

OMNI- CHANNEL RETAILING FOR ENHANCING CUSTOMER ENGAGEMENT AMIDST SUPPLY CHAIN DISRUPTION: AN EMERGING MARKET PERSPECTIVE

Sudhanshu Joshi^{1,2*}, Manu Sharma^{3,4} and Prasanjit Chatterjee⁵

¹ Operations and Supply Chain Management Research Laboratory, School of Management, Doon University, Dehradun, India ,
sudhanshujoshi@doonuniversity.ac.in

² Australian Artificial Intelligence Institute (AAII), School of Computer Science, Faculty of Engineering & Information Technology, University of Technology Sydney, Sydney, Australia, sudhanshu.joshi@uts.edu.au

³ Department of Management Studies, Graphic Era Deemed to be University, Dehradun, India, manu.sharma@geu.ac.in

⁴ Guidhall School of Business and Law, London Metropolitan University, London

⁵ MCKV Institute of Engineering, West Bengal, India

Received: 3 August 2022;

Accepted: 18 October 2022;

Available online: 10 November 2022.

Original scientific paper

Abstract: *The research aims to explore the strength of enablers and adoption barriers in omnichannel retailing (OCR) and discuss how organizations may focus on redesigning their business models in emerging markets to manage the disruptive environment. The major enablers may enhance the omnichannel' performance to deliver a unified experience across all channels during the pandemic. The paper has used hybrid Multi-Criteria Decision-Making (MCDM) Methods. Organizations widely use these methods to explore the interrelationship among barriers and enablers affecting their performance. In the current study, 18 experts from different domains have examined and evaluated the 10 barriers and 7 enablers. The study reveals that integration, Visibility, internet accessibility, and advanced distribution centers are the primary enablers and driving the customer analytics enabler to strengthen their customer engagement and providing a unified experience to the. During the pandemic time the usage of the online channels have increased and thus retail channels may consider these enablers to enhance the unified experience level of the customers. The study also shows that inconsistency in price is the main adoption barrier followed by inconsistency in product discounts that should be minimized to engage customers effectively. The retail organizations need to understand the roadblocks in*

* Corresponding author.

E-mail addresses: sudhanshu.joshi@uts.edu.au (S. joshi), manu.sharma@geu.ac.in (M. Sharma), dr.prasanjitchatterjee6@gmail.com (P. Chatterjee)

adopting OCR and should take relevant actions to minimize them. The retail organization or marketers may redesign their existing strategies based on price consistency, integration, Visibility, information systems, and coordination to develop a unified experience across channels during the pandemic situation.

Key words: *Omni-Channel Retailing (OCR); Supply Chain Disruption; Emerging Markets; Interpretative Structural Modeling (ISM); Fuzzy - MICMAC.*

1. Introduction

The global disruption, digital technologies progression, pandemic and enhanced usage of smart devices have reformed the countenance of retailing all across the world, subsequently engaging customers using multiple touch points and adopting OCR strategies to augment their experience (Li et al., 2020; Sharma et al., 2021). The explosive growth rate of online customers in South Asia, Europe, UK and USA is carrying an irregular change to these marketplaces and giving a chance to companies to necessarily reimagine their business models. Developing economies like India and China are showing high encouragement through more engagement of online customers, and online purchases upsurge to \$3.9 trillion value (WEF, 2020). Approximately 3 billion consumers from the emerging market will be online by 2022, exposing the opportunity for retail organizations to plan and target customer engagement appropriately (Nguyen et al., 2019). It is expected to achieve 1000 million target by 2030 (WEF, 2020). Moreover, the impact of digital influence can be understood by an example of Africa where e-commerce is limited to 1 % only but the digital influence is skyrocketing (BCG, 2018). In terms of growth perspective, online consumers in emerging markets represent an enormous opportunity.

Technically, OCR raises to combine multiple points for online customers. The consumer decides where and when to shop and through which device (Ieva & Ziliani, 2018). If consumers do not purchase directly on the Internet, they still search for information on their mobile phones, which often influences their purchases. The value of digitally influenced spending in emerging markets is expected to reach \$4 trillion (BCG, 2018). In the past years, emerging economies have shown exceptional growth. During 2000-2018, the share of these countries is from 11 to 28% in the world's gross domestic product and 11 to 24 % in global household consumption expenditures. The price fall of smartphones by 40% in emerging markets has impelled these devices into the hands of millions of people who were previously unable to afford them. The arrival of high-speed data networks has enabled these markets to achieve spectacular expansions in the connectivity and due to this half of the population is now connected to the Internet in emerging markets, mainly in the parts of Southeast Asia, Russia, Turkey and Brazil. The generations are spending time online, and thus marketers should explore new ways to reach digitally millennial consumers on modern platforms. Both online and offline retailers in emerging markets are highly motivated and aim to serve customers better through seamless experience and creating the appropriate content for each segment, communicating each segment through proper channels. Retailers in the emerging market need to adopt OCR as their businesses cannot be long-lasting if consumers are connected in a unidirectional way. With the advancement in information technology, consumers quickly disseminate and access information through multiple channels (Cai & Lo, 2020; Joshi et al., 2021; Joshi & Sharma, 2021). But, purchase actions happen as per consumer convenience and choices (Park & Lee, 2017;

Chatterjee & Kumar, 2017). Thus, retail organizations need to understand what factors drive and restrict consumers' convenience during switching channels and completing their purchase actions. Previous research also highlights that discounts are the significant triggers for online purchases, but in emerging markets, discounts are not the only thing that matters (Chopra, 2016; Chopra, 2019; Arslan et al., 2021; Joshi et al., 2021). The other form of retail, i.e., Offline retail organization, has a limitation of consumer's time constraint that restricts him from visiting the store. Also, a limited range of product availability is overcome by online retailers. Thus, amidst the pandemic, retail organizations need to adopt a hybrid business model where online and offline formats will merge and engage consumers by giving them a choice to decide when, where, and how to shop. Online retail organizations have some limitations, such as tangibility, waiting for product delivery, delivery delay, dynamic pricing, etc. (Yang et al., 2019; Sharma et al., 2022a). There is still a population who believes in the visualization of products before purchase, and thus e-commerce companies need to open brick-and-mortar stores to capture this segment. Lens kart is one of the recent examples of OCR in the Indian market. Emerging market economies are expanding, boosted by educated younger, healthier populations with rising incomes, fueling a substantial increase in goods and services consumption. The spending by consumers in these economies is projected to be more than the developed nations. Thus, OCR is essential for retailers to reach targeted consumers efficiently by adopting digital technologies with minimum cost. Offline and online channels will complement each other to develop an efficient OCR system, breaking the wall between all the channels to provide a unified brand experience (Sharma et al., 2020a; Sharma & Joshi, 2020). The development of OCR will be dependent on the infrastructural development, technologies and digital transformations, and retailers' decisions to manage the current issues such as price inconsistency, order management, customer expectations, and others to provide a flawless experience across all the channels (Picot-Coupey et al., 2016; Ewerhard et al., 2019). There is a need to evaluate the existing scenario of the retailing industry in emerging markets as the future lies in the young and educated populations. There are research contributions in the area of OCR. Still, little attention has been given to the challenges or bottlenecks handled by the retail firms in the acceptance of OCR and also the influence of enablers enhancing its acceptability. This study is significant for mainly three reasons. First, prior research in the context of OCR in emerging markets is limited and focused only on the basic understanding and comparison with multi-channel retailing. Second, there are insufficient information regarding OCR's challenges and adoption barriers and enablers (Salviotti et al., 2022; Sharma et al., 2020a; Solem et al., 2022). The past research has not examined the challenges and adoption barriers existing in OCR influencing customer purchases. Lastly, the merit of inter-relationships among the identified adoption barriers and enablers of OCR is still unknown. Thus, to bridge the above research gaps, the present study intends to determine the enablers and adoption roadblocks in the OCR ecosystem influencing customers' journeys, choices, and unified experience. All the enablers and barriers are to be analyzed to explore the strength and weaknesses of the current channels of retail organizations that restrict or drive the customer to adopt OCR. The customers' switching of channels to complete their purchase action has questioned the organizations to investigate the reasons behind their behavior.

This study provides the basis of acceptance and rejection of the omnichannel based on their attributes. This study also explores the intensity of enablers and barriers using hybrid MCDM methods for understanding the interrelationship among

them. Thus, it helps the policymakers develop their OCR strategies based on the critical obstacles and enablers prioritized by the experts. Thus, the study framed key objectives to demarcate pressing strategic challenges that could set the pathway for retail management and can further contribute to existing theories. The theoretical background of the research is carried out from dynamic capabilities theory, the combination of the Technology acceptance model (TAM)- technology- organization-environment model(TOEM), and resource-based view theory. Retail chains' dynamic capabilities demonstrate their ability to develop and adopt the Omni channel framework for creating agile and responsive supply chains and improving operational excellence. Also, there is an urgent need to develop a strategic roadmap to bridge the implementation and research gaps. The research is an attempt to overall these issues. Based on these arguments, The study proposes the following objectives.

