

**Open University of Cyprus**

*Faculty of Economics  
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*Enterprise Risk Management*

**Master Thesis**



**How Can New Technologies In Hotels Restore Tourism Opportunities  
And Reduce Risk In An Era Of The Pandemic?**

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**Supervisor:**

**Dr. Angeliki Menegaki**

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## Summary

The purpose of this paper is to describe the new technologies that enhance customer service in the hotel industry and to use them. Technology has been used more frequently due to the pandemic, which has significantly impacted how quickly hotels recover.

The first chapter begins with an introduction to hotel technology and a discussion of the historical development of the technology. Also discussed are the effects of the COVID-19 pandemic on all industries and the role technology plays in the hospitality sector both now and in the future. Thus, the benefits and drawbacks of using technology in the hospitality sector are discussed.

Continuing in the second chapter, earlier research studied the revolution of technology in the hotel industry as it was demanded by customers.

We discover how the various systems are used today and what advancements they will experience in the future through their definition and historical review.

New technologies that enhance both guest service and hotel management are discussed in the third chapter. These technologies will make guests' stay enjoyable, healthy, and safe while also promoting the hotel to potential guests directly or through social media. As a result, previous guests will return and recommend the hotel to others. The hotel of the future is created through the use of all new technologies, as shown in chapter four. In this chapter, technological advancements take a further step and demonstrate how all hotels will eventually need to adopt new technologies in order to make their facilities

Then, in the fifth chapter, the future perspective on how the hotels will want to be according to technological changes. In chapter six, some deeper research highlighted that the hotels will never be the same again as the pandemic has changed the mindset of the industry, but also that until 2023 the industry will still suffer.

The result of this work was illustrated in chapter seven. We have seen that no matter what the technological changes were, the number of visitors has dropped significantly and this show that there were other variables like governmental restrictions that played their role and flight restrictions in this drop that inevitably technology could not turn around the situation during this hard time. Also, technology is important, but hospitality needs a face with a smile also to befall, so not everything can be digitalised to make people feel the customer experience.

The main objective was to determine if customer service before, during and after the pandemic made their stay more pleasant but safer. In this chapter, we analyse the usefulness of the new technologies in hotels and apartments.

In chapter eight we analyse the future proposal research that all hotels should aim to create a better reputable image using technologies using the research of information along with Artificial intelligence. These further study tourists and attract them to visit the hospitality venue that applies these advanced technologies, creating a safer and more pleasant customer experience.

To conclude, Covid-19 have accelerated the need for the hospitality industry to look closer to the technological advances that could be applied in their industry for the customer experience to be maximized. In Cyprus, they have applied some practices, but they believe that only if Covid-19 ends will give rise to the number of visitors to their venues.

## Περίληψη

Σκοπός αυτής της εργασίας είναι να περιγράψει τις νέες τεχνολογίες που ενισχύουν την εξυπηρέτηση πελατών στον ξενοδοχειακό κλάδο και να τις χρησιμοποιήσει. Η τεχνολογία έχει χρησιμοποιηθεί πιο συχνά λόγω της πανδημίας, η οποία έχει επηρεάσει σημαντικά το πόσο γρήγορα ανακάμπτουν τα ξενοδοχεία.

Το πρώτο κεφάλαιο ξεκινά με μια εισαγωγή στην ξενοδοχειακή τεχνολογία και μια συζήτηση για την ιστορική εξέλιξη της τεχνολογίας. Συζητήθηκαν επίσης οι επιπτώσεις της πανδημίας COVID-19 σε όλους τους κλάδους και ο ρόλος που παίζει η τεχνολογία στον τομέα της φιλοξενίας τόσο τώρα όσο και στο μέλλον. Έτσι, συζητούνται τα οφέλη και τα μειονεκτήματα της χρήσης της τεχνολογίας στον τομέα της φιλοξενίας.

Συνεχίζοντας στο δεύτερο κεφάλαιο, σε μια παλαιότερη έρευνα μελετήθηκε η επανάσταση της τεχνολογίας στον ξενοδοχειακό κλάδο όπως αυτή ζητήθηκε από τους πελάτες.

Ανακαλύπτουμε πώς χρησιμοποιούνται τα διάφορα συστήματα σήμερα και ποιες προόδους θα βιώσουν στο μέλλον μέσω του ορισμού και της ιστορικής ανασκόπησης.

Οι νέες τεχνολογίες που βελτιώνουν τόσο την εξυπηρέτηση των επισκεπτών όσο και τη διαχείριση του ξενοδοχείου συζητούνται στο τρίτο κεφάλαιο. Αυτές οι τεχνολογίες θα κάνουν τη διαμονή των επισκεπτών ευχάριστη, υγιεινή και ασφαλή, ενώ παράλληλα θα προωθήσουν το ξενοδοχείο σε πιθανούς επισκέπτες απευθείας ή μέσω των μέσων κοινωνικής δικτύωσης. Ως αποτέλεσμα, οι προηγούμενοι επισκέπτες θα επιστρέψουν και θα συστήσουν το ξενοδοχείο σε άλλους. Το ξενοδοχείο του μέλλοντος δημιουργείται με τη χρήση όλων των νέων τεχνολογιών, όπως φαίνεται στο κεφάλαιο τέταρτο. Σε αυτό το κεφάλαιο, οι τεχνολογικές εξελίξεις κάνουν ένα περαιτέρω βήμα και δείχνουν πώς όλα τα ξενοδοχεία θα χρειαστεί τελικά να υιοθετήσουν νέες τεχνολογίες για να κάνουν τις εγκαταστάσεις τους

Στη συνέχεια, στο πέμπτο κεφάλαιο, η μελλοντική προοπτική για το πώς θα θέλουν να είναι τα ξενοδοχεία σύμφωνα με τις τεχνολογικές αλλαγές. Στο έκτο κεφάλαιο, κάποια βαθύτερη έρευνα τόνισε ότι τα ξενοδοχεία δεν θα είναι ποτέ ξανά τα ίδια καθώς η πανδημία άλλαξε τη νοοτροπία του κλάδου, αλλά και ότι μέχρι το 2023 ο κλάδος θα εξακολουθεί να υποφέρει.

