Automation in the Hospitality Industry

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Abstract

Hospitality is an industry which is heavily reliant on human interactions to perform most daily tasks to keep an establishment running.

Replacing the human workforce with autonomous technology seems cold and hostile, but due to the recent downturn in the hospitality industry worldwide, such methods and practices need to be put in place.

The aim of this dissertation is to analyse all the benefits and detriments that come with automating a humanitarian system, and determine if such actions are feasible or not.

Such methods might be quite controversial, so the aim of this dissertation is to gain the public's personal opinion on such matters and determine what is the best outcome.

Keywords : Automation,Human interaction, representative,establishments

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DECLARATION OF AUTHENTICITY FOR BACHELOR STUDENTS

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Title of Long Essay: Automation in the Hospitality Industry

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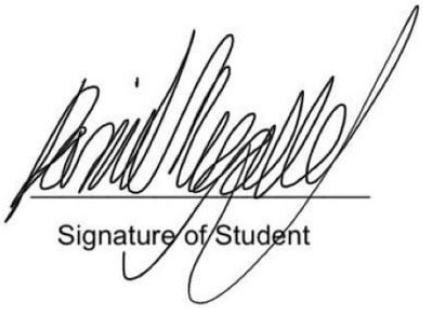

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Chapter 1 - Introduction

"Once safely on shore, we found out that the island was called Malta. The islanders showed us unusual kindness. They built a fire and welcomed us all because it was raining and cold"

ACTS 28:1-2

The above extract from the bible, proves that hospitality in Malta, although not yet formalised as an industry, has been with us for almost two thousand years, and probably more. After all these years, the welcoming charm of the local community has remained a hallmark and is a key competitive advantage when compared with overseas competition. It is good to note that the genuine human welcome that the Maltese are capable of showing, is something that can never be automated.

Automation has indeed gone a long way in helping the country to enhance its level of hospitality.

The aim of this study is to analyse how automated systems can be implemented in the hospitality industry. This will be done by taking into account various key issues such as the impact on customers, on employees, and the investment model in general. Furthermore, this research will delve into the detail of various forms of automation within the industry, ranging from robotics, enhanced marketing techniques, and the ever growing use of personal smart phones with the ultimate aim of answering the principle research question of this dissertation: "What is the impact of automation in the Maltese hospitality industry?".

Chapter 2 - Literature Review

2.1 Introduction

The literature review will explore various topics - all related to automation and the hospitality industry - to create a sound and well-rounded foundation of background knowledge which would aid in formulating a more structured and knowledgeable approach to investigating the inherently multifaceted nature of the industry. The literature review, whilst extensive and technically detailed, chiefly encapsulates and represents the two principle pillars of the industry: people (including employees and customers), and technology.

2.2 - Automation

Automation is the process of using robotics and machines in order to carry out repetitive operations and functions,thus encouraging workers to do other duties at the same time (Agilysys, 2019). As a result of this, new technological innovations have revolutionised many industries especially the hospitality sector.This can be seen being widely adopted through various mediums that would improve consumer loyalty and employee productivity (Agilsys, 2019). The main aim of automated methods is to construct an ecosystem that is entirely computed using numerous integrated automation structures.

An automated method can vary in complexity from physical robotics to software. Such systems are normally categorised as a form of digitisation, which is the process of converting non-digital material into digital data. For instance, converting handwritten letters into email. Digitalisation has been around for almost a century

(Casella, 2020), and through new technological automated methods work hand in hand to push the technology forward.

2.3 - Impact on Employment

The introduction of automation within the hospitality industry has created many opportunities and benefits to customers, to employees, to management, and to shareholders. Employees have been known to have a greater job satisfaction as a result of automation, as the more boring and mundane jobs started to be handled by machinery (Frey & Osborne (2017). But it is not all that rosy, as Frey & Osborne found. Their study, which was one of the early researches on AI and its impact on employment, concluded that 47% of activities which were linked to employment, were at a high risk of being lost to automation within the next two decades, and that the salaries were inversely proportional to the probability of automation. Differently put, the more automatable one's job is, the lower it is paid (Frey & Osborne, 2017).

In 2019 the Organization for Economic Co-operation and Development (OECD) published new data on the effects of automation and AI on job security.The study concluded that there is a chance of work restructuring, although it may vary from country to country. 14% of jobs will probably be completely automated, whilst 32% will undergo a significant change (El Hajal et al., 2020).

Are jobs within the hospitality industry truly threatened by automation ? It is recognised that since face to face exchange between guests and hospitality professionals is vital, the hospitality industry remains highly labour intensive.

For these and other factors, managers give importance to placing workers at the forefront of the attention of an organization (Saviotti, P.P., 2018).It was noticed that

the human aspect is what makes a product distinctive and what differs between one service provider and another.It is argued that thanks to rapidly changing technology and resources, managers will be free from activities considered difficult or boring, and will thus concentrate on activities that are seen to be more stimulating. Consequently this will result in reduced human resources costs, increased job satisfaction and more satisfied customers.

Notwithstanding the aforestated, some argue that the advent of automation is truly a threat to jobs within the employment sector. There are various arguments in favour or against this statement. One must however realise two important points as follows.

Firstly, automation is typically directed at the more routinuous work which, studies have found, tends to alienate people. This means that forward looking employees are more likely to welcome the advent of automation since it liberates them to focus on their creative abilities and to develop an enhanced customer experience. Secondly, jobs are not truly lost but changed. If jobs are lost within one sector, this in turn serves to open up new opportunities for employees within the automation industry such as new career paths for project managers, programmers and IT analysts. But in truth, the focus of this analysis is on the hospitality industry, where jobs can truly be lost (Carbonero et al,2020.).

2.4 - Impact on Customers

Many industries are adopting automation of service processing and are shifting the balance of service co-production from employees to customers. This creates a more commoditised and digitised economy (Bolton et al., 2014). Where human touch was once regarded as a source of competitive advantage, nowadays there is a

movement away from the human touch and this is particularly evident in the realm of hospitality (Lallement and Fox,2000). It is acknowledged that technology is rapidly becoming accepted as meeting the needs of both organisations and guests (Nizri,2016).

While decreased human interaction in service may increase efficiency and lower costs, it may come at the expense of the value of the customer when hospitality is removed from experience. It can be claimed that you can not exclude hospitality from the hospitality business, and that only humans can provide hospitality (Rae, 2016). In reality, hospitality was founded on compassion, genuineness, goodwill and reverence for human contact (Mody et al., 2019).

In a commoditised and intensely competitive environment, this can evoke an emotional bond that has a positive influence on consumer recall and can be a major differentiator. Moreover, the origins of hospitable service lie in the special relational connection of warmth and trust between hosts and visitors (Lashley, 2000). This indicates that human touch plays an important part in value- creation in hospitality. Thus, while technological implementation may make a major contribution to improved process performance, it also needs to fulfill consumer standards in terms of hospitality (Rae, 2016). The effect of automation on customers will depend on the various conditions that constitute the demand for hospitality.

Whilst the younger generation is thrilled to be welcomed in an environment of robots and hi-tech equipment, the older generation may think differently (Cheung et al,2003.) . Given that the establishment is keen to secure its market share, management must therefore take care to respond accordingly. One method is that of positioning the establishment as catering for a particular age bracket, with marketing

efforts being focused exclusively for the younger generation. This in turn will attract the type of customers that would be thrilled by the marvel of automation, thereby creating a competitive advantage in that respect. Another technique is that of allowing for a choice of delivery channels, possibly coupled by a differentiated pricing policy. Those who do like technology may choose to be served by a robot, whilst others would rather have the option of being served with the traditional human smile (Klieštik,2018). This approach will invariably leave a positive impact on customers, whoever they may be, provided of course that the logistics permit for the implementation of a dual channel approach.

Customers of a fast food chain are likely to welcome automation, especially if a part of the cost savings is passed on to the customer by way of cheaper pricing (Ong et al,2015). By contrast, a customer who is dressed up in his tuxedo and is set for an experience of fine dining with his partner for a pricey gala dinner, is unlikely to be enthused by the welcome of a robot. In conclusion, if management is capable of adapting to the nature of the event and to customers' expectations, then it is unlikely that one can go wrong (Ong et al,2015).

However, irrespective of the customer profile, it is very likely that automation in back office jobs will continue to reap benefits in terms of efficiency and cost savings (Stohr & Zhao, 2001). The customer experience is unlikely to be affected negatively insofar as back office automation is concerned.

2.5 - Impact on Management

Automation in the hospitality industry is likely to be beneficial for the smooth running of the establishment (dvvDVV,2019). Automated back office operations, as well as high tech marketing techniques, are likely to provide valuable assistance to management at a fraction of the costs (Huff,2015). The advantages and disadvantages of each must be weighed in comparison.

When employing people, management would need to face what is known as the “human element”, where employees can report sick, can call for higher wages, can call an industrial action, and can be characterised by staff issues and mood swings. By contrast, employees are often very understanding, flexible, and more appropriately nurtured to solve ad hoc problems (Vermeulen et al, 2018.).

When minimising the number of people and focusing on the introduction of technology, most of the above problems would cease to exist, only to then be replaced by other problems of a different nature (Roe,2019). Machinery, whilst “willing” to work 24 hours a day, seven days a week, can stop abruptly or can malfunction in a way that its repair can incur a high cost in terms of time and money, much to the disruption of the business and the anger of customers (Bessen and Kossuth,2019).

The key to the above issues, from a management perspective, is about business continuity planning (BCP) (Dey,2011). BCP is a branch of risk management, and serves to focus on the various if then scenarios which can disrupt the business, whilst taking care to create adequate mitigants that ensure continuity. In the case for

automation, management must be in a position to have a ready answer to each of the following questions and similar ones:

- How mission critical is the use of equipment? Differently put, if the equipment were to fail, how disruptive would the situation be on the customer and on the internal operations?
- Can failed equipment be replaced by a manual solution or by a human workforce at short notice? Is such a workforce readily available? Does it require specific training?
- Is there a contractually guaranteed time by when repairs can be carried out? How expensive is the cost of repairs? How reliable is the supplier? Does the repair of failed equipment rely exclusively on one supplier?

The use of equipment necessitates the employment of people who know how to service it and know how to operate it. How scarce is that skill? Is there an in-house back-up? Is there a reliance on one person who can operate automated facilities? And if yes, does the job market readily offer similar skills at short notice?

2.6 - Impact on Shareholders: Business Model

The choice of business model is something that the top management, as well as the main stakeholders would typically be involved in (Pettinger,2018). When setting up business, one can opt for a traditional hotel with little or no automation, and with a resultant heavy reliance on manpower. On the other hand, a hotel which relies on heavy automation would enjoy reduced costs in terms of manpower, but would then incur higher fixed cost as would be invariably necessary through the accounting for depreciation and maintenance (Sifter,2019).Some models within the hospitality

industry, vary substantially. A traditional restaurant without automation is likely to have a high variable cost, coupled by relatively few fixed costs.By contrast, a theme park would have many ride installations which rely on heavy machinery at a cost of approximately € 25 million per ride. Such a high level of automation would then necessitate a high level of fixed costs (Viswanadham,2002).

With such diverse models, one would expect different outcomes. During times of crisis, as happened during this ongoing pandemic, traditional restaurants either closed down or reduced their level of business, and were spared from the agony of declaring losses. This was due to their high reliance on variable costs which can easily be dismissed during times of low business cycles (Schwedel,2018).

By contrast, those institutions who invested heavily in automation, have found it more difficult to cope with a crisis scenario such as covid (Schwedel,2018). Whilst a worker can easily be dismissed, it is not so with heavy investments in automation, which must still be maintained and depreciated even if with zero customers (Cameron,2019). This would in turn lead to a scenario of painful losses.

