

Business Development Using Big Data within UAE SMEs Retail Sector: Prospects & Questions

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Abstract—Despite research on big data analytics being conducted in past, there are no studies focused on the opportunities i.e., growth prospects and its associated challenges in specific industries in UAE. In this study, big data analytics were used in SMEs retail sector in UAE region to assess the use of these technologies. Companies can use these to gain new understandings from their customers and suppliers perspective utilizing big data analytics techniques to take informative decisions on pricing, inventory management, payment solutions and marketing decisions. Big data can be used to help SMEs foresee the needs and preferences of their target audiences. The focus of this study is on SMEs since these are the pillar of every economy and can make quick adjustments to productivity changes. It aims to analyze and identify major chances and threats of Big Data and propose the best ways for SMEs to utilize it for improving their efficiency and business practices.

Keywords—Retail, SME, big data, digital transformation, retail analytics, competitive edge, technology adoption model

I. INTRODUCTION

The COVID-19 viral pandemic has had a significant impact on corporate growth across several industries. Small and mid-sized enterprises (SMEs) are among the most economically disadvantaged, a fact that has prompted governments of all views to enact unprecedented measures to help small businesses - such as tax holidays, soft loans, and implementation of digital technology to increase operational efficiency and ultimately revenue generation. On a regional level, several regulators and authorities have taken proactive measures to mitigate the impact on small enterprises. The ability of a small business to pivot and adapt to a new reality reflects its financial vulnerability, and it has been seen that businesses are innovating in the face of adversity - whether it's changing existing services, catering to the requirements of newly housebound consumers, or adjusting product offerings to support government efforts to combat the coronavirus [1]. Most bigger firms are undergoing much-needed digital transformations on a small or large scale in order to stay competitive and be very customer-centric. Economic growth is bolstered by a growing SME sector, which decreases unemployment and poverty as well as encourages entrepreneurial activity and thus making it important for any country [1]. The Emirate is working to transition from an oil and gas dependent GDP to a free - market economy focused on trade, services, and manufacturing [2]. The contemporary market economy, on the other hand, relies heavily on SMEs, which account for over 40% of Dubai's GDP [3].

Big Data has recently been viewed as a novel solution to assist state policymakers and practitioners in a variety of application contexts and domains. Many unique data analytics solutions have emerged as a result of the volume of data gathered and held over several years by various organizations, particularly in the retail sector. The utilization of Big Data is critical for business organizations of all kinds to investigate in order to create major change in corporate growth. These opportunities are being discovered by multinational firms as well as small and midsize businesses (SMEs) [4]. In today's business environment, all businesses, no matter how big or little, aim for important, reliable data that can be utilized to make decisions.

The usage of big data study, on the other hand, lags in the retail industry among small and medium-sized businesses. While there has been a lot of research done in the past linking big data and online/offline retailers, such as Amazon, Walmart and Tesco, there has been very little research done on its application in SMEs retail sector in the UAE, which is a research gap in our current study. To further understand this issue, this study examines how these SMEs are currently utilizing big data analytics, as well as the corresponding potential and challenges for their business success.

Small businesses face a variety of obstacles. They are still hesitant to invest in this aspect of digital transformation since the incremental value of data analytics is unknown [5]. On this ground, more study is needed to establish how SMEs in the retail market can reap the value of big data and analytics and how they can use big data technologies without making substantial expenditures in their businesses.

As a result, the focus of this paper is on SME growth, and we are examining literature to identify main barriers and potential for SMEs in the UAE's retail industry to apply Big Data Analytics in their system. Big data practice for SME growth could disrupt present decision-making and policy initiatives at both the macro and local levels of government (micro).

II. LITERATURE REVIEW

A. SMEs and Retailers in UAE

1) Criterion for SME definition

UAE is the second largest GCC economy. Here, SMEs are defined by the number of employees and the company's annual sales in trade, manufacturing and services division. A company

with 10-35 employees and income of 50 million dirhams in the trading sector is considered a small company. Manufacturing requires 20-100 employees and 100 million dirhams income. According to Dubai SME, a government agency that promotes the development of SMEs in the Emirate, the service sector should have 20-100 employees and annual sales of 25 million dirhams to be considered a small enterprise [6]. In the trading sector, companies with 36-75 employees and incomes of 250 million dirhams are considered medium-sized companies. Manufacturing requires 101 to 250 employees and incomes of 250 million dirhams. The service sector has 101 to 250 employees and sales of 150 million dirhams to be considered a medium sized enterprise. Below the threshold is a micro-business in the country, and any enterprise above that is a large business.