Το αποτέλεσμα αυτής της εργασίας απεικονίστηκε στο έβδομο κεφάλαιο. Είδαμε ότι όποιες και αν ήταν οι τεχνολογικές αλλαγές, ο αριθμός των επισκεπτών έχει μειωθεί σημαντικά και αυτό δείχνει ότι υπήρχαν άλλες μεταβλητές, όπως κυβερνητικοί περιορισμοί που έπαιξαν το ρόλο τους και περιορισμοί πτήσης σε αυτή την πτώση που αναπόφευκτα η τεχνολογία δεν μπορούσε να ανατρέψει την κατάσταση κατά τη διάρκεια αυτή τη δύσκολη στιγμή. Επίσης, η τεχνολογία είναι σημαντική, αλλά η φιλοξενία χρειάζεται επίσης ένα πρόσωπο με χαμόγελο, επομένως δεν μπορούν να ψηφιοποιηθούν όλα για να κάνουν τους ανθρώπους να αισθανθούν την εμπειρία του πελάτη.

Ο κύριος στόχος ήταν να μάθουμε εάν η εξυπηρέτηση των πελατών πριν, κατά τη διάρκεια και μετά την πανδημία έκανε τη διαμονή τους πιο ευχάριστη αλλά πάνω από όλα ασφαλέστερη. Σε αυτό το κεφάλαιο αναλύουμε τη χρησιμότητα της εφαρμογής νέων τεχνολογιών που χρησιμοποιήθηκαν στην Κύπρο σε ξενοδοχεία και διαμερίσματα.

Στο κεφάλαιο όγδοο αναλύουμε τη μελλοντική πρόταση έρευνας ότι όλα τα ξενοδοχεία θα πρέπει να στοχεύουν στη δημιουργία μιας καλύτερης, αξιόπιστης εικόνας χρησιμοποιώντας τεχνολογίες που χρησιμοποιούν έρευνα πληροφοριών μαζί με τεχνητή νοημοσύνη. Αυτές οι περαιτέρω μελέτες θα πρέπει να ελκύσουν τους τουρίστες ως μάρκετινγκ και για να επισκεφθούν τον χώρο φιλοξενίας που εφαρμόζει

αυτές τις προηγμένες τεχνολογίες που στη συνέχεια θα δημιουργήσουν μια ασφαλέστερη και ευχάριστη εμπειρία πελατών.

Συμπερασματικά, ο Covid-19 έχει επιταχύνει την ανάγκη για τον κλάδο της φιλοξενίας να κοιτάξει πιο κοντά στις τεχνολογικές εξελίξεις που θα μπορούσαν να εφαρμοστούν στον κλάδο τους για να μεγιστοποιηθεί η εμπειρία του πελάτη. Στην Κύπρο, έχουν εφαρμόσει κάποιες πρακτικές, αλλά πιστεύουν ότι μόνο με το τέλος του Covid-19 θα αυξηθεί ο αριθμός των επισκεπτών στους χώρους τους στο μέγιστο βαθμό.

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# Introduction

In recent years, there has been a lot of discussion about the digital transformation of various industries, including the hospitality industry. With the advent of COVID-19, its acceleration became even more rapid, new tools were created, but also the use of existing ones was expanded. The digital transformation of hotels seems inevitable in an era where everything is done remotely, and potential customers are looking for an instant one-click solution.

With the existence of a multiplicity of digital channels and technologies, hotels rely extensively for all their processes on their digital operation. In this way, they can achieve the reduction of operating costs, the creation of a new digital clientele and the increase of loyal customers, through the improvement of their experience. In this research, we will see if and how hotels can optimally respond to the new technology! (PWC, 2013)

The developments of the conditions of the pandemic have affected all forms of hospitality, forcing adaptation to the new data and the organization of seminars, hotel exhibitions, but also conferences, where their transition to a digital environment through the help of AR (augmented reality), seems to be a viable solution, both for the duration of the pandemic and for the new normality to come (Pillai et al, 2021).

## Purpose of Research

This thesis will explore technologically innovative solutions that can reduce the risk and spread of a pandemic, particularly Covid-19, in the Hospitality-Tourism industry. The pandemic of the Covid-19 era has had and continues to have a huge negative impact on people's daily lives worldwide. In the meantime, people were forced to urgently find solutions for health care. Therefore, technology provided one of the most vital and supreme decisions to end or eliminate the dangers posed by Covid-19.

The tourism industry is experiencing a huge decline due to local lockdowns and other major restrictions imposed, including the closure of airports. Most people were trapped inside their homes for more than a year, unable to continue their vacations or business trips. Technology, then, has given a solution to these people. They were advised to work from home through Microsoft groups, google meet etc. Now that vaccines have started and our lives seem to be returning to normal, people need the relaxation of a hotel more than ever.

In light of the Covid-19 pandemic, the focus of this study will be on the technological security measures taken by the hotel industry. As shown below, it offers several instances of initiatives and research that aim to offer the hotel industry solutions and enhance guest comfort. Noteworthy examples of solutions already used in hotels include contactless room key cards and facial check-in with temperature control.



# Chapter 1

## 1. Definition Of Technology

### 1.1.Introduction to Hotel/Apartment technology

Technology has advanced quickly in recent years, having a significant impact on all facets of our lives, and transforming the way we live. One of these sectors, the tourism industry, particularly the hotel industry, has seen a significant impact from technological development. Almost every area and task in a hotel have been invaded and taken over by technology. A hotel's main goal has always been and still is to provide a secure setting that can guarantee both cleanliness and a peaceful, comfortable

The COVID-19 pandemic, also known as the new Coronavirus, has accelerated an already rapid pace of technology adoption in the hospitality industry. The global spread of COVID-19 is causing major changes in the hotel industry, making technology more critical than ever and a key factor in hotel recovery. Smart features and services that were once considered add-ons to enhance the customer experience will soon become essential in the post-pandemic hospitality industry. The use of technology in hotel management can be utilized in all departments and greatly upgrade the experience of each customer by offering immense comfort but at the same time protection from the virus.