By contrast, when the market conditions are favourable, those who had invested in automation would be typically geared to register higher profits when compared with traditional models (Speier and Venkatesh,2002). For example, if a traditional restaurant wishes to take in more customers, it must of course pay for additional labour, which, during times of favourable conditions, can be expensive (Salamons,2018).

2.7 - Technology Innovations.

Technology innovations have continually progressed through the centuries, making our lives easier. Many of us are reluctant to adapt and to familiarise ourselves with such new technology. Some see it more as a luxury than as a necessity. But this issue is not a show stopper, because as technology progresses so would our own standard of living (Krasadakis,2017).

Below is a selection of various technologies that can be implemented within the hospitality industry ;

2.7.1 - WIFI 2.0 / 5G.

A strong internet access service is now an inevitable essential requirement and is no longer seen as a luxury (Pearcy,2019). It is advantageous not only to the clients, but also to the workers and the company to introduce a good WIFI network within the organization (Pearcy,2019).

Most of today's computer systems will often operate online and will need a WiFi link to function properly (Helix,2018). This will decrease the workload on workers by introducing a good high-speed internet and provide a better service for visitors.

A robust internet platform, as powered by a fast WiFi, would also help employees to provide additional information to customers as requested (Andrews,2014).. Many customers would typically ask basic questions such as the time of the next bus, or

hints for sight-seeing, or the opening hours of a particular shop. With internet and wifi connectivity at their fingertips, employees can nowadays serve the needs of such customers by answering their queries (Andrews,2014).

It must be noted that in this day and age, the majority of customers have their own smartphone, tablet, or laptop, where they expect a consistently fast wifi service.They also expect to not be charged for it (Dickens,2019). WIFI connectivity is not only necessary from the point of view of the tourist who is planning a holiday. One must bear in mind also that a number of guests are in fact businessmen who would need to continue working and communicating from the comfort of their own hotel room (Lehr and McKnight, 2018).

Wifi has now become a basic necessity, and is typically one of the first things that the customer would check before making a reservation (Krasadakis,2017). Boasting of a fast wifi is clearly not enough for any establishment. The wifi must truly be fast and efficient, because if not, there are likely to be adverse comments on platforms such as TripAdvisor. Today's customer is known to be more discerning, and would not treat any advert as a fact. Hence resorting to checking the reviews has become a standard routine before booking a hotel (Andrews,2014).

2.7.2 - Mobile Applications.

Mobile Applications allow guests to control all smart devices from anywhere. This can be easily utilised in the hotel industry where all electronic equipment can be controlled wirelessly from any given device (Djalovic,2019).

Most hotels are doing away with the traditional metal keys or card keys which were used to access guest rooms in the past (Djalovic,2019). Through a free download on the mobile phone of the guest, the mobile phone can in fact be used as a key to one's guest room. Any number of guests within the same room can enjoy the same services, thereby providing customers with additional "keys" at no extra cost. Such systems can also be controlled centrally for the better safety of guests (Wang et al,2015). One feature, for example, is that access to the guest room can be automatically disabled upon checkout, thereby ensuring the safety of the other guests that subsequently use the same room later on.

Mobile applications are not only useful for allowing room access. One key deliverable which is only possible thanks to current technology, relates to the availability of real time information such as hotel billing (Adukaite et al.2014). This means that if a guest was at the bar and has asked to charge the bill on his room number, he can instantly see real time itemised billing on his mobile phone, so as to avoid last minute surprises upon check out. The same would apply if the customer requests ancillary services such as ordering a newspaper or ordering food to be consumed in the guest room.

In reality, mobile applications are used for a variety of other purposes. Through the download of the appropriate app as provided by the hotel, mobile phones now have the ability to communicate with any device that receives commands via infrared light beams or similar technology (Ozturk et al,2016). Such devices include, but are not

limited to, the use of TVs, streaming boxes, air conditioning units, minibars, and safe deposit lockers within the hotel. Whilst some of these services are typically free, such as the use of air-conditioning units or the use of basic TV channels, it must be noted that some of the services can be subject to the payment of an additional fee.This would include the consumption of items within the frigobar, or access to premium channels on TV . With today's mobile technology, the customer can be prompted to authorise payment at point of usage. Payment can be instantly settled through underlying apps such as revolut, or can be added to the room bill (Ozturk et al,2016).

2.7.3 - Interactive TV

Interactive TV sets within hotel rooms have been commonly used since the early 2000s. Such TV sets would typically have the hotel's own channel which, through a passcode, would provide some of the features that have been described under the section for mobile technology (Goodman,2000).

Through interactive TV sets, one can experience a personalised approach, even with simple features such as "Good morning Mr John Smith" as appearing on the TV screen when switched on. Most interactive TVs also provide real time billing information, hotel information, tourist information, as well as access to premium TV channels (Chorianopoulos and Lekakos,2008) .

The latter would typically be authorised by a code using the TV remote. One disadvantage of interactive TV sets when compared with mobile phones, is that they cannot cover all the features that would otherwise be covered by a mobile phone (Goodman,2000). For example, they cannot be used for room access.

One advantage, however, is that since not all customers have a smartphone, or since not all customers are willing to download additional apps on their mobile phone, the interactive TV remains readily available for all guests irrespective as to whether they use a smartphone or not (Ursu et al.2008).

2.7.4 - Wireless Technology/Charging Stations.

Wireless technology enables the user to decrease the amount of contact with humans and materials. Most of these systems are being implemented as financial aids, security and power. A system that is being adapted right now is the use of QR scanning. Most mobile devices have an inbuilt scanner that would direct the user to necessary information (Willig et al,2019).

This technology is quite diverse, varying from wireless pads to facial recognition software, thereby enabling a safer and more sterile experience for both guests and employees.

It is with satisfaction that one notes that banks are typically co-operating in this regard, even by increasing limits for the use of contactless cards (Barnes,2002).

In turn, this has been proved to encourage usage, also in the light of covid-19 issues. It must be noted that use of cash and coin, or where the customer's credit card or cheque is handed over to an employee for processing, can create a situation which will serve as a health hazard for the customer and the employee alike (Lacmanović et al.2020).

2.7.5 - Augmented Reality vs Virtual Reality.

Virtual Reality is the process of encapsulating the user around him in a virtual world. This is done by using virtual reality headsets which enable the user to explore the world around him. This system is mostly used in attractions, where users get to experience virtual renditions of the real thing such as museums.(Ohlenburg et al,2004.)

This system is also being implemented on rollercoasters offering users to submerge themselves in an animated world. Such examples include Crazy Bats at Phantasialand, Cologne, Germany.(Jung et al,2014.)

On the other hand augmented reality combines the digital world with the real world. Many mobile applications such as messenger and Instagram use such software to create a fun experience through various animated filters.

2.7.6 - Artificial Intelligence - Overview

Artificial intelligence or AI, refers to the performance of seemingly intelligent behaviours by computer or machines. This is done by computing various algorithms into the systems to enable the machine to self-teach (Ivanov and Webster,2017).

AI is a computing software that is embedded in all sorts of electronic equipment from robotics, to mobile devices, example mobile virtual assistants like Alexa (Apple) and Bixby (Samsung) (Yang et al,2019)

AI is already playing an important role in the hospitality industry, primarily because of its ability to carry out human tasks for any prolonged duration, thereby eliminating human error and delivering a hundred percent efficiency every time. Moreover, AI has the capacity to assist with tasks like data analysis and data collection. It can also effectively “learn” and adapt to customer interactions. With hindsight this would allow employees to focus more on the guest’s experience and use the data collected to enrich the requirements of the various guests (Frankenfield,2018).

2.7.7 - Artificial intelligence - Case Studies

It is interesting to observe a typical case study of AI in action within the hospitality industry.The study is based on the Postillion Hotel group which encompasses six hotels and three conference centres in the Netherlands.

The group had commissioned the implementation of a robot with the name of Michiel. He, or should one say, “it”, is the artificial intelligence reservation employee at Postillion hotels.

Michiel provides a flawless response to all sales lead requests, and provides a personalised offer letter after taking into consideration a thorough analysis of all available data.

Michiel is also capable of reading an email and translating it into a quotation. It is linked to the hotel’s reservation systems and can make offers 24 hours a day, seven days a week. Its response time is usually a few minutes.

In just one year, Michiel managed to achieve a significant reduction in employee costs, and helped to increase turnover. As a result, many back-office employees

were asked to focus on delivering an enhanced customer experience through their own human touch. *(TEl Hajal and Bill Rowson – 2020)*

In a different case study, it was noted that in the year 2019, the Chinese e-commerce giant, Alibaba, opened a boutique hotel in Hangzhou, China, positioning it as a concept where technology meets hospitality.

Robot butlers make the rounds delivering toiletries and food, whilst guests can check in to the hotel using facial recognition instead of traditional keys. The hotel uses facial recognition of guests so as to allow access to rooms and elevators. *(Rahagoal, 2019)*

Hotel companies in Singapore also started testing facial recognition technology, and managed to link its database to the immigration authorities. The procedure is reducing check in time from five minutes to approximately one minute, this to the evident satisfaction of guests. *(Biron 2019)*

2.7.8 - Data Transmission.

Data transmission, also known as digital communication, refers to the data transmission from a dual or multi communication channel (Chang,2019).

Digital data formats facilitate the collection, analysis, management and manipulation of information by a company. It will therefore be easier to share digital data with a broad and diverse audience, including both humans and machines. Organizations can leverage a host of technologies such as the "Internet of Things " (IOT), artificial

intelligence, machine learning, virtual reality, cloud computing and more (Chang,2019).

These technologies, in turn, enable systems and equipment automation to help businesses make better decisions, carry out repetitive tasks and even operate with minimal human intervention or even without it (Mazanec,2017).

2.7.9 – Customer Relationship Management CRM

Customer relationship management (CRM) makes use of customer data and information, so that, through the use of technology, one would be able to analyse behavioural patterns through the customer life cycle (Zuneshine,2020). In turn, this would then lead to improved customer service, repeat business, and cross selling. Data mining has been with us since the turn of the century, hence early 2000s, but its underlying techniques have been fine-tuned since.

One pre-requisite for the implementation of a CRM methodology is the availability of a substantial amount of data about customers (Hardjono and San,2017) .This approach is typically not recommended for small businesses, but in the case of the hospitality industry, it would be recommended for large hotel chains which operate worldwide (Hardjono and San,2017) . Ideally, the collected data about the customer would go beyond the usual basic details such as name, date of birth etc. Ideally, customers would be willing to provide additional information such as role, place of work, reason for visiting the hotel, hobbies, or status (married, single etc).

Such data is then fed into data mining applications such as Darwin; SPSS Clementine; or Revinate, where prediction models are created on the basis of observed usage.

To cite one example, the application can observe that those guests who are in the executive grade, are within a particular age bracket, and who visited the hotel in a particular country for business purposes, have made use of the same hotel brand in another country for at least four times in a year (alem Mohammad et al,2019)

The application may also observe that once a year, typically during summer, the customer would call again with family, this time for holiday purposes. When such patterns are observed electronically, one can then create special offers which are specific to the customer and which are very likely to appeal. With the concept of customer segmentation, CRM can assist companies to focus on what is called “the segment of one” (alem Mohammad et al,2019).

This means that each customer has his own unique characteristics and can be targeted in a unique manner by tapping on the database of the entire hotel chain. In this respect, even the type of credit card as used by the customer, can reveal valuable information and can help us differentiate between those who have a student card versus those executives who typically pay with a gold or platinum visa card (Sigala,2005).

A CRM approach would not only enhance cross selling and up selling opportunities, but would also enhance the customer experience. With a CRM approach, the hotel would not send a special offer for a family deal, when the person had declared that he is single, or is a student, or falls outside the parameters of a particular age bracket (alem Mohammad et al,2019).

