, P. W.	Managing Multi- and Omni-Channel Distribution: Metrics and Research Directions	Journal of Retailing
MG	B2B	2016	Lapoule, P., & Colla, E.	The multi-channel impact on the sales forces management.	International Journal of Retail

					and Distribution Management

3 Theory & Method

In order to build a model that brings together the interactions of an omnichannel scenario, and in which it is consequently possible to identify and measure which causal elements are the most important, this study has been based on Complexity Theory. The Fuzzy Cognitive Map (FCM) technique was chosen for modeling. *"Fuzzy Cognitive Maps are a methodology for modeling method in the decision-making process of complex systems"* (Kalantari & Khoshalhan, 2018). FCM is a modeling technique that allows the properties of the variable (Omnichannel Management, in this case) to be modeled from expert knowledge. The FCMs "*define the causal links between events"* and show "*how variables relate to one another and cause changes"* (Dickerson & Kosko, 1994). Organizations often face an "*unstructured decision making problem due to the large number of variables to consider and the uncertainty imposed on those variables"* (Lee et al., 2013). Thus, firstly, a solid theoretical framework is required that permits the identification of those variables or factors that are decisive in the company-client relationship in the omnichannel field. And secondly, it is also necessary to provide tools that show how this complex network operates. This will make it possible to analyze possible intervention scenarios, based on the nodes and interactions that characterize the organization (Xirogiannis & Glykas, 2004).



$$a_i^{t+1} = f\left(\sum_{j=1, j\neq 1}^{n} w_{ji} a_j^t\right)$$

Figure 1. Example FCM to calculate concept values

The aim was therefore to build the map of customer-company relationships (network) within the scope of B2B Omnichannel Management by using a Fuzzy Cognitive Map. This process consisted of three phases:

1. Nodes: Key Concepts from an Expert Panel.
2. Map: Cause-and-effect relationship in each of the arcs and a graphical representation of the network
3. Model: Numerical values and computational simulation

Once the Omnichannel Management model had been formulated, the subsequent simulation tasks (what-if scenarios) were carried out, with assumptions that modify the input variables (Value Repositories and Constraints), to finally check what impact these changes have on the performance of Omnichannel Management.

The panel was selected from managers of manufacturing or wholesale companies that had already initiated an omnichannel strategy. Once the companies had been chosen, C-level employees were contacted. In preparing the panel, over 1,000 top-level managers were contacted worldwide. The first round of the Delphi survey was sent to 455 managers, of whom 83 (18.2%) agreed to participate.

Regarding the size of the Delphi sample, in this field of study, articles have been published based on an Expert Panel of as few as 18 members (von Briel, 2018). This aspect has been extensively discussed in the literature. It can be concluded that the optimal size is between 15-30 experts having similar training and a general understanding of the field of interest (Akins et al., 2005). Thus, the panel was finally limited to 30 experts (6.6% of the total), while ensuring that all panelists worked for different companies and representing the largest possible number of countries. This expert panel was made up of executives from manufacturers and wholesalers in 17 countries spread over five continents (Argentina, Australia, Belgium, Brazil, Czech Republic, Denmark, Estonia, Germany, India, Italy, Mexico, Spain, Switzerland, Thailand, Tunisia, UK and USA).

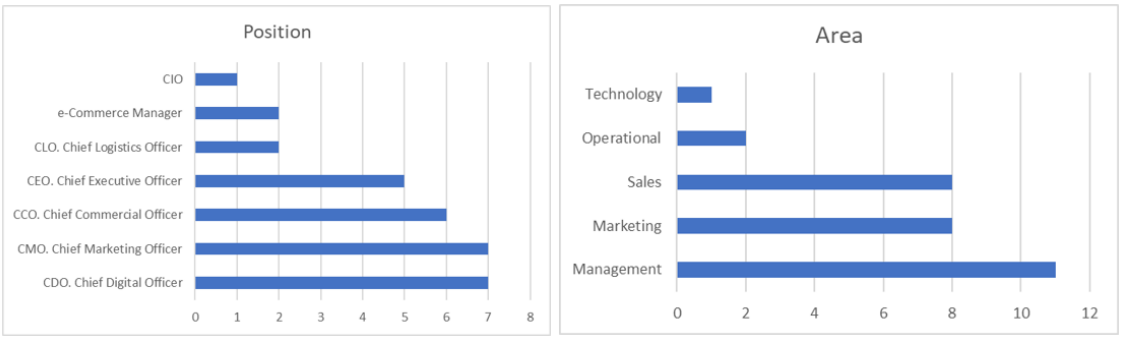


Figure 2. Panelists by role and area

The Delphi was structured in four rounds in the period from October 2019 to February 2020. The first round was completed in the weeks of October 7 and 14, 2019. The second round was held in November 2019. The third round began in December 2019 but ended in January 2020. The final round ended in February 2020. The average time it took for panelists to complete the entire survey in each round was 6m:56s, 10m:2s, 37m:14s and 28m:36s respectively. As described later in the next section, the last two rounds were somewhat complex and required more attention, but the average times reveal the attention the panelists devoted to the project.

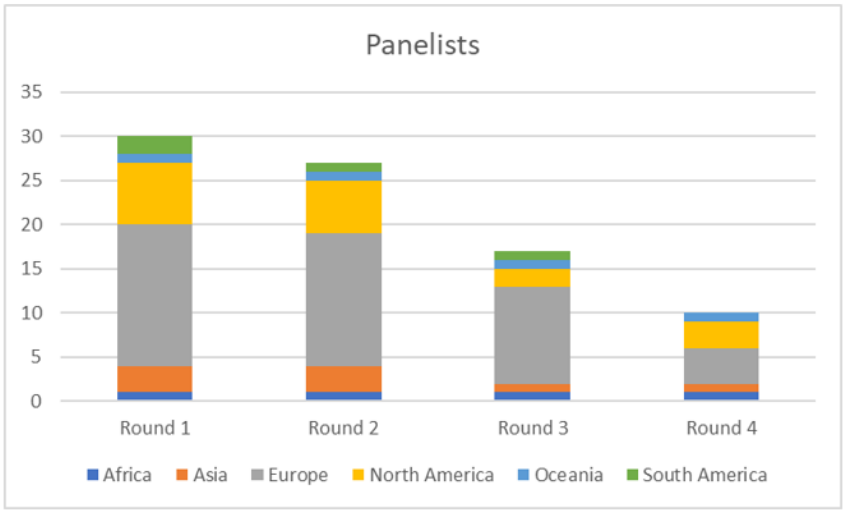


Figure 3. Delphi panellist distribution for each round

The objective of this study is twofold:

1. To answer the question: What actions should companies with Omnichannel Management take to increase the value they create and guarantee their competitiveness?

2. To simulate the set of changes that will improve value creation in companies with Omnichannel Management and allow executives to expect profits.

4 Results of the study. Delphi process, final model and simulation scenarios.

4.1 Delphi process

For the first round of the Delphi process, an online questionnaire with two unique questions was designed. The questions are designed to generate an "expert consensus" on the external constraints on the creation of value in omnichannel organizations, and also a consensus on the key value repositories that affect the performance of Omnichannel Management.

After completing Round 1, a second questionnaire (Round 2) was submitted in which the experts were asked to review the elements summarized by the research team based on the information provided in the first round. In this second round, a consensus was established as to the basic components of value creation in omnichannel companies.

On the one hand, the main external constraints on value creation in Omnichannel Management were identified. This yielded a list of ten constraints. Understanding that the term "value" may be subjective, the responders were requested to consider "value" in general terms, either as the client's user value, the value exchanged with the client, the value offered to the market or a combination of these.

Additionally, key value repositories in omnichannel companies were identified. Based on their best knowledge and experience, the responders were requested to state what they believe to be the key value repositories that impact Omnichannel Management in

the long term. Each of these experts was asked to identify up to 15 repositories, taking into consideration all the functions of a company. The term value repositories referred to autonomous internal operating networks that group together activities, resources, processes and/or multifunctional tools, with the sole purpose of creating a unique and differentiated value to be exchanged with other internal or external repositories. The expert responders were warned that, in most cases, the repositories do not coincide with specific units in the organization chart, nor with the dimensions of the conventional value chain.

After completing Round 2, an interim report summarizing the results obtained in Rounds 1 and 2 was submitted. This was then followed by a third questionnaire (Round 3) in which the experts were asked to establish the relationships and impact weights between the consensus value constraints, the consensus value repositories and the performance of Omnichannel Management in an organization. After the first two rounds, the 10 constraints on which the experts agreed are as listed in Table lists (brackets have been placed around the labels to make the charts easier to read later):

Table 2. Constraints on which the experts agreed

Constraint	Charts labels
Achieve an internal **agreement** on value (as a priority objective with omnichannel management)	(AG)
Maturity of the channel	(MT)
The customer **approach**	(AP)
Knowledge of the customer or supplier (data, single view)	(KN)
Difficulty finding resources with appropriate skills (**Human Resources**)	(HR)

Funds / **Finance**	(FI)
Integration of new **technology** with existing solutions in the company (backoffice)	(TE)
Proliferation of **stakeholders** involved in the company itself.	(ST)
The **cost** of adopting the new technology internally.	(CO)
The **transformation** of the process and the traditional way of selling.	(TR)

Likewise, the 15 value repositories on which there was a consensus are those listed in Table 3:

Table 3. Value repositories with a consensus

Constraint	Charts labels
Analysis of Customer Data (**360 vision**)	(VI)
Brand (s)	(BR)
Channel Integration	(IN)
Corporate **Culture**	(CU)
Customer **Experience**	(EX)
Customer **Loyalty**	(LO)
Customer-centric **proposition**	(PR)
Digital **channels**	(CH)
Innovation	(IV)
IT Management	(IT)
Management Leadership	(MG)
Marketing Management	(MK)
Network (suppliers and distributors)	(NT)
Portfolio of Products and Services	(PF)

Sales Management	(SA)

Based on the value repositories, four specific scopes can be grouped. Firstly, those that are intrinsic to the Customer: shopping experience and loyalty. Secondly, those with a technical/technological component: IT Management and Channel Integration. A third block is made up of traditional marketing aspects, such as the Brand, Value Proposition, Portfolio and Digital Channels enabled; to which is added the 360 vision of the client for the analysis of behavior. Lastly, the most general area, which is linked to corporate management, from the company's own culture and corporate leadership, to innovation, through sales, marketing and distribution network management.

The questionnaire consisted of 3 questions divided into the following sections. The first collected how each of the 10 agreed value constraints impacted on the 15 agreed value repositories. Similarly, the second section collected the impact that each value repository had on the rest of the agreed value repositories. Finally, the respondents were asked how the 15 consensus value repositories affect long-term Omnichannel Management (OM, as a label in the charts) in their companies.

In the last round, based on the results chosen in the previous round, the experts were requested to indicate the "Sign of the link" (i.e. whether the link or interconnection is positive or negative) for these three cases: the link between Constraints and Value Repositories, Value Repositories' links to each other and the link between Value Repositories and Omnichannel Management. They were informed that a positive link is a relationship between two factors such that, as one factor increases, the other also

increases. A negative link is a relationship such that, as one factor increases, the other decreases. And a neutral sign refers to a link that does not exist.

We then used the following figure to show the impact between the variables agreed upon by the panel of experts.

Figure 4. Interconnection strength, constraints - value rep

Visually, it can be seen that there is no homogeneity in the impacts that the model variables have on each other. Some constraints, such as difficulty finding resources with the appropriate skills, financial needs, or in-depth knowledge of the customer or supplier, which were chosen in previous rounds, now have a weak impact on most value repositories, except for certain value repositories, i.e. the Customer-centric proposition, Innovation, and customer data (360 view), for which the strength of the interconnect is labeled primarily as above average. However, some constraints have a "strong" impact, such as the transformation of the process and the traditional way of selling, the cost of adopting new technologies, and the approach to the customer. At the same time, the

proliferation of actors in the company and the difficulty in achieving an internal agreement on value (corporate goals) are the constraints with the weakest interconnections of all.

Two value repositories that were significantly impacted ("strong" impact) by the constraints can be highlighted: channel integration and customer-centric proposition. At the other end, the distribution network (suppliers and distributors) is the value repository least impacted by the constraints.

The most frequently labeled interconnection strengths between the value repositories are summarized in the heatmap diagram presented in Figure 5. Visual observation of the graph suggests a degree of dispersion similar to that of the constraints. The weakness of the interconnections in the relationship network (suppliers and distributors) is particularly noteworthy, although the interconnections with IT management and the brand itself are also weak. On the other hand, customer experience and the customer-centric proposition are the ones that are most strongly impacted.

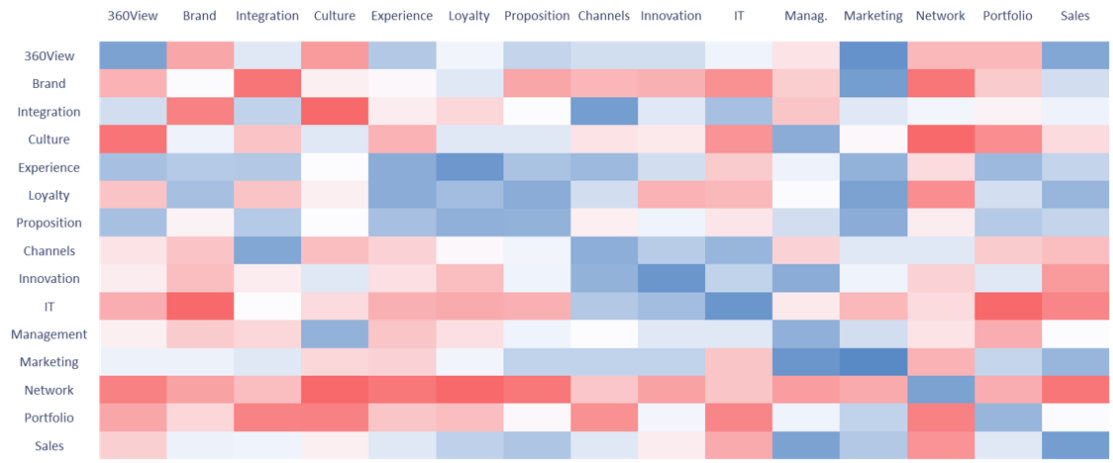


Figure 5. Interconnection strength, value rep to each other

Figure 6 reveals, based on Panel Members' responses, that value repositories mainly have a strong impact on Omnichannel Management.

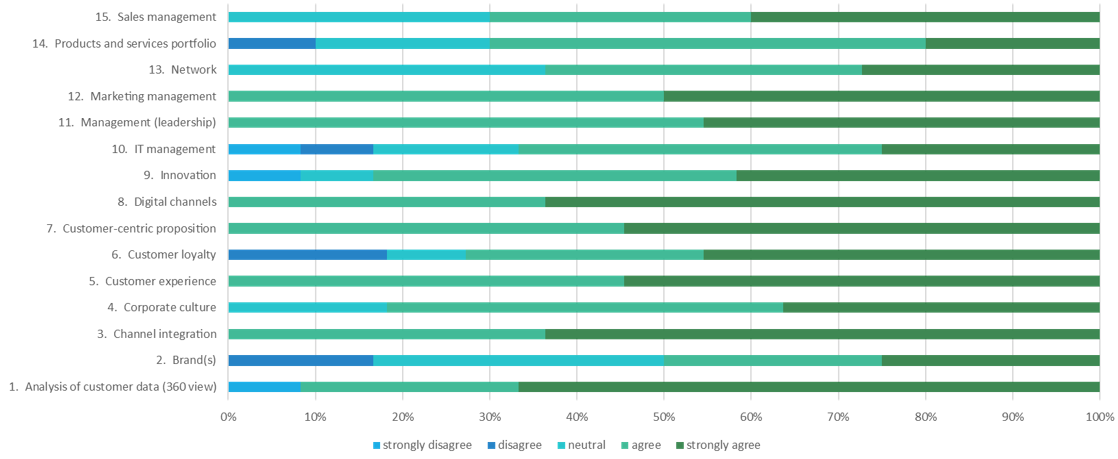


Figure 6. Interconnection strength. OM-value reps

The main interconnections are due to Customer Data Analysis (360 view), Channel Integration and Digital Channels, not to mention the "Strong" interconnection assigned to Experience and the Customer-centric proposition, to name just a few examples.

4.2 Complexity Analysis

The FCM-based map was constructed from the information collected in Delphi. This map should represent the company system and thus display the complexity of the company network.

The graph was analyzed using hierarchical grouping (figures 7, 8 and 9). The hierarchical grouping algorithm groups similar objects into groups called clusters. The result is a hierarchy of clusters, in which each cluster is distinct from the others and the

value repositories within each cluster are very similar to each other (Cunningham, 1972).

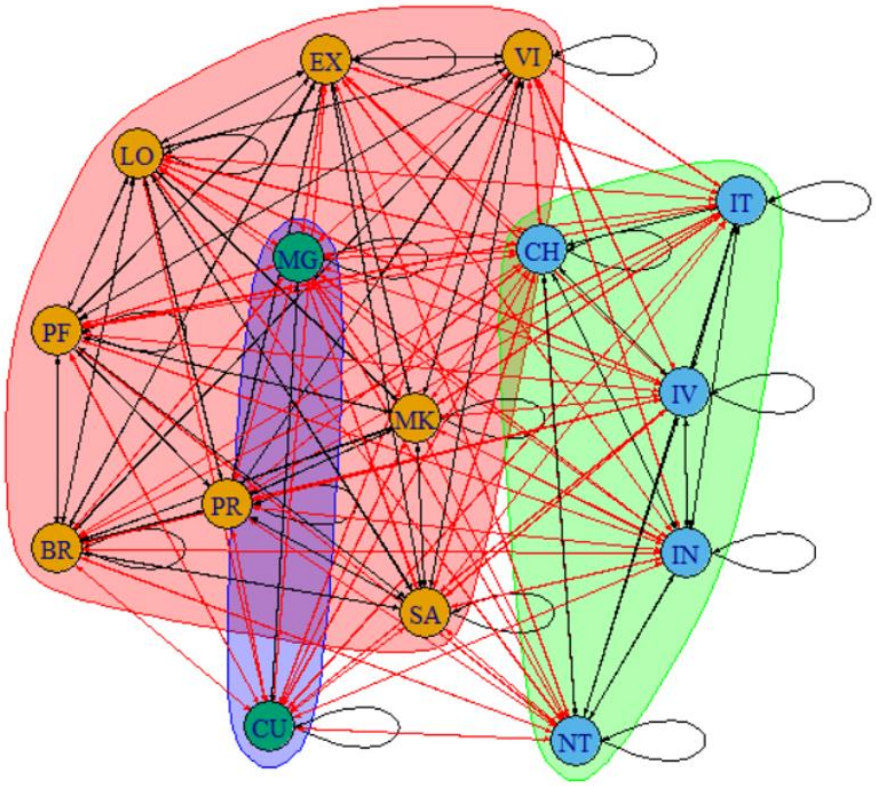


Figure 7. Hierarchical grouping for all data gathered

However, to simplify the display of clusters, the following figure includes the groups for which the strength of the interconnections is "Strong" or "Very strong":

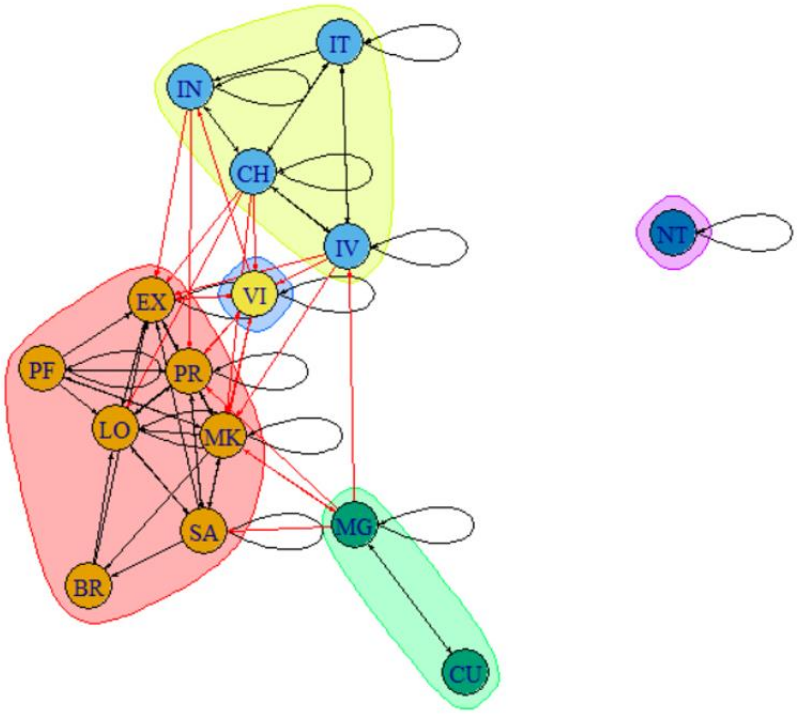


Figure 8. Hierarchical grouping based only on strong links

The clusters that were collected are the following:

- Cluster 1 (red) contains seven (7) value repositories: the Brand, the Customer Experience, Customer Loyalty (Loyalty), the Customer-Centric Proposition, Marketing Management, the Portfolio of Products and Services and Sales Management.
- Cluster 2 (yellow) contains four (4) value repositories: Channel Integration, Digital Channels, Innovation and IT Management.
- Cluster 3 (green) contains two value repositories: Corporate Culture and Management Leadership.

- Cluster 4 (blue) is made up of a single value repository: Analysis of Customer Data (360 vision)
- Cluster 5 (purple) is also made up of a single value repository: Network (suppliers and distributors) (NT)

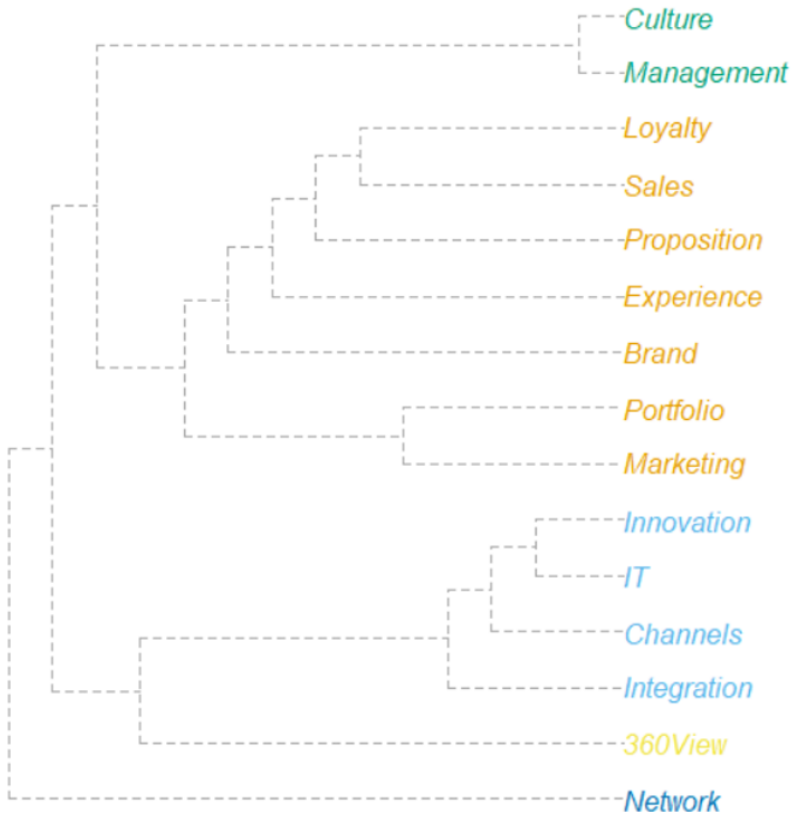


Figure 9. Dendrogram for strong interconnections

The Appendix entitled “R code for Network Analysis” presents a summary of some of the key topological methods available for understanding network complexity. For several decades, tools for social network analysis were essentially isolated from those supporting conventional statistical analyses. A major reason for this isolation was the difficulty in manipulating and representing relational data within standard statistical packages (Butts, 2008). In recent years, the emergence of flexible statistical computing

environments allows the world of network data to become more accessible, and analyzing such complex datasets becomes more feasible for "*a range of scientists to dive straight into network analysis"* (Kolaczyk & Csárdi, 2014). The complexity methods of the topological network presented in the annex include vertex characteristics, measures of network cohesion and assortativity.

Eigenvalue/Eigenvector decomposition is commonly used to reduce the dimensionality of a high-dimensional space while its internal structure is preserved. Given a collection of value repositories in a high-dimensional space, "*the eigenvalues of the covariance matrix reveal the underlying dimensionality of the space"* (Börner et al., 2005). Each node within the network will be given a score or value: the higher the score the greater the level of influence within the network. Thus, the more central the neighbors of a value repository are, the more central that value repository becomes (Kolaczyk & Csárdi, 2014).

Table 4 lists the eigenvector centrality values. Given these results, Customer Experience is the most influential value repository in the network model. Based on giving the maximum value to this repository, the values of the others have been calculated.

Table 4. Value repositories in order of importance in the model (own elaboration)

Value Repository	Weight
Experience	100
Proposition	98
Marketing	96
360View	94

Sales	94
Loyalty	94
Innovation	92
Channels	91
Management	90
Integration	90
Culture	84
Portfolio	82
Brand	82
IT	81
Network	72

It is worth noting that value repositories related to the sales strategy—e.g. Value proposition, marketing and sales—are the most important value repositories, while the Network is the least relevant repository within the model.

So far, fifteen value repositories have been identified that affect the Omnichannel Management of companies. Given that all value repositories, according to Delphi, have an impact on the Omnichannel Management of a company, the intensity and influence of each one with such management must be studied. Thus, twelve value repositories have a "very strong" interconnection with Omnichannel Management, specifically all except the Brand, IT Management, and the Network.

4.3 B2B Omnichannel model

Fuzzy Cognitive Map (FCM) "is a soft computing technique useful to model the dynamics involved in a given complex system using a set of concepts and the causal relationships between them" (De Maio et al., 2015). "FCM uses a mix of qualitative and quantitative approaches, it enables the inclusion of multiple and diverse sources to overcome the limitations of expert opinions, it considers multivariate interactions that lead to nonlinearities, and it aims to make implicit assumptions (or mental models) explicit" (A. J. Jetter & Kok, 2014). This technique is increasingly used in the field of social sciences, including marketing and business management (Xirogiannis & Glykas, 2004). Of special interest to the scope of this study are articles on industrial marketing planning (Lee et al., 2013) and studies on industrial logistics (Kalantari & Khoshalhan, 2018; Mirghafoori et al., 2018).

FCM is used to make a causal representation of business maturity principles, from which it is possible to simulate the operational efficiency of complex strategy models with imprecise relationships and quantify the impact of strategic change on the business model (Xirogiannis & Glykas, 2007). This is the final objective of the study, i.e. to make a causal representation of the elements that affect the Omnichannel Management of a company in the B2B field, from which simulations can be carried out to infer the impact.

"FCM model building is a multi-step process that captures causal knowledge in the form of cognitive maps, formally describes these maps as adjacency matrices, and applies neural network computation to refine the model and analyze model results" (A.

J. Jetter & Kok, 2014). According to this multi-step process, the Delphi described above was performed to cover the first stage of the process, namely, knowledge capture. Subsequently, the FCM model was built on the adjacency matrix obtained from the causal cognitive map described by the Delphi results. Finally, simulation scenarios have been chosen from different input vectors in order to interpret the effects that modifying the model variables have on Omnichannel Management.

The results of the survey of the panel of experts have been adjusted to a five-point Likert scale (von der Gracht, 2012). Greater value in these results means a greater impact on the relationship between the measured variables: constraints, value repositories and Omnichannel Management. To generate a unique cognitive map, an adjacency matrix has been constructed that collects the average value (weight) of the individual values given by each panelist.

The signs, ranging from positive (+1) to negative (-1), which describe the causal relationships between network components, are also incorporated into the adjacency matrix. When the weight ω_ij is positive, it implies a positive causality between the two components of the relationship C_i and C_j. If the weight is negative, an increase in C_i implies a reduction in C_j. If the weight is zero, there is no effect between those two components.

The adjacency matrix calculated for the model is shown in the table below.