2) SMEs in UAE

Small and Mid-sized Enterprises (SMEs) contribute significantly to the GDP of the economy of any country. Dubai accounts for 41% of new SMEs in the United Arab Emirates, 23% in Abu Dhabi, 17% in Sharjah and majority of the remainder in Ras Al Khaimah [7]. Over 95% of the Emirate's business is conducted by these companies and employ an estimated 61% of Dubai's total workforce [6]. However, SMEs often face a variety of market challenges that can hinder their establishment and growth. Due to their relatively small size and limited resources, access to new digital technologies and market opportunities may also be limited. Governments play crucial part in driving the creation and development of SMEs and develop effective policies and focused plans on creating an effective business environment. Established over the last decade, UAE's main SME business sectors are corporate support customer services, building and raw material, financing services, apparel and fixtures, retailing, food and medicine selling, electronic equipment and mass media units.

3) Retail SMEs

Definition of "retail" as per the Cambridge glossary is "an activity of selling goods to the public rather than selling to other businesses, stores etc." SMEs in the retail sector are businesses with less than 250 employees that sell products to end users, such as consumer goods to customers, in small quantities [8]. Consumer goods to customers. This sector accounts for the majority of UAE's GDP and includes physical retailers, so it needs to be analyzed.

B. Adoption Of Digital Technologies in UAE

Even though SMEs in UAE have enormous economic significance, they are struggling with many shortcomings, which greatly obstruct their performance. Businesses in the modern era suffer from ineffective business information systems, poor strategic planning, and a lack of human capital. By integrating the advanced digital technologies of industry into the business operations of SMEs, these inefficiencies can be resolved, and the current state of SMEs can be improved. A dedicated IT employee or department is employed by 27% of SMEs. Manufacturing and service SMEs are more likely to have a dedicated IT employee or department (at 29 percent for both the sectors) [9]. Being on-line isn't an elective commercial enterprise anymore, it's miles a vital a part of the toolkit - and a circulate of sales that can't be ignored. Amongst

numerous elements of virtual transformation, one of the maximum critical factors is Big Data Analytics. Big Data can nurture alliance in SMEs via way of means of growing real-time answers to demanding situations in each enterprise [10]. The IT funding required to have the ability use this era is massive but the fee of being left at the back of in virtual age could be extra withinside the lengthy run. So, a top-down management lookout needs to be adopted [11]. The purpose needs to be to remedy the whole hassle via way of means of an included solution, as opposed to striving for remoted successes in some factors.

C. Big Data Analytics for SMEs Retail Sectors

Organizations of all size be it small, medium or large are leveraging data in a wide range of ways due to its sheer value. The practice of Big Data management is not confined to global corporations. SME's can now make better and more efficient decisions by leveraging the huge amount of data available to them [3]. The retail industry is always evolving with technology, but small and medium-sized businesses in the UAE are still finding it difficult to compete with the likes of Amazon and Noon. These big names are constantly developing new technologies and tools to better serve their customers, but SMEs are still falling behind.

D. Big Data Opportunities in Retailing

Big Data, which is a collection of datasets, can assist retailers in analyzing and evaluating massive data collected from a variety of sources in order to better understand trends, past purchasing patterns, and other important aspects of customers in order to create customized offers and services for them. Big Data Analytics, particularly in the retail industry, can be extremely beneficial [12]. The following are some of the ways that Big Data can help retailers succeed and gain a competitive advantage.

1) Procurement management

The utilization of big data analytics technologies can assist businesses in better managing their inventory and advising buyers to take accurate procurement decisions. Using information such as sales histories and seasonality, retailers can better forecast stock needs by combining multiple datasets and using analytics [12]. Retailers can analyze stock availability information collected from sources like barcode systems, automate stock replenishment decisions, and reduce supply delays by analyzing stock usage.