.By contrast, the customer would be provided with offers which are very likely to appeal. And this is indeed the process of transforming data into information.

With the advent of data protection legislation, one must of course be careful when collecting the appropriate consent forms. Such forms will typically authorise the company to use personal data for marketing purposes and to share the same with its own subsidiaries worldwide. Whilst understanding the value of data, some hotels have been known to offer a small gift, or a discount, or a free participation in a lottery, for all those customers who agree to provide them with information about themselves and to authorise its use for marketing purposes (Sota et al,2018).

CRM creates personalized experiences through segmented, targeted campaigns. For example, data from Revinate* has shown that a pre-arrival campaign run through CRM has a 57% open rate, where the industry average stands at a mere 20%.In digitised marketing, the term “open rate”, refers to the number of emails or messages that have actually been opened as opposed to deleted (Harrigan et al,2020). .The difference between results through the use of CRM, versus market averages without CRM, is called the “lift”. It is what truly provides a competitive advantage compared to other institutions who do not embrace the technology.

Aside from targeted campaigns, hotels are also using social media in conjunction with their CRMs to engage, communicate, and gather crucial customer feedback.

According to a recent survey by Capterra, retail is leading the way in CRM adoption and use, followed by business services, technology companies, banking, and manufacturing. While hospitality isn’t paving the way as a “top five” CRM adopter, it isn't far behind (Harrigan et al,2020).

2.8 - Automation in various Hospitality Establishments

2.8.1 - Theme parks/Resorts

Most of the afore-stated analysis had mostly focused on hotels and restaurants. But the hospitality industry covers other areas well beyond hotels and restaurants. This particular section shall focus on theme parks, also known as amusement parks. The difference between the two terms is just a matter of detail. An amusement park is a park which offers all types of facilities which are aimed at providing entertainment, typically with a family focus (Tho et al,2005). Whilst a theme park is a type of amusement park which, rather than being generic, would focus on particular themes for its various sections (Rourke,2020). For example, Disneyland focuses its own themes on past Disney films, with areas such as Mickey Toontown, and Star wars. By contrast, Europa Park had opted to base its themes on the various different countries, with areas such as the Swiss section or the Italian section. Santa's Workshop is another theme park in New York, where the Christmas theme is evident throughout. For the purpose of this analysis, the words theme park and amusement park, are interchangeable (Lyon R ,2005).

Within the hospitality industry, theme parks are probably one of the key examples where automation had to be embraced as a matter of survival (Gabe,2020). Whilst it is very possible to see a restaurant which shies away from embracing technological advancements, this cannot be so with the theme park industry (Gabe,2020). Theme parks thrive on competing through the latest state of the art technological advancements which are creatively built so as to ensure customer’s fullest satisfaction and safety.

The first early examples of amusement parks had no automation whatsoever. These parks consisted of areas which were built around the concept of family entertainment, all in the absence of technology. Areas included stands such as the one to throw the ring around a bottle, where successful participants would get a prize. Other stands included all forms of entertainment such as brass bands, jugglers, clowns, donkey rides, and fireworks (S Lock,2019).

As the years passed, automation started to reshape the definition of amusement parks, with Copenhagen taking the lead for such development. In fact, the oldest theme park in the world is called Bekken, in Copenhagen, which was established more than 437 years ago in 1583 (Travis,2011). Bekken is the typical example of an amusement park which owes its survival to the idea of embracing technology and automation. Today, Bekken has 33 automated attractions, six of which are roller coasters. With 2.7 million visitors per year, there is no way that Bekken could have possibly survived without embracing automation.

It is also said that the amusement park in Tivoli, also in Copenhagen Denmark, was the place which actually inspired Walter Disney to create his own theme park. Tivoli opened in 1843 hence well after Bekken (Travis,2011). Tivoli is another example where automation was embraced so as to give new life to the hospitality industry.

The argument here is that you can have a hotel or a restaurant which can opt to shy away from the concept of automation. But in the case of a theme park, automation has become an absolute must. The early theme parks which refused to embrace automation, were eventually forced to close their doors. This is being stated to the extent that some automated features are now mandatory by law and are installed in the name of public safety.

Automation in the theme park industry has accounted for exorbitant costs over the years, with one ride alone costing to the tune of 25 million euros (Buehler et al,2012). For example, Six Flags in America, has a number of rides, including nineteen roller coasters, so one can imagine the extent of this heavy investment in automation. This scenario has led theme parks to adopt business models which rely on technology, and are relatively not that labour intensive. In financial terms, such a model has its advantages and disadvantages, this due to the relatively high value of fixed costs as opposed to variable costs.

Imagine that there are no attendants to man the rides. In such a scenario, one could pay an entrance fee, enjoy the park, and then notice that 100% of the sales revenue as generated by that person, would be allocated as a contribution, primarily towards fixed costs, and secondarily towards profits (S.Lock 2020).

Now in reality, there would indeed be a number of attendants and a number of additional variable costs. But the typical model of a theme park, excluding its own restaurants, is always based on a high segment of fixed costs, and a relatively lower segment of variable costs (S.Lock 2020).. In turn, this would render the business to be very scalable, meaning that one can easily admit additional guests with an additional cost which is near to zero. Such a model is known to work perfectly well when the going is good. But during times of recession and low custom, as exemplified through the covid pandemic, such a model can lead theme parks to generate a loss, typically because of their high reliance on fixed costs.

Statistics for the year 2019 were very encouraging, with as much as 254 million guests opting to visit the world's top 25 theme parks. Disney parks alone account

for 20.29 billion US Dollars worth of sales revenue during that same year (Mine et al,2019).

.The global market for amusement and theme parks is forecast to reach $44.3 billion (€ 38 billion) by the end of 2020. (Markets and Sectors – April 2019). This information was however compiled at a time when nobody knew of the impending pandemic. In fact, the figures for the year 2020 are expected to be substantially different due to covid-19. (S Lock,2020)

Once the data for the year 2020 becomes available, one would be able to see the stark impact of automation through this particular business model within the hospitality industry. It is typically the case where automation can rocket your profits to the highest point, or can force you to declare losses. It all depends on circumstances. The circumstances of the year 2020 were different from those of the year 2019.

The closing down of such heavily automated establishments can be rather costly, but such is the impact of automation on this particular segment of the hospitality industry. In fact, two hundred and nineteen theme parks have closed down during the past few decades (Boshoff,2019). So whilst automation in theme parks can literally have its thrills, it also comes complete with a word of caution to the investor.

Automation within theme parks is probably one of the most versatile and one of the most creative, covering technical areas such as robotics, virtual reality, and the like. The main focus must however be on safety.

A typical case study would be the “Dalton Terror” at Walibi. This is a zero gravity ride where safety takes on board new standards. The faultless and precise upward and downward motion required is achieved using speed-controlled Leroy-Somer geared motors. These move the seats to the top of the tower prior to the free-fall phase before being safely and rapidly slowed by magnetic current brakes, independent of power supply. Signals from encoders fitted to each of the motors give feedback to the drives which are then re-transmitted to programmable logic controllers that control the safety of the entire system (G Lukken,2015).

2.8.2 – Casinos

As stated above, theme parks top the list of those establishments which must embrace technology as a prerequisite for survival. But automation does not stop there. For example, according to an analysis carried out by Fabian Beiner in his site called “replaced by robots”, it was noted that the future of a croupier at a casino, is very likely to eventually be taken over by robotics.(Fabian Beiner ,2019)

As a case study one can analyze the implementation of what is affectionately known as the “Tipsy” Robot in Las Vegas. “Tipsy is a mechanical arm which mixes cocktails that patrons order on tablet computers. The underlying message at the future-themed bar is that humans are irrelevant. This and similar concepts have led tens of thousands of people to strike, out of fear of losing their jobs (The Guardian2018).

There are various other examples of automation within casinos. For example, the new set up had catered for automated kiosks that can cash tickets for gamblers instead of having a fully-staffed cashier station (Liao and Wang,2018).

It being the mecca of casino gambling, Las Vegas would make the ideal case study. According to David Schwartz, automated technology is allowing casinos to earn more money by reducing payroll costs. Schwartz reports that gaming employees in Las Vegas, had represented 32 percent of all casino employees in the US in 1990, and this figure is now down to 23%. David Schwartz is a gaming expert and researcher at the University of Nevada Las Vegas, and his article was published in Forbes magazine (Fisk, 2012).

The 40 point gap between rising casino revenues and employee payroll, represents a significant boost to casinos," Schwartz writes in Forbes. "Casinos were able to achieve this increase in productivity by investing significantly in technology that allowed them to reduce the number of employees involved directly with gambling."

2.8.3 – Cruise Liners

Before the outbreak of covid-19, cruise liners constituted a major economic pillar within the hospitality sector. This can be stated in relation to the world in general, and Malta in particular. Due to its natural beauty and its strategic position, Malta is positioned as being a natural hub for cruise liners (Ivanov et al.2017).

The "Harmony of the Seas", which is the world's largest cruise liner, entered service during May 2015, and was built at a cost of 1.35 billion dollars. It can take a maximum of 6,800 passengers (Saltzman,2020).

Whilst the automation of navigation procedures has added a degree of safety to the passengers, it is probably the least noticed. What guests do notice, though, is the use of state of the art automation related to guest entertainment. As an example,

one of the bars on board, called the “Bionic bar”, is equipped with two robotic arms which can mix your cocktails in the most expert manner. Orders have to be keyed in on a dedicated i-pad which can be activated by swiping your room card (Ivanov et al.2017).

As part of this dissertation, a thorough analysis was carried out regarding automation in hotels, restaurants, bars, and theme parks. Cruise ship automation serves to combine all four together, coupled by the often transparent technology which is an underlying necessity for navigational safety. (Saltzman,2020)

2.8.4 – The roaming tourist

This particular section is authored with a focus on the Maltese tourism industry.

When the tourist lands on local soil, he is immediately greeted by state of the art technology. His first experience is through the Malta International Airport (MIA,2019) which is a state of the art structure embracing full automation as applicable.

When looking at the modern information screens at MIA, one may not be readily aware of the high level of sophistication which these screens represent. Plugged into these monitors, there is a state of the art Airport Management System (AMS), which was provided by SITA. SITA are the global IT providers to the air transport industry. Through such systems, flight information is more flexible to customise, thereby allowing for the better communication of information to passengers. (MIA,2019)

“With a seven million traffic milestone on the horizon, it is perhaps more important than ever to harness innovation so as to have access to real-time data to plan ahead, make timely decisions, and improve our agility in allocating the resources available in a way that enhances the airport experience for our passengers and the ease with which our team can perform certain day-to-day tasks,” said MIA Head of Innovation and Technology Ian Maggi, whilst thanking all those involved in the process of testing and gradual implementation of the intricate system.(MIA,2020)

The innovative MAS provides a dashboard which integrates various sub-modules both at land and airborne. Through the automated integration of these modules, management can provide timely information about flights, parking, and billing, thereby minimising human error. As part of its technology drive, MIA has also recently invested more than €1.2 million for the installation of photovoltaic panels, thereby contributing to the curb of CO2 emissions. Furthermore, MIA is also working on a new Baggage reconciliation system which provides for better luggage management to all partnering airports. The main objectives relate to the prevention of loss, coupled by additional security features (Lee et al,2018).

Upon arrival, the tourist is then typically greeted through state of the art technology through his mobile phone. The various apps serve to bring together the technological creativity of the various participants such as car hire, restaurants, and other service providers.

