

# The Implementation and Acceptance of Kitchen Technologies in the Hospitality Industry: A Focus on Fast Food Business

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## Abstract

The implementation of robotics technology to the hospitality industry became one of the most talked about trends in the industry. Most of the implemented contemporary technologies were introduced in the front of house operation, which created a gap in implementation of these phenomenons to the fast food preparation. However, emerging new technologies are in the market, which may revolutionise the industry. The article looked into empirical research that may apply technologies in the fast food preparation or attempt to find technological solutions in fields which are correlated to the fast food kitchen. The researcher found out that the implication comes with a bunch of unanswered questions and with limitations regarding the diffusion of the technology in the industry. Hence, the industry must overcome the limitations to successfully implement new technologies. The future utilisation of new technologies in the fast food kitchens will play a crucial role in the industry as the implementation of new technologies could be the key to grow and sustain profitable businesses. The gap could be filled if the industry focuses on solving the current limitations and creates space for future development.

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## Chapter 1. Introduction

### 1.1. Background Information

The widespread adoption and integration of information technology (IT) in the fast food business has resulted in the creation of a slew of new tools for the industry, making many people's lives easier (Buhalis and Amaranggana, 2013; Dorcic et al., 2019; Jabeen et al., 2021). Particularly in the hospitality business these days have a challenge in finding the ideal ratio between human and artificial robotic power (Naumov, 2019). It's also worth noting that robotic technology is still in its adolescence, with management and employees searching for ways to have better optimisation of robotic integration in the hospitality industry (Blöcher and Alt, 2020). Last but not least, traditionally human-powered enterprises, such as the hospitality businesses,

must investigate and develop a strategy for how AI and humans can collaborate as a team to build a new business approach (Genysis 2017; Paluch and Wirtz 2020; Berezina et al., 2019; Blöcher and Alt, 2020).

The perks of robotics can play a very specific role in reducing costs in an enterprise, and managers and staff can use robots to follow the latest trends in cost reduction and the implementation of digital innovations (Verevka, 2019). In comparison to other industries, hospitality will be changed by the use of artificial intelligence and robots, and this will have a significant impact on salaries, training, and preparation (Chui et al., 2016; Blöcher and Alt, 2020). According to Wongphati et al., (2012) robotic arms can be a huge support for cooks in terms of preparation and cleaning by assisting them with various types of simple jobs such as chopping vegetables. In

2012, 21% of employees at businesses sought to include this form of assistance into their daily lives (Wongphathi et al., 2012).

### 1.2. *Rationale*

The research will look into the academic world of artificial intelligence and the challenges of implementing these new technologies in the fast food industry. The paper will also attempt to bridge the academic gap between businesses and their potential benefits of using new technology in several areas in the kitchen department. The purpose of this article is to close the gap in technology adoption in the kitchen department and to demonstrate the spread of technology in the kitchen. Since studies are often designed for various sectors and there is a gap from implementation to kitchen, the study's most important aspect is to apply studies that may have a very tight relationship with the topic. Robotic technology has advanced significantly in recent years, gaining a significant market share, and as a result, robots and artificial intelligence (AI) have become increasingly influential in the fast food business (Kim et al., 2021). The inspiration for the essay grew as the global pandemic progressed and people began to prefer food prepared by robots than food prepared by humans. The global pandemic has also prompted businesses to begin investing in automation in the food related tasks (Kim et al., 2021). According to latest studies and articles, 86 percent of businesses are eager to spend in AI in the future, indicating that robotic technology is one of the world's most rapidly emerging technologies (Lu et al., 2019; Persado 2017).

### 1.3. *Aim and Objectives*

#### *Aim*

This study aims at investigating critical components of modern technology (robotics) deployment in the fast food kitchen context.

#### *Objectives*

1. To examine the diffusion of innovations in the fast food restaurant kitchens.
2. To identify potential obstacles to robotics technology application in the kitchen department.
3. To identify the technologies that may apply for inception in a kitchen department of fast food restaurants.

## **Chapter 2. Literature review**

### 2.1. *Introduction*

Artificial intelligence and robotics are two technologies that have a lot of potential in a

variety of industries. The AI is separated into two broad groups: "general" and "narrow" AI. The general group represents basic software, while the narrow group represents more advanced software. (Broussard, 2018). Sophisticated technology learns in the same way that the human brain does, and trainers can use the same tactics as they would when teaching a human individual. The AI can be utilised for a variety of purposes, ranging from simple video games to high-level industrial applications. (Raj and Seamans, 2019). The author will discuss and describe some of the most important theories and models in a theoretical framework. The theory of diffusion of innovations, the original technology acceptance model, and the most advanced technology acceptance model will be the emphasis of the theoretical framework.