Table 5. Adjacency matrix

	AG	MT	AP	KN	HR	FI	TE	ST	CO	TR	VI	BR	IN	CU	EX	LO	PR	CH	IV	IT	MG	MK	NT	PF	SA	OM
AG	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7500	0,5167	0,7000	0,6000	0,5833	0,4333	0,6429	0,6500	0,4833	0,4833	0,5667	0,5000	-0,1786	0,5333	0,5333	0,0000
MT	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,5833	0,5333	0,8750	0,2833	0,7167	0,6833	0,7500	0,6167	0,6833	0,3667	0,4833	0,5333	0,3833	0,5000	0,4500	0,0000
AP	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,9667	0,5714	0,5357	0,5179	0,8167	0,7500	0,9464	0,5667	0,5357	0,3667	0,4464	0,6000	0,3333	0,6500	0,6786	0,0000
KN	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,9500	0,4333	-0,7333	0,3333	0,6333	0,6000	0,8167	0,6000	0,4821	0,3167	0,3667	0,5333	-0,1833	0,5333	0,4833	0,0000
HR	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,3000	-0,3167	-0,2000	0,8167	-0,4333	-0,5000	-0,5500	-0,3833	0,5833	0,4464	0,7667	0,4000	-0,4286	-0,3833	-0,4500	0,0000
FI	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,4833	-0,5000	-0,6000	-0,4500	-0,4667	-0,3500	-0,5000	-0,6167	-0,7500	-0,4333	-0,4833	-0,3393	-0,3000	-0,6833	0,2667	0,0000
TE	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,5833	-0,2167	0,8167	0,5333	-0,5167	-0,4167	-0,6667	0,7667	0,7667	0,7857	0,6000	0,4833	0,3333	0,4643	0,4464	0,0000
ST	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,4833	-0,5167	-0,6333	-0,7000	-0,6167	-0,5167	-0,5333	-0,5833	-0,7833	0,4167	0,5167	0,5000	0,3667	-0,4333	-0,4833	0,0000
CO	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,7333	0,2679	-0,8393	0,6667	-0,5536	-0,4643	-0,7167	-0,7500	0,8036	0,7679	0,6333	0,6167	-0,3929	-0,6071	-0,4286	0,0000
TR	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7167	0,3393	0,7500	0,6667	0,8571	0,6333	0,8214	0,6833	0,7308	0,4821	0,7500	0,6071	0,5000	0,7167	0,7667	0,0000
VI	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,0000	0,6071	0,7679	0,5167	0,8214	0,6333	0,8214	0,6786	0,6923	0,6000	0,6964	0,7333	0,5357	0,5893	0,6500	0,8667
BR	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,5893	1,0000	0,5357	0,7321	0,8036	0,8214	0,7000	0,6333	0,6250	0,5000	0,6429	0,7333	0,4167	0,6607	0,7333	0,6333
IN	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7500	0,4821	1,0000	0,6333	0,8077	0,6333	0,8036	0,8667	0,6923	0,7143	0,6607	0,7500	0,6250	0,5385	0,7308	0,9000
CU	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,5714	0,6964	0,5000	1,0000	0,7143	0,6964	0,7143	0,6250	0,7500	0,6667	0,8462	0,6607	0,5000	0,5357	0,6964	0,8167
EX	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,8077	0,7083	0,6923	0,6071	1,0000	0,8571	0,8214	0,6538	0,6731	0,6042	0,6346	0,6538	0,5208	0,6346	0,7500	0,9000
LO	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7292	0,7500	0,6607	0,7500	0,8929	1,0000	0,8500	0,7083	0,6250	0,4038	0,6731	0,7292	0,5000	0,6250	0,7917	0,7833
PR	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7857	0,5893	0,7143	0,7500	0,8167	0,8571	1,0000	0,7292	0,7308	0,6042	0,7308	0,7885	0,5208	0,7083	0,8125	0,8833
CH	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7692	0,6136	0,8846	0,6786	0,8333	0,7679	0,6964	1,0000	0,8462	0,8077	0,7143	0,7885	0,6364	0,5577	0,7500	0,8833
IV	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7692	0,6042	0,7500	0,6875	0,7679	0,6071	0,7308	0,8000	1,0000	0,8269	0,7500	0,7885	0,5833	0,7273	0,6923	0,8167
IT	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,7308	0,4423	0,8214	0,5625	0,6429	0,6154	0,6818	0,8393	0,7885	1,0000	0,7500	0,6346	0,6346	0,5417	0,5962	0,7167
MG	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,6786	0,6458	0,6346	0,8571	0,7321	0,7115	0,7679	0,6538	0,8571	0,6875	1,0000	0,8958	0,5769	0,7308	0,8750	0,8750
MK	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,9038	0,8846	0,7500	0,7083	0,8462	0,8750	0,8571	0,7500	0,7308	0,6154	0,7679	1,0000	0,5962	0,7885	0,8077	0,8571
NT	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,6154	0,5192	0,7273	0,5000	0,6667	0,5536	0,6923	0,7500	0,6538	0,6667	0,6786	0,6071	1,0000	0,5357	0,5625	0,7143
PF	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,6154	0,6429	0,7000	0,5536	0,8333	0,7667	0,8036	0,6429	0,7500	0,5000	0,6000	0,7833	0,6000	1,0000	0,7500	0,7500
SA	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,8667	0,7679	0,7321	0,6667	0,7857	0,8393	0,7857	0,6250	0,5714	0,5417	0,7143	0,8393	0,4808	0,7167	1,0000	0,8214
OM	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	1,0000

In the last stage of the process, the model that has been built is initialized. FCM simulations can be used to experiment with different decision alternatives and compare their outcomes holistically, i.e. with regard to all variables of interest. Thus, "*complex decision problems can be dealt with"* (A. Jetter, 2006). For demonstration purposes, this research has randomly taken an input vector to initialize the model and provide a baseline against which to compare the results of new scenarios that modify the input variables. "*The value of each concept is calculated, computing the influence of other concepts to the specific concept, by applying the calculation rule of equation"* (Stylios & Groumpos, 1999):

$$x_i(t) = f\left(\sum_{j=1;j\neq i}^{n} x_j(t-1)\omega_{ji}\right)$$

Where f is the sigmoid function:

$$f = \frac{1}{1+\mathrm{e}^{-\lambda x}}$$

This function determines the type of FCM to choose. The sigmoid has been chosen in this research since sigmoid FCMs are "suitable for qualitative and quantitative problems where the representation of a degree of increase, a degree of decrease or stability of a concept is required and the strategic planning scenarios are going to be introduced" (Tsadiras, 2008).

The learning goal of FCMs is to compute a weight matrix that best fits the decision-making and prediction problems. "*Learning algorithms can train FCMs, which means*

the adjustment of the strength connections (weights) among concepts (constraints and value repositories), *as in the case of synapses of neural networks"* (Papageorgiou, 2012). The algorithm used in this research has been Differential Hebbian Learning (DHL). Differential Hebbian Learning encodes how changes in one concept map to changes in another concept. "*The discrete change* ΔAC_i *lies in [-1,1]. So* $\Delta AC_i \Delta AC_j > 0$ *iff concepts* C_i *and* C_j *move in the same direction.* $\Delta AC_i \Delta AC_j < 0$ *iff concepts* C_i *and* C_j *move in the opposite direction. The discrete update equation for differential Hebbian learning is* $\omega_{ij}(t+1) = \omega_{ij}(t) + \gamma(t)\left[\Delta C_i \Delta C_j - \omega_{ij}(t)\right]$ *if* $\Delta C_i \neq 0$, *and* $w_{ij}(t+1) = \omega_{ij}(t)$ *if* $\Delta C_i = 0$, *where* $\gamma(t)$ *is a decreasing learning coefficient. The weight matrix updates only when a causal change occurs at the input"* (Dickerson & Kosko, 1994).

"During DHL learning, the values of weights are iteratively updated until the desired structure is found. The weights of outgoing edges for each concept in the connection matrix are modified only when the corresponding concept value changes" (Papageorgiou, 2012).

4.4 Simulation

"We can undertake some interesting "what-if" analyses using FCM" (Hester, 2015). "Exploiting adjacency matrix describing FCM, what-if simulation is performed by multiplying the input configuration vector representing the state of each node with the adjacency matrix. The value for each element of the input case can be" any in the interval [1,-1] (De Maio et al., 2015).

Based on the relevance of the value repositories and the constraints gathered in Delphi, the following what-if scenarios have been defined:

Table 6. Simulation scenarios

Scenario	Objectives	Constraints/ Value Repositories
Scenario 1	More critical situation (stronger constraints)	Transformation of the process and the traditional way of selling Adoption costs of new technologies Customer approach
Scenario 2	Strengthening of the most influential value repositories in relation to marketing	Analysis of customer data (360 vision) Customer-centric proposition Portfolio of products and services Digital channels
Scenario 3	Strengthening the value repositories that most strongly impact omnichannel	Customer experience Marketing Management Analysis of customer data (360 vision) Customer-centric proposition

For the inference from the FCM, the current commercial circumstances of one of the companies to which one of the panelists belongs can be used (Lee et al., 2013) However, to compare the scenarios, in this research a random vector with all the concepts set to 0.5 has been used as the first input to get the baseline scenario against

which to compare the subsequent simulations. The simulation results for the baseline scenario are shown in Figure 10.

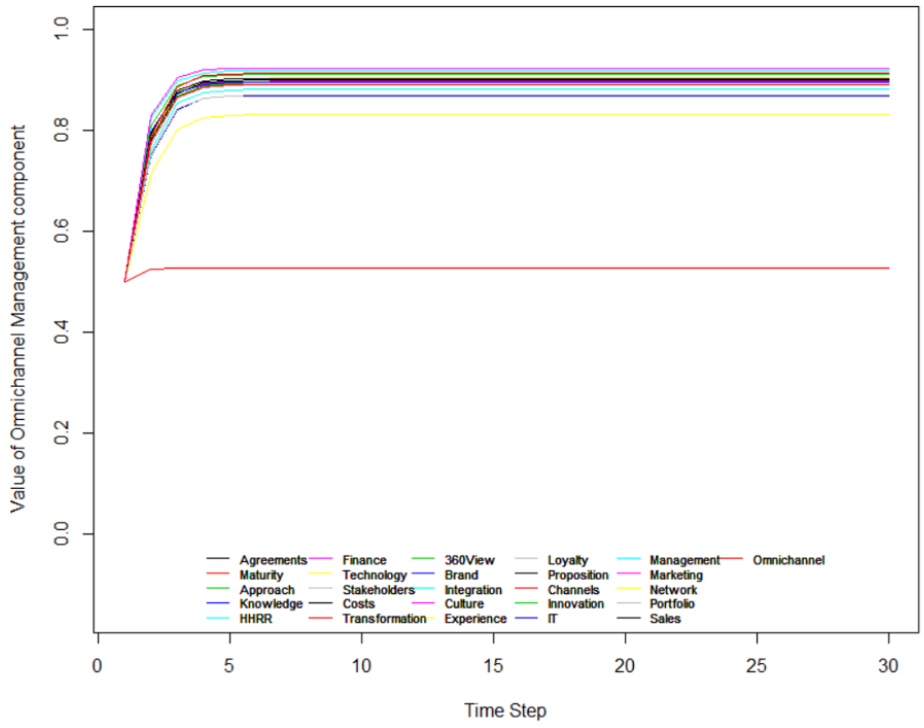


Figure 10. Reference scenario

Table 7 shows the results of the baseline scenario with which we will compare the what-if scenarios.

Table 7. Output vector for the base scenario

Base Scenario: Outcome state vector					
360View	0.8953102	Innovation	0.8907309	Marketing	0.9191858
Brand	0.8694332	Integration	0.9004129	Network	0.9243975
Channels	0.8820055	IT	0.8927432	Portfolio	0.8318582
Culture	0.8974754	Loyalty	0.9118432	Proposition	0.8702592

Experience	0.9042192	Management	0.8967236	Sales	0.9038871

Omnichannel Management	
Omnichannel	0.9142983

For the base vector chosen, it is observed that the most important value repositories are marketing management, management leadership and innovation. Those that have the least influence on Omnichannel Management as a result of this base simulation are the brand, the portfolio of products or services and the integration of the channels.

Scenario 1: More critical situation (stronger constraints). A 'what-if' simulation was conducted to assess the impact of a more critical situation in relation to the constraints that impact Omnichannel Management. Taking into consideration the most influential constraints, this scenario was marked by difficulties in the process of transforming sales into this new omnichannel situation, an increase in the cost of adopting new technologies, and greater difficulties in approaching the customer. Table 8 only shows the vector values that change with respect to the inference vector of the base scenario.

Table 8. Input vector for the first scenario

Model Component	Input Value
Approach	-0.9
Costs	-0.9
Transformation	-0.9

To provide decisional support from FCM in control, Table 9 and Figure 11 *"show the simulation results and corresponding outputs for the values obtained at* n *iteration*

execution" (De Maio et al., 2015). In Table 9, the results show the percentage deviation of the final values with respect to those obtained for the baseline scenario.

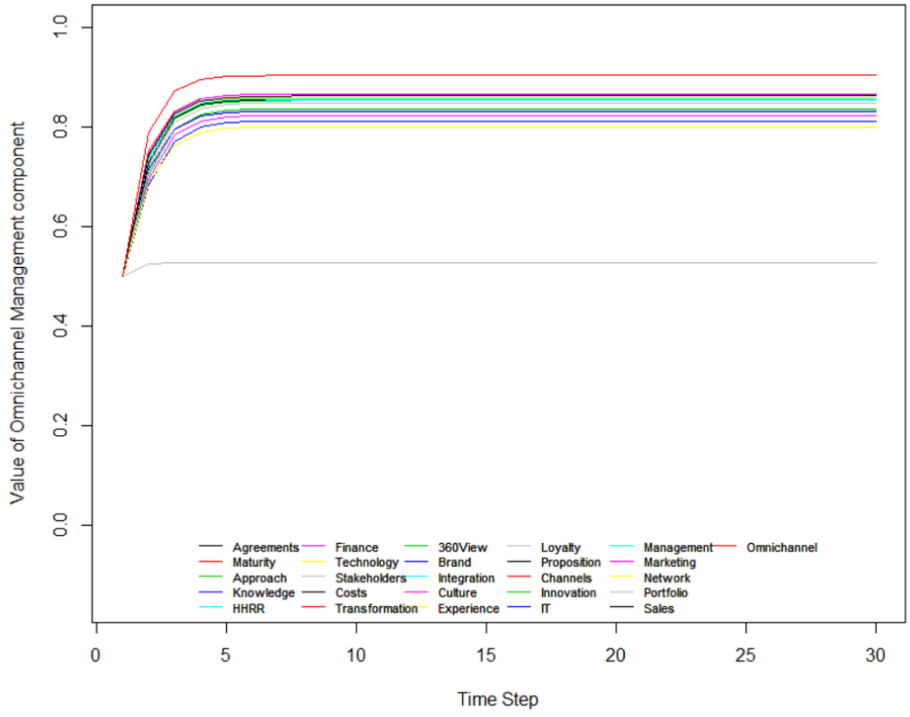


Figure 11. Inference output for the first scenario

Table 9. Output vector for the first scenario

Scenario 1: A tougher business environment								
360View	0,85427	-4,6%	Innovation	-8,2%	0,4%	Marketing	0,86685	-6,2%
Brand	0,81189	-6,6%	Integration	-2,9%	0,5%	Network	0,80078	-3,7%
Channels	0,86675	-2,9%	IT	-7,1%	0,4%	Portfolio	0,83072	-4,5%
Culture	0,82347	-8,2%	Loyalty	-4,7%	0,5%	Proposition	0,85691	-4,8%

Experience	0,85954	-4,9%	Management	-6,6%	0,3%	Sales	0,86338	-4,5%

Omnichannel Management		
Omnichannel	0.90451	-1,07%

We can see that, as a result of the simulation, Omnichannel Management efficiency is expected to decrease if the general conditions tighten. It is worth noting that this scenario significantly affects the two most strategic repositories whose return is most evident in the long term, namely corporate culture and innovation. The drop in IT management is also significant. It could therefore be deduced that, in the face of more negative business scenarios, the economic focus turns to those activities that can give the greatest return in the short term.

The three value repositories that have the most weight in the baseline scenario (marketing management, management leadership and innovation) are within the top five most affected in this scenario with tougher conditions. However, the three value repositories with the least weight in the baseline scenario have an unequal impact on each other, with the brand being the most pronounced.

Scenario 2: implementation of the main marketing-related processes. In a similar way to the previous scenario, a "what if" simulation was carried out to evaluate the result of an improvement in the processes oriented to the proposition and customer sales. Once again, Table 10 only shows the values of the vectors that change with respect to the inference vector of the base scenario.

Table 10. Input vector for the second scenario

Model Component	Input Value
360 View	0.95
Proposition	0.95
Portfolio	0.95
Channels	0.95

In the same way as for the previous scenario, Table 11 and Figure 12 show the results of the simulation and the corresponding outputs.

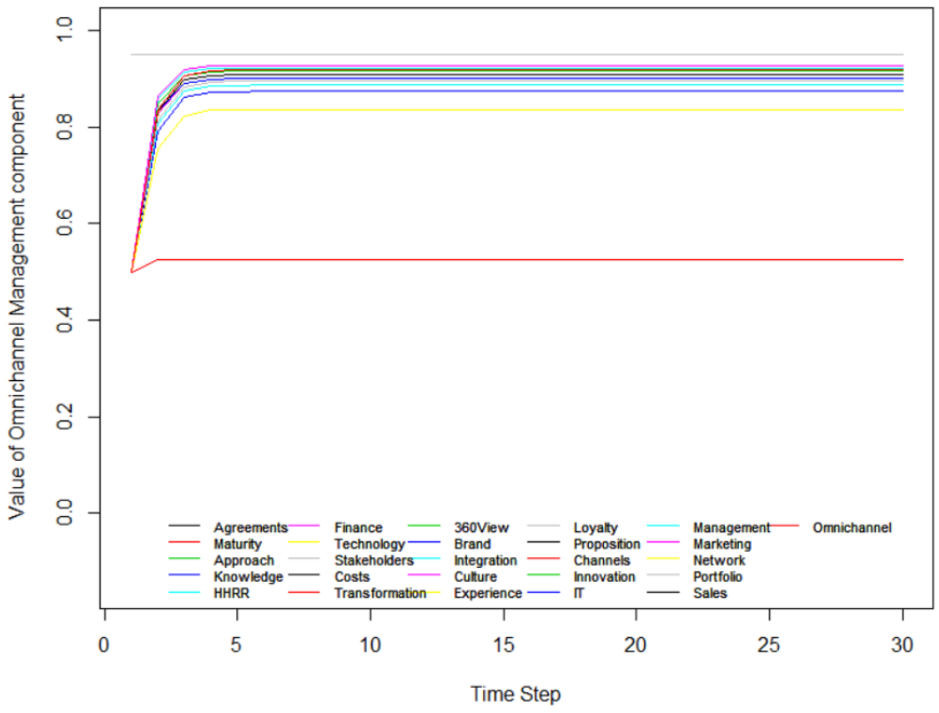


Figure 12. Inference output for the second scenario

Table 11. Output vector for the second scenario

Scenario 2: implementation of the main processes linked to marketing

360View	0.95000	6.1%	Innovation	0.91517	0.4%	Marketing	0.92737	0.3%
Brand	0.87337	0.5%	Integration	0.88635	0.5%	Network	0.83637	0.5%
Channels	0.95000	6.4%	IT	0.89992	0.4%	Portfolio	0.95000	9.2%
Culture	0.90067	0.4%	Loyalty	0.89479	0.5%	Proposition	0.95000	5.5%
Experience	0.90815	0.4%	Management	0.92199	0.3%	Sales	0.90744	0.4%

Omnichannel Management		
Omnichannel	0.91794	0.40%

The results derived from implementing better marketing-oriented processes (excluding those values that are part of the input vector) show that the values that are, relatively, most affected are those that have a direct relationship with the client (loyalty and improvement of the experience), together with aspects such as the management of the distribution network and the integration of the channels themselves. In absolute terms, the values that benefited most are those related to general management, especially marketing management. In any case, the impact on Omnichannel Management has less relative significance than the previous impact resulting from the constraints (Scenario #1).

The three value repositories that have the most weight in the baseline scenario (marketing management, management leadership and innovation) remain the most important in this simulation if the repositories that are part of the input vector are not considered. However, they are the ones with the least relative increase. On the other hand, repositories with less weight in the baseline scenario, such as integration and the brand, are those that experience a greater relative increase under the conditions included in this scenario.

Scenario 3: management of more productive assets. The third simulation is performed to evaluate the impact of the most important values according to the analysis in Table 4. The input vector to this new "what-if" scenario only changes the values shown in Table 12 with respect to the base scenario.

Table 12. Input vector for the third scenario

Model Component	Input Value
Experience	0.95
Proposition	0.95
Marketing	0.95
360View	0.95

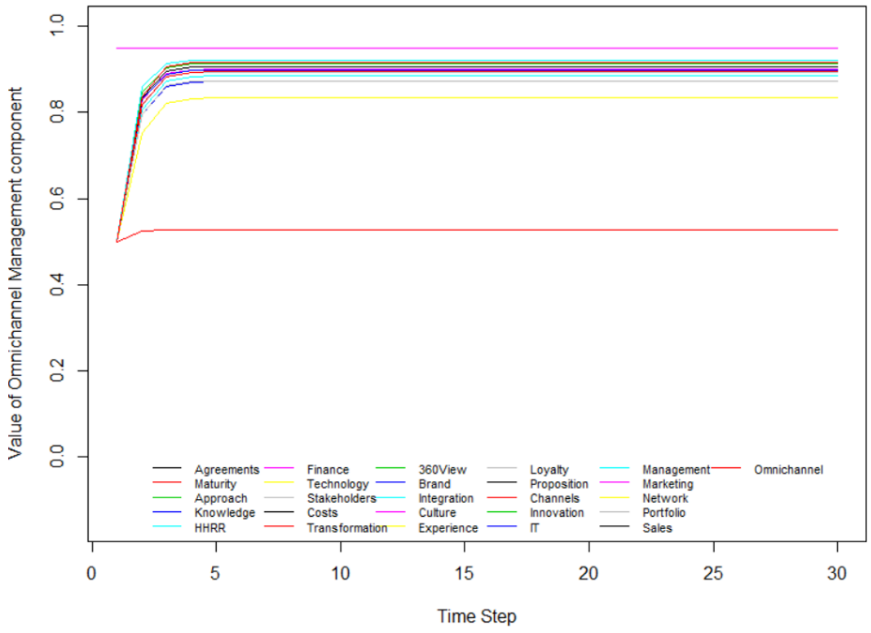


Figure 13. Inference output for the third scenario

Table 13. Output vector for the third scenario

Scenario n. 3: more productive asset management								
360View	0.95000	6.1%	Innovation	0.91415	0.3%	0.95000	2.8%	0.95000
Brand	0.87251	0.4%	Integration	0.88509	0.3%	0.83497	0.4%	0.83497
Channels	0.89548	0.3%	IT	0.89903	0.3%	0.87330	0.3%	0.87330
Culture	0.89988	0.3%	Loyalty	0.89382	0.3%	0.95000	5.5%	0.95000
Experience	0.95000	5.1%	Management	0.92131	0.2%	0.90651	0.3%	0.90651

Omnichannel Management		
Omnichannel	0.9173206	0.33%

In view of the results, it is possible to conclude that the improvement in customer experience, with an accurate value proposition, better customer knowledge and better marketing management, favors the management of the distribution network and the

positioning of the brand, in relative values; while favoring leadership in management and innovation in absolute values. However, as in scenario 2, the relative effect on Omnichannel Management in this scenario is less than in scenario 1. In other words, constraints have a greater relative effect than value repositories. It is also striking that the expected effect on Omnichannel Management is lower in these supposedly more productive values than those directly related to Marketing, based on the results of scenario 2.

The value repositories with greater and less weight in the base scenario follow the same trends as those described in scenario 2. Thus, the value repositories that have the most weight in the base scenario continue to be the most important in this simulation, without taking into account the repositories that are part of the input vector. At the same time, they are the ones with the smallest relative increases. On the other hand, the three repositories with the least weight in the baseline scenario (channel integration, portfolio and brand) are the ones that experience the greatest relative increases under the conditions set out in this scenario.

5 Discussion of results

To summarize the data obtained, the following can be concluded:

1. The impacts that value repositories have on Omnichannel Management are not the same for all of them. Similarly, some constraints have a more pronounced impact on value repositories than others.

2. It can be expected that, of the most significant constraints, three stand out. These are: the transformation of the process and the traditional way of selling; the costs of adopting new technologies; and the customer approach.
3. The value repositories most affected by the constraints are the customer-centric proposition and channel integration. In the opposite case, the value repository "the distribution and supply chain network" stands out as having less impact.
4. The model obtained from Delphi shows a strong interconnection between value repositories.
5. The interconnection between value repositories and Omnichannel Management is principally revealed to be "strong" and "very strong".
6. The greatest impact on companies' Omnichannel Management comes from three value repositories: Customer data analysis (360 view), Channel integration and Digital channels.
7. Of all the value repositories, Customer Experience has the greatest impact, with other marketing-related value repositories, such as 360 Vision, Customer-centric Value Proposition, and Marketing Management itself, following closely in importance.
8. The omnichannel B2B business value creation network is divided into five interconnected clusters. These same clusters connect to each other with different connection weights.
9. Two of the most influential value repositories in the baseline scenario, namely management leadership and innovation, are strongly affected in a scenario with

more pronounced constraints (scenario 1). However, they are among the least impacted by changes in other value repositories (scenarios 2 and 3).

10. Two of the value repositories with the least influence in the baseline scenario, namely the distribution network and channel integration, are the least affected by the constraints and yet the most impacted in the scenarios that include changes in the value repositories, excluding the repositories of values that are part of the input vector in each scenario.

The results of the network model simulations have important management implications: Constraints on omnichannel implementation, such as transforming the sales process, taking a greater and better focus on the customer, and reducing costs to adopt new technologies, should preferably be mitigated. Mitigating constraints will be more effective than actions such as encouraging marketing activities, modifying the value proposition, or enabling more digital channels.

Based on the resulting model and the simulation scenarios, it can be concluded that Omnichannel Management in the B2B environment is far more significantly affected by the constraints on creating value in companies than by the principal activities, resources and processes (value repositories) that are directly linked to Omnichannel Management. In other words, based on the model and the simulation, Omnichannel Management in manufacturers and wholesalers should be aimed at reducing the costs of adopting new technologies or at transforming the traditional sales process, rather than at actions such as encouraging the proliferation of more digital channels or improving marketing management in the organization.

6 Conclusions

6.1 Theoretical and methodological implications

Due to the shortage of studies on Omnichannel Management in the B2B field, our study provides the first model that brings together the main elements that influence optimal Omnichannel Management in the industrial field. The model also captures the impacts that the constraints that the company is facing have on Omnichannel Management.

The model we have presented is considered to provide both theoretical and practical benefits to any company undertaking a digital transformation, given that it makes it possible to think through the expected performance metrics a priori and permits a benchmarking framework to be created for the management initiatives to be addressed. More specifically, fuzzy cognitive mapping makes it possible to study an organization's performance and anticipate any unwanted secondary effects of actions in the company.

To date, most of the research listed in Table 1 analyzes the impact that each variable has on Omnichannel Management separately; in some cases, two variables are reviewed, such as price and channel (Kim & Chun, 2018; Modak & Kelle, 2019). The cognitive map facilitates the decomposition into variables and their interrelations. These variables and interrelations constitute a valid construct that coincides with the complexity of the companies. The level of engagement achieved by Panel Members and the quality of contributions support the view that the complex model approach enables a flexible and realistic understanding of companies and the interactions that shape their behavior.

As a theoretical assessment, it is appropriate to contrast the results of the study with the research published and listed in Table 1. The first block of research attempts to characterize customer behavior. The model created in this study collects behavior in two main variables defined by customer experience (EX) and customer loyalty (LO) and a principal constraint which is the lack of knowledge and customer data (KN). This situation agrees with the articles published and the lines of research already mentioned, although it reveals one of the main problems to be solved in the model, which is how the measurement of customer experience is carried out in an omnichannel environment (Lemon & Verhoef, 2016).

The strategy by channel and price is given in the model by two value repositories: channel integration (IN), digital channels (CH); and constraints such as the maturity of the channel (MT). In the published studies, channel integration and digital channels are widely studied. Maturity can be associated with studies on cannibalization (Kim & Chun, 2018) and dual channel management (Modak & Kelle, 2019), so the model would be aligned with published research.

In the model, logistics is represented by a single value repository, namely network (NT). However, as shown in Table 1, this is the field in which there has been the greatest scientific contribution to date. Research into this area within Omnichannel Management, at least in the retail field, has been extensive. It is therefore worth asking whether the model is limited to a single variable, which is also the one with the lowest absolute weight in all the scenarios, although it is the one with the greatest relative change in the simulations in which the value repositories are improved (scenarios 2 and

3). There are multiple studies on issues and opportunities in forward and reverse logistics, fulfillment, warehouse impact, coexistence with the traditional distribution channel, among others. And yet the model is reduced to a single variable. In the opinion of the authors, this is an aspect that needs to be explored, either to endorse the model or to enrich it. But if the model is endorsed, and in Omnichannel Management logistics is not one of the principal values, then research in the other fields becomes more pressing.

The IT-related impact is included in the model through the IT management value repository (IT) and two constraints. These are the integration of new technology with corporate systems (TE) and the cost of adopting the new technology (CO). It can be concluded that the model is aligned with the published literature regarding IT management. Several articles have also been published on specific technology in different contact points, but according to the panelists, this technology is not relevant enough to be part of a general model.

Finally, one of the contributions that the model presents is the disparity of variables (VI, BR, CU, PR, IV, MG, MK, PF, SA) and constraints (AG, AP, HR, FI, ST, TR) that occur in the area of “management”. The scope is very broad, but when the research to date is grouped in Table 1, such a broad concept reveals the vast field of potential research into Omnichannel Management in general. Each value repository and constraint identified within the "Omnichannel Management" field constitutes an area in the omnichannel field that could be researched. For example, no articles have been found that address the value repositories or the constraints linked to the organization from the perspectives of leadership (MG), recruitment of human resources (HR),

definition of roles or the internal organization/stakeholders (ST) In contrast, the perspectives of impact on the sales force, the personnel in the physical store and customer service (SA) have been studied.

