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A Foresight Study on Baby Boomers towards Using Robots in Replacing Carts at Supermarkets

Hannan Nur Ain Mazli[1] & Anim Zalina Azizan[1],*

[1]Department of Management and Technology, Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, 86400 Batu Pahat, Johor, MALAYSIA

*Corresponding Author

Abstract: Even with the use of robots to replace carts, it appears that the method is a new and creative way for Baby Boomers to use the convenience of robots in supermarkets. However, there are concerns about the effectiveness of using robots, as they are not yet popular enough among Baby Boomers to take over the place of carts. Therefore, this study aims to identify the issues, challenges, trends, and drivers of the use of robots to replace carts in supermarkets and to explore future images of the use of robots in replacing carts in supermarkets. In the investigation, a mixed approach of qualitative and quantitative methods was used. A tool of foresight methodology, the STEEPV method was used in the first phase of identifying the issues, challenges, trends, and drivers of the use of robots to replace carts. The distribution and SPSS statistical analysis were used to identify the two drivers of robot adoption in supermarkets in the second phase of the investigation with impact-uncertainty analysis. The result of the two drivers are robots observe the condition of the item, and robots encourage and guide consumer where an item is placed. A scenario analysis formulation has been constructed in conjunction with the two drivers that provide insight into four possible alternatives within the time horizon of the next few years. The two drivers have a strong correlation where both selected drivers must coexist to generate a positive scenario for the development and sustainability of the technology and robotics sector.

Keywords: Baby boomers, Carts, Robots, Supermarkets

1. Introduction

This section will introduce an overview of the use of robots in supermarkets to replace carts. Carts are used to make it easier for customers to transport goods purchased in supermarkets. However, there are also constraints on the use of such carts. Many customers shop in the supermarket and want to carry their goods using the supplied shopping cart or basket, but there are frequent cases such as the basket is missing or confused (Ramadhana *et al*., 2021). Therefore, with the robot, this can help replace the

use of carts in supermarkets. In this section, will involve the background of the study that is about the replacement of carts in supermarkets. In addition, it also describes the problem statement that is the problems encountered while using the cart and the things that cause the cart to be replaced with a robot. Next, this section also involves the objectives of the study, the importance of this research to certain parties, and the scope of the study.

Today, the use of technology is becoming more widespread and can be used in every society. The increase in demand for smart service equipment is due to the developments in science and technology today, as well as the continuous improvement in the living standards of people (Bo *et al*., 2019). An example of the technology are Radio-Frequency Identification (RFID) technology and drone technology. The technology using drones has been widespread, where drones are now used in food delivery services (Hwang & Choe, 2019). Every technology created is very useful for human use and provides many benefits. Today, the use of robots is also becoming more widespread. It can be implemented in supermarkets to make it easier for every customer to carry their items to be purchased, rather than using carts. This is because there are problems in using carts, such as congestion in the supermarket. With the use of robots, it can help customers who come to the supermarket to bring the items that they want to buy.

Today, it can be seen that the use of robots has already started in restaurants, such as Mamak restaurants. They deliver food to customers no longer manually but by using robots. The robot is also the one who will bring the ordered food to the right customer with the right order. According to a website written by Zikri (2021), the responsibility of the robot, or called a robotic server is to serve customers by delivering food and drinks. The robot will also serve foods and drinks up to three tables at once as it has been programmed in such a way. The restaurant that has started using the robotic server is Original Penang Kayu Nasi Kandar restaurant, which is a local restaurant located at Bukit Jambul, Penang. The restaurant has been given longer operating hours than usual; with that, Indian and Indian-Muslim restaurants now feel that they are short of manpower and because of that they have to use robotic waiters in their restaurants to solve the problem (Rahim, 2021). There are also several other Mamak restaurants that use robots as servers, namely CH Premier Restaurant, Kuching, Nam Heong Restaurant Ipoh, Perak, Nale The Nasi Lemak Co. Restaurant, Shah Alam, Selangor, and JBorn Cafe & Bistro, Johor. Based on a website written by Aruno *et al*. (2021), he said that during the Covid-19 pandemic, to reduce human contact within the premises, a restaurant located in Melaka had to use robotic servers. The robot is already fitted with wheels and multiple food trays. The technology used on the robot server is a technology called simultaneous localization and mapping or also known by using the acronym SLAM. Using the technology, the robot server will return to the customer's desk where the order it has taken. To simplify daily life, there are already many applications in mobile robotics. For example, the sector that can use automated robots is in the mall, and this is to facilitate shopping activities (Islam *et al*., 2019). Therefore, the idea of using a robot can be further expanded in supermarkets by placing robots instead of using carts.

In every supermarket, it can be seen that the use of carts is indeed useful to consumers. A cart is provided for customers to make it easier for them to bring the items to the cashier after selecting the items to be purchased and is designed to make it easier for customers to shop (Gunawan *et al*., 2019). But despite the ease of use of the cart, there are also its own drawbacks. The first issue that can be seen in supermarkets when consumers use carts is that when the cart is filled with many items, it is quite heavy and difficult to push. Furthermore, if the consumer is from the elderly group and comes to the supermark*et al*one. Pushing a cart by ourselves can cause boredom, for example boredom controlling the cart, especially for the elderly and physically disabled (Aiswarya Padma *et al*., 2019). The cart was originally created to facilitate the movement of every consumer who wants to buy goods without having to bring their own and only needs to put the goods in the cart. But over time, this situation becomes trivial as it is necessary to push the cart, and if the cart is filled with a lot of items, it will be heavy to push. On the other hand, the shopping cart is equipped with a child seat, which makes it easier for

parents to drive. However, any potential danger to children is unpredictable and especially when parents or guardians are unaware of the risks that may occur to a particular situation or even related to impending accidents due to children's behaviour. The injuries mentioned are related to toddlers; even older children can be seen that they are sitting in a seat on a shopping cart or called the basket of the cart. The child is placed in a cart basket by their parents or guardians, where their parents or guardians are often unaware of the risks that will arise (Eiríksson & Sigurðardóttir, 2020). In addition, if the environment in the supermarket is too crowded where too many people buy goods on the day, such as weekends, it will become crowded with the presence of many people using carts.