### 1.2. The history of Hotel/Apartment technology

The hospitality industry has come a long way in embracing innovation, as seen in this hotel technology timeline story below. The rapid advancements in hospitality technology have acquired a lot of attention over the past 10 years, but innovation has been taking place since the beginning of the industry. Hotel Customer Service in society has led to new expectations that are redefining what it takes to satisfy guests and remain competitive in earning loyalty. Throughout the history of hotel technology, there have been countless milestones celebrated in the hospitality industry, including the introduction of electricity, the hotel telephone, the in-room radio, the now-standard hotel room television, and the current adoption of mobile technology to improve the overall guest experience. (Intelity, 2016).

Following the personal computer and graphical user interfaces, the Internet has made electronic systems almost universal in all areas of industry in the 20th century. The computer is gradually becoming easier to use in every aspect of life after the Internet. The Electronic Point of Sale System and the IT department in hotels and apartments perform the role of IT in restaurants and catering services. In the past, a well-disassembled central system appears around which all information revolves and interacts.

### 1.3. The present and future of hotel technology

Every industry in the world has been affected by COVID-19, but the hotel industry has been hit particularly hard and is currently struggling to survive. Without a doubt, the pandemic has accelerated the adoption of new technologies and applications in the hospitality sector. The outbreak of COVID-19 continues to wreak havoc on the hospitality industry and has serious implications for its current and long-term survival. (Jaffer, 2021).

Despite the devastation, Covid-19 is helping tourism recover. Contactless technologies are seen as solutions and are among the most important emerging technology trends for the post-pandemic hospitality industry. In a post-COVID-19 world, technological innovation will now be the driving force behind the changes needed to promote and ensure health and safety.

#### **1.4. Advantages of using technology in the hotel industry**

Hotel technology can be used across all departments to improve operations, manage post-COVID-19 protocols, and improve customer and employee communication as customer expectations have changed. Businesses in the hospitality industry can use technology to improve customer satisfaction, save time and money, and stay competitive. (Manager, M.D.B. and Zesium, E.I.C., 2022).

##### **Advantages:**

- **Efficiency**  
Customers dislike waiting in lines. Customers want a seamless experience at check-in and check-out, especially in the hospitality sector where contactless hospitality is becoming increasingly popular. They can avoid waiting in line or leaving their room by using a tablet to order room service or checking in at an automated kiosk by scanning a QR code. (ReviewPro, 2021).
- **Security**  
Customers need the security of their data, including their credit card numbers, billing addresses and other information. However, the Cloud is also used to store these items instead of local computers, where they can be lost or stolen. Most modern applications have backup and storage capabilities.
- **Scalability**  
Hotel customer relationship management (CRM) programs combine customer data, automate payments, and assist with account management, reporting, and other tasks.
- **Simplicity**  
With integrated mobile tools, customers can easily access all the resources they need in one location. Customers can easily find amenities such as a pool, gym, spa, nearby entertainment venues, and even medical or laundry facilities on an app, which is why many hotels have developed them.
- **Sustainability**  
Saving energy and money has never been easier. Installing programs that adjust room lighting based on the amount of natural light provided, and automatically using motion sensors to turn off electricity in uncovered areas.
- **Proficiency**  
Customers are more likely to make informed recommendations. Integrating modern systems like mobile keys, smart TVs, room controls, interactive digital signage and things that naturally leads to the best customer experience

However, the benefits of technology mentioned above for the hotel industry do not just apply to the clientele. Technology can also improve operational efficiency and help hotel management in the opposite

direction, reducing and ultimately replacing expensive human labour. Improving customer service can also be achieved by facilitating simple interaction and communication between staff members.

### **1.5. Limitations and disadvantages of using technology**

- Lack of security and reliability.  
Ensuring complete security on the Internet is impossible. Some risks can threaten the security of both the website and its visitors by accepting important data such as their credit card code
- Lack of trust.  
There is a lack of trust on the part of some consumers, who do not trust the Internet for their transactions and are wary of online shopping (due to a lack of complete security).
- Face-to-face transactions.  
Many people prefer interpersonal interactions. There isn't much interpersonal interaction on the Internet. Some customers, however, prefer to touch the goods before making a purchase or travelling with a travel agent.
- Fear of technology.  
It takes some time for customers to gain trust in a travel website and technology in general. Difficulty switching from a physical travel agency to an online agency due to consumer-tourists not trusting a faceless seller, paperless transactions, and e-money.
- Lack of job opportunities.  
Some hotel employees report that they are worried about losing their jobs because they believe that new technology will eventually replace them. As more technology is used in the hotel, such as more automatic checkout, the need for manpower will decrease.
- High operating and maintenance costs.  
The cost of running and maintaining a tourism website is also quite higher due to the constant development of new technologies.
- Lack of appropriate technological infrastructure.
- Lack of trust and product resistance.

Many businesses are sceptical of the many benefits that technology adoption can bring because it is an ever-evolving and rapidly changing field. Despite its advantages and disadvantages, recognizing the role of technology in improving the customer experience. There's no doubt that technology can play an important role in creating the hotels of the future, but some things, like the human touch, will never really be replaced. Even though human interactions occur less often overall, they are more important than ever.

### **1.6. Identify the problems**

This study aims to identify possible safe and preventive measures that hotels could take to boost tourism and reduce the risk of the spread of the Covid-19 virus. Exposure to Covid-19 risks in hotels and their harmful effects on the tourism industry are the main topics of our study. In order to reduce these risks to the targeted industry and restore tourism, this thesis will consider various solutions as well as ongoing research and investigations.

