



Meta-Analysis for Online Retail Performance

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Abstract

With continuous rise of business value and importance of online retail business (e-commerce), academic research has not been far behind to understand this recent market phenomenon. This has led to numerous studies exploring several antecedents, consequences, and models; but without any consolidated framework to unambiguously guide researchers and practitioners. This meta-analysis, by combining and synthesizing research of past two decades, attempts to identify key constructs (which have been, so far, defined in multiple ways in different researches) that explain the details of online retail performance in more coherent manner. The authors attempt to synthesize a diverse set of 26 studies by analysing 203 correlations between different antecedents and consequences related to online retail performance. We hope that this should resolve some existing ambiguities of conflicting research findings, help identify relatively more important factors influencing online retail and provide a concise framework to researchers and practitioners to further build upon in coming times. Lastly, implications of findings and directions for future research are discussed.

INTRODUCTION

Online retail business continues to grow at an impressive rate of more than 20% per annum (Marketline report, 2014), with revenue of \$986.7 billion in 2014, and expected to reach \$2041 billion by 2019 (an increase of more than 100%). Although smaller as compared to traditional retail channels, online retail shows tremendous opportunity with opening of developing economies, rising education, increasing penetration of broadband and smart phones. Although during the initial years of online retail, the fraction of internet users who bought online was very less (DoubleClick, 2004; as cited in Elliot & Speck, 2005); this scenario has changed significantly. It is expected that digital buyer proportion (% of internet users who buy online) will increase from 38% (792 million users) in 2011 to 45% (1.32 billion users) by 2016 (Statista research, 2015)¹. Given such immense potential, online retail has attracted lot of attention from academic researchers to understand several facets of it. Research spanning during last two decades has uncovered multiple antecedents, consequences, models and frameworks- both from the perspective of online retail consumer and online retail businesses. However, an analysis of extant research reveals that many constructs used and proposed are highly overlapping (e.g. e-loyalty, patronage intentions, online repeat purchase intention etc.), with multiple models proposing several relationships- which leads to ambiguity in drawing any concrete inferences about the antecedents, consequences and relationships related to online retail.

This work attempts to bring coherence to extant diverse research on online retail business, by conducting meta-analysis on relevant research studies. The authors feel that a meta-analysis is opportune during this stage of research because of two reasons. Firstly, as mentioned, there is lot of work done on understanding online retail phenomenon from multiple perspectives, and therefore- streamlining the extant findings can provide a legitimate way forward for researchers and practitioners. Secondly, meta-analysis will also resolve ambiguity around some conflicting findings that have been found in extant literature, along with eliciting relative strength of relations (effect sizes) between different constructs. The flow of paper is as follows: a brief overview of extant literature on online retail is provided, followed by discussion on research methodology, identification of unit and level of analysis and moderating elements. Finally, results are discussed, along with implications and directions for future research.

¹ <http://www.statista.com/statistics/261676/digital-buyer-penetration-worldwide/>