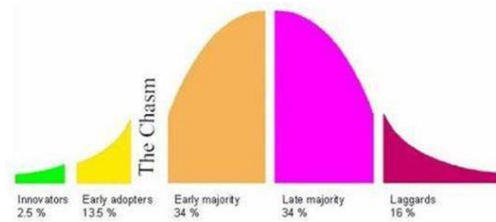
### 2.2. *Theoretical framework*

#### 2.2.1. *Theory of Diffusion of Innovations (DIT)*

Individuals' propensity to embrace new technologies into their working lives is demonstrated in a study by Rogers (1995, cited by Lai, 2017). According to Rogers (1995), the theory has five stages, each of which describes how people from various social backgrounds get access to technological progress.

An S-curved graph developed by Rogers (1995) explains the concept in Figure 1. Innovations are essential, especially in order to create a competitive environment. The initial stages will profit from this since they will have a wider range of technologies to accept and implement. This stage has the greatest impact on innovation since the majority of ideas fail and never diffuse because inventors and early adopters are denied the opportunity to participate in the innovation, resulting in an implementation failure for the technology (Dearing and Cox, 2018). Individuals normally accept innovations quicker than corporations, but if an external factor influences their decision, such as the mass media, the adoption rate might slow down or speed up, depending on the impact on society. The early and late majority of technological implementers are generally affected by this influence (Rogers, 1995). Nevertheless, the bulk of the early and late adopters of a technology are not solely affected by the mainstream media. Many additional elements impact these two phases of the DIT, such as the views of society's leaders, as well as the individuals who are part of these two groups feeling a great deal of societal pressure to integrate technology (Rogers, 1995). The laggards are the model's last stage; this group is similar to the innovators in that both groups are under the least amount of social pressure, and this group feels free to take their time making decisions.

Potential consumers have the ability to recognize and incorporate innovations into their daily lives, regardless of whether or not they are interconnected to one another. This sort of sensation can arise as a result of having the same social standing, sharing the same interests, or working in the same industry at the same level, all of which might drive future adopters to accept or decline developments based on the actions of others. (Dearing and Cox, 2018).



**Figure 1**

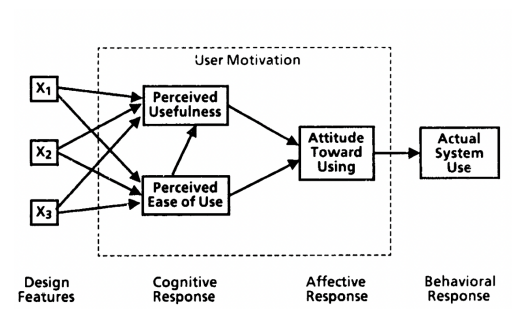
As previously stated, the five phases are interconnected in many ways. For example, innovators take inventions to the horizon, while early adapters are those who transmit ideas to the majority of society through a variety of techniques, and this group is home to the majority of opinion leaders. The two primary groups are inextricably linked, and it reflects the fact that that group is under the most pressure to incorporate technology into their everyday lives. The relationship between the last and first groups is also quite strong since they have the most freedom in terms of technological application (Rogers, 1995).

### 2.2.2. Original Technology Acceptance Model (TAM)

The original version of the Technology Acceptance Model (TAM) was introduced by Davis (1985) as the doctoral research paper to develop a new model on acceptance specially made for technology (Lai, 2017). The Fishbein Model was used to build this model, which contains the main parts of the Technology Acceptance Model. The fundamental idea behind the model is to use binary design elements to represent alternate indicators. According to Davis (1985), the popularity of a system's use among users is defined by the user's perspective toward it; this indicates whether or not the user will adopt the technology. As a consequence of this attitude, two major groups emerge. These two categories are stated in the second paragraphs as perceived usefulness and perceived ease of use (Davis, 1985).