2) Price optimization

To guide pricing decisions, retailers might use a range of data sources. Retailers can analyze the sales data and pricing data available to see how changes in prices and products affect the market by doing an analysis. Then, in order to enable an appropriate pricing decision, insights into pricing can be produced. Demand, popularity, competitor prices, weather conditions, geography, and the customer's purchasing history are just a few of the characteristics that cause real-time pricing variations. Offline retailers have begun to experiment with dynamic pricing, and some have even incorporated RFID-enabled electronic price tags that modify prices based on the number of people near the tag [11].

3) In-store experience improvisation

Retailers may improve a customer's in-store experience by delivering appropriate information at the correct time by

offering deals and information on the things that a customer would be more interested based on his search patterns on his smartphone as well as his location within the store. Large retailers use geo-fencing in conjunction with Big Data in their stores to improve real-time offers and recommendations to their customers. They can also utilize this technology to optimize shop layouts by measuring client activity, time spent in each aisle, and the things sold in each aisle. As a result, the data gathered on in-store behavior can be analyzed to draw ideas into how to improve areas of a retailer's store, such as the layout [13]. In this way, retailer employees can analyze in-store behavior to improve store layout, rows, shelf placement, and product mix by analyzing information about in-store behavior.

4) *Customer analysis and better product recommendation*

Predictive analytics can provide retailers with a wealth of information, including customer buying trends, prior purchase records, customer reactions to offers and promotional schemes, and much more. These analyses take advantage of the vast amounts of data created by customers to aid decision-making, such as monitoring real-time responses to marketing campaigns and interacting with customers personally by providing them with distinct tailored options [12]. In a nutshell, Big Data aids in the understanding of customers' purchasing behaviors and reactions in order to provide them with a better shopping experience and better product recommendations.

5) *Multiple trend forecasting*

What would be the future demand for the specific products? Where should all the efforts be concentrated? Where should resources be allocated to achieve the best results? These answers can allow retailers to build a strategy accordingly [13]. By facilitating demographic data and economic indicators, Big Data can assist retailers in anticipating demand and patterns.

E. *Issues of implementing Big Data Analytics by SMEs Retail Sector*

There are numerous environmental factors that influence SMEs' lack of big data adoption. Due to a range of problems unique to SMEs, SMEs may be unable to efficiently integrate technical and organizational infrastructures in order to fully exploit the potential of big data [14]. Some of the most common and relevant factors are listed below.

1) *SMEs awareness of big data*

SMEs in the UAE currently have a low level of consensus of big data technologies, and they are reluctant to move into a segment that they don't comprehend. A small business isn't sure if its data is considered big data. In response, SMEs consider that big data analytics will not generate a predictable return on investment.

2) *Lack of in-house big data experts*

There is a severe dearth of data analysis expertise throughout small and medium sized enterprise as they are unable to employ them in-house. Several factors contribute to the lack of data specialists in these SMEs. High set-up costs against unknown ROI from Big Data Analytics; insufficient skills to handle BDA; insufficient skilled workforce; and high employee costs are just a few examples. SMEs do not have the luxury of delegating many duties to multiple persons, as large corporations do [15]. SMEs require cross-functional professionals with experience in

a variety of fields (such as IT and business). In the labor market, the accessibility of such skills is even more constrained.

3) *Lack of Successful Business Cases*

There are fewer case studies and success stories to compare regarding the use of big data analytics within medium-sized businesses. Innovations are more likely to spread successfully among SMEs if this occurs. Despite the existence of recommendations and instances, there are not much encouraging and applied cases involving use of such technologies in SMEs in UAE.

4) *Issues of data security*

Security concerns are one of the primary roadblocks to SMEs using big data. Data security is more important to SMEs as compared to large corporations. The reason is that SMEs don't have the same type of software skills and environment as large corporations. Some of the vulnerabilities in the IT infrastructure of SMEs can be traced to obsolete database management systems whose developers have ceased maintaining them [16]. Therefore, cyber-attacks, intrusions, and data breaches constitute major threats to SEMs.

