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Advantages and Disadvantages of Unmanned Stores



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ABSTRACT

An unmanned store is a sales area where products are displayed, even if no employees or cashiers are present inside the store. Currently, such business formats have been increasing not only in Japan but also overseas. This type of store format has both advantages and disadvantages. This article summarizes the characteristics of such unmanned stores, introduces stores in Japan and abroad, and considers whether such stores will thrive in the future.



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INTRODUCTION

An unmanned store is a sales area where products are displayed, even in the absence of employees or cashiers inside the store. It may be highly mechanized or simply a set of shelves. Presently, such types of businesses have been increasing in Japan as well as worldwide. In unmanned stores, products are sold, goods are rented, and spaces are rented out. This type of storage format offers several advantages. For example, personnel costs can be reduced if there are no permanent staff. However, it also has some disadvantages. Because it is unmanned, it is easy for products and money to be stolen. After considering the balance between the two, it is determined that if the disadvantages are small, some stores may open into chains.

This study summarizes the advantages and disadvantages of unmanned stores, introduces stores in Japan and abroad, and considers whether such stores will continue to thrive in the future.

Background: The emergence of unmanned stores

Since long in Japan, farmers have been selling products (fruits and vegetables) whose specifications (color and shape) cannot be picked up by the Japan Agricultural Cooperatives (JA) at low prices in unmanned sales stands. Ordinary people also sold their home-grown vegetables at low yields, and there is a possibility that they did this without obtaining permission. The JA is an organization where member farmers are involved in the market distribution of agricultural products. The JA sells agricultural products grown by farmers at a higher price if they meet established standards, and at a lower price otherwise; then, it sells products of same standards to consumers at the same price. Thus, by keeping the quality of shipped agricultural products constant and controlling their quantity, the quantity and price of distributed agricultural products can be stabilized. This has the potential to increase agricultural productivity and income. However, substandard agricultural products may not be chosen by the JA, which poses a problem for farmers who are unable to recover the cost or receive much profit despite their effort, time, fertilizer, and other costs.

Particularly, agricultural products that are not selected by the JA do not meet the standards regarding color, shape, or size; however, this does not mean that they are low in nutritional value or are cheap. For example, considering processed products, it can be observed that there are no differences in various properties such as color and nutritional value. Even if products such as

unripe fruits and poorly shaped vegetables cannot be sold at the JA because they do not meet the standard, buyers may notice their value if they are inexpensive. It is often possible to sell agricultural products without going through the JA; nonetheless, it is sometimes difficult to secure a stable sales channel. If all go well, farmers may directly bring vegetables and fruits to Michi-No-Eki (a roadside station) without going through the JA, post the producer's photo and name, and sell them at this station. Michi-No-Eki is a facility set up along roads near tourist spots that directly sells famous and regional products and souvenirs. Yet non-farmers often do not grow many crops because some farm for short periods for their own household consumption. If the harvest is too large, it may not be possible to consume all of it. In the past, all these crops were either thrown or given away for free to nearby residents. People began to think that it would be better to make a profit even if a small amount, and consequently, they started selling at unmanned stores.

Since long, unmanned stores have been commonly located on the sides of major roads where they are easily seen while driving. Mostly, they were simple sheds displaying products on shelves. The payment was placed in a coin container, similar to a piggy bank, in exchange for receiving the product. No coins were used for this change. The purchase of agricultural products was based on trust. There was no monitoring to ensure that payments were made properly. It seems possible that money was stolen in some cases, but the people who set up the stores did not really care about it. Because they had set up the facilities hoping that they would be able to sell even a small amount of produce that would otherwise have been thrown away, it was difficult to worry about small losses.

New unmanned stores in recent years

Presently, proper stores have begun to sell several products such as frozen foods (gyoza or dumpling, grilled meat, and eel kabayaki), refrigerated foods (udon or Japanese wheat noodle and cakes), used clothes, books, and secondhand electronics (in a situation where profits are important and there will be financial hardship if the product does not sell)^{1),2)}. Unmanned gymnasiums have also been established³⁾. Many of these products such as conventional vegetables do not have a low market value but may also be expensive to buy (e.g., secondhand clothes or frozen products), which incur development costs resulting in high losses if stolen.

These new types of stores are not placed in a traditional situation where farmers earn extra money or where it does not matter whether they sell. These stores are run like manned stores but are originally unmanned; the location is carefully considered and prefabricated, and they do not install water or air conditioners. Therefore, they attempt to reduce personnel, rent, and utility costs and earn more profits¹⁾. This is convenient because it is not affected by the recent labor shortage in Japan^{2),4)}. As no need store staff is required, it is possible to operate all day¹⁾. Furthermore, people with other jobs can easily consider this as a side job⁴⁾.

If capital investment is possible, customers can be identified using an authentication system when they enter a store; additionally, surveillance cameras can accurately capture data regarding their activities and purchases. It is possible to carry out more effective store operations, such as optimizing the timing of product replenishment and the content displayed on in-store digital signage, according to customers visiting the store²⁾. Furthermore, payments can be made electronically to prevent cash theft.

