

An Optimized Technique to Foster Omnichannel Retail Experience Leveraging Key Technology Dimensions in the Context of an Emerging Digital Market



Girish Kumar, V R Uma

Abstract: Customers' approach towards shopping has transformed, as a result of their reduced tolerance, increased technology usage and being well informed than ever before. As customers expect a seamless shopping experience regardless of where they are engaged within a retailer's network, the line between physical and digital retailing is blurring. Retailers across the world are contemplating on transforming into Omnichannel hubs to deliver an elevated experience anytime anywhere. And, experts have often indicated that an Omnichannel strategy delivers a unified shopping experience than a mere channel experience. However, the true Omnichannel experience is still not evident in India with minimal action in this space, indicating a subverted outlook towards building necessary Omnichannel Capabilities. This paper examines the most essential and significant technology dimensions that are imperative towards fostering a seamless Omnichannel Retail Experience. The findings of this study serve as a basis for retailers in India to evaluate their strategies towards adopting these technology dimensions and respective capabilities, using an optimized approach. The study employed a quantitative research involving survey of executives from major retailers in India. The quantitative data was analyzed applying Structural Equation Modeling, to ascertain the technology dimensions that emerged and their significance in deriving Omnichannel Retail Experience.

Keywords: Omnichannel, Digital Market, Retail, Shopping Experience.

I. INTRODUCTION

The change in attitude of consumers and emergence of Organized Retail have transformed the face of retailing in India. Of late, Multichannel has extended beyond concurrent use of channels to customer centric blend of channels, leading towards Omnichannel.

Revised Manuscript Received on August 30, 2019.

* Correspondence Author

Girish Kumar*, CHRIST (Deemed to be University), Hosur Road, Bengaluru, India.

V R Uma, CHRIST (Deemed to be University), Hosur Road, Bengaluru, India.

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

An Omnichannel strategy is a form of retailing that allows customers to shop through multiple channels anytime anywhere, thereby providing a unified shopping experience that breaks down the barriers between channels. Customers using multiple channels during their purchase journey are referred as Omnishoppers, who are mobile, highly connected and expect a smoother movement from one channel to another. Often, their product search occurs over an extended timeframe or involves multiple devices. They might research for a product through a mobile application, compare prices across websites through a computer, and finally, purchase the product at a physical store [1]. Retailers need to enable a 360° view of such Omnishoppers aiding deeper analysis of their behavioral data, purchase patterns, trends and vicinity, allowing personalization of the customer journey and appropriate product recommendations, engaging them in a meaningful way [2].

At the outset, Rigby [3] defined Omnichannel Retail as an integrated experience that binds the advantages of physical stores and information-rich digital stores. It is a natural evolution from Multichannel, eliminating barriers between channels and bringing in Crosschannel experience [4]. By 2020, the penetration of Organized Retail in India is expected to rise to 24%, largely driven by Omnichannel Retailing, compelling seamless integration of channels [5, 6].

While customers expect retailers to serve every time everywhere, the seamless experience of Omnichannel is not evident in India. Many retailers have technically set-up multiple discretely managed channels as Omnichannel, leading to inconsistencies, which must be remodeled correctly [7], as customers are increasingly demanding personalized offerings irrespective of the channel they interact.

And, as digital disruption drives retailers to reform their operating models, it is important to find the key factors that underpin Omnichannel Retail Experience.

This paper explores the key technology dimensions that retailers in India are deliberating as highly essential and suggests an optimized approach towards Omnichannel to enhance the customer experience, thereby enabling technological capability strength for a sustainable competitive advantage.

