Challenges in Adoption of Business Analytics by Small Retailers:
An Empirical Study in the Indian Context

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ABSTRACT

Business analytics are transforming every industry in modern times, and the retail sector is not an exception to this. However, the adoption of analytics among small and medium enterprises is quite limited. There is a decent amount of research that has been done in the recent past on identifying the barriers of digitalization for small and medium enterprises. But any such work is missing in the case of analytics. Also, the small retailer, in particular, has been left untouched by the existing research studies when it comes to identifying what prohibits him from the use of analytics for making business decisions. Using a scientific way of data collection from small and mid-sized retailers and from retail industry experts, this study explores why the local retailers are reluctant to use analytics in their work and what can be done to make them more comfortable with the use of analytics. The study also proposes a novel framework for adoption of data analytics and titles it "SPEFSERT Framework."

KEYWORDS

Analytics Disruption, Business Analytics, Computational Intelligence, Retail, Ubiquitous Computing

1. INTRODUCTION

Small and medium businesses play an important role in the World economy since they contribute to more than 50% of the businesses and employ more than 90% of the workforce globally (IFC, 2012). These are also an important part of the social fabric given the size of manpower they employ. Therefore, they need to be competitive. To survive and grow in the tough markets, they need to utilize their limited resources such as manpower, inventories, capital, etc. most optimally and effectively (Raj et al. 2016).

But it has been observed in most sectors that SMEs (Small and Medium Enterprises) are quite vulnerable and lack the strength to combat the competition from global and large players (Ngah et al. 2015; Rozak and Fachrunnisa, 2021). The retail industry accounts for a big chunk of these small and medium enterprises globally. Although the retail markets have been growing, the local retail outlets are undergoing survival challenges with the declining market shares in the overall retail pie. Even the revenues have been dipping in absolute numbers.

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This can be attributed to multiple reasons. First, in recent times, consumer buying habits have changed from offline shopping to online shopping. Second, the bigger retail chains which have digitalized their business models and have economies of scale, make it difficult for the small retailers to compete on price or quality of service (Yasynska et al. 2020). Third, the retail chains that used to have an only online presence at one point in time, have now started having their physical spaces in the cities and enjoy a higher recall value for the consumer (Zhang et al. 2020). Fourth, the advent of the omni-channel phenomenon into the existing businesses that require them to provide a seamless experience to the customers across the diverse touchpoints on different platforms has also made the survival of small businesses (Cai and Lo, 2020; Wang et al. 2020; Jocevski, 2020; Serkan Akturk et al. 2022).

Therefore, it is not unusual to see small shops being closed down, showrooms becoming empty, or a falling product assortment range at the stores. It is very challenging for small retailers to survive this type of digital disruption. These small businesses need to re-shape their business models and adopt the digital chord to stay relevant (Koprivnjak and Peterka, 2020).

While digital disruption would be clear as a term to most of us, "analytics disruption" is a term that has been defined by the authors of this study to convey the disruptive or breakthrough change in business models with the advent of data analytics. The benefits of data analytics in businesses have been proven (Chen et al., 2012). Data analytics is a source of competitive advantage in today's World and has been enabling the organization to make more robust business decisions (Chaudhuri et al, 2011; Shabbir and Gardezi, 2020). It can be definitely profitable for them to learn customer behavior such as how many households, what particular segment is buying what & when and what motivates buyers etc. Retail analytics can also be used to improve customer satisfaction and retention rate by providing easier channels to exchange goods and feedback on how happy they are with the products purchased.

While the larger retail chains have the muscle, i.e. capital, skilled and IT savvy manpower, bandwidth, process excellence, and the IT architecture needed to use the analytics as their competitive advantage; the small and medium businesses seem to be at a disadvantage. Local retailers have limited financial strength as well as employee bandwidth and capability to be able to use analytics (Khattak and Shah, 2020). The constrained IT resources also mandate the small retailers to depend upon external expertise for embarking on IT projects. Also, the perceived usefulness of analytics for a small retailer is lesser due to the lack of awareness of how analytics can benefit the business. Much of their time and energy goes into the core business operations and daily chaos so that not much room is left for them to think of how business decisions can be made more systematic and processes can be digitized.