RO1: Investigating the enablers and adoption barriers of OCR in emerging markets.

RO2: To develop the hierarchical structure of enablers and barriers using the ISM approach.

RO3: To investigate interrelationships among enablers and barriers using Fuzzy MICMAC and DEMATEL methods.

The decision to design OCR is a complex problem. It has multiple levels, and thus hybrid MCDM approach has been employed to achieve the above objectives. The rest of the research work is structured as follows. Section 2 elaborates on existing works on OCR, enablers, and barriers. Section 3 explained the research methodology and steps for ISM, fuzzy MICMAC and DEMATEL methods. Section 4 presents the method applications, followed by the findings and discussions in Section 5. Section 6 elaborates the inferences and future work directions. Section 7 summarizes the study.

2. Literature review

Based on the Scopus database, a comprehensive review of literature has been carried out on the relevant research works on omnichannel retailing and emerging markets in this domain. As depicted in Table 1, a search protocol was used using multiple keywords: "Omni- Channel Retailing" AND "Emerging Markets," AND "Pandemic" OR "COVID-19". A systematic literature review process was followed to evaluate the prominent publications on Omni Channel Strategy implementation challenges and the digitalization of retailing in emerging economies amidst the pandemic. For the SLR, the selected timeline was 2019–2022; the research results are articles. After the standard systematic literature review process, 37 papers were selected for final review.

Table 1. Search Protocol for Systematic Literature Review

Dimensions	Detailed Explanation
Keywords/ Terms used	"Omni- Channel Retailing" AND "Emerging Markets" AND "Pandemic" OR "COVID-19"
Timeline	2019-2022
Field Covered	Title, Keywords, detailed abstract
Inclusion Criteria	SCOPUS database
Exclusion Criteria	Non-English Articles

2.1 Omni-Channel Retailing: Opportunities and Challenges

OCR can be explained as a supply chain system where information, material, and fund flow happen by using several channels to coordinate, interact and fulfill customer demand (Rai et al., 2019; Chopra, 2016; Chopra, 2019; Galipoglu et al., 2018). It has caused interventions from many fields, such as Decision Sciences, Virtual Reality (VR), visual displays and merchandising decisions, engagement patterns, big data analytics, and profitability (Payne et al., 2017; Farah et al., 2019). Retail has evolved through multi-channel and has enhanced supply chain networks (Prabhuram et al., 2020). The traditional retailers of various products are extending their channels through virtual stores to derive the benefits of online media. Also, online retailers extend their reach through physical stores (Pan et al., 2017). This indicates the need for channel integration (Bayram & Cesaret, 2021). The integration in OCR has been categorized from three perspectives i) OCR stages ii) OCR types iii) OCR agents (Saghiri et al., 2017). The core enablers of integration and consistency in OCR strategy (Melero et al., 2016; Shen et al., 2018; Mirzabeiki & Saghiri, 2020). The Omnichannel need enablers, including broadband internet accessibility (Ye et al., 2018); well located and well-designed distribution centers (Melacini et al., 2018; Mkansi et al., 2018); efficient & extensive logistics (Kembro et al., 2018; Murfield et al., 2017; Saghiri et al., 2017; Daugherty et al., 2018; Hazen & Ellinger, 2019); customer analytics (Lekhwar et al., 2019; Vakhutinsky et al., 2019; Zaki & Neely, 2019); Visibility to customers (Ewerhard et al., 2019; Gawor & Hoberg, 2018); information system (Kembro et al., 2018; Kembro & Norrman, 2019) and product digitization (Cortiñas, et al., 2010; Ainsworth & Ballantine, 2017). Few researchers have underlined integration and Visibility as essential enablers for OCR (Ewerhard et al., 2019; Verhoef et al., 2015). The challenges in OCR are discussed by Picot-Coupey et al. (2016) and divided into strategy-related and development-related levels. The organizational, managerial, and cultural were included in strategy-related and product mix, and information systems in development-related (Rai et al., 2019; Niranjana et al., 2019). Achieving demand, inventory, and in a single view is one of the most critical challenges for omnichannel. The objective of OCR is to transform the current business models, consumer behavior, and advancements in technology (Marchet et al., 2018).

2.2 Omnichannel Retailing in Emerging Markets

OCR is changing the retailing landscape in emerging economies. The incremental growth of online retailing in association with small offline retailers is bringing profits for these economies. The integration of physical and online channels will create a win-win situation, such as a reduction in distribution costs and a wide variety of product availability. However, the success of this hybrid model depends on the development of complementary strengths of both channels to create a cost-efficient omnichannel and more responsive to consumer needs (Chopra, 2019). Retailers have put significant efforts into providing information access to customers using a number of channels and devices in the developed markets (Mrutzek-Hartmann et al., 2022). An e-retailer can send only sensory and digital information, which is a significant factor in the existence of physical retail organizations in emerging markets as still, many consumers use the offline channel for shopping (Asmare & Zewdie, 2022; Chopra, 2016; Lin et al., 2022; Yin et al., 2022). The omnichannel structure is not creating all the capabilities in each channel but rather assigns products and tasks to channels on the basis of effective handling (Chen et al., 2014; Chen et al., 2022). This

structure is more appropriate in emerging markets where interim retailing models such as Borders and Circuit way have not yet been developed, and governments are still struggling to cope with the impact of online retailing on offline retailers (Ishfaq et al., 2022; Teixeira et al., 2022). The OCR will offer an exclusive opportunity that merges the online and offline model's advantages to bring mutual benefits.

2.3 Research Gaps

The shift to OCR has been well familiar in the research literature (Park & Lee, 2017; Park & Kim, 2018). In the last decade, multi-channel retailing has grown into a standard approach (Schramm-Klein et al., 2011). Recent studies advocate the transition stage (Park & Kim, 2018; Zhang et al., 2019). Due to the prominent role of the physical retail format in the buying process, hybrid strategies for OCR have also been proposed (Huang & Jin, 2020). The previous research suggests customer wants a seamless experience during online purchases. Many studies have been conducted to understand the scenario of e-commerce in emerging markets in the context of dynamic pricing (Cavallo, 2017; Dan et al., 2012). The fulfillment and returns are also discussed by many researchers representing the consumers' view towards the e-commerce process in the context of the omnichannel environment (Bayram & Cesaret, 2021; Ewerhard et al., 2019). Moreover, the increasing synergy between both channels has been analyzed and highlights that channel integration is one of the key issues discussed (Zhang et al., 2019). Past research is limited to the understanding of Omnichannel. But what are the barriers and enablers that may affect the OCR framework that is still missing? The presence of enablers like coordination, infrastructure, analytics, etc., can enhance the OCR results, whereas the barriers like price inconsistency and others may bring failure for omnichannel strategies. The literature also reveals that emerging markets like India and omnichannel are providing a wide variety of products to customers at a lesser cost, and thus, the strengths of both channels can be combined to develop a strong omnichannel structure (Chopra, 2016). This study establishes an OCR framework considering the barriers and enablers present in the retail environment that need to be considered by the retailers to build a strong and robust OCR framework where customers can be engaged and influenced to purchase products without any discrepancy among the channels. The conceptual framework is developed and illustrated in Figure 1.

The literature review has identified seven main enablers and ten critical barriers exhibited in Table 2. The enablers are supporting OCR to enhance the customer's experience during purchase, including internet accessibility (Wang, 2013; Yu et al., 2016), Internet-enabled distribution centers (Chatterjee et al., 2002; Chen et al., 2014), Efficient and extensive logistics (Chen et al., 2022; Yan & Pei 2011; Blázquez, 2014), Customer analytics (Chatterjee et al., 2002), Visibility to customers (Agatz et al., 2008; Bahn & Fischer, 2003; Berman & Thelen, 2018; Cassab & MacLachlan, 2009), Product digitization (Bernon et al., 2016; Verhoef et al., 2015), and integration (channel types, channel agents, and channel stages) (Saghiri et al., 2017). whereas the barriers are restricting the customer to use omnichannel including Low coordination among channel partners (Fulgoni, 2014; Hübner et al., 2016; Picot-Coupey et al., 2016), Variation in Pricing (Shankar et al., 2003; Neslin et al., 2006; Verhoef et al., 2015), Product Unavailability (Bernon et al., 2016; Chopra, 2016; Hübner et al., 2016; Ishfaq et al., 2022; Huang & Jin, 2020), Inconsistent contents (Verhoef et al., 2015), Central product (Balasubramanian et al, 2005; Verhoef et al., 2015), Data Security issues (Piotrowicz & Cuthbertson 2014) and Non-Understanding young customer habits (Verhoef et al., 2015), Order fulfillment

(Chopra, 2016), Inconsistent Product discount (Sousa & Voss, 2006), and Time Constraint (Picot-Coupey et al., 2016; Neslin et al., 2006).