6.2 Managerial implications. Relationship

According to the findings of this research, Omnichannel Management in a B2B environment is more strongly impacted by constraints than by variables in its favor. In other words, a more restrictive environment entails a greater impact on Omnichannel Management than any attempts to improve the context of the variables that favor such management.

Thus, for example, if we review how the Channel Integration value repository has been treated in research to date (see Table 1), it can be concluded that greater channel integration has a positive impact on Omnichannel Management (L. Cao & Li, 2015b; Herhausen, Binder, Schoegel, et al., 2015). Our study confirms this conclusion, given that a new channel (scenario 2) favors Omnichannel Management. However, from a management point of view, it would be advisable to make a greater effort to mitigate negative scenarios such as the one shown in scenario 1, instead of opening a new channel.

This exercise also reveals that applying a complexity-based vision of the organization can offer a wide range of options for better addressing a company’s true situation and from here, evaluate "what-if" scenarios that will facilitate the decision-making (Xirogiannis & Glykas, 2007). The model created in the study does not pretend to be a

true reflection of reality, but rather a tool to help decision-making, which, based on the experience of experts, makes it possible to highlight the main variables that influence Omnichannel Management and the impacts between them. "*Models are open to review by all relevant stakeholders, including critics, and modelers seek out opportunities to confront the model with data and test assumptions"* (Sterman, 2015). "*The benchmark for FCM "validation" should therefore be if it adequately describes what the respondents know about the subject matter, which requires them to take an active role in model testing"* (Jetter & Kok, 2014)

6.3 Limitations and further research

The investigation starts with a Delphi process, to build the model. This is one of the main limitations of the study. For Delphi to be relevant, three main conditions must be met (Skulmoski et al., 2007):

- "Heterogeneous or homogeneous sample: when the group is homogeneous, a smaller sample of between ten and fifteen people can give enough results.
- Trade-off between decision quality/Delphi manageability: there is a reduction in group error (or an increase in decision quality) as the sample size increases.
- Internal or external verification: The larger the group, the more convincingly it can be said that the results are verified."

The selection of experts with similar training and general knowledge in the field of interest allows the efficient and reliable use of *"a small sample of a limited number of experts in the field of study"* (Akins et al., 2005). The 30 selected panelists have a

managerial profile and work in companies in the B2B field, whether they are manufacturers or wholesalers. However, the international nature of the sample, the different sizes of the companies, and the diversity of sectors, are factors that could be adjusted for a more accurate result: by geographic scope, industry, company size and/or type of company in a traditional supply chain.

Other limitations come from the process of creating the FCM itself. With the use of DHL, we are accepting one of "the main drawbacks of this approach, which is that the formula updates weights between each pair of concepts, taking into account only these two concepts and ignoring the influence that comes from other concepts" (Papageorgiou, 2012). Other learning methods could be used, such as active HL or online HL. However, the model resulting from this research does not invalidate the contrast with what-if scenarios, if these are considered from a qualitative rather than a quantitative point of view.

However, the above limitations do not invalidate the applicability of the complexity-based research in addressing the true situation of companies, nor should its results be neglected.

A possible future task would be to assess the validity of the FCM model that has been identified. If the FCM model reproduces with some accuracy the Omnichannel Management processes in each of the organizations of the experts who have been part of the Delphi process. However, it should be noted that when using calibrated FCM there is "*a temptation to see their predictions as the truth about how the future will unfold,*

when what they truly provide are alternative and often competing ideas on ways in which it may unfold" (Jetter & Kok, 2014).

The model includes an evaluation of which traditional processes are most affected in this new Omnichannel Management and, to some extent, how management efficiency is characterized, defined and measured in a company that accepts the need for continuous adaptation to an increasingly diverse and changing demand. As a line of research, this model could be iterated—either on companies in a specific industry, or with different positions in the value chain (manufacturers vs. wholesalers) or company sizes—to infer more specific models. Likewise, it is necessary to define which indicators are key to Omnichannel Management for industrial clients and, if possible, how these could be measured. This would make it possible to define strategies in advance and to measure business performance once these strategies have been addressed, in order to facilitate continuous internal analysis and comparison between companies in the same sector.

7 Appendices

7.1 Data gathered from the Delphi

7.1.1 edgespanel.dat

from	to	weight
Agreements	360View	0,75
Maturity	360View	0,583333333
Approach	360View	0,966666667
Knowledge	360View	0,95
HHRR	360View	-0,3
Finance	360View	-0,483333333
Technology	360View	-0,583333333
Stakeholders	360View	-0,483333333
Costs	360View	-0,733333333
Transformation	360View	0,716666667
Agreements	Brand	0,516666667
Maturity	Brand	0,533333333
Approach	Brand	0,571428571
Knowledge	Brand	0,433333333
HHRR	Brand	-0,316666667

Finance	Brand	-0,5
Technology	Brand	-0,216666667
Stakeholders	Brand	-0,516666667
Costs	Brand	0,267857143
Transformation	Brand	0,339285714
Agreements	Integration	0,7
Maturity	Integration	0,875
Approach	Integration	0,535714286
Knowledge	Integration	-0,733333333
HHRR	Integration	-0,2
Finance	Integration	-0,6
Technology	Integration	0,816666667
Stakeholders	Integration	-0,633333333
Costs	Integration	-0,839285714
Transformation	Integration	0,75
Agreements	Culture	0,6
Maturity	Culture	0,283333333
Approach	Culture	0,517857143
Knowledge	Culture	0,333333333
HHRR	Culture	0,816666667
Finance	Culture	-0,45
Technology	Culture	0,533333333
Stakeholders	Culture	-0,7
Costs	Culture	0,666666667
Transformation	Culture	0,666666667
Agreements	Experience	0,583333333
Maturity	Experience	0,716666667
Approach	Experience	0,816666667
Knowledge	Experience	0,633333333
HHRR	Experience	-0,433333333
Finance	Experience	-0,466666667
Technology	Experience	-0,516666667
Stakeholders	Experience	-0,616666667
Costs	Experience	-0,553571429
Transformation	Experience	0,857142857
Agreements	Loyalty	0,433333333
Maturity	Loyalty	0,683333333
Approach	Loyalty	0,75
Knowledge	Loyalty	0,6
HHRR	Loyalty	-0,5
Finance	Loyalty	-0,35
Technology	Loyalty	-0,416666667
Stakeholders	Loyalty	-0,516666667
Costs	Loyalty	-0,464285714
Transformation	Loyalty	0,633333333
Agreements	Proposition	0,642857143
Maturity	Proposition	0,75
Approach	Proposition	0,946428571
Knowledge	Proposition	0,816666667
HHRR	Proposition	-0,55
Finance	Proposition	-0,5
Technology	Proposition	-0,666666667
Stakeholders	Proposition	-0,533333333
Costs	Proposition	-0,716666667
Transformation	Proposition	0,821428571
Agreements	Channels	0,65
Maturity	Channels	0,616666667
Approach	Channels	0,566666667
Knowledge	Channels	0,6
HHRR	Channels	-0,383333333
Finance	Channels	-0,616666667
Technology	Channels	0,766666667

Stakeholders	Channels	-0,583333333
Costs	Channels	-0,75
Transformation	Channels	0,683333333
Agreements	Innovation	0,483333333
Maturity	Innovation	0,683333333
Approach	Innovation	0,535714286
Knowledge	Innovation	0,482142857
HHRR	Innovation	0,583333333
Finance	Innovation	-0,75
Technology	Innovation	0,766666667
Stakeholders	Innovation	-0,783333333
Costs	Innovation	0,803571429
Transformation	Innovation	0,730769231
Agreements	IT	0,483333333
Maturity	IT	0,366666667
Approach	IT	0,366666667
Knowledge	IT	0,316666667
HHRR	IT	0,446428571
Finance	IT	-0,433333333
Technology	IT	0,785714286
Stakeholders	IT	0,416666667
Costs	IT	0,767857143
Transformation	IT	0,482142857
Agreements	Management	0,566666667
Maturity	Management	0,483333333
Approach	Management	0,446428571
Knowledge	Management	0,366666667
HHRR	Management	0,766666667
Finance	Management	-0,483333333
Technology	Management	0,6
Stakeholders	Management	0,516666667
Costs	Management	0,633333333
Transformation	Management	0,75
Agreements	Marketing	0,5
Maturity	Marketing	0,533333333
Approach	Marketing	0,6
Knowledge	Marketing	0,533333333
HHRR	Marketing	0,4
Finance	Marketing	-0,339285714
Technology	Marketing	0,483333333
Stakeholders	Marketing	0,5
Costs	Marketing	0,616666667
Transformation	Marketing	0,607142857
Agreements	Network	-0,178571429
Maturity	Network	0,383333333
Approach	Network	0,333333333
Knowledge	Network	-0,183333333
HHRR	Network	-0,428571429
Finance	Network	-0,3
Technology	Network	0,333333333
Stakeholders	Network	0,366666667
Costs	Network	-0,392857143
Transformation	Network	0,5
Agreements	Portfolio	0,533333333
Maturity	Portfolio	0,5
Approach	Portfolio	0,65
Knowledge	Portfolio	0,533333333
HHRR	Portfolio	-0,383333333
Finance	Portfolio	-0,683333333
Technology	Portfolio	0,464285714
Stakeholders	Portfolio	-0,433333333
Costs	Portfolio	-0,607142857

Transformation	Portfolio	0,716666667
Agreements	Sales	0,533333333
Maturity	Sales	0,45
Approach	Sales	0,678571429
Knowledge	Sales	0,483333333
HHRR	Sales	-0,45
Finance	Sales	0,266666667
Technology	Sales	0,446428571
Stakeholders	Sales	-0,483333333
Costs	Sales	-0,428571429
Transformation	Sales	0,766666667
360View	360View	0,875
Brand	360View	0,589285714
Integration	360View	0,75
Culture	360View	0,571428571
Experience	360View	0,807692308
Loyalty	360View	0,729166667
Proposition	360View	0,785714286
Channels	360View	0,769230769
Innovation	360View	0,769230769
IT	360View	0,730769231
Management	360View	0,678571429
Marketing	360View	0,903846154
Network	360View	0,615384615
Portfolio	360View	0,615384615
Sales	360View	0,866666667
360View	Brand	0,607142857
Brand	Brand	0,711538462
Integration	Brand	0,482142857
Culture	Brand	0,696428571
Experience	Brand	0,708333333
Loyalty	Brand	0,75
Proposition	Brand	0,589285714
Channels	Brand	0,613636364
Innovation	Brand	0,604166667
IT	Brand	0,442307692
Management	Brand	0,645833333
Marketing	Brand	0,884615385
Network	Brand	0,519230769
Portfolio	Brand	0,642857143
Sales	Brand	0,767857143
360View	Integration	0,767857143
Brand	Integration	0,535714286
Integration	Integration	0,788461538
Culture	Integration	0,5
Experience	Integration	0,692307692
Loyalty	Integration	0,660714286
Proposition	Integration	0,714285714
Channels	Integration	0,884615385
Innovation	Integration	0,75
IT	Integration	0,821428571
Management	Integration	0,634615385
Marketing	Integration	0,75
Network	Integration	0,727272727
Portfolio	Integration	0,7
Sales	Integration	0,732142857
360View	Culture	0,516666667
Brand	Culture	0,732142857
Integration	Culture	0,633333333
Culture	Culture	0,75
Experience	Culture	0,607142857
Loyalty	Culture	0,75

Proposition	Culture	0,75
Channels	Culture	0,678571429
Innovation	Culture	0,6875
IT	Culture	0,5625
Management	Culture	0,857142857
Marketing	Culture	0,708333333
Network	Culture	0,5
Portfolio	Culture	0,553571429
Sales	Culture	0,666666667
360View	Experience	0,821428571
Brand	Experience	0,803571429
Integration	Experience	0,807692308
Culture	Experience	0,714285714
Experience	Experience	0,857142857
Loyalty	Experience	0,892857143
Proposition	Experience	0,816666667
Channels	Experience	0,833333333
Innovation	Experience	0,767857143
IT	Experience	0,642857143
Management	Experience	0,732142857
Marketing	Experience	0,846153846
Network	Experience	0,666666667
Portfolio	Experience	0,833333333
Sales	Experience	0,785714286
360View	Loyalty	0,633333333
Brand	Loyalty	0,821428571
Integration	Loyalty	0,633333333
Culture	Loyalty	0,696428571
Experience	Loyalty	0,857142857
Loyalty	Loyalty	0,826923077
Proposition	Loyalty	0,857142857
Channels	Loyalty	0,767857143
Innovation	Loyalty	0,607142857
IT	Loyalty	0,615384615
Management	Loyalty	0,711538462
Marketing	Loyalty	0,875
Network	Loyalty	0,553571429
Portfolio	Loyalty	0,766666667
Sales	Loyalty	0,839285714
360View	Proposition	0,821428571
Brand	Proposition	0,7
Integration	Proposition	0,803571429
Culture	Proposition	0,714285714
Experience	Proposition	0,821428571
Loyalty	Proposition	0,85
Proposition	Proposition	0,846153846
Channels	Proposition	0,696428571
Innovation	Proposition	0,730769231
IT	Proposition	0,681818182
Management	Proposition	0,767857143
Marketing	Proposition	0,857142857
Network	Proposition	0,692307692
Portfolio	Proposition	0,803571429
Sales	Proposition	0,785714286
360View	Channels	0,678571429
Brand	Channels	0,633333333
Integration	Channels	0,866666667
Culture	Channels	0,625
Experience	Channels	0,653846154
Loyalty	Channels	0,708333333
Proposition	Channels	0,729166667
Channels	Channels	0,854166667

Innovation	Channels	0,8
IT	Channels	0,839285714
Management	Channels	0,653846154
Marketing	Channels	0,75
Network	Channels	0,75
Portfolio	Channels	0,642857143
Sales	Channels	0,625
360View	Innovation	0,692307692
Brand	Innovation	0,625
Integration	Innovation	0,692307692
Culture	Innovation	0,75
Experience	Innovation	0,673076923
Loyalty	Innovation	0,625
Proposition	Innovation	0,730769231
Channels	Innovation	0,846153846
Innovation	Innovation	0,895833333
IT	Innovation	0,788461538
Management	Innovation	0,857142857
Marketing	Innovation	0,730769231
Network	Innovation	0,653846154
Portfolio	Innovation	0,75
Sales	Innovation	0,571428571
360View	IT	0,6
Brand	IT	0,5
Integration	IT	0,714285714
Culture	IT	0,666666667
Experience	IT	0,604166667
Loyalty	IT	0,403846154
Proposition	IT	0,604166667
Channels	IT	0,807692308
Innovation	IT	0,826923077
IT	IT	0,895833333
Management	IT	0,6875
Marketing	IT	0,615384615
Network	IT	0,666666667
Portfolio	IT	0,5
Sales	IT	0,541666667
360View	Management	0,696428571
Brand	Management	0,642857143
Integration	Management	0,660714286
Culture	Management	0,846153846
Experience	Management	0,634615385
Loyalty	Management	0,673076923
Proposition	Management	0,730769231
Channels	Management	0,714285714
Innovation	Management	0,75
IT	Management	0,75
Management	Management	0,85
Marketing	Management	0,767857143
Network	Management	0,678571429
Portfolio	Management	0,6
Sales	Management	0,714285714
360View	Marketing	0,733333333
Brand	Marketing	0,733333333
Integration	Marketing	0,75
Culture	Marketing	0,660714286
Experience	Marketing	0,653846154
Loyalty	Marketing	0,729166667
Proposition	Marketing	0,788461538
Channels	Marketing	0,788461538
Innovation	Marketing	0,788461538
IT	Marketing	0,634615385

Management	Marketing	0,895833333
Marketing	Marketing	0,916666667
Network	Marketing	0,607142857
Portfolio	Marketing	0,783333333
Sales	Marketing	0,839285714
360View	Network	0,535714286
Brand	Network	0,416666667
Integration	Network	0,625
Culture	Network	0,5
Experience	Network	0,520833333
Loyalty	Network	0,5
Proposition	Network	0,520833333
Channels	Network	0,636363636
Innovation	Network	0,583333333
IT	Network	0,634615385
Management	Network	0,576923077
Marketing	Network	0,596153846
Network	Network	0,875
Portfolio	Network	0,6
Sales	Network	0,480769231
360View	Portfolio	0,589285714
Brand	Portfolio	0,660714286
Integration	Portfolio	0,538461538
Culture	Portfolio	0,535714286
Experience	Portfolio	0,634615385
Loyalty	Portfolio	0,625
Proposition	Portfolio	0,708333333
Channels	Portfolio	0,557692308
Innovation	Portfolio	0,727272727
IT	Portfolio	0,541666667
Management	Portfolio	0,730769231
Marketing	Portfolio	0,788461538
Network	Portfolio	0,535714286
Portfolio	Portfolio	0,839285714
Sales	Portfolio	0,716666667
360View	Sales	0,65
Brand	Sales	0,733333333
Integration	Sales	0,730769231
Culture	Sales	0,696428571
Experience	Sales	0,75
Loyalty	Sales	0,791666667
Proposition	Sales	0,8125
Channels	Sales	0,75
Innovation	Sales	0,692307692
IT	Sales	0,596153846
Management	Sales	0,875
Marketing	Sales	0,807692308
Network	Sales	0,5625
Portfolio	Sales	0,75
Sales	Sales	0,884615385
360View	Omnichannel	0,866666667
Brand	Omnichannel	0,633333333
Integration	Omnichannel	0,9
Culture	Omnichannel	0,816666667
Experience	Omnichannel	0,9
Loyalty	Omnichannel	0,783333333
Proposition	Omnichannel	0,883333333
Channels	Omnichannel	0,883333333
Innovation	Omnichannel	0,816666667
IT	Omnichannel	0,716666667
Management	Omnichannel	0,875
Marketing	Omnichannel	0,857142857

Network	Omnichannel	0,714285714
Portfolio	Omnichannel	0,75
Sales	Omnichannel	0,821428571

7.1.2 vertices.dat

name	label	type	id	
Agreements	AG	constraint	1	
Maturity	MT	constraint	2	
Approach	AP	constraint	3	
Knowledge	KN	constraint	4	
HHRR	HR	constraint	5	
Finance	FI	constraint	6	
Technology	TE	constraint	7	
Stakeholders	ST	constraint	8	
Costs	CO	constraint	9	
Transformation	TR	constraint	10	
360View	VI	valuerepo	11	
Brand	BR	valuerepo	12	
Integration	IN	valuerepo	13	
Culture	CU	valuerepo	14	
Experience	EX	valuerepo	15	
Loyalty	LO	valuerepo	16	
Proposition	PR	valuerepo	17	
Channels	CH	valuerepo	18	
Innovation	IV	valuerepo	19	
IT	IT	valuerepo	20	
Management	MG	valuerepo	21	
Marketing	MK	valuerepo	22	
Network	NT	valuerepo	23	
Portfolio	PF	valuerepo	24	
Sales	SA	valuerepo	25	
Omnichannel	OM	om	26	

7.2 R code for reproducible research

7.2.1 Hierarchical clustering

```
library(igraph)
library(sna)
library(network)
library(ape)

edgesraw <- read.table("edgespanel3.dat", header=TRUE, sep="\t")
verticesraw <- read.table("vertices.dat", header=TRUE, sep="\t")

edgespanel <- edgesraw[151:375,]
vertices <- verticesraw[11:25,]

# make edges weights as numeric
edgespanel$weight <- as.numeric(as.character(sub("," , ".", edgespanel$weight)))

# make a data frame with the edges and vertices attributes
paneldata.g <- graph.data.frame(edgespanel, directed= "TRUE", vertices= vertices)

# delete edges with weight<0.5
panel.m <- delete_edges(paneldata.g, which(E(paneldata.g)$weight <=0.5 ))
```

```
# delete edges with weight<0.75
panel.g <- delete_edges(paneldata.g, which(E(paneldata.g)$weight <=0.75 ))

# Fast agglomerative hierarchical clustering algorithm
panel.und <- as.undirected(panel.g)
panel.agc <- fastgreedy.community(panel.und)
length(panel.agc)

## [1] 5

sizes(panel.agc)

## Community sizes
## 1 2 3 4 5
## 7 4 2 1 1

membership(panel.agc)

##    360View      Brand Integration     Culture  Experience
##          4          1          2          3          1
##    Loyalty Proposition    Channels  Innovation         IT
##          1          1          2          2          2
## Management   Marketing     Network   Portfolio       Sales
##          3          1          5          1          1

# Just the strong and very strong ones
panel.undm <- as.undirected(panel.m)
panel.agcm <- fastgreedy.community(panel.undm)
length(panel.agcm)

## [1] 2

sizes(panel.agcm)

## Community sizes
## 1 2
## 9 6

membership(panel.agcm)

##    360View      Brand Integration     Culture  Experience
##          2          1          2          1          1
##    Loyalty Proposition    Channels  Innovation         IT
##          1          1          2          2          2
## Management   Marketing     Network   Portfolio       Sales
##          1          1          2          1          1

plot(panel.agc, panel.g, edge.arrow.size=0.2)
plot(panel.agcm, panel.m, edge.arrow.size=0.2)
plot(panel.agct, paneldata.g, edge.arrow.size=0.2)

# Corresponding dendrogram for this partitioning
dendPlot(panel.agc, mode= "phylo")
```

7.2.2 Eigen Centrality

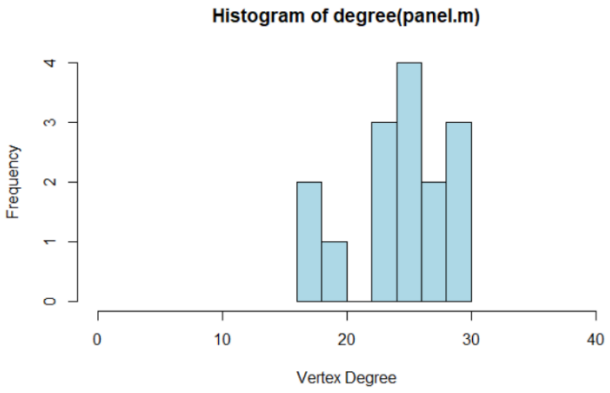
```
library(igraph)
library(sna)
library(network)
library(ape)

# load data
edgespanel <- read.table("edgespanel3.dat", header=TRUE, sep="\t")
vertices <- read.table("vertices.dat", header=TRUE, sep="\t")

# make edges weights as numeric
edgespanel$weight <- as.numeric(as.character(sub("," , ".", edgespanel$weight)))

# make a data frame with the edges and vertices attributes
paneldata.g <- graph.data.frame(edgespanel[151:375,], directed= "TRUE", vertices= vertices[11:25,])

# eigen_centrality
eigen_centrality(paneldata.g, directed= TRUE, scale= TRUE, weights = NULL)

# $vector
#    360View       Brand Integration     Culture  Experience
#  0.9387270   0.8187286   0.8989344   0.8415103   1.0000000
#    Loyalty Proposition    Channels  Innovation          IT
#  0.9375863   0.9786971   0.9094071   0.9160369   0.8086611
# Management   Marketing     Network   Portfolio       Sales
#  0.9019415   0.9557928   0.7183488   0.8220118   0.9386999

#$value
#[1] 10.60132

#$options
#$options#$bmat
#[1] "I"

#$options#$n
#[1] 15

#$options#$which
#[1] "LR"

#$options#$nev
#[1] 1

#$options#$tol
#[1] 0

#$options#$ncv
#[1] 0

#$options#$ldv
#[1] 0

#$options#$ishift
#[1] 1

#$options#$maxiter
#[1] 1000

#$options#$nb
#[1] 1
```

```
#$options#$mode
#[1] 1

#$options#$start
#[1] 1

#$options#$sigma
#[1] 0

#$options#$sigmai
#[1] 0

#$options#$info
#[1] 0

#$options#$iter
#[1] 2

#$options#$nconv
#[1] 1

#$options#$numop
#[1] 11

#$options#$numopb
#[1] 0

#$options#$numreo
#[1] 10
```

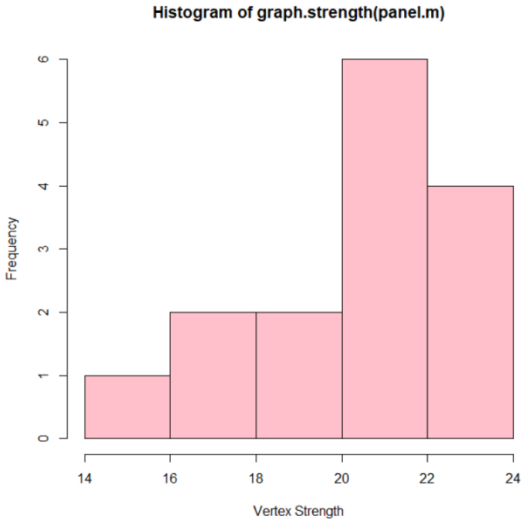
7.2.3 Topological network complexity methods

```
library(FCMapper)
library(igraph)
library(sna)

edgesraw<- read.table("edgespanel3.dat", header=TRUE, sep="\t")
verticesraw<- read.table("vertices.dat", header=TRUE, sep="\t")

edgespanel <- edgesraw[151:375,]
vertices <- verticesraw[11:25,]

# make edges weights as numeric
edgespanel$weight <- as.numeric(as.character(sub("," , ".", edgespanel$weight)))

# make a data frame with the edges and vertices attributes
paneldata.g <- graph.data.frame(edgespanel, directed= "TRUE", vertices= vertices)

# delete edges with weight<0.5
panel.m <- delete_edges(paneldata.g, which(E(paneldata.g)$weight <=0.5 ))

##########################################
# Basic Network Metrics
##########################################
## Panel.m
```

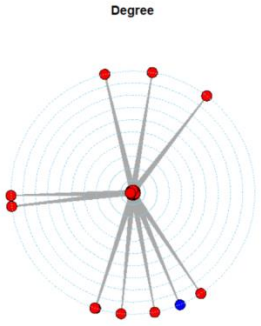
```
is.simple(panel.m)
## [1] FALSE

igraph::is.connected(panel.m)
## [1] TRUE

igraph::is.connected(panel.m, "weak") # see clusters
## [1] TRUE

igraph::is.connected(panel.m, "strong") # see clusters
## [1] TRUE

diameter(panel.m, directed = TRUE)
## [1] 1.435714

##########################################
# Vertex Degree
##########################################
# Group of vertices by degree
degree(panel.m)

##    360View      Brand Integration     Culture  Experience
##         24         17         23         27         29
##    Loyalty Proposition    Channels  Innovation         IT
##         26         29         26         28         24
## Management   Marketing     Network   Portfolio       Sales
##         30         26         17         25         19

hist(degree(panel.m), col="lightblue", xlim=c(0,40), xlab="Vertex Degree")
```




```
mean(igraph::degree(panel.m))
## [1] 28.53333

hist(graph.strength(panel.m), col="pink", xlab="Vertex Strength")
```

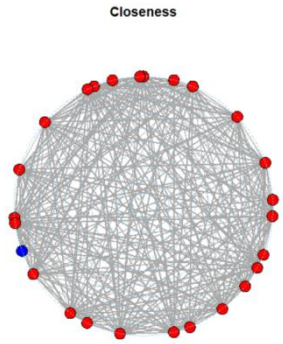



```
##########################################
# Vertex Centrality
##########################################
# Number of clusters found
panel.sccm <- clusters(panel.m, mode=c("strong"))
table(panel.sccm$size)

## < table of extent 0 >

# Number of neighbors per a concrete vertex
neighbors(panel.m,5)

## + 15/15 vertices, named, from 45842a6:
##  [1] 360View     Brand       Integration Culture     Experience
##  [6] Loyalty     Proposition Channels    Innovation  IT
## [11] Management  Marketing   Network     Portfolio   Sales

# Adjacecny Matrix
adj_mat <- read.table("edgespanel_adjacency.dat", header=TRUE, sep="\t")

# Vertex centrality by degree
central.panel.t <- network::as.network.matrix(adj_mat,matrix.type="adjacency")
gplot.target(central.panel.t,  degree(central.panel.t),  main="Degree",  circ.lab=  FALSE,  circ.col="skyblue",
usearrows = FALSE, vertex.col=c("blue", rep("red", 32), "yellow"), edge.col="darkgray")
```

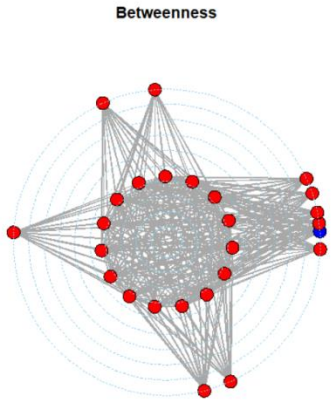



```
# Vertex centrality by closeness
```

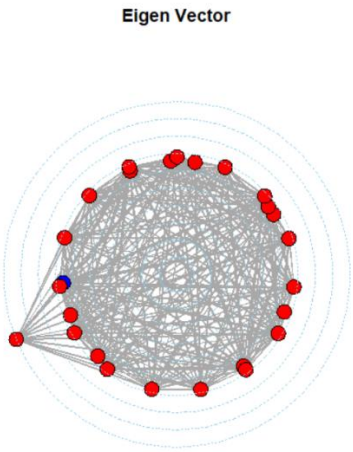
```
gplot.target(central.panel.t, closeness(central.panel.t), main="Closeness", circ.lab= FALSE, circ.col="skyblue", usearrows = FALSE, vertex.col =c("blue", rep("red", 32), "yellow"), edge.col="darkgray")
```




```
# Vertex centrality by betweenness
gplot.target(central.panel.t, betweenness(central.panel.t), main="Betweenness", circ.lab= FALSE, circ.col="skyblue", usearrows = FALSE, vertex.col=c("blue", rep("red", 32), "yellow"), edge.col="darkgray")
```