Apps such as electronic maps and location finders, further serve to harness the use of automation within the hospitality industry. Furthermore, as part of its ongoing efforts to promote Malta as a travel destination, the Malta Tourism Authority has developed a number of audio-visual materials and other resources that are available

free of charge and which provide assistance to tourists. This service is supported by a number of free wi-fi hot spots across the island (Neuhofer et al.,2012).

One typical service which is provided to the roaming tourist, relates to on site information at key tourist areas such as Mdina and Valletta. Traditional audio guides with headphones are now a thing of the past, as historic information and route finders are now available through mobile phones, either free of charge or at a minimal fee. The Malta Tourism Authority has also invested in electronic signage at various tourist localities in Malta and gozo. Through interactive screens, one can search for information about the particular locality where the module is located(Dickinson et al,2016).

All these services, tied together in a seamless manner, serve to provide an optimum level of technology and automation, as particularly intended for visiting tourists.

2.9 - Company Example - Radisson Red Brussels

Radisson Red offers a brand-new concept hotel that falls under the RHG Group (Radisson Hotel Group). Their first launch was implemented in the year 2017 in Belgium, Brussels. The concept of the Radisson Red Chain is to be inspired by the lifestyle of its customers. As a thriving hotel chain, Radisson aims their Red chain to boast a daring, living and inspiring design approach. “Radisson RED Brussels | Hotels Born Different.” *Radisson RED*, 2017,

As an establishment it aims to connect with a younger audience but still retain the traditional Radisson values. The inspirational concept intertwines the comfort of three and four star resorts that are merged with art, music and fashion. Different Red establishments not only show the creativity of the actual brand but also incorporate

elements from the local culture where the hotel will be situated. A good example of this can be seen in design elements of their first hotel, where depictions and illustrations of Rene Magritte and TinTin are found throughout the hotel. *(Radisson RED Brussels | Hotels Born Different." Radisson RED, 2017)*

Given the young diversity of the hotel chain, various automated technology innovations have been implemented from self-check-in kiosks to a self-check- in bistro. All of these are controlled through their mobile application OIU. The application allows guests to control their stay directly from their personal device. All the necessary information is presented to the guests through the app. This includes the locking mechanism of their room, check-in/check-out and ordering of any services and amenities. *("Radisson RED Brussels | Hotels Born Different." Radisson RED, 2017)*

Chapter 3 - Research Methodology

3.1 - Introduction

The research was analysed from both the general public's point of view and a select few of industry practitioners.This was also coupled by the work experience of the author, through various forms of analytical research, including web research and field research

The research was carried out by using various primary data collection methods which would provide a thorough analysis on the impact of automation on the hospitality industry, with a focus on the Maltese islands.In addition to this a pilot study was carried out by convenience sampling methods , so as to verify, that there weren't any faults in the interviewee and survey questions.

3.2 - Surveys

The first exercise took the form of surveys which was addressed to the general public. This was developed through google forms, and attracted a response from 140 people from diverse walks of life and with a mix of backgrounds and age groups.

The nature of this first exercise constituted a mix of quantitative and qualitative analysis. A number of questions had to be answered through the simple use of tick boxes, and that helped to provide statistical analysis as necessary, hence the quantitative aspect.

A number of other questions were however open ended, hence qualitative. In these cases, the respondents had the opportunity to disclose their opinion in a free format manner. Some people actually opted to write at length, and their in-depth approach helped to influence the authorship of this document and were observed and analysed. This is being stated also in the light of personal characteristics such as age groups and gender.

3.3 - Interviews

The second exercise took the form of one to one interviews with industry practitioners. A total of ten people participated in this exercise, which was qualitative by nature. Respondents were intentionally chosen to come from different backgrounds within the hospitality industry, including workers in the aviation,hotel, restaurant and healthcare industries. These ten interviews were carried out either telephonically, or by way of a webinar. The interviews were recorded except for those cases where the respondent requested otherwise.

3.4 - Limitations - COVID-19

The coronavirus outbreak affected most sectors of the world's economy. However, the hotel,leisure,retail and travel industries were the most hard hit.(Gursoy, D.Chi, C.G., 2020).

With the increase in case numbers at the beginning of the year 2020, the majority of hospitality establishments, as well as other businesses within the travel sector, had to shut down or drastically curtail their operations. In turn, this has forced establishments to declare redundancy and to rely on government subsidies.The government also provided financial incentives to Maltese residents to help the

hospitality industry as part of a wider recovery plan (MTA 2020).Thanks to the government allowance and to the lifting of some restrictions, the service industry started to operate again, whilst implementing new methods so as to reduce human contact as much as possible. Many of these were done by utilising technological advancements that help create a clean and sterile environment for the guests.

Chapter 4 - Results

4.1 - Introduction

Based on a thematic analysis of the interviews conducted, each main and sub theme will be introduced and their significance defined in connection to the main research Question :“How can automated systems be implemented in the hospitality industry ?”

4.2 - Organisation IT Systems & Back - office systems

4.2.1 - Backup Systems

A backup system is a secondary operating system that acts as a duplicate to the main system and is used as a replacement when the main system data is compromised, removed or damaged.

“Every establishment that relies on such automated systems, would have a backup system just in case something would go astray”.

Interviewee 4 - Digital Consultant (Hotel Industry)

Five out of ten of the interviewees stated that they work in establishments that use back-up systems. By having such a system all imputed data wouldn't be wiped allowing them to to provide a consistent efficient work flow for its customers.

One Mater Dei worker went on to remark that if an operation robot was operating on a patient and the system malfunctions, it can be too late until the system would be back on. Yes automation does decrease the element of human error, but a human can learn from his mistakes , a robot can't.

Hospitals are labelled as an enforced hospitality thereby the impact of malfunction needs to be analysed extremely seriously, for it can have harsh repercussions if not managed properly. When such systems are applied to establishments in hospitality that focus on service, the system wouldn't need to be as elaborate as a hospital and can be toned down.

4.2.2 - Computerised Maintenance Software

Computerised Maintenance Software (CMMS) is used to schedule,organise,track and optimize maintenance.The term CMMS originally just referred to basic word order management systems, but the technology has come a long way.

Now modern cloud -based CMMS software helps maintenance teams accurately record and track all maintenance work in a central location so as to ensure the optimum performance and efficiency of all linked equipment.

"All technological systems are linked to a mother system which provides daily analysis on components and software to the technicians"

Interviewee 3 - Systems Administrator (Aviation Industry)

The interviewee went on to say that such an advanced system allows them to stay on top of things and monitor all inventory and consumption. Through this it allows us to keep track of maintenance schedules, prioritize work and stay on top of the workload.

By utilising data analysis to spot trends and make informed decisions one would be able to connect and collaborate with the rest of the business systems through everyone's personal mobile device.

Seeing the positive impact that CMMS has at MIA, it can be highly helpful for such a system to be used elsewhere. Hotels and other various service establishments can adopt CMMS to ensure a high degree of upkeep rather than the conventional method, where generally any malfunctioning device is reported through guests and staff and then recorded to be later on amended by maintenance .

4.3 - Front Office Systems

4.3.1 - CRM Systems

A customer relationship management system's (CRM) framework offers a single location in which organisations can store customer's data, monitor customer experiences and exchange the information with other employees. This helps the organisations handle customer relations thus in return helping the organisation to expand. It is being analysed As a principal it acts as a data tracking system that helps maintain efficiency and provide the necessary help to guests.

All ten interviewees stated that they adopt a CRM system in their infrastructure.Be it operational,analytical or a collaborative System (Burns,2019) every establishment tailor makes a CRM system around their business to get an in-depth outlook on their customer base.

"With the use of CRM we are able to have a constant data analytics of the customer booking through our main website or through third party websites"

Interviewee 9 - Night Auditor (Hotel Industry)

The interviewee went on to say that although such a customer isn't seen by the customer first hand, this allows us to have daily updates on the customers' preferences and dislikes.

Without having such a system we wouldn't be able to keep track of all the information entering through the business. By having a system that allows this data to be tracked,staff are able to maintain efficiency and provide the necessary help to their users.

4.3.2 - CRS

A central reservation system is a system that allows employees and employers to manage all the bookings(hotel, resort apartments etc.) It provides establishments with all the important data such as bookings, modifications of bookings and cancellations and other important data such as revenue management and guest arrivals.

“We tailor make to our customers.We provide various reservation booking systems and computing systems so establishments can compute their business more efficiently.”

Interviewee 5 - Software Developer (Hospitality Industry)

The interviewee went on to say that such systems are more of a method of digitising the data on a computer system than automation in its true form.

Such a system can be tailored to one which would need manual input from staff members or one which would be done by the customer, example mobile check-in systems and check-in kiosks would both utilise such software.

Given the increase in self-check in systems it won’t be long before CRS software that requires manual input from a representative would become obsolete.

4.3.3 - Contactless Payments

Contactless payments systems include credit cards and debit cards, key fobs and smart cards or any technology that uses radio frequency identifiers and near-field details to ensure encrypted payments for smartphones and other mobile devices.

“ Due to covid I have seen increase in people paying with contactless cards vs cash “

Interview 2 - Receptionist (Hotel Industry)

All interviewees stated they take contactless card payments. This was also due to the increase in customers having mobile banking applications like Revolut and N26, which upon signing up deliver a contactless banking card and digital card where

users can pay through their personal smartphone. The technology behind this uses an NFC (Near Field Communication) chip which is embedded in most phones today. .

Given that with a card you are paying the necessary fixed amount without the exchange of any change improves on a cash system which involves a lot of touching.Thereby such a system is being made mandatory in many establishments so as to reduce human contact.Given that the money is seen as a digital currency and not physical, makes it harder for the money to be mishandled and should be adopted even after the pandemic is over.

4.3.4 - Mobile Applications.

Mobile applications are a form of program that can run on a handheld device, for example smartphones or tablets. The application is generally referred to as an app. Mobile apps also provide consumers with programs similar to those accessible on PCs. Many customer based businesses opt for a mobile application software, for it is more intuitive for the user.

Within the hospitality industry, mobile applications allow guests to control all smart devices from anywhere. This can be easily utilised in the hotel industry where all electronic equipment can be controlled wirelessly from any given device.

One of the main principles of such a system is to act as a digital concierge and reception thus allowing the guests to check - in and out as they please without the need for human interaction.

“The hotel was implementing a new mobile application system”

Interviewee 7- Maintenance Technician (Hotel Industry)

Two out of ten of the interviewees stated that within their establishment they provide an infrastructure that allows its users to navigate through the premises through their phone. Whilst eight out of ten stated that they did not have such systems but are intrigued with the concept and would consider implementing such systems in the foreseeable future.

4.3.5 - Self-Check -in Kiosks

Self-Check- in Kiosks are touch-screen systems that allow the user to check-in remotely without the need for a human representative. Such systems are commonly seen at airports but now are starting to be adopted in accommodation establishments to help ease employees on their repetitive tasks and focus more on interacting with the guest.

Two out of ten of the interviewees went on to say they use self- check- in systems in their establishments whilst eight out of ten of the interviewees didn’t. Eight out of ten of interviewees stated that such a system wasn’t needed for their establishment since their premises doesn’t see an influx of people or isn’t necessary for their operations, thereby preferring more traditional methods of check-in.

“ MIA has around 4 self -check- in kiosks “

Interviewee 3 - Systems Administrator (Aviation Industry)

The interviewee went on to state that the self check-in kiosks at Malta International Airport have been installed by the star alliance corporation to aid it’s customers to provide a smoother customer experience at the airport.

This is very vital given that check-in at MIA is still done through traditional methods where one would have to walk up to the airline customer service clerk that would check you in. The system is mostly seen being used mainly by business customers, where most demographics seem quite hesitant to use such systems and prefer the traditional method, to add on to this the system only works if you just have carry- on luggage.