- Pandemic risk determination in hotels and apartments
- Consumer behaviour during the pandemic
- Threats posed by the pandemic and its effects on the hospitality industry
- Use of technology to reduce risk and boost tourism
- Reducing the risk of a pandemic

### **1.7. Proposed methodology**

The proposed methodology for this research will be articles and relevant academic literature on technological innovations under development to reduce exposure to Covid-19 in hotels. An additional tool that will be used is the construction of a questionnaire that will be delivered to the general managers of Airbnb hotels and apartments. This will be a useful and constructive way to investigate the approaches being taken to slow the spread of the virus and suggest new ideas for reducing the risks. All levels of the hotel industry, from a modest studio to a 5-star hotel, will receive this questionnaire.

Considering the insightful feedback received from those in the industry, the pilot method was used at the beginning of the research when the construction of the questionnaire began. After the questionnaire was completed, the first thing we did was send it to a smaller sample size. Two property managers were given the draft questionnaire to review and provide feedback. The idea behind this method was that if there was a question that both testers complained about, it was to be removed or modified. Also, if they had an interesting extra question to add.

The result of the pilot test was that the three questions shared without ranges for % arrival occupancy were fixed. This gave an easier view for the person completing the questionnaire to have some options on how to answer these questions about the occupancy rate before, during and after post-pandemic expectations. This was seen, as the formerly listed arrivals by week and the latter gave an annual figure. As a result, visualization and analysis of the results would be difficult.

### **1.8. Brainstorm questions**

The purpose of the first 8 questions was to warm up the survey respondent along with some general questions such as the type, name, and star rating of the hosting site. Certain private information, including the reviewer's name, reasons for confirming confidentiality, the reviewer's age, educational background, and website location.

The main body includes questions that reveal how familiar the person answering the questionnaire is with technology, to see how correlated the answers to the following questions are. Additionally, ask questions to see if they already had any technology before the pandemic and were. Accordingly, we asked what the changes were along with Covid, but we also included some options to make it easier and have some standard answers for comparison. We then asked them whether these changes had a positive impact and whether they agree or not. Then, creating a question to also reveal some disadvantages of the technological innovations and choose the most important one to reveal what their main concern was when implementing this change in their hosting space. For this reason, it was asked which technology was required least from customer feedback and which ageing area required more technology in hospitality spaces.

In order to evaluate their continued willingness to upgrade their hosting with technology, they were asked about a proposal for their specific case that either does not exist or, if it does exist, has not been implemented. This is even though there is a certain formula that provides three options that would be great to have even after the Covid era. To determine what would be most important in listing three technological

innovations according to their needs, values, and mindset as a hospitality space, one could create a hierarchy query by providing various combinations.

A comparison between a time series is made in Part C by delving into the numerical results, using the occupancy rate to control for arrivals. Before, during and expected arrivals after the pandemic was the three timelines we created. The first question asked of these three asked them about their capacity in terms of the number of rooms in order to help them give a more accurate answer about occupancy in these phases.

Last but not least is one of the important questions that would inform future research on more technological advances to be studied in the long term.

### **1.9. Potential Barriers to Research**

Some expected obstacles would be delays due to difficulty in contacting people in the industry who are able and willing to help, or delays in the deadlines for answered questionnaires.

### **1.10. Possible solutions to obstacles**

If the expected obstacle of difficulty in contacting people in the industry arises, we can find the president of the Cyprus Hoteliers Association who can deliver these questionnaires to the right people.

### **Impact of coronavirus on the hotel industry**

The situation in Cyprus is not ideal. PwC estimates that even with the successful development of a coronavirus vaccine, it could take four years for capacity utilization to return to pre-Covid-19 levels. Hotel sales and marketing teams are trying to maximize their results right now, ignoring the negative impact the pandemic is having on the industry. (Shapoval et al, 2021).

# Chapter 2

## Earlier research

### **2.1. Hotels: Due to consumer demand for seamless services, there will be a technological revolution.**

The pandemic, but also the frequent reports of future viruses that are likely to appear, make tourists very careful in their interpersonal contacts inside the hotel. According to research by Skift and Oracle Hospitality, most hotel customers would like as little contact as possible with staff, with automated technology solutions to serve them. That's why 40% of hotel industry executives in the survey estimate that the future of hotel management will be based on an airline-like model with minimal customer-staff contact. 73% of hotel customers say they prefer a hotel with technology that will allow them to manage their entire experience through their mobile devices - such as check-in and check-out, paying and ordering food, so that they have minimal contact with the accommodation staff and other guests. This indicates very significant changes and investments on the part of hoteliers in such technological applications, which will ensure automated service. The impending recovery in tourism is accelerating the need for such investment, as research shows people want to travel in the next six months, after two years of being confined to their home or region, but also want social distancing. Most of the survey participants emphasized that they do not miss the environment with the people around them on the hotel premises. Therefore, 38% state that they are interested in technologies that favour full self-service within the accommodation. Similarly, 49% prefer contactless payments. (Oracle.com, 2022).

### **2.2. Are hotel guests asking for technological solutions after the pandemic?**

Technology is expected to play an important role in hotels in the coming years, as new trends have been combined after almost 3 years of the pandemic. According to recent research by Skift and Oracle Hospitality, a significant percentage of guests do not wish to interact with hotel staff and would prefer automated technological solutions to be served. The survey points out, that more than 70% of customers prefer a hotel with technology that will allow them to manage their entire experience through their mobile, whether it is check-in or payments so that they have limited contact not only with the staff but also with the other guests. (Oracle.com, 2022).

