FUTURE PROSPECTS OF FULLY AUTONOMOUS AUTOMATED RETAIL STORES IN INDIA BASED ON ARTIFICIAL INTELLIGENCE
A STUDY ON STARTUP VENTURE OF WATASALE STORE
BY NAYASALE RETAIL PVT. LTD IN KOCHI, KERALA

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ABSTRACT

The upcoming decade is expected to be the golden age of the consumer, with buyers having more options, alternatives and control than ever before. They will be presented with a growing line-up of products and services, often customized to their specific needs and wants. Consumers will continue to demand price and quality lucidity along with a wide range of appropriate fulfilment options. Overall, the retail experience is self-assured to become more innovative, stimulating, simple and convenient, depending on the consumer's ever-changing needs. Artificial intelligence (AI) is acting very briskly into the consumer packaged goods (CPG) and retail sectors. Already, more and more buyers are using so-called 'voice commerce' on home-based devices to restore household supplies and groceries. In the next two to three years, the industry's initial movers will seize major edge over the laggards. Retailers that arise successfully from the shock waves hitting their industry will be those that redesign their physical stores and supply chains to meet digital consumer needs. The current article makes an attempt to build some innovative and curious thoughts in the minds of the scholars what retail will look like as a result of the changing customer, and re-envisaged stores, supply chains, lay out vital plan of action and a potential roadmap for facing the future, including how retailers can make shopping easier and more convenient as a special case of the recently opened "Watasale" store by Nayasale private limited in Cochin city of Kerala which is India's first fully automated autonomous retail store based on artificial intelligence.

KEYWORDS: Artificial intelligence, Computer vision, Deep learning, QR code, Sensor fusion

I. INTRODUCTION

Two years back global e-commerce giant Amazon, in its biggest announcement, lunched Amazon Go, a new kind of brick-n-mortar shopping store featuring the world's most advanced shopping technology with no queening up for

checkout required just walk out shopping experience, simply use the mobile app to enter the store, take the products you want, and go. Amazon started out as an online bookstore. Now, the company runs physical bookstores and the Amazon Go retail stores.

Asian consumers appear to be the most responsive and amenable to adopt Artificial intelligence (AI) devices for shopping. As per global Consumer Insights Survey 2018, in China's massive consumer market, more than one in five respondents (21%) already own an AI device and more than half (52%) plan to buy one. The story is similar in Vietnam (19% own, 45% plan to), Indonesia (18% own, 49% plan to), and Thailand (15% own, 44% plan to). Asian consumers' openness in buying AI devices reflects their desire for voice interaction with electronics, as well as lower levels of concern about online privacy and security. By enabling machine learning and natural language processing to use, retailers will be able to analyse massive amounts of unstructured data and better understand consumer behaviours.

As India has still to wait for Amazon Go to arrive in the country, a Kochi, Kerala-based start-up called Nayasale Retail Pvt Ltd. has launched a fully automated live store called 'Watasale', which is modelled on Amazon Go and will make use of cutting-edge technologies like artificial intelligence, computer vision, deep learning, and sensor fusion to provide the customers with a hassle-free shopping experience. Imagine entering a store, bagging your goods and skipping out. No queues, no checkout counters— that's exactly what Watasale, the new autonomous store, promises. The first ever such store to be open in India operates from Gold Souk mall in Kochi. They follow a similar model as Amazon Go, the world's first autonomous store.

III. SIGNIFICANCE OF THE STUDY

Consumers are candidly the central point of the retail and consumer packaged goods (CPG) industries. Their lives are effortless and their behaviour, customs have improved due to technological advancements. Technology is immersed into their daily lives, which means hyper connectedness is the existing state of affairs. Sensors and digital devices are everywhere – throughout homes, in clothing, in appliances – and the data that collected guides a highly personalized consumer participation in the journey to secure a product.

The advancement in consumer demand, combined with transformative technological innovations, will continue to drive fundamental changes. The boundaries of "retailer" and "manufacturer" will continue to fade, as companies evolve to meet their customers' needs. These forces will cause the retail and consumer packaged goods (CPG) outlook to change more in the next 10 years than it has in the past 40 years. The key drivers of success over the next decade will be centred on building a deep understanding of and connection to the empowered consumer, instantly incorporating imaginative technologies, accepting and adopting transformative business models in both the offline and online space, and establishing key proficiencies. Change can be challenging, but it brings with it enough opportunities for retailers to move ahead, unfazed by the misery and darkness that penetrates much of the traditional sector. As a result the current work has gained its relevant space in retailing industry.