If you are carrying any luggage that needs to be put into the hold of the aircraft, then one would need to check in the traditional way. Although such systems might seem antiquated compared to other international airports.Future plans show that Malta International Airport will have a complete automated self-check in system that would rival other international airports (MIA 2020).

Comparing the self-check-in system of Malta International Airport with self-check-in kiosks as used by Radisson Red as stated in the literature review,one notices a difference. Whilst the check-in systems are primarily there to assist travellers in attaining their boarding pass and checking in,the check-in kiosks at the hotel are their to provide the necessary details for the guest to check-in into their

accommodation.The system uses the same central reservation system (CRS) just as the mobile check-in.

We do live in a society where we take it for granted that everyone has a smartphone, but believe it or not only 35.12% (Metev,2019) of the world's population has a smartphone, so by adopting such a system establishments can attract non-users too.

4.4 - Emerging Technologies

4.4.1 - Robotics and Delivery

At the interface of computer science and engineering, robotics is an interdisciplinary research field. The purpose of robot technology is to build smart machines that can support people in their everyday life and protect others.

In the hospitality industry it is seen as a substitute for the traditional methods of using human representatives that provide a service. This system is already being adopted by using robot butlers where their main primary objective is to deliver belongings and food and any other necessary items to the respected guests *(Rahagoal, 2019)*. Such systems can take the form of more simplified devices such as facial recognition cameras and biometric scanners.This in turn would allow the guests to check in to the hotel’s facilities remotely without any aid from any human representative.

“an advanced robotic system named Mario that distributes medicine to the necessary wards and patients.”

Interviewee 6 - Customer Relations (Health Care Industry)

Three out of ten of the interviewees have adopted an automated system so as to deliver any materialistic goods. Such a system improved work and customer efficiency dramatically. On the other hand seven out of ten of the interviewees see such systems too costly to be adopted in their infrastructure.

Upon further examination it can be seen that many of the interviewees stated that such systems are implemented in their workplace because their indoor public service establishments for example Mater Dei and Malta International Airport, where there is a great influx of people entering the building, therefore such automated systems would be beneficial to their operations.

4.4.2 - Artificial Intelligence

Artificial intelligence or AI in short , refers to the performance of seemingly intelligent behaviours by computer or machines.This is done by computing various algorithms into the systems to enable the machine to self teach.

AI is already playing an important role in the hospitality industry, primarily because of its ability to carry out human tasks, for any prolonged duration, thereby eliminating human error and delivering a hundred percent efficiency every time.

Two out of ten exclaimed how adopting systems with Artificial Intelligence ,relieves employees from mundane tasks. This system can be seen being used throughout Malta International Airport where customer service points inform the person of any minute query they might have, thereby allowing customer service representatives to focus on situations which are more serious.

"Yes, I do with the increase in artificial intelligence and robotics we will probably see many jobs in the service industry non-existent in the foreseeable future".

Interviewee 10 - Owner (Tour Operator)

Eight out of ten of the interviewees though showed high levels of resentment to establish such a system at their place of work. This being that many see it as the epitome of robotics and technology that would result in the loss of many jobs especially those that work in the customer service sector.

4.4.3 - Pneumatic Tube System

The pneumatic tube system is an antiquated automated delivery system(Pragay et al,1980),that helps deliver items fast and efficiently within an establishment.

In the past this system was highly used to deliver files and documents, but now that most of our networking has been digitised many establishments have stopped using such systems in their operations.

Despite being antiquated, this research found that such a system is still being used in Mater Dei hospital, Malta's main hospital.

"Mater Dei holds the largest system of pneumatic tubes on the island, allowing staff to deliver packages in seconds through various departments."

Interviewee 6 - Customer Relations (Health Care Industry)

The interviewee carried on by mentioning that the initial implementation of this system involved a greater deal of manual intervention from its users, as it had to be operated using a combination of levers. However, with the aid of more contemporary technologies, users are able to define the destination of the capsule being delivered via such systems through a computer, which enhances efficiency, allows for better monitoring of capsules and more efficient troubleshooting. This service, despite not being formally a patient-facing one, aids the hospital in providing an overall more efficient service to its patients.

Pneumatic systems reduce human error and increase speed of delivery. This will in turn aid it's users to work more efficiently. By seeing that pneumatic tube systems have been of great significance in offering high levels of efficiency in hospitals throughout the years,such a system would be ideal to be erected in places that see a great influx of people on a daily basis. Such as theme parks and accommodation establishments. .

4.4.4 - Thermal Imaging

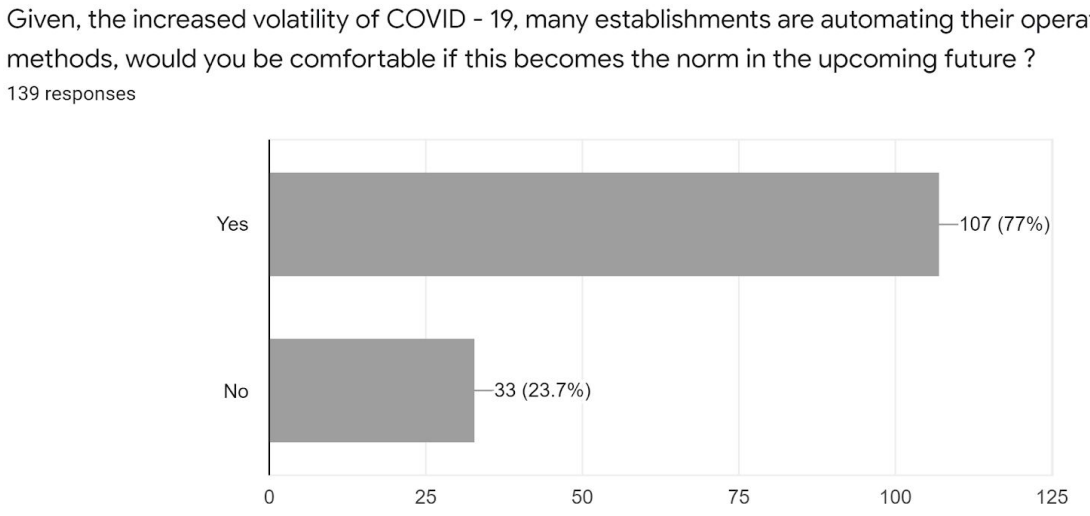
Thermal imaging is an automated method, where through constant infrared imaging the temperature of living and inanimate things would be displayed on a digital screen.

"given the outbreak in the beginning of the year we also installed a thermal imaging point at the point of departure"

Interviewee 1 - Aerodrome Officer (Aviation Industry)

This can be seen first hand, through the responses given by two out of ten of interviewees.These systems have been put into operation to handle the large quantities entering into indoor public spaces. The other eight out of ten use a more simplified version which is a handheld infrared laser thermometer, which when pointed at any surface would display its temperature.

Such systems aren't seen as common practice but given the present circumstances, many establishments are using such technology to fight the virus.



Seeing that 77% of the surveys feel that these safety methods should be kept in place, shows how the virus had such an impact on us being aware of our health,thereby having automed system that give us piece of mind that we are healthy is an assurance to us and a future way of mitigating a virus.

4.5 - Customer Experience

4.5.1 - Customer Satisfaction

Customer satisfaction is calculated through the level of satisfaction that is provided by the establishment.Verging from material goods to any form of service.

All Interviewees showed their emphasis on ensuring customer satisfaction to their guests. Most of which monitor their customer satisfaction through online platforms such as tripadvisor. In some cases, establishments implement a more engaging approach.

“This data can be obtained through various digital stands that display an engaging interface to acquire the satisfaction level of that particular customer”.

Interviewee 3 - Systems Administrator (Aviation Industry)

The interviewee followed this,by saying that when using such automated systems it allows staff to focus more on their daily tasks , instead of conducting research analysis surveys the traditional way. Then at the end of the day a personnel would analyse the data sheet and finalise the results in a daily data-report.

Through polls and customer feedback reviews,businesses can identify the strengths and weaknesses of their business, thus allowing them to improve their operations services or any malfunctioning items.

4.5.2 - Communication

Communication is becoming more important today as it is not only used for business, but is also used in our everyday lives.

According to the survey conducted to the public 57.2% showed that they are one to engage in extra conversation with the staff where 42.8% would engage with the staff. The pandemic might affect the study, resulting in people wanting to engage less with staff, but due to the exponential gap, proves that the operation of service can be automated . This can be easily seen in the many examples that the surveys gave to local and foreign establishments around the world.

70% of the interviewees stated that they use the two main forms of communication. Verbal and Non-verbal Communication.Between employees there was more of a tendency to use verbal communication, whilst a more non- verbal approach of communication is used with customers. This is completely undestable given the COVID-19 situation where stringent human contact regulations are being enforced by the health authorities.

“Sadly nowadays communication is becoming more non-verbal than verbal where a great percentage of the world’s population communicates through digital forms of networking.”

Interviewee 8 - Owner (Restaurant Industry)

The interviewee went on to show how in today's world, many people are being more desolate,relying on digitised content for short periods of dopamine, thus making us more reliant on our own devices rather than human verbal communication.
In the hospitality and tourism field, communication is not only used between the customer and the employees, but also used within the staff of the company.

4.5.3 - Human Interaction

Human Interaction is a psychological need that makes us feel like one's self. Through human interaction , a person would feel valued and wanted. This helps the person cope with any negative aspects of his life and have a more positive outlook on life.

60% of interviewees mentioned how human interaction is a crucial part of the hospitality industry. In some departments of service, this can be done but when a customer needs assistance you would always need some form of human interaction. Human experiences are vital to our customers as they show concern for actual issues, strive to understand their needs, give each customer personal consideration and care about hotel guests sincerely.

“I am a firm believer that human interaction is necessary for the development of social skills and for the well-being of the individual.”

Survey Response

The element of human interaction can never be automated, automation can act as a form of assistance to the representative offering the service, so as to ease his work load and spend more time interacting with the customer.

4.6 - Market Trends

4.6.1 - Job Retention

Retention of employees refers to an organization 's willingness to maintain its personnel. If employees feel a lack of fulfillment and loyalty to the employer this will lead the employee to react negatively and search for new opportunities.
This is also seen in the interviews when eight out of ten interviewees when answering the question;

> “As an employee/employer, do you feel threatened that you may lose your job or miss out on career opportunities because of increased automation ? “

This might seem counterintuitive but automation in itself would help retain employees decreasing staff turnover. Eight out of ten interviewees see automation in the hospitality industry as a way of being replaced and not see automation as a way that can be beneficial by offering a better working environment for the employees.This in truth would also help employers have a much lower staff turnover.

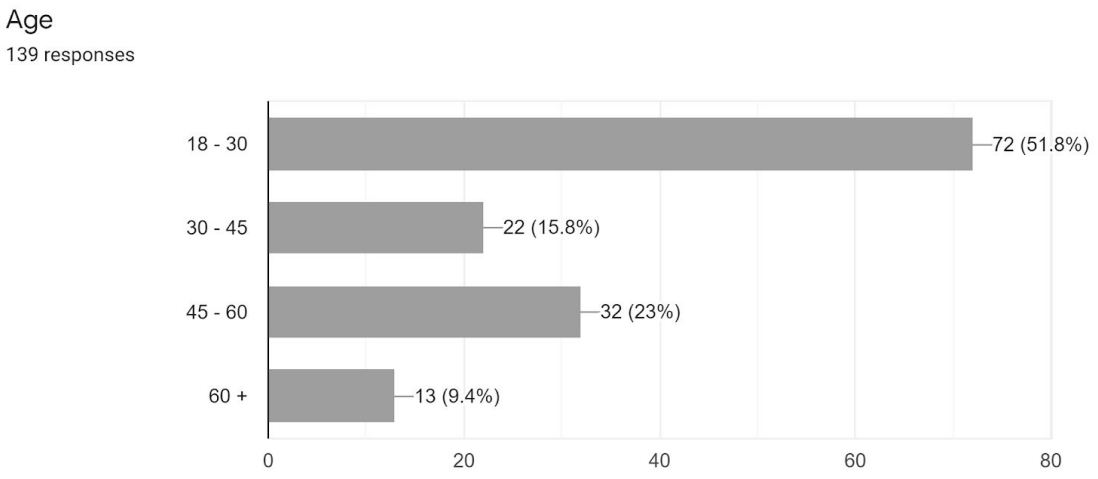
The other two see automation as a way to push their staff constantly and give them the flexibility required to create innovative production technologies amid an improved retention of employees. Hospitality is an industry which sees establishments with

exorbitant high staff turnover rates,so such automated methods would become extremely beneficial.