The other issue is when there are parents who come to the supermarkets with their children and that will make it difficult because they have to control their children and, at the same time, they also have to push the cart. This seems difficult if children do not listen to their parents. When such a situation occurs, the children will rebel and it will be difficult to control. At the same time, parents should also look for items to buy and also want to push the cart. Customers who have one or more children will find it quite difficult to push the shopping cart because in this case, they have to care for and hold the hand of their child and at the same time, they have to push the cart (Islam *et al.*, 2019). The cart provided is used by the customer by placing the goods to be purchased and then directly to the payment counter to pay (Sarathkumar *et al.*, 2020). In addition, it can also be linked to the current situation of the Covid-19 pandemic, where every item touched must be sanitized first to ensure that no germs or dirt are still attached to an item. The same applies to carts, where this means that the cart to be used by the next customer must first be sanitized. However, it is not possible to determine the extent of its cleanliness even after sanitization. The carts available in every supermarket are already used by too many people. It can be seen during the last Covid-19 pandemic, when a grocery store in the Midwest province of Coborn's Inc. has added a new safety measure that the store has started disinfecting its shopping carts every time after using the cart by customers by using an electrostatic cleaning spray to disinfect the shopping cart, as this is a strategy to reduce the spread of Covid-19 virus on the surface. This is done as soon as the customer returns the shopping cart to the trolley parking lot, then Coborn staff will use the Victory cordless sprayer to spray disinfectant on the shopping cart (Browne, 2020). The activity that can be said to be a necessity for every community is shopping in the supermarket, where the facilities provided to them have made things easier in the supermarket, which is the cart, but there has been congestion with the use of the cart, which in turn becomes a problem (Mensah, 2020). Therefore, to achieve the research objectives the issues, challenges, and trends of Baby Boomers towards the use of robots to replace carts in supermarkets are identified. Furthermore, the drivers of Baby Boomers towards the use of robots to replace carts in supermarkets also identified. Consequently, the future images of the use of robots to replace carts in supermarkets is explored.

The scope of this study is limited to the group of Baby Boomers where they were the group born in 1946 to 1964. The reason why this study will be done on Baby Boomers is because they want to know about their acceptance of the use of robots to replace the cart in supermarkets. This is limited to Baby Boomers because it is found that they are the group who feel burdened with the use of carts. Therefore, the respondents to this study consisted of consumers of supermarkets among Baby Boomers who use carts when shopping in the supermarket. The locations that will be covered for this study are supermarkets at Negeri Sembilan that use carts in their premises. This study is important to many parties. First and foremost is to customers who shop in supermarkets, where they feel the use of carts is tiring and this study can give them a more thoughtful idea besides using carts for shopping. Besides that, it is important to every supermarket owner because this study can give them an idea of how to make it easier for customers to carry the items to be purchased when shopping in the supermarket rather than using a cart. The idea of using robots to replace shopping carts in supermarkets is relevant today because the world now depends a lot on the use of technology rather than manually or traditionally doing a job. In addition, this study can also benefit the environment in supermarkets because this study suggests the use of robots to replace carts as it causes supermarkets to become congested.

2.   Research Methodology

Research methodology deals with the practical 'how' of any pre-determined part of research. To understand in more depth, it can be referred to as a method for researchers to design a study in a structured way so that the results are true and reliable in line with the goals and objectives or direction of research (Jansen & Warren, 2020). In this section will be described about the research methodology that was used in carrying out this study. The method used is a quantitative method in which the researcher uses a questionnaire. In addition, another method used is qualitative method which is the foresight method. The methodology used will be able to help researchers obtain important data and information related to the use of robots to replace shopping carts.
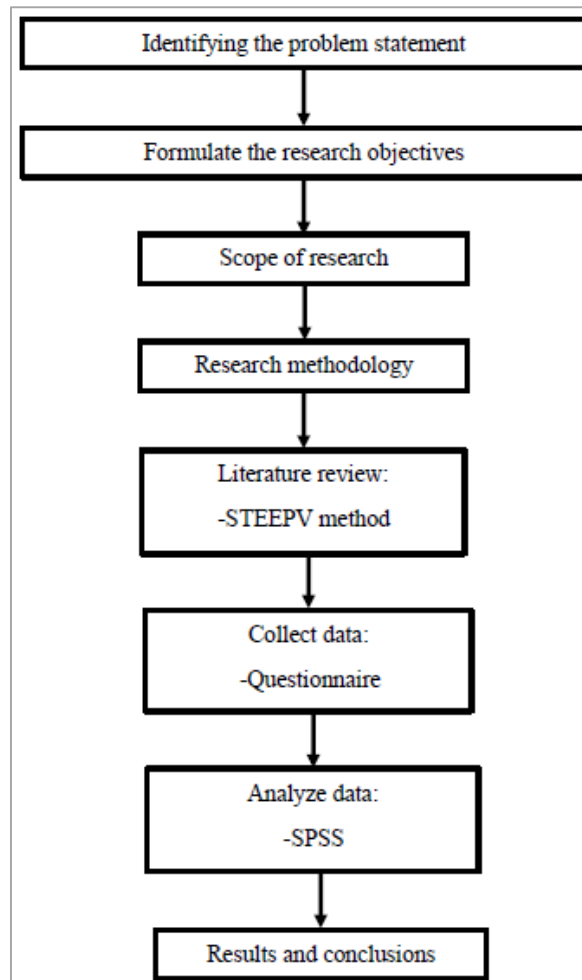
2.1 Research Design