The model is designed to help people understand how they react to various types of new technology. Figure 2 illustrates the TAM model, which depicts various persons and their

motivations for using new technology. The motivation is fuelled by the ease of use of the technology, which can be valuable in the participant's working lives. Moreover, it highlights the value that technology provides to individuals and these values lead the individual to a perceived usefulness by the technology. These two primary areas are markers of how an individual will accept new technology, and as a result, the model will illustrate how the technology will be used in the individual's life in real life (Davis, 1985). The model's potential will gain usefulness in the individual, resulting in improved performance in the workplace hypothetically, and businesses will be able to generate more revenue in the same amount of time as a result of this higher performance (Davis, 1985). The model's ease of use reflects how the technology's application will affect work in terms of how duties will be more straightforward with technologies. The model's ease of use and utility have had a separate, but significant impact on users' feelings about technology. However, because consumers frequently gauge the usefulness in perceived ease of use, ease of use is usually regarded as a stronger influencer (Masrom, 2007).



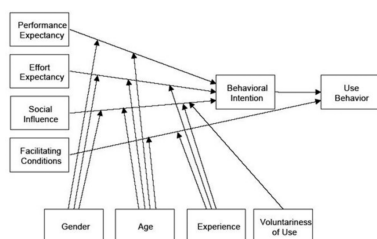
**Figure 2**

The TAM model is made up of several different aspects and can be broken down into several steps. The model comprises four steps in which data is gathered, and it comes to a conclusion with actual system use at the end of the method. Three of these phases are the user's responses, and they are: cognitive, affective, and behavioural responses. They are all interconnected, and the model is built to follow this sequence until it leads to actual use. The first step is to collect data from individuals; the second is to analyse the data and divide it into two categories. This category will be collected into a main account, to the attitude toward adopting the new technology, and this will bring the users to the actual system use (Davis, 1985). Moreover, there is a signal towards usefulness from the category ease of use, implying that the perceived ease of use may be referred to as usefulness to the users before the model reaches the effective response stage.

### 2.2.3. Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) has been around for over a quarter (Venkatesh et al., 2016). The method is a more comprehensive version of the Technology Acceptance Models (Lai, 2017). The mass of research publications focus on applying the theory to information technology (IT). To construct the hypothesis, the inventors of the UTAUT theory combined previously existing models such as TAM and formed a concept, identifying four key components and four indications (Venkatesh et al., 2016).

Performance expectancy, effort expectancy, social influence, and facilitating conditions are the four major variables in the theory. As per the theory, the first two of the four essential aspects are investigated, and they primarily influence the behavioural intention to use technology; however, the other two elements of the factors are observed, and they conclude that technology use plays a significant role in an individual's life (Venkatesh et al., 2016). The five major elements that make up the performance expectancy in the UTAUT theory are perceived usefulness, external motivation, role, perceived benefits, and achievement goals. However, the model's effort expectancy element is responsible for the technology's intricacy and simplicity of use (Lai, 2017). Nevertheless, the four essential indicators of the theory that are used have a significant impact on two specific sectors that are influenced by the four primary factors. The two parts were intertwined, and each of the eight separate factors had an impact. In the UTAUT paradigm, the four markers of gender, age, experience, and voluntariness of usage connect various sorts of relationships. Field inspections at workplaces revealed that 77 percent of employees are open to utilising new ideas and technologies, and 55 percent of those polled are currently utilising technology in their everyday lives (Venkatesh et al., 2016). The UTAUT is commonly used in a number of sectors. According to Venkatesh (2016), there is just one research that uses the UTAUT in the theory's original context, but the researchers have applied the theory in most of the key segments of the economy and all over the world.



**Figure 3**

The relationships between each of the four essential components and the four indicators are interwoven in Figure 3, which illustrates the UTAUT model above. (Lai, 2017). The UTAUT model may be extended beyond its basic use with new results mechanics or the inclusion of new external, internal, and moderation to the previously existing model (Venkatesh et al., 2016). The researchers implemented and used the UTAUT model to investigate innovation acceptance in a wide range of situations, including, for example, different types of technologies, specific functions, and changing roles. Following data collection, researchers were able to divide people into groups such as workers and clients (Venkatesh et al., 2016).