II. THEORETICAL BACKGROUND

Cook [8] explains that each channel needs to be aware of the experience that the customer has had to date through the other channels, such as, what they viewed, what was compared, the last page they visited and what was abandoned. This makes the buying process continuous though the customer hops between channels. Likewise, Hentschel [9] re-emphasized about retailers engaging their associates as well as customers in a highly relevant and personalized way within the store. And that, customer-facing associates are the front line of the customer experience, so they need to be more refined in how they interact with customers. Associates equipped with digital devices can pull-up product information on their devices and guide a shopper exactly to that item in the store. Singhi et al. [10] broadly emphasize that, by 2020, it is expected that pure-play online players would continue to strengthen their capabilities, but retailers who are able to build a strong Omnichannel experience would be better poised to win against pure play. In a similar vein, Sopadjieva et al. [11] point out that an Omnichannel strategy ensures retailers to provide a differentiated service, through a seamless shopping experience in their stores and through a variety of digital channels. It also provides them a competitive edge over pure play online retailers by leveraging their store assets and fusing the shopping experience across channels. Bezes [12] explains that retailers are under severe pressure as they struggle to develop a big picture for their Omnichannel strategy, and find ways to synchronize physical and digital capabilities. Supporting this, Brynjolfsson et al. [13] emphasize that the line between online and offline retail is blurring with the advent of technologies, creating a challenging environment. Hortaçsu and Syverson [14] conclude that rapid growth of online retail and intrinsic strength of offline retail indicate potential for a blend of both. As Farbstein [15] concludes, customers expect retailers to recognize, remember and relate to them, to recommend relevant products. Retailers can achieve this through insights from purchase history, shopping patterns and individual preferences, creating customized and meaningful experiences. They need to identify personalization opportunities for real time engagement based on data-driven understanding of customer behavior. As some of the studies

show offline retailers adopting digital channels, there is also a trend of online retailers opening physical stores. Though prior studies have put forth key knowledge on Omnichannel Retail, there was no view on the significant technology dimensions or an optimized approach towards their adoption particularly for retailers in India, to serve as a basis to foster Omnichannel Retail Experience. Hence, it is compelling to find the perception of retailers towards these key aspects. This paper aims to close this gap by examining expert opinion through a quantitative survey of executives from major retailers in India to ascertain essential technology dimensions, their significance and an optimized approach to foster Omnichannel Retail Experience.

III. METHODOLOGY

The study employed a Quantitative approach involving a survey of retail executives from Organized Retailers in India, to ascertain the key technology dimensions that influence Omnichannel Retail Experience. The survey was conducted using a structured questionnaire containing 5-point unipolar Likert Scales (1 “Not a Priority” to 5 “Essential”), to elicit expert opinion on the significance of specific technology elements. The questionnaire was designed through an extensive review of literature identifying the latent constructs and respective manifest variables representing technology elements influencing the Omnichannel Retail Experience. Three latent constructs denoting technology dimensions and one denoting Omnichannel Retail Experience were identified. Five or more manifest variables to measure each of the constructs [16] were adapted from various sources, to design the questionnaire instrument grounded in the literature [17]. The instrument was designed on a 5-point Likert Scale, as it is a proven scale to create enough variances required for examining relationships and internal consistency using reliability estimates [18]. The questionnaire was evaluated with retail domain experts to ensure content validity as well as face validity. A pilot test of the questionnaire was conducted with 30 participants. Accordingly, some of the items were reworded or removed [19]. The final questionnaire had about twenty-five items measuring respective constructs as depicted in table 1 below.

Table 1. Latent Constructs and Manifest Item Variables.

Sl. No	Latent Construct	Manifest Item Variables	Questionnaire Item No.	Source
1	Distinctive Digital Technology Capabilities (DDTC)	Digital coupons through mobile applications	Q1	[20, 21]
		Digital loyalty cards through mobile applications	Q2	[20]
		Marketing campaigns through Social media platforms	Q3	[20, 21]
		Virtual Trial Room for online channels	Q4	[22, 23]
		Chatbot for automated customer support	Q5	Own
		Real-time stock availability of products	Q6	[20, 24]
		Real-time shipment status updates	Q7	[20]
2	Personalized Content and	Systematically aggregate and blend data from multiple channels	Q8	[25, 26]
		Customized Offers based on purchase preferences and patterns	Q9	[20, 21]



3	Recommendation Capabilities (PCRC)	Customized Offers driven by individual contextual data (events)	Q10	[20, 21]
		Personalized offers when customers are in the vicinity of store.	Q11	Own
		Product or assortment recommendation relevant to the customer	Q12	[7, 27]
	Distinctive In-store Technology Capabilities (DITC)	Fraud protection of personal data passing through various systems	Q13	[21]
		Self-service kiosks providing online access within stores	Q14	[20, 28]
		Virtual Trial Room or Interactive Mirror in the store	Q15	[22, 23]
		Digital signage displaying dynamic content on screens in-store	Q16	[21, 29]
Contactless payments through Mobile Wallets		Q17	[20, 21]	
Tracking customer movement in and around the store		Q18	[20, 30]	
Associates equipped with insights on products and purchases data		Q19	[8, 20]	
4	Omnichannel Retail Experience (OCRE)	Associates enabled with Customer Intelligence through Sentiment Analysis of social media	Q20	[31]
		Create a relaxing shopping environment	Q21	[32]
		Make shopping satisfying	Q22	[32]
		Create an engaging shopping environment	Q23	[32]
		Provide a unique shopping experience	Q24	[32]
	Make shopping exciting	Q25	[32]	

The sample size for the survey was determined based on the accepted thumb rule of eight to ten times the number of items measured in the questionnaire in order to perform suitable statistical analysis [19]. Hence, the survey was administered to about 250 participants. The participants were chosen through purposive sampling based on their experience in retail and awareness on Multichannel or Omnichannel [33]. Full and complete responses with no missing values were received from about 205 respondents.