5) *Legal issues*

SMBs must comply with several data protection and privacy requirements when conducting big data analytics on consumers' data. Due to these regulations, small and medium-sized businesses with little or no on-site experience are put in an uncomfortable position.

6) *Access to finance*

Growing SMEs face significant challenges when it comes to accessing sufficient financing. Financing options for SMEs are limited. The reason for this is that there exists information gap between financial houses and small businesses. SMEs are typically cautious to take benefit of possibilities that do not ally with their enterprise plan due to their limited financial reserves [16]. Improving SMEs' ability to develop and embrace new technology at a faster rate is critical for the UAE's economy.

As a result of their limited budgets, small and medium-sized stores are unable to provide customers with the highest buying experience. It may even entice long-term clients to switch sides. It is the most difficult task for retailers. Furthermore, they frequently fail to anticipate what their clients expect from their stores. In the retail industry, understanding client perceptions is critical. They are unable to increase their spending on advertising and sales strategic plan. They also find it difficult to access to discover profitable consumers or those with significant potential in the future.

After reviewing existing literature and studies, it has been discovered that there are several challenges faced by SMEs in retail sector currently in general in the competitive digital business marketplace [17]. These challenges faced by SMEs in retail sector can be categorized as external and internal in nature which can be addressed by the utilization of Big Data analytics effectively.

Internal factors which are under the control and impede the growth of SMEs retail sector are as below:

i. *Operational inefficiencies:*

Most of the micro and small retailers capture their daily transaction, operational and companies' daily activity data in basic Microsoft excel or rely on paperwork. Medium sized companies have basic CRM system deployed. However, in both the cases SMEs lack the skills and technology needed to utilize these *customer's* and *supplier's* data to take accurate decisions for their business growth. SMEs need to actively monitor these data to be successful in the marketplace and use it efficiently. One of the best ways to attain this efficiency is usage of digital technologies such as Big Data Analytics for better operation yield. Technological benefits include improvisation in decision making by enabling high visibility into operational workflows. Purchase managers can accurately forecast stocks to procure and thereby reduce inventory costs by monitoring inventory levels and sending automated alerts for replenishment [18]. It can also reduce risk of operations bottlenecks by monitoring operations and related risks in real time.

ii. Lack of skilled manpower:

There is enormous amount of data that gets generated everyday by SMEs retailers. However, they don't have inhouse talent to utilize, understand and make sense of these data. This is primarily because they do not value this data and secondly, they don't have budget to hire such expensive technical resource. Having high skilled technical person will help the organization in using digital technologies which can improve resource utilization as an instance with minimized risks of over-or underutilization.

iii. Financial capital:

Any organization small or large need financial capital to sustain and eventually grow its business. SMEs lack allocation of this capital in areas like upscaling employee's technical skills through training, implementing effective marketing campaigns after understanding its need through data analytics and in their IT department in general [19].

iv. Innovation:

Every organization believes in customer centric approach, and they all strive towards it through implementation of various innovative actions. No organization can survive in this competitive landscape unless they upgrade their thoughts and technology to meet overall success [20]. With use of Big Data analytics, SMEs can better utilize their resources by cutting on cost and spending more on brand value and thus increasing overall turnover.

In addition to above internal factors, there are few external factors as well that dampen the growth of SMEs significantly. They are as below:

i. Having inaccurate competitor knowledge:

SMEs lack accurate competitor's promotional and pricing knowledge on time. If a retailer doesn't implement an aggressive sales or promotional scheme or lower down its prices compared to its competitor or offer some value-added service to the customers right on time, there are high probability of customers walking away to another retail store to meet their requirement [21]. Lack of such information results in SMEs losing their customers to its competitors or selling at a loss.

ii. Having inaccurate customer information:

In today's digital world customers use several tools to put pressure on the retailers. Every time a customer walks into a store, they expect exceptional customer experience such as best customer service, faster delivery, expansive range and choice of products available always, better price, fresh and quality products in case of FMCG retailers, value for money goods, excellent support and after sales service, elaborate information being shared about each of the items available in the online or offline store. If the retailers miss in offering any of these to their customers, the customer in turn shifts to another retailer immediately. That's why it is of utmost importance for the retailers to improve on all these factors to gain customer trust and loyalty [21].