To define research design, it is very simple that research design is a plan that provides how a study runs in making the elements of quantitative research integrated so that the end result is reliable, unbiased, and can be generalized as much as possible. Research design can determine how participants are selected, variables used, and how they are manipulated, how data are collected and analyzed, and how external variability can be controlled so that all research-related problems can be addressed as a whole (Hancock *et al*., 2018). Based on Abu-Taieh *et al*. (2020), the purpose of having a study design is to provide a framework that is appropriate for a study to be conducted.

Quantitative research is the process of collecting and analyzing data that have to do with numbers or is referred to as numerical research. It can be used to find patterns and averages, make predictions, test whether there is a causal relationship, and generalize results to a wider population (Bhandari, 2021b).

This study requires a large number of respondents among Baby Boomers to explore and find information about the future in the use of robots to replace shopping carts in facilitating them as well as providing opportunities for the future. Therefore, a mix-based method where it includes qualitative method and quantitative method will be selected in analyzing the data to be obtained. In this research, trends, uncertainties and all challenges in the use of robots in the future will be interpreted using mix-based methods through a foresight process.

2.2 Research Flow Chart

Flow chart in Figure 1 shows the process flow in conducting a study where it starts from the identification of the problem statement. This flow chart helps the researcher in carrying out this study and gain more understanding through the flow chart overview.

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│     Identifying the problem statement │
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│     Formulate the research objectives │
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        ┌─────────────────────┐
        │   Scope of research  │
        └─────────────────────┘
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        ┌─────────────────────┐
        │ Research methodology │
        └─────────────────────┘
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        ┌─────────────────────┐
        │  Literature review:  │
        │  -STEEPV method      │
        └─────────────────────┘
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        ┌─────────────────────┐
        │  Collect data:       │
        │  -Questionnaire      │
        └─────────────────────┘
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        ┌─────────────────────┐
        │  Analyze data:       │
        │  -SPSS               │
        └─────────────────────┘
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        ┌─────────────────────┐
        │ Results and conclusions │
        └─────────────────────┘
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Figure 1: Research flow chart

2.3 Foresight Process

Foresight can be defined as a particular human capacity in which one has to think in relation to the future. In organizational terms, foresight should not be recognized or universal and, in general, the process should be implemented openly, supported by appropriate methodologies as this is used to develop the organization's capacity to be farsighted. The use of the foresight method is to inform the thought process of staff in an organization so that a more accurate and true decision can be made regarding future strategies (Conway, 2007).

According to Medicine (2020), the Organization for Economic Co-operation and Development's (OECD) defined the horizon scanning as a technique for examining early signs of improvement where it can be important through systematic examination of potential threats and opportunities, along with an emphasis on new technologies and their implications for issues faced.

STEEPV analysis is a tool that is used to give an idea or predict a situation that may occur in the future. STEEPV is used by researchers to analyze, identify, and organize all the drivers of robotic use to replace shopping carts. STEEPV analysis is one of the qualitative data approaches used in this study to identify key drivers, issues, challenges, trends, and future images in the foresight study on Baby Boomers towards using robots in replacing carts at supermarkets.

Drivers can be referring as the factors that will change, shape, or influence the future development. Drivers will be determined or identified by using STEEPV approach. Ranking of drivers or identification of the drivers can be determined by using various tools. For example, impact-uncertainty

analysis, the s-curve, and future wheel. In this research study, the drivers or future factors that influence and change the trend of the use of robots to replace carts at supermarkets was studied with impact-uncertainty analysis.

2.4 Population and Sampling

Population can refer to the target population for the study to be studied or treated. Often, it is inappropriate or even said to be not feasible to take on an entire population in conducting clinical research studies (Majid, 2018). This research focuses on the use of robots to replace shopping carts in supermarkets among Baby Boomers. Therefore, the target population is supermarket consumers among Baby Boomers only.

Sampling is required for data collection where it is considered to be representative of the target population due to the fact that there are situations where the entire population cannot participate in the study or members of the target population cannot be traced. The main categories of sampling strategies are divided into two where they are used in population research. The first is probability sampling and the second is non-probability sampling (Stratton, 2021).

2.5 Research Instrument

The research instrument can be defined as tools that can be used to collect, measure, and analyze data that are relevant to the researcher's research. In research instrument, it includes interviews, surveys, or checklists (Columbia University, 2020). According to Ph.D.s (2020), the formats for research instruments include questionnaires, surveys, interviews, checklists, or simple tests. The selection of the right research instrument to be used in the study will be determined by the researcher. Furthermore, it has to do with the actual methods that the researcher will use in the study.

A questionnaire is an important instrument or tool in data collection activities. A list of questions or items, where it is used as a collection of desired data from respondents related to their attitudes, experiences, or opinions, is called a questionnaire (Bhandari, 2021a). Among the advantages of conducting a questionnaire is that researchers can collect a lot of data in a short time (QuestionPro, n.d.). For this study, a questionnaire will be used to find out about the important drivers, the main driver that can cause Baby Boomers to use robots in the replacement of shopping carts in supermarkets, and also the future image of the use of robots to replace carts at supermarkets. The questionnaire that will be distributed to the Baby Boomers will contain four sections, namely Section A, Section B, Section C, and Section D.