Many companies have entered the market aiming to reduce labor costs; however, owing to the impact of the new coronavirus infection, reducing contact with other people is also considered a major advantage. The boom is beginning to spread widely; thus, unmanned retail stores led by local governments have appeared recently²⁾.

Disadvantages of unmanned stores

Recently, there have been many reports of theft; hence, stores may have to opt for security camera installation or cancellation of unmanned stores⁴⁾. This is because the products they attempt to sell are expensive. In addition to store staff visiting the stores to restock products and collect money, there is now a requirement for store employees to visit stores for security and patrol purposes. Many additional costs are associated with personnel expenses and capital investment, which may result in business failure.

Because unmanned retail stores do not require kitchens or other cooking equipment, like regular restaurants, there may be an impression that they can be started relatively inexpensively without incurring construction costs. If crime prevention is a priority, facial recognition systems, smart locks that can be opened and closed using smartphones, and systems that notify employees' smartphones when a customer enters a store are required. When these systems are delivered to

stores, initial costs increase. If they want to introduce advanced technology for security, those who desire to opt for it should know that it will be pricy²⁾. Consequently, there may be an excessive expenditure on personnel and equipment. In some cases, traditionally staffed stores are cheaper.

However, legal problems exist in this regard. It is difficult to comply with laws such as the consumption tax and the Food Sanitation Law. Unmanned stores do not have the capacity for staff, making tax calculations and checking display standards more complicated. Unmanned foodservice stores also require strict quality controls and hygiene management¹⁾. Furthermore, employees in unmanned stores are unable to manage sudden accidents⁴⁾. Dealing with problems such as equipment failure and infrastructure outages is rather difficult. In an unmanned store, if the freezer becomes unusable for several hours because of a malfunction or power outage, products that require freezing or refrigeration will spoil and be discarded, resulting in damage⁴⁾. Therefore, it is necessary to build additional systems to address such accidents.

Examples of unmanned stores in Japan⁵⁾

Starting in August 2019, one of the Japanese convenience store chains conducted a smart store operation experiment in Yokohama by making its stores unmanned late at night (i.e., midnight to 5 a.m.). During unmanned business hours, customers can enter a store by swiping the app's QR code (linked to personal information) over a device near the door or by taking photos of their faces. Once inside the store, the customer selects an item, scans it with a smartphone cash register or selects self-checkout, and pays. In an unmanned store, a camera installed inside the store recorded user behavior, which was used to improve future service.

Some small stores (kiosks) inside train stations were unmanned for approximately two months starting in October 2018. When customers hold their Suica (prepaid electronic transportation money popular in Japan) over the scanner at the entrance, they are authenticated, the door opens, and they can enter the store, selecting and picking up items as they proceed. In an unmanned store, they can complete their purchases and leave by tapping their Suica card again at the exit. The previous year, a demonstration experiment was conducted at another station. During that time, only one person could enter the store at a time, and there were problems such as the inability to return items once they were removed from the shelves. Improvements were observed

in the current demonstration experiment at the station, with the system now allowing up to three people to enter the store simultaneously and recognizing products and customers almost reliably. This was also recognized even when the product was placed in a bag and could be considered excellent regarding security. There is still an issue in that the recognition rate drops once the number of people visiting the store increases, and product and customer recognition during busy times remains an issue for the future. In addition to the shopping experience, it is possible to utilize data such as customer gender, age, and selected products for marketing purposes.

Robot Mart was Japan's first unmanned roadside store, with its first store located in Nihonbashi, Tokyo. The products sold are primarily sweets and drinks. There are no employees in the store and customers are served by robots. Surveillance cameras are also used to monitor stores to deter crimes such as shoplifting. Product purchases are easy. Place the product you want to purchase on a stand equipped with a product-reading camera, recognize the product, display the amount on the monitor, and complete the purchase with a QR code payment. Currently, two payment methods are available—electronic money and virtual currency (as cash cannot be accepted).

Unmanned sales overseas

An unmanned convenience store opened in China in 2016; in July 2017, the company opened an unmanned store in Hangzhou for a limited time. Simultaneously, cashless payments using smartphones have rapidly gained popularity in China. As there were only a limited number of store types available, unmanned stores where users enter and make payments using payment apps were quickly accepted. Within half a year since opening the first convenience store, we have expanded to 300 stores in 29 cities²⁾. In December 2016, Amazon began the launch and research and development of an unmanned store, and in January 2018, it officially opened an unmanned store for general customers in Seattle, USA; in May 2019, another store was opened in New York City. In May 2017, an unmanned was store opened in Seoul, Korea. In January 2018, unmanned stores were also opened in Taiwan.

In early 2018, many unmanned stores in China were forced to close or go bankrupt. The reason for this rapid decline in the number of unmanned stores is that, while many stores focus on technology, they neglect customer experiences. Although unmanned stores declined once in China, it is believed that the fusion of technology and retail will continue to progress, and there

is still room for the development of unmanned stores in the country.

Survival of unmanned stores

Unmanned stores can be considered a type of cultural behavior. In some cases, it can be viewed as a simpler version of a street stall. To continue unmanned sales, trust between sellers (store owners) and buyers (users and consumers) is essential. If the behavior of paying only for purchased items without causing theft continues, the system will not be sustainable (especially if there is insufficient investment in equipment such as surveillance cameras).