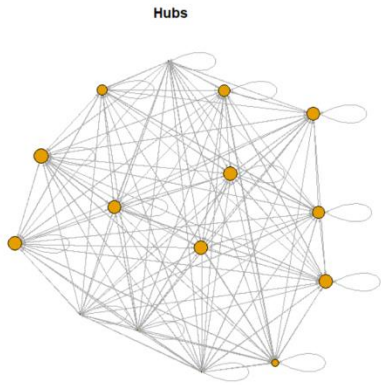



```
# Vertex centrality by eigenvector
gplot.target(central.panel.t, evcent(central.panel.t), main="Eigen Vector", circ.lab= FALSE, circ.col="skyblue", usearrows = FALSE, vertex.col =c("blue", rep("red", 32), "yellow"), edge.col="darkgray")
```

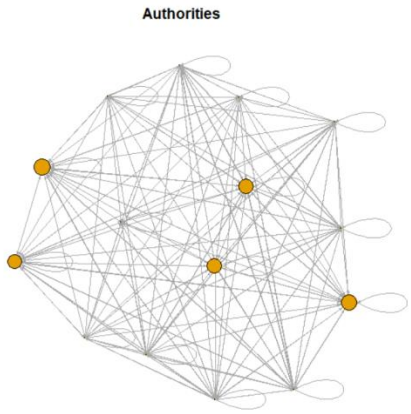



```
# Hubs and Authorities
```

```
lm <- layout.kamada.kawai(panel.m)
plot(panel.m, layout=lm, edge.arrow.size=0.2, main="Hubs", vertex.label= "", vertex.size=10 * sqrt(hub.score(panel.g)$vector))
```




```
plot(panel.m, layout=lm, edge.arrow.size=0.2, main="Authorities", vertex.label="", vertex.size=10 *sqrt(authority.score(panel.g)$vector))
```




```
##########################################
# Edges characteristics
##########################################
# Edge betweennnes centrality
edgebtwm <- edge.betweenness(panel.m)
E(panel.m)[order(edgebtwm, decreasing=T)[1:10]]

## + 10/214 edges from 718d094 (vertex names):
##  [1] 360View   ->IT          Brand     ->360View
##  [3] Network   ->Brand       360View   ->Network
##  [5] Innovation->Network     Culture   ->360View
##  [7] Loyalty   ->360View     Portfolio ->360View
##  [9] Culture   ->Brand       Brand     ->Integration

##########################################
# Network cohesion
##########################################
# Census of cliques
table(sapply(cliques(panel.m), length)) # how structured the graph is

##  1   2   3   4   5   6   7   8   9  10  11  12  13
```

```
##  15  103  429 1210 2442 3630 4026 3333 2035  891  265   48    4

cliques(panel.m)[sapply(cliques(panel.m), length) == 10]
clique.number(panel.m) # the size of the largest clique

## [1] 13

# Maximal cliques
table(sapply(maximal.cliques(panel.m), length)) # a clique that is not a subset of a larger clique

## 13
## 4

# Census of dyads and triads
panel.m<- simplify(panel.m)
dyad_census(panel.m) # match this analysis with that of hubs and authorities

## $mut
## [1] 96
##
## $asym
## [1] 7
##
## $null
## [1] 2

# Motifs
graph.motifs(panel.m, size=3) #small connected subgraphs of interest

## [1]  NA  NA   0  NA   0   6   0   0   4   2  18   0   2   1  69 353

# Transitivity
transitivity(panel.m) #measure of global clustering, relative frequency with which connected triples close to form triangles

## [1] 0.980198

# Reciprocity
reciprocity(panel.m, mode="default") # match this result with that of d yad census

## [1] 0.9648241

reciprocity(panel.m, mode="ratio")

## [1] 0.9320388

########################################
# Connectivity
########################################
# Census of all connected components within the graph
comps <- decompose.graph(panel.m) # see giant components
table(sapply(comps, vcount))

##
## 15
##  1

# Further analysis of giant component, check for small world properties
panel.mc <- decompose.graph(panel.m)[[1]]
average.path.length(panel.mc) # the shortest path distance between pairs of vertices is quite small

## [1] 1.052381
```

```
diameter(panel.mc) # the clustering is relatively high, check for i.e. transitivity

## [1] 1.329167

# Vertex and edge (high/low) connectivity
vertex.connectivity(panel.mc) # it requires the removal of .. vertex/ed ge to break this subgraph into additional components

## [1] 7

edge.connectivity(panel.mc)

## [1] 7

# Indentify Vertex-cut or edge-cut, thus if the network is vulnerable
panel.cut.vertices <- articulation.points(panel.mc)
length(panel.cut.vertices)

## [1] 0

########################################
# Assortativity
########################################
# degree-degree correlation of adjacent vertices
assortativity.degree(panel.m) # match this analysis with that of vertex centrality

## [1] -0.209837
```

7.2.4 Code for Fuzzy Cognitive Map

```
# load libraries
library(igraph)
library(FCMapper)

# load and read data
edgespanel <- read.table("edgespanel3.dat", header=TRUE, sep="\t")
vertices <- read.table("vertices.dat", header=TRUE, sep="\t")
edgespanel$weightws <- as.numeric(as.character(sub("," , ".", edgespanel$weight)))

# igraph data frame with the edges and vertices attributes
panel.g <- graph.data.frame(edgespanel, directed= "TRUE", vertices=vertices)

# adjacency matrix
edgespanel.adj <- as_adjacency_matrix(panel.g, attr = "weightws")
edgespanel.m <- as.matrix(edgespanel.adj)
diag(edgespanel.m) <- 1 #condition for Stylios Type II FCM

# save adjacency matrix to paste in document #
write.csv(edgespanel.m, file = "./FCM_adjmatrix.csv")
dimnames(edgespanel.m) <- NULL

# pass adj matrix to check.matrix
check.matrix(edgespanel.m)

## [1] "Matrix is square."
## [1] "All values of the matrix are within -1 and 1."
## [1] "The diagonal is not equal to 0 (ie, there is a self-loop). Consider whether this is appropriate."

# set parameters for simulation scenario
```

```
concept.names <- vertices$name

#####################################################
# Scenarios Settings
#####################################################
iter = 30
lambda <- 0.2
w <- edgespanel.m
act_vector <- matrix(0, nrow = iter, ncol = length(w[1,]))
act_vector[1,] <- rep(0.5, 26)

#Scenario 1
#set.concepts <- c("Approach", "Costs", "Transformation")
#set.values <- c(-0.9, -0.9, -0.9)

#Scenario 2
#set.concepts = c("360View", "Proposition", "Portfolio", "Channels")
#set.values = c(0.95, 0.95, 0.95, 0.95)

#Scenario 3
set.concepts = c("Experience", "Proposition", "Marketing", "360View")
set.values = c(0.95, 0.95, 0.95, 0.95)

# Just for Scenarios
#act_vector[1,which(concept.names %in% set.concepts == TRUE)] = set.values

#####################################################
# FCM Inference Engine with Hebbian Learning Rule
#####################################################
alfa <- 0.1

for (k in 2:iter) {
        act_vector[k, ] = 1/(1 + exp(-lambda * (act_vector[k - 1,] %*% w)))

        for (i in 1:length(w[1,])) {
                for (j in 1:length(w[1,])) {
                        if (i == j) {
                                dw <- 0
                        } else {
                                dci <- act_vector[i+1] - act_vector[i]
                                dcj <- act_vector[j+1] - act_vector[j]
                                if (dci * dcj > 0) {
                                        dw <- dci * dcj
                                } else {
                                        dw <- 0
                                }
                        }
                        w[i,j] <- w[i,j] + alfa* dw
                }
        }

# Just for Scenarios
#act_vector[k, which(concept.names %in% set.concepts == TRUE)] = set.values

}

# FCM outcome stability check
if (all.equal(act_vector[iter,], act_vector[iter-1,]) != TRUE) {
        print("WARNING: Convergence not reached. Try increasing the number of iterations.")
}

# FCM outcome data frame
```

```
results = data.frame(concept.names, act_vector[iter, ])
colnames(results) = c("Concept", "Equilibrium_value")
results

# plot results
plot(act_vector[, 1] ~ seq(1, iter, 1), type = "n", ylim = c(-0.15, 1), xlab = "Time Step", ylab = "Value of Omnichannel Management component")

for (n in 1:length(w[1, ])) {
        points(act_vector[, n] ~ seq(1, iter, 1), type = "l", col = n)
}

legend("bottom", legend = concept.names, cex = 0.7, col = seq(1, n, 1), lty= 1, lwd=1.5, ncol=6, bty= "n", text.width=c(2.2,2.2,2.2,2.2))
```

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CHAPTER 3: Digitalization in B2B Marketing. Omnichannel Management from a PLS-SEM approach

(Journal of Business & Industrial Marketing)

Digitalization in B2B Marketing. Omnichannel Management from a PLS-SEM approach

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Abstract

Purpose – The objective of this research is to establish a reference model that will allow us to understand the factors that influence the omnichannel management of an organization in a B2B context.

Design/methodology/approach - In building the model, a PLS-SEM approach was followed. More than 1,000 executives with a C-level profile (CEO, CMO or CDO),

from manufacturers and wholesalers, in various industries worldwide were contacted. The final sample consisted of 124 C-level executives in multinational B2B companies from 35 countries worldwide.

Findings **-** The principal finding is that optimal omnichannel management must involve a customer-centric proposition forming the basis for individualized marketing that tailors the company's portfolio of solutions to suit each client. To ensure this, customer knowledge at each touchpoint is essential. The results show that the main predictor of B2B omnichannel management is sales and marketing, even above channels. The principal conclusions are that the model shows that good omnichannel performance is measured by the performance of the industrial buyer. Loyalty and experience are primary measures of this customer's performance.

Originality **–** Research into omnichannel management in the B2B field is scarce, especially concerning the creation of models for decision-making.

Keywords: Omnichannel management; Business-to-business; Digitalization; Industrial buyer; Loyalty; Customer experience.

1 Introduction

Omnichannel management has been defined (Verhoef et al., 2015) as:

> *the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized*

This synergistic management is what differentiates an omnichannel strategy from multichannel management. The omnichannel strategy has been boosted by the latest technological advances that provide precise information, at each moment and for each channel, of each client's context. The corporation's value proposition can therefore be adapted within a specific channel and at a specific time (Cai & Lo, 2020). This paper, however, focuses on omnichannel management in the B2B sphere, i.e. on the concept of industrial client, professional buyer, or procurement officer (Alonso-Garcia et al., 2021a; Hadjikhani & LaPlaca, 2013; Mudambi, 2002). As stated in the literature review section, few papers cover the B2B field (Alonso-Garcia et al., 2021b), so the models that have already been published to aid omnichannel decision-making do so from a retail point of view. We have no reference models to use in establishing the success factors for omnichannel implementation. There are thus elements of B2B firms that have an impact on this omnichannel management and that have not been taken into account in the published models that refer to the retail industry. For example, a wholesaler's traditional sales force is a characteristic element of an industrial customer's B2B experience. Likewise, a manufacturer's distribution network is a variable that has not been taken into account in the omnichannel management models published to date, because such networks are typical of the B2B sphere (Hoehle et al., 2018; Hoogveld & Koster, 2016; Hossain et al., 2020; Shen et al., 2018). The objective of this research is to remedy this lack of research by establishing a reference model that will allow us to understand the factors influencing an organization's omnichannel management in a B2B context. This model may therefore serve as a guide to identifying

the key aspects that should be developed to ensure optimal management. The questions to resolve are, therefore:

- What are the principal predictive variables for omnichannel management in the B2B sphere?
- What is the importance of adopting new digital channels and their integration with the other channels through which the company provides its services and/or sells its products?
- What are the measurement variables that determine omnichannel management in B2B?

2 Theory and hypotheses

To ensure a relevant theoretical background, we can base our work on two lines of research. On the one hand, we can infer behaviors in a digital channel in B2B from papers on e-commerce in that field (Power, 2005). And on the other, the many papers on omnichannel management in the context of the retail sector are relevant (Ho et al., 2021). While these two lines of research do not fully match the fundamental objective of this paper, they do establish preliminary bases for the model.

2.1 B2B e-Commerce

There has been extensive research into digital channels in the B2B field, from the e-commerce perspective, as is reflected in the literature. In fact, this is a constantly developing area. There are therefore numerous literature reviews in this sphere in general (Herhausen et al., 2020; Leek & Christodoulides, 2011; Pandey et al., 2020;

Paris et al., 2016), and particularly in the more specific research areas, such as channels (Dwivedi et al., 2021; Müller et al., 2018), or industries (Buratti et al., 2018; Chirumalla et al., 2018; Fauska et al., 2013; Rose et al., 2021). Research into the implementation of e-commerce can therefore be considered relevant for omnichannel research. Although these are papers that focus more on multichannel research than omnichannel management, there are some in the B2B field that deal with the effects of the adoption of digital channels on traditional physical channels and the company's general performance, and these studies are relevant (Bakri et al., 2010; Leek & Christodoulides, 2011; Lorca et al., 2019; Mudambi, 2002; Rajamma et al., 2011; Yuan et al., 2021). Table I below gathers the most relevant papers in B2B by area of interest according to the most recent literature review (Herhausen et al., 2020; Kittur et al., 2021; Pandey et al., 2020). Those related to some topic within omnichannel have been selected.

Table I. Most relevant work in B2B

Topic	Sources
Customer Loyalty	(Kwiatek et al., 2020; Lam et al., 2004; Ramaseshan et al., 2013; Sirdeshmukh et al., 2002; Uncles et al., 2003; Verhoef, 2003)
Multichannel management	(Järvinen et al., 2012; Kabadayi et al., 2007; Long et al., 2007; Osmonbekov et al., 2009)
Performance	(Agustin & Singh, 2005; Bakri et al., 2010; Lorca et al., 2019; Müller et al., 2018; Ulaga, 2003; Yuan et al., 2021)
Relationship management	(Agnihotri et al., 2017; Keramati et al., 2010; Rajamma et al., 2011; Rauyruen & Miller, 2007; Ruiz-Martínez et al., 2019)

Sales Management	(Guesalaga, 2016; Li et al., 2018; Marcos Cuevas, 2018; Pandey, 2015; Rollins, Nickell, & Wei, 2014)
Strategies & Branding Positioning	(Brown et al., 2011; Buratti et al., 2018; Chirumalla et al., 2018; Dwivedi et al., 2021; Fauska et al., 2013; Leek & Christodoulides, 2011; Mudambi, 2002; Rose et al., 2021; Sheth & Sinha, 2015)
Technologies & Innovation	(Boyd & Koles, 2019; Gordini & Veglio, 2017; Grewal et al., 2001; Shaltoni, 2017; Suppatvech et al., 2019; Veldeman et al., 2017)

2.2 Retail omnichannel management

Omnichannel management has been studied to a great extent in the retail field, with a special focus on the integration of digital channels with physical stores (Cao et al., 2016; Gao & Su, 2017; Harsha et al., 2019). Omnichannel management is a research field of growing interest. In the scientific literature, we find literature review papers that establish the bridge between e-Commerce and multichannel management, on the one hand, and omnichannel management, on the other (Beck & Rygl, 2015; Trenz, 2015; Verhoef et al., 2015). Within omnichannel management itself, as indicated above, research in the B2B field is still limited (Alonso-Garcia et al., 2021a; Kembro et al. , 2018). In this area, we would highlight the papers that refer to specific case studies of manufacturers or wholesalers (Hansen & Sia, 2015; Saghiri et al., 2017). The paucity of relevant research in the B2B field is shown by the multiple literature review papers, which, however, restrict their review to the retail field (Cai & Lo, 2020; Galipoglu et

al., 2018; Lazaris & Vrechopoulos, 2013; Melacini et al., 2018; Mirsch, Lehrer, & Jung, 2016; Simone & Sabbadin, 2017).

However, these are the models that are applicable to the scope of this work and have already been identified in this field, although they are in the retail industry. These studies have been taken into account in identifying the constructs to be used in the model used in this research, because they have models that are directly applicable in omnichannel management. This is due to their research on channels (Shen et al., 2018), processes (Hoogveld & Koster, 2016; Hossain et al., 2020), or some aspect of customer performance defined later in this paper (Hoehle et al., 2018). Table II shows the most relevant papers in omnichannel management according to recent literature review (Cai & Lo, 2020; Galipoglu et al., 2018; Mirsch et al., 2016).

Table II. Most relevant work in omnichannel management

Topic	**Sources**
Consumer behavior and preferences	(B. Chen & Chen, 2017; Chiu & Lin, 2016; Chou et al., 2016; Flavián, Gurrea, & Orús, 2016; Grewal et al., 2017; Pantano & Viassone, 2014; Shen et al., 2018; Xu et al., 2017)
Logistics	(Bernon et al., 2016; Castillo, Bell et al., 2018; Galipoglu et al., 2018; Hübner et al., 2016; Hübner et al., 2016; Ishfaq et al., 2016; Ishfaq & Raja, 2018; Kembro et al., 2018; Lim & Srai, 2018; Marchet et al., 2018; Melacini et al., 2018; Wollenburg et al., 2018)

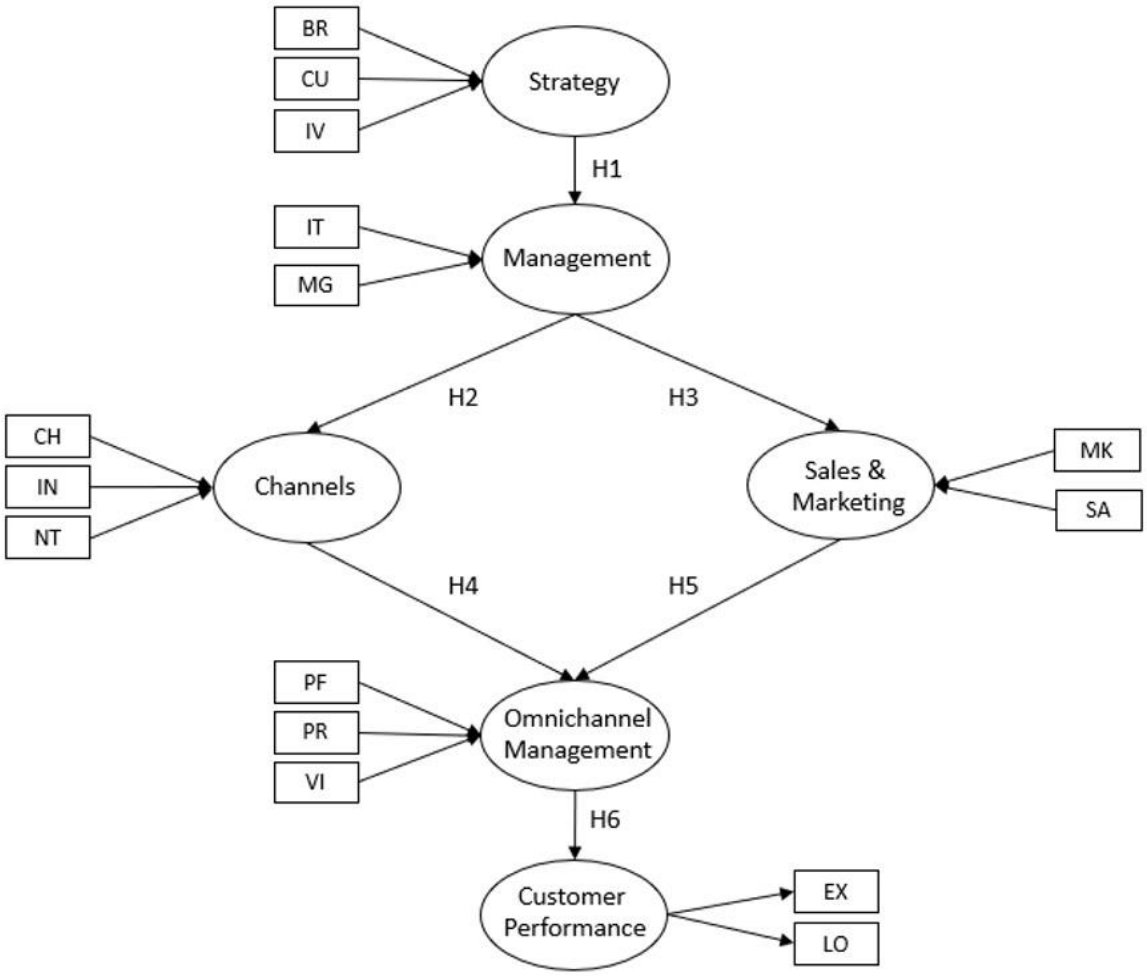
Marketing	(Hilken, de Ruyter, Chylinski et al., 2017; Hoehle et al., 2018; Pauwels & Neslin, 2015; Verhoef, Neslin, & Vroomen, 2007; Verhoef et al., 2017)
Omnichannel management	(Avery et al., 2013; Breugelmans & Campo, 2016; Brynjolfsson et al., 2013; Bell et al., 2014; Gallino et al., 2017; Gao & Su, 2017; R. Hansen & Sia, 2015; Herhausen et al., 2015; Kireyev et al., 2017; Piotrowicz & Cuthbertson, 2014; Verhoef et al., 2015; Weinberg et al., 2007)
Strategy	(Ailawadi & Farris, 2017; Beck & Rygl, 2015; L. Cao, 2014; L. Cao & Li, 2015; Lapoule & Colla, 2016; Pauwels & Neslin, 2015; Rigby, 2011; Zhang et al., 2016)

In addition to the review of the literature, a previous work has been carried out to discover the identifiers that are part of the constructs of the model. As detailed later in the material and methods section, a Delphi process was carried out with a panel of experts to reach a consensus on the indicators that should be part of the model. The relationship of these indicators with the latent variables and the resulting model has been made based on a review of the published literature as detailed in the following sections.

Figure 1 shows the conceptual model proposed, with each construct, its dimensions, and the hypotheses to be tested. Omnichannel management seeks to maximize the company's profit, but it does so by improving the customer experience and/or increasing

customer loyalty, in such a way that both variables generate a greater volume and recurrence of purchases (Chaffey, 2010).

Figure 1. Conceptual model and hypotheses



2.3 Strategy

The B2B literature states that, for good performance in the B2B sphere, strategy and prudent change management must prevail if significant business benefits are to be expected. Profit will mainly be determined by formulating an *effective strategy*

formulation (Power, 2005). Similarly, Omnichannel papers point out that taking advantage of new opportunities implies facing challenges and *rethinking their competitive strategies* (Brynjolfsson et al., 2013). It is one of the models that a company can adopt to carry out a digital transformation, but given the nature of the transformation, this requires a long-term strategy. Digital transformation eliminates traditional business models and strategies and, at the same time, adds considerable value to all areas of the company (Fernández-Rovira et al., 2021; Simone & Sabbadin, 2017). The strategy to be followed will therefore be one of the most important variables that precede the impact on the rest of the model.

Regarding *brand strategy [BR]*, in omnichannel literature, as the channels are managed jointly, the customer tends to perceive the brand more than the channel (Piotrowicz & Cuthbertson, 2014). In fact, one of the main differences between omnichannel management and traditional multichannel strategy is the focus on the brand (Verhoef et al., 2015). Therefore, in omnichannel, brand and channel are closely related (Neslin et al., 2014). Moreover, each customer touch point can affect the performance of retailers and brands (Baxendale et al., 2015). In the B2B literature, the impact of the brand on the perceived value to the customer has been considered, as well as the concept of the brand or corporate reputation (Hansen et al. 2008). Therefore, brand strategy is incorporated as an element of the omnichannel management model, within the strategy construct.

As for the *innovation strategy [IV]*, this variable is present in research linked to the B2B sphere, as an element to be considered in the process of digitalizing companies (Markovic et al., 2021; Obal & Lancioni, 2013; Tsai et al., 2013). Likewise, in the

omnichannel field, retailers establish strategies that include applying digital and physical innovations (Simone & Sabbadin, 2017). There are several drivers of innovation for channel marketing, and all of them are applicable to an omnichannel approach: innovation in processes (services and distribution formats); in relations with the channel and the consumer; and organizational innovation (Musso, 2010).

The third measure of the strategy construct is *corporate culture [CU]*. The customer engagement pursued by omnichannel management must be based on corporate culture – in fact, this must be one of its main tenets (Grewal et al., 2017). Omnichannel management seeks to create greater value for the customer (Larke et al., 2018), which usually implies changes in the culture of the company (Guenzi & Troilo, 2007). Multichannel management already implied a cultural change in traditional companies (Chaffey, 2010; Lewis et al. 2014), and omnichannel management implies an even more pronounced cultural change, since when organizational silos by channel are abandoned, the company must undertake cultural change (Cao, 2014). Based on the lessons learned in companies that implement a digitalization strategy and, in particular, an omnichannel management strategy, changes in culture and mindset are essential for success (Hansen & Sia, 2015; Ritala et al., 2021).

The measures collected in this construct have been related to each other in multiple papers. For example, organizational culture and strategic management have been shown as impact variables for organizational excellence or business performance. In these models, innovation is an impact indicator (Alhefiti et al., 2019; Lončar, 2017). Similarly, innovation and organizational culture are key elements of impact on the

brand's own strategy (de Oliveira et al., 2018; O'Cass & Viet Ngo, 2007). The model collects these indicators as formative since it is assumed that the construct is expressed in terms of the manifest variables, that is, the indicators form, cause or precede the construct. The model does not expect a correlation between. A high value in terms of innovation strategy does not necessarily have to imply a high value in brand strategy or corporate culture.

There are several studies that have demonstrated the impact of strategy on various dimensions of corporate management. Especially regarding leadership in management as collected in the following construct "Management" (Kohlbacher et al., 2011; Kotler & Pfoertsch, 2007; Marx, 2015). The adoption of an omnichannel strategy implies a transformation of the company in which the mindset of the organization towards a new customer-centric process and the way in which innovation can be applied in the corporation will be key in the final performance. In addition, the new management processes must respect the boundaries already established in terms of brand strategy. Therefore, the authors argue that the brand and innovation strategy, as well as the organizational culture, establish the management framework of an omnichannel organization. Thus, this research hypothesizes that:

Hypothesis 1 (H1). Strategy (as it has been defined above) has a positive effect on management in an omnichannel B2B company.

2.4 Management

From the indicators identified by the panel of experts, two are involved in the "management" construct of the model and therefore in daily operations: IT management and the leadership of the management team. Both are fundamental to the digitalization processes employed by companies (Annarelli et al., 2021).

In regard to *IT Management [IT]*, it is technology that has driven and makes omnichannel "inevitable" (Brynjolfsson, Hu, & Rhaman, 2013; Simone & Sabbadin, 2017; Verhoef et al., 2017). Therefore, from a management point of view, IT management becomes essential in this type of strategy. These include augmented reality (Hilken et al., 2017), big data (Lehrer et al., 2018), and artificial intelligence (Betzing et al., 2018). In order to develop the company's digital transformation, the IT manager (CIO) evolves into the new role of Chief Digital Officer, with greater responsibility and collaboration with the company's other areas (Hansen & Sia, 2015).

Regarding *leadership in management [MG]*, senior-level leadership is required in every transformation (Chaffey, 2010). The multi-channel papers already included the importance of the management team in preventing the effects of cross-channel cannibalization (Cai & Lo, 2020). Similarly, omnichannel and B2B literature highlights the importance of commitment from both employees and the management team for positive results to be obtained (Hoogveld & Koster, 2016; Ruiz-Alba et al., 2019; Simone & Sabbadin, 2017). Leadership in an omnichannel strategy must especially be orientated to training and motivating employees to achieve results and performance (Grewal et al., 2017; Schwarzmüller et al., 2018). Since management involvement is so

important for success, lack of attention from management is also one of the main causes of failure (Wollenburg et al., 2018).

New technologies are key in omnichannel management. This fact reinforces that the management construct adds IT management to management leadership. Actually, given the incipient weight of new technologies, recent research has been published that considers IT management as a key element in management decision-making for any type of corporation (Harguem, 2021; Reichstein, 2019; Santos Castellanos, 2021). As in the strategy construct, the model assumes that of management with formative indicators. That is, again, both indicators form the construct and are not correlated with each other.

The management thus considered has a direct impact on the decision of the channels. That is, how many and what digital channels should be added to the organization's offer; in what phase and with what degree of integration; and how it should affect the traditional channels represented by the distribution chain of the manufacturer or distributor. These decisions and the daily management of the channels will determine the performance of the company in terms of omnichannel (Kersmark & Staflund, 2015). Thus, relevant published research already shows how both digital channels, such as integration and the distribution network, impact the performance of the company and how decision-making impacts in turn on these channels (Straker et al., 2015), or the level of integration, respectively (L. Cao & Li, 2015). Thus, this research hypothesizes that:

Hypothesis 2 (H2). Management has a direct and positive impact on the channels through which services are provided.

In the same way, the leadership in management and the digital tools provided to the sales and marketing team will largely define the management of these specific areas. Leadership in management and new digital tools impact the management of the sales force in a field of digital transformation (Wengler et al., 2021). Furthermore, this management influence and the new digital tools have a positive impact on marketing management, thanks to a much more enriched and contextualized customer information, which allows predictive and real-time models (Fernández-Rovira et al., 2021). Therefore, this research also hypothesizes that:

Hypothesis 3 (H3). Management has a direct and positive impact on sales and marketing management in the omnichannel strategy.