### **2.3. Technological advances can improve the experience of consumers affected by COVID**

The majority of hosting companies are concerned about customer experience as they try to find a balance between internal goals and customer requirements. The hospitality sector is struggling to win over customers amid numerous health concerns. The untouchable nature of the coronavirus has accelerated and forced hotels to adopt new technological trends. Originally intended to increase comfort, modern innovations and features have now become essential. (hospitalityinsights.ehl.edu., 2021)

To date, we have observed widespread trends in which guests use their mobile devices to check in/out, adjust the temperature of their rooms, and even request services. These, however, no longer apply in the

absence of personalized offers. Visitors with specific tastes are not as satisfied because the majority of connected experiences are still unique. (Attala, J., 2019).

# Chapter 3

## 3. COVID-related solutions for the customer experience

### 3.1. To better serve customers in the face of COVID-19, businesses must adapt and innovate.

A hotel's main goal is to ensure that its customers have a positive experience during their stay. This will encourage them to return and recommend the hotel to other people who might travel there, either in person or online. The health and safety concern caused by COVID-19 has also accelerated the use of both new and old technologies.

Public health is one of the top priorities, but the global economy is also at risk, which poses serious challenges for some industries and requires major changes in the way goods are produced. Many businesses are looking for innovative technology and innovative solutions that will allow customers to continue their daily lives safely. Hotels must implement policies and procedures to guarantee the safety of their guests in the event of a pandemic. Some of these changes are purely health-related, while others allow hoteliers to move forward by modernizing the industry and promoting innovation.

Businesses should always think creatively, implementing QR codes to better engage customers and provide them with an unforgettable experience. The following list of past tech trends includes some of the most loved ones. (hospitalityinsights.ehl.edu., 2021)

- **Digital key**

Plastic key cards have been replaced as a method of room entry by digital ones identified with a mobile phone. Customers will never lose their keys again thanks to this method. However, keyless room entry will improve hotel operations, help save costs and improve the overall guest experience. Because of these factors, hotels are installing more advanced "smart" room access systems that allow guests to open doors with just their phones. Customers can access and enter their hotel room using Bluetooth technology using a mobile phone as a key. As a result, guests do not need to ask hotel staff for a key to enter their rooms.

- **Blockchain**

A decentralized and traceable data platform is very beneficial for the hospitality sector. Blockchain is the best solution available. Cryptocurrencies and DeFi are by far the most widely used applications of blockchain, and both represent lucrative investment opportunities. Blockchain, however, has a wide range of uses outside the realm of investment, such as in the hospitality sector. A decentralized digital "database" that distributes hotel rooms eliminates the need for middlemen. Instead, guests have direct access to their rooms. In addition, this technology provides improved cyber security. (Hayes, A., 2022).

UK-based TUI is one example of an industrial company using this technology. TUI's BedSwap project will allow hotels with excess inventory or vacancies to update their blockchain, allowing authorized parties to see how many hotel rooms are available at any time and place. (Anon, 2017).

- **Contactless communication**



Contactless communication helps hotels meet guest needs while adhering to health guidelines. Nevotek, a technology company specializing in hospitality solutions, recently developed and launched guest engagement technology that can be perfectly synchronized with your existing property management system. (at-visions., 2022)

The **Grace** platform allows guests to communicate in real-time with hotel staff using their preferred messaging app (WhatsApp, WeChat, etc.), eliminating the need to download more apps. Secure communications also allow hotel staff to address guest needs without asking for room numbers or names. It also has analytics and AI options to enable chatbots. NevoTouchless, from the same company, streamlines the process by enabling guests to use mobile devices to access hotel services. The device can be used as a remote control by guests by pairing it with the TV in their rooms. Accessing the paper's online reviews and ordering its room service are two other things guests can do with their devices. (Hospitality Upgrade., 2022).

AccorHotels UK & Ireland have introduced a feature that allows guests to communicate with hotel staff via WhatsApp. Now you can quickly send a message via WhatsApp messenger to contact the front desk or other hotel amenities and services instead of using your room phone for this purpose. With this service, guests will be provided with a dedicated mobile phone number along with their room key card upon arrival. A member of staff monitors immediate requests such as room service provided, housekeeping, and restaurant reservations. Guests can send messages to the hotel from their mobile phones, so they can contact the hotel before, during and after their stay, from anywhere inside or outside the hotel. The service is now available at approximately 90% of the group's hotels running mobile operating systems, launched last year, and will be rolled out further at selected hotels within the portfolio. (Hospitality Technology., 2022)

- **Facial Recognition**

One of the most important emerging trends in technology, in general, is recognition technology, but the potential applications in the hospitality sector are particularly interesting. Facial recognition systems are a type of biometric technology that uses an analysis of a person's facial features to reproduce their identity. These systems cannot match a scanned image or video frame to a database of recognized faces.

Also, considering the increased customer demand for contactless services, the use of facial recognition is one of the best ways to automate various authentication processes.

### **3.1. Access and security.**

Security and access issues are two of the main uses of facial recognition in business. This could involve using technology to give guests access to their hotel in a hotel environment. When it comes to security, technology can also play a critical role in identifying disruptive guests or guests who have already been asked to leave the property.

### **3.2. Support for customers.**

Technology can be used by those in the hospitality industry to provide better customer service. For example, facial recognition can enable more personalized greetings and more specialized service, allowing employees to quickly identify guests, possibly even before they check-in. However, recognizing technology speeds up the check-in/check-out process and streamlines what would otherwise be a laborious process

### **3.3. Payment Authorization.**

Facial recognition technology can be useful in speeding up the approval process for payments. Thanks to systems already implemented by companies such as MasterCard that support facial recognition, the customer can confirm the payment using their phone camera or a camera provided by the supplier. Facial recognition technology can also be applied in the hospitality industry. Its use is shown in the following example. If guests of one hotel transfer to another, where their identity is confirmed and their payment is confirmed in the same way, without having to speak to a member of the hotel staff.

### **3.4. Voice search & Voice control**

Voice control is a type of voice recognition technology that allows gadgets such as smartphones, smart TVs, and home appliances to understand spoken language and respond appropriately to simple voice commands. Users are no longer required to perform more common control actions such as pressing buttons. Depending on the device, voice control features may or may not be fully functional. While some devices can only be turned on or off using wake and sleep commands, others can perform smart tasks, provide real-time data, or even command other nearby devices.