### 2.3. Review of empirical research

#### 2.3.1. Integrating Diffusion of Innovations

(DIT) and to predict utilisation of information technology by end-users

Diffusion of technology refers to how various concepts propagate throughout a community (Rogers, 1995). Many researchers have been interested in the application of various inventions and how these innovations affect humans for a long time (Wejnert, 2002). The empirical study focused on how end-users will integrate technology into their daily lives, namely information technology (Moore and Benbasat, 1996). The study focuses on the end-user adoption of the Diffusion of Technology model by studying how people interact with various types of personal workstations (PWS) (Moore and Benbasat, 1996). Moreover, in order to attain the aim, the research concentrated on a number of important pillars, including relative advantage, compatibility, ease of use, trialability, image, outcome demonstrability, and visibility (Moore and Benbasat, 1996). The research gathered data from a variety of disciplines to illustrate how different socioeconomic levels of individuals are likely to accept different products in their everyday lives (Moore and Benbasat, 1996). Secondly, lower tier employees of various firms showed a stronger readiness to disseminate a technology, although lower tier employees perceived effect from higher leaders, and overall, the adopters had a larger proportion as it indicates the end-users' willingness to apply technology (Moore and Benbasat, 1996).

#### 2.3.2. An empirical examination of the acceptance behaviour of hotel front office systems: An extended technology acceptance model

Technology adoption is a crucial motivator for hospitality organisations to improve efficiency and retain market competitiveness (Wang &

Qualls, 2007). Since the Technologies Acceptance Model is used in so many different fields, numerous additional extensions of the core models have been developed to gauge people's readiness to adopt new technology (Venkatesh et al., 2003). Even though there is a great need for hotel firms to employ technology into their operations, these companies are researching the upsides and downsides of using it (Wang & Qualls, 2007). The TAM's two key motivating variables, "perceived ease of use" and "perceived usefulness," have just a modest impact on hotel organisation's behavioural adoption of technology (Wang & Qualls, 2007). The majority of research on the TAM model's perceived ease of use revealed that this stimulus had the most effect on the other metrics (Kim et al., 2008). Lederer et al. (2000, cited by Kim et al., 2008) discovered that if the two motivators elements have any beneficial impact on the user, the users attitude about the internet has a favourable effect. The acceptance behaviour of front office systems was investigated in a number of South Korean premium hotels. The research looked into several aspects of the hotel operations system, including the front desk, reservations, and housekeeping (Kim et al., 2008). The goal of the empirical study was to propose various types of solutions for front-desk staff to implement in order to increase front-desk system acceptance (Kim et al., 2008). The study outlined five basic foundations for how staff might adopt technology and integrate it into the hotel's process. The first pillar is that the software have to provide wide range of information to the staff, the second is that the system must provide protected workflow for the staff, allowing the professionals to concentrate more on providing quality guest service, the third pillar is that the leaders have to provide beneficial assistance to the team in order for the system to be used effectively, and the fourth is that the system must provide a user friendly surface that is easy to use and useful to the user, the last pillar is that system users must acknowledge that the system provides them with numerous advantages (Kim et al., 2008). The system may also have limits if the pillars are not functioning well, as Lam et al., (2007) noted that the duration of time is the most important factor in determining how employees would adopt technology. The results of the study revealed that the system's adoption was highly effective in terms of acceptability and efficiency, with employees benefiting the most from its ease of use (Kim et al., 2008).

### *2.3.3. Preference for robot service or human service in hotels? Impacts of the COVID-19 pandemic*

The application of robot technology to the daily lives of employees is the latest phenomenon in the hospitality business. In the industry, robots are typically portrayed as physical objects with

pre-programmed intelligence that serve as a valuable tool for employees (Chen & Hu, 2013). Individuals may employ service robots in the workplace in a variety of ways, from the most basic to the most advanced, where robots can produce things on their own (Ivanov et al., 2018; Berezina et al., 2019; Lukanova and Ilieva, 2019; Choi et al., 2019). The great majority of the studies investigated how robotic technology adoption might affect the potential costs of a hotel or fast-food restaurant, as well as the impact of utilising robotic systems on the standard of guest service. Moreover, researchers also examined the possible effectiveness of work with robotics help (Ivanov and Webster, 2019). The Hema restaurant in China was among the first to employ automation in the kitchen department. These automated systems cooked fried rice totally independently in the kitchen, allowing the kitchen workers to serve the customers in the most efficient manner possible (Bhardwaj, 2018). Moreover, several different outlets also opened with the same mindset including places where robots preparing noodles (Elkins, 2015), sushi (Sushirobo, 2016), sausage (Filloon, 2016), and burgers (Momentum Machines, 2016) with this approach, managers and owners may reap significant benefits from the enhanced use of technology in their workplace, as well as save operating expenses. It's also worth noting that the Covid-19 epidemic has been a major motivator for businesses to adopt modern technologies (Singh et al., 2021).