2.5 Channels

The "Channels" construct may be the most characteristic of an omnichannel strategy. In addition, its position in the model has a clear dependence on corporate management, especially IT, and business strategy (Mirsch et al., 2016; Shen et al., 2018).

Digital channels [CH] are the ones that have led to the appearance of the omnichannel strategy. As many as "34 different digital touchpoints" with the client have been identified, with 4 types of digital channels, "formed by clustering" (Straker et al., 2015). Multichannel papers have shown the complementarity that digital channels bring to physical channels (Avery et al., 2013).

Integration [IN] among channels is also a basic feature in omnichannel. In fact, the main difference between omnichannel versus cross-channel retailing and multi-channel

retailing is the complete integration between channels, as perceived by the customer and controlled by the company (Beck & Rygl, 2015; Cai & Lo, 2020; Hübner et al., 2016; Rigby, 2011). In fact, the need to move towards complete channel integration, in order to obtain more information on customer behavior, was already mentioned in the papers on multichannel (Neslin et al., 2006). In this model, channel integration is taken in a broad sense, to refer to the three levels of integration in an omnichannel strategy (Saghiri et al., 2017).

The third measure of the construct, the *distribution network [NT]* is an element in the B2B sphere, manufacturers, and wholesalers, that differentiates it from the purely retail B2C. In a multichannel framework, the impact that the digital channel (web) has on the distribution network and how this affects the manufacturer's multichannel management has been studied (Chung et al., 2012). The model used in this research will make it possible to determine how relevant the distribution network is, but in any case, channel partners should be included in the omnichannel strategy (Hansen & Sia, 2015; Kim & Chun, 2018; Yadav et al., 2017).

The channels available to customers and their level of integration is a determining aspect in omnichannel management, both for sales Hossain et al., 2020; Wollenburg et al., 2018; Yadav et al., 2017; S. Zhang et al., 2016), as in after-sales services and reverse logistics (Bernon et al., 2016). Therefore, of the indicators identified in the Delphi that is described later in the methodology section, the channel construct must interrelate the three: the digital channels that are added to the traditional distribution network of the company and the integration that occurs between all of them. Once

again, the construct is modeled with formative indicators. A greater number of digital channels does not necessarily imply greater integration or better performance of the distribution network.

Once the construct that may seem most decisive in omnichannel management has been established, the indicators that form it have a direct impact on the company's performance. Thus, sales through digital and traditional channels have an influence on profitability and revenue (Lorca et al., 2019). Although there is some research that qualifies the impact depending on the type of client and product (Bang et al., 2013; Pauwels et al., 2011), or even that a manufacturer's aggregate performance is worse (Chen & Ku, 2013), all of them collect the impact of the channels on performance, so this research establishes the following hypothesis to be confirmed by the model:

Hypothesis 4 (H4). Channels have a direct positive effect on omnichannel management.

2.6 Sales & Marketing

In omnichannel management, the variables that are probably more characteristic of the B2B field, rather than to omnichannel in retail companies, are the distribution network included in the channel construct, and the sales network that is included in the “Sales & Marketing" department. The distribution network is part of the previous channel construct and in this model, it is not included together with the sales force or intermediaries, as has already been argued in other research on omnichannel (Carvalho & Campomar, 2014). In a specific omnichannel strategy, such as one aimed at achieving

superior customer value (Larke et al., 2018) joint sales and marketing actions should be considered (Guenzi & Troilo, 2007).

Sales management [SA] has a more complex impact on omnichannel management, based on the fact that the metrics on which to base this management differ for a supplier from those for a retailer (Ailawadi & Farris, 2017). New digital sales channels do not replace the traditional sales team in physical channels, but rather reinforce it, given that they provide them with more complete information about their customers (prediction capacity) and allow efforts to be focused on those customers that may lead to better results (Lapoule & Colla, 2016; Wengler et al., 2021; Ye et al., 2018).

Regarding *marketing managemen*t *[MK]*, from a retail multi-channel approach, the strategy must vary by channel if greater customer retention is to be achieved (Vrontis et al., 2017). In an omnichannel strategy, marketing strategies become more significant, since this is how improved customer experience and increased loyalty are achieved, which constitute a fundamental objective (Simone & Sabbadin, 2017). Again, the challenge for marketers will be to mitigate the effects of cross-channel cannibalization (Shankar & Kushwaha, 2020), so the marketing plan must include holistic management of all direct and indirect touchpoints (Baxendale et al., 2015).

The link between marketing and sales management, especially in terms of internal or external sales force management, has been reflected in research already from the multichannel field and the adoption of digitalchannels (Lapoule & Colla, 2016; Neslin & Shankar, 2009). Actually, it is a new challenge for marketing management to manage multiple channels and the effect of sales management to make it profitable (van

Bruggen et al., 2010). As in the previous ones, the construct is modeled with formative indicators, assuming in advance that they are not correlated.

There is numerous research that supports the importance of marketing and sales management in the performance of an omnichannel company, maintaining that this effect is also positive in terms of purchase and profit results (Javalgi et al., 2014; Leeflang et al., 2014; Li & Kannan, 2014; Shankar & Kushwaha, 2020). Thus, this research hypothesizes that:

Hypothesis 5 (H5). Sales and marketing as a construct have a direct positive effect on omnichannel management.

2.7 Omnichannel Management

Omnichannel management in the model is established on three formative indicators identified by the panel of experts (Chin, 1998). The first indicator is the customer-centric proposition [PR]. Optimal cross-channel management must involve a customer-centric proposition (Cao & Li, 2015), Similarly, the main references at the omnichannel level have opted for a customer-centric perspective (Lehrer et al., 2018; Simone & Sabbadin, 2017). Thus, in an omnichannel strategy, the information and the product provided to the customer is the most important factor (Bell et al., 2014). Taking customer loyalty as the principal variable in omnichannel management, this loyalty can only be achieved through a customer-focused approach (Lemon & Verhoef, 2016; Russo & Confente, 2017a). The customer-centric proposal is therefore a principal driver

in omnichannel management (Gupta & Ramachandran, 2021; Kersmark & Staflund, 2015).

Regarding the *360-degree view [VI]* of the client, omnichannel management must be based on the knowledge of the client's behavior in all channels, provided by the data collected from him and advanced analysis of such data (Brynjolfsson et al., 2013; Grewal et al., 2017; Gupta et al., 2021; Leeflang et al., 2014; Mirsch et al., 2016). This dimension of omnichannel management, the 360-degree view, is what facilitates increased customer loyalty (Simone & Sabbadin, 2017), and has a direct impact on value creation (Fernández-Rovira et al., 2021; Hossain et al., 2021).

The adaptation of the *portfolio [PF]* of services and products to each client is the aspirational element that defines omnichannel management, in aiming to generate a unique experience and greater loyalty (Larke et al., 2018). The companies intend, through omnichannel management, to achieve individualized marketing that can adapt the portfolio to each client (Gensler et al., 2012; Simone & Sabbadin, 2017).

Once again, the construct has been defined as formative because a correlation between the three indicators is not expected. A client-centric proposition does not necessarily imply that the portfolio can be tailored or that a full 360-degree view of the client has been obtained.

In the scientific literature, it is argued that good omnichannel management has a direct impact on customer loyalty and satisfaction, and therefore on their purchase intention (Hoehle et al., 2018; Russo & Confente, 2017b). Some research directly addresses

omnichannel loyalty and the omnichannel experience to reinforce that good omnichannel performance directly impacts customer loyalty and experience (Peltola et al., 2015; Simone & Sabbadin, 2017; Yadav et al., 2017). It can be assumed that good omnichannel performance seeks to improve the customer experience and customer loyalty as the ultimate goal (Kumar et al., 2019; Larke et al., 2018; Min, 2021). Thus, this research hypothesizes that:

Hypothesis 6 (H6). Omnichannel management has a direct and positive impact on customer performance.

2.8 Customer Performance

Based on the literature, we can state that customer performance should be considered as an indicator of good omnichannel performance (Cassab & MacLachlan, 2006; Fink et al., 2008; Hoogveld & Koster, 2016). This can be measured both by customer loyalty (Akrout & Diallo, 2017) and by the experience of the consumer – or industrial buyer, in our case (Graca et al., 2015).

Customer loyalty [LO] is not only one of the main measures of omnichannel management, but one of its main purposes, as increased customer loyalty is necessary if an improvement in sales is to be achieved. In retail, omnichannel aims to win new customers and retain existing ones, improving their loyalty as a result of their greater satisfaction with the service offered (Simone & Sabbadin, 2017). At the model level, this research has included both loyalty and customer engagement, that is, how motivated the customer is to buy the brand (Kumar et al., 2019; Lemon & Verhoef,

2016; Ostrom et al., 2015). Customer loyalty is a target variable for performance improvement in multichannel environments (Neslin et al., 2006; Ramaseshan et al., 2013). In an omnichannel strategy, such loyalty will be favored by adding digital channels to traditional ones, as it increases customer convenience (Cao et al., 2016).

Customer experience [EX] is identified as a separate construct for omnichannel purposes (Lemon & Verhoef, 2016). It should be said that the model comprehends the total customer experience, not only the customer experience of the digital channels (Chatzopoulos & Weber, 2018) or customer performance (Rosenzweig et al., 2003; Simone & Sabbadin, 2017). In the academic literature, customer experience and customer behavior are referred to as one of the most important research challenges in the omnichannel field (Weber & Chatzopoulos, 2019). In this area, it has been shown that a good user experience has a positive effect on the use of omnichannel services (Shen et al., 2018). Omnichannel management seeks to increase customer performance and purchase intention in all situations (Herhausen et al., 2015; Hoehle et al., 2018; Hübner et al., 2016).

In this case, customer performance has been defined with reflective indicators since the observable variables are expressed as a function of the construct, in such a way that they reflect or are manifestations of the construct. Therefore, the latent variable precedes the indicators in a “causal” sense. The model assumes that both indicators would covariate and describe the customer performance.

3 Material and methods

Given the novel nature of the subject and the paucity of relevant literature, it was also advisable to broaden the focus to receive the most comprehensive range of inputs possible. Table III shows a summary of the literature review with the sources of the items and the constructs of the model presented. The process of obtaining the items has been carried out using a Delphi.

Table III. Constructs, items, and sources

Items	**Acro.**	**Sources**
Brand strategy	BR	(Piotrowicz & Cuthbertson, 2014; Verhoef et al., 2015; Neslin et al., 2014; Baxendale *et al.*, 2015; Hansen *et al.*, 2008).
Corporate culture	CU	(Grewal et al., 2017; Larke et al., 2018; Guenzi & Troilo, 2007; Chaffey, 2010; Lewis et al., 2014; Hansen & Sia, 2015; Ritala et al., 2021)
Innovation strategy	IV	(Markovic et al., 2021; Obal & Lancioni, 2013; Tsai *et al.*, 2013; Simone & Sabbadin, 2017; Musso, 2010).
IT management	IT	(Brynjolfsson *et al.*, 2013; Simone & Sabbadin, 2017; Verhoef et al., 2017)
Leadership management	MG	(Chaffey, 2010; Hoogveld & Koster, 2016; Simone & Sabbadin, 2017; Grewal *et al.*, 2017; Schwarzmüller *et al.*, 2018; Ruiz-Alba et al., 2019; Simone & Sabbadin, 2017)
Digital channels	CH	(Straker *et al.*, 2015; Avery *et al.*, 2013)

Channel integration	IN	(Beck & Rygl, 2015; Cai & Lo, 2020; Hübner *et al.*, 2016; Rigby, 2011; Neslin et al., 2006; Saghiri et al., 2017; Saghiri et al., 2017; Verhoef et al., 2015; Herhausen *et al.*, 2015; Hossain et al., 2020; Shen et al., 2018; Gallino *et al.*, 2017; Herhausen *et al.*, 2015; Simone & Sabbadin, 2017)
Distribution network	NT	(Rosenzweig *et al.*, 2003; Chung *et al.*, 2012; Ailawadi & Farris, 2017; Hansen & Sia, 2015; Kim & Chun, 2018; Yadav *et al.*, 2017).
Marketing management	MK	(Vrontis *et al.*, 2017; Simone & Sabbadin, 2017; Shankar & Kushwaha, 2020; Baxendale et al., 2015).
Sales management	SA	(Ailawadi & Farris, 2017; Simone & Sabbadin, 2017; Lapoule & Colla, 2016; Wengler *et al.*, 2021; Ye *et al.*, 2018)
Portfolio	PF	(Larke et al., 2018; Gensler et al., 2012; Simone & Sabbadin, 2017; Herhausen et al., 2015; Bhatnagar & Syam, 2014)
Customer-centric proposition	PR	(Cao & Li, 2015; Bell *et al.*, 2014; Lemon & Verhoef, 2016; Russo & Confente, 2017; Shaphali *et al.*, 2021; Kersmark & Staflund, 2015).
360-degree view	VI	(Brynjolfsson et al., 2013; Grewal et al., 2017; Gupta et al., 2021; Leeflang et al., 2014; Mirsch et al., 2016; Simone & Sabbadin, 2017; Fernández-Rovira et al., 2021; Hossain et al., 2021; Zhang et al., 2009)
Customer experience	EX	(Lemon & Verhoef, 2016; Chatzopoulos & Weber, 2018; Rosenzweig et al., 2003; Rajamma et al., 2011; Simone & Sabbadin,

		2017; Weber & Chatzopoulos, 2019; Herhausen *et al.*, 2015; Hoehle et al., 2018; Hübner *et al.*, 2016).
Loyalty	LO	(Simone & Sabbadin, 2017; Kumar et al., 2019; Lemon & Verhoef, 2016; Ostrom et al., 2015; Neslin et al., 2006; Ramaseshan *et al.*, 2013; Cao et al., 2016; Grewal *et al.*, 2017).

A Delphi process was therefore conducted to reach a consensus as to the indicators that should form part of the model. The model has been established based on the literature review, using a traditional PLS-SEM modeling approach. Once the model had been constructed, the technique of partial least squares structural equation modeling was used to analyze and test the research hypotheses.

The Delphi process had been carried out with a panel of 30 experts, from 17 different countries, to reach a consensus on the indicators that should be part of the model. In preparing that panel, more than 1,000 executives from around the world were contacted. The first Delphi round was sent to 455 executives, of which 83 (18.2%) agreed, and the panel was finally limited to 30 experts (6.6% of the total). Tables IV and V show the distribution of the sample.

Table IV. Delphi sample distribution (21 of 30 are manufacturers)

Area	**Function**	**Total**
Marketing	CMO	7
	CDO	9
Management	CEO	5
Sales	CSO	6

Operational	CLO	2
IT	CIO	1

Table V. Delphi sample distribution in 17 countries and 14 different industries

Regions	**Total**
Africa	1
Asia	3
Europe	16
North America	7
Oceania	1
South America	2

PLS-SEM is a variance-based method that estimates composites representing latent variables in path models (Hair, Hult, Ringle, & Sarstedt, 2016). PLM-SEM has been chosen since the objective of the research is oriented towards prediction, that is, it is intended to verify the predictive power shown by the model with respect to omnichannel management (Chin et al., 2003). Likewise, PLM-SEM is prescriptive when, as in this research, the hypotheses are derived from a macro-level theory of which not all the relevant or outstanding variables are known. That is, the theory is not solidly developed (Alonso-Garcia et al., 2021a), and the manifest variables present different levels of measurement. In addition, the fact that the measures are not fully developed because they come from Delphi experts and not having a very large sample, again points to better use PLM-SEM than other types of techniques more oriented to

confirmatory research, such as for example CSEM (Richter et al., 2016; Vinet & Zhedanov, 2011). To perform the analysis, SmartPLS has been selected from the different software packages available (Hair et al., 2016).

More than 1,000 executives with a C-level profile (CEO, CMO or CDO), from manufacturers and wholesalers, in various industries worldwide, were contacted. The sample has thus been expanded to a total of 142 C-level executives. After filtering those answers that are complete and applicable to the scope of the investigation, the final sample size is 124 executives. This far exceeds the minimum number for a sample, according to the 10 times rule (Hair et al., 2016), and therefore reinforces the validity of the model.

The questionnaire used a five-point Likert scale that asked how each variable affected long-term omnichannel management in companies. Tables VI and VII show the distribution of the sample.

Table VI. Sample distribution (98 of 124 are manufacturers)

Area	**Function**	**Total**
Marketing	CMO	41
	CDO	16
Management	CEO	18
	CFO	3
	CHR	2
Sales	CSO	21
Operational	COO	11

	CLO	5
IT	CIO	7

Table VII. Sample distribution in 35 countries and 32 different industries

Regions	**Total**
Africa	1
Asia	14
Europe	74
North America	26
Oceania	4
South America	5

4 Results

4.1 Assessment of the measurement model: Reliability and Validity

The collinearity between the formative indicators that make up a variable should be investigated using the variance inflation factor (VIF). Table VIII shows that the VIF values for the indicators range between 1.058 and 1.202, suggesting that multicollinearity is not a problem in our data as it is below the threshold of 5 (Hair et al., 2016).

The individual reliability of the item is evaluated by examining the loads (λ), or simple correlations for the reflective indicators, and the weights for the formative ones. In this respect, for an indicator to be accepted as part of a construct, it must have a load equal

to or greater than 0.707 (Carmines & Zeller, 1979). As shown in Table VIII, the loadings of the two reflective indicators of the model, EX and LO, exceed this limit and therefore no "item cleaning" applies (Barclay et al., 1995). Regarding the formative indicators, when evaluating their weights, BR, CU, IT, NT and VI have a lower relative importance in the creation or formation of their respective latent variables than the rest of the indicators (Chin & Newsted, 1998; Hair et al., 2016).

Table VIII. Evaluation of the measurement model

Construct	**Items**	**Weight**	**Loading**	**VIF**	**R^2 values**
Strategy	BR	0.274	0.414	1.032	
	CU	0.121	0.362	1.088	
	IV	0.879	0.977	1.118	
Management	IT	0.902	0.913	1.123	0.190
	MG	0.226	0.524	1.123	
Channels	CH	0.723	0.899	1.142	
	IN	0.389	0.611	1.084	0.118
	NT	0.262	0.455	1.058	
Sales & Marketing	MK	0.635	0.864	1.202	0.159
	SA	0.555	0.819	1.202	
OM	PF	0.592	0.678	1.056	
	PR	0.656	0.762	1.171	0.268
	VI	0.200	0.237	1.158	
Customer Performance	EX	0.650	0.820		0.205
	LO	0.597	0.779		

To carry out the assessment of the reliability we follow the composite reliability indicator (ρ_c) of the construct (Bacon *et al.*, 1995). The composite reliability for customer performance has a value of 0.780, above the threshold of 0.7, which gives reliability to the investigation (Hamid *et al.*, 2017). It should be noted that the simulation of the model with the formative constructs changed to reflective, shows that the composite reliability does not obtain significant values, especially for the omnichannel management and strategy construct, with values of 0.672 and 0.682, respectively. In this way, we can validate that they remain formative in the model.

The assessment of convergent validity is carried out by the average extracted variance (AVE). It is recommended that AVE be greater than 0.50 (Fornell & Larcker, 1981). The AVE value in the customer performance construct is 0.640, which exceeds the minimum threshold.

4.2 Assessment of the structural model

A measure of the predictive power of a model is the R^2 value for the dependent latent variables. This measure should be greater than or equal to 0. 1 (Hair et al., 2016). As shown in Table VIII, all the R2 values exceed the minimum variance, the Channels construct being the one with the lowest value, namely 0.118.

According to an evaluation of effect sizes, levels of f2 can be observed as a test or indication of the effect that in the structural domain is due to a latent predictor variable (Chin & Newsted, 1998).

The model shows in Table IX that all latent variables have a large effect, except "management" on "channels", which are close to the threshold of 0.15; and "channels" on "omnichannel management", where each has a small effect.

Table IX. f^2 values and confidence intervals (bias corrected)

Predictor variables	***f^2***	***Original Sample (O)***	***Sample Mean (M)***	***Bias***	***2.5%***	***97.5%***
Strategy -> Management	0.235	0,006	0,126	0,12	-0,486	0,17
Management -> Channels	0.134	0,036	0,166	0,131	-0,441	0,299
Management -> Sales & Marketing	0.189	0,152	0,369	0,217	-0,389	0,156
Channels -> Omnichannel Management	0.092	0,158	0,416	0,258	-0,347	0,123
Sales & Marketing -> Omnichannel Management	0.173	0,168	0,342	0,174	-0,482	0,316
Omnichannel Management -> Customer Performance	0.259	0,221	0,462	0,24	0,132	0,132

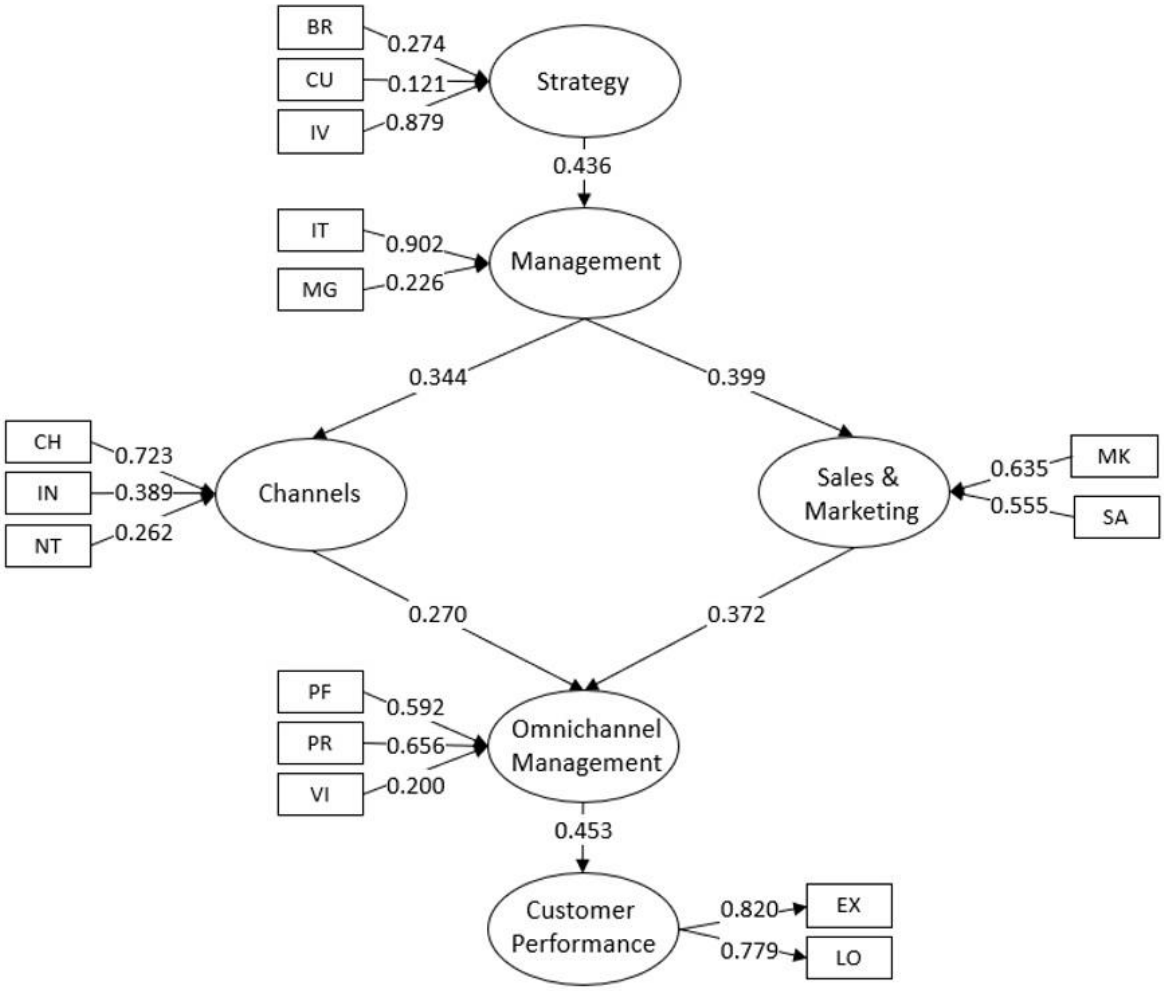
Table X. β values (path coefficients)

Predictor variables	***β***	***Hypothesis***	***Conclusion***
Strategy -> Management	**0.436**	H1	Supported
Management -> Channels	**0.344**	H2	Supported
Management -> Sales & Marketing	**0.399**	H3	Supported

Channels -> Omnichannel Management	**0.270**	H4	Supported
Sales & Marketing -> Omnichannel Management	**0.372**	H5	Supported
Omnichannel Management -> Customer Performance	**0.453**	H6	Supported

According to an evaluation of path coefficients and their significance levels, to be considered significant, the standardized path coefficients (β) should reach a value of at least 0.2, and ideally be above 0.3 (Chin, 1998). Following this last indicator, an empirical rule can be followed according to which a predictor variable should explain at least 1.5% of the variance in a predicted variable (Falk & Miller, 1992; Hair et al., 2016). As shown in Figure 2, all the β coefficients meet the required minimum of 0.2 and, in fact, exceed 0.3, except the one from "channels" to "omnichannel management" which is 0.270. It can therefore be that the hypotheses H1, H3, H5 and H6 are supported in the model. The most significant is H6, as omnichannel management explains more than 23% of the variance in customer performance. Regarding H2, the hypothesis is also supported by explaining management more than 12% of the variance of channels. Finally, H4, even being the predictive relationship with the lowest coefficient, is still supported, since it explains more than 8% (0.303x0.270) of the variance of omnichannel management according to the correlations shown in the Table X.

Figure 2. Structural model



According to an evaluation of the overall fit of the estimated model, to estimate the precision of the PLS estimates, a non-parametric technique such as Bootstrap is used (Efron & Gong, 1983). The results are shown in Table XI.

Table XI. Model Fit (Bias-Corrected and Accelerated Bootstrap, using two-sided significance test and 5,000 subsamples)

Value	Model	Original Sample	Sample Mean	95%	99%
SRMS	Saturated Model	**0,092**	0,077	0,093	0,102
SRMS	Estimated Model	0,107	0,084	0,100	0,109
d_ULS	Saturated Model	**1,025**	0,718	1,048	1,255
d_ULS	Estimated Model	1,364	0,848	1,189	1,421
d_G	Saturated Model	**0,289**	0,228	0,316	0,370
d_G	Estimated Model	**0,334**	0,247	0,343	0,397

The general fit of the model should be evaluated with a saturated structural model by investigating the discrepancy between the empirical and model-implied variance–covariance matrices of indicators (Benitez et al., 2020). Thus, the SRMS value is at the limit of 0.1 to be considered as a good fit, taking into account that it is a goodness-of-fit measure for PLS-SEM and is one of the most reliable indicators of model misspecification (Henseler et al., 2014). Regarding the difference between the covariance matrix implied by the model and the empirical covariance matrix, both the d_ULS (squared Euclidean distance) and d_G (geodesic distance) are shown in Table XI. In the model, all the values of the original sample in the saturated model are lower than the upper bound 95% point. That is, it can be said that the model fits well since the discrepancy is so small that it can be purely attributed to sampling error ($p > 0.05$) (Dijkstra & Henseler, 2015). Additionally, it is recommended to evaluate the fit

according to the estimated model since it is a model that is based on a total effect scheme and considers the structure of the model. In this restricted version of the fit measure, both SRMS and d_ULS do not meet the criteria for the upper bound at the 95% point but do meet the criteria for the 99% point. As expected, the overall fit indicators in the estimated model are worse than those in the saturated model since the specified model still has some degrees of freedom (Benitez et al., 2020).

5 Discussion

5.1 Theoretical implications

As stated in the paper, research on omnichannel management in the B2B field is scarce, especially when it comes to the creation of decision-making models. The main contribution of the research, therefore, is the built model itself, since, unlike retail models, it incorporates variables typical of the industrial sphere, such as the distribution network or the sales force. In addition, the variables that had already been included in the retail models, such as channels, are still maintained but within an industrial context.

As a first key contribution, the model demonstrates that good performance in B2B omnichannel management leads to an improvement in the performance of a company's industrial customers. Industrial customers are performing better when there is a greater frequency of purchase and greater spending. Therefore, both loyalty (Akrout & Diallo, 2017) and customer experience (Graca et al., 2015) are indicators of the performance of this industrial client (Hadjikhani & LaPlaca, 2013; Mudambi, 2002). In addition, based on the results, both indicators have an equivalent weight in the customer performance variable.

As a second key contribution, the model demonstrates that B2B omnichannel management is defined by three indicators. Optimal omnichannel management must involve a customer-centric proposition (L. Cao & Li, 2015), from which to carry out individualized marketing that tailors the company's portfolio of solutions to suit each client (Gensler et al., 2012). To ensure this, customer knowledge at each touchpoint (360 vision) is essential (Simone & Sabbadin, 2017). These three indicators, namely a customer-centric proposition, portfolio, and customer knowledge at each touchpoint, are thus formative variables for omnichannel management.