Therefore, this study explores why local retailers are reluctant to use analytics in their work. And what can be done to make them more comfortable with the use of analytics? Thus, two research questions are going to be addressed by this study. The first research question (RQ1) is "What prohibits the use of analytics among small retailers". While the second research question (RQ2) is "How can the small retailers start using analytics". The answer to the second research question is derived from that of the first question.

2. LITERATURE REVIEW

Many studies in the existing literature are a testimony to the fact that data analytics techniques offer tremendous potential to the retail businesses to improve the quality of business decision making (Makkar et al. 2021; Dastidar et al. 2021; Acquila-Natale and Iglesias-Pradas, 2021). This potential exists across the board whether it may be related to pricing, inventory, assortment planning, product design, demand forecasting, spends optimization, consumer insights generation, etc. In an age when customers are highly inter-connected through social media, their behavior on online connectivity platforms such as Instagram can be analysed to generate many insights (Chen et al. 2022). Such insights can be used to improve the reputation, satisfaction and trust which are very important success factors in retail industry.

Analytics has also helped in transforming the customer shopping experiences (Densinger et al. 2010; Paulino, 2022). Gopal et al. 2022 advocated that supply chain efficiency in the retail can also be substantially improved with the adoption of data analytics. Not only the efficiency of supply chains, but also the sustainability can be enhanced with the use of data-driven decision-making (Jeble et al. 2018; Fosso et al. 2018). Thus, adoption of analytics has led to a positive impact on the performance for the retailers who have taken this path (Ramanathan et al. 2017; Aversa et al. 2021; Hopf et al. 2022). Aversa et al. 2016 advocated that it has benefitted not only the retailers but also the consumers. Motorola, one of the early adopters of ambient computing and business intelligence, had a very positive and enriching experience in designing the internet of things around its retail processes (Schaller and Mueller, 2009).

Literature also mentions technology advancements to be complementing the adoption of analytics in the retail industry (Tupikovskaja-Omovie and Tyler, 2021). Web analytics (Kumar and Ayodeji, 2022), fraud detection (Hauser et al. 2021; Knuth and Ahrholdt, 2022), pricing decisions (Kayikci et al. 2022), advanced demand forecasting (Rizvi et al. 2022; Falatouri et al. 2022), checkout analytics (Aloysius et al. 2016), assortment planning (Gabel and Timoshenko, 2022) are some of the other applications that have been discussed in the literature. Effectiveness of retail promotion campaigns can also be easily measured with the use of analytics (Epstein et al. 2016). Video analytics also hold a promise for the industry (Rai et al. 2011). Borner et al. (2013) reviewed the effectiveness of ambient displays in the retail context.

The existing literature is also rich with how social media analytics can help retail. Sentiment analysis of the customer feedback can help the retailers understand how delighted or satisfied are their customers with their products and services (Sivakumar and Rajalakshmi, 2021; Baumgarten et al. 2013; Karkkainen et al. 2013). Similarly, producing desired marketing outcomes through social media (Raguru and Sharma, 2021) is another area in which business analytics can help small retailers. Analytics can also help retailers in increasing their visibility using search engine optimisation (O'Neill and Curran, 2011). Evaluation of service quality can also be done quite effectively using analytics (Ingaldi and Ulewicz, 2018). Consumer behaviour towards the evolving technologies can also be studied with the use of data analytics on social media (Gladys Gnana Kiruba and Acharjya, 2020).

However, Lorente-Martínez et al. (2020) advocated in a research study that the prevalence of analytics in the retail industry has a drastic scope for improvement. Therefore, the reasons for the low adoption of analytics in retail need to be studied.

Sodero et al. (2019) had tried to explore the factors affecting the adoption of analytics in logistics and supply chain industry. Van Dyk and Van Belle (2020) studied the drivers and challenges for digital transformation in case of African retail industry. But there is no such study that has been performed on the retail sector. Also, there are cross-country differences in the adoption behaviour of analytics (Youssef et al. 2022).

Therefore, this research study aims to explore the drivers and challenges in adoption of analytics by smaller retailers in Indian context. It has been structured in the form of eight sections. Section 1 mentions the introduction to topic and motivation behind this research. Section 2 reviews the existing literature, and Section 3 explains the research methodology. Section 4 elaborates the findings of the survey questionnaire, and Section 5 summarizes the findings of open-ended questions in the survey from retailers. Section 6 captures the views of a few industry experts on what is preventing the small retailers from adopting analytics. Section 7 mentions the managerial implications of the study for the retailers, and also proposes a model for adoption of analytics in retail. Section 8 concludes the research paper while mentioning the future.