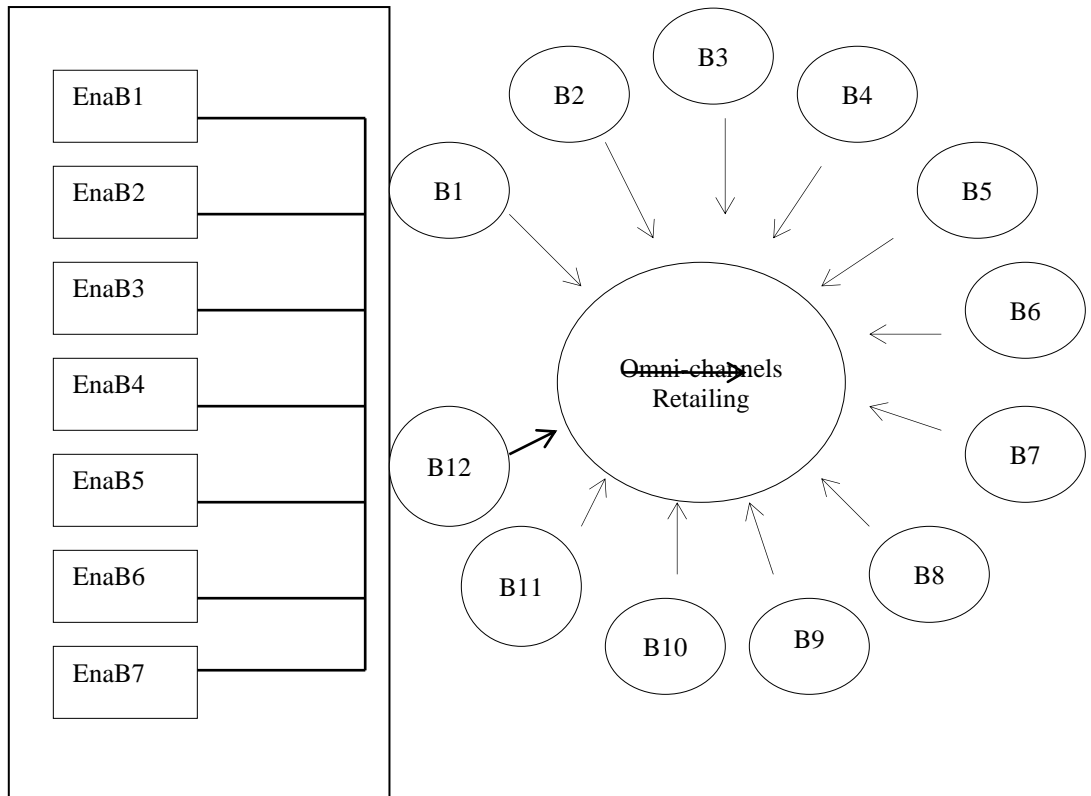


Figure 1. Conceptual framework of Omnichannel Retailing

The paper intends to discuss the influence of strong enablers on consumer’s experience towards OCR. The enablers and barriers need to be analyzed so that the decision- makers can enhance the organizational performance through omnichannel.

Table 2. Enablers & barriers identified from literature

Enablers	References
1. Broadband internet accessibility	(Wang, 2013; Ye et al., 2018; Yu et al., 2016)
2. Internet-enabled distribution centers	(Chatterjee et al., 2002; Chopra, 2016; Sharma et al., 2020c)
3. Efficient and extensive logistics	(Zhang et al., 2019; Yan & Pei 2011; Blázquez, 2014)
4. Customer analytics	(Chatterjee & Kumar, 2017; Berman & Thelen, 2018)
5. Visibility to customers	(Agatz et al., 2008; Bahn & Fischer, 2003; (Berman & Thelen, 2018; Cassab & MacLachlan, 2009)
6. Product digitization	(Berman & Thelen, 2018; Verhoef et al., 2015)
7. Integration (channel types, channel agents, and channel stages)	(Saghiri et al., 2018; Jocevski et al., 2019; Shanker et al., 2022; Sharma et al., 2020b; Sharma et al., 2022c).

Enablers	References
1. Low coordination among channel partners	(Fulgoni, 2014; Hübner et al., 2016; Picot-Coupey et al., 2016)
2. Variation in Pricing	(Shankar et al., 2003; Neslin et al., 2006; Verhoef et al., 2015).
3. Product Unavailability	(Bernon et al., 2016; Chopra, 2016; Hübner et al., 2016; Huang & Jin, 2020)
4. Inconsistent contents	(Clinton & Whisnant, 2019; Sousa & Voss, 2006; Verhoef et al., 2015)
5. Central product	(Balasubramanian et al., 2005; Verhoef et al., 2015)
6. Data Security issues	(Piotrowicz & Cuthbertson 2014; Verhoef, & Agrawal, 2004)
7. Non-Understanding young customer habits	(Verhoef et al., 2015; Picot-Coupey et al., 2016)
8. Order fulfillment	(Chopra, 2016)
9. Inconsistent Product discount	(Picot-Coupey et al., 2016)
10. Time Constraints	(Neslin et al., 2006)

3. Research Methodology

This study proposes a framework of enablers as well as barriers of OCR based on literature and experts' responses. Data is collected through experts' interviews, reviews, databases, and reports of the retailing industry. Various databases like WoS, Scopus, Emerald Insight, and Google scholar are extracted for identifying the enablers and barriers. The experts validated the enablers and barriers and evaluated them for developing hierarchical levels using ISM methodology. It is elaborated in two phases. Phase I includes the identification of enablers and barriers of OCR and employing Interpretative Structuring modeling (ISM) to develop a multi-level structure. The relationships among the variables vary, sometimes strong, weak equal, or not equal; thus, Fuzzy MICMAC and DEMATEL methods are used to compute the strengths of the enablers and barriers.

3.1 Phase I

3.1.1. Data collection

The retail experts working in different capacities are selected for collecting data. The pool of experts includes consultants, CIOs, digital marketing, and supply chain management professionals. Three experts from the supply chain function of the retail organizations with a working experience of more than ten years, two academicians associated with the retail management program, two experts in the marketing domain from an online retail store, and three experts from operation management with five years of experience are selected for the panel. A questionnaire was circulated among the experts to collect data for this study.

3.1.2 Interpretative Structural Modeling (ISM) method

This method is used to describe the relationship between the variables through hierarchical levels (Sharma et al., 2019). The steps of the ISM model, post-identification of barriers and enablers, are described as follows.

- i. Seven enablers and ten barriers are identified and validated by experts' judgment.
- ii. Established a relationship among all the identified enablers and barriers.
- iii. A Structural Self Interaction Matrix (SSIM) is formed, and the relationship is represented in the form of four symbols.
 V: enabler *i* will ameliorate enabler *j*;
 A: enabler *i* will be ameliorated by enabler *j*;
 X: enablers *i* and *j* will ameliorate each other; and
- iv. An initial reachability matrix (IRM) is formed, and transitivity is checked
- v. The final reachability matrix is developed after checking for transitivity.
- vi. A digraph is made based on contextual relationships.
- vii. Nodal elements are then replaced by the statement.
- viii. The established model has assessed any conceptual inconsistencies.

3.2 Phase II

3.2.1 Fuzzy MICMAC and DEMATEL methods

This phase includes Fuzzy MICMAC and DEMATEL to explore the strength of enablers and barriers. The fuzzy MICMAC method derives the driving and dependence value of the variables that help to understand the interrelationship among the variables. The relationships among the enablers or barriers vary, weak, equal, or sometimes stronger. Thus, this method helps to categorize the enablers and barriers on the basis of their driving and dependence powers. The following steps are used to obtain results (Sharma & Joshi, 2020).

- i. Establishing Binary Direct Relationship matrix
- ii. Developing Fuzzy Binary Direct Relationship matrix (FBDRM)
- iii. Developing Fuzzy-MICMAC stabilized matrix

In the recent literature, multi-criteria decision methods are used for a variety of research in the area of marketing operations, viz online shopping for analyzing the change in purchasing behavior (Sharma et al., 2020a; Sharma et al., 2020b; Sharma et al., 2022a); to develop marketing strategies for alliance development, technological interventions in marketing and retailing (Kamble et al., 2019; Singh et al., 2020), waste management (Sharma et al., 2019; Sharma et al., 2020a; Sharma et al., 2020b) and product development and its supply chain management (Panchal & Kumar, 2017; Panchal et al., 2022; Sharma et al., 2020c; Tyagi et al., 2019). Specifically, the DEMATEL method has been employed in various domains such as marketing, supply chains, waste management, technology management, and reverse logistics (Chauhan et al., 2020; Mousavizade & Shakibazad, 2018; Sharma et al., 2020c).

The method is described as follows:

Step 1: Average matrix computation

The experts are asked to rate the variables on the scale of 0 – 4, where 0 indicates 'no influence', 4 indicates 'Very high influence'.