In one hand key industry figures believed that low-skill, low-wage employment such as kitchen helpers, preparers and dishwashers would soon be automated, allowing businesses to save money (Wirtz et al., 2018), moreover, important industry executives feel that employees who stay after the installation of robots must begin to enhance their abilities since hotels and fast-food restaurants will soon begin to focus on providing customers with a constant level of service and robots are the most consistent way to secure this approach and on a long term base the usage of the robots will decrease the high number of the employee turnover (Kuo et al., 2017, Huang and Rust, 2018).

### *2.4. Background to the primary research context*

Due to the fact that the development must fulfil various standards, the Hotel and fast food corporation is one of the laggards in terms of incorporating new technology into the system (Fisher and Beatson, 2002). In terms of technological adoption, kitchen departments are one of the least developed industries. The kitchen departments have a variety of ways to incorporate modern technology, since the twenty-first century offers a plethora of inventions that may be found

in these hotel departments (Bhardwaj, 2018). The extensive application of technology in the kitchen may provide a really amazing outcome, as both productivity and professionalism can be greatly increased. Few hotels, such as Henn na Hotels, have already included the prospect of robot use into day-to-day hotel operations, resulting in improved human-robot collaboration (Reis et al., 2020).

### 2.5. *Conclusions*

The purpose of the article was to highlight the critical factors of technology adoption and dissemination in the everyday operations of fast food and hotel kitchen departments. The study aims to highlight one of the theoretical framework's most intriguing notions. The author's goal in the empirical review was to highlight how diverse currently existing instances are implanted and embraced technology. The researcher was also interested in filling a gap in the area of kitchen department technology deployment.

## Chapter 3. Methodology

### 3.1. *Research aim and objectives*

This study aims at investigating critical components of modern technology (robotics) deployment in the fast food kitchen context.

The paper's objectives is categorised into three pillars:

1. To examine the diffusion of innovations in the fast food restaurant kitchens
2. To identify potential obstacles to robotics technology application in the kitchen department
3. To identify the technologies that may apply for inception in a kitchen department of fast food restaurants

### 3.2. *Research approach*

The application of robot technology to the fast food industry, with a concentration on the kitchen department, will play a critical role in the industry's future. Since this qualitative technique fits the researcher and a small group of experts has the potential to provide essential information about the article, the researcher must perform qualitative research (Creswell et al., 2007). Moreover, the study uses the case study design for the paper as that would be the perfect fit to conduct research in small groups (Merriam, 1988). In a study by Buick (2003, cited by O'Connor and Murphy, 2004) new technology implementation methods in the fast food business are often slower than in other industries. The research strategy must correspond to the paper's objective, and if the author considers the

paper's goal, the qualitative approach is the most appropriate to use in the study (Veal, 2016). Since the paper focuses on giving a very precise view of why technology implementation is important in the kitchen department, the qualitative approach is the most appropriate for the paper (Miles and Huberman, 1994). The study focuses on using the approach of pragmatism as it is seeking for information to understand how effective and what type of experience the users are gaining while they are using new technology. Individual data is a crucial point in this article that is the key to a successful technology implementation (Miles and Huberman, 1994). Additionally, the article wishes to comprehend the individual's requirements as well as gain knowledge from the participant's prior experiences (Merriam, 1988).

### 3.3. *Sampling*

The author opted to use the purposeful sampling strategy in the study. Since this purposeful sampling strategy is extensively used in the field of qualitative research and is a highly valuable tool for identifying the most thorough and significant data from a restricted resource, the author decided to utilise it (Benoot et al., 2016). The sampling method allows the researcher to identify individuals or groups with the most experience in the subject in which the author would like to conduct research (Palinkas et al., 2015). Purposeful sampling is a terrific tool for the author to use in this article, but it comes with its own set of issues that the author must evaluate and account for during the investigation. The profile of the sample group would be determined that the author is looking for individuals that have minimum of 5 years of working in the fast food preparation, with that the researcher could have valuable data. The variances between the probing individuals or groups are not always known by the conductor at the start of the sample, and as a result, the response range is not always large enough (Coyne, 1997). It is necessary to set a goal to obtain relevant data from the persons who have been questioned in order for the process to be an accomplishment (Palinkas et al., 2015). Additionally, re-taking the sampling with individuals or groups might be a beneficial step for the author, since this technique can help the researcher obtain more exact data (Palinkas et al., 2015).