IV. ANALYSIS AND RESULTS

The quantitative data collected through the survey of executives from major Organized Retailers in India was analyzed for key technology dimensions influencing Omnichannel Retail Experience. The data was first coded using appropriate numerical codes of Likert responses as well as other nominal demographic responses. The average experience of the respondents was 11 years. About 75 were from multinational retailers and the rest from domestic. While about 56 were from multi-brand retail and the rest from single brand retail. There were no significant differences between the sub-samples on any of the demographic variables collected for this study. Hence, further analysis was on the total sample of 205 respondents.

It is recommended to apply Confirmatory Factor Analysis (CFA) on measuring instruments, in order to evaluate a model's goodness of fit [34]. Thus, the data was examined through Structural Equation Modeling (SEM) by analyzing the Measurement Model using CFA followed by analyzing the Structural Model for further affirmation of significant technology dimensions influencing Omnichannel Retail Experience. The data was analyzed using IBM SPSS AMOS v21 software package. The model as shown in figure 1 below was evaluated for its fitness of the observed data.

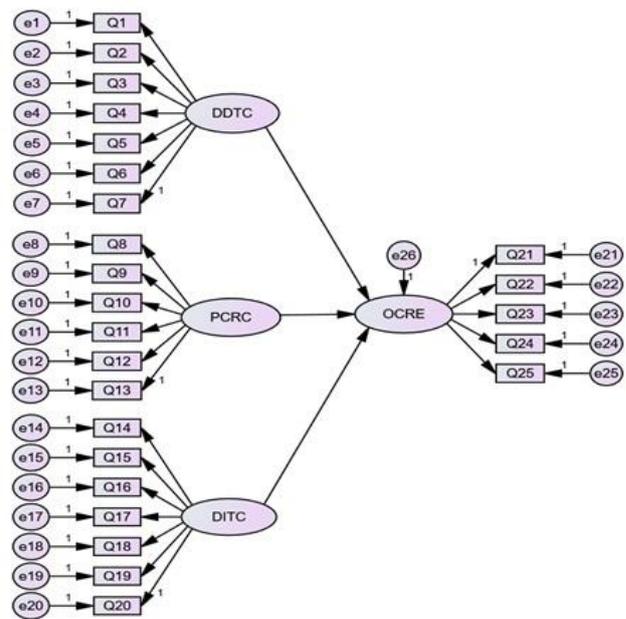


Figure1: Technology Dimensions Influencing Omnichannel Retail Experience.

The analysis revealed that all four constructs and respective scale items were loaded in accordance to the above structure. The overall chi-square value for the model was statistically significant ($\chi^2= 344.493$; $df= 271$; $p<0.05$) and was closer to the degrees of freedom, indicating a good fit[35]. In addition to chi-square, it is recommended to evaluate other indices such as Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI) and Root Mean Square Error of Approximation (RMSEA) in order to assess the model fit. The values gathered for the model under study indicated a good fit for the data set obtained, as they are in the acceptable range indicated in table 2 below.

Table 2. Model Fit Indices Summary.

Model χ^2	DF	P-value	CMIN/DF	TLI	CFI	GFI	AGFI	RMSEA
344.493	271	0.002	1.271	0.908	0.917	0.888	0.865	0.036

Additionally, all the individual scale items loaded significantly on the respective latent constructs. Each measurement item reported $p < 0.001$ indicating a good fit of the measurement model statistically. The standardized

regression estimates obtained for the measurement items pertaining to their respective latent constructs are as listed in table 3 below.