A $n \times n$ matrix is developed as $X^k = [x_{ij}^k]$ on the basis of the expert responses. The responses are incorporated from h respondents, direct relation matrix ' a_{ij} ' is formed through equation 1.

$$a_{ij} = \frac{1}{H} \sum_{K=1}^H x_{ij}^k \quad (1)$$

Where, K = number of respondent with $1 \leq k \leq H$

N = number of criteria

Step 2: Calculating the normalized initial direct- relation matrix

$$D = M X B$$

$$B = \text{Min} \left[\frac{1}{\text{Max} \sum_{j=1}^n a_{ij}}, \frac{1}{\text{Max} \sum_{i=1}^n a_{ij}} \right] \tag{2}$$

Step 3: Calculating the total relation matrix

By the following equation T is calculated as

$$T = N(I - N)^{-1} \tag{3}$$

I denote the identity matrix.

Step 4: Drawing the Diagram

The Sum of rows $[R_i]_{n \times n}$ and columns $[C_j]_{1 \times n}$ denotes the vectors. Values of $(R_i + C_j)$ and $(R_i - C_j)$ are calculated. (If the value of $(R_i - C_j)$ is positive, then the enabler is categorized as causal group variables, and if the value of $(R_i - C_j)$ is negative, then the enablers are categorized as effect group variables.

4. Models Application

The integrated ISM-Fuzzy MICMAC-DEMATEL elaborated in section 3 is followed in this section for obtaining dependence and driving powers. The ten barriers are classified into six hierarchical levels and seven enablers after iterations shown in Tables 3 and 4. The hierarchical levels of enablers and barriers are exhibited in Figure 2. These barriers and enablers are taken into phase two for further analysis to explore the inter-relationships.

Table 3. IRM -Enablers

Enablers	OCRE7	OCRE6	OCRE5	OCRE4	OCRE3	OCRE2	OCRE1
OCRE1	V	X	V	V	V	V	
OCRE2	X	V	V	A	V		
OCRE3	O	V	O	X			
OCRE4	V	V	V				
OCRE5	A	A					
OCRE6	V						
OCRE7							

Table 4. IRM- Barriers

	Ado B10	Ado B9	Ado B8	Ado B7	Ado B6	Ado B5	Ado B4	Ado B3	Ado B2	Ado B1
AdoB1	V	V	V	V	O	V	V	V	V	
AdoB2	O	X	O	O	O	O	X	O		
AdoB3	A	O	V	O	O	A	V			
AdoB4	O	A	V	A	O	V				
AdoB5	V	V	V	V	O					
AdoB6	O	O	O	V						
AdoB7	O	O	V							
AdoB8	A	A								
AdoB9	V									
AdoB10										

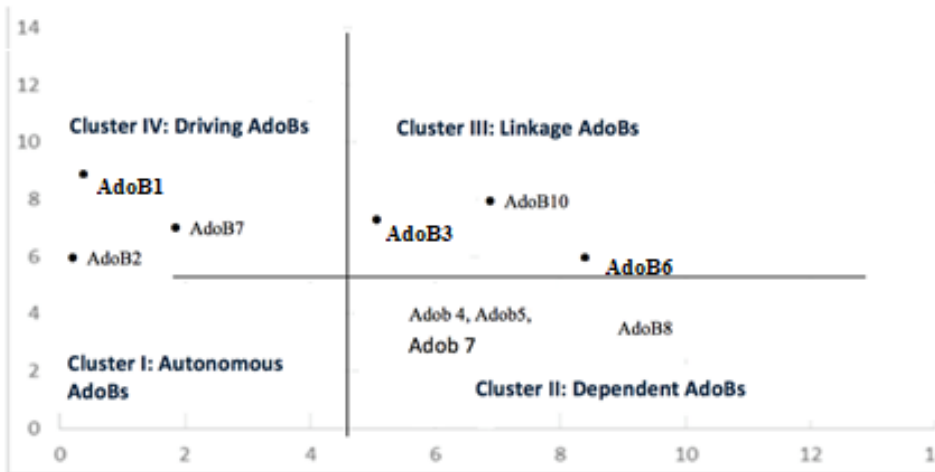


Figure 2. Driving and dependence power diagram

In phase II, a binary direct reachability matrix (BDRM) is obtained and the diagonal entries are converted to zero. FUZZY set theory (Eq. 4) is used to enhance the responsiveness of MICMAC.

$$C = A, B = \max k[(\min(a_{ik}, b_{kj}))] \text{ where } A = [a_{ik}] \text{ and } B = [b_{kj}] \quad (4)$$

The final matrix for enablers and barriers are obtained and exhibited in Table 5 and 6.

Table 5. IRM- Enablers

	OCRE1	OCRE2	OCRE3	OCRE4	OCRE5	OCRE6	OCRE7
OCRE1	1	1	1	1	1	1	1
OCRE2	0	1	1	0	1	1	1
OCRE3	0	0	1	1	0	1	0
OCRE4	0	1	1	1	1	1	1
OCRE5	0	0	0	0	1	0	0
OCRE6	1	0	0	0	1	1	1
OCRE7	0	1	0	0	1	0	1

Enablers: broadband Internet accessibility (ORCE1);well-located and well-designed distribution centers (OCRE2);efficient and extensive logistics network(ORCE3);cross-channel integration (ORCE4);customer analytics(ORCE5);Omni-channel visibility to customers (ORCE6);product digitization (ORCE7).

Table 6. IRM- Barriers

	Ado B1	Ado B2	Ado B3	Ado B4	Ado B5	Ado B6	Ado B7	Ado B8	Ado B9	Ado B10
AdoB1	1	1	1	1	1	0	1	1	1	1
AdoB2	0	1	0	1	0	0	0	0	1	0
AdoB3	0	0	1	1	0	0	0	1	0	0
AdoB4	0	1	0	1	1	0	0	1	0	0

	Ado B1	Ado B2	Ado B3	Ado B4	Ado B5	Ado B6	Ado B7	Ado B8	Ado B9	Ado B10
AdoB5	0	0	1	0	1	0	1	1	1	1
AdoB6	0	0	0	0	0	1	1	0	0	0
AdoB7	0	0	0	1	0	0	1	1	0	0
AdoB8	0	0	0	0	0	0	0	1	0	0
AdoB9	0	1	0	1	0	0	0	1	1	1
AdoB10	0	0	1	0	0	0	0	1	0	1

AdoB1: Lack of coordination and Information among channels; AdoB2: Price Inconsistency; AdoB3: Product Unavailability; AdoB4: Content Inconsistency; AdoB5:Lack of Centralized product assortment (CPA); AdoB6:Data privacy; AdoB7:Non-Understanding young customer habits; AdoB8: Order fulfillment; AdoB9:Inconsistent Product discount; AdoB10:Time Constraint.

The relationship among the seven enablers, as well as the ten adoption barriers, have been developed using DEMATEL. By steps 1,2,3,4, and 5 of the DEMATEL process demonstrated in section 3, the direct influence matrix, normalized direct influence matrix, total relation matrix, and degree of influences are developed. Tables 7 and 8 represent the direct influences of enablers and barriers. Table 9 (a) and Table 9 (b) demonstrated Direct Influences – Enablers and Direct Influences – barriers using DEMATEL.

Table 7. Transitivity matrix -Enablers

	OCRE1	OCRE2	OCRE3	OCRE4	OCRE5	OCRE6	OCRE7
OCRE1	1	1	1	1	1	1	1
OCRE2	*1	1	1	*1	1	1	1
OCRE3	*1	*1	1	1	1	1	*1
OCRE4	*1	1	1	1	1	1	1
OCRE5	0	0	0	0	1	0	0
OCRE6	1	1	*1	1	1	1	1
OCRE7	0	1	*1	0	1	*1	1

Enablers: broadband Internet accessibility (OCRE1);well-located and well-designed distribution centers (OCRE2);efficient and extensive logistics network(OCRE3);cross-channel integration (OCRE4);customer analytics(OCRE5);Omni-channel visibility to customers (OCRE6);product digitization (OCRE7).

Table 8. Transitivity matrix-Barriers

	Ado B1	Ado B2	Ado B3	Ado B4	Ado B5	Ado B6	Ado B7	Ado B8	Ado B9	Ado B10
AdoB1	1	1	1	1	1	0	1	1	1	1
AdoB2	0	1	0	1	*1	0	0	*1	1	*1
AdoB3	0	*1	1	1	*1	0	0	1	0	0
AdoB4	0	1	0	1	1	0	*1	1	*1	*1
AdoB5	0	*1	1	*1	1	0	1	1	1	1
AdoB6	0	0	0	*1	0	1	1	*1	0	0
AdoB7	0	*1	0	1	*1	0	1	1	0	0
AdoB8	0	0	0	0	0	0	0	1	0	0
AdoB9	0	1	*1	1	*1	0	0	1	1	1
AdoB10	0	0	1	*1	0	0	0	1	0	1

AdoB1: Lack of coordination and Information among channels; AdoB2: Price Inconsistency; AdoB3: Product Unavailability; AdoB4: Content Inconsistency; AdoB5: Lack of Centralized product assortment (CPA); AdoB6: Data privacy; AdoB7: Non-Understanding young customer habits; AdoB8: Order fulfillment; AdoB9: Inconsistent Product discount; AdoB10: Time Constraint.