IV. SCOPE AND LIMITATIONS OF THE STUDY

• Even though the main title of this paper makes contribution towards a much broader area comprising of retailing, Artificial intelligence, Computer vision, Deep learning, QR code, Sensor fusion, the area of work is limited to the recently opened "Watasale" store by Nayasale private limited in Cochin city of Kerala which is India's first fully automated autonomous retail store.

• Since only a week has crossed after its opening, a detailed study about the customer responsiveness, perception and successful acceptance cannot be made in such a point of time.

• Current work is as a part of major research's pilot study only and does not covers detailed analysis and data interpretation of the entire population and sample group.

V. OBJECTIVES OF STUDY

1.   To identify the background cause and motivation of developing such an idea of a fully automated, India's first supermarket in Kochi.
2.   To showcase the various technological benefits and challenges of introducing such a start-up venture in retailing.
3.   To explore and study about the process and working of 'watasale' unmanned store.
4.   To identify watasale's future plan of action in doing and diversifying the business.
5.   To provide further suggestions and future research based on this work.

VI. COMPANY PROFILE - WATASALE

"Watasale is a product of Nayasale Retail Pvt Ltd. We stand for easing the way customer shops. We thrive to attain a seamless shopping experience for the customers with our cashier-less stores" as the motto.

Watasale can be used as a fully autonomous retail store which can be scalable to the size of a hypermarket. This store model can be scaled up to support larger number of customers than traditional models. With this solution there is unprecedented instantaneous data on inventory status, stock outs, shelf life, sales and other customer analytics. Watasale is a fully autonomous unmanned store. The customer can walk into the store with their mobile, take the product and just walk away! That's it. No cashier, no scanning, no waiting in line. The customer scans the QR generated in Watasale app to enter and after you are done with the shopping, you can pick the items and just leave. The bill will be deducted from your credit/ debit card or mobile wallet linked to the app.

Moreover as Watasale stores can be installed in any locations, store owners and managers can also use this concept and have a breather into their otherwise monotonous lives by automating store process and use manpower for more productive off store work.

❖   **BACKGROUND AND HISTORY**

It took the team of Watasale nearly three years of exhaustive brainstorming and countless trial sessions to get their algorithms right post which they began focusing on building up the physical infrastructure and skeletal framework of the retail store. The biggest challenge, Jose (COO) said, was to form the core technical team and the right manpower who have expertise on advanced stages of artificial intelligence. Since the team decided not to opt for external funding during the initial process, finding a financial outlet was challenging as well, he added.

"Back in 2015, it was a time when machine learning and artificial intelligence was really coming out. We knew any segments can be disrupted using this technology. If you look at the market structure, the retail segment was still following the age-old technologies. We found it as a ripe ground for innovation and disruptive technologies," said Richu Jose, COO of Watasale, who teamed up with four of his friends from engineering and tech backgrounds to begin the project three years ago.

Branded as 'Watasale', the store, inaugurated last week at a popular mall in the city, does not feature any salespersons or cashiers manning the counters. Instead, it offers shoppers a unique 'checkout-free' experience using a combination of advanced technologies like artificial intelligence, sensor fusion and computer vision. What's more, in less than a week of operations, the team behind 'Watasale' have an offer of funding and strategic partnership from one of Japan's largest corporate groups – the Mitsui & Co Ltd.

❖   **MODE OF WORKING**

The Watasale store, located at the Grand Souk Mall in Kochi, is modelled on the same technology that Amazon has used in its 'checkout-free' grocery store in Seattle, United States. "The core technology is the same. Amazon has done in its own fashion. We have done it our way," said Jose.

Shoppers at the Watasale store have to download the company's Android app from the Play Store before entering. Scanning a QR code generated on the app will help them get past the gated turnstiles into the store. At present, there are two racks on either sides of the store selling a variety of items like biscuits, soft drinks and chocolates to soap and talcum powder. The shopper can pick and choose whatever he/she wishes to purchase before coolly walking out of the store. Within five minutes of exit from the store, a detailed bill will arrive on the shopper's phone for which payment can be done through mobile wallets, debit and credit cards. Computer vision and multiple sensors installed inside the store will automatically pick up signals of a product that has been purchased off a particular shelf and bill it to the right customer. For the first two weeks, they will be closely evaluating macro-data of buying patterns of shoppers to fix the glitches if necessary.

The 'just-walk-out' technology, that the Watasale store is based on, is a first of its kind in India, claim the founders. Unlike in a brick-and-mortar shop, shopping is hassle-free. There is no need to scan the products, generate the bill, enter the card pin, or get the bill checked at the exit. It runs on a combination of Artificial Intelligence (AI), computer vision and sensor fusion, the same technology that is employed in self-driving cars.