As a third key contribution, the principal finding from the model we have constructed is that the principal predictive variable for omnichannel management in the B2B sphere is the sales and marketing construct. This is significantly more important than channels. What is striking is that the weight of the construct on omnichannel management is even higher than the channel construct. Some elements of this construct, such as the sales force, are very characteristic aspects of the industrial field compared to retail and this is the main difference of this model with respect to retail models. Before the measurement, it would be expected that sales management would be partially affected, even negatively, by the possibility that any new digital channel incorporated as part of an omnichannel strategy could cannibalize the sales of offline channels (Simone & Sabbadin, 2017).

The prevalence of the construct "channels" is equally significant. From the indicators identified by the panel of experts, the indicators that make up the “Channels” construct are the incorporation of new *digital channels* in addition to the traditional channels; the

integration between the new digital channels and the existing ones; and all the agents involved in the *network*/supply chain in the B2B scenario. Channel integration, however, could have negative elements that affect the general performance (Herhausen *et al.*, 2015), especially due to the costs associated with implementation (Simone & Sabbadin, 2017). The results of the model have finally made it possible to identify the final positive effect of this variable.

Another measure of the construct closely linked to the B2B field, manufacturers, and wholesalers, is the *distribution network [NT]* that differentiates it from the purely retail B2C. However, the model of this research has determined not much relevance of the distribution network in the construct.

5.2 Managerial implications

The main contribution of the research, from a management point of view, is that business managers now have a reference model that allows them to understand the factors that influence the omnichannel management of an organization in a B2B context. This model establishes the principal determinants that should be reinforced at the levels of strategy and management. It should therefore be especially relevant to decision-making by a company that seeks to measure and improve its omnichannel performance.

The second contribution is that the two variables inherent to a B2B model, and not present in a retail model, are the sales force management and the distribution network. Sales force management is key to sales of industrial companies and therefore key to the

client's performance, even in multichannel (Neslin & Shankar, 2009). Omnichannel management must consider how new digital channels can improve the relationships between commercial agents and their customers (Lapoule & Colla, 2016). Similarly, the distribution network is an equally specific aspect of the B2B sphere (Chung et al., 2012). The depth of this network, especially for manufacturers, is a factor also under study in relation to omnichannel management (Hossain et al., 2020; Shen et al., 2018). The results of the model show that the management of the sales force has a determining weight in omnichannel management, much higher even than the impact that the adoption of new digital channels or the integration of the channels with each other may have. Therefore, it highlights that the distribution network does not have a determining weight in omnichannel management. This may show that in current omnichannel strategies, solutions that involve the distribution channel, B2B2B or B2B2C, are underdeveloped, although they are an area of growing interest (Brotspies & Weinstein, 2019).

As a third contribution, a consequence of the previous one, the results show that even though they are not the main predictor of omnichannel management, channels have a direct and significant impact. A manager must be aware that adopting new digital channels adds more value to the organization than improving integration between existing ones or developing the distribution network. This premise is consistent with the formative variables of omnichannel management: the largest source of data on customer behavior is obtained from digital channels and it is in them where the portfolio of services can be adapted in a more agile way according to interest and context particular to each client.

The fourth contribution is that the most important variable in corporate management is IT management. The model demonstrates that this variable is key to good omnichannel performance. Good IT management will facilitate the adoption of new digital channels and also the knowledge of the company of its clients through the implementation of new technologies, including big data and IoT (Fernández-Rovira et al., 2021; von Briel, 2018).

The fifth contribution is that corporate strategy must include innovation strategy, as this is key to good performance in omnichannel management. In fact, it can be considered linked to the previous contribution, since much of the innovation used in implementing omnichannel is technological (Fernández-Rovira et al., 2021; Gupta et al., 2021).

5.3 Limitations and future research

The research is not without its limitations. The model should arguably include control variables such as the size of the company and the industry to which it belongs. Given the novelty of the research and the absence of previous B2B models, a sample of international experts has been consulted, but no adjustments have been made for either the industry or the type of company. As has been described, most are large international manufacturing companies, working in a variety of industries, including automotive, fashion, energy, and telecommunications.

Our research gives rise to several opportunities for future research. A clear line of future research would be to limit the sample to a specific industry, or to the position that the company occupies in the value chain (Gessner & Snodgrass, 2015; Heidekrüger et al.,

2018). For example, while both belong to the B2B sphere, a manufacturer and its distribution network is very different from a wholesaler selling to SMEs.

6 Conclusions

This paper fills a research gap, by establishing a reference model for the omnichannel management of an organization in a B2B context. The main determinants and predictive variables of omnichannel management have been defined. The paper also has implications for managers and consultants who want to establish an omnichannel management strategy. The model shows how good omnichannel performance is indicated by the industrial buyer's performance as measured by larger and more frequent purchases. Loyalty and experience are primary measures of this customer performance.

Funding

This work was supported by the Department of Education and Research of the Community of Madrid, Spain, with a grant towards the cost of the IT equipment [grant number H2019/HUM-5761 (INNJOBMAD-CM)], and by the University of Alcala, Madrid, Spain to support the writing [grant number COVID-19 2021 2020/00003/016/001/003].

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GENERAL CONCLUSIONS

1 Conclusions

1.1 Theoretical implications

In recent years, Omnichannel Management has been studied as a new capacity that every organization must develop to satisfy a new context of hyperconnected demand (Brynjolfsson et al., 2013). The origin of the thesis emanates from that reality already studied in the retail field and seeks to study the impact that omnichannel management may have for the marketing management of an industrial company.

To determine the impact of omnichannel management, it must be marked by the perception of the customer, as in the retail field, but with the considerations of the industrial field. Therefore, one of the main elements to determine is precisely how these customer expectations are characterized and measured under an omnichannel strategy. The starting thesis was that the expectations of an industrial customer (professional buyer) cannot be very different from those of a final consumer. In the end, the purchasing manager of a company will be influenced and will have a bias by his experience as a final consumer in different channels. Therefore, with the exceptions that must be made for the industry, it has been developed throughout the investigation in order:

1. Contextualize all the research that exists in the field of omnichannel B2B management.
2. Once the research gap is identified, establish a B2B omnichannel management model.
3. Establish the determinants that characterize B2B omnichannel management.

Following this sequence, the first paper shows that relationships between companies in omnichannel scenarios have been studied less than relationships with end consumers, something that other papers had already highlighted (Kembro et al., 2018; Lazaris & Vrechopoulos, 2013). Nor has work been done on models in the value chain in general (manufacturers, wholesalers, and distributors), nor in specific sectors in which this type of management is applied more widely. To confirm this lack of papers on Omnichannel Marketing Management in the B2B field, the research has collected in its first paper a method that combines the best practices for the review of scientific literature together with several bibliographic methods.

After showing the research gap, the thesis assumed that organizations should modify their internal processes to respond to the new demand for an omnichannel professional client. As an initial thesis, this change would not only affect those processes related to the client (professional in this case), but all the processes of the organization are affected. Especially significant will be the impact on those processes related to marketing and commercialization, given the greater and better knowledge of the client. The impact of predictive demand analytics provided by new technologies should also be considerable.

In this way and to endorse the initial thesis, the second paper was developed, with the aim of characterizing the organizational model of a company focused on Omnichannel Marketing Management. This research should answer how companies should be configured (technologically and organizationally) to provide a beneficial basis for Omnichannel Marketing Management. The model included in the second paper provides both theoretical and practical benefits to any company undertaking a digital

transformation, since it allows to think about the performance metrics expected a priori and allows creating a benchmarking framework for marketing management initiatives to be managed. More specifically, the application of fuzzy cognitive mapping makes it possible to study the performance of an organization and anticipate the unwanted secondary effects of actions in the company. The cognitive map facilitates the decomposition into variables and their interrelationships. These variables and interrelationships constitute a valid construct that coincides with the complexity of the companies. The level of engagement achieved by panel members and the quality of the contributions support the view that the complex model approach allows for a flexible and realistic understanding of companies and the interactions that shape their behavior.

The second paper also reveals that the application of a vision of the organization based on complexity can offer a wide range of options to better address the real situation of a company and, from here, evaluate hypothetical scenarios that will facilitate decision-making (Xirogiannis & Glykas, 2007). The model created in this research does not pretend to be a true reflection of reality, but rather a tool to help decision-making, which, based on the experience of experts, makes it possible to highlight the main variables that influence Omnichannel Management and the impacts between them.

Finally, as the third stage of the research and as the evolution proposed in the second paper, it was necessary to define which indicators are key for Omnichannel Management for industrial clients and, if possible, how they can be measured. This allows to define strategies in advance and measure business performance once these strategies have been addressed, in order to facilitate continuous internal analysis and

comparison between companies in the same sector. With this objective the third paper is approached.

The third paper concludes with three main contributions regarding the determinants for B2B omnichannel marketing management. First, research shows that good performance in B2B omnichannel marketing management leads to improved performance for a company's industrial customers. The performance of B2B or industrial customers (Hadjikhani & LaPlaca, 2013; Mudambi, 2002), is determined both by loyalty (Akrout & Diallo, 2017) and by customer experience (Graca et al., 2015) and both with a similar weight. Experience is taken to mean the buyer's experience of all the channels and service processes (Kumar et al., 2019), not just the buying experience (Holmlund, 2008). Both indicators have a substantial impact on repeat buying behavior. However, it was advisable to assess the possible negative effects on customer participation, since before the measurement it would be possible to consider that their privacy is questioned by omnichannel management (Grewal, Roggeveen, & Nordfält, 2017) and therefore that the effect was negative. As has been collected, the model finally shows that the omnichannel management effect is really positive.

As a second contribution, the paper establishes three formative indicators of omnichannel B2B management: the client-centric proposal (L. Cao & Li, 2015a), a personalized portfolio for each client (Gensler et al., 2012) and omnichannel knowledge customer or 360-vision (Simone & Sabbadin, 2017). All omnichannel management is based on a customer-centric value proposition (Gupta & Ramachandran, 2021; Kersmark & Staflund, 2015; Min, 2021; Ostrom et al., 2015). To implement this, the aggregated data of the client is captured in each channel, thus providing a 360-degree

view, (T. M. T. Hossain et al., 2020; Lehrer et al., 2018) and from this information, hyper-personalization can be achieved (Gupta et al., 2021). This implies an individualized marketing strategy in which the portfolio of services or products is adapted to the context of each individual client (Carvalho & Campomar, 2014; Piotrowicz & Cuthbertson, 2014; von Briel, 2018). Before measuring, it should be considered whether portfolio customization would have a negative effect on omnichannel management due to the inherent differences in terms of the selection of goods and services provided through each channel (Bhatnagar & Syam, 2014; Emrich et al., 2015; Herhausen, Binder, & Schoegel, 2015). However, after the measurement it has been shown that the effect of the portfolio is positive.

As a third main contribution, it should be noted that the main predictive variable for omnichannel management in the B2B field is the sphere is the sales and marketing construct. One of the most striking aspects of the model's measurement results is the impact of the "Sales and Marketing" construct on omnichannel B2B management. What is striking is that the weight of the construct on omnichannel management is even higher than the channel construct. Some elements of this construct, such as the sales force, are very characteristic aspects of the industrial field compared to retail and this is the main difference of this model with respect to retail models. Before the measurement, it would be expected that sales management would be partially affected, even negatively, by the possibility that any new digital channel incorporated as part of an omnichannel strategy could cannibalize the sales of offline channels (Simone & Sabbadin, 2017).

The prevalence of the construct "channels" is equally significant. From the indicators identified by the panel of experts, the indicators that make up the “Channels” construct are the incorporation of new *digital channels* in addition to the traditional channels; the *integration* between the new digital channels and the existing ones; and all the agents involved in the *network*/supply chain in the B2B scenario. There are three levels of integration in an omnichannel strategy (Saghiri, Wilding, Mena, & Bourlakis, 2017). In the first place, the integration that allows a client to interact with different channels in a homogeneous way, with the same level of information and a similar selection of products or services (Emrich et al., 2015). The second aspect of integration is that between types of channels to provide synchronized continuity to the operations and for the customer, i.e., a process can be started in one channel and continue in another (Verhoef et al., 2015). Finally, there is the integration of entities or divisions in the same organization (Herhausen, Binder, & Schoegel, 2015). Since channel integration is a basic element in Omnichannel Marketing, several papers have reviewed the quality of such integration, and thus how it influences cross-buying customer behavior and customer value (T. M. T. Hossain et al., 2020; Shen et al., 2018). It has also been proven that the integration of digital and physical channels promotes sales dispersion (Gallino et al., 2017). Channel integration, however, could have negative elements that affect the general performance (Herhausen, Binder, & Schoegel, 2015), especially due to the costs associated with implementation (Simone & Sabbadin, 2017). The results of the model have finally made it possible to identify the final positive effect of this variable.

Another measure of the construct closely linked to the B2B field, manufacturers, and wholesalers, is the *distribution network [NT]* that differentiates it from the purely retail B2C. Even without omnichannel, the distribution network is an important factor for any company's performance (Rosenzweig et al., 2003), as the model has also proven. In the omnichannel area, sales results are affected by whether or not a supplier adds new channels to its distribution network, although it has been pointed out that there is a lack of research into the elasticity of sales and how they are affected by the depth and breadth of the distribution network (Ailawadi & Farris, 2017b). The model of this research has determined not much relevance of the distribution network in the construct.

1.2 Managerial implications

The thesis assumes that just as there is a wide development of digital channels in B2B, the latest omnichannel strategies are equally applicable to the entire supply chain, regardless of the industry to which we refer. Consequently, any manager of an organization should be clear about the processes that can be most affected by this new type of strategy and ideally be able to measure their development. In other words, what can be expected from omnichannel implementation in a sphere of relationship between companies. How it should be measured and, therefore, how a company can assess whether it is performing optimal management by itself and in relation to the rest of the organizations in its industry.

Once the research gap in the B2B field is evident in the first paper, the main implications from a managerial point of view are included in the second and third papers.

The main implication indicated by the second paper and as a result of the research, is that Omnichannel Management in a B2B environment is more affected by limitations than by variables in its favor. In other words, a more restrictive environment entails a greater impact on Omnichannel Management than any attempt to improve the context of the variables that favor such management. This is a relevant aspect and one that allows a better allocation of the company's resources according to the variables of its particular context. Similarly, an important contribution at the managerial level is the omnichannel model that this research provides and the simulation tool for what-if scenarios, as a tool for decision-making.

On the other hand, the third paper offers several implications. At the level of constitutive variables, the model includes two characteristic elements of the B2B field, such as the management of the sales force and the distribution network. The results of the model show that the management of the sales force has a determining weight in omnichannel management, much higher even than the impact that the adoption of new digital channels or the integration of the channels with each other may have. Therefore, it highlights that the distribution network does not have a determining weight in omnichannel management. In the same way, the results show that even though they are not the main predictor of omnichannel management, channels have a direct and significant impact. A manager must be aware that adopting new digital channels adds more value to the organization than improving integration between existing ones or developing the distribution network.

Finally, the research concludes that both the innovation strategy and IT management are basic elements in the omnichannel B2B environment.

2 Limitations

The limitations of the research have been collected in each step of the same and have therefore been shown in each paper.

Regarding the bibliographic review and the research agenda (expanded in the next section), the main limitation comes from the number of papers collected. In other words, the matrix from which the research is carried out has few papers and this may cast doubt on the results obtained. In addition, its effectiveness could be questioned, since the results collect papers in the retail field and not strictly in the B2B field. However, it has already been mentioned in said paper that in terms of the final number of papers, it is not considered that the search has been inaccurate, but that it is indeed a less studied area. In any case, the procedure has been compiled in detail in order to reproduce the method that has led to the basic foundations of the research.

The investigation for the second paper starts with a Delphi process, to build the model. This is one of the main limitations of the research. For Delphi to be relevant, given either a significant sample size must be available, or, being a smaller sample, it must be homogeneous (Skulmoski et al., 2007). The selection of experts with similar training and general knowledge in the field of interest allows the efficient and reliable use of *"a small sample of a limited number of experts in the field of study"* (Akins et al., 2005). The panelists have a managerial profile and work in companies in the B2B field, whether they are manufacturers or wholesalers. However, the international nature of the sample, the different sizes of the companies, and the diversity of sectors, are factors that

could be adjusted for a more accurate result: by geographic scope, industry, company size and/or type of company in a traditional supply chain.

Other limitations come from the process of creating the FCM itself in the second paper. With the use of DHL, it's accepted one of "*the main drawbacks of this approach, which is that the formula updates weights between each pair of concepts, taking into account only these two concepts and ignoring the influence that comes from other concepts*" (Papageorgiou, 2012). Other learning methods could be used, such as active HL or online HL. However, the model resulting from this research does not invalidate the contrast with what-if scenarios, if these are considered from a qualitative rather than a quantitative point of view.

As stated in the third paper, the sample chosen for PLS-SEM modeling meets the requirements to validate the research, such as the rule of 10 times (Hair, Hult, Ringle, & Sarstedt, 2016) among others. However, the model should arguably include control variables such as the size of the company and the industry to which it belongs. Given the novelty of the research and the absence of previous B2B models, a sample of international experts has been consulted, but no adjustments have been made for either the industry or the type of company. As has been described, most are large international manufacturing companies, working in a variety of industries, including automotive, fashion, energy, and telecommunications.

3 Further research

As the first paper of this thesis shows, it can be clearly concluded that there is an important gap in the literature, and it is recommended that research in this field

continue. In the research process, after the analysis of the bibliographic review carried out in the first paper, the research agenda can be extended to the rest of the clusters indicated in the paper, as shown in the following table.

Cluster	Topic	Research Questions	References
Customer Journey (as Procurement Officer)	Conceptualization, drivers and consequences of customer experience	• What is required to provide a seamless omnichannel customer experience in a professional environment? • Which models can be applied to represent and understand purchaser choices within the omnichannel environment? • Which models and theories can be applied to study the customer journey within omnichannel in professional (inter-companies) environments? • What are the components and linkages in an integrated model of PX and the customer journey? How could such a model be tested? • How can different sources of data (e.g., surveys, operational data, social media) be linked to further elucidate the formation of PX?	(Lemon & Verhoef, 2016; Piotrowicz & Cuthbertson, 2014; Verhoef et al., 2015; Own)

Cluster	Topic	Research Questions	References
	Customer journey analysis, design, and management	• Heterogeneity in Purchase Officers' Reasons for Buying Online. How the importance of convenience and price-based attributes correlates in different segments. • Characterize the Path to Purchase Across Offline and Online Intermediaries. • Can the "purchase funnel" and the "loyalty funnel" be integrated in such a way that we can understand short-term behavioral consequences as well as long-term loyalty effects of the design of the customer journey? • What is the optimal design for the customer journey for firms? Or do optimal designs not exist? • What is the role of the brand in the PX and customer journey? How do customer choices for touch points in the customer journey relate to each other? Do these choices and influences change over time?	(Ailawadi & Farris, 2017; Lemon & Verhoef, 2016; Own)

Cluster	Topic	Research Questions	References
		• How does the use of multiple devices across the journey influence PX and purchase officers' behaviors? • Can we identify anomalies in customer journeys—whereby customers deviate from habit or predictions—and identify potential moments of influence? • Can we identify new types of customer (as Procurement Officers) segments by their use of specific touch points in the customer journey?	
Channels & Touchpoints	Adding new channels. Strategy	• How broad should the range of offered channels be? • How can specific customer contact points improve the omnichannel performance? • Study the impact when Suppliers add New Channels. • At what point does the integration of channels create additional value? • What is the role of mobile devices in the omnichannel environment?	(Ailawadi & Farris, 2017a; Brynjolfsson et al., 2013; R. Hansen & Sia, 2015; Lewis et al., 2014; Piotrowicz & Cuthbertson, 2014; Verhoef et al., 2015)

Cluster	Topic	Research Questions	References
	Execution: design, and management	• How can touch points be seamlessly integrated across the journey (similar to channel integration)? What models will enable firms to accomplish such integration? • How can brands exert more control over non-" owned" touch points? Can such touch points be turned into brand-owned touch points? At which stages of the journey?	(Lemon & Verhoef, 2016)
Marketing	Conceptualization, drivers and consequences of customer experience	• Which types of omnichannel services provide additional customer value over existing offline and online alternatives? • What are the drivers of PX and how does this differ between industries and cultures? • What are the consequences of PX? • How does a further conceptualized PX construct relate to other major constructs in customer management and marketing? • Can PX explain purchaser behavior and firm performance beyond existing	(R. Hansen & Sia, 2015; Lemon & Verhoef, 2016; Trenz, 2015; Verhoef et al., 2015; Own)

Cluster	Topic	Research Questions	References
		constructs (such as customer satisfaction or customer engagement)? • What are the combined effects of PX at multiple touch points during different phases of the customer journey on overall PX and customer behaviors (e.g., conversion, loyalty, WOM)? Are those different in an SME with just one purchaser and in Large Enterprises with several? • How can different sources of data (e.g., surveys, operational data, social media) be linked to further elucidate the formation of PX? • How must pricing be rethought in an omnichannel setting?	
	Customer experience measurement	• How can PX be measured while taking into account its rich, multidimensional nature? How can we measure the PX construct across multiple touch points and journey stages? Are different measures needed for different stages of the journey? Are there optimal moments to	(Lemon & Verhoef, 2016; Own)

Cluster	Topic	Research Questions	References
		measure? What fast, simple metrics could provide insight? • How should firms link distinct metrics across the customer purchase journey? How does PX differ across industries, contexts, and cultures, and what does this imply for the measurement of PX? • What are the effects of different touch points on customer experience, conversion, and loyalty? And how can integrated touch points make a difference?	
	Multi-Modal Order Fulfillment	• To examine the effects of improved service levels (reduced lead times) on the incremental revenue achieved. • How lead-time levels, and control over lead time in relation to cost, influence customer satisfaction and purchase decisions?	(Lawson et al., 2017)
Logistics	Logistics-Design	• What new competences and capabilities are required in a MH node to handle an increased use of complex automation solutions and other technology?	(Brusset, 2016; B. Chen & Chen, 2017; R. Hansen, 2015;

Cluster	Topic	Research Questions	References
		• What are the challenges and opportunities for human–robot interaction? • How should the overall warehouse layout be designed to enable flexibility to handle extreme demand peaks (such as Black Friday)? • How should investments, risks, costs, and gains related to new storage and handling equipment necessary for OC activities be shared, especially if the channel consists of independent decisionmakers (e.g. franchise)? • How can operational issues of channel integration be resolved? • How examine the effects of improved service levels (reduced lead times) on the incremental revenue achieved in a Multi-Modal Order Fulfillment? • Which other learning capabilities combined with the agility can support the dynamic capabilities of a supply chain from the supply chain manager's point of view?	Kembro et al., 2018; Lawson et al., 2017; Mirsch et al., 2016; Piotrowicz & Cuthbertson, 2014; Verhoef et al., 2015)

Cluster	Topic	Research Questions	References
		• Does adding a direct channel benefit the manufacturer when competition is introduced among retailers? Moreover, if the manufacturer's unit quality cost cannot be observed, what happens when a direct channel is introduced into supply chains?	
	Logistics Models	• How to develop a mixed transport service and the understanding of how to implement a dynamic allocation policy? • How contextual elements can affect the business logistics model adopted by companies and, more generally, the success of an OC strategy?	(Marchet et al., 2018)
	Put-away, Storage, Fulfillment and Shipping	• How do OC (Manufacturers, Wholesalers or Distributors) decide which SKU level to store (i.e. single units or case packs) when integrating inventories for warehouse and e-commerce? • How is the overall inventory optimization strategy and increased use of drop-shipments affecting the	(Kembro et al., 2018; Own)

Cluster	Topic	Research Questions	References
		inventory strategy and stock levels in various MH nodes? • How should the picking and sorting operation and activities be designed to meet requirements on shorter lead times from customer order to delivery? • How should OC retailers prioritize between online- and warehouse orders when there is a limitation in inventory or capacity? • How should packing activities for consolidation of multiple flows/orders/packages be designed to support delivery of single shipments to customers? • How should the packing and shipping operation be designed to meet requirements on shorter lead times from customer order to delivery?	
	Receiving (Suppliers)	• How can automation be used to increase effectiveness and efficiency of the receiving operation and what factors should be considered?	(Kembro et al., 2018; Own)

Cluster	Topic	Research Questions	References
		• What challenges do OC (Manufacturers, Wholesalers or Distributors) encounter in designing the receiving layout when integrating multiple flows in one warehouse? • How should the receiving layout be designed to manage increased cross-dock flows? • What are the challenges and opportunities in the choice of handling equipment to manage increased complexity of multiple incoming flows in the receiving operation?	
	Receiving (returns)	• To what extent is it possible and valuable to automate the receiving of customer returns and what factors should be considered? • How do increased return flows impact layout considerations for the receiving area? • What factors impact the decision to separate or integrate receiving layout for customer returns and incoming goods from suppliers?	(Kembro et al., 2018)

Cluster	Topic	Research Questions	References
		• What handling and storage equipment is required to support effective and efficient receipt of return flows and what factors should be considered?	
	Put-away and Storage	• To what extent is it possible and valuable to automate the put- away and storage and what factors should be considered? • How do OC (Manufacturers, Wholesalers or Distributors) manage increased complexity (larger assortment and mixed order size) in the design of storage space? • What factors impact the decision to integrate or separate the storage layout for store- and online orders? • How can the next-generation equipment be used to manage increased complexity (larger assortments and variety) and make the put-away and storage more effective and efficient?	(Kembro et al., 2018; Own)

Cluster	Topic	Research Questions	References
	Picking and Sorting	• How can automation be used to improve picking and sorting, e.g. to meet big and rapid changes in demand, or to handle a variety of order types and flows? • How do OC (Manufacturers, Wholesalers or Distributors) design integrated picking areas with different order profiles (mixed order size)? • To what extent is sorting required in OC warehousing and what are the layout requirements? • What mix of equipment is required to manage increased complexity in picking (e.g. larger assortment and mixed order size) and what factors should be considered?	(Kembro et al., 2018; Own)
	Packing and Shipping	• How do varying packaging characteristics and requirements from store and e-commerce impact the appropriate type and level of automation? • What factors impact the appropriateness to integrate or	(Kembro et al., 2018)

Cluster	Topic	Research Questions	References
		separate physical shipping areas for different types of packing and consolidation activities? • How does increased complexity (mixed order size and new customer requirements such as labeling) impact the choice of packing and shipping equipment?	
Technology and tools	Governance	• How should companies be configured (technologically) to provide a beneficial basis for omnichannel management? • How can IT governance improve omnichannel management? • How can firms effectively use technology in PX management? • Enterprise Network Integration Platform application in an omnichannel scenarios.	(Lemon & Verhoef, 2016; Li et al., 2015; Mirsch et al., 2016; Own)
	New techniques for data collection and analysis	• How can we capture PX data in situ? How can we capture and analyze the raw components of CX without influencing the customer journey or experience?	(Lemon & Verhoef, 2016; Own)

Cluster	Topic	Research Questions	References
		• How can we incorporate new data and analytics into PX analysis (e.g., social listening, text, photo and video analytics, location-based data) to further understand PX and the customer journey? • How can new neuroscientific approaches be used to measure PX? Can machine learning models be used to analyze the customer purchase journey and identify opportunities for intervention and influence?	
	Application on Logistics	• How can OC OC (Manufacturers, Wholesalers or Distributors) improve registration of received goods through IT systems? (e.g. pre- arrival notice)? • What are the requirements on IT systems to enable effective and efficient cross-dock flows? • What functionality in IT systems are required to support effective and efficient picking and sorting of a variety of orders and flows (e.g. e-commerce and store replenishment)?	(Kembro et al., 2018; Own)

Cluster	Topic	Research Questions	References
		• How can IT systems support sorting, consolidation, and coordination of multiple flows to avoid scattered shipments (considering a wide range of final destinations and shipping times)? • What new competences and capabilities are required in MH nodes to handle an increased use of complex IT solutions? • What are the challenges and opportunities with integrating WMS with other network IT systems to best support OC logistics?	
	Customer experience management	• How do organizations need to adapt to the complexity of the customer journey? • How can firms effectively use technology in PX management?	(Lemon & Verhoef, 2016; Own)

Table 7. Research agenda for clusters other than Management & Operations (CX: Customer eXperience; OC – Omnichannel; MH – Material Handling; PX – Purchase Officer Experience or Purchaser Experience)

On the other hand, as lines of research, in addition to refining the general model collected in the second paper, models can be made for specific industries. These

industries could be, in order of importance: consumer goods, consumer services, technology, multimedia content and construction (Straker et al., 2015). It should be considered, as an initial hypothesis for subsequent research, that the relationships between companies (manufacturer-distributor) are also affected by the new Omnichannel paradigm. The expectations that characterize the demand of a business customer towards their supplier are also influenced by the context of the move to digital that has forced retailers to undertake omnichannel strategies.

Additionally, as has been argued throughout the research, and as indicated by the papers that are limited to intercompany omnichannel management, it is worth highlighting the need to investigate how to characterize the professional buyer, as the basis of any management strategy. That is why a new concept of Procurement Officer Experience (or Purchase Experience) has been proposed in the papers, which will be a counterpart to the already widely studied Customer Experience, which generally refers to the end consumer, who is served mainly by retailers.

One of the contributions presented by the model collected in the second paper is the disparity of variables and limitations that occur in the field of “management”. The scope is very wide, but at the same time it shows us the vast potential research field in Omnichannel Management in general. Each store of value and constraint identified within the "Omnichannel Management" field constitutes an area in the omnichannel field that could be investigated. For example, no papers have been found that address value repositories or constraints linked to the organization from the perspectives of leadership, hiring of human resources, definition of roles or the internal organization/stakeholders.