Background on Online retail performance

The foundational research towards understanding factors that drive usage of online platforms started with Technology Acceptance Model (TAM; Davis, 1989), which was inspired from classic theory of reasoned action (TRA; Ajzen and Fishbein 1980) and the theory of planned behavior (TPB; Ajzen 1991). The TAM model proposes that 'perceived usefulness', 'perceived ease of use', and 'enjoyability' influences that attitude of individual to use the online platform, which in turn influences behavioural intention to use. Numerous studies have later evaluated the TAM and modified in specific context to provide sharper predictions. Elliot and Speck (2005) identified web site related (ease of use, product information, entertainment, trust and currency) and individual related (product involvement and online shopping experience) factors that drive attitude towards a particular retail web site. Highlighting the critical role of trust in online retail transactions, Chen and Dibb (2010) proposed several antecedents and consequences of consumer trust in online retail (Usability, security and privacy assurance, download speed and product information quality (among others) leading to positive attitude and behavioural intentions). Likewise, Mukherjee and Nath (2007) evaluated the role of trust in online retailing from perspective of commitment-trust theory (Morgan and Hunt, 1994). Building on the TAM, Zhou et al (2007) proposed Online shopping acceptance model (OSAM) by critically surveying extant literature during that time. However, the model was not based on any statistical or empirical methods, but based on authors' analysis of research. Moreover, it looked at online retail only from consumers' perspective. From the perspective on online retailers, Pentina and Hasty (2009) evaluated the effect of multichannel coordination and e-commerce outsourcing on online retail performance, and found that inter-channel coordination increases sales while outsourcing does not lead to significantly higher sales performance. Likewise, Holzwarth, Janiszewski and Neumann (2006) found that usage of attractive or expert avatars have different effect on low and high involvement consumers, and it leads to overall better satisfaction from consumers towards online retailers. Eroglu, Machleit and Davis (2001) proposed the conceptual model for impact of atmospheric qualities of online retailing on approach/ avoidance behaviour of online consumers. Several other researches like Childers et al (2001), Monsuwe, Dellaert and Ruyter (2004), Ha and Stoel (2007) and Kim, Fiore and Lee (2007) (among others) evaluated multiple antecedents and consequences of online shopping behaviour and evaluated the findings through different frameworks in reference to the TAM (Davis, 1989).

As one can see, there is no dearth on research on the phenomenon on online retailing, both from the perspective of online retail consumers and online retail providers. Several researchers have also proposed different models and frameworks to capture the diversity of relationships that exist. However, most of the attempts to summarize findings into frameworks have been qualitative. Moreover, while reviewing the extant work, one can quickly understand that different researchers have used different terminology for seemingly same underlying constructs. All these reasons make it appropriate to conduct a meta-analysis to identify factors that are commonly found to have strong influence on online retail performance, as well as resolve ambiguity around variety of terms used for same constructs, and to resolve conflict in the findings of extant research. Next, we discuss the research design adopted to conduct the meta-analysis.

RESEARCH DESIGN

To initiate the meta-analysis process, we searched for relevant studies in common online research databases like ABI/ INFORM, Business source premier, Google Scholar, Science direct, INFORMS PubOnLine etc., by using keywords such as 'online retail', 'e-commerce', 'online retail performance', 'e-business', 'online shopping', 'online consumers', and 'online stores'. We also manually searched relevant management, marketing and electronics journals like Journal of Retailing, Journal of Marketing, Journal of Marketing Research, Journal of Business Research, Journal of Retailing and Consumer services, Internet Research, Electronic Commerce Research and Applications etc. for research studies relevant to meta-analysis. We also screened the references of studies found from above research for additional leads. The search was concluded when it was found that additional search efforts were not yielding any incremental studies relevant to the topic. Finally, we considered 120 empirical studies for detailed analysis and coding. It was seen that from these 120 studies, 26 studies reported 203 correlations between different entities. Since our meta-analysis was primarily concerned with finding the strength of relationship (effect size) between several types of antecedents and consequences used in previous research, we limited our attention to reported correlation coefficients between formally stated antecedents and consequences. Forty nine correlations were used to aggregate the strength of relationship reported in several studies.

UNIT AND LEVEL OF ANALYSIS:

As per the established method of conducting meta-analysis, the next step was to identify an appropriate measure of association (between antecedents and consequences) and a level of analysis (at model level or study level) for the research. During coding, the review of studies

shortlisted from preliminary research indicated that correlations were the most commonly reported in the literature, and were also readily amenable to meta-analytic approach. A total of 26 studies reported 203 correlations.

Moreover, we decided that doing analysis at model level rather than study level (by averaging correlations of a study into single value) will make more sense because of apparent heterogeneity of studies. This decision was statistically validated by Q-test (Cochran, 1950) for homogeneity of correlations. The Q-test was rejected at $p < 0.01$ ($\chi^2 = 72.4$, d.f. = 47), suggesting sufficient heterogeneity within studies (Hedges and Olkin, 1985). Moreover, model level analysis helps us to remain consistent with previous meta-analysis done in marketing (which were also based on model level analysis) ((e.g., Geyskens, Steenkamp, and Kumar 1998; Henard and Szymanski 2001; Sultan, Farley, and Lehmann 1990). The 203 correlations derived from 26 studies ranged from -0.5 to +0.91.