Table 1: Structure of the questionnaire

Section	Item
A	Demographic information of the respondents
B	The importance of drivers on Baby Boomers towards the use of robots in replacing carts at supermarkets
C	The impact of drivers on Baby Boomers towards the use of robots in replacing carts at supermarkets
D	The uncertainty of drivers on Baby Boomers towards the use of robots in replacing carts at supermarkets

2.6 Data Collection

Data collection is divided into two methods, namely primary and secondary. Primary data are the collection of data by researchers. In data primary, this process is an initial information gathering procedure, where it is done before anyone doing any further research (Simplilearn, 2022). An example is collecting data using a questionnaire and an interview. For this study, researcher has used a

questionnaire to collect the data. The secondary data is data that have been used where it is collected by any party and has been done by statistical analysis. The data cited are information that has been collected by others on the instructions of the researcher or information that has been sought by the researcher himself (Simplilearn, 2022). Examples are books, journals, websites, government records, published sources, unpublished personal sources, and newspapers. This research is based on secondary data collection. Data obtained from various sources related to the use of robots to replace shopping carts were collected and analyzed to identify the drivers in using robots in supermarkets.

2.7 Data Analysis

Descriptive analysis, also called as descriptive analytics or descriptive statistics, is a process performed using statistical methods in explaining or summarizing a set of data. Descriptive analysis is as one of the main types of data analysis where descriptive analysis is well known due to its ability in obtaining accessible observations from an uninterpreted data (Bush, 2020). The data obtained from the questionnaire will be analyzed using the 'Statistical Package for Social Science' (SPSS). SPSS can be used easily because it is a set of computer-based software programs that are combined together in one package. SPSS will provide results in the form of frequency, percentage, mean, and standard deviation.

The development of the scenarios was generated after conducting impact-uncertainty analysis based on the mean collected in data analysis. The list of drivers generated were shortlisted according to importance, impact, and uncertainty to construct impact-uncertainty analysis. The two drivers with the highest level of impact and level of uncertainty have been selected to develop scenario analysis.

The scenario analysis was generated with the corresponding two drivers obtained in the impact-uncertainty analysis. Four different alternatives scenarios were generated reflecting the future consequences of events and trend of the use of robots in replacing carts at supermarkets regardless favourable or unfavourable outcome. Implications and recommendations of the study must be developed at the end of the research. These scenarios give an insight to four possibilities that can occur during 2023 to 2033.

3. Literature Review

In this section will contain about the definition, the advantages and disadvantages related to robots and carts, it will also contain about the characteristics of Baby Boomers and the supermarkets. This is important to gain a clearer understanding of the study to be done. The journals, articles, and trusted websites related to the study will be used to obtain useful and important information. In this section also will contain horizon scanning that was used to gather a comprehensive range of information on emerging current issues, challenges, and trends of using robots to replace carts. The STEEPV analysis was used to cluster the issues, challenges, trends, and drivers pertinent to use of robots.

3.1 Robots and Carts

The robot is created by placing on it a robot arm where it can assist the user in moving objects that are not too heavy and relatively light (Ryumin et al., 2020). Today, robots are created to make human life easier. In performing social tasks, social robots can help where they are indeed designed to have the same characteristics as animals or humans, eyes, movement, gestures, sound, and speech technology, although they have many differences in appearance and technology (Konijn et al., 2020).

A mechanical device in which it is to carry or transport an item at various points is called carts or trolleys (Mahayutdin et al., 2020). For shopping carts, it will usually be used when consumers want to shop and want to transport goods such as food where the quantity is in a relatively large amount. This is to save energy because there is no need to transport it by ourself and can minimize the potential for injury where it can be caused by manual handling of heavy materials. When customers use a shopping

trolley where it is also called a shopping cart, shopping basket or carriage, which is a cart that can be pushed in the supermarket, the cart can make it easier for them to bring groceries to the checkout counter as well as to their vehicles (Miller, 2022). Almost all stores or supermarkets provide their own shopping carts for customers. At the beginning of the 20th century, there was the creation of shopping carts, where it makes every premise can enter the era of mass consumption as well as it allows retail stores and product brands to grow their business, and shopping carts can also facilitate customers to deliver their goods to the car (Meyersohn, 2022). In shopping centres such as modern malls, supermarkets and even hypermarkets, shopping carts are widely used (Islam *et al.*, 2019). A cart is an object that has wheels that are used to move or transport items that are heavy or difficult to lift from one place to another. The shopping cart is intended to be a support system to facilitate the movement of goods from one location to another (Oyejide *et al.*, 2020).

3.2 Advantages of using Robots and Carts

The advantages of robots can be seen from many angles. If you want to compare robotic systems with traditional human labour, this robotics-related system has advantages such as immunity to viruses and is incapable of spreading from humans to robots and then to humans with respect to the spread of pathogenic diseases (Shen *et al.*, 2021). Besides that, various human tasks such as welding, painting, and packing activities can be performed by the robot itself as the robot is now able to perform human tasks and it does not need much human intervention (Graetz & Michaels, 2018).