Table 3. Standardized Regression Estimates for Measurement Model

Measurement Model	Estimate	Standard Error (S.E.)	Critical Ratio (C.R.)	P
Q7 <--- DDTC	1.000			
Q6 <--- DDTC	.887	.145	6.121	***
Q5 <--- DDTC	.749	.135	5.539	***
Q4 <--- DDTC	1.135	.170	6.675	***
Q3 <--- DDTC	.893	.140	6.376	***
Q2 <--- DDTC	.768	.140	5.483	***
Q1 <--- DDTC	.390	.116	3.368	***
Q13 <--- PCRC	1.000			
Q12 <--- PCRC	1.214	.194	6.272	***
Q11 <--- PCRC	.949	.163	5.812	***
Q10 <--- PCRC	.914	.164	5.581	***
Q9 <--- PCRC	.621	.158	3.939	***
Q8 <--- PCRC	.572	.148	3.852	***
Q20 <--- DITC	1.000			
Q19 <--- DITC	1.479	.364	4.065	***
Q18 <--- DITC	1.682	.386	4.356	***
Q17 <--- DITC	2.054	.473	4.344	***
Q16 <--- DITC	1.285	.337	3.817	***
Q15 <--- DITC	1.506	.362	4.164	***
Q14 <--- DITC	1.438	.352	4.082	***
Q21 <--- OCRE	1.000			
Q22 <--- OCRE	1.152	.162	7.130	***
Q23 <--- OCRE	.894	.144	6.225	***
Q24 <--- OCRE	1.025	.148	6.923	***
Q25 <--- OCRE	.629	.138	4.564	***

The internal consistency of the measurement scales was established through reliability analysis by estimating the Cronbach's alpha values for each construct scale. All the scales were observed to be reasonably reliable as an alpha

value >0.7 is generally accepted for a scale to be highly reliable. The values obtained for the respective scales are as depicted in table 4 below.

Table 4. Cronbach's Alpha Values.

Latent Construct	No. of Manifest Items	Cronbach's Alpha
Distinctive Digital Technology Capabilities (DDTC)	7	0.741
Personalized Content and Recommendation Capabilities (PCRC)	6	0.716
Distinctive In-store Technology Capabilities (DITC)	7	0.728
Omnichannel Retail Experience (OCRE)	5	0.727

Further, analyzing the structural model, the degree to which the three technology dimensions: DDTC, PCRC, and DITC are related to OCRE was assessed. The standardized regression weights were used to compare the relative effect of

each of the technology dimensions on OCRE. The standardized regression estimates depicting the association between the constructs are presented in table 5 below.



Table 5. Standardized Regression Estimates for Structural Model

Structural Model		Estimate	Standard Error (S.E.)	Critical Ratio (C.R.)	P
OCRE	<--- DDTC	-0.053	0.107	-0.499	0.618
OCRE	<--- DITC	-0.050	0.189	-0.266	0.790
OCRE	<--- PCRC	0.249	0.107	2.337	0.019

Noting the values of critical ratio (CR) and p-value of the regression estimates for each of the associations, it was observed that PCRC was significantly and positively associated with OCRE. While the other two dimensions DDTC and DITC did not emerge to be significant in influencing OCRE. Overall, the analysis assured that the data set obtained from the designed survey instrument fits the model quite well. No post-hoc modifications were required from the results of the analysis as the data was observed to be a good fit to the model. The results establish that PCRC is the most significant and essential technology dimension for retailers in India to deliver an elevated Omnichannel Retail Experience. The results suggest retailers to strongly emphasize on personalized customer engagement aspects, as they embark on the Omnichannel retail journey.

V. CONCLUSION

In today’s digital ecosystem, technology plays a key role across all retail touch points in enhancing Omnichannel experience of customers. The study recognizes that retailers are keen on adopting technology capabilities in transforming their brick-and-mortar stores alongside integrating online channels, to create an Omnichannel engagement with customers. As demand for seamless experience intensify, it would be vital for Organized Retailers in India to consider the key technology dimensions examined in this study by following the suggested approach, to formulate a suitable strategy to foster Omnichannel Retail Experience. The technology dimensions examined were: Distinctive Digital Technology Capabilities (DDTC), Personalized Content and Recommendation Capabilities (PCRC) and Distinctive In-store Technology Capabilities (DITC). Retailers can iteratively focus on these dimensions in order to build experience driven processes for their customers. The results of the study suggest that they need to emphasize on PCRC on priority as it emerges to have the most significant influence on Omnichannel Retail Experience. Emphasizing on this particular dimension, they need to focus on specific aspects examined for this dimension, such as, systematically aggregating customer data from multiple channels, providing customized offers based on individual preferences, purchase patterns, individual contextual data. And, there should be firm focus towards ensuring customer data security and privacy protection. They should also build capabilities to disseminate personalized offers when customers are in the vicinity of the store and recommend products relevant to the customer.