As stated in the second paper, a possible future task would be to assess the validity of the FCM model that has been identified. If the FCM model reproduces with some accuracy the Omnichannel Management processes in each of the organizations of the experts who have been part of the Delphi process. However, it should be noted that when using calibrated FCM there is “a temptation to see their predictions as the truth about how the future will unfold, when what they truly provide are alternative and often competing ideas on ways in which it may unfold” (A. J. Jetter & Kok, 2014) . The model includes an evaluation of which traditional processes are most affected in this new Omnichannel Management and, to some extent, how management efficiency is characterized, defined, and measured in a company that accepts the need for continuous adaptation to an increasingly diverse and changing demand. As a line of research, this model could be iterated—either on companies in a specific industry, or with different positions in the value chain (manufacturers vs. wholesalers) or company sizes—to infer more specific models.

Finally, the third paper points out several opportunities for future research. A clear line of future research may be to limit the sample used for the PLM-SEM modeling to a specific industry, or to the position that the company occupies in the value chain (Gessner & Snodgrass, 2015; Heidekrüger, Heuchert, Clever, & Becker, 2018). For example, while both belong to the B2B sphere, a manufacturer and its distribution network is very different from a wholesaler selling to SMEs.

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ANNEXES

1 CHAPTER 1: Omnichannel Management in a B2B context: Concept, research agenda and bibliometric review

1.1 Thesaurus omnichannel

label	replace by
omni-channel	omnichannel
omnichannel's	omnichannel
multi-channel	omnichannel
multichannel	omnichannel
multi channel	omnichannel
multi-channel retailing	omnichannel retailing
multichannel retailing	omnichannel retailing
omni-channel retailing	omnichannel retailing
operation	operations
warehousing	warehouse
Bricks	Brick-and-mortar
Mortar	Brick-and-mortar
Brick & Mortar	Brick-and-mortar
Bricks-and-mortar-only	Brick-and-mortar
Supply Chains	Supply chain
retailing	retail
consumer behaviour	consumer behavior
air pollutant	air pollutants
algorithm	algorithms
analytic method	analytical method
banking regulation	banking regulations
banking service	banking services
Online Channel	Online Channels
Mobile Commerce	M-Commerce
Surveys	Survey
Identifications	Identification
Websites	Website
Whole Sale	Wholesale
Wi Fi	Wi-Fi
Business Model	Business Models
web-rooming	webrooming
Willingness-to-pay	Willingness to pay
Word-of-mouth	Word of mouth
World Wide Web	Internet
Managements	Management
Problems	Problem
U.S	USA
U.S.	USA
United Kingdom	UK
United States	USA
Students	Student
Areas	Area
Transportation	Transport
User Generated Content(UGC)	User Generated Content
User-Generated Content	User Generated Content
Technological	Technology
Modeling	Model
Thresholds	Threshold
Touch-Point	Touchpoint
Touchpoints	Touchpoint
Touch points	Touchpoint
Markets	Market
SCM	Supply Chain Management
So-lo-mo	SOLOMO
Salesperson	Sales Force

Sales Agents	Sales Force
Salespeople	Sales Force
Centres	Center
Centers	Center
Show-rooming	Showrooming
Showrooms	Showrooming
Measurements	Measurement
Measure	Measurement
Optimizations	Optimization
Small and Medium Enterprise(SME)	Small and Medium Enterprise
Small and Medium Enterprises(SMEs)	Small and Medium Enterprise
Small and Medium-sized Enterprise	Small and Medium Enterprise
SME	Small and Medium Enterprise
SMEs	Small and Medium Enterprise
Radio Frequency Identification (RFID)	RFID
Recommender	Recommendation
Systems	System
Remanufacturer	Remanufacturing
Formats	Format
Prices	Price
Techonologies	Technology
Retailer	Retail
Managements	Management
Rfid	RFID
Russian Federation	Russia
Specifications	Specification
Personalizations	Personalization
Models	Model
Preferences	Preference
Strategies	Strategy
Life Cycle	Lifecycle
Improvements	Improvement
Off-line	Offline
On demands	On demand
Apps	App
Methods	Method
Bankings	Banking
Mobile Commerce(m-commerce)	M-Commerce
Devices	Device
Mobile Instant Messaging(MIM)	Mobile Instant Messaging
Shoppers	Shopper
Last Mile	Last-Mile
Latent Class	Latent-Class
Variables	Variable
Lisboa	Lisbon
Reviews	Review
Providers	Provider
Information and communication technologies	IT
Information and communication technology	IT
Information and communications technologies	IT
Information technology	IT
ICT	IT
Values	Value
Internet Commerce	e-Commerce
Internet of things	IOT
Internet of things (IOT)	IOT
Internet of things (IoT)	IOT
Investments	Investment
Streets	Street
Human Computer Interaction	Human-Computer Interaction
Differences	Difference
Generations	Generation
Pickups	Pickup
Institutions	Institution

Services	Service
E-commerce	e-Commerce
E-tailers	e-Tailer
E-tailing	e-Tailer
Ease Of Use	Ease-of-Use
Electronic-Commerce	e-Commerce
Networks	Network
EU	European Union
Decision Modeling	Decision Model
Systems	System
Supports	Support
Decision Making	Decision-Making
Countries	Country
Digitalisation	Digitalization
Digitalizations	Digitalization
Dynamical	Dynamic
Call Centers	Call Center
Cell Phone Shopping	m-Commerce
Choice Modelling	Choice Modeling
Choice Model	Choice Modeling
Makings	Making
electronic commerce	e-commerce
consumers	consumer

2 CHAPTER 2: Omnichannel Management in B2B. Complexity-based model. Empirical evidence from a panel of experts based on Fuzzy Cognitive Maps

2.1 Delphi round 1

Management Indicators in Omni-Channel

Welcome to the Delphi Survey - Round 1 (out of 4)!

Presentation

This research project is initiated by a Research Group at the Faculty of Economy and Management, **University of Alcala** in Madrid – Spain. The objective of this study is twofold:

1. to answer the question: What actions are required by companies with an **Omni-channel management** to increase the value they create and ensure their competitiveness?;
2. and to simulate the range of changes that will improve the creation of value in companies with **Omni-channel management** and allow executives to anticipate the benefit.

The study is purposefully designed to impact on your time as little as possible, and for this reason we will be adopting the Delphi technique.

About Round 1

The questionnaire consists of 2 questions and will take approximately 10-15 minutes or less. The

About Round 1

The questionnaire consists of 2 questions and will take approximately 10-15 minutes or less. The questions are designed to generate an "expert consensus" on the external constraints for the creation of value in omnichannel organizations and on the repositories of key values that affect the performance of the omnichannel administration. This questionnaire will be carried out with an online survey.

What's Next?

After completing Round 1, you will receive a second questionnaire (Round 2) in which you will be asked to review the elements summarized by the research team based on the information based on the information provided in the first round. In Round 2, a consensus will be formed on the basic components of creating value in omnichannel companies.

Confidentiality

All data obtained from the participants will be kept confidential and will only be reported in an aggregated format (reporting only the combined results and never reporting the individual results). All questionnaires will be hidden, and no one other than members of the research team will have access to them.

By participating in the research, you could:

Learn and share ideas with other experts in value creation in omnichannel companies and other relevant topics for your work. This Delphi study is interactive and iterative, allowing you to reflect on issues of great importance to your business.

- Receive a copy of the pre-publication copies of the main reports produced, which will help you better understand what is currently influencing omnichannel management and the creation of related value, which is likely to influence them in the future and provide information for their planning decisions.

Questions about the research?
If you have any questions regarding this study, you can contact Pr. Javier Alonso-Garcia at +34 619 542 840, franciscojavier.alon@edu.uah.es.

OK

NEXT

Management Indicators in Omni-Channel

Contact Info

Login

Name

Company

Position

Country

Email

Management Indicators in Omni-Channel

Question 1 of 2

What do you think are the main external constraints for the creation of value in omnichannel management?

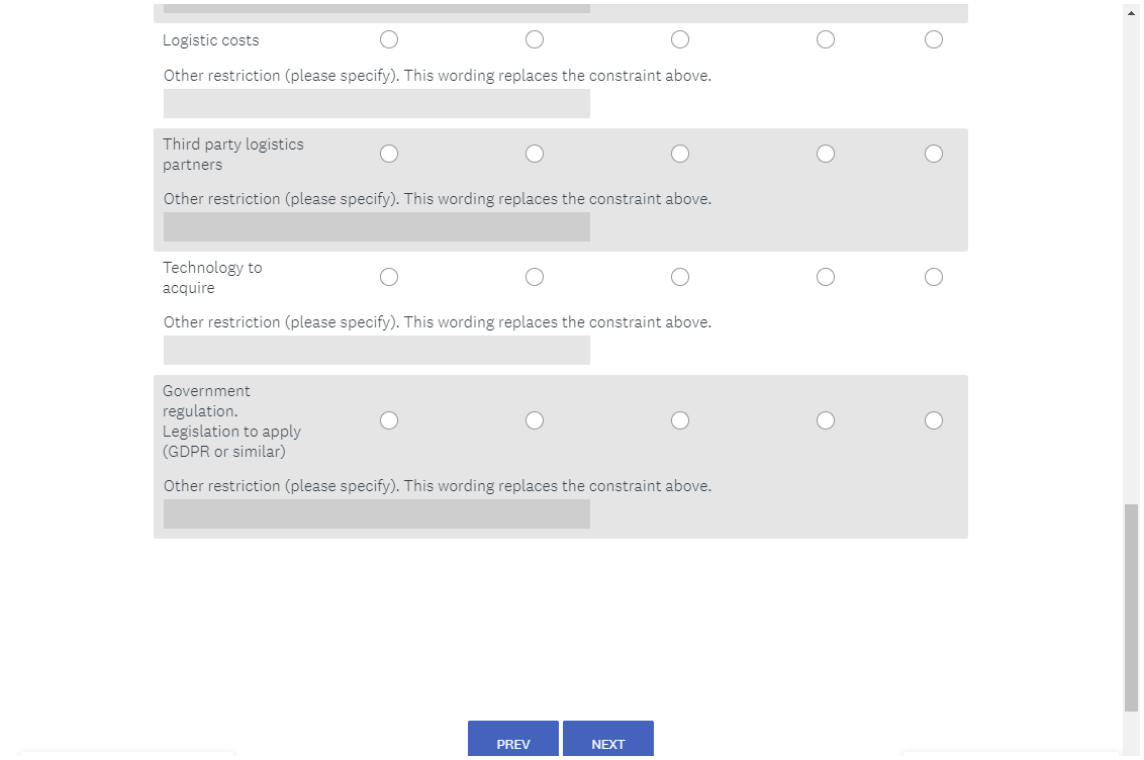
Check up to 10 of the main suggested constraints that you think affect most to value creation in omnichannel firms. You can also add your own constraints by writing in the blank boxes. The maximum number of constraints **to consider is 10**, either the list suggested or the new ones created. Note that if you answer more than 10, it will not allow you to go to the next question.

It is considered that you have chosen any of the restrictions at the time you evaluate with the different alternatives offered (from strongly agree to strongly disagree).

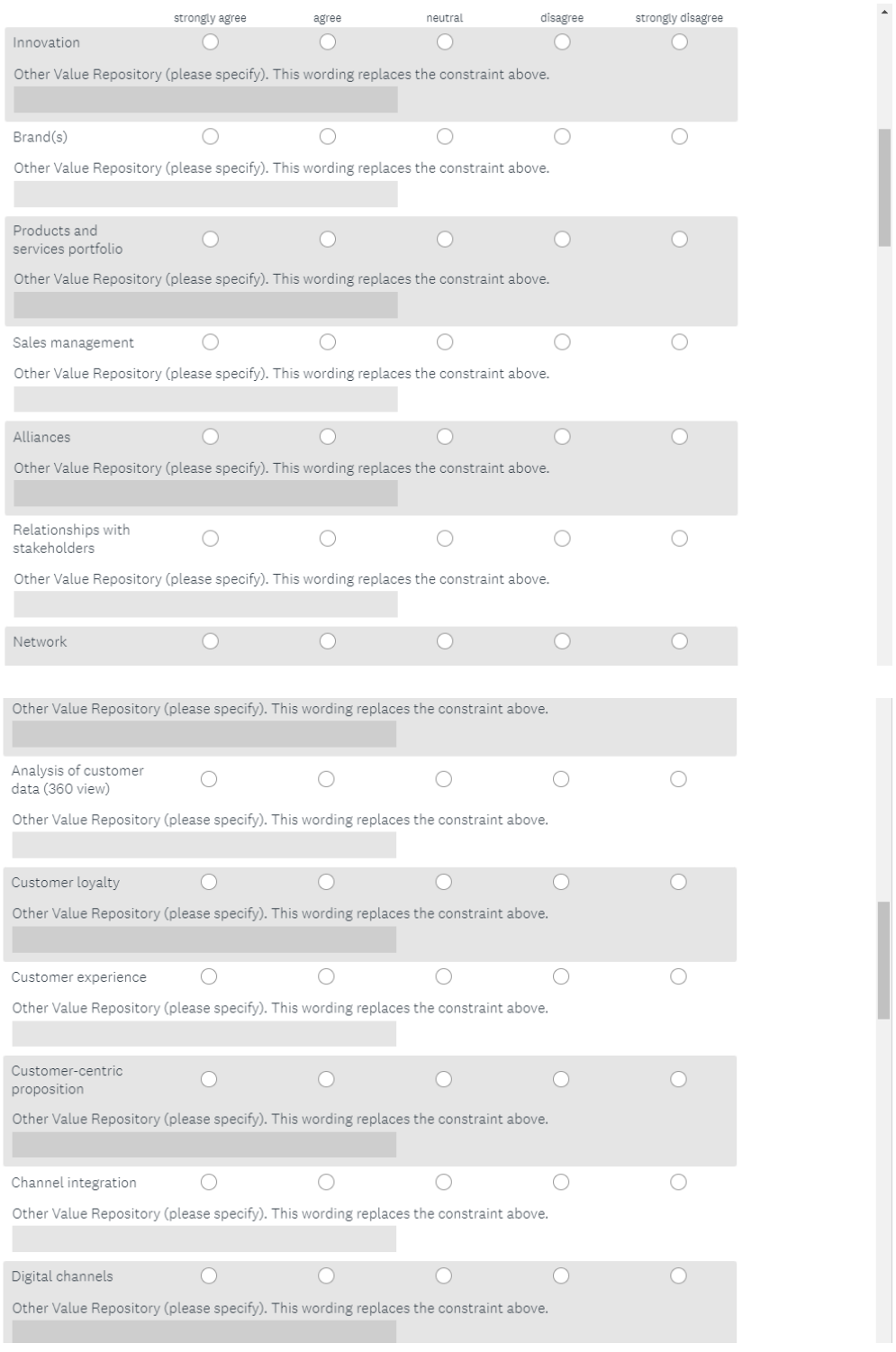
Important note. The research team is aware that the term "value" is a subjective concept that can mean different things to different people, even with the same organization. Participants are encouraged to answer question # 1 by considering "value" in general terms, either as a combination of the customer's

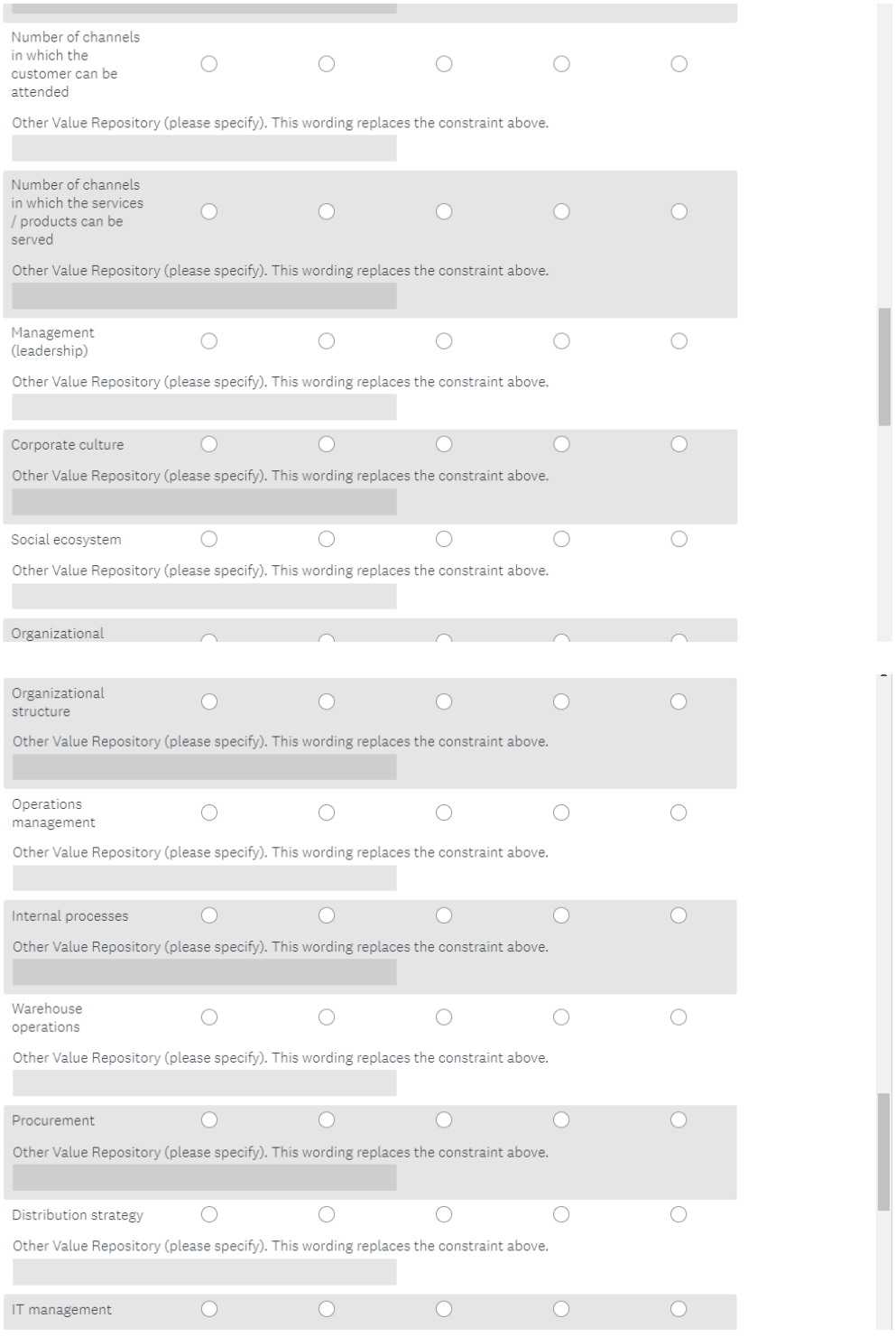
user value, the value exchanged with the customer or the offer of value to the market.

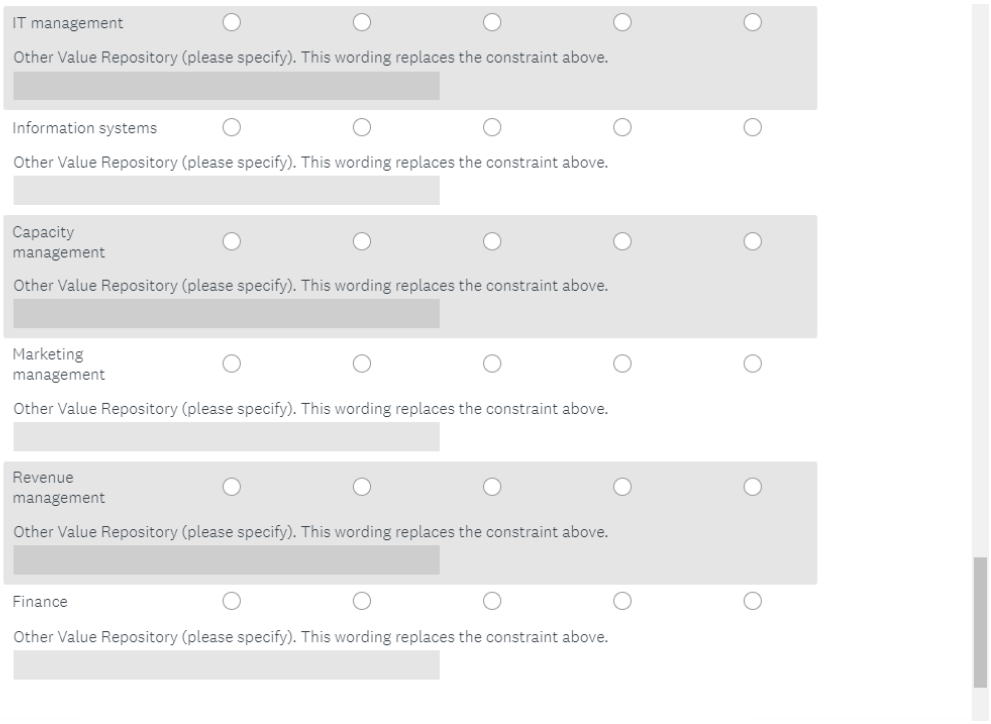
	strongly agree	agree	neutral	disagree	strongly disagree
The heterogeneity of the buyer (Chief Procurement Officer)	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
Channel maturity	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
Third-party channel partners	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
Third-party catalog partners	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
Competitors established	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
New niche players / new players outside the industry	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
Funds / Finance	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
Difficulty finding resources with appropriate skills for the company (Human Resources)	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					
Labor costs	○	○	○	○	○
Other restriction (please specify). This wording replaces the constraint above.					

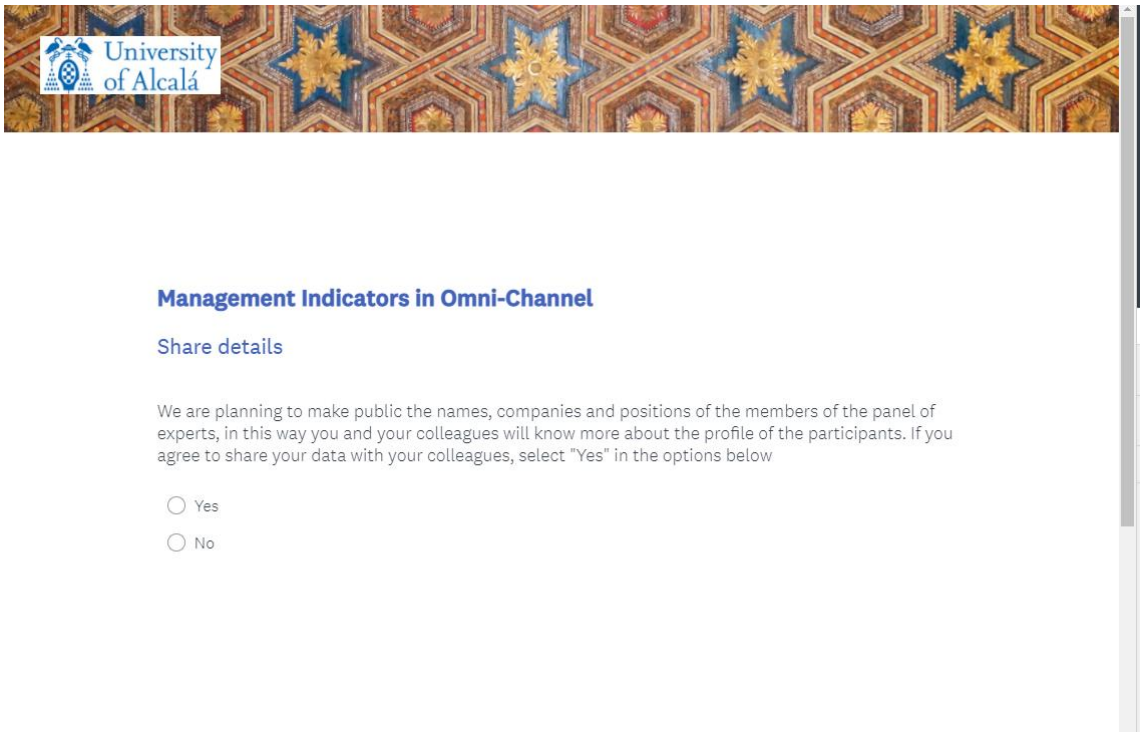

Logistic costs
Other restriction (please specify). This wording replaces the constraint above.
Third party logistics partners
Other restriction (please specify). This wording replaces the constraint above.
Technology to acquire
Other restriction (please specify). This wording replaces the constraint above.
Government regulation. Legislation to apply (GDPR or similar)
Other restriction (please specify). This wording replaces the constraint above.
PREV
NEXT


University of Alcalá
Management Indicators in Omni-Channel
Question 2 of 2
What are the key value repositories in omnichannel companies?
Based on your best knowledge and experience, write down what you believe are the key Value Repositories (VR) that impact long-term omnichannel management. The participant is requested to consider VR in all the functions of a company. If needed, you can also add your own VR by writing in the blank boxes below. The maximum number of value repositories to consider is 15, either the list suggested or the new ones created.
It is considered that you have chosen any of the restrictions at the time you evaluate with the different alternatives offered (from strongly agree to strongly disagree).
Important note: Value repositories (VR) are autonomous internal operating networks that group activities, resources, processes and / or multifunctional tools with the sole purpose of creating a unique and differentiated value to exchange it with other internal or external VRs. Note that most of the times the VRs do not coincide with the units in the organization chart, nor with the dimensions of Porter's conventional value chain of 5 forces analysis.


strongly agree
agree
neutral
disagree
strongly disagree
Innovation
Other Value Repository (please specify). This wording replaces the constraint above.
Brand(s)
Other Value Repository (please specify). This wording replaces the constraint above.
Products and services portfolio
Other Value Repository (please specify). This wording replaces the constraint above.
Sales management
Other Value Repository (please specify). This wording replaces the constraint above.
Alliances
Other Value Repository (please specify). This wording replaces the constraint above.
Relationships with stakeholders
Other Value Repository (please specify). This wording replaces the constraint above.
Network
Other Value Repository (please specify). This wording replaces the constraint above.
Analysis of customer data (360 view)
Other Value Repository (please specify). This wording replaces the constraint above.
Customer loyalty
Other Value Repository (please specify). This wording replaces the constraint above.
Customer experience
Other Value Repository (please specify). This wording replaces the constraint above.
Customer-centric proposition
Other Value Repository (please specify). This wording replaces the constraint above.
Channel integration
Other Value Repository (please specify). This wording replaces the constraint above.
Digital channels
Other Value Repository (please specify). This wording replaces the constraint above.


Number of channels in which the customer can be attended
Other Value Repository (please specify). This wording replaces the constraint above.
Number of channels in which the services / products can be served
Other Value Repository (please specify). This wording replaces the constraint above.
Management (leadership)
Other Value Repository (please specify). This wording replaces the constraint above.
Corporate culture
Other Value Repository (please specify). This wording replaces the constraint above.
Social ecosystem
Other Value Repository (please specify). This wording replaces the constraint above.
Organizational
Organizational structure
Other Value Repository (please specify). This wording replaces the constraint above.
Operations management
Other Value Repository (please specify). This wording replaces the constraint above.
Internal processes
Other Value Repository (please specify). This wording replaces the constraint above.
Warehouse operations
Other Value Repository (please specify). This wording replaces the constraint above.
Procurement
Other Value Repository (please specify). This wording replaces the constraint above.
Distribution strategy
Other Value Repository (please specify). This wording replaces the constraint above.
IT management


IT management
Other Value Repository (please specify). This wording replaces the constraint above.
Information systems
Other Value Repository (please specify). This wording replaces the constraint above.
Capacity management
Other Value Repository (please specify). This wording replaces the constraint above.
Marketing management
Other Value Repository (please specify). This wording replaces the constraint above.
Revenue management
Other Value Repository (please specify). This wording replaces the constraint above.
Finance
Other Value Repository (please specify). This wording replaces the constraint above.


University of Alcalá
Management Indicators in Omni-Channel
Share details
We are planning to make public the names, companies and positions of the members of the panel of experts, in this way you and your colleagues will know more about the profile of the participants. If you agree to share your data with your colleagues, select "Yes" in the options below
Yes
No

2.2 Delphi round 2

Management Indicators in Omni-Channel - Round 2

Welcome to the Delphi Survey - Round 2 (out of 4)!

Welcome to Delphi Round 2

The questionnaire consists of 2 questions and will take approximately 10-15 minutes or less. Participant is asked to review the items summarized by the investigators based on the information provided in the first round. The questions are designed to generate an "expert consensus" on the external constraints for the creation of value in omnichannel organizations and on the repositories of key values that affect the performance of the omnichannel administration. This questionnaire will be carried out with an online survey.

What's Next?

After completing Round 2, you will receive an interim report summarizing the results obtained in rounds 1 and 2. This will be followed by a third questionnaire (Round 3) where you will be asked to establish the connections between the value constraints and the value repositories, and among the value repositories themselves.

Confidentiality

All data obtained from the participants will be kept confidential and will only be reported in an aggregated format (reporting only the combined results and never reporting the individual results). All questionnaires will be hidden, and no one other than members of the research team will have access to them.

By participating in the research, you could:

Learn and share ideas with other experts in value creation in omnichannel companies and other relevant topics for your work. This Delphi study is interactive and iterative, allowing you to reflect on issues of great importance to your business.

- Receive a copy of the pre-publication copies of the main reports produced, which will help you better understand what is currently influencing omnichannel management and the creation of related value, which is likely to influence them in the future and provide information for their planning decisions.