Moreover, self-checkout systems are currently popular worldwide; however, owing to an increase in shoplifting, there is a movement in Europe to return to the original face-to-face checkout system. In fast-food stores, the mainstream format is for orders to be taken by machines without human intervention, and for payment and product delivery to be handled by store staff. Consumer inability to use self-checkout machines may lead to shoplifting. Self-checkout machines are expensive. If this technology could be used for many years, it would be possible to reduce costs rather than personnel costs; thus, its introduction has increased in many countries and regions, including Japan. Users are not necessarily familiar with its working procedure, and it is now essential to have store staff on standby to give lectures on how to operate it to avoid problems. Additionally, there is a possibility that some users may unintentionally not pay because of a lack of familiarity with the equipment, such as purchasing plastic bags or making additional purchases of the same product. There are cases where people intentionally try to shoplift, which poses a higher risk than face-to-face checkouts.

Considering these criteria, there is no doubt that unmanned sales offices are a new sales format that can reduce labor costs. However, it is thought that users are not yet accustomed to using these devices, and that there is a need to further develop systems to deter crime. They may have become commonplace after their development. The current stage is to correct deficiencies while operating the system, and once these are completed, the system may become an efficient store that reduces labor costs and deters crimes such as theft. It is thought that the emergence of such stores will accelerate, and that their systems and know-how will be weeded out, with the possibility that only some will survive.

CONCLUSION

Unmanned sales offices are a business type that is likely to increase in the future. This is because they are believed to reduce expenses and increase profits. Even if a store is unmanned, there is a need for store staff to patrol it for purposes such as replenishing products, cleaning, and deterring theft, making it difficult to reduce personnel costs for this purpose. To deter theft, it is also necessary to collect information on who enters and leaves the store and explore payment methods other than cash. Therefore, it may not be possible to start quickly and inexpensively.

If a simple unmanned store does not pursue traditional profits, there is no need to think too much about it. If one considers that they are intended to earn high profits, it is also conceivable that the system construction of currently unmanned stores is still in the developmental stage. This business format will continue in the future, but much progress is still required.

REFERENCES

- 1) Touch To Go Co. (2023) Analyzing the actual situation and trends of theft at unmanned sales locations! -Also explains laws and regulations. TTG, Collection of introduction examples, published June 12, 2023, <https://ttg.co.jp/media/> (browsed January 2024).
- 2) Square. What is unmanned sales (unmanned stores)? -Explains the benefits, domestic examples, and key points for success. Town Square, <https://squareup.com/jp/ja/townsquare/automated-store-japan> (browsed January 2024).
- 3) What is the appeal of the rapidly increasing number of "unmanned stores" and what preparations are necessary to open one? Kanaeru, Usen's business start-up support site, <https://canaeru.usen.com/dly/p975/> (browsed January 2024).
- 4) [2024] 10 recommended franchises for unmanned sales. Recommended franchise headquarters, published January 22, 2024, <https://sojikun.com/unmanned-sales-franchise/> (browsed January 2024).
- 5) How advanced are unmanned stores in Japan? -Introducing seven cases. TechFirm, published July 18, 2019, <https://www.techfirm.co.jp/blog/unmanned-stores-in-japan> (browsed January 2024).

Table 1 Advantages and disadvantages of unmanned stores

Feature	Item	Explanation
Merit	Cost reduction	Reduce fixed costs such as personnel costs and rent. Labor shortages continue in Japan, and this store format eliminates the need to secure staff. Convenience stores are also open 24 hours, but payments such as late-night extra wages to employees can be reduced. By analyzing customer data, you can create new demand and increase customer satisfaction.
	Eliminating labor shortages	
	Open 24 hours	
Demerit	Unearthing customer needs	Because there are no store staff, products and money are more likely to be stolen if security measures are insufficient. It is difficult to comply with laws such as consumption tax and the Food Sanitation Law. If a lot of equipment is introduced for crime prevention measures and customer data acquisition, the cost will increase. Problems may occur due to power outages, equipment malfunctions, and system failures.
	Theft	
	Legal issues	
	Risk of high initial cost	
	Crisis in case of system down	

Based on the contents of References 1) and 2).

Table 2 Unmanned stores of Japan’s leading franchises

Symbol	Item for sale	Minimum start-up cost (US \$)	Franchise fee (US \$)	Royalty
A	Frozen gyoza	23,000	13,000	None
B	Sweets, Ice	20,000	10,000	6% of sales
C	Frozen gyoza	23,000	Not clear	None
D	Frozen gyoza, beef tongue,	10,000	Not clear	Not clear
E	pizza, ramen	15,000	4000	200
F	Frozen hormone	Not clear	Not clear	Not clear
G	Sweets	20,000	9000	8% of sales
H	Old clothes	130,000	13,000	700
I	Indoor golf practice range	30,000	5000	13% of sales when full occupancy
J	Trunk room (Rental storage)	33,000-	13,000	400
	Meat	47,000		

Amount is based on the exchange rate as of April 2024.

Based on the contents of Reference 4).