The usual shopping cart in the supermarket provided has a fairly large basket in which it is mounted on four rotating wheels, as well as having a small basket in front of it to make it easier for children to sit in the place (Miller, 2022). Based on Winleader (2018), for a tray-type shopping cart, or also called an American shopping cart, it has a total of three functions. The first and the advantage is that it has a basket that is a place for children to sit. The second is that the design of the trolley is convenient for women or to any person who brings children to shop together. The last one is that it gives a relatively larger and more compact placement because of having a volume in the box. The use of carts is an important mechanism in factories, stores, supermarkets, home, and office complexes. With the cart, it can help in moving heavy items such as products from the store, paper from the office, mini computers and all accessories, important files, groceries, and various other items from one location to another (Oyejide *et al.*, 2020).

3.3 Disadvantages of using Robots and Carts

The disadvantages of robots are also, to some extent, identifiable. Human jobs nowadays are mostly largely replaced by robots (Koch *et al.*, 2021). This can be seen when robots are nowadays more used in manufacturing than humans. There are also other opinions that say that humans will not be completely replaced by robots, but humans and robots will work mutually together with an equal division of labour and responsibilities (Wang, 2018). However, this has indirectly replaced humans with robots, as there is a use of robots in the industry.

Among the disadvantages of using a cart is that after the customer has finished buying the goods, they have to go to the payment counter by carrying the cart and line up or stand in line to pay the bill at the counter along with the cart (P. Mahajan *et al.*, 2018). Pushing a trolley for some people is a physically demanding task or thing, and this can be to some extent time consuming (Praveen *et al.*, 2021). In developing countries, there were many carts that could not be folded and this made them at that time difficult to import or export and could not be used for multi-functional purposes (Oyejide *et al.*, 2020).

3.4 Baby Boomers

Based on Enam & Konduri (2018), it states that the Baby Boomers group is a group born in 1944 – 1964. There is another article that states that the Baby Boomers are those born from 1946 to 1964 and

according to the article, they are a group that can be influenced by marketing strategies that are traditional and also online (Slootweg & Rowson, 2018). Gaidhani, S., Arora, Lokesh & Sharma (2019) states that approximately during 1946 to 1964, which was during the 'Baby Boom' after World War II, the Baby Boomers were the ones born at that time. Most western countries in the years after the outbreak of World War II had an increase in births when they recovered from the economic conditions that occurred during the war. Conditions that have never been experienced before by the new generation of baby boomers, such as the level of economic growth and prosperity throughout their lives. Indeed, they have just entered the world in times of trouble, but because they have entered the field of education, the help of the government, rising property prices, and even advances in technology, they can emerge as a generation that is said to be smart and able to live comfortably.

3.5 Supermarkets

In developing countries, most fast-growing supermarkets have complemented and replaced some traditional food markets, as well as grocery stores (Fikri *et al*., 2020). For buyers as well as employees, a safe supermarket environment should be ensured by the supermarket (Murshed *et al*., 2018). This is because accidents such as slipping or falling that can be caused by slippery roads will result in injuries that have physical and financial costs. However, this can be avoided if in the supermarket there is accurate detection at the time of the dangerous situation, such as spilt liquids or items falling on the floor, and such detection can reduce the possibility of serious injuries. Although accidents can be classified as commonplace, supermarket owners should also designate a responsible permanent cleaner. With that, the industry which is mainly from supermarkets is increasingly interested in doing repetitive and dangerous work using robots and not humans. In areas that are crowded or are seen to have a lot of people, it is usually in shopping malls and even supermarkets (Islam *et al*., 2019).

3.6 The STEEPV Analysis

After referring to the textual materials mainly consist of journals and articles together with the STEEPV method, a broad range of relevant issues, challenges, trends, and drivers have been found. Journals, website, and other sources from the internet has been analyzed for the STEEPV analysis in identification of issues, challenges, trends, and drivers pertinent to use of robots to replace carts at supermarkets.

Table 2: Output of STEEPV analysis

Factors	Total
Social	3
Technological	3
Environmental	3
Economic	3
Political	3
Values	3

3.7 Table with Merged Drivers

A total number of thirteen drivers had been developed after the merging of key terms drivers. This will be included in the questionnaires for the purpose of collecting data.

Table 3: Merging of drivers

No.	Drivers
1.	Companion for consumer
2.	An assistant for consumer
3.	Useful device for consumer

4.	Consumer prepared to interact with robot
5.	Consumer able to manage with robot
6.	Robots decrease the sense of loneliness and improve mood for consumer
7.	Robots informs consumer about the price of an item if not displayed
8.	Robots increase the safety for consumer
9.	Robots encourage and guide consumer where an item is placed
10.	Robots monitor the amount taken by consumer
11.	Robots observe the condition of the item
12.	Robots have a lot of information about the item
13.	Consumers have control over the robot

4. Results and Discussion

4.1 Results

(a) Reliability analysis

Table 4: Pilot test questionnaire

Section	Cronbach's Alpha	N of Items	N of Respondents
B	0.973	13	30
C	0.956	13	30
D	0.966	13	30

Table 5: Real questionnaire

Section	Cronbach's Alpha	N of Items	N of Respondents
B	0.969	13	150
C	0.955	13	150
D	0.962	13	150

Table 4 and Table 5 shows the reliability results of both the pilot test questionnaire and the real questionnaire that obtained from the reliability analysis in SPSS. For pilot test questionnaire, the Cronbach's Alpha is 0.973 for Section B, 0.956 for Section C, and 0.966 for Section D. All of them have 13 questions and answered by a total of 30 respondents. Therefore, the result of Cronbach's Alpha value is excellent. For the real questionnaire, Cronbach's Alpha obtained is 0.969 (Section B), 0.955 (Section C), and 0.962 (Section D) and the result is also excellent.