### 3.4. *Data collection*

The author believes that the focus group method of data collecting is the most appropriate for the study. Since of this, the author can employ interview tools with this form of data gathering approach because it allows them to ask questions of the examined group (Morgan, 1996). The focus group moderator asks the probed group an

already prepared question, and the main benefit of this approach is that the moderator has the ability to acquire more information from the group by gathering comments from the group (Paradis et al., 2016). The focus group approach allows you to comprehend and investigate the group's distinctions. The most easiest approach to gauge opinion with this method is if the focus group has 8-10 members and the maximum amount of information can be extracted with this number (Paradis et al., 2016).

### 3.5. *Data analysis*

During conducting the study, the researcher employed semi-structured interviews, one of the most frequent interview techniques in qualitative research. (Campbell et al., 2013). As the article is using semi-structured interviews, the researcher chose structural coding which is a question based code, it helps to determine the most valuable data from the given data set, which would be a great asset to conduct the research (Saldaña, J. 2021). One of the main purposes of that research analysing data is to find out the patterns are in the given data set. The article uses thematic analysis which is a tool “to identifying, analysing and reporting patterns”, otherwise thematic analysis is a crucial tool for researchers to find correlation between the given answers (Vaismoradi et al., 2013).

### 3.6. *Trustworthiness*

The author to ensure the transparency of the research would use the process of the audit trail which method was developed by Lincoln and Guba (1985) the method minimises the bias of the research as the method requires two separate parties where the second party analyses the methods and decisions of the first party. Moreover, the author of the article will implement the method of triangulation, which is a key method to stand against bias as of the nature of the method, which is that the conductor of a research examines a data set from various perspectives using a minimum of two different methods (Oppermann, 2000). Although, the implementation of these methods would already ensure credibility of the study, it is still worth to mention that the research would also implement member checking which gives the possibility to the conducted group to analyse the questionnaire and that they could also have a look on the other participants answers to make correlations with similar experiences (Birt et al., 2016).

### 3.7. *Ethical issues*

In the societies of attorneys, researchers, and legislators, ethical problems are a key driving

factor in the conduct of research on human participants for many years (Creswell, 2014). The Helsinki Declaration provides foundations for how the study must treat the participants ethically (Yip et al., 2016). The purpose of utilising human volunteers is to make data collection simpler. Additionally, the researcher is responsible for safeguarding the participant's secret data and personal information. The Belmont report, according to Yip et al., (2016), contains three pillars in which researchers must apply ethical norms.

- Respect of persons: The importance of safeguarding and acknowledging various forms of sovereignty.
- Beneficence: The researcher must aim to maximise the advantages while minimising the risks as much as feasible.
- Justice: The researcher must consider the potential of justice at all levels, including private and institutional.

The application of the ethic to the researcher plays a critical role in the development of the researcher's professional behaviour. (Creswell, 2014). Moreover, the conductor must present participants with the option to withdraw from the program if they believe they do not have any further value to provide, as well as the conductor must indicate and the attendees must recognize that participation has no negative consequences for them.

### 3.8. *Limitations*

Since the fast food sector is trailing behind in adopting new technology, there may be severe restrictions on how quickly new technologies may be implemented. Another key limitation is the fact that the hospitality sector would not give out the most recently integrated technologies, as this is a key component of their competitive advantages. If a competitor learned about these sources through research, it could have a significant negative impact on a company's advantage. Nevertheless, the focus group might indicate a study drawback since the approach does not give completely clear information because the vast majority of participants hold biases toward particular worldviews.

## **Chapter 4. Discussion**

### 4.1. *Introduction*

The use of robots in the hospitality industry became a hotspot in the modern world due to the widespread use of technology in the sector, and several articles were published on the subject. It must be noted, though, that the majority of papers primarily analyse the widespread use of the



technology in the service department or the usage of AI and there is a lack of studies conducted in the kitchen department. The discussion chapter of this paper will attempt to provide a more detailed summary of how technology could be implemented in the kitchen department. Nevertheless, since the study excludes primary research, the author will rely solely on statistical data as well as on literature review.