Regarding the number of studies chosen for meta-analysis (26), it is found to be consistent with several published meta-analysis in marketing, like Sultan, Farley, and Lehmann (1990: 15 studies), Szymanski and Busch (1987: 24 studies), and Szymanski, Troy, and Bharadwaj (1995: 22 studies). As mentioned, these 26 studies represent more than 18000 individual respondents/ subjects with sample sizes ranging from 57 to 1211. The number of correlations considered (203) also easily exceed correlations considered in other meta-analyses in marketing ((e.g., Rao and Monroe 1989: 85 effects; Szymanski, Kroff, and Troy 2007: 93 effects; Szymanski, Troy, and Bharadwaj 1995: 64 effects). Lastly, to best of our knowledge, this work is the first attempt to conduct a meta-analysis on research studies related to online retail performance, and as compared to some other meta-analysis done in marketing; we believe that 26 studies covering 203 correlations should provide robust outcomes to make substantial inferences about this phenomenon.

To develop our database, two researchers independently coded half the studies and cross checked each others' work. Inconsistencies were resolved by discussion to reach mutually consensual coding of conceptually similar items. Entries of moderators and consequences, and related effect sizes were doubly checked to ensure proper data entry into the meta-analysis.

IDENTIFICATION OF MODERATING DESIGN ELEMENTS

The identification of factors that determine online retail performance is necessarily restricted to factors that can be coded from the extant literature. Inclusion of factors is also restricted to

available theories around relationships that can exist between the factors. Based on analysis of antecedents, consequences and mediators discussed in shortlisted studies, we categorised antecedents into three categories: Content (i.e. quality of product information, aesthetics, ease of use, web experience, choice etc.); Credibility (i.e. security and privacy protocols, integrity, degree to additional communication (promotion message/ emails etc), online payment information management, credibility, word of mouth etc.); and Convenience (service quality, responsiveness, customer management, satisfaction with delivery/ payment platform, customization etc.). Likewise, we identified two mediator level factors: Trust (security assurance, trust in intermediaries, technical trustworthiness, reputation etc.) and Value (hedonic value: flow experience, shopping enjoyment; and utilitarian value: usefulness, ease of use, post purchase service etc.). Lastly, the consequences can also be categorized into two categories: The present behavioural intention of buying (purchase intention, willingness to buy, frequency of purchase etc.) and Patronage (future prospects of buying again: repeat purchase, loyalty, patronage intention, e-loyalty, repurchase intention etc.). The final set of moderators was restricted to variables for which sufficient power existed to detect differences (based on p values and Cohen's (1992) guidelines for evaluating effect size).

As far as consequences are concerned, we could observe a pattern that most of the studies were related to either present buying intention or future buying intention. Only 4 out of 203 correlations considered a consequence other than present buying intention or future buying intention. So, we could safely assume that most of the studies have mostly considered the above two consequences. A brief description of these consequences is as follows:

PRESENT BUYING INTENTIONS:

This consequence was conceptualised to encapsulate multiple related variables used in several studies like purchase intention, participation in e-commerce, willingness to buy, behavioural intentions, online purchase intention etc. (Park, Gunn and Han, 2012; Hong and Cho, 2011; Prasad and Aryasri, 2009; Eastlick and Lotz, 2011; Yoon, 2002; Corbitt, Thanasankit and Yi,2003). As one can see, all these consequences are concerned with present intention to buy/ engage with online retail. Moreover, these variables are also directly representative of online retail performance, and from managerial perspective- managers would like to know the factors that influence these online retail business parameters.