### **3.5. Privacy and Security Issues**

Voice control raises some privacy concerns, even though it is becoming more common in the hospitality industry. Hoteliers can also wipe the device remotely, while Alexa for Hospitality, for example, wipes interactions once a day.

However, giving guests the option to opt out of voice control features entirely is one of the best ways for a hotel to ensure their privacy. Plus, it promotes confidence, which is a good thing. Therefore, voice recognition software can be very useful.

# Chapter 4

## 4. After COVID-19, what role will contactless hotel technology play in hotel operations?

Everyone is indeed under pressure to adopt technology faster during the COVID-19 pandemic, both from a consumer and business perspective. Many guests expect digital acceptance in hotels even after the pandemic because we are used to maintaining our needs and routines. (reviewpro.shijigroup.com.,2022)

Covid-19 has had a significant impact on businesses of all shapes and sizes, but few are feeling the effects as keenly as the hospitality sector. Many locations around the world have been forced to close their bars, restaurants, and hotels due to restrictions put in place to stop the spread of the coronavirus.

Before the pandemic brought domestic and international travel to a halt, the global hospitality industry looked bright. But instead of enjoying the biggest growth forecast hoteliers have ever experienced, we are entering the toughest period in the industry's history.

Rising cancellations and occupancy rates could have caused businesses to fail, but bed and breakfasts, boutique hotels and international chains have changed their strategies and refocused their efforts to adapt to the new normal. (Hospitality Technology, 2021).

Here's a summary of the key trends to watch. Over the past year, COVID-19 has had a significant impact on the hospitality industry, affecting thousands of workers and businesses worldwide. Companies had to innovate, create more efficient methods, and implement risky new designs. Although the pandemic is only a short-term disruption, many of these new technologies will move forward and shape the future. (Jaffer, Z., 2021).

Let's look at key technologies that have appeared as essential for the post-pandemic future hospitality industry.

### 4.1.Hotel AI voice assistant and smart room

Major hotel chains have started putting artificial intelligence (AI) voice assistants like Alexa and Amazon Echo into their newly upgraded "smart rooms" over the past couple of years. These voice-activated digital warriors that combine room technology with the Internet of Things (IoT) can do everything from finding nearby attractions to dimming the light. The benefits of concierge AI have become even clearer as a result of the pandemic's need for contactless services. In addition to offering our customers attractive and secure services, this innovative technology also enables us to collect and analyse critical data. (Torrens Blog., 2022).

However, if you're looking for a sci-fi future with humanoid robot butlers, you might have to wait a little longer. There have been few attempts to install moving, talking butler robots in hotels, and many have been unsuccessful. There are rumours that robots will take our jobs, but in reality, the AI of the future will be used to complete various tasks alongside human staff. Indeed, talented professionals with strong management, communication and soft skills will continue to be in high demand. (posts, G.C., 2021).

### 4.2.Machine learning and AI systems

Machine learning, big data and AI systems are already playing a central role in an industry characterized by online search engines and booking apps.

- **Automated Revenue Management Tool**

Using machine learning and AI to develop better ways for hotels to forecast demand and model occupancy. This is critical for hotels looking to minimize costs and maximize profits during the post-COVID-19 industry recovery.

Machine learning and AI predictive tools like Aiosell can help small hotel businesses that lack staff trained in statistical analysis and revenue management. Or free up hotel revenue managers to focus on strategy instead of forecasting. New developments in machine learning are expanding and personalizing this process, and machine learning can now “teach itself” at a much faster rate.

As tastes, prices, seasons, or trends change, search engines and services evolve and stay relevant in real time. Developers are already building new databases using the latest machine learning and AI technologies. **Fetch.ai**, a Cambridge-based artificial intelligence and machine learning lab, recently announced that it will launch its AI machine learning travel agency network in 2021. This new network will provide a decentralized “AI travel agency” service, allowing customers to search to book rooms in over 770,000 hotels around the world. Customers activate their own Autonomous Economic Agent (core AI) that searches on their behalf, learning their preferences in the process and saving the fees normally charged by sites like Expedia. (Network, F. ai, 2022).

- **Become more Personal**

The biggest advantage of machine learning developments is that they will enable businesses to personalize the experience and provide constantly improved, optimized service and marketing based on customer data. Predictive personalization can be applied not only to micro-targeted marketing but also to finding new revenue opportunities, such as suggesting additional products and services to guests who are more likely to receive your offer. (De Mauro et al, 2022).

- **Virtual Reality Travel Experience/Reservation System**

Technology company Navitaire said he developed a VR booking system in 2017, but the technology has yet to be widely adopted. The true value of virtual reality in hospitality and tourism has been shown during the coronavirus lockdowns and curfews. Would-be tourists sat at home in sweatpants and wished to go somewhere else. (Writer OPJ, 2021).

**VR travel company Ascape** reports that from December 2019 to April 2020, he saw a 60% increase in downloads of his VR apps and a further doubling in downloads from January to April 2020.

The pandemic has seen a surge in creative VR travel experiences created by a variety of providers, including national parks, hotels, travel agencies, public broadcasters, and museums. for example:

- Virtual NYC is packed with digital experiences handpicked by the city's tourism office.
- See the Galapagos Islands in 360 degrees with this spectacular interactive VR video from the BBC.
- You can do his entire six-day trip to Machu Picchu without ever leaving your couch.

Hotels, airlines, tourism bureaus, and travel agencies, among others, are using virtual reality to highlight local attractions and shopping destinations and to guide customers through room and facility tours. (Your Site NAME Goes HERE., 2021).

For example, **Jump to Travel** provides potential customers with hotel reviews and travel experiences in VR. Even if customers can't travel now, memorable experiences and “try before you buy” opportunities will motivate them to travel later.