iii. Economic and geopolitical situations:

Economy is one of the significant factors that influence the growth of any business. Factors such as fluctuating demand and supply ratio, inflation, currency exchange rate and unemployment, tax and tariffs can have negative impact on SMEs to an extent that it can even render some organizations as bankrupt [22]. However, if this is correctly and accurately monitored and factored in machine learning algorithms, then it can save SMEs in proper forecasting and placing orders with its suppliers and accordingly pricing its products.

iv. Technological factors:

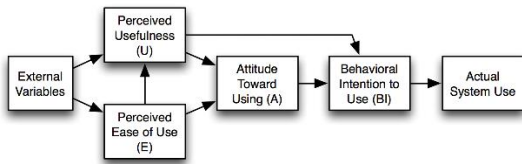
Factors such as Big Data analytics, cloud computing and internet of things are the most common terms used by larger retailers both online and offline such as Amazon, Noon, Walmart, Carrefour etc. Despite the size of the organization, technology will always benefit SMEs to harness customer's pain points, being customer focused and ultimately serving them at the correct time, at the correct place and at the correct time [23].

Currently, the state of digital transformation of most of the SMEs in UAE are in dual phase. One segment who has not at all implemented this transformation and the other who have started incorporating the changes but with minimal investment and including only basic automation techniques wherever required [22]. However, with the basic automation techniques used by most of the SMEs through application of multiple CRM systems, SMEs are completely missing out the point that automation is smaller part of digital transformation. Retailers are facing significant business losses and losing customers and unable to optimize their operations efficiency with their existing techniques. Therefore, this existing solution as reviewed in this study has failed to prove it to be the right solutions to accelerate business growth. In order to capture on the bigger part, SMEs must start incorporating Big Data analytics in their business operations to have a fully customer centric approach.

As per the existing literature and studies, several points as stated earlier in this paper have been factored for not implementing Big Data analytics by SMEs in UAE. However, ignoring this technology will not help SMEs thrive with the larger retailers in this competitive digital business landscape [24]. This is so because the need of hour is to understand customer's pain points and requirements even before they realize it, offer best of customer service to earn the badge of customer trust and loyalty. As stated above in the paper, Big Data analytics can benefit SMEs from both perspectives i.e.,

Internal as well as External factors and thereby cannot be left behind.

After reviewing existing literature and understanding reasons behind non implementation of Big Data analytics by SMEs in UAE, a solution to better adoption of digital technologies specifically Big Data analytics by SMEs in retail sector can be explained through application of Technology Adoption Model (TAM), developed by Fred Davis in year 1989 [25].



Structure of TAM

F. The Technology Adoption Model (TAM)

It is an information management theoretical framework for understanding how consumers come to embrace and use technology. It has two key constructs that influence the user about how and when they use technology [25]. They are as below:

Perceived usefulness: It describes how strongly an individual feel that employing a certain system would improve their performance at work.

Perceived ease-of-use: It describes the extent to which individuals feels that utilizing a given system would be effortless.

(i) *The rationale of TAM can be applicable as below in the context of the research paper.*

As mentioned in the main structure of TAM, there are two main external variables in the context of the research paper. The first variable i.e., Perceived usefulness is defined in the study as the level to which SMEs believe that using Big Data analytics would increase not only the operational functioning of the stores, but it also increases sales growth and revenue with respect to each division and brand. The second variable i.e., Perceived ease-of-use is defined in the study as the extent to which retailers starts believing that the use of this aspect of digital transformation would make their work very easy [25]. They can start getting deeper insights from these data which otherwise cannot be foreseen and would always remain hidden behind the data without benefiting them. SMEs can realize that these insights are great tool for market growth, and it keeps them at an advantage over their competitors. And all of these would make them believe that they would be free from many efforts which they would be doing manually with stress and inaccuracy.