(b) Demographic information

In this section, the respondent's background information has been analyzed and discussed. The information is related to their gender, race, the kind of supermarket that they usually go, frequently go to shop, and often use a cart (trolley) at the supermarket are the questions asked in the questionnaire.

Table 6: Demographic information

Demographic	Item	Frequency (N)	Percentage (%)
Gender	Male	44	29.3
	Female	106	70.7
Race	Malay	106	70.7
	Chinese	25	16.7
	Indian	19	12.7

The kind of Supermarket that Usually Go	Other	0	0.0
	AEON	25	16.7
	Econsave	22	14.7
	Giant Hypermarket	40	26.7
	Lotus's	38	25.3
	Mydin	24	16.0
	Other	1	0.7
Frequently Go to Shop	Very frequent	45	30.0
	Frequent	52	34.7
	Moderate	30	20.0
	Not frequent	20	13.3
	Very not frequent	3	2.0
Often Use a Cart (Trolley) at the Supermarket	Yes	150	100.0
	No	0	0.0

The tabulated demographic information are as follows. A total of 150 respondents participated in this study. The data found shows that 44 people are male and a total of 106 people are female who are made up of Baby Boomers. In short, this study consists of 29.30% male and 70.70% female. The majority of respondents are Malay with a percentage of 70.70%. Next, followed by the Chinese with a percentage of 16.70% and Indian with 12.70%. There was zero for other races respondent. For kind of supermarket that respondents usually go, for AEON supermarket, the data analyzed shows 16.70% (25 respondents) who shop at AEON. For Econsave, the percentage is 14.70% (22 respondents). For Giant Hypermarket, 26.70% is equivalent to 40 respondents who often shop at the supermarket. For Lotus's and Mydin shows a percentage of 25.30% (38 respondents) and 16.00% (24 respondents) respectively. Only 0.70% (1 respondent) shop at other supermarkets. Overall, the data shows that more respondents shop at Giant Hypermarket.

Next, for frequently go to shop, it shows that most respondents frequent shop at supermarkets with a percentage of 34.70% equal to 52 respondents. For respondents who shop very frequent, the percentage is 30.00%. For moderate, not frequent and very not frequent are 20.00%, 13.30% and 2.00% respectively. Respondents all often use a cart in supermarkets because the data shows that respondents choose 'yes', which is with a percentage of 100.00% (150 respondents) compared to 'no' with zero respondent.

(c) Impact-uncertainty analysis

The mean value for both impact and uncertainty level in Table 7 has been formulated to clearly explain the mean difference in both aspects before building the impact-uncertainty analysis. The data in Table 7 was used to formulate an impact-uncertainty analysis to find the drivers with the highest significant results on impact and uncertainty on future prospect. The results of the analysis are presented in Figure 2. The results of the two drivers with high impact and uncertainty will be selected.

Table 7: Mean of 7 leading drivers for level of impact and uncertainty

No.	Drivers	Impact	Uncertainty
1.	Companion for consumer	4.2533	1.8067
2.	An assistant for consumer	4.2533	1.8400
3.	Robots informs consumer about the price of an item if not displayed	4.0600	2.0533
4.	Robots observe the condition of the item	4.2000	2.0600
5.	Useful device for consumer	4.0933	1.9800
6.	Robots encourage and guide consumer where an item is placed	4.0867	2.1467
7.	Consumers have control over the robot	4.1533	1.9667
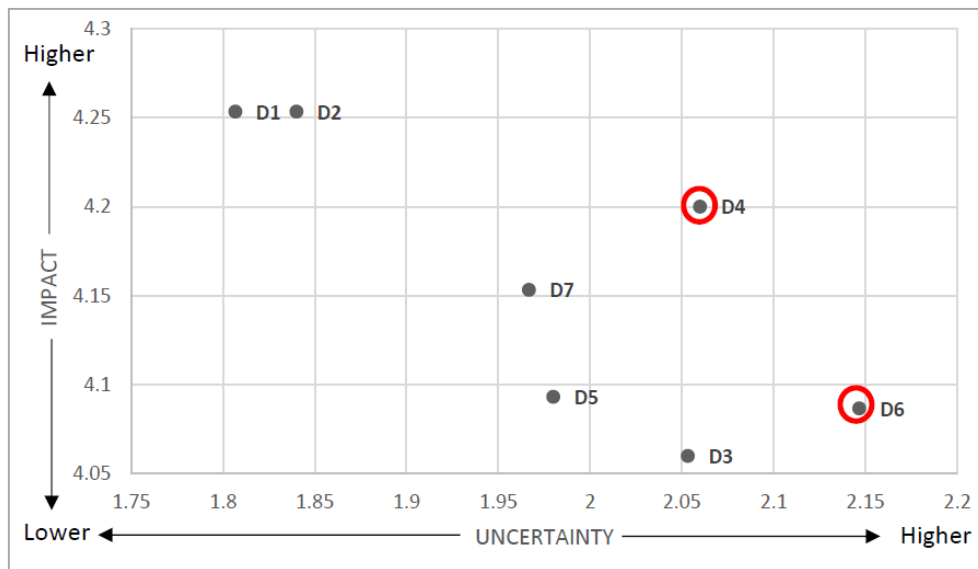
Figure 2: Impact-uncertainty analysis

Based on Figure 2, the coordinates D4 (2.0600, 4.2000) and D6 (2.1467, 4.0867) were chosen. This is because D4 and D6 is the driver with the highest level of impact and uncertainty. They represent two drivers 'robots observe the condition of the item' and 'robots encourage and guide consumer where an item is placed' respectively. These two drivers are selected as the selected drivers of change and will be used to generate the scenario building analysis.