#### *4.2. To examine the diffusion of innovations in the fast food restaurant kitchens*

The first objective of the study is to look closer to the diffusion of innovations in the fast food industry kitchen departments. In parallel it can be stated that if a fast food restaurant adopts an innovation in an earlier stage could make a relatively big strategic advantage.

Moreover, front-office staff may simply observe in those hospitality organisations that diffused innovation at an earlier stage achieved a significant amount of labour efficiency, and this model might be adopted in fast food sector kitchens as a means of acquiring a competitive advantage (Zebulom and Ile, 2022).

As one of the major contributors to food service innovation, the researcher must mention McDonald's as the biggest international fast food chain, and even in the earlier stages of McDonald's diffused massive innovations in their kitchen, such as the layout which revolutionised the fast food industry as well as McDonalds still a leading company of creating and implementing new technologies in their restaurants (Fontinelle, 2019). Hence, it can be stated that diffusion of innovation in an earlier stage could lead to a more efficient working environment. Moreover, it can be stated that earlier diffusers of technologies or inventors are in most of the cases the biggest opinion leaders.

#### *4.3. To identify potential obstacles to robotics technology application in the kitchen department*

The researcher identified as a suitable second objective to identify the potential obstacles of using robotics in the kitchen. The demand of applying technologies into the food manufacturing business recently increased with a high volume which created potential obstacles in the implementation of robotics technology. Implementation of robotics comes with an important number of challenges which are currently unanswered, the researcher already mentioned the technology acceptance model developed by Davis (1985), this theoretical framework could give a good starting point to identify obstacles of application of robots in kitchens, as end users of new robot technologies

in the kitchen are very sceptical about the benefits of the kitchen robots which drives that these users are only willing to adopt the new technology phenomenon if they find clear and compelling values (Lusk et al., 2014). The perceived ease of use and usefulness is also could be mentioned as a major driving force to apply technology into a department as a correlation can be drawn between front office users and kitchen staff (Wang & Qualls, 2007). Moreover, one of the major obstacles of implementing robotics to the kitchen is the cost of the automated robotic systems as this new technology phenomenon is very costly due to the reason that the technology is still in its adolescence phase and may be an obstacle as well that implementation of these systems is sometimes prohibited by the governing bodies (Bader and Rahimifard, 2018). That may state robotics implementation has a massive potential, however currently many obstacles pulling back the widespread of the technology implementation in the kitchen department, the diffusion of the robotics technology may be applicable already in fast food chains as of the cost and the acceptance of the end-users are very low the widespread still not started.

#### *4.4. To identify the technologies that may apply for inception in a kitchen department of fast food restaurants*

Last objective of the article is focused on the identification of new technologies that may be beneficial to implement in the kitchen of fast food restaurants. As the researcher already mentioned in the reviews of the empirical research that the covid-19 world pandemic had a great impact on fast-food and hotel business started to implement new technologies (Singh et al., 2021). Major technological innovation which could be implemented in the fast food industry that the usage of automated kitchen robots which as an example of Hema restaurant in China was already mentioned in the empirical research where automated cooks were able to prepare not that complicated procedures which would be also suitable for fast-food outlets (Bhardwaj, 2018). Another key component where fast-food restaurants could potentially start thinking about the implication of robot technology is in the low skilled low wage sector of kitchen helpers where automated cleaning robots would be a perfect match and business could save a huge amount of extra cost (Wirtz et al., 2018). Although the widespread implementation of new technologies into the fast food industry is not yet diffused the currently implemented technologies help a lot to the restaurants and it reduces the cost with a high volume. If in the future more technologies diffuse it may bring huge strategy advantages for the companies that implement in an early stage.



#### 4.5. Conclusion

It can be stated that several studies were made on technology implementation in other fields in the fast food industry rather than the implementation into the kitchen. However, useful statistical data about implementation of technology to fast food preparation could be also found, the diffusion of the technologies to the preparation is slow, as it could be stated to generally to the whole industry, that effect may have a change in the future if corporations would work closer to each other.

Hence, unanswered obstacles could be easily found as many kitchen professionals are sceptical about implementing new technologies into their daily operations.

New technology developments are rising as many people prefer robotics touch rather than human touch in food preparation, due to this effect of the recent pandemic, most of the key companies of the industry are researching and developing new technologies. That can be stated if the current pace of the new technologies will last in the foreseeable future, that will bring a completely new point of view to the industry.