3. RESEARCH METHODOLOGY

This work is an empirical study covering multiple dimensions related to the use of analytics by two key stakeholders- the small and medium retailers, and the retail industry experts. Through a scientific approach to data collection, this study will seek to answer the research questions posed in the introduction section. This will be followed by the analysis of data and generating insights about

how different stakeholders in the entire retail ecosystem can facilitate the transition of the existing retail sector from being analytics-exclusive to analytics-inclusive.

Therefore, this study will follow multiple steps as follows. The first step is to conduct a survey for the retailers that will have a few open-ended questions and a few close-ended questions. The second step is to analyze the data collected in the survey to generate useful insights. The third step is to interview a few of the industry experts working on building product/analytics solutions for SMEs. The fourth step is to analyze the data collected in the above-stated steps and summarise the findings. The fifth step is to draw the implications for the managers and practitioners and propose a model for the adoption of analytics among small retailers.

The survey consisting of purposefully designed questions and a few demographic questions on the respondent's profile, was floated to 200 SME retailers in the Delhi-NCR (National Capital Region), India. Around 85% of the respondents replied to the survey questions consisting of fifteen questions. These retailers were from different business segments spanning across fast moving consumer goods, consumer durables, real estate, insurance, banks, electronic gadgets, stationery items, travel and tourism, etc.

3.1. Survey Questionnaire Design on the basis of Innovations Diffusion Theory

Theory of "Diffusion of Innovations" proposed by Everett Rogers was used to identify the characteristics of any innovation that were important in its adoption. And then, these factors were considered while designing the questionnaire that was circulated to the retailers to examine the barriers for them in adoption of analytics. According to Rogers, these characteristics are relative advantage, compatibility, complexity, triability and observability. Table 1 shows the mapping of these characteristics to the survey questions.

Table 1. Mapping of the research questions with the characteristics of innovation under consideration (computational intelligence)

Characteristic	Survey Question
Relative Advantage	- Do you think that use of analytics techniques can help you in making better decisions than your hunch? - Do you have a well-defined Business Intelligence strategy in place that can enable you reap competitive advantage from using data? Ø In which areas of decision making do you think analytics can help you?
Compatibility	- Have you measured and recorded the point-of-sales data? - Does your data collection mechanism allow you to perform data mining? - Does your business have online presence that can make data collection easier?
Complexity	- Are you comfortable with basic understanding of data and statistics? - Do you have adequate expertise among your manpower resources to analyse the data and generate insights? - Is the data captured in your system hygienic enough for processing?
Triability	- If there is a low-cost solution available, would you like to make decisions on the basis of data analytics? - Do you think existing software or solutions in the area of analytics are user-friendly and intuitive enough? Ø Do you find the cost of existing ERP systems and analytics software unaffordable for your business?
Observability	- Have you interacted with any peers who are using analytics to improve their business decisions? - Have you analysed the point-of-sales data ever? - Do the existing software serve your business needs well?

4. FINDINGS OF THE STRUCTURED QUESTIONNAIRE CIRCULATED TO SMALL AND MEDIUM RETAILERS

This section illustrates the various insights that were generated from the data collected as discussed in the upcoming paragraphs.

Starting with the awareness of the usefulness of data analytics, about 62% of the respondents said, they are aware that using data analytics would help their business grow while 38% are unaware of this fact. Also, Only 38.4% of the retailers who know analytics can help their business grow, are using any form of analytics at present. Hence there is a huge potential for us to motivate the other group to start using analytics. Among the group of retailers who are not using any form of analytics, when asked about their plans to use analytics in near future, only 12.5% expressed their intent to use analytics in the future for decision making. 87.5% of the retailers were still not sure whether they would be using analytics in near future.

It is also a dismal observation that 95.23% of the retailers do not have any defined analytics strategy within the organization. This could possibly be because of the lack of awareness of the full scope of decisions in which analytics can offer help, or due to a lack of analytical sophistication, analytical resources, etc.