Table 9 (a). Direct Influences - Enablers

	Row Total (D)	Column Total (R)	D+R Values	D-R Values
OCRE1	1.569	0.280	1.849	1.289
OCRE2	0.815	0.638	1.453	0.177
OCRE3	0.523	0.615	1.138	-0.093
OCRE4	0.974	0.390	1.364	0.585
OCRE5	0.000	1.384	1.384	-1.384
OCRE6	0.782	0.962	1.743	-0.180
OCRE7	0.402	0.796	1.199	-0.394

Table 9 (b). Direct Influences – Barriers

	Row Total (D)	Column Total (R)	D+R Values	D-R Values
AdoB1	0.294	0.000	0.294	0.294
AdoB2	0.032	0.204	0.236	-0.172
AdoB3	0.013	0.244	0.258	-0.231
AdoB4	0.128	0.239	0.367	-0.112
AdoB5	0.179	0.183	0.363	-0.004
AdoB6	0.001	0.000	0.001	0.001
AdoB7	0.013	0.125	0.138	-0.111
AdoB8	0.000	0.454	0.454	-0.454
AdoB9	0.175	0.199	0.373	-0.024
AdoB10	0.002	0.092	0.094	-0.090

5. Results and Discussion

The ISM and Fuzzy MICMAC results demonstrate the hierarchical structure and categorization of the enablers and barriers. The enablers have shown a two-level structure from the ISM method application, whereas the barriers show a six-level structure in Figures 2. Customer analytics (OCRE5) is the top-level enabler at the hierarchical level. All other enablers are on the second level, which exhibits the two hierarchical levels structure for enablers, whereas there are six hierarchical levels in the adoption barriers. Order management (OCRB8) is on the top level, followed by three barriers, namely- inconsistency in content (OCRB4), inconsistency in product information (OCRB5), and lack of information about consumers (OCRB7). The third level of barriers has product unavailability (OCRB3) and time constraint (OCRB10). Data privacy and security (OCRB6) is present at the fourth level. The inconsistency in price (OCRB2) is the most critical adoption barrier in the OCR, followed by a lack of coordination & information sharing (OCRB1) and inconsistency in price discounts (OCRB9). The levels are exhibited in Figures 2, illustrating the multi-levels of the enablers and barriers. These levels are further validated by the Fuzzy MICMAC and DEMATEL and reveal that inconsistency in price, discounts, and information sharing are the most critical barriers in the OCR framework.

The Fuzzy MICMAC results are exhibited in Figure 2, showing the four clusters consisting of enablers and barriers as per their dependence and driving powers. The

seven enablers are categorized into two clusters only, whereas adoption barriers are classified into 3 clusters. Cluster I reflects weak driving and dependence power. The absence of any enablers or barriers in this cluster suggests that all the enablers and barriers undertaken in the study are significant. The enabler -customer analytics (OCRE5), and three barriers - order management (OCRB8), inconsistency in content (OCRB4) and inconsistency in product information (OCRB5), and lack of information about customers (OCRB7) are included in cluster II (Dependent barriers). This cluster has strong dependence and weak driving power. The strength of these variables (enablers & barriers) shows that the other variables need support to minimize their effect. These enablers and barriers are critical and need to be addressed by the retail organizations or decision-makers as a priority. The OCR should be more effective and efficient if the adoption barriers are minimized. No enabler is present in cluster III (linkage barriers), indicating that the enablers are either dependent or driving. This cluster has three barriers having high driving and dependence power, making it sensitive. These barriers are highly volatile and impede the execution of adoption among omnichannel. Data privacy and security (OCRB6), product unavailability (OCRB3) and time constraint (OCRB10) are linkage barriers. Cluster IV (Driving barriers) has high driving barriers and low dependence on power. This cluster includes enablers- Internet accessibility (OCRE1), well-located distribution centers (OCRE2), integration (OCRE3), integration across channels (OCRE4), visibility (OCRE6) and digitization (OCRE7). Omni-channel retailers should focus on integration among channels, Visibility to customers, and accessibility to understand and develop strategies for enhancing the customer's experience. The intention of retail firms is to provide a single view of products, services, and inventory to the customers, possible only when all the operations of channels are integrated and synchronized. Thus, retailers need to integrate their entire value chain, including supply chains, operations, e-commerce, and order fulfillment, which will lead to enhanced Visibility and transparency among the channels regarding customers' orders, information and purchase (Liu et al., 2020). The barriers present in this cluster are - inconsistency in price (OCRB2), lack of coordination & information sharing among channels (OCRB1), and inconsistency in product discounts (OCRB9). The adoption barriers of OCR, main inconsistency in price, discounts and information sharing, can deteriorate the unified experience of the customer (Sharma et al., 2019; Sharma & Joshi, 2020).

The DEMATEL findings from Table 7 validate the results obtained from ISM and Fuzzy MICMAC methods application. The value for R-C shows that the single enabler customer analytics (-0.647) is the only dependent enabler and should be treated as the effect factor group, whereas the four barriers- order management (OCRB8); inconsistency in content (OCRB4), inconsistency in product information (OCRB5); lack of information about customers (OCRB7). DEMATEL results also signify that inconsistency in price (OCRB2), lack of coordination among channels & information sharing (OCRB1) and inconsistency in price discounts (OCRB9) are the cause group variables. The results of DEMATEL signify that the ISM results are valid and the levels of enablers and barriers should be considered by the retail organizations while designing their strategies.

The firms should take action to remove inconsistencies among the price, discounts and information sharing, as on these driving barriers, the other barriers are dependent (Sharma et al., 2020a; Sharma et al., 2022b). For example, if the inconsistency in price and discount exists, it will affect the order management of the product. Three barriers, namely inconsistency in price (OCRB2), lack of coordination & information sharing among channels (OCRB1), and inconsistency in product

discounts (OCRB9), are the driving barriers affecting all the other barriers. Inconsistency in price has the highest R-C value (1.162), driving all the other barriers, and thus organizations need to remove inconsistency among prices across their channels. This study tries to develop a theoretical understanding of the OCR in relation to the adoption barrier faced by retail firms as well as the enablers to enhance OCR adoption. The driving barriers (OCRB1, OCRB2, OCRB9) are validated integrated ISM-Fuzzy MICMAC-DEMATEL methods and proven that these are the most significant barriers that need to be minimized in the OCR framework. Also, the retail organization can perform better if they focus on the prominent enablers like integration, efficient logistics system and digitization (Cao & Li, 2015; Li et al., 2020).

6. Implications

The emerging markets currently have the highest market potential, which may be targeted at young, millennial, and educated populations who are making their buying choices at their convenience through multiple channels like smartphones, the Internet, and mom-and-pop stores. Consumers are becoming agnostic today and want a unified experience across all the multiple points, but retailers are not upgraded yet and need much more integration in their back-end systems. Traditional retail firms are well aware that their systems, like merchandise planning, inventory planning, order management and others, are not compatible with omnichannel. Thus, enablers like integration, Visibility, robust information systems, information sharing, and the wide accessibility of the Internet need to be strengthened by the retail firms to engage their customers effectively and enhance their customer experience. Previously the studies have focused on the relationship between the physical shop's retail metrics and firm performance (Ailawadi & Farris, 2017; Sharma et al., 2019; Sharma et al., 2021). But, today, the turbulence in the current retail industry enhances the need to select the right metrics at the right time to predict product purchases (Caro & Sadr 2019; Caboni & Hagberg, 2019; Sharma et al., 2021; Sharma et al., 2022a; Hagberg et al., 2017). Thus, a more focused approach is needed to unravel the challenges in a more changing environment like OCR, which saves time and cost for the retailer and the customers (Larke et al., 2018; Galipoglu et al., 2018; Jucevski et al., 2019).

The study also reveals customer analytics is the only dependent enabler. Analytics is not limited to online interactions only. Rather, physical stores can use advanced analytics through their robust information system that will help to learn how customers navigate their purchasing journey (Sharma et al., 2021). Moreover, analytics provides real-time information regarding the assortment and merchandise of the organizations and thus helps the retailer to improve the experience through optimized assortment decisions. The other benefit is personalization, one of the imperatives of the OCR and key to engaging customers effectively. It customizes the customer's experience by presenting only the most relevant choices, content, and offers. Data analytics is the emerging area of marketing to employ information management tools, which help retailers to engage consumers appropriately with more personalization. Cross-channel analytics seeks to correlate and analyze customer interaction across channels. It helps to track the performance of the multiple channels, i.e., how effective and attractive channels are performing at certain risks or generating positive results. Retailers need to develop their logistics systems through real-time monitoring, sensors etc., for better control of the supply chains. Also, a well-distributed warehouse helps retail organizations to control their

order management and delivery. Integration and Visibility are the main enablers nowadays, as customers are more aware and access multiple devices. The retailers know it very well that without omnichannel transformation, the customers cannot be retained in the long run. The decision-makers and retailers can track customers' behavior at various touch points, indicating how organizations may improve the experience throughout the customer's journey through all these enablers. The analysis of clickstreams and product searches can also provide knowledge of the purchase journey, gauge demand, and upsell opportunities to the retailers for their future strategies. Nowadays, software is also employed, such as 'shopping assistant,' to ease and direct the customer journey.