Technology allows retailers to deliver Personalized Content and appropriate Recommendations to customers. The study further observes some of the technologies for Retailers to realize PCRC across its corresponding manifest items. As per the observations, Big Data engineering technologies help to bring together all structured data (from Enterprise Systems

and Multiple Channel systems) as well as unstructured data into Hadoop software to blend and analyze as a combined data set [21]. In fact, AI-driven solutions using Big Data analytics help analyze such huge data sets to identify purchase patterns, critical events, frequently visited stores, correlations, shopping trends, customer preferences etc. to effectively mine insights for personalization and relevant product recommendations [26, 27]. Machine-learning algorithms with deep-learning techniques are used to build suitable Semantic Models to enrich the data set. Recommendation Systems are usually implemented using predictive analytics by extracting insights for each persona to drive timely as well as customized offers [26]. Also, there are technologies such as BLE Beacon that captures the vicinity of customers in and around the store to analyze their instore behavior and push personalized offers [21]. Last but not least, Fraud prevention capabilities are built through multi-layered technology platforms leveraging specific tools for identity, authentication and fraud management that help in protecting data and tracking IP addresses, to provide a safe shopping experience to customers [36]. Predictive data modelling tools and Machine-learning techniques also help identify fraud trends across the customer base to flag any unusual behavior, use of skeptical devices, or potential fraud transactions. Other technology solutions include Address Verification Systems (AVS), Firewalls, PayPal payment processor engine, Tokenization and Encryption security algorithm, Algorithms compliant with Payment Card Industry Data Security Standard [37] and more.

The findings help retailers evolve on their Omnichannel journey providing a sustainable competitive advantage. It is expected to serve as a basis for retailers to develop suitable Omnichannel strategies in order to accelerate their experience driven processes. This paper contributes to the literature on Omnichannel serving as a knowledge base for retailers to evaluate their efforts that are underway and make any correction to the changes already made.

REFERENCES

1. Juaneda-Ayensa E, Mosquera A and Murillo Y S 2016 Omnichannel customer behavior: Key drivers of technology acceptance and use and their effects on purchase intention. *Front. In Psych.* 7 1-11
2. Phibbs B 2015 4 Ways to Improve Your Retail Customer Experience and Sales. Available at: <https://www.retaildoc.com/blog/improve-retail-customer-experience-sales-follow> (accessed October 2017)
3. Rigby D 2011 The Future of Shopping. *Harv. Bus. Rev.* 89:64-75
4. Strang R 2013 Retail without Boundaries. *Supply Chain Management Review.* Available at: <https://longitudes.ups.com/retail-without-boundaries/> (accessed December 2017)

An Optimized Approach to Foster Omnichannel Retail Experience Leveraging Key Technology Dimensions in the Context of an Emerging Digital Market