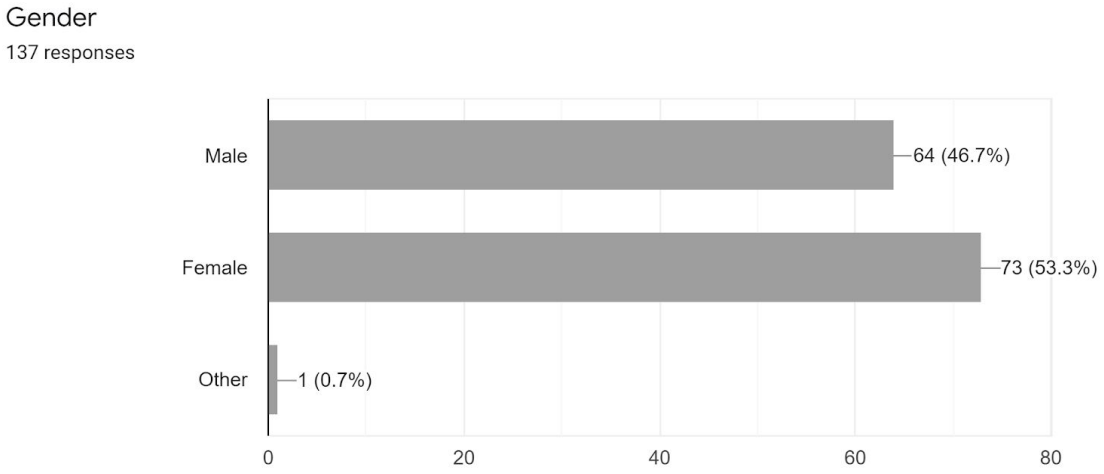
4.6.2 - Demographics

The term demographics is a way of segmenting the customer base that one is approaching. Demographics can be divided into various sections. Two of the sections are the age and the gender, which are the sectors I have chosen to analyse the survey demographics.

From a total of 138 surveys. 64 were male, 72 female and one other. Given that all surveys and interviews were done through online platforms and not through traditional methods,this resulted in a young demographic audience.



51% of the surveys were between the ages of 18-30. With half of demographics under the age of 30 the rest 49% were divided through the ages group between, 30-45, 45 -60 and 60+.



“It is hard to please all, but we conducted our own surveys to analyse the people’s experience on new pre-boarding scanners.The results showed highly positive remarks across a wide range of demographics”.

Interviewee 3 - Systems Administrator (Aviation Industry)

One particular interviewee showed that when they were conducting their own research, they found that even though the younger generations are more keen on using automated systems the older demographics are keen on learning and using such systems.

This was seen first hand at MIA at the pre-boarding departure zone, where older generations were having trouble scanning their boarding passes but through the help of human representatives they were intrigued and amazed by these new technological advancements and wanted to learn how such systems function.

4.6.3 - Marketing Trends

A market trend refers to the increase of particular customer patterns(Lee et al,2018). This data is normally examined through the increase of customer usage and financial gain.In conclusion, the adoption of automation within the hospitality industry, constitutes a strategic decision which must be taken with foresight and in a scenario of many unknown circumstances.

Five out of ten of the interviewees that were interviewed, stated that when researching methods so as to attract customers, they use various online softwares such as google trends to analyse what's popular right now and use the given trends to increase sales in their establishment. The other half of the interviewees did not mention any form of research to help increase their sales.

Upon conducting the surveys. This can highly be seen where 65% of the surveys are in favour of going to an establishment that is automated, whereas 42% are in favour of traditional methods.

In today's generation vast technological advancements are seen as marketing trends. Such systems include AI and VR technologies. Given also the pandemic outbreak an increase in automated systems in general is being adopted worldwide especially inside indoor public spaces. Given the marketing trends on such automated methods being purchased, the purchase costs are starting to decrease resulting in more and more establishments implementing such systems.

4.7 - Table of Themes

The table below is a tabulation and tally of the main and sub themes identified in the transcripts of the interviews. Considering that structured interviews were conducted, the main themes outlined below are also the area of interest upon which questions were based. The count is portrayed in a numerical form, so as to analyse the repeated frequency amongst all ten interviewees.

Main Theme	**Sub Theme**	**Count**
Organisation IT Systems & Back - office systems	Back Up Systems	5
	CMMS Systems	1
Front Office Systems	CRM Systems	10
	CRS Systems	7
	Mobile Applications	2
	Contactless Payments	10
	Self- Check in kiosks	2
Emerging Technologies	Robotics and Delivery	3
	AI	2
	Pneumatic Tube System	1
	Thermal Imaging	2

Customer Experience	Customer Satisfaction	10
	Communication	7
	Human Interaction	6
Market Trends	Job Retention	5
	Demographics	5
	Marketing Trends	1

Chapter 5 - Conclusion

As a result it evidently became clear that various sectors within the industry reacted differently to automation.

One of the key findings, as derived through research, is related to the impact of automation on customers. As stated in the introduction, the genuine human welcome that the Maltese people are capable of giving, is something that can never be automated. Nor can one attempt to automate creativity.

In the hotel and restaurant industry, it was noted that the focus was on the deployment of automation for the purpose of supporting the human touch, as opposed to replacing it.

Insofar as hotels and restaurants were concerned, automation was deemed to add value in assisting or replacing back office jobs or other positions which did not necessitate the human interface. The use of robots which assist or replace chambermaids was a typical example, since such work is usually carried out when the guest is away.

It transpired that young people would typically prefer to be thrilled by robots and high tech equipment which is preferred to the human touch. The older generation are more opposed to such ideas and would prefer more traditional methods.

It was noted that the majority of respondents (57%), were the type to engage in a conversation with an employee. This finding has revealed the importance of the human touch, because one evidently cannot engage in a conversation with a robot.

Through the afore-stated field research, it was interesting to note also that as much as 66% of respondents preferred using automated channels as opposed to manual ones. This is understandable, considering that the majority of respondents were in the 18 to 30 age bracket. It seems that the older generation have a greater preference for the human touch.

Apart from looking at customers, this study also analysed the impact on workers within the industry. Many were the employees who considered automation as a threat to their livelihood.The people who suffered most, where those whose job could be easily automated due to its repetitive nature. By contrast, those workers who were deemed to be necessary were retained by the institution, even after automation, elevated job satisfaction.Insofar as the latter category of people is concerned, staff turnover was found to be favourably lower. This was due to the fact that the work was deemed to be more interesting and less repetitive. Additional research which was carried out directly by the undersigned, sheds light on the issue, and forms an integral part of this work.

Automation within the hospitality industry, was analysed also from an economic perspective, leading to the creation of appropriate investment strategies. It was noted that where establishments opted for a high level of automation, their fixed costs tended to shoot up because of maintenance and depreciation. Such establishments also saw their variable costs being reduced, typically because of a smaller payroll. It was noted that investors in automation enjoyed higher levels of profitability within the right economic climate.

By contrast, when business was low, especially in view of the covid pandemic, those with such a high level of investment were the ones who were at greater risk of making losses due to their higher fixed costs.

In conclusion, it is clearly evident that the local industry has retained its warm touch of friendship ever since St Paul first landed on these islands. Over the years, automation served to contribute towards a better quality service, with a higher degree of accuracy, and often also with greater contributions towards profitability.

Recommendations

This research can be of aid, to any establishment within the hospitality industry. This allows owners and employers to gain an insight on automated infrastructures, so when they decide to upgrade their systems, they can have a clear view of what is best implemented in their respective establishment .

Limitations

Many people might see this pandemic as an obstacle in their tracks,but when it comes to focusing and writing a thesis, it felt that it was the most ideal situation.The situation did impose some restrictions though, especially when it came to communicating with the interviewees. All scheduled interviews were meant to be in-person, so due to the unforeseen changes arrangements had to be made to conduct them using other various techniques.

References

Alem Mohammad, Abdul, et al. “Assessing the Influence of Customer Relationship Management (CRM) Dimensions on Organization Performance.” *Journal of Hospitality and Tourism Technology*, vol. 4, no. 3, 27 Sept. 2013, pp. 228–247, 10.1108/jhtt-01-2013-0002. Accessed 27 Nov. 2019.

Andrews, Jeffrey G. “What Will 5G Be? - IEEE Journals & Magazine.” *Ieee.Org*, 2014, ieeexplore.ieee.org/abstract/document/6824752.

Barnes, Stuart J. “Under the Skin: Short-Range Embedded Wireless Technology.” *International Journal of Information Management*, vol. 22, no. 3, 1 June 2002, pp. 165–179, www.sciencedirect.com/science/article/abs/pii/S0268401202000038, 10.1016/S0268-4012(02)00003-8. Accessed 27 Sept. 2020.

Burns, Rachel. *3 Types of CRM Software: Which Is Right for Your Business?* 30 Apr. 2019.

Carbonero, Francesco, et al. “Robots Worldwide: The Impact of Automation on Employment and Trade.” *Www.Econstor.Eu*, 2020, www.econstor.eu/handle/10419/222392.

Chang, Robert W. “Synthesis of Band-Limited Orthogonal Signals for Multichannel Data Transmission.” *Bell System Technical Journal*, vol. 45, no. 10, Dec. 1966, pp. 1775–1796, 10.1002/j.1538-7305.1966.tb02435.x. Accessed 27 Sept. 2020.

Cheung, C.F., et al. “A Multi-Perspective Knowledge-Based System for Customer Service Management.” *Expert Systems with Applications*, vol. 24, no. 4, May

2003, pp. 457–470, 10.1016/s0957-4174(02)00193-8. Accessed 15 Mar. 2020.

Dey, Manik. “Business Continuity Planning (BCP) Methodology — Essential for Every Business.” *2011 IEEE GCC Conference and Exhibition (GCC)*, Feb. 2011, 10.1109/ieeegcc.2011.5752503. Accessed 29 July 2020.

Fisk, David. “Cyber Security, Building Automation, and the Intelligent Building.” *Intelligent Buildings International*, vol. 4, no. 3, July 2012, pp. 169–181, 10.1080/17508975.2012.695277. Accessed 23 May 2019.

Goodman, Ann. “Implementing Sustainability in Service Operations at Scandic Hotels.” *Interfaces*, vol. 30, no. 3, June 2000, pp. 202–214, 10.1287/inte.30.3.202.11653. Accessed 14 Dec. 2019.

Gursoy, D.Chi, C.G., 2020. Effects of COVID-19 pandemic on hospitality industry: review of the current situations and a research agenda.Vancouver

Hardjono, Budiono, and Lai Pooi San. “Customer Relationship Management Implementation and Its Implication to Customer Loyalty in Hospitality Industry.” *Jurnal Dinamika Manajemen*, vol. 8, no. 1, 23 July 2017, journal.unnes.ac.id/nju/index.php/jdm/article/view/10414, 10.15294/jdm.v8i1.10414. Accessed 26 Nov. 2019.