This study has focused on the critical role of cross-channel digital technologies, internet accessibility, distribution centers and inconsistency among price, discounts and content in the OCR structure. This study has indicated various key factors that need to be addressed by the managers and practitioners to transform the retail form into OCR.

6.1 Research limitations and future directions

The results from ISM show the multi-level structure that can be further extended by TISM for exploring the strength of the enablers and the barriers. Firstly, OCR is an evolving area, and thus new approaches would be welcomed to analyze the effect on consumer engagement in emerging markets. Secondly, prominent adoption barriers and enablers identified in this study can be further built for industry-based studies such as consumer goods, automobiles, FMCG, and online retail. This study has undertaken the OCR as a whole, which can be further broken into distinct segments of products and services. Future studies may work on products and services that may help to redesign strategies specifically for them appropriately. Thirdly, the framework developed can be further empirically validated in future research works.

7. Conclusion

The evolving OCR unifies all the customer touch points. There is a lack of theoretical embeddedness of research in OCR, and therefore, this study highlights the comprehensive structure of OCR considering enablers and adoption barriers influencing the performance of retail organizations in emerging markets like India. Retail organizations can perform better if they focus on prominent enablers like integration, efficient logistics system and digitization. Advanced technologies like artificial intelligence, predictive modeling, machine learning, and real-time monitoring etc. may help retailers to develop their competitive advantage in engaging customers effectively. Digital technologies have challenged traditional retail organizations to transform their business models. Retail organizations need to adopt advanced analytical models to cope with the pandemic situation, as their traditional models are weak in handling customer's choices and expectations and managing customer's journeys efficiently. This study highlights the importance of integration across the channels with consistency, which may enhance the customer's intentions for future purchases. Due to the upsurge in mobile technology usage, new systems need to be developed with better integration and interchangeability. From the analysis of this study, inconsistent price (OCRB2) is the most crucial barrier in the OCR adoption process. Organizations should take action to eradicate inconsistency among prices across all channels. OCR does not aim to develop all the capabilities in each channel but rather assign products and tasks to channels on the basis of

effective handling. The study also reveals that customer analytics is dependent on all the other enablers, which implies that the retailers need to upgrade their current sub-systems if they need to best fit the customer choices with multiple channels. The finding of the research work shall help in decision-making to the practitioners also as they can involve these enablers and barriers while adopting the OCR. More specifically, the practitioners should concentrate on the enablers and barriers to successfully adopting OCR. Both retail channels in emerging markets are highly motivated and aim to serve their customers better by facilitating them with a seamless purchasing experience. The digitization and hybrid business models are creating a competitive environment for firms where OCR combat the prevailing barriers and design strategies to strengthen their enablers. The implication of OCR suggests that retailers become ubiquitous.

Author Contributions: Conceptualization, S.J and M.S.; methodology, M.S.; software, M.S. and P.C.; validation, S.J and M.S.; formal analysis, S.J.; investigation, S.J.; resources, S.J.; data curation, P.C.; writing—original draft preparation, M.S.; writing—review and editing, S.J and P.C.; visualization, M.S.; supervision, P.C.; project administration, M.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Acknowledgments: The authors are thankful to the reviewers and editorial members of the DMAME.

Data Availability Statement: Not Applicable.

Conflicts of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Agatz, N. A., Fleischmann, M., & Van Nunen, J. A. (2008). E-fulfillment and multi-channel distribution—A review. *European journal of operational research*, 187(2), 339-356.
- Ailawadi, K. L., & Farris, P. W. (2017). Managing multi-and omni-channel distribution: metrics and research directions. *Journal of retailing*, 93(1), 120-135.
- Ainsworth, J., & Ballantine, P. W. (2017). Consumers' cognitive response to website change. *Journal of Retailing and Consumer Services*, 37, 56-66.
- Arslan, A. N., Klibi, W., & Montreuil, B. (2021). Distribution network deployment for omnichannel retailing. *European Journal of Operational Research*, 294(3), 1042-1058.
- Asmare, A., & Zewdie, S. (2022). Omnichannel retailing strategy: a systematic review. *The International Review of Retail, Distribution and Consumer Research*, 32(1), 59-79.

Bahn, D. L., & Fischer, P. P. (2003). Clicks and mortar: balancing brick and mortar business strategy and operations with auxiliary electronic commerce. *Information Technology and Management*, 4(2), 319-334.

Balasubramanian, S., Raghunathan, R., & Mahajan, V. (2005). Consumers in a multi-channel environment: Product utility, process utility, and channel choice. *Journal of interactive marketing*, 19(2), 12-30.

Bayram, A., & Cesaret, B. (2021). Order fulfillment policies for ship-from-store implementation in omni-channel retailing. *European Journal of Operational Research*, 294(3), 987-1002.

BCG. (2018). Global Competitiveness Report 2019: How to end a lost decade of productivity growth. Retrieved June 20, 2020, from BCG: https://image-src.bcg.com/Images/BCG-Digital-Consumers-Emerging-Markets-and-the-244-Trillion-Future-Sep-2018_tcm9-202652.pdf

Berman, B., & Thelen, S. (2018). Planning and implementing an effective omnichannel marketing program. *International Journal of Retail & Distribution Management*, 46(7), 598-614.

Bernon, M., Cullen, J., & Gorst, J. (2016). Online retail returns management: Integration within an omni-channel distribution context. *International Journal of Physical Distribution & Logistics Management*. 46 (6/7). 584-605.

Blázquez, M. (2014). Fashion shopping in multi-channel retail: The role of technology in enhancing the customer experience. *International Journal of Electronic Commerce*, 18(4), 97-116.

Caboni, F., & Hagberg, J. (2019). Augmented reality in retailing: a review of features, applications and value. *International Journal of Retail & Distribution Management*. 47(11), 1125-1140.

Cai, Y. J., & Lo, C. K. (2020). Omni-channel management in the new retailing era: A systematic review and future research agenda. *International Journal of Production Economics*, 229, 107729. <https://doi.org/10.1016/j.ijpe.2020.107729>

Cao, L., & Li, L. (2015). The impact of cross-channel integration on retailers' sales growth. *Journal of retailing*, 91(2), 198-216.

Caro, F., & Sadr, R. (2019). The Internet of Things (IoT) in retail: Bridging supply and demand. *Business Horizons*, 62(1), 47-54.

Cassab, H., & MacLachlan, D. L. (2009). A consumer-based view of multi-channel service. *Journal of Service Management*. 20 (1), 52-75.

Cavallo, A. (2017). Are online and offline prices similar? Evidence from large multi-channel retailers. *American Economic Review*, 107(1), 283-303.

Chatterjee, D., Grewal, R., & Sambamurthy, V. (2002). Shaping up for e-commerce: institutional enablers of the organizational assimilation of web technologies. *MIS quarterly*, 65-89. <https://doi.org/10.2307/4132321>

Chatterjee, P., & Kumar, A. (2017). Consumer willingness to pay across retail channels. *Journal of Retailing and Consumer Services*, 34, 264-270.

Chauhan, A. S., Badhotiya, G. K., Soni, G., & Kumari, P. (2020). Investigating interdependencies of sustainable supplier selection criteria: an appraisal using ISM. *Journal of Global Operations and Strategic Sourcing*, 13(2), 195-210.

Chen, J. E., Pan, S. L., & Ouyang, T. H. (2014). Routine reconfiguration in traditional companies' e-commerce strategy implementation: A trajectory perspective. *Information & Management*, 51(2), 270-282.

Chen, X., Su, X., Li, Z., Wu, J., Zheng, M., & Xu, A. (2022). The impact of omni-channel collaborative marketing on customer loyalty to fresh retailers: the mediating effect of the omni-channel shopping experience. *Operations Management Research*, 1-15. <https://doi.org/10.1007/s12063-022-00319-y>

Chopra, K. (2019). Indian shopper motivation to use artificial intelligence: Generating Vroom's expectancy theory of motivation using grounded theory approach. *International Journal of Retail & Distribution Management*. 47 (3), 331-347.

Chopra, S. (2016). How omni-channel can be the future of retailing. *Decision*, 43(2), 135-144.

Clinton, L., & Whisnant, R. (2019). Business model innovations for sustainability. In *Managing sustainable business* (pp. 463-503). Springer, Dordrecht. https://doi.org/10.1007/978-94-024-1144-7_22

Cortiñas, M., Chocarro, R., & Villanueva, M. L. (2010). Understanding multi-channel banking customers. *Journal of Business Research*, 63(11), 1215-1221.

Dan, B., Xu, G., & Liu, C. (2012). Pricing policies in a dual-channel supply chain with retail services. *International Journal of Production Economics*, 139(1), 312-320.

Daugherty, P. J., Bolumole, Y., & Grawe, S. J. (2018). The new age of customer impatience: An agenda for reawakening logistics customer service research. *International Journal of Physical Distribution & Logistics Management*. 49(1), 4-32.