There were also concerns regarding the user-friendliness of analytics software systems or business intelligence tools available to the retailers. For the retailers using any sort of analytical software, 60% of the retailers felt that the software was not so intuitive and that they needed the training to use it, whereas only 40% felt comfortable with using the software. However, 90% of them felt that the existing software satisfied their business need

However, the positive point is that 94% of the retailers said they would be willing to implement an analytical solution if shown a demo on the benefits. When asked whether they were willing to adopt a paid solution for analytics, 60% of the retailers said they would opt for a paid solution if they understood the benefits of it and the free version doesn't satisfy their business needs. 35% of the retailers would continue with the free version with limited functionality while only 5% of the retailers are willing to go for a full-fledged paid solution. Also, 80% of the retailers would like to get some consultants' help in implementing analytics solutions if at they decide to go for one.

Also, the digitization of sales transactions at small and medium retailers is a challenge, which was evident from the survey observation that while 90% of the retailers have a POS system in place, only 57% of them collect and store the POS data for analysis. Also, 76% of the retailers who have POS digitization in place, did not analyze any POS data. 80% of the retailers did not have an online presence in their business. 57% of retailers would like to explore and understand more about how POS data help manage their business better while 76% of the retailers would like to know more about how POS data analysis can help grow their business.

When asked about the problems that they were trying to address with the help of analytics, it was found that inventory management and demand forecasting were the most critical business problems that these retailers are trying to solve. They did not have much sophistication to understand that analytics could also help in higher order decisions such as product pricing, assortment rationalization, lift maximization, minimization of marketing spends, association rule mining, collaborative filtering, etc.

The most important challenge that came up was the inability to appreciate the promise that the use of analytics holds for retailers. 76.1% of the retailers were not sure of what analytical solution would help their business. 71% of them admitted that they lacked the adequate number of skilled resources to implement analytics solutions.

The study also showed that the decision taken by the retailers to adopt analytics was influenced by the technological barrier and the high cost of implementing changes. This research suggests that, though about 62% of small retailers are aware of the benefits of data analytics to some extent, only 38.4% of those are using some form of analytics today. While 90% of the retailers have a POS system, only 57% collect POS data. Also, 76% of retailers are not analyzing their POS data.

Also, the majority of the retailers do not find the software to be intuitive and the majority of those said that the existing software did not satisfy their business needs. While there are a plethora

of software solutions available, there exists a huge scope for the software vendors to sensitize these small retailers by identifying the problems they are trying to solve, helping them with the right set of tools and solutions, help them integrate POS systems with analytical software, etc.

The fact that 76% of the retailers did not analyze their POS data, according to this survey, implies that they are missing out on the drivers of consumer behavior. This is attributed to the fact that they were not aware of what analytics can be performed on POS data and what benefits could be derived out of it. Also, 76% of the retailers would like to know more about how POS data analysis can help their business grow. Also, since a majority of retailers said they are not sure of what analytical solution would help their business and therefore, they were not sure of the ROI of an analytics solution, it can be inferred there is a huge need for the solution providers to connect and engage with the retailers.

5. FINDINGS FROM THE OPEN-ENDED QUESTIONS ASKED TO THE RETAILERS

Since many of the questions asked to the retailers were open-ended, this section consolidates the challenges of the small retailers as discovered from the survey.

5.1. The Challenges of the Retailers in Adopting Analytics

The retailers communicated the following challenges in the adoption of analytics for decision making.

5.1.1. Absence of Data Collection Systems

The starting point for any analytics is the availability of data. Collecting data and data driven decision making is critical to success, especially in retail markets. One of the major sources of data collection in case of retailers is the Point-Of-Sale (POS) data. This data helps in inventory management, and in understanding customer counts, sales trends, profit margin, customer brand preferences. Analyzing this data helps retailers make more reliable decisions. However, the problem is that the POS data is not captured by many of the small and mid-sized retailers.

5.1.2. Implementation Challenges

Though the technology has allowed small businesses to enter into the once-exclusive BI (Business Intelligence) community, one of the biggest challenges faced by the SME retailers in implementing a BI solution is the lack of skilled resources. Most of the big name BI solutions require full time database administrators to implement and maintain them. Tools on the lower end of the spectrum have limitations like the need to be installed locally, which can be very daunting when businesses need to make the dashboard and reports available outside of the corporate network. Though there are many open source and affordable solutions available, the major challenge is in terms of deciding among the multiple alternatives.