5. Retailers Association of India - Knight Frank Report 2017 Think India. Think 'CONNECTED' Retail. Available at: <https://content.knightfrank.com/research/317/documents/en/think-india-think-connected-retail-2017-4441.pdf> (accessed February 2018).
6. FICCI 2016 Retail Sector Profile. Available at: http://ficci.in/sector/33/Project_docs/Sector-prof.pdf (accessed November 2017)
7. Joseph G 2015 Sustaining Brick & Mortar through Omnichannel: An emerging Story of Retail Business Model Convergence. The Int. J of Bus and Mgmt. 3 203-211
8. Cook G 2014 Customer experience in the omni-channel world and the challenges and opportunities this presents. J. of. Dir. Data. and Digi. Mktg. Pr. 15262-266
9. Hentschel J 2016 Stores Make a Comeback: Becoming a Hub for an Array of Customer Services. Available at: <https://www.chainstoreage.com/news/stores-make-comeback-becoming-hub-array-customer-services> (accessed October 2018)
10. Singhi A, Mall A and Puri N 2016 Retail Transformation: Changing Your Performance Trajectory. BCG and CII. National Retail Summit
11. Sopadjieva E, Dholakia U and Benjamin B 2017 A Study of 46,000 Shoppers Shows That Omnichannel Retailing Works. Harv. Bus. Rev.
12. Bezes C 2013 Effect of channel congruence on a retailer's image. Intl. J. of. Ret and Distr. Mgmt. 41 254-273
13. Brynjolfsson E, Jeffrey Hu Y and Rahman M S 2013 Competing in the Age of Omnichannel Retailing. MIT Sloan Mgmt. Rev. 54 23-29
14. Hortaçsu A and Syverson C 2015 The Ongoing Evolution of US Retail: A Format Tug-of-War. The J. of Eco. Persp. 29 89-112
15. Farbstein J 2012 Brick-and-mortar's inherent advantage: In-store relevance. Available at: <https://www.retailcustomerexperience.com/articles/brick-and-mortars-inherent-advantage-in-store-relevance> (accessed August 2018)
16. Hinkin T and Schriesheim C A 1989 Development and application of new scales to measure the French and Raven (1959) bases of social power. J. of Appl. Psych. 74 561-567
17. Carpenter S 2018 Ten Steps in Scale Development and Reporting: A Guide for Researchers. Comm. Meth. and Mrs. 1225-44
18. Lissitz R and Green S B 1975 Effect of the number of scale points on reliability: A Monte Carlo approach. J. of Appl. Psych. 60 10-13
19. Boateng G O, Neilands T B, Frongillo E A, Melgar-Quinonez H R and Young S L 2018 Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer, Front. in Pub. Hlth. 6 149
20. Lazaris C, Vrechopoulos A, Doukidis G and Fraidaki K 2015 The Interplay of Omnichannel Store Atmosphere on Consumers Purchase Intention towards the Physical Retail Store. Eur. Medtrn. Middle Eastn. Conf. on Info Sys. 1-16
21. Piotrowicz W and Cuthbertson R 2014 Introduction to the Special Issue Information Technology in Retail: Toward Omnichannel Retailing. Intl. J. of Elec. Comm. 18 5-16
22. Gao F and Su X 2016 Online and Offline Information for Omnichannel Retailing. Mfg & Serv Ops Mgmt.
23. Picot-Coupey K, Huré E and Piveteau L 2016 Channel design to enrich customers' shopping experiences. Intl. J. of Ret & Distr. Mgmt. 44
24. Herhausen D, Binder J, Schoegel M and Herrmann A 2015 Integrating Bricks with Clicks: Retailer-Level and Channel-Level Outcomes of Online-Offline Channel Integration. J. of Ret. 91 309-325
25. Zhang J, Farris P W, Irvin J W, Kushwaha T, Steenburgh T J, Weitz B and Smith R H 2010 Crafting Integrated Multichannel Retailing Strategies. Harv. Bus. Rev.
26. Pattnaik M 2016 How Predictive Analytics is Changing the Retail Industry. Intl. Conf. on Mgmt. and Info. Sys. 212-224
27. Sheng X and Zolfagharian M 2014 Consumer participation in online product recommendation services: augmenting the technology acceptance model. J. of Serv. Mktg. 28 460-470
28. Cummins S, Peltier J and Dixon A 2016 Omni-channel research framework in the context of personal selling and sales management A review and research extensions. J. of Res in Intercv. Mktg. 10 2-16
29. Burke R R 2002 Technology and the Customer Interface: What Consumers Want in the Physical and Virtual Store. J. of the Aca. of Mktg. Sci. 30 411-432
30. Verhoef P C, Kannan P and Inman J J 2015 From Multi-Channel Retailing to Omni-Channel Retailing. Introduction to the Special Issue on Multi-Channel Retailing. J. of Ret. 91 174-181
31. Batrinca B and Treleven P C 2014 Social media analytics: a survey of techniques, tools and platforms. AI and Society. 30 89-116
32. Bagdare S and Jain R 2013 Measuring retail customer experience. Intl. J. of Ret. and Distr. Mgmt. 41 790-804
33. Malhotra N K and Dash S 2011 Marketing research: An applied orientation (6th ed) (Dorling Kindersley Pvt. Ltd: New Delhi)
34. Hinkin T R, Tracey J and Enz C A 1997 Scale construction: Developing reliable and valid measurement instruments. J. of Hospy. and Toursm. Res. 21 100-120
35. Thacker J W, Fields M and Tetrick L E 1989 The factor structure of union commitment: An application of confirmatory factor analysis. J. of Appl. Psycho. 74 228-232
36. Experian Information Solutions 2018 The 2018 Global Fraud and Identity Report. Available at: <https://www.experian.com/assets/decision-analytics/reports/global-fraud-report-2018.pdf> (accessed May 2018)
37. ACI Worldwide Inc and Forrester Consulting 2015 Managing Fraud in an Omni-channel World. Available at: <https://www.aciworldwide.com/-/media/files/collateral/trends/managing-fraud-in-an-omni-channel-world-us.pdf> (accessed May 2018)