4.2 Discussion Based on the First and Second Research Objective

Robots observe the condition of the item is the driver that has the highest ratings in terms of importance and is also the most effective driver when compared to other drivers. It scored 2.0600 and 4.2000 respectively in terms of uncertainty and impact out of a total score of 5.000. A robot that can observe the condition of an item is the most impactful on the respondents' perspective because the use of a robot is the best option for Baby Boomers to feel like someone is accompanying them to shop at the supermarket. This is because if Baby Boomers shop alone, then robots can be their companion to help check the condition of an item whether the item being sold is still good or otherwise. Besides the robot being able to help Baby Boomers to shop at the supermarket when they are alone, the robot can also be their companion. In supermarkets, robots have now taken up and are used to be used as assistants for shopping users or consumers, or as autonomous cleaning devices (Lewandowski *et al.*, 2020). Sometimes there are Baby Boomers who shop alone, and they need a companion to communicate, so a robot can be their companion while making a purchase. Nowadays, robots are indeed seen to be a part of human life either in the medium or long term. Robots have been designed to be used in controlled environments to better meet human needs (Pino & Cadena, 2018). Human needs can include the need for companionship and communication. This is especially important for seniors like Baby Boomers because they need to communicate about their needs. With that, robots are the right choice if Baby Boomers do not have anyone to accompany them when shopping at the supermarket. This in turn can replace the use of carts to the use of robots in terms of purchasing goods. With that, robots can check or observe the condition of goods for Baby Boomers.

Next, robots encourage and guide consumer where an item is placed is the second driver that got the second highest vote in importance and also the most uncertain driver compared to the other drivers is on robots encourage and guide consumer where an item is placed. It gets a score value of 2.1467 and 4.0867 out of 5.000 in uncertainty and impact respectively. Respondents mostly thought that drivers are the most uncertain and unpredictable in future developments and their impact on future Baby Boomers

about the use of robots to replace carts at supermarkets. Robots can help consumers in shopping activities in supermarkets. This is because robots nowadays are created to be able to do various activities in the supermarket. This is no exception in helping Baby Boomers in guiding them to find goods in the supermarket if the goods are not found. Baby Boomers have 2 options once they arrive at the supermarket. They can choose whether to ask the robot in the supermarket to guide them through the various supermarket section or the second choice is they are familiar with supermarket layout, then they just want the robots to follow them wherever they go and this is acting as a shopping cart (Nithya Priya *et al*., 2021). This situation can happen because the elderly, the Baby Boomers, sometimes do not find where the item is placed. Therefore, guidance from a robot to help find goods in a supermarket is important however it is uncertain because it is related to the readiness of the robot in increasing the effectiveness to be a robot that has good quality in a long term and is not easily damaged and the motivation by the robot creators to create robots with good quality with many more in supermarkets.

4.3 Discussion Based on the Third Research Objective

The third research objective is to explore the future images of the use of robots to replace carts in supermarkets. It is to identify scenario that act as driving forces for future development and how they change and shape the future environment and the use of robots in supermarkets. This image is achieved by generating a scenario analysis of four different alternative scenarios based on the two drivers selected from the impact-uncertainty analysis. This scenario gives an idea of four different possibilities that may occur in the time horizon of the next few years. Four possible scenarios have been illustrated in Figure 3.
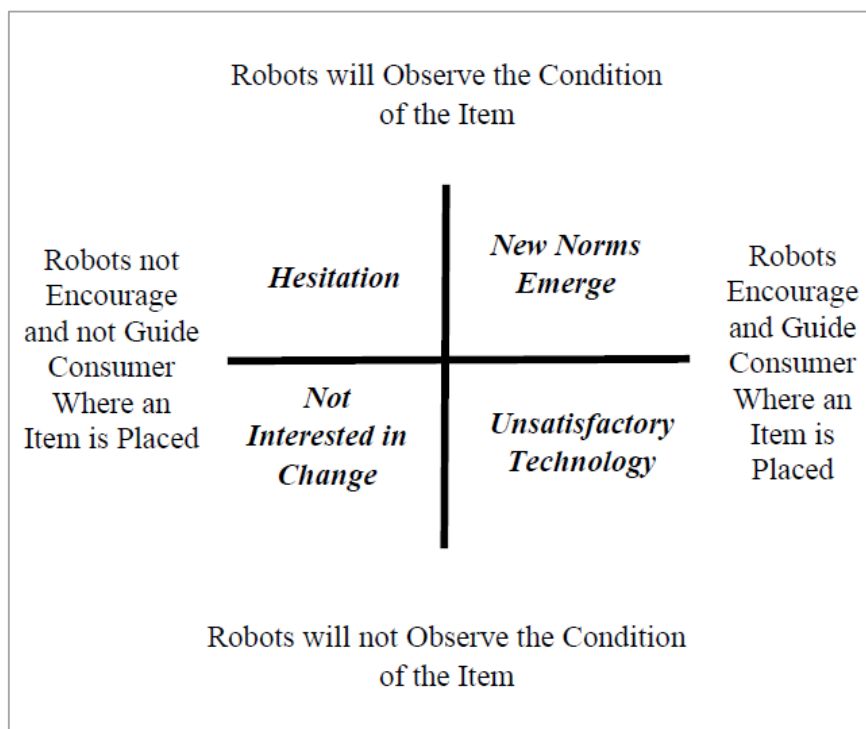
Figure 3: Four alternative scenarios

(a) Scenario 1 'New norms emerge'

The first scenario occurs when the robot will observe the condition of the item in the robot encouraging and guiding the consumer where the item is placed. It will create a new kind of normalization in which the use of robots to replace carts in supermarkets will thrive and grow as the main important use while shopping. 'New norms emerge' refers to the situation of using robots seen as a common situation for Baby Boomers in all supermarkets.