Questions about the research?
If you have any questions regarding this study, you can contact Pr. Javier Alonso-Garcia at +34 619 542 840, franciscojavier.alon@edu.uah.es.

OK

NEXT

Management Indicators in Omni-Channel - Round 2

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PREV NEXT

Management Indicators in Omni-Channel - Round 2

Question 1 of 2

What do you think are the 10 key constraints for the creation of value in omnichannel management?

The items listed are the value constraints set by the members of the expert panel. You are asked to select **the 10 constraints** that you think most affect the creation of value in omnichannel firms.

It is considered that you have chosen any of the restrictions at the time you evaluate with the different alternatives offered (from strongly agree to strongly disagree).

	strongly agree	agree	neutral	disagree	strongly disagree
1 The heterogeneity of the buyer (Chief Procurement Officer)	○	○	○	○	○
2 Customer approach	○	○	○	○	○
3 Many internal stakeholders	○	○	○	○	○
4 Achieving internal agreement on value	○	○	○	○	○
5 Channel maturity	○	○	○	○	○
6 Third-party channel partners	○	○	○	○	○
7 Third-party catalog partners	○	○	○	○	○
8 Competitors established	○	○	○	○	○
9 New niche players / new players outside the industry	○	○	○	○	○
10 Transform the process and traditional way of selling	○	○	○	○	○
11 Funds / Finance	○	○	○	○	○
12 Difficulty finding resources with appropriate skills for the company (Human Resources)	○	○	○	○	○
13 Labor costs	○	○	○	○	○
14 Logistic costs	○	○	○	○	○
15 Third party logistics partners	○	○	○	○	○

16 Volatility of third partners	○	○	○	○	○
17 Customer or supplier knowledge (data, single view)	○	○	○	○	○
18 Technology to acquire	○	○	○	○	○
19 Tech readiness and manpower to transfer	○	○	○	○	○
20 Integration of new technology with existing solutions in the company (backoffice)	○	○	○	○	○
21 The cost of adopting the new technology internally	○	○	○	○	○
22 Government regulation. Legislation to apply (GDPR or similar)	○	○	○	○	○

PREV NEXT

Management Indicators in Omni-Channel - Round 2

Question 2 of 2

What are the key 15 value repositories affecting performance in omnichannel companies?

The items listed are the repositories of values established by the members of the expert panel. Now, you are asked to select the **15 value repositories** that you think most impact, either directly or indirectly, on omnichannel long-term management in omnichannel companies.

It is considered that you have chosen any of the restrictions at the time you evaluate with the different alternatives offered (from strongly agree to strongly disagree).

Reminder: A Value repository (VR) is an autonomous internal operating networks that group activities, resources, processes and / or multifunctional tools with the sole purpose of creating a unique and differentiated value to exchange it with other internal or external VRs.

	strongly agree	agree	neutral	disagree	strongly disagree
1 Innovation	○	○	○	○	○
2 Brand(s)	○	○	○	○	○
3 Products and services portfolio	○	○	○	○	○
4 Custom-made products	○	○	○	○	○
5 Sales management	○	○	○	○	○
6 Suitable scalable prices	○	○	○	○	○
7 Alliances	○	○	○	○	○
8 Relationships with stakeholders	○	○	○	○	○
9 Sales representatives	○	○	○	○	○
10 Network	○	○	○	○	○
11 Deep coverage across countries	○	○	○	○	○
12 Analysis of customer data (360 view)	○	○	○	○	○
13 Customer loyalty	○	○	○	○	○
14 Customer experience	○	○	○	○	○
15 Customer-centric proposition	○	○	○	○	○
16 Channel integration	○	○	○	○	○
17 Digital channels	○	○	○	○	○

18 Number of channels in which the customer can be attended (including Digital)	○	○	○	○	○
19 Number of channels in which the services / products can be served	○	○	○	○	○
20 Management (leadership)	○	○	○	○	○
21 Corporate culture	○	○	○	○	○
22 Social ecosystem	○	○	○	○	○
23 Organizational structure	○	○	○	○	○
24 Operations management	○	○	○	○	○
25 Internal processes	○	○	○	○	○
26 Warehouse operations	○	○	○	○	○
27 Procurement	○	○	○	○	○
28 Distribution strategy	○	○	○	○	○
29 IT management	○	○	○	○	○
30 Information systems	○	○	○	○	○
31 Capacity management	○	○	○	○	○
32 Marketing management	○	○	○	○	○
33 Revenue management	○	○	○	○	○
34 Finance	○	○	○	○	○

PREV NEXT

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Management Indicators in Omni-Channel - Round 2

Share your details

If you agree to share your details with your peers, please select "Yes" in the options below:

○ Yes

○ No

PREV DONE

2.3 Delphi round 3

Management Indicators in Omni-Channel - Round 3

Welcome to the Delphi Survey - Round 3 (out of 4)!

Welcome to Delphi Round 3
As anticipated in the previous round, the results of the first two rounds of Delphi are shown on the next sheet.

The questionnaire consists of 3 questions divided into the following sections: (1) section 1: it consists of ten matrix type questions; (2) Section 2: consists of fifteen other matrix questions; and (3) section 3: consists of a matrix type question. The estimated completion time is 20-30 minutes. The participant is asked to establish the relationships and impact weights between the 10 consensus Value Constraints, the 15 consensus Value Repositories and the performance of Omnichannel Management in an organization. This questionnaire will be carried out with an online survey.

What's Next?

After completing Round 3, you will receive a copy of your own "Omnichannel Value Creation Canvas" (OVCC) that describes the relationships and impacts between Value Constraints, Value Repositories and Omnichannel Performance Management. The OVCC will be followed by our last questionnaire (Round 4) where you and the peers of the panel of experts will be asked to try to reach a final consensus on the same questions.

Confidentiality

All data obtained from the participants will be kept confidential and will only be reported in an aggregated format (reporting only the combined results and never reporting the individual results). All questionnaires will be hidden, and no one other than members of the research team will have access to them.

By participating in the research, you could:

Learn and share ideas with other experts in value creation in omnichannel companies and other relevant topics for your work. This Delphi study is interactive and iterative, allowing you to reflect on issues of great importance to your business.

- Receive a copy of the pre-publication copies of the main reports produced, which will help you better understand what is currently influencing omnichannel management and the creation of related value, which is likely to influence them in the future and provide information for their planning decisions.

Questions about the research?
If you have any questions regarding this study, you can contact Pr. Javier Alonso-García at +34 619 542 840, franciscojavier.alon@edu.uah.es.

OK

Management Indicators in Omni-Channel - Round 3

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Management Indicators in Omni-Channel - Round 3

Results of the first rounds of Delphi

The panel of experts is made up of executives from manufacturers and wholesalers in 17 countries on five continents (Argentina, Australia, Belgium, Brazil, Czech Republic, Denmark, Estonia, Germany, India, Italy, Mexico, Spain, Switzerland, Thailand, Tunisia , United Kingdom and United States).

After the first two rounds, the 10 consensus Value Restrictions are as follows:

1. Achieving internal agreement on value
2. Channel maturity
3. Customer approach
4. Customer or supplier knowledge (data, single view)
5. Difficulty finding resources with appropriate skills for the company (Human Resources)
6. Funds / Finance
7. Integration of new technology with existing solutions in the company (backoffice)
8. Many internal stakeholders

9. The cost of adopting the new technology internally
10. Transform the process and traditional way of selling

Likewise, the 15 consensus Value Repositories are the following:

1. Analysis of customer data (360 view)
2. Brand(s)
3. Channel integration
4. Corporate culture
5. Customer experience
6. Customer loyalty
7. Customer-centric proposition
8. Digital channels
9. Innovation
10. IT management
11. Management (leadership)
12. Marketing management
13. Network
14. Products and services portfolio
15. Sales management

OK

Management Indicators in Omni-Channel - Round 3

Question 1 of 3. Value Constraints vs. Value Repositories

How do the 10 consensus Value Constraints impact on the 15 consensus Value Repositories?

The items on the first column are the **15 consensus Value Repositories** reached by the experts in round 2 of the expert panel. The columns on the right contain the **10 consensus Value Constrains**. For the sake of clarity this question has been divided in ten sections each containing a question relating all 15 consensus Value Repositories with one consensus Value Constraint at a time.

OK

Section 1/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Achieving internal agreement on value"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Achieving internal agreement on value"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○
4. Corporate culture	○	○	○	○	○
5. Customer experience	○	○	○	○	○
6. Customer loyalty	○	○	○	○	○
7. Customer-centric proposition	○	○	○	○	○
8. Digital channels	○	○	○	○	○
9. Innovation	○	○	○	○	○
10. IT management	○	○	○	○	○
11. Management (leadership)	○	○	○	○	○
12. Marketing management	○	○	○	○	○
13. Network	○	○	○	○	○
14. Products and services portfolio	○	○	○	○	○
15. Sales management	○	○	○	○	○

Reminder. Value repositories (VR) are autonomous internal operating networks that group activities, resources, processes and / or multifunctional tools with the sole purpose of creating a unique and differentiated value to exchange it with other internal or external VRs.

OK

Section 2/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Channel maturity"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Channel maturity"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○
4. Corporate culture	○	○	○	○	○
5. Customer experience	○	○	○	○	○
6. Customer loyalty	○	○	○	○	○
7. Customer-centric proposition	○	○	○	○	○
8. Digital channels	○	○	○	○	○
9. Innovation	○	○	○	○	○
10. IT management	○	○	○	○	○
11. Management (leadership)	○	○	○	○	○
12. Marketing management	○	○	○	○	○
13. Network	○	○	○	○	○
14. Products and services portfolio	○	○	○	○	○
15. Sales management	○	○	○	○	○

Section 3/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Customer approach"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Customer approach"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○
4. Corporate culture	○	○	○	○	○
5. Customer experience	○	○	○	○	○
6. Customer loyalty	○	○	○	○	○
7. Customer-centric proposition	○	○	○	○	○
8. Digital channels	○	○	○	○	○
9. Innovation	○	○	○	○	○
10. IT management	○	○	○	○	○
11. Management (leadership)	○	○	○	○	○

Section 4/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Customer or supplier knowledge (data, single view)"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Customer or supplier knowledge (data, single view)"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 5/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Difficulty finding resources with appropriate skills for the company (Human Resources)"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Difficulty finding resources with appropriate skills for the company (Human Resources)"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 6/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Funds / Finance"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Funds / Finance"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 7/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Integration of new technology with existing solutions in the company (backoffice)"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Integration of new technology with existing solutions in the company (backoffice)"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 8/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Many internal stakeholders"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Many internal stakeholders"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 9/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "The cost of adopting the new technology internally"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "The cost of adopting the new technology internally"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 10/10: Select the options that best describe on each of the 15 consensus Value Repositories the impact of the Value Constraint "Transform the process and traditional way of selling"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank

Value Constraint: "Transform the process and traditional way of selling"

	very weak	weak	zero	strong	very strong
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Management Indicators in Omni-Channel - Round 3

Question 2 of 3. Value Repositories vs. Value Repositories

How the 15 consensus Value Repositories are related and how they impact each other?

The items on the first column the **15 consensus Value Repositories** reached by the experts in round 2 of the expert panel. The columns on the right are also **the 15 consensus Value Repositories**. For the sake of clarity this question has been divided into fifteen sections, each of which contains a question that relates the consensus Value Repository among them.

OK

Section 1/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Analysis of customer data (360 view)"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Analysis of customer data (360 view)"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○
4. Corporate culture	○	○	○	○	○
5. Customer experience	○	○	○	○	○
6. Customer loyalty	○	○	○	○	○
7. Customer-centric proposition	○	○	○	○	○
8. Digital channels	○	○	○	○	○
9. Innovation	○	○	○	○	○
10. IT management	○	○	○	○	○
11. Management (leadership)	○	○	○	○	○
12. Marketing management	○	○	○	○	○
13. Network	○	○	○	○	○
14. Products and services portfolio	○	○	○	○	○
15. Sales management	○	○	○	○	○

Section 2/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Brand(s)"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Brand(s)"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 3/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Channel integration"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Channel integration"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 4/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Corporate culture"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Corporate culture"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 5/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Customer experience"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Customer experience"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 6/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Customer loyalty"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Customer loyalty"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 7/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Customer-centric proposition"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Customer-centric proposition"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 8/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Digital channels"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Digital channels"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 9/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Innovation"
(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Innovation"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 10/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "IT management"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "IT management"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 11/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Management (leadership)"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Management (leadership)"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 12/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Marketing management"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Marketing management"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 13/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Network"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Network"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 14/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Products and services portfolio"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Products and services portfolio"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Section 15/15: Select the options that best describe in each of the 15 consensus Value Repositories the impact of "Sales management"

(1) Only one option must be selected per row; (2) Leave unknown impacts blank; (3) Loops are allowed (the impact of one Value Repository on itself)

Value Repository: "Sales management"

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○

Management Indicators in Omni-Channel - Round 3

Question 3 of 3. Value Repositories vs. Long-Term Omnichannel Management Performance

How do the 15 consensus Value Repositories impact long-term Omnichannel Management in companies?

You are asked to select one option (very weak, weak, zero, strong, very strong) that best describes the impact of each consensus Value Repository on long-term omnichannel management in companies.

Note. The Omnichannel strategy seeks to provide a unique and improved experience regardless of the purchase phase and the channel in which the customer is located (customer journey). This study focuses on manufacturers and wholesalers that reach their customers (purchasing managers) through different channels (for example, electronic commerce and sales force).

Long-term Omnichannel Management

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Brand(s)	○	○	○	○	○
3. Channel integration	○	○	○	○	○
4. Corporate culture	○	○	○	○	○
5. Customer experience	○	○	○	○	○
6. Customer loyalty	○	○	○	○	○
7. Customer-centric proposition	○	○	○	○	○
8. Digital channels	○	○	○	○	○
9. Innovation	○	○	○	○	○
10. IT management	○	○	○	○	○
11. Management (leadership)	○	○	○	○	○
12. Marketing management	○	○	○	○	○
13. Network	○	○	○	○	○
14. Products and services portfolio	○	○	○	○	○
15. Sales management	○	○	○	○	○

PREV NEXT

Management Indicators in Omni-Channel - Round 3

Share your details

If you agree to share your details with your peers, please select "Yes" in the options below:

◯ Yes

◯ No

2.4 Delphi round 4

Management Indicators in Omni-Channel - Round 4

Welcome to the Delphi Survey - Round 4 (Final)!

Welcome to Delphi Round 4
The questionnaire consists of 3 questions divided in the following sections: (1) section 1: consists of fifteen matrix-type questions, (2) Section 2: consists of another fifteen matrix-type questions, and (3) section 3: consists of one matrix type question. Participant is asked to set the final sign of the links between the 10 Consensus Value Constraints, the 15 Consensus Value Repositories and the performance of Omnichannel Management in an Organization. Participants will only need to fill the"Sign of the link". Estimated time of completion is 15-18 minutes or less.

What's Next?
Round 4 is the last round of this research project. From here on, the research team will prepare an Interim Report with the conclusions gained and the "Omnichannel Value Creation Canvas (OVCC)" for distribution among participants. Then we will continue according to the metodology to the modelling stage of the Project.

Confidentiality
All data obtained from the participants will be kept confidential and will only be reported in an aggregated format (reporting only the combined results and never reporting the individual results). All questionnaires will be hidden, and no one other than members of the research team will have access to them.

By participating in the research, you could:
Learn and share ideas with other experts in value creation in omnichannel companies and other relevant topics for your work. This Delphi study is interactive and iterative, allowing you to reflect on issues of great importance to your business.

- Receive a copy of the pre-publication copies of the main reports produced, which will help you better understand what is currently influencing omnichannel management and the creation of related value, which is likely to influence them in the future and provide information for their planning decisions.

Questions about the research?
If you have any questions regarding this study, you can contact Pr. Javier Alonso-Garcia at +34 619 542 840, franciscojavier.alon@edu.uah.es.

OK

Management Indicators in Omni-Channel - Round 4

Contact Info

Login

Name

PREV NEXT

Management Indicators in Omni-Channel - Round 4

Question 1 of 3. Value Constraints vs. Value Repositories

Set the final sign and strength of the links between the 15 Consensus Value Repositories and the 10 Consensus Value Constraints.

How to fill the "Sign of a link": Select an option that describes whether the link between a Value Repository and Value Constraint is either positive or Negative. A Positive link is a relationship between two factors (i.e. a value repository and a value constraint) so that as one factor increases, the other also increases. A negative link is such a relationship that as one factor increases, the other decreases. Neutral refers to a link that does not exist.

OK

Section 1/10: Consensus Value Repositories vs. Value Constraint "Achieving internal agreement on value"

Value Constraint: "Achieving internal agreement on value"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○
4. Corporate culture	○	○	○
5. Customer experience	○	○	○
6. Customer loyalty	○	○	○
7. Customer-centric proposition	○	○	○
8. Digital channels	○	○	○
9. Innovation	○	○	○
10. IT management	○	○	○
11. Management (leadership)	○	○	○
12. Marketing management	○	○	○
13. Network	○	○	○
14. Products and services portfolio	○	○	○
15. Sales management	○	○	○

Reminder. A Positive link is a relationship between two factors (i.e. a value repository and a value constraint) so that as one factor increases, the other also increases. A negative link is such a relationship that as one factor increases, the other decreases. Neutral refers to a link that does not exist.

OK

Section 2/10: Consensus Value Repositories vs. Value Constraint "Channel maturity"

Value Constraint: "Channel maturity"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 3/10: Consensus Value Repositories vs. Value Constraint "Customer approach"

Value Constraint: "Customer approach"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 4/10: Consensus Value Repositories vs. Value Constraint "Customer or supplier knowledge (data, single view)"

Value Constraint: "Customer or supplier knowledge (data, single view)"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 5/10: Consensus Value Repositories vs. Value Constraint "Difficulty finding resources with appropriate skills for the company (Human Resources)"

Value Constraint: "Difficulty finding resources with appropriate skills for the company (Human Resources)"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 6/10: Consensus Value Repositories vs. Value Constraint "Funds / Finance"

Value Constraint: "Funds / Finance"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 7/10: Consensus Value Repositories vs. Value Constraint "Integration of new technology with existing solutions in the company (backoffice)"

Value Constraint: "Integration of new technology with existing solutions in the company (backoffice)"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 8/10: Consensus Value Repositories vs. Value Constraint "Many internal stakeholders"

Value Constraint: "Many internal stakeholders"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 9/10: Consensus Value Repositories vs. Value Constraint "The cost of adopting the new technology internally"

Value Constraint: "The cost of adopting the new technology internally"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 10/10: Consensus Value Repositories vs. Value Constraint "Transform the process and traditional way of selling"

Value Constraint: "Transform the process and traditional way of selling"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Management Indicators in Omni-Channel - Round 4

Question 2 of 3. Value Repositories vs. Value Repositories

Set the final sign and strength of the links among the 15 Consensus Value Repositories.

How to fill the "Sign of a link": Select an option that describes whether the link between two Value Repositories is either positive or Negative. A Positive link is a relationship between two factors (i.e. a value repository and a value constraint) so that as one factor increases, the other also increases. A negative link is such a relationship that as one factor increases, the other decreases. Neutral refers to a link that does not exist.

OK

Section 1/15: The 15 consensus Value Repositories vs. "Analysis of customer data (360 view)"

Value Repository: "Analysis of customer data (360 view)"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○
4. Corporate culture	○	○	○
5. Customer experience	○	○	○
6. Customer loyalty	○	○	○
7. Customer-centric proposition	○	○	○
8. Digital channels	○	○	○
9. Innovation	○	○	○
10. IT management	○	○	○
11. Management (leadership)	○	○	○
12. Marketing management	○	○	○
13. Network	○	○	○
14. Products and services portfolio	○	○	○
15. Sales management	○	○	○

Section 2/15: The 15 consensus Value Repositories vs. "Brand(s)"

Value Repository: "Brand(s)"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 3/15: The 15 consensus Value Repositories vs. "Channel integration"

Value Repository: "Channel integration"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 4/15: The 15 consensus Value Repositories vs. "Corporate culture"

Value Repository: "Corporate culture"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 5/15: The 15 consensus Value Repositories vs. "Customer experience"

Value Repository: "Customer experience"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 6/15: The 15 consensus Value Repositories vs. "Customer loyalty"

Value Repository: "Customer loyalty"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 7/15: The 15 consensus Value Repositories vs. "Customer-centric proposition"

Value Repository: "Customer-centric proposition"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 8/15: The 15 consensus Value Repositories vs."Digital channels"

Value Repository: "Digital channels"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 9/15: The 15 consensus Value Repositories vs."Innovation"

Value Repository: "Innovation"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 10/15: The 15 consensus Value Repositories vs. "IT management"

Value Repository: "IT management"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 11/15: The 15 consensus Value Repositories vs. "Management (leadership)"

Value Repository: "Management (leadership)"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	◯	◯	◯
2. Brand(s)	◯	◯	◯
3. Channel integration	◯	◯	◯

Section 12/15: The 15 consensus Value Repositories vs. "Marketing management"

Value Repository: "Marketing management"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 13/15: The 15 consensus Value Repositories vs. "Network"

Value Repository: "Network"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 14/15: The 15 consensus Value Repositories the impact of "Products and services portfolio"

Value Repository: "Products and services portfolio"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Section 15/15: The 15 consensus Value Repositories vs. "Sales management"

Value Repository: "Sales management"

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○

Management Indicators in Omni-Channel - Round 4

Question 3 of 3. Value Repositories vs. Long-Term Omnichannel Management Performance

Set the final sign of the links between the 15 consensus Value Repositories and the long-term Omnichannel Management in companies?

How to fill the "Sign of a link": Select an option that describes whether the link between a Value Repository and he long-term management in omnichannel companies.

Note. The Omnichannel strategy seeks to provide a unique and improved experience regardless of the purchase phase and the channel in which the customer is located (customer journey). This study focuses on manufacturers and wholesalers that reach their customers (purchasing managers) through different channels (for example, electronic commerce and sales force).

Long-term Omnichannel Management

	Positive	Neutral	Negative
1. Analysis of customer data (360 view)	○	○	○
2. Brand(s)	○	○	○
3. Channel integration	○	○	○
4. Corporate culture	○	○	○
5. Customer experience	○	○	○
6. Customer loyalty	○	○	○
7. Customer-centric proposition	○	○	○
8. Digital channels	○	○	○
9. Innovation	○	○	○
10. IT management	○	○	○
11. Management (leadership)	○	○	○
12. Marketing management	○	○	○
13. Network	○	○	○
14. Products and services portfolio	○	○	○
15. Sales management	○	○	○

PREV NEXT

Management Indicators in Omni-Channel - Round 4

Share your details

If you agree to share your details with your peers, please select "Yes" in the options below:

○ Yes

○ No

3 CHAPTER 3: Digitalization in B2B Marketing. Omnichannel Management from a PLS-SEM approach

3.1 Extended Delphi for the panelists in paper 2

One last question about omnichannel management indicators

Presentation
You kindly participated in an academic research on Omnichannel Management a year ago. This research has been published in one of the most important specialized journals (here) and as we committed, we ask you for an email address to which we can send you the complete article if you wish. However, we have included the main research findings on the next page.

Taking advantage of this contact we wanted to ask you to complete the assessment that you gave us in your day with only two additional questions that we collect below. Research continues with new experts, but we would like to also incorporate the information collected in the previous rounds and for this we have to complete it with two new variables.

Thank you very much again for your cooperation.

Confidentiality
All data obtained from the participants will be kept confidential and will only be reported in an aggregated format (reporting only the combined results and never reporting the individual results). All questionnaires will be hidden, and no one other than members of the research team will have access to them.

Questions about the research?
If you have any questions regarding this study, you can contact Pr. Javier Alonso-García at +34 619 542 840, franciscojavier.alon@edu.uah.es.

OK

Basic Info (e-mail only if you want the full article of the research to be sent to you)

Name or initials

e-mail (if research is required)

How do Artificial Intelligence impact long-term Omnichannel Management in companies?

You are asked to select one option (very weak, weak, zero, strong, very strong) that best describes the impact of Artificial Intelligence on long-term omnichannel management in companies.

	strongly agree	agree	neutral	disagree	strongly disagree
Artificial Intelligence	○	○	○	○	○

Impact on society

In your opinion, does having an efficient omnichannel management of a b2b company have any beneficial impact on society in general?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
There is a positive impact on society in general if the company in the B2B field performs good omnichannel management.	○	○	○	○	○

NEXT

One last question about omnichannel management indicators

Omnichannel Management in B2B. Conclusions. Managerial implications

According to the findings of this research, Omnichannel Management **in a B2B environment is more strongly impacted by constraints than by variables in its favor**. In other words, a more restrictive environment entails a greater impact on Omnichannel Management than any attempts to improve the context of the variables that favor such management.

Thus, for example, if we review how the Channel Integration value repository has been treated in research to date, it can be concluded that greater channel integration has a positive impact on Omnichannel Management (Cao & Li, 2015; Herhausen, Binder, Schoegel, & Herrmann, 2015). Our study confirms this conclusion, given that a new channel (scenario 2 in the research) favors Omnichannel Management. However, from a management point of view, **it would be advisable to make a greater effort to mitigate negative scenarios** such as the one shown in scenario 1 (failure to adapt the customer's approach; higher cost of adopting new technologies and difficulties in transforming the process and the traditional way of selling), **instead of opening a new channel.**

This exercise also reveals that applying a complexity-based vision of the organization can offer a wide range of options for better addressing a company's true situation and from here, evaluate "what-if" scenarios that will facilitate the decision-making (Xirogiannis & Glykas, 2007). The model created in the study does not pretend to be a true reflection of reality, but rather a tool to help decision-making, which, based on the experience of experts, makes it possible to highlight the main variables that influence Omnichannel Management and the impacts between them. "Models are open to review by all relevant stakeholders, including critics, and modelers seek out opportunities to confront the model with data and test assumptions" (Sterman, 2015). "The benchmark for FCM "validation" should therefore be if it adequately describes what the respondents know about the subject matter, which requires them to take an active role in model testing" (A. J. Jetter & Kok, 2014)

References

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Sterman, J. D. (2015). Business Dynamics, System Thinking and Modeling for a Complex World. Massachusetts Institute of Technology Engineering Systems Division, (April 2002).

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OK

3.2 Delphi for new panelists

Management Indicators in Omni-Channel

Welcome to the B2B Omnichannel Management Survey! (page 1/4)

Presentation

This research project is initiated by a Research Group at the Faculty of Economy and Management, University of Alcala in Madrid – Spain.

The objective of this study is to establish a reference model that will allow us to understand the factors that influence an organization's omnichannel management in a B2B context. This model may, therefore, serve as a guide to identifying the key aspects that should be developed to ensure optimal management.

The survey is purposely designed to impact your time no more than 5 minutes.

Confidentiality
All data obtained from the participants will be kept confidential and will only be reported in an aggregated format (reporting only the combined results and never reporting the individual results). All questionnaires will be hidden, and no one other than members of the research team will have access to them.

By participating in the research, you could:
Receive a copy of the pre-publication copies of the main reports produced, which will help you better understand what is currently influencing omnichannel management and the creation of related value, which is likely to influence them in the future and provide information for their planning decisions.

Questions about the research?
If you have any questions regarding this study, you can contact Pr. Javier Alonso-Garcia at +34 619 542 840, franciscojavier.alon@edu.uah.es.

OK

NEXT

Management Indicators in Omni-Channel

Contact Info (page 2/4)

Basic Info (this question requires at least one answer)

Name or initials	
Company	
Industry	

Management Indicators in Omni-Channel

Main variables vs. long-term Omnichannel Management Performance (page 3/4)

How do the following 16 main variables impact long-term Omnichannel Management in companies?

You are asked to select one option (very weak, weak, zero, strong, very strong) that best describes the impact of each variable on long-term omnichannel management in companies.

Note. The Omnichannel strategy seeks to provide a unique and improved experience regardless of the purchase phase and the channel in which the customer is located (customer journey). This study focuses on manufacturers and wholesalers that reach their customers (purchasing managers) through different channels (for example, electronic commerce and sales force). The variables have been defined from a previously conducted panel of international experts.

The variable impacts Omnichannel Management

	strongly agree	agree	neutral	disagree	strongly disagree
1. Analysis of customer data (360 view)	○	○	○	○	○
2. Artificial Intelligence	○	○	○	○	○
3. Brand(s)	○	○	○	○	○
4. Channel integration (integration between all channels, both digital and traditional physical channels)	○	○	○	○	○
5. Corporate culture	○	○	○	○	○
6. Customer experience	○	○	○	○	○
7. Customer loyalty	○	○	○	○	○
8. Customer-centric proposition	○	○	○	○	○
9. Digital channels (especially the adoption of new digital channels)	○	○	○	○	○
10. Innovation in the corporation	○	○	○	○	○
11. IT management	○	○	○	○	○
12. Management (leadership)	○	○	○	○	○
13. Marketing management	○	○	○	○	○
14. Network (especially the dealer network)	○	○	○	○	○
15. Products and services portfolio	○	○	○	○	○
16. Sales management	○	○	○	○	○

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Social action theory in business-to-business marketing (page 4/4)

In your opinion, does having an efficient omnichannel management of a b2b company have any beneficial impact on society in general?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
There is a positive impact on society in general if the company in the B2B field performs good omnichannel management.	○	○	○	○	○