### **More mobile app integrations**

Mobile app consolidation, essentially the jargon of “your phone becomes almost everything you have,” is a trend that has been steadily growing over the years. The pandemic has greatly accelerated adoption. Branded apps are now available at most major hotels including **Marriott, Hilton, Sheraton, IHG, Ritz-Carlton and Hyatt**. These apps allow guests to make pre-check-in requests, expedite check-in, unlock rooms, communicate with staff, view menus, and control room services and features. (Fox, J.T., 2020).

Travel apps, booking apps, review sharing apps, social media content aggregators, apps that manage and integrate other hospitality industry apps like Siteminder and so on. Mobile integration has endless possibilities, not only to help customers but also to help to host companies track data, manage revenue, offer new products, and improve their services. Additionally, branded apps and mobile menu apps have proven effective in increasing customer spending. It enables easy, no-wait ordering, promotes special offers and boosts sales with push notifications.

### **4.3. More Innovative ways for hotels and apartments to adapt (Examples)**

Nothing has demonstrated the value of flexibility in business better than the responses of many hoteliers to the pandemic. Hoteliers have used a variety of techniques and action plans to overcome the current travel crisis. (Hotel Management., 2022).

- **Change check-in and digitize keys**

Reducing human contact is an important part of curbing the virus, so hotels like **Manchester's City Suites Aparthotel** have made some key changes. (Prolific North., 2020).

- **Robot butler**

Robot butlers are a great way to reduce personal interactions with staff and have proven very popular with hotel guests. Robots are now being used to make money by charging for deliveries such as coffee from lobby cafés that were impossible to make in the past. (Pintelie, A., 2022).

- **Robot Maid**

While they may not be as sophisticated as the Iron Man or Star Wars franchises, the robotic machines are doing jobs in a variety of fields, including hospitality. Robotic hotel staff have been essential during this pandemic and have reduced human contact. South Korea-based telecommunications **company KT Corporation** has launched the second generation of her GiGA Genie hotel robot aimed at improving service delivery. (Corp, K.T., 2022).

- **IoT (smart sensor)**

This technology is now being used in a variety of areas, such as allowing visitors to reserve parking spaces before they arrive. Guests can drive to the hotel knowing their seats are reserved upon arrival. This not only improves the guest experience but also reduces the cost of manually managing parking inventory for hotels. His cloud-based IoT services are also used to facilitate back-of-house operations and simplify complex activities. This includes ensuring compliance with new hygiene guidelines, assigning tasks to hotel staff,

and adjusting cleaning systems. Additionally, his connected IoT devices will be integrated into the hotel to collect relevant customer data. This data is used to provide personalized services. Chinese company **Tink Labs** has developed a mobile IoT device that delivers tailored content to hotel guests. A device called Handy has a help desk to help with the local language help. It also provides local event information. (Attala, J., 2019).

- **Cloud technology**

Admittedly, cloud-based property management systems have been around for quite some time and aren't exactly new technology. However, that application has evolved and is now being used to gain more usefulness during this time. Using a cloud-based mobile application, the non-discrimination between hotel staff and guests can be improved. Allows for face-to-face interaction. Many hospitality companies are migrating critical applications to the cloud to improve their overall operations. Cloud technology integration allows you to manage your daily tasks such as reservation and check-in management in one place. (Grant, T., 2022).

- **Predictive maintenance**

Hoteliers have previously benefited from smart energy management systems' ability to control and even optimize energy usage. Now imagine a system that can detect hazards and other problems before they occur. This is precisely the goal of predictive maintenance. It also helps hotel management to predict components that are likely to fail and replace them before damage occurs. This will prevent further failures (added costs) and guest inconvenience. (Berglof, N., 2021).

# Chapter 5

## 5. Future perspectives: What are the goals of contactless hotel technology?

Guests interacting with the hotel's contactless technology after the pandemic. It is important to preserve them. If they seem very useful today, it proves that the technology is flexible and adaptable to unpredictable scenarios. (reviewpro.shijigroup.com., 2021).

By enhancing the flexibility, scalability and efficiency of hotel operations, technology can help fight the pandemic. During a pandemic, technology can help with social isolation and help people achieve more with fewer resources. Later, however, you can give your staff some time to engage in new and creative interactions. It allows visitors to enjoy the same experiences from their phones as they do in their everyday lives. Last but not least, we should not overlook the fact that technology has always been developed to improve the visitor experience. Therefore, contactless hotel technology remains important after COVID-19. (reviewpro.shijigroup.com., 2021).

### 5.1. Increase in contactless solutions in hospitality

The human touch has always been at the heart of service-defined industries, but now there are ways to manage security that doesn't replace customer service with a smile. Contactless check-in options have been introduced by many hotel brands around the world and use the same short-range wireless technology as **Apple Pay** and **Google Pay**. Contactless control panels have been used in hospital elevators during the pandemic, and the technology is now starting to take hold in the hotel market. Many of these contactless solutions are simple, convenient, fast, and integrated with smart hotels and mobile apps, with the added benefit of streamlining the customer experience. (ReviewPro, 2021).

### 5.2. Artificial Intelligence

Would guests like hotels to use artificial intelligence to receive offers or other relevant suggestions? Additionally, are there willing to preselect hotels in the metaverse? In recent research, other technologies preferred by tourists include chatbots for customer service, access to on-demand entertainment, voice-activated controls for all room amenities and controls that automatically adjust temperature, lighting, and digital applications. (Quick text., 2022).

Hotel understaffing, according to the survey, will force hoteliers to accelerate their technology investments in customer self-service services. In the survey, hoteliers stated that this will be the goal of their technology strategy which will do so through contactless technology, and they will prioritize technology that will improve or eliminate front desks by 2025. (Oracle, 2021).

Travellers also say they accept such an operating model in hotels: they would be willing to book a hotel that allows them to pay only for the services they use, that would pay more to choose the view, to choose their room, to check in/ out earlier or later and to use the spa, or fitness services. Experts point out that the pandemic has established the role of technology in the guest experience, which is why the tourism and hotel industry will never go back to the way it was before. (Operto, 2021).