5.1.3. Lack of Awareness on the Applications of Analytics

One of the business intelligence challenges is disjoint BI practices. For a company to be successful in implementing a BI solution, everyone in the organization should be on the same page and the solution should be universally adopted which is usually very difficult. For SMEs, probably people do not have the knowledge of data culture. Departments may be discouraged by many factors such as lack of time, resources etc. Analytics awareness is a barrier for analytics adoption points towards the lack of awareness/understanding of the benefits and available solutions suiting the business needs.

From our data analysis, we found that while a considerable chunk of small retailers is aware of some of the benefits of analytics, majority of those do not presently use any form of analytics and most of them are not sure if they will be using analytics in near future. This presents a major opportunity for software vendors in the analytical space to help these retailers understand/realize the benefits of using analytics.

5.1.4. Absence of defined BI strategy

Having a defined BI strategy is critical in finding the right BI solution for the organization. This will also facilitate the decision making process. SMEs probably lack this vision which could be hindering their analytics adoption. In terms of a defined BI strategy, we saw 95% of the retailers do not have a defined BI strategy. This possibly could be attributed to reasons like lack of complete understanding of the benefits of analytics, lack of resources etc. This is partly indicated by the fact that most of the want to learn more on how POS can help them manage and grow their businesses. This means BI awareness is a major factor prohibiting analytics adoption among the small retailers.

5.1.5. Cost Challenge

Cost came out to be an important factor when retailers think of implementing analytics. This is supported by the fact that, most of our respondents who are using some sort of analytics today, are using a free version with local setup. However, majority of those retailers are open towards adopting a paid solution if they are fully sure of the benefits. Also, since 80% of the retailers said they would get some consultants help for implementation, this indicates that they do not have enough skilled resources with them.

5.1.6. The lack of user-friendliness of existing solutions

Many retailers communicated in the survey that the existing suite of software are not user-friendly enough, or that they do meet their requirements. This indicates that, software vendors have a huge opportunity in simplifying the software experience including intuitive UI and plug n play kind of setup. A few other factors which emerged are the solutions which some of the retailers are using are not so very intuitive. Hence there seems to be a huge scope for software vendors to improve on UX.

6. FINDINGS FROM THE OPEN-ENDED INTERACTIONS WITH INDUSTRY EXPERTS

In this section, the findings from the discussions with four industry experts are captured.

According to Mr. Sunil Pandey, CEO of Versa Cloud ERP (one of the prominent seller of ERP solutions to smaller businesses), the major challenge in adoption of analytics by small retailers is that majority of retailers are not collecting enough information about their customers due to lack of resources.

Mr. Pravin Mhaske, a consultant working with Infosys on analytics solutions for retail clients conveyed that the challenge is not only in data collection but also in quality of collected data and in the retailers' limited understanding of what to do with that data. While some of them collect data, either the collected data is not enough for actionable insights, or they are not equipped to derive the insights from it.

Dr. Amit Srivastava, Global Analytics Leader at Honeywell Connected, feels that pricing is another pain point is being addressed via the availability of cost effective and open source solutions. The third challenge lies in the fact that those solutions are not easy to configure and customize. This needs resources with IT skills which is not always possible for small retailers.

Mr. Abhinav Anand from Udaan, one of the largest firms into the business of aggregating demand of retailers, has a different perspective on the barriers of analytics adoption by small retailers. As per him, cost of implementation of analytics solution is a major challenge among the small retailers in India given the initial implementation cost. He says, it is not just cost which impacts analytics adoption, the awareness on the benefits of analytics (cost benefit analysis), lack of proper data collection systems also have a significant role.

To sum it up, the common issues that emerge from these interviews are lack of a POS data collection system, quality issues with the data collected, software implementation challenges with the analytics solutions. Along with this, the factors like implementation cost, lack of awareness about the benefits of analytics, lack of IT resources, lack of a defined BI strategy also play a role in hindering adoption of analytics by small retailers.

7. MANAGERIAL IMPLICATIONS OF THIS RESEARCH

This section proposes a framework for adoption of analytics by the small retailers, and discusses in detail the implications for the retailers from this study.