Hernandez, Dan. “Las Vegas Casino Workers Prep for Strike over Automation: ‘Robots Can’t Beat Us.’” *The Guardian*, The Guardian, 3 June 2018, www.theguardian.com/us-news/2018/jun/02/las-vegas-workers-strike-automation-casinos.

Jung, Timothy, et al. “Functional, Hedonic or Social? Exploring Antecedents and Consequences of Virtual Reality Rollercoaster Usage.” *Augmented Reality and Virtual Reality*, 7 Sept. 2017, pp. 247–258,

link.springer.com/chapter/10.1007/978-3-319-64027-3_17, 10.1007/978-3-319-64027-3_17. Accessed 8 Nov. 2019.

Klieštik, Tomáš. “WILL COGNITIVE TECHNOLOGY-DRIVEN AUTOMATION LEAD TO ECONOMIC GROWTH?” *Journal of Self-Governance and Management Economics*, vol. 6, no. 4, 2018, pp. 13–18, www.ceeol.com/search/article-detail?id=728036. Accessed 27 Sept. 2020.

Lallement, Yannick, and Mark S. Fox. “Interact: A Staged Approach to Customer Service Automation.” *Advances in Artificial Intelligence*, 2000, pp. 164–175, 10.1007/3-540-45486-1_14. Accessed 27 Sept. 2020.

Lehr, William, and Lee W McKnight. “Wireless Internet Access: 3G vs. WiFi?” *Telecommunications Policy*, vol. 27, no. 5–6, June 2003, pp. 351–370, 10.1016/s0308-5961(03)00004-1. Accessed 21 Mar. 2020.

Lock, S. “Amusement and Theme Park Attendance Worldwide 2019.” *Statista*, 2020, www.statista.com/statistics/194247/worldwide-attendance-at-theme-and-amusement-parks/.

---. “Topic: Amusement and Theme Parks.” *Www.Statista.Com*, Statista, 2019, www.statista.com/topics/2805/amusement-and-theme-parks/.

Metev, Denis. “39+ Smartphone Statistics You Should Know in 2019.” *Review42*, 30 Aug. 2019, review42.com/smartphone-statistics/.

MIA. “Malta Airport to Generate Even More Clean Energy through Investment in PV Panels.” *Malta International Airport*, 23 Sept. 2019, www.maltairport.com/malta-airport-generate-even-clean-energy-investment-pv-panels/. Accessed 27 Sept. 2020.

Ohlenburg, Jan, et al. “The MORGAN Framework.” *Proceedings of the ACM Symposium on Virtual Reality Software and Technology - VRST ’04*, 2004, 10.1145/1077534.1077568. Accessed 27 Sept. 2020.

Ozturk, Ahmet Bulent, et al. “What Keeps the Mobile Hotel Booking Users Loyal? Investigating the Roles of Self-Efficacy, Compatibility, Perceived Ease of Use, and Perceived Convenience.” *International Journal of Information Management*, vol. 36, no. 6, Dec. 2016, pp. 1350–1359, 10.1016/j.ijinfomgt.2016.04.005.

Pragay, D. A., et al. “A Computer Directed Pneumatic Tube System: Its Effects on Specimens.” *Clinical Biochemistry*, vol. 13, no. 6, 1 Dec. 1980, pp. 259–261, www.sciencedirect.com/science/article/pii/S0009912080800051, 10.1016/S0009-9120(80)80005-1. Accessed 26 Sept. 2020.

R, Lyon. “CAB Direct.” *Www.Cabdirect.Org*, 2005, www.cabdirect.org/cabdirect/abstract/19871842106. Accessed 27 Sept. 2020.

Saltzman, Dori. “5 Trends in Onboard Cruise Ship Technology.” *Www.Cruisecritic.Com*, 2020, www.cruisecritic.com/articles.cfm?ID=2379. Accessed 27 Sept. 2020.

Sota, Shikha, et al. “Customer Relationship Management Research in Hospitality Industry: A Review and Classification.” *Journal of Hospitality Marketing & Management*, 8 Apr. 2019, pp. 1–26, 10.1080/19368623.2019.1595255. Accessed 24 Apr. 2019.

Speier, Cheri, and Viswanath Venkatesh. “The Hidden Minefields in the Adoption of Sales Force Automation Technologies.” *Journal of Marketing*, vol. 66, no. 3, July 2002, pp. 98–111, 10.1509/jmkg.66.3.98.18510. Accessed 3 Feb. 2020.

Stohr, Edward A., and J. Leon Zhao. “Workflow Automation: Overview and Research Issues.” *Information Systems Frontiers*, vol. 3, no. 3, 2001, pp. 281–296, 10.1023/a:1011457324641. Accessed 4 Feb. 2020.

Vermeulen, Ben, et al. “The Impact of Automation on Employment: Just the Usual Structural Change?” *Sustainability*, vol. 10, no. 5, 21 May 2018, p. 1661, 10.3390/su10051661.

Vermeulen, B., Kesselhut, J., Pyka, A. and Saviotti, P.P., 2018. The impact of automation on employment: Just the usual structural change?. *Sustainability*, *10*(5), p.1661.

Viswanadham, N. “The Past, Present, and Future of Supply-Chain Automation.” *IEEE Robotics & Automation Magazine*, vol. 9, no. 2, June 2002, pp. 48–56, 10.1109/mra.2002.1019490. Accessed 16 Feb. 2020.

Wang, Dan, et al. “Assessing Hotel-Related Smartphone Apps Using Online Reviews.” *Journal of Hospitality Marketing & Management*, vol. 25, no. 3, 3 Apr. 2015, pp. 291–313, 10.1080/19368623.2015.1012282. Accessed 16 Dec. 2019.

Works Cited

Adukaite, Asta, et al. “Hotel Mobile Apps. The Case of 4 and 5 Star Hotels in European German-Speaking Countries.” *Information and Communication Technologies in Tourism 2014*, 2013, pp. 45–57, 10.1007/978-3-319-03973-2_4.

Bessen, James, and James Kossuth. “Research: Automation Affects High-Skill Workers More Often, but Low-Skill Workers More Deeply.” *Harvard Business Review*, 13 Feb. 2019,

hbr.org/2019/02/research-automation-affects-high-skill-workers-more-often-but-low-skill-workers-more-deeply.

Boshoff, Christo. “A Proposed Instrument to Measure the Customer Satisfaction of Visitors to a Theme Park.” *Management Dynamics : Journal of the Southern African Institute for Management Scientists*, vol. 15, no. 3, 1 Jan. 2006, pp. 2–11, journals.co.za/content/mandyn/15/3/EJC69713. Accessed 30 Sept. 2020.

Buehler, D, and A Dietlerla. “Energy Saving Concept in Europa-Park Hotel Colosseo. Functional Technology Warrants Four-Star-Comfort; Energiesparkonzept Im Europa-Park Hotel Colosseo. Funktionale Technik Garantiert Vier-Sterne-Komfort (Journal Article) | ETDEWEB.” *Www.Osti.Gov*, 2004, www.osti.gov/etdeweb/biblio/20559917. Accessed 30 Sept. 2020.

Cameron, Pat. “Automated Operations: 5 Benefits of Automation | HelpSystems.” *Helpsystems.Com*, 2019, www.helpsystems.com/resources/guides/automated-operations-5-benefits-your-organization.

Chorianopoulos, Konstantinos, and George Lekakos. “Introduction to Social TV: Enhancing the Shared Experience with Interactive TV.” *International Journal of Human-Computer Interaction*, vol. 24, no. 2, 11 Feb. 2008, pp. 113–120, 10.1080/10447310701821574. Accessed 1 Sept. 2019.

Dickens, MIT Technology. “China Is Racing Ahead in 5G. Here’s What That Means.” *Medium*, 9 Jan. 2019, medium.com/mit-technology-review/china-is-racing-ahead-in-5g-heres-what-that-means-7d41c2a6c4c4. Accessed 29 Sept. 2020.

Dickinson, Janet E., et al. “Mobile Technology and the Tourist Experience: (Dis)Connection at the Campsite.” *Tourism Management*, vol. 57, Dec. 2016, pp. 193–201, eprints.bournemouth.ac.uk/24168/1/Dickinson%20et%20al%202016%20open%20accesss%20version.pdf, 10.1016/j.tourman.2016.06.005. Accessed 16 Dec. 2019.

dvvDVV. “Automation and AI: How It Will Actually Affect the Workplace.” *Personnel Today*, 5 Sept. 2019, www.personneltoday.com/hr/analysis-ai-automation-impact-on-jobs-hr-employment/. Accessed 29 Sept. 2020.

EventHelix. “5G Service-Based Architecture (SBA).” *Medium*, 8 Dec. 2018, medium.com/5g-nr/5g-service-based-architecture-sba-47900b0ded0a. Accessed 29 Sept. 2020.

G Lukken. “Attractiepark Walibi Opent Nieuw Seizoen Met Social Influencers Op Youtube (Online Article).” *TravelNext*, 2015, pure.buas.nl/en/publications/attractiepark-walibi-opent-nieuw-seizoen-met-social-influencers-o. Accessed 30 Sept. 2020.

Gabe, Todd. “Impacts of COVID-Related Capacity Constraints on Theme Park Attendance: Evidence from Magic Kingdom Wait Times.” *Applied Economics Letters*, 9 Aug. 2020, pp. 1–4, 10.1080/13504851.2020.1804047.

Harrigan, Paul, et al. “The Role of Social Media in the Engagement and Information Processes of Social CRM.” *International Journal of Information Management*, vol. 54, Oct. 2020, p. 102151, 10.1016/j.ijinfomgt.2020.102151. Accessed 7 July 2020.

"How Mobile Apps for Hotels Help Attract Guests | ALICE." *Www.Aliceplatform.Com*, 12 Nov. 2019, www.aliceplatform.com/blog/why-hotels-need-to-use-mobile-apps#:~:text=A%20mobile%20app%20establishes%20a. Accessed 29 Sept. 2020.

Huff, Gerald. "The Automation of Management." *Medium*, 8 May 2015, medium.com/@geraldhuff/while-most-discussions-of-the-impact-of-automation-on-jobs-have-focused-on-blue-collar-and-44497feb20d8. Accessed 29 Sept. 2020.

Ivanov, Stanislav Hristov, et al. "Adoption of Robots and Service Automation by Tourism and Hospitality Companies." *Ssrn.Com*, 2017, papers.ssrn.com/sol3/papers.cfm?abstract_id=2964308.

Ivanov, Stanislav Hristov, and Craig Webster. "Adoption of Robots, Artificial Intelligence and Service Automation by Travel, Tourism and Hospitality Companies – A Cost-Benefit Analysis." *Ssrn.Com*, 2017, papers.ssrn.com/sol3/papers.cfm?abstract_id=3007577.

Krasadakis, George. "Technology Innovation — Trends and Opportunities." *Medium*, 21 June 2020, medium.com/innovation-machine/2018-innovation-trends-and-opportunities-8a5d642fd661. Accessed 29 Sept. 2020.

"Labor 2030: The Collision of Demographics, Automation and Inequality." *Bain*, 7 Feb. 2018, www.bain.com/insights/labor-2030-the-collision-of-demographics-automation-and-inequality/. Accessed 13 Dec. 2019.

Lacmanović, Izabela, et al. “Contactless Payment Systems Based on RFID Technology.” *IEEE Xplore*, 1 May 2010, ieeexplore.ieee.org/abstract/document/5533621. Accessed 29 Sept. 2020.

Lee, Hanna, et al. “Tourists’ Happiness: Are There Smart Tourism Technology Effects?” *Asia Pacific Journal of Tourism Research*, vol. 23, no. 5, 3 May 2018, pp. 486–501, 10.1080/10941665.2018.1468344. Accessed 9 Feb. 2020.