This scenario is ideal because it will make it easier for Baby Boomers to shop at supermarkets. It is easy for them to shop alone even if they are not accompanied by their children. This is because if Baby Boomers see and are informed about robots in the supermarket that can observe and check an item for them, then they will be more prepared and happier to shop. A robot can check the condition of an item because the robot is also the one that arranges the items on the shelves in the supermarket. Several issues need to be resolved to enable robots to replenish supermarket shelves by manipulating products with large differences in size, shape, weight, and fragility and also in narrow spaces (Challenges, 2021). Therefore, Baby Boomers even if they are alone, they can still find out the items that are placed in the supermarket easily. With that, smarter robots will be created by robot inventors and robots that can guide Baby Boomers to show where an item is placed to be produced.

(b) Scenario 2 'Not interested in change'

Not interested in change is when the robot will not observe the condition of the item in the robot does not encourage and does not guide the consumer where an item is placed. This scenario is where Baby Boomers do not want a robot to help them in checking the condition of an item while the robot does not guide the Baby Boomers to show where an item is placed. This is the worst-case scenario in terms of the use of robots in replacing carts because Baby Boomers are not interested in the changes that are happening in supermarkets and they think that robots cannot help in checking items properly for them. Therefore, the supermarket will remain unchanged and fixed in terms of used cart consumption.

Baby Boomers themselves belong to the elderly and this makes them not interested in any change. Especially the changes related to technology today. This is because they must first learn how the technology works and how to use it. This makes them think that this situation is quite difficult and requires them to try to learn the technology. For example, less computer experience by older adults is associated with their greater computer anxiety; therefore, for them, accessing health information on the internet is more difficult for older adults (Tsai *et al*., 2020). Resistance to change is a difficult thing because it is related to the individual's attitude to decide whether to accept or not with the change. Therefore, the rate of adaptation will be slow because Baby Boomers are not very receptive to the use of robots in supermarkets.

(c) Scenario 3 'Hesitation'

The third scenario occurs when the robot will observe the condition of the item while there is still no robot encouraging and guiding the consumer where an item is placed. This scenario will make Baby Boomers hesitate to use robots to replace carts in supermarkets because robots cannot necessarily be drivers, as the Baby Boomers themselves feel. However, the feeling of skepticism will not last long because robots can still help Baby Boomers in the supermarket to check the condition of items. This scenario suggests the ability to demand the use of robots in supermarkets but has the inability to maintain robots as Baby Boomers' guides due to the negative attitudes of robot enablers. The use of robots in general has its own limitations. Therefore, Baby Boomers in the application of the use of robots to replace carts.

This scenario is the second-best scenario for the use of robots to replace carts because there is still an opportunity for the use of robots to grow further in the future because Baby Boomers still want robots as assistants to check the condition of goods or items in supermarkets. Robots can be assistants in many ways. From a treatment point of view, it can help deliver medical samples, carry clothes, carry supplies, and greet patients (Miseikis *et al*., 2020). It will have to rely on research and development efforts and the right methods to get Baby Boomers using robots.

(d) Scenario 4 'Unsatisfactory technology'

The last scenario is produced by the presence of the robot encouraging and guiding the consumer where an item is placed and the robot not observing the condition of the item. In general, with the presence of robots as a guide in supermarkets but robots are not Baby Boomers' assistants in checking the condition of an item, it will lead to new innovations that are able to replace and disrupt the position of using robots. This scenario is good for the development of robots to guide the Baby Boomers and unfortunately a negative situation for the development of the use of robots to replace carts in the future.

This scenario shows the unsatisfactory technology in the use of robots to replace carts in supermarkets. This scenario is good in terms of the robot as a guide, but negative for the robot as checking the condition of an item for Baby Boomers. Although robots can be a guide for Baby Boomers in the supermarket, there are also Baby Boomers who choose to use robots to replace carts. Robots that do not satisfy Baby Boomers may cause Baby Boomers to continue to not use robots instead of carts and will stay to use carts, which is the traditional way. Most of the people buy different and many items from the supermarket and put them in the cart because it is the most convenient method to use in the supermarket to carry the goods (Srivastava *et al.*, 2020). Therefore, unsatisfactory technology will prevail in the future when it comes to the use of robots.

5. Conclusion

In conclusion, this research was basically conducted to identify the issues, challenges, trends, and drivers of the use of robots to replace shopping carts in supermarkets and to explore the future images of the use of robots in supermarkets to replace shopping carts. This research objectives have been successfully achieved by identifying the selected two drivers and four alternative future images that show the interrelation between robots observe the condition of the item and robots encourage and guide consumer where an item is placed will impact and shape the way of life in the future. Indeed, the high robots observe the condition of the item as well as robots encourage and guide consumer where an item is placed will result in a positive future development for the use of robots to replace carts at supermarkets. The presence of these factors has a strong relationship with each other where they must co-exist to achieve the best future scenario which is 'new norms emerge' for improving the development and sustainability of the use of robots. Otherwise, it will lead to negative implications in terms of the development of the use of robots 'hesitation', 'not interested in change', and 'unsatisfactory technology' where one or both factors are missing in the scenario.

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