7.1. Proposing the SPEFSERT Framework that can facilitate the adoption of analytics in retail

Based on our study of the above theory and the research data collected, we propose the following framework which could drive the analytics adoption for small and medium retailers, as shown in Figure 1 and Table 2. SPEFSERT is an abbreviation that has been coined by the authors to denote "Solution Providers, External Factors, Supplier Ecosystem and Retailers Themselves."

7.1.1. Solution Providers

Providers of analytics products and services play a major role in adoption by the retailers. Product providers need to make sure to develop cost effective, easy to implement, intuitive to use analytical products. If the product is very complex to use, it will take more time to be adopted by the retailers

Figure 1. Pictorial representation of the proposed SPEFSERT Framework for adoption of analytics in retail
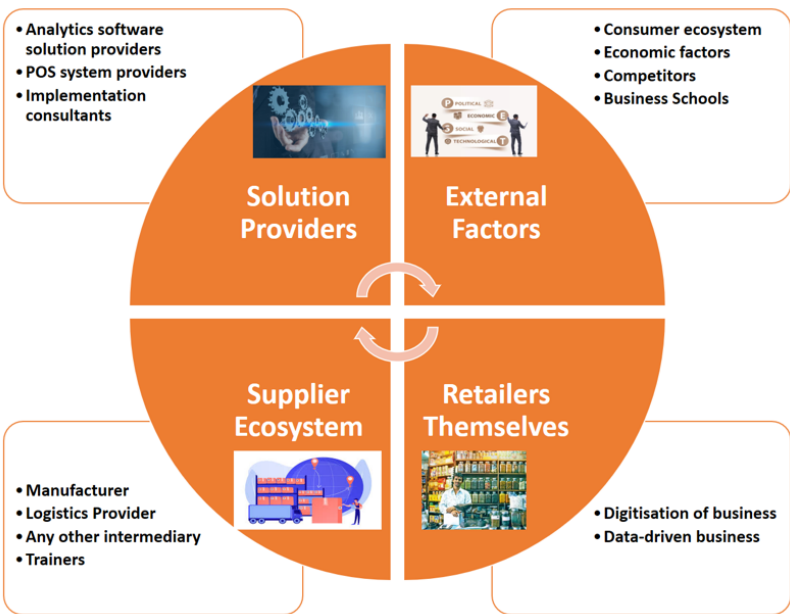

Table 2. Tabular representation of the proposed SPEFSERT Framework for adoption of analytics in retail

SOLUTION PROVIDERS	EXTERNAL FACTORS
• Analytics software solution providers • POS system providers • Implementation consultants	• Consumer ecosystem • Economic factors • Competitors • Business Schools
SUPPLIER ECOSYSTEM	RETAILERS THEMSELVES
• Manufacturer • Logistics Provider • Any other intermediary	• Digitisation of business • Data-driven business

or could potentially become a blocker too. Service providers need to sensitize the retailers by understanding their business needs, suggesting them the right solution and help implement the same along with demonstrating the benefits. We also believe solutions and service providers have a scope to interact and engage the supplier ecosystem too to better drive the adoption by retailers.

7.1.2. Supplier Ecosystem

This encompasses all the upstream parties involved for any given retailer. We believe, if the supplier ecosystem adopts to the digital business model that would go a long way in driving analytics adoption by retailers. The retailers will find it very difficult to use analytics unless the wholesalers, carrying and forwarding agents, manufacturers and logistics service providers also shown openness to the use of analytics and digitization of business transactions across the entire value chain that can make the data available in a transparent manner.

7.1.3. External Factors

This comprises all the external entities like consumers, competitors, government, economic activities etc. If consumers can be sensitised to use digital mode of transaction with retailers including ordering and payment, this would drive the retailer to go digital and pave the way for using data analytics. The economic reasons such as survival and business growth amid a tough competition can also drive the adoption of analytics among the small retailers. Competitor success stories using analytics can motivate retailers. Thus, positive externalities of competition can help in this. Government incentives for conducting digital business can also help drive the analytics adoption. Similarly, the business schools can conduct education programs for the smaller retailers where they can be trained on the use of analytics for making robust business decisions.