Ewerhard, A. C., Sisovsky, K., & Johansson, U. (2019). Consumer decision-making of slow moving consumer goods in the age of multi-channels. *The International Review of Retail, Distribution and Consumer Research*, 29(1), 1-22.

Farah, M. F., Ramadan, Z. B., & Harb, D. H. (2019). The examination of virtual reality at the intersection of consumer experience, shopping journey and physical retailing. *Journal of Retailing and Consumer Services*, 48, 136-143.

Fulgoni, G. M. (2014). "Omni-channel" retail insights and the consumer's path-to-purchase: how digital has transformed the way people make purchasing decisions. *Journal of Advertising Research*, 54(4), 377-380.

Galipoglu, E., Kotzab, H., Teller, C., Hüseyinoglu, I. Ö. Y., & Pöppelbuß, J. (2018). Omni-channel retailing research—state of the art and intellectual foundation. *International Journal of Physical Distribution & Logistics Management*. 48(4), 365-390.

Gawor, T., & Hoberg, K. (2018). Customers' valuation of time and convenience in e-fulfillment. *International Journal of Physical Distribution & Logistics Management*. 49(1), 75-98.

Hagberg, J., Jonsson, A., & Egels-Zandén, N. (2017). Retail digitalization: Implications for physical stores. *Journal of Retailing and Consumer services*, 39, 264-269.

Hazen, B. T., & Ellinger, A. E. (2019). Special issue editorial: logistics customer service revisited. *International Journal of Physical Distribution & Logistics Management*. 49(1), 12-32.

Huang, M., & Jin, D. (2020). Impact of buy-online-and-return-in-store service on omnichannel retailing: A supply chain competitive perspective. *Electronic Commerce Research and Applications*, 41, 100977. <https://doi.org/10.1016/j.elerap.2020.100977>

Hübner, A. H., Kuhn, H., & Wollenburg, J. (2016). Last mile fulfilment and distribution in omni-channel grocery retailing: a strategic planning framework. *International Journal of Retail & Distribution Management*, 44(3). <https://doi.org/10.1108/IJRDM-11-2014-0154>

Ieva, M., & Ziliani, C. (2018). Mapping touchpoint exposure in retailing: Implications for developing an omnichannel customer experience. *International Journal of Retail & Distribution Management*. 46 (3), 304-322.

Ishfaq, R., Davis-Sramek, B., & Gibson, B. (2022). Digital supply chains in omnichannel retail: A conceptual framework. *Journal of Business Logistics*, 43(2), 169-188.

Jocevski, M., Arvidsson, N., Miragliotta, G., Ghezzi, A., & Mangiaracina, R. (2019). Transitions towards omni-channel retailing strategies: a business model perspective. *International Journal of Retail & Distribution Management*. 47(2), 78-93.

Joshi, S., & Sharma, M. (2021). Digital technologies (DT) adoption in agri-food supply chains amidst COVID-19: an approach towards food security concerns in developing countries. *Journal of Global Operations and Strategic Sourcing*.15(2), 262-282.

Joshi, S., Sharma, M., Bisht, P., & Singh, S. (2021). Explaining the factors influencing consumer perception, adoption readiness, and perceived usefulness toward digital transactions: online retailing experience of millennials in India. *Journal of Operations and Strategic Planning*, 4(2), 202-223.

Kamble, S. S., Gunasekaran, A., Parekh, H., & Joshi, S. (2019). Modeling the Internet of things adoption barriers in food retail supply chains. *Journal of Retailing and Consumer Services*, 48, 154-168.

Kembro, J. and Norrman, A. (2019), "Exploring trends, implications and challenges for logistics information systems in omnichannels: Swedish retailers' perception", *International Journal of Retail & Distribution Management*, 47(4), 384-411.

Kembro, J. H., Norrman, A., and Eriksson, E. (2018), Adapting warehouse operations and design to omni-channel logistics: A literature review and research agenda. *International Journal of Physical Distribution & Logistics Management*, 48(9), 890-912.

Larke, R., Kilgour, M., & O'Connor, H. (2018). Build touchpoints and they will come: transitioning to omnichannel retailing. *International Journal of Physical Distribution & Logistics Management*. 48(4), 465-483.

Lekhwar, S., Yadav, S., & Singh, A. (2019). Big data analytics in retail. In *information and communication technology for intelligent systems* (pp. 469-477). Springer, Singapore. https://doi.org/10.1007/978-981-13-1747-7_45

Li, G., Zhang, T., & Tayi, G. K. (2020). Inroad into omni-channel retailing: Physical showroom deployment of an online retailer. *European Journal of Operational Research*, 283(2), 676-691.

Lin, Y. H., Wang, Y., Lee, L. H., & Chew, E. P. (2022). Omnichannel facility location and fulfillment optimization. *Transportation Research Part B: Methodological*, 163, 187-209.

Liu, L., Feng, L., Xu, B., & Deng, W. (2020). Operation strategies for an omni-channel supply chain: who is better off taking on the online channel and offline service?. *Electronic Commerce Research and Applications*, 39, 100918. <https://doi.org/10.1016/j.elerap.2019.100918>

Marchet, G., Melacini, M., Perotti, S., Rasini, M., & Tappia, E. (2018). Business logistics models in omni-channel: a classification framework and empirical analysis. *International Journal of Physical Distribution & Logistics Management*. 48(4), 439-464.

Melacini, M., Perotti, S., Rasini, M., & Tappia, E. (2018). E-fulfilment and distribution in omni-channel retailing: a systematic literature review. *International Journal of Physical Distribution & Logistics Management*. 48(4). 391-414.

Melero, I., Sese, F. J., & Verhoef, P. C. (2016). Recasting the customer experience in today's omni-channel environment. *Universia Business Review*, (50), 18-37. <https://doi.org/10.3232/UBR.2016.V13.N2.01>

Mirzabeiki, V., & Saghiri, S. S. (2020). From ambition to action: How to achieve integration in omni-channel?. *Journal of Business Research*, 110, 1-11. <https://doi.org/10.1016/j.jbusres.2019.12.028>

Mkansi, M., Eresia-Eke, C., & Emmanuel-Ebikake, O. (2018). E-grocery challenges and remedies: Global market leaders perspective. *Cogent Business & Management*, 5(1), 1459338. <https://doi.org/10.1080/23311975.2018.1459338>

Mousavizade, F., & Shakibazad, M. (2018). Identifying and ranking CSFs for KM implementation in urban water and sewage companies using ISM-DEMATEL technique. *Journal of knowledge management*. 23 (1), 200-218.

Mrutzek-Hartmann, B., Kotzab, H., Hüseyinoğlu, I. Ö. Y., & Kühling, S. (2022). Omni-channel retailing resources and capabilities of SME specialty retailers—insights from Germany and Turkey. *International Journal of Retail & Distribution Management*. 50 (8/9). <https://doi.org/10.1108/IJRDM-10-2021-0503>

Murfield, M., Boone, C. A., Rutner, P., & Thomas, R. (2017). Investigating logistics service quality in omni-channel retailing. *International Journal of Physical Distribution & Logistics Management*. 47(4), 263-296.

Neslin, S. A., Grewal, D., Leghorn, R., Shankar, V., Teerling, M. L., Thomas, J. S., & Verhoef, P. C. (2006). Challenges and opportunities in multi-channel customer management. *Journal of service research*, 9(2), 95-112.

Nguyen, T. T. H., Nguyen, N., Nguyen, T. B. L., Phan, T. T. H., Bui, L. P., & Moon, H. C. (2019). Investigating consumer attitude and intention towards online food purchasing in an emerging economy: An extended tam approach. *Foods*, 8(11), 576. <https://doi.org/10.3390/foods8110576>

Niranjan, T., Parthiban, P., Sundaram, K., & Jeyaganesan, P. N. (2019). Designing a omnichannel closed loop green supply chain network adapting preferences of rational customers. *Sādhanā*, 44(3), 1-10.

Pan, S., Giannikas, V., Han, Y., Grover-Silva, E., & Qiao, B. (2017). Using customer-related data to enhance e-grocery home delivery. *Industrial Management & Data Systems*. 117(9), 1917-1933.

Panchal, D., & Kumar, D. (2017). Maintenance decision-making for power generating unit in thermal power plant using combined fuzzy AHP-TOPSIS approach. *International Journal of Operational Research*, 29(2), 248-272.

Panchal, D., Chatterjee, P., Pamucar, D., & Yazdani, M. (2022). A novel fuzzy-based structured framework for sustainable operation and environmental friendly production in coal-fired power industry. *International Journal of Intelligent Systems*, 37(4), 2706-2738.

Park, J, and Kim, R. B. (2018). A new approach to segmenting multi-channel shoppers in Korea and the US. *Journal of Retailing and Consumer Services*, 45, 163-178.

Park, S., and Lee, D. (2017). An empirical study on consumer online shopping channel choice behavior in omni-channel environment. *Telematics and Informatics*, 34(8), 1398-1407.