FUTURE BUYING INTENTIONS (PATRONAGE)

Many studies also capture the intent of customers to come back to online retail platform for continued patronage. This was operationalized in multiple ways like loyalty, patronage loyalty, repurchase intention, e-loyalty, attitudinal loyalty, intent to repurchase, continuance intention, online repurchase intention (Rose, Meuter and Curran, 2005; Lee, Eze and Ndubisi, 2011; Srinivasan, Anderson and Ponnaveolu, 2002; Prasad and Aryasri, 2002; Al-Maghrabi et al, 2011; Bodet, 2008; Kim, Fiore and Lee, 2007; Park, Cho and Rao, 2012). From sustainability and competitive advantage perspective- patronage/ loyalty is factor of critical importance of managers, and knowing the factors that influence this consequence can be of important value.

We now discuss the different categories of moderators synthesized from evaluation of extant studies. Also, the proposed hypotheses to be tested in meta-analysis are presented.

CONTENT RELATED MODERATORS

Many studies have focused on antecedents which are related to content related aspects of online retail platform. This included product variety, product category (Ayanso, Lertwachara and Thongpapanl, 2010), webstore environment (Prasad and Aryasri, 2009), image interactivity level (Kim, Fiore and Lee, 2007), choice, contact interactivity (Srinivasan, Anderson and Ponnaveolu, 2002), and functionality (Lee, Eze and Ndubisi, 2011). It is argued that the experience of user with content of website will be positively related with current and future intentions to buy. However, when comparing the comparative relation between current and future intent to buy, it is argued that content related moderators will be more strongly related to current intent to purchase than future intent to purchase. This is because the saliency of content related factors is more prominent when an individual in planning to make a purchase on online platform. E.g. When the product variety presented to consumer is optimal, it is more likely that consumer is able to find the item of choice and make a purchase; as compared to impact of product variety on future intent to buy. It is important to highlight the positive affect/ impression generated by high quality content will lead to future intention to purchase, but this will be relatively less strongly related than current intent to purchase. Likewise, webstore environment that is conducive to consumers' needs is more likely to provide consumer with right product and increase chances of current purchase. This will also have positive residual effect on future purchase intention, but strength of relation will be more for current purchase. So, we hypothesize:

H1: Content related moderators will be positively related with current intent to purchase and future intent to purchase

H2: Content related moderators will be more positively related with current intent to purchase than future intent to purchase

CREDIBILITY RELATED MODERATORS

Credibility related factors have been widely researched in relation to online retail performance. It has been argued widely in literature that online retailers have to go extra mile to signal credibility due to lack of physical infrastructure or personal connection with customers, which is hallmark of brick and mortar retailers. Online retailers try to communicate credibility in various ways. The antecedents that we found in our review were retailer control (perceived control of online retailer on complete channel of delivery; Rose, Meuter and Curran, 2005), Trust, e-retailer age (Ayanso, Lertwachara and Thongpapanl, 2010; Prasad and Aryasri, 2009), character, privacy disclosures, reliability and firm's reputation (Lee, Eze and Ndubisi, 2011; Srinivasan, Anderson and Ponnnavolu, 2002). Given that online retail is relatively new (as compared to conventional physical stores) and requires sharing of payment and personal information with online retailers, credibility is a crucial antecedent that drives current and future intention of purchase. Therefore, once the customers are convinced about the credibility of online retailer, credibility should positively influence both the consequences. Moreover, since credibility is essential to develop and sustain a sense of loyalty, and to induce customers to come back to online retailer again- it is argued that antecedent of credibility will be more positively related to future intention to buy than current intention to buy. This is because a customer will visit an online retailer in first place when the retailer has established a basic minimum perception of credibility. So, current intent to purchase, given that customer has visited the online retailer will be less positively influenced by credibility. On the other hand, the intent to revisit and patronize a particular retailer will be more positively related to perception of credibility of the online retailer. So, we hypothesize:

H3: Credibility related moderators will be positively related with current intent to purchase and future intent to purchase

H4: Credibility related moderators will be more positively related with future intent to purchase than current intent to purchase