These two variables would further influence SMEs attitude to the usage of Big Data technology which means that it influences retailers' attitude to the usage of either technology effectively in their daily activities which effect the intention of use and eventually effect the actual use of the system. Government can also influence the attitude of SMEs and promote them as they are the strong hold of any economy. Government can advertise the importance of Big Data analytics in SMEs and can provide these tools at cheaper price to attract

the retailers to at least start using the technology. Currently, when major part of the industry is heading towards digitalization globally, government can also promote digital spread in SME industry in UAE. They can provide trainings to these retailers. It will serve two major purposes: (I) Educate the retailer towards new technologies and eventually reach of digitalization in retail industry. (ii) Growth in country's economy due to increased sale as SMEs will get more insights to pitch their product and be customer centric. Government agencies can even partner with educational institutions to impart big data knowledge via various courses/ talks as part of CSR initiative. It will be win-win situation for all the three-party involved i.e., Government, Educational institute and SMEs.

As per the classification of SMEs basis number of employees and annual turnover and application of TAM, adoption of Big Data analytics can be illustrated as below:

In Dubai alone, micro enterprises account for 72 percent of total business count, small firms account for 18 percent, and medium sized firms account for 5 percent. [26]. The volume of data generated by all these firms are extremely high put together. Retailers in the micro and small firm segment have employee less than 9 and 35 people respectively and annual turnover of less than 9 mm Aed and 35 mm Aed on average. And this low number of human resource and relatively low turnover obstructs them to hire additional data analytics resource and allocating financial budget for the digital transformation will incur additive expense to them which micro and small retailers are unable to sustain [27]. However, applying Technology Adoption Model (TAM) in this segment, perceived usefulness can be explained to the retailers that the usage of such analytical techniques would enhance the overall efficiency of his store and he would be free from manual efforts of documenting each of the transactions along with multiple other benefits as stated above in the paper. Hence, in this situation one of the solutions could be to outsource major data analytics work to third party service-based IT firms who can help these SMEs in analyzing their data and giving relevant customer centric recommendations time and again as per the agreed terms. This can be achieved at a much a cheaper rate compared to hiring an inhouse resource and spending on purchasing licenses of super pricy software related to Big Data [28]. Another approach is that the government should take key initiatives to fund these SMEs to implement such technologies and help them sustain in the competitive digital marketplace. On contrast, medium sized enterprise has the potential to invest in data analytics technologies. Application of TAM can be relevant and explained in this segment as well in the similar fashion as micro and small retailers and they can be made aware of the benefits of this part of digital transformation. They can adopt hybrid model of either outsourcing this activity to third party IT service firms or can have in-house data analytics resources.

III. CASE REVIEW OF RETAIL SECTOR IN UAE

The article relies on credible nongovernment and government sources for all the data and figures cited in the paper. The government of the UAE, Dubai Chamber of Commerce and Industry, World Economic Forum among others have adopted economic reports. This paper is based on a review of recent cases, academic journals and articles relating to SMEs and retail in the UAE region and identifies the main points noted in the reports.

IV. CONCLUSION

There has been a dramatic increase in the amount of data generated by both real and virtual worlds in the last few decades. Companies of all sizes use big data tools to manage vast amounts of data and obtain comprehensive information that advances their business intelligence and allows them to make smart decisions. The retail business is one of the most diverse businesses, and some retailers are among the UAE's top corporations. Simultaneously, the retail industry has many tiny "mom-and-pop" establishments, making it vital to many families' livelihoods. Big Data Analytics has the potential to help these people. By analyzing data and creating correlations between diverse things, Big Data Analytics can enable these stores to discover new changes in their units. Finally, Big Data Analytics must be recognized as a crucial aspect in making the SMEs retail sector's business a success story, considering all the facts, figures, and prospects covered in the article. If SMEs want to take advantage of Big Data's capabilities, they must first undergo a cultural transformation. This necessitates them investigating data-handling tools and procedures outside of their smaller organizations, as well as being prepared to actively use Big Data in their decision-making processes. They must be prepared to dive in and explore the ever-expanding ocean of data that awaits them out there. Sayings alone, however, will not be enough to get SMEs on the path to data analytics. All shareholders, including domestic and worldwide regulators, the IT diaspora, the industry group, and the digital transformation community, face a difficult dilemma as a result of the previously identified issues. Further investigation and research can be done by doing empirical study and collecting raw data from various SMEs in retail sector in U.A.E. And then meaningful information can be extracted for further analysis to demonstrate the feasibility and reliability of the model mentioned in the paper.

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