7.1.4. Retailers Themselves

The retailers, themselves, are required to have a big motivation or self-drive to establish data analytics mechanisms in their businesses. They need to update themselves with how the other peers in the industry are benefitting themselves with the use of data-driven decision-making, and what is the scope of making data-based decisions in their business. The retailers also need to show willingness to invest in the data analytics software, point-of-sales automation, data digitization, using the services of resources or consultants with analytics expertise, etc.

7.2. Implications for the Retailers

This research study has many important insights for retailers that can help them in their pursuit of making more robust business decisions using data. These are captured as below.

First, the SMBs need to become open to using data. SMBs can get a better picture of their customers by using social media which has become a valuable source of customer data. Identifying niche markets and customer feedback has become much cheaper and easy to get as most of the data is available publicly on Twitter, Facebook etc. Identifying the trends on where the market is heading and how demand for products will change or get affected over the period of time. Google trends can generate insights on the popularity of the brand or product which gives an understanding of the competitor. These insights can be used in all aspects of operations and also gives an information on which channel should be focussed on for marketing. The investment can be worth the risk as it offers in depth understanding of the customer behaviour and can also help develop new products.

Second, the retailers need to appreciate that data analytics can help them with much larger set of activities or decisions than what they are currently using it for. Data analytics, which is mostly used for demand forecasting and inventory planning, can also play a crucial role by analysing factors like number of people visiting the website, people visiting the social media page of the product for a specific region. It can help understand the demographics and execute by proper planning and strategy and focus on a specific segment of population. Analytics can also be used for consumer

choice modeling, building product recommendation engines, developing upselling and cross-selling strategies, making markdown optimisation decisions and assortment planning decisions, etc. Also, the seasonal demands can be met very effectively using data analytics. India being a country of multiple festivals, the businesses has to cater the needs of the customers as per the festivals for a specific region.

Third, it is important for SMBs to keep themselves updated on how customers are looking at the products, what services they are looking for. As there is a very good possibility that the current offerings or services are outdated. Data analytics can help identify the shortcomings in the offerings and come up with more innovative solutions to meet the market.

Fourth, the major drivers for adoption of analytics among the are the need to better understand consumer behaviour (analysing trends in consumer behaviour, understanding what products and services are appreciated by customers more, how satisfied are the customers, and the competitive insights), a simplified and cost effective payment terms by solution providers, and success stories of other retailers or competitors on the use of analytics, that help them also invest some resources in analytics competency building.

8. CONCLUSIONS AND FUTURE DIRECTIONS

Small and medium retailers generate huge data from which they can benefit their own business and unfortunately overall adoption of retail analytics in the Small and Medium business sector is substantially low. Nowadays, with more digital adoption by customers there is a challenge to Small and Medium business to sustain and stay competitive with large retail networks. When the small and medium businesses are enabled and adapt to retail analytics they can offer more benefits to the customers and also track sales cycle, maintain SKUs and profits.

However, it can be inferred from this research study that analytics adoption by small retailers is going to be a journey than being a big bang change. To enable this journey, this paper tried to understand what were the major business challenges that these retailers faced in adopting analytics for decision making. The retailers need to be given hand holding in terms of how to solve their problem at hand, and help them understand with simulations/demos on how analytics can help.

The small retailers probably would move away from implementing a solution if the initial implementation cost itself is high or they find it difficult to use the software. Therefore, the available software package needs to improve in terms of setup and UX. Easy to use and cost-effective analytics packages needs to be developed. There is also a strong need to help the smaller retailers set up POS systems. Perhaps, the governments also should play a role in encouraging them to use POS rather than just cash transactions. This could incentivise the retailers for using digital payments or lowering/waiving off digital transaction costs. Sharing success stories of other small retailers can also help motivating others to adopt analytics.

There exist a few directions in which this study can be extended further in future. For example, the categorization of small and medium retailers can be done in terms of business size or sub-sector with in the retail industry, and it can be found whether the challenges are significantly different for the different business sizes or sub-sectors. Sub-sectors can be garment retailing, shoe retailing, auto-component retailing, etc. Similarly, the advanced statistical techniques such as factor analysis can be used to reduce the number of variables influencing the adoption of analytics in retail, and then the classification of different retailers can be done on the basis of these reduced dimensions.

STATEMENT OF COMPETING INTERESTS

The authors of this study confirm that there was no competing interest while carrying out this research study.

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