CONVENIENCE RELATED MODERATORS

The antecedents related to ease of use or convenience emerged as third major theme. However, the convenience related factors were not only related to experience of making a purchase, but also extended to multi channel management, delay in service etc. Some of the major items considered as antecedents in extant research were customer service, multi-channel management, traffic management, customer management, perceived service quality, convenience, care, customization, perceived ease of use (Ayanso, Lertwachara and Thongpapanl, 2010; Prasad and Aryasri, 2009; Kim and Damhorst, 2009; Srinivasan, Anderson and Ponnnavolu, 2002; Lee, Eze and Ndubisi, 2011). It is argued that convenience, as an antecedent, will be positively related to both current and future intent to purchase. Comparatively, it is argued that convenience will have more positive relationship with current intent to purchase than future intent to purchase. This is because factors related to convenience will increase the likelihood of probable purchase to confirmed purchase by the customer. Conversely, factors which make the online retail platform inconvenient and cumbersome can even turn off a person willing to buy to change his or her mind. Again, the positive affect/ impression generated by convenience with current purchase will have residual effect on future purchase and will positively influence it, but relatively less as compared to current intent to purchase. Thus, we hypothesize:

H5: Convenience related moderators will be positively related with current intent to purchase and future intent to purchase.

H6: Convenience related moderators will be more positively related with current intent to purchase than future intent to purchase.

ANALYSIS PROCEDURE

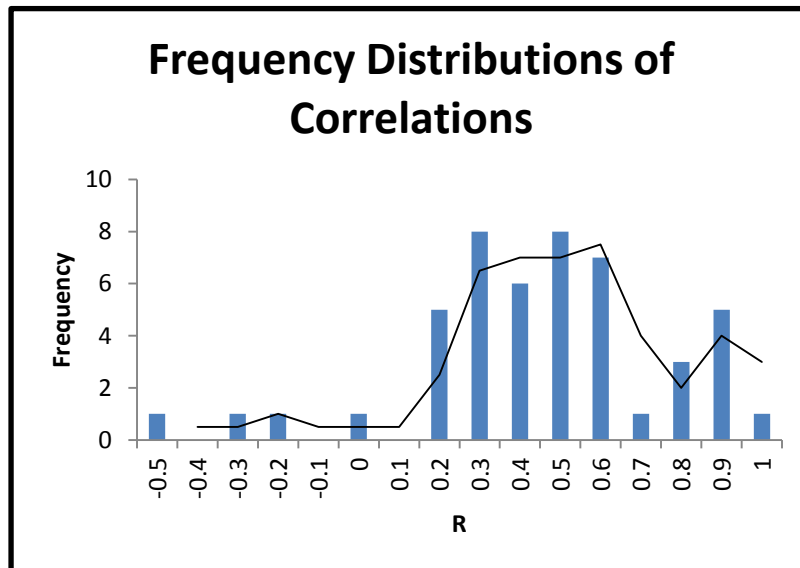
The analysis of coded data is done on similar lines to other meta-analyses in marketing (Troy, Hirunyawipada and Paswan, 2008; Henard and Szymanski 2001; Szymanski, Kroff, and Troy 2007), and are suggested by authors in meta-analyses (Hedges and Olkin 1985; DeCoster, 2004). We conduct a preliminary analysis for insights into distribution of correlation values, including size and direction of the relationship. We then calculate the aggregated effect sizes of correlation coefficients and respective significance values to test the hypotheses.

PRELIMINARY ANALYSES

Figure 1 illustrates the frequency distribution of correlation values collated through multiple studies. The correlations ranged from -0.5 to +0.91. As we can see in the histogram, most of

the correlation values are positive, with only four values as negative or zero. This was expected because most of the components of antecedents are argued to be positively related to consequences.

Figure 1: Frequency distribution of Correlation coefficients



Before evaluating the aggregate correlations between antecedents and consequences, we first did homogeneity test (Q-test) to detect systematic variances associated with correlation coefficients. The Q_T value for given data was 1665.63 (Chi-square critical value for 47 d.o.f: 72.44, $P < 0.01$). Thus, this test confirms that distribution of effect size (correlation coefficients) is heterogenous (rejection of Q-test). Thus, this substantiates our basis for using model level analysis i.e. treating each correlation separately rather than doing analysis at study level. We also remain consistent with previous meta-analyses in marketing that analyze correlations at the model level rather than at the study level (e.g., Geyskens, Steenkamp, and Kumar 1998; Henard and Szymanski 2001; Sultan, Farley, and Lehmann 1990).