### **Chapter 5. Conclusion and Recommendations**

The use of many types of modern technology in the fast food chains can play an important role in the future growth of the industry. The future trend of utilising new technologies will play an important role. Due to that reason, diffusion of innovations is one of the best benchmark tools to analyse the popularity of certain technologies. If a fast food chain implements a technological novelty in the early stage it can have an impact on the whole industry (Dearing and Cox, 2018). As examples can be mentioned McDonalds which is a company that diffused technology always in an early stage and became the number one fast food chain in the world, that example shows how significant it can be to adopt technologies in an early stage. A key driving force that can influence the implementation of new technologies is the strategic advantage that a business receives after implication of a new technology. The technological acceptance model (TAM) developed by Davis (1985) is a great indicator for fast food business to evaluate how the employees have the intention to use a certain technological innovation through the perceived usefulness and perceived ease of use. It could be stated that the use of the TAM model is a useful tool for fast food business to evaluate and to provide useful insight for the developers to adjust the technology to the needs of the users. However, currently it causes a big issue that the

technological innovations are not yet diffused which lead to a lack of information on certain innovations. To be successful in implementing innovations the current costs need to be cutted and users and the deciding bodies of the government have to be more open-minded on implementing different innovations. Moreover, the findings revealed that the complex tasks in the kitchen are still an unsolved problem for robotics developers. If the industry overcomes these few challenges then the TAM will be a useful tool to give real insights to developers. The significance of implementing new technologies is huge in the fast food industry, as if a company is a pioneer in its own field it can generate more revenue which leads to more profit, which is what every company is looking for. During the covid-19 company the importance of applying new technologies got even more significant as the people's needs were changed and the majority preferred that fast-food chains reduce the human touch to the lowest possible to stop the spread of the virus. The successful companies in the fast food industry were always the ones that followed the path of the technological revolution, which makes the point that implementing and accepting technologies are a crucial driver to create and sustain a profitable business.

Future research will need to place a greater emphasis on the constant adoption of new technologies, as well as the relationship between new technologies and the fast food industry (Law et al., 2019). The implementation of new technologies, particularly robots, has significant limitations, and future researchers and authors must focus on what effects robotisation can have on the labour market. The interconnection and balance of human-robot work is a critical part of the topic's observation, and the proper assignment of tasks between these two workforces is critical (Osawa et al., 2017). Hence, future research must also take into consideration the fast developments in the field of applied technology in the fast food production units in order to justify conclusions that reflect contemporary operational realities. Moreover, as a limitation people's aversion to new technologies during the adoption of emerging technologies could cause issues in the installation phase. The author suggests that the future researchers may focus on finding detailed evidence on organisational level how the acceptance of technology can be changed as it is one of the key limitations of the widespread in the technologies. The issue roots back to that the workforce are unable to use or accept the new technologies phenomena. Besides, these recommendations in future studies may focus on how more complex duties could be allocated to robotics or how human labour could work in a synthesis with the

help of robotics as currently, it pulls back the diffusion of the technologies in the fast food industry focused on kitchen. Employees are unable to work together with new emerging technologies as a result of the pull back.

Additionally, while implementation is not yet required for fast food cooperation and these companies could stay competitive on the market, the traditional style remains the predominant approach, as a result that on organisational level the fast food chains are unable to train their workforce to work with novelty technology. On the top of that, limitations can be drawn as Reis et al., 2020 stated that diversified opinions are still dominating the industry on whether technology development is always advantageous or not, future researchers should find the harmony of how technology and tradition may work together. The study found out a drawback as that the major fast food and hospitality business are not willing to share their competitive advantages or new in-house developed technologies as until they have a trademark on a particular technology development it gives them a pink ocean strategic advantage, this will limit the widespread of technologies as others needs to figure out a different way to react on the competitors technology development which takes time and that cause a lag in the diffusion of technologies in the fast food industry.

Moreover, the focus group method used in the methodology could create a limitation as it cannot provide a totally honest summary of the opinion of the people as many people are following a certain worldview which creates bias during the conduction of the surveys, that certain worldview influences the answers which leads to a totally different outcome. It is worth mentioning that people could also have some type of inhibition which can come from their workplace or could be that the society generally requires a certain answer which inhibits people to tell their honest belief.

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