Payne, E. M., Peltier, J. W, and Barger, V. A. (2017). Omni-channel marketing, integrated marketing communications and consumer engagement. *Journal of Research in Interactive Marketing*. 11(2), 185-197.

Picot-Coupey, K., Huré, E, and Piveteau, L. (2016), Channel design to enrich customers' shopping experiences: Synchronizing clicks with bricks in an omni-channel perspective—the Direct Optic case. *International Journal of Retail & Distribution Management*, 44(3), 336-368.

Piotrowicz, W., and Cuthbertson, R. (2014). Introduction to the special issue information technology in retail: Toward omnichannel retailing. *International Journal of Electronic Commerce*, 18(4), 5-16.

Prabhuram, T., Rajmohan, M., Tan, Y, and Johnson, R. R. (2020). Performance evaluation of Omni channel distribution network configurations using multi criteria decision making techniques. *Annals of Operations Research*, 1-22. <https://doi.org/10.1007/s10479-020-03533-8>

Rai, H. B., Verlinde, S., Macharis, C., Schoutteet, P., & Vanhaverbeke, L. (2019). Logistics outsourcing in omnichannel retail: State of practice and service recommendations. *International Journal of Physical Distribution & Logistics Management*. 49(3), 267-286.

Saghiri, S. S., Bernon, M., Bourlakis, M., & Wilding, R. (2018). Omni-channel logistics special issue. *International Journal of Physical Distribution & Logistics Management*. 48(4), 362-364.

Saghiri, S., Wilding, R., Mena, C., & Bourlakis, M. (2017). Toward a three-dimensional framework for omni-channel. *Journal of Business Research*, 77, 53-67.

Salviotti, G., Ziliani, C., Teller, C., Ieva, M., & Ranfagni, S. (2022). Omnichannel retailing and post-pandemic recovery: building a research agenda. *International Journal of Retail & Distribution Management*. 50 (8/9), 1156-1181.

Schramm-Klein, H., Wagner, G., Steinmann, S, and Morschett, D. (2011). Cross-channel integration—is it valued by customers? *The International Review of Retail, Distribution and Consumer Research*, 21(5), 501-511.

Shankar, V., Smith, A. K., & Rangaswamy, A. (2003). Customer satisfaction and loyalty in online and offline environments. *International journal of research in marketing*, 20(2), 153-175.

Shanker, S., Barve, A., Muduli, K., Kumar, A., Garza-Reyes, J. A., & Joshi, S. (2022). Enhancing resiliency of perishable product supply chains in the context of the COVID-19 outbreak. *International Journal of Logistics Research and Applications*, 25(9), 1219-1243.

Sharma, M., & Joshi, S. (2020). Online advertisement using web analytics software: a comparison using AHP method. *International Journal of Business Analytics (IJBAN)*, 7(2), 13-33. <https://doi.org/10.4018/IJBAN.2020040102>

Sharma, M., Gupta, M., & Joshi, S. (2019). Adoption barriers in engaging young consumers in the Omni-channel retailing. *Young Consumers*, 21(2), 193-210.

Sharma, M., Joshi, S, and Kumar, A. (2020b). Assessing enablers of e-waste management in circular economy using DEMATEL method: An Indian perspective. *Environmental Science and Pollution Research*, 27(12), 1-14. <https://doi.org/10.1007/s11356-020-07765-w>

Sharma, M., Joshi, S., Kannan, D., Govindan, K., Singh, R., & Purohit, H. C. (2020a). Internet of Things (IoT) adoption barriers of smart cities' waste management: An Indian context. *Journal of Cleaner Production*, 270, 122047. <https://doi.org/10.1016/j.jclepro.2020.122047>

Sharma, M., Joshi, S., Luthra, S., & Kumar, A. (2022c). Managing disruptions and risks amidst COVID-19 outbreaks: role of blockchain technology in developing resilient food supply chains. *Operations Management Research*, 15(1), 268-281.

Sharma, M., Luthra, S., Joshi, S., & Kumar, A. (2021). Accelerating retail supply chain performance against pandemic disruption: adopting resilient strategies to mitigate the long-term effects. *Journal of Enterprise Information Management*. 34(6), 1844-1873.

Sharma, M., Luthra, S., Joshi, S., & Kumar, A. (2022a). Implementing challenges of artificial intelligence: Evidence from public manufacturing sector of an emerging economy. *Government Information Quarterly*, 39(4), 101624.

Sharma, M., Luthra, S., Joshi, S., & Kumar, A. (2022b). Developing a framework for enhancing survivability of sustainable supply chains during and post-COVID-19 pandemic. *International Journal of Logistics Research and Applications*, 25(4-5), 433-453.

Sharma, M., Gupta, M. and Joshi, S. (2020c). Adoption barriers in engaging young consumers in the Omni-channel retailing. *Young Consumers*, 21 (2), 193-210.

Shen, X. L., Li, Y. J., Sun, Y., & Wang, N. (2018). Channel integration quality, perceived fluency and omnichannel service usage: The moderating roles of internal and external usage experience. *Decision Support Systems*, 109, 61-73.

Singh, R. K., Joshi, S., & Sharma, M. (2020). Modelling Supply Chain Flexibility in the Indian Personal Hygiene Industry: An ISM-Fuzzy MICMAC Approach. *Global Business Review*, 0(0). <https://doi.org/10.1177/0972150920923075>

Solem, B. A. A., Fredriksen, J. I., & Sørrebø, Ø. (2022). Dynamic capabilities in the realisation of omnichannel retailing. *International Journal of Retail & Distribution Management*, (ahead-of-print). <https://doi.org/10.1108/IJRDM-12-2021-0599>

Sousa, R., & Voss, C. A. (2006). Service quality in multi-channel services employing virtual channels. *Journal of service research*, 8(4), 356-371.

Teixeira, R., Duarte, A. L. D. C. M., Macau, F. R., & de Oliveira, F. M. (2022). Assessing the moderating effect of brick-and-mortar store on omnichannel retailing. *International Journal of Retail & Distribution Management*, (ahead-of-print). 50(10), 1259-1280. <https://doi.org/10.1108/IJRDM-03-2021-0139>

Tyagi, M., Panchal, D., Singh, R. P., & Sachdeva, A. (2019). Modeling and analysis of critical success factors for implementing the IT-based supply-chain performance system. In *Operations Management and Systems Engineering* (pp. 51-67). Springer, Singapore. https://doi.org/10.1007/978-981-13-6476-1_4

Vakhutinsky, A., Mihic, K., & Wu, S. M. (2019). A prescriptive analytics approach to markdown pricing for an e-commerce retailer. *Journal of Pattern Recognition Research*, 14(1), 1-20.

Verhoef, A. A., & Agrawal, N. (2004). Channel conflict and coordination in the e-commerce age. *Production and operations management*, 13(1), 93-110.

Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2015). From multi-channel retailing to omni-channel retailing: introduction to the special issue on multi-channel retailing. *Journal of retailing*, 91(2), 174-181.

Wang, D. (2013). Influences of cloud computing on e-commerce businesses and industry. 6(6), <https://doi.org/10.4236/jsea.2013.66039>

WEF. (2020). *Global Competitiveness Report 2019: How to end a lost decade of productivity growth*. Retrieved June 20, 2020, from WEF: <https://www.weforum.org/reports/how-to-end-a-decade-of-lost-productivity-growth>

Yan, R., & Pei, Z. (2011). Information asymmetry, pricing strategy and firm's performance in the retailer-multi-channel manufacturer supply chain. *Journal of Business Research*, 64(4), 377-384.

Yang, F., Li, X and Huang, Z. (2019). Buy-online-and-pick-up-in-store Strategy and Showroom Strategy in the Omnichannel Retailing. *Advances in Business and Management Forecasting*, 13, 25-49.

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Ye, Y., Lau, K. H., & Teo, L. K. Y. (2018). Drivers and barriers of omni-channel retailing in China: A case study of the fashion and apparel industry. *International Journal of Retail & Distribution Management*, 46(7), 657-689.

Yin, C. C., Chiu, H. C., Hsieh, Y. C., & Kuo, C. Y. (2022). How to retain customers in omnichannel retailing: Considering the roles of brand experience and purchase behavior. *Journal of Retailing and Consumer Services*, 69, 103070. <https://doi.org/10.1016/j.jretconser.2022.103070>

Yu, Y., Wang, X., Zhong, R. Y., & Huang, G. Q. (2016). E-commerce logistics in supply chain management: Practice perspective. *Procedia Cirp*, 52, 179-185. <https://doi.org/10.1016/j.procir.2016.08.002>

Zaki, M., & Neely, A. (2019). Customer experience analytics: dynamic customer-centric model. In *Handbook of Service Science, Volume II* (pp. 207-233). Springer, Cham. https://doi.org/10.1007/978-3-319-98512-1_10

Zhang, P., He, Y., & Zhao, X. (2019). "Preorder-online, pickup-in-store" strategy for a dual-channel retailer. *Transportation Research Part E: Logistics and Transportation Review*, 122, 27-47.

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