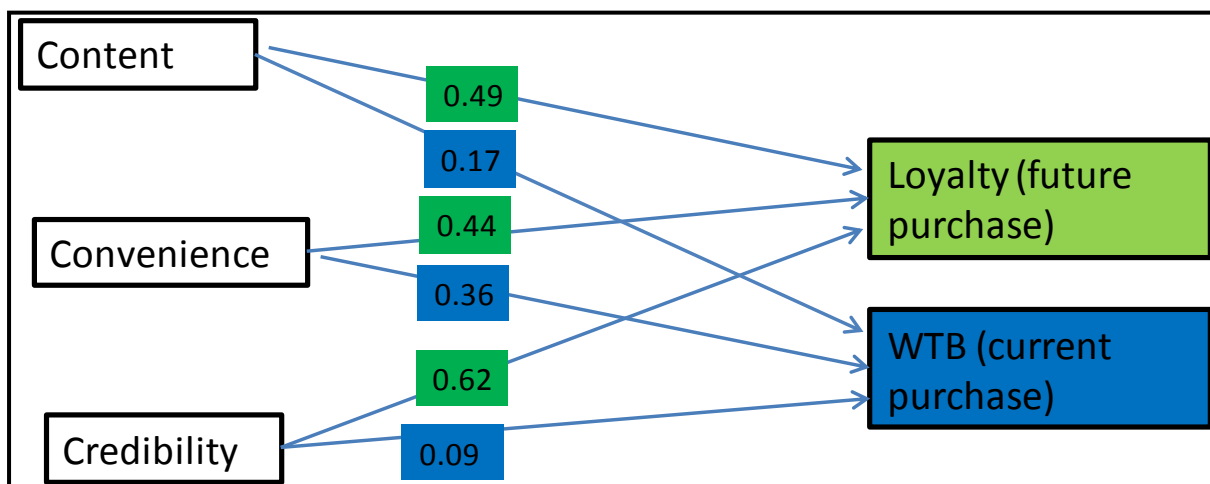
Also, consistent with other meta-analyses in marketing, we used reliability corrected correlations in the analyses. We then converted the reliability corrected correlations to 'z' values using Fisher's transformation. This method of transformation is generally considered superior than linear combinations of correlations (Hedges and Olkin 1985; Neter et al. 1996). Once the Fisher's z values were generated, we aggregated the correlations to evaluate the composite effect size / strength of relationship between antecedents and consequences (DeCoster, 2004). Lastly, the Fisher's z values were converted back into correlation coefficients to make meaningful interpretations from the analysis. We also checked the aggregated correlation values for significance (i.e. significantly different from zero). All the

values were significantly different from zero at $p < 0.01$. The aggregate values of correlations between antecedents and consequences are discussed in the findings section.

FINDINGS

Figure 2 captures the strength of correlations between antecedents and consequences of online retail performance.

Figure 2: Strength of relation between antecedents and consequences of Online retail performance (Correlations are colour coded as per the particular consequence they relate to)



We will now analyse the above results in reference to the hypotheses made earlier about relationship between given antecedents and consequences.

As hypothesized, all the aggregate correlations are positive and significant. Thus, this supports the argument that incremental improvements in aspects of content, convenience and credibility are positively related to present intent to purchase (e.g. willingness to buy) as well as future intent to purchase (e.g. loyalty). These findings support our hypotheses: H1, H3, and H5. Also, if we compare the relative strength of relationships between antecedents- we can see that credibility is most strongly related with future intent to purchase. This is consistent with earlier studies that argue that credibility is essential in inspiring trust, and hence making customers come back again to particular online retailer. The impact of content and convenience is also high (but relatively less than credibility), which points to the fact that people tend to visit those online retailers more frequently (and more loyal) which provide superior experience of ease of use and product/ service related features. However, contrary to our hypotheses, the relationship of content and convenience is relatively less strong with current intent of purchase, as compared to future intent of purchase (rejection of H2 and H6).