Liao, Da-Yin, and Xuehong Wang. “Applications of Blockchain Technology to Logistics Management in Integrated Casinos and Entertainment.” *Informatics*, vol. 5, no. 4, 27 Nov. 2018, p. 44, 10.3390/informatics5040044. Accessed 12 Jan. 2020.

MAZANEC, J. “Positioning Analysis with Self-Organizing Maps An Exploratory Study on Luxury Hotels.” *The Cornell Hotel and Restaurant Administration Quarterly*, vol. 36, no. 6, Dec. 1995, pp. 80–95, 10.1016/0010-8804(96)81007-x. Accessed 28 July 2019.

Mine, Mark R., et al. “Projection-Based Augmented Reality in Disney Theme Parks.” *Computer*, vol. 45, no. 7, July 2012, pp. 32–40, 10.1109/mc.2012.154. Accessed 16 Nov. 2019.

Neuhofer, Barbara, et al. “Conceptualising Technology Enhanced Destination Experiences.” *Journal of Destination Marketing & Management*, vol. 1, no. 1–2, Nov. 2012, pp. 36–46, 10.1016/j.jdmm.2012.08.001. Accessed 12 Mar. 2020.

Nizri, Gabby. “The Impact of Robotic Process Automation on Customer Experience.” *Ayehu*, 2 Nov. 2016, ayehu.com/impact-robotic-process-automation-customer-experience/.

Ong, Victor, et al. *The Impact of Service Automation on Customer Satisfaction and Customer Retention: An Empirical Study of Malaysian Rail Transportation*. 2015.

Pearcy, Aimee. “What You Should Know About the Coming of 5G.” *Medium*, 12 Dec. 2019, onezero.medium.com/5g-is-coming-whether-we-like-it-or-not-21e6537c89fc. Accessed 29 Sept. 2020.

Pettinger, Tejvan. “Automation – Benefits and Costs | Economics Help.” *Economicshelp.Org*, 16 Jan. 2018, www.economicshelp.org/blog/25163/economics/automation/.

Rae, Tiia. “The Effect of Marketing Automation on Customer Experience.” *Aaltodoc.Aalto.Fi*, 2016, aaltodoc.aalto.fi/handle/123456789/27676. Accessed 29 Sept. 2020.

Roe, David. “How Will Automation Affect the Future Workplace?” *CMSWire.Com*, CMSWire.com, 18 July 2019, www.cmswire.com/digital-workplace/how-will-automation-affect-the-future-workplace/.

Rourke, John. “Talking the Future of Theme Park Technology with FORREC’s Eric J. O’Rourke.” *Coaster101*, 9 Jan. 2020, www.coaster101.com/2020/01/09/talking-the-future-of-theme-park-technology-with-forrecs-eric-j-orourke/.

Sifter, Chris. “How Analytics and Automation Can Improve Shareholder Value | Bank Director.” *Www.Bankdirector.Com*, 7 Feb. 2019, www.bankdirector.com/issues/how-analytics-and-automation-can-improve-shareholder-value/. Accessed 29 Sept. 2020.

Sigala, Marianna. “Integrating Customer Relationship Management in Hotel Operations: Managerial and Operational Implications.” *International Journal of Hospitality Management*, vol. 24, no. 3, Sept. 2005, pp. 391–413, 10.1016/j.ijhm.2004.08.008. Accessed 24 Apr. 2019.

Tho, Siew Wei, et al. “Technology-Enhanced Physics Programme for Community-Based Science Learning: Innovative Design and Programme Evaluation in a Theme Park.” *Journal of Science Education and Technology*, vol. 24, no. 5, 11 Feb. 2015, pp. 580–594, 10.1007/s10956-015-9549-5. Accessed 30 Sept. 2020.

Travis, A.S. “CAB Direct.” *Www.Cabdirect.Org*, 2011, www.cabdirect.org/cabdirect/abstract/20113297737. Accessed 30 Sept. 2020.

Ursu, Marian F., et al. “Interactive TV Narratives.” *ACM Transactions on Multimedia Computing, Communications, and Applications*, vol. 4, no. 4, Oct. 2008, pp. 1–39, 10.1145/1412196.1412198. Accessed 29 Sept. 2020.

Willig, A., et al. “Wireless Technology in Industrial Networks.” *Proceedings of the IEEE*, vol. 93, no. 6, June 2005, pp. 1130–1151, ieeexplore.ieee.org/abstract/document/1435743/, 10.1109/jproc.2005.849717. Accessed 25 Nov. 2019.

Yang, Li, et al. “Artificial Intelligence and Robotics Technology in the Hospitality Industry: Current Applications and Future Trends.” *Digital Transformation in Business and Society*, 5 Oct. 2019, pp. 211–228, 10.1007/978-3-030-08277-2_13.

ZUNENSHINE, MICHAEL. “15 Best Hotel CRM (2020).” *CRM.Org*, 3 Mar. 2020, crm.org/crmland/best-hotel-crm. Accessed 29 Sept. 2020.

Appendix 1 - Interview Questions

1. Regarding automation in the hospitality industry, how do you see the concept developing in the future ?

2. Do you believe in the concept of automation within the hospitality industry, and if yes, to what extent ?

3. Have you personally ever experienced a high level of automation within your work environment in the sector ? and if yes, please elaborate.

4. Do you think that customers would be warm to the idea of a high level of automation in the hospitality industry, and if yes, to what extent?

5. If a stronger level of automation were to be introduced at your place of work, who do you think will benefit most from it ? a) customers b) management c) other staff d) owners of the hotel or establishment e) suppliers of automated equipment. This list of five is in alphabetical order. Please re-list them in order of preference, highest benefit being 1st, and lowest benefit being 5th

6. As an employee, do you feel threatened that you may lose your job or miss out on career opportunities because of increased automation ?

7. Are you concerned about business continuity in a highly automated environment ? Example: If an employee is sick, you phone someone else to

take his place. But if a machine is not working, and cannot be fixed before a week, do you see an issue in offering continuity to customers ?

8. Given the increased volatility of COVID - 19, many establishments are automating their operation methods, would you be comfortable if this becomes the norm in the upcoming future ?

Appendix 2 - Survey Questions

1. **Gender**

   Male/Female/Other

2. **Age**

   18-30/30-45/45-60/60+

3. **Job Position**

   Business Professional/Self-Employed/Technicians and Associate Professionals/Health-Care/Civil Services/Clerical/Customer Service/Manager/Educator/Retired/Full-Time Student/Homemaker/Sales/Hospitality-Tourism/Transportation/Social Service.

4. **How often do you visit service establishments (hotels,restaurants,bars, etc) ?**

   At Least Once a week/At Least Once a month/At Least Once a year

5. **Apart from the basic communication such as placing an order, are you the type to engage in a conversation with a member of the staff ?**

   Yes/No

6. **When booking a reservation/accommodation, what method would you prefer using automated or traditional methods ?**

   Automated Methods/Traditional Methods

7. **Have you ever been to an establishment that utilises any automation methods ?**

   Yes/No

8. **If no, would you consider going to such an establishment ?**

   Yes/No

9. **If yes, please specify the name of the establishment and the country it's located in.**

   Write

10. **What is your opinion regarding establishments who automate their operation systems, thus reducing human interaction?**

    Write

Appendix 3 - Overview of Transcripts

Interviewee	Profession	Industry
1	Aerodrome Officer	Aviation
2	Receptionist	Hotel
3	Systems Administrator	Aviation
4	Digital Consultant	Hotel
5	Software Developer	Hospitality
6	Customer Relations	Health Care
7	Maintenance Technician	Hotel
8	Owner	Restaurant
9	Night Auditor	Hotel
10	Tour Operator (Owner)	Hospitality

Appendix 4 - Sample of Transcript

Main Theme		Sub Theme
Market Trends	**Interviewer;** Regarding automation in the hospitality industry, how do you see the concept developing in the future ? **Interviewee;** “I see the foreseeable future, such automated systems would become the norm, where we will become completely reliant on them”. **Interviewer;** Do you believe in the concept of automation within the hospitality industry,and if yes, to what extent ? **Interviewee;** “Yes, I truly believe, especially in an environment like an airport, where by utilising automation provides a higher level of efficiency”. **Interviewer;** Have you personally ever experienced a high level of automation within your work environment in the sector ? and if yes, please elaborate.	
Front Office		

Systems IT Systems Emerging Technologies Customer Experience	**Interviewee;** “MIA boosts a high level of automated systems, around 80 different systems in fact. This varies from the smallest of sensors to robotics. All technological systems are linked to a mother system which provides daily analysis on components and software to the technicians. Examples of such systems include ,self check in kiosks, CMMS (Computer Maintenance Management Software),Q Matrix feedback technology,IRC Sensor (People Counting System),automated baggage tracking systems and penta scanners for boarding passes,given the outbreak in the beginning of the year we also installed various thermal imaging points around the airport”. **Interviewer;** Do you think that customers would be warm to the idea of a high level of automation in the hospitality industry, and if yes, to what extent?	Self Check In Kiosks CMMS Artificial Intelligence Customer Satisfaction

Market Trends	**Interviewee ;** “It is hard to please all, but we conducted our own surveys to analyse the people’s experience on new pre-boarding scanners.The results showed highly positive remarks across a wide range of demographics”. **Interviewer;** Are you concerned about business continuity in a highly automated environment ? Example: If an employee is sick, you phone someone else to take his place. But if a machine is not working, and cannot be fixed before a week, do you see an issue in offering continuity to customers ? **Interviewee;** “Every establishment that relies on such automated systems, would have a backup system just in case something would go astray”. **Interviewer ;** As an employee/employer, do you feel threatened that you may lose your job or	Demographics Job Retention

	miss out on career opportunities because of increased automation ? **Interviewee ;** “Not one bit, working in the industry of IT provides work security”.	

Appendix 5 - Sample of Consent Form

INSTITUTE OF TOURISM STUDIES
IN ACADEMIC AFFILIATION WITH THE EMIRATES ACADEMY OF HOSPITALITY MANAGEMENT

Consent Form for Undergraduate Research Study

Title of Research Automation in the Hospitality Industry

Researcher Daniel Micallef

Degree Bachelor's in international hospitality management (Hons)

Dear Sir / Madam,

I, Daniel Micallef a student at the Institute of Tourism Studies am currently in the final year of my *bachelor's in international hospitality management (Hons)* I am carrying out research on automation within the hospitality Industry. I would like to explore your views on this matter by asking you some questions. The purpose of this form is to provide you with information so you can decide whether to participate in this study. Any questions you may have will be answered by the researcher.

There are no known risks related with this research project other than possible discomfort with the following:

- You will be asked to be honest when answering questions.

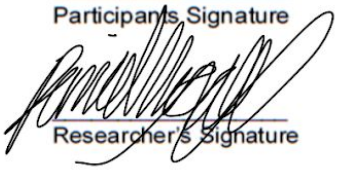
The information in the study records will be kept strictly confidential. All data will be stored securely and will be made available only to those individuals conducting the study. No reference will be made in oral or written reports that could link you to the study.

Your identity will not be revealed in any publications that result from this study.

You can terminate your participation at any time without prejudice. You also do not have to answer individual questions you don't want to answer. Your name will not be attached to the questionnaire and I will ensure that your participation remains confidential.

Participant's declaration

I have read this consent form and am giving the opportunity to the researcher to ask questions. I hereby grant permission to use the information I provide as data in the above-mentioned research project, knowing that it will be kept confidential and without use of my name.

Dalton J Portelli		19/09/20
Participants Name	Participants Signature	Date
Daniel Micallef		19/09/20
Researcher's Name	Researcher's Signature	Date

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