❖   **TECHNOLOGY**

A synergy of AI, Deep learning, Computer vision and Sensor fusion.

➢   **Artificial intelligence (AI):** Artificial intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans. Some of the activities computers with artificial intelligence are designed for include Speech recognition, Learning, Planning, Problem solving.

➢   **Computer vision:** Easy to install cameras is the major component of this technology. The cameras are fitted such that the customer privacy is not compromised (no facial recognition). As computer vision advances, it's easy to imagine all sorts of life-improving innovations in store.

➢   **Deep Learning**: Deep learning is used to analyse the interaction with the customers and the store. Years of research has gone into understanding various customer interactions inside store. When combined with the years of practise and training, the system evolved as a working fool proof model.

➢   **Sensor Fusion:** Multiple sensors are used to complement the computer vision. Pressure, stress, light sensors used in this completes the technology stack. The combination of sensor fusion and computer vision gives credibility to the results.

❖   **FUTURE PLANS**

Watasale is planning to come up with the next generation automated online delivery to customer doorsteps using automated delivery robots. The start-up envisions opening 1000's of stores in various horizontal markets all across the world. In the long run, the firm is looking to get external funding from investors which will help in scaling up the company's tech prowess and emerge into supermarket-chain franchises. In any case, the retail sector in India has just witnessed its first major disruption and it is only going to get bigger.

Watasale micro stores are the next step in the plan. These 'stores next door' will be deployed in apartment complexes, housing areas, workplaces and transit areas. These work as upgraded vending machines, but on the same cashier-less principle, where the customer can scan the QR code and pick up what they need. These micro stores can be placed in any location, and the customers can use them at any time of the day for groceries, daily essentials, food items and the like. Watasale is planning to expand to Bengaluru and Delhi, and the company also plans to open franchisee stores, and as a later step, include farmers by directly purchasing from them and delivering fresh produce to consumers.

❖   **GLOBAL DISRUPTIVE TECHNOLOGIES & READINESS LEVELS**

Table 1: Current readiness levels of disruptive technologies and key enablers to reach full readiness

TECHNOLOGY	TIME TO FULL READINESS	KEY ENABLERS FOR FULL READINESS
INTERNET OF THINGS	2-5 years	• Advanced capability to synthesize data, identify insights and act on them on an ongoing basis across the organization • Global standards for data collection • Advances in data security to ensure protection of consumer information
AUTONOMOUS VEHICLES / DRONES	Autonomous vehicles: 6-10 years Drones: 6-10 years	• Technology needs to mature (e.g. autonomous vehicles need advanced features to accommodate all road types in all weather conditions; drones need improved battery life, the ability to carry heavier items) • Regulatory frameworks for use
ARTIFICIAL INTELLIGENCE/ MACHINE LEARNING	2-5 years	• Advanced capability to synthesize data, identify insights and act on them on an ongoing basis across the organization • Advances in data security to ensure protection of consumer information.
ROBOTICS	2-5 years	• Advanced features needed (e.g. dexterity and battery life) • Development of smarter bots
DIGITAL TRACEABILITY	2-5 years	• Advanced capability around predictive and preventive analytics • Common digital language for supply-chain traceability within industry.
3D PRINTING	6-10 years	• Advanced features needed to improve speed, multi-material capabilities etc.
AUGMENTED REALITY / VIRTUAL REALITY	2-5 years	• Component parts (e.g. chips) must be affordable to sell AR/VR devices at scale • VR headsets need to become wireless while retaining processing power.
BLOCKCHAIN	6-10 years	• Ability to perform high-volume transactions in a secure way • Regulatory frameworks for payment application

Source: Accenture/World Economic Forum analysis

VII. CONCLUSION

Consumers will be paramount in moulding the future direction of the industry. As their assumption around cost, alternatives, comfort, control and exposure continue to climb, they will challenge the industry to keep up. At the same time, new-born and imaginative technologies will critically influence the end-to-end industry value chain, boosting both the industry and consumers. Business models will be also revamped to serve these consumer and technological evolutions. The conservative retail model is quickly being restored by brick-and-mortar stores with evolved value programmes, proposals and modified business models in the online space. To flourish and bloom, organizations will need to competitively chase innovation and be ready to challenge themselves.

Industry players will require to build the true capabilities to guarantee that they are ready for success in this present world. Societal challenges – such as the impact of physical retail on societal groups, the influence of new technologies on the industry's workforce and the associations of last-mile delivery on sustainability – need to be tackled head on. To overcome these barriers, collaborations and alliances (intra-industry, extra-industry and public-private) will be critical.

Cooperation among stakeholders will also be pivotal to ensure that the digital transformation of retail benefits are to everyone: the industry, consumers and wider society.

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