There can be two reasons for the same: One is related to data that has been captured and presented in extant literature. In our analysis, majority of relations of antecedents were with future intent of purchase than current intent of purchase. This can lead to improper weight/proportion given to current intent to purchase consequence. Secondly, from a substantive point of view, it is possible that factors related to convenience and content have strong contribution in creating perception and experience with online retailer- which lasts much beyond the immediate transaction (current purchase). This large affective residual created by good content or convenience delivery can have larger impact on long term patronage and loyalty of consumer, as compared to immediate transaction specific results. Specific experimental studies in future can provide further insights into the comparative impact of content and convenience related factors on current and future intent of purchase.

DISCUSSION

The attempt of this meta-analysis was to integrate multiple disparate studies related to online retail performance and provide a holistic view on diversity and depth of different antecedents and consequences that are related to online retail performance. Our meta-analysis revealed that online retail performance, and its relation to different factors is complicated and multi-relational. Online retail performance is influenced by multiple factors in varying degree and the impact is also different on current and future performance of online retailer. Thus, the performance parameters, as well as factors influencing the performance parameter are multi-faceted. We found that factors that influence online retail performance can be categorized into three categories: Content, Convenience and Credibility.

Factors related to content include product variety, choice, flow of information, traffic management, price and deal perceptions, interactivity, webstore environment, content management etc. Likewise, factors related to convenience include delay in service, multi-channel management, customer management, service quality, customization, ease of use etc. Lastly, factors that constitute third antecedent of credibility include retailer control, trustworthiness, privacy norms, signals for security of financial information, reliability, and firm's reputation. All these antecedents have positive and significant impact on both dimensions of consequences- current and future intent to purchase. Interestingly, the relation of all antecedents was stronger for future intent to purchase (loyalty, patronage) than current intent to purchase- possibly hinting towards strong affective state generated by these antecedents about the quality of online retail performance. This overall impression goes

beyond current transactions and significantly impacts the long term returns of the online retailer- through continued patronage and loyalty.

This meta-analysis also has certain limitations and provides future research prospects. The meta-analysis was done on correlation coefficients which, although a common practice for meta-analysis, does not allow us make any causal inferences between antecedents and consequences (as in case of usage of beta coefficients (assuming underlying theoretical causality)). Moreover, it will be for prospective research to experimentally (in causal manner) delineate the comparative impact of each antecedent on two types of consequences. Although our results provide initial basis for higher impact on future intent to purchase- experimental research will substantiate it further. Lastly, evaluation of underlying mediators that are present in relationship between antecedents and consequences of online retail performance will provide further richness to schematic diagram presented in figure 2.

From managerial implications' perspective, it is well documented that online retail presents immense business potential, and has achieved reasonable proportion of total sales in very short time (at least in developed markets). Moreover, online retail provides lot of opportunities for entrepreneurship and creativity. Given such importance, understanding of factors that influence the current and future prospects of purchase, especially loyalty/patronage can be very helpful to new and established online retailers. Through this meta-analysis, we have tried to aggregate dispersed findings showing varying results between different factors, so as to provide complete view of extant research and strength of relationships between few key antecedents and consequences. Focusing on these antecedents, as per their business priority and context, can help managers reap benefits in more efficient manner.

CONCLUSION

Our study began with intention to bring clarity on plethora of studies that have been published about online retail performance (given its rising importance for business). Different studies have looked at specific aspects and relations of online retail performance, reporting different strengths of relationships. Our objective was to provide a holistic view and summarize aggregate effects of key antecedents on important consequences. The findings indicate that factors related to content, convenience and credibility significantly and positively impact current and future intent to purchase, with larger impact on future intent to purchase. We hope that this meta-analysis will stimulate further research in uncovered areas

of online retail performance and provide more clarity to managers for efficiently and effectively governing their online retail ventures.

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