### 5.3. Why should hotels consider introducing robot services

One explanation is that providing human services has disadvantages. Customers can be unhappy and "their experiences can be tarnished", for example, if staff members do not provide the expected level of service. These errors can be, at best, an inconvenience. At worst, they can expose the hotel to legal action, financial loss and reputational damage. In addition, staff shortages are believed to be the biggest problem facing the industry because, if the pandemic allows, hotel units will be virtually unable to cope with any increased tourist flows.



# Chapter 6

## 6. After COVID-19: will guests still need contactless hotel technology?

There are already numerous other applications of contactless technology, including online banking, online check-in and bookings made without visiting an airport or travel agency. The hospitality sector has historically been a late adopter of technology, but this is no longer acceptable given the rise of digital habits. At no time in history have people embraced technology as quickly as now, especially in situations like working from home. The way guests use your property changes along with their habits. (reviewpro.shijigroup.com., 2022).

Robotic room service and contactless check-in are already commonplace in many hotels. Forget everything you knew before. There will never be another time. Most people are prepared to travel because most people are fully immunized around the world and outbreaks are rare in many nations. People prepare for care and room service after three years of living in their own homes. If you plan to stay in a hotel, you will quickly realize that it has changed. The virtual tour guide, premium cleanliness certificates, vending machine meals and contactless check-ins are all examples of the new travel norm. (Sayej, N., 2021).

### 6.1. Prediction: No normal activity until 2023

There is a consensus that the hospitality sector will soon return to normal, although the goal of \$1.7 trillion in business travel by 2023 may still be a long way off. For the majority of small hotels in Cyprus, getting through the coming months will likely be the biggest challenge. In the coming months, adopting a customer-centric and technically efficient approach has the potential to maximize sales and also provide security to customers after a long period without a hotel break. Even after the Covid-19 pandemic is over, some of these new tactics may prove to be reliable sources of income, even though others may only be temporary. (businesstravelnewseurope.com., 2022).

### 6.2. How technology will transform the hotel sector after the pandemic

The hotel industry is trying to instil confidence in guests in an environment where health concerns are widespread. Could a combination of innovative technologies address both issues and revitalize the hospitality sector at the same time? It is possible to do this. Customer expectations are higher than ever as we adjust to the "new normal" and hotels slowly begin to reopen. Now, users can predict better tools. Such as support channels with a live agent or artificial intelligence and customized communications. Of course, higher hygiene standards. In general, guests will become more loyal to hotels that meet these needs. (Baratti, L., 2020).

### 6.3. Technology trends that will affect the hotel industry in the future, part

One of the most accurate facial recognition systems in the world is Cyberlink's "FaceMe" product. One of them is mask detection, which can recognize people even when they are wearing masks. In addition, it makes it easier to manage notifications when someone enters the building without a mask. It also has a built-in thermal camera.

#### 6.3.1. Contactless communication

Nevotek, a global provider of cloud-based hosting technology solutions, has recently launched two new visitor attraction technologies.

- **“Grace”** is a new platform that allows guests to message hotel staff in real time. Through their app of choice (e.g., WhatsApp, Messenger, WeChat), reducing the need to download an additional app. This secure communication option allows hotel staff to respond directly to guests' needs. (Baratti, L., 2020).
- The company also launches “NevoTouchless,” another innovative product allowing guests to access hotel services through their mobile devices. Guests can pair their devices with their in-room TVs. To be used as remote controls, to access online versions of in-room paper collections, and to order room service. (Nevotek., 2022).

### **6.3.2. Location detection**

Radar, which specializes in building geo-regions and geo-based applications, believes that technology that leverages location data is becoming essential for travel brands to promote the exchange of up-to-date information.

# Chapter 7

## Results of Research

As people's requirements and priorities change day by day and especially now with the COVID-19 pandemic, so do the predecessors in technology. Logically, technology should be adopted progressively everywhere, mostly by the hotel industry, as people should not encounter each other. "Contactless" or "touchless" technologies are considered the paramount solutions.

The use of new technologies in the hotel industry will improve customer service, both their stay, and their health and, at the same time, their safety. For these reasons, more hotels will improve their services with the use of new technologies so that each customer's stay is more pleasant, efficient, and "safe". Numerous advantages will be gained by the hotel industry since technology not only led to better customer service but also improves efficiency in the operation and management of hotels.

My questionnaire has been sent out to hoteliers and apartment/ Airbnb owners via email, Viber, Instagram, and Facebook chat. The questionnaire was open for two and a half weeks for responders to answer and closed after receiving 46 responses. The choice of the type of accommodation was on Question 1, 39.1% were managers of apartments or Airbnb, while 60.9% were hotel owners or employees.

The second question which was part of my first eight warm-up questions was the name of the hotel or apartment along with the 6<sup>th</sup> question which the respondent had to give his/her name. These 2 questions were about giving some information that of course will not be handed to anybody or shared without their consent. They are only used for purpose of confirmation.

Two properties out of the 46 did not answer with the name of the hotel and eight people did not give their name even though on the top I have briefed that their data will be used only for the research purpose and that they will be dealt with confidentiality.

The next question was about the Star rating of the property which:

- 37% with 0 Stars (apartments or Hotel apartments)
- 2.2% for each 1- and 2-Star hotel,
- 15.2% were 3 Stars hotels,
- 23.9% were 4 Stars hotels, and
- 19.6% were 5 stars hotels.

The following question was about their age group:

- 39.1% were in the range of 26 to 35 years old and
- only 1 respondent was below 25 the rest of the respondent's ages were split fairly with
- 10 people being 46 to 55 years old 21.7% and
- 19.6% with a range of age bis36 to 45 and
- 17.4% to be in the range of 56 and above.

Additionally, 45.7% have a master's degree and only 4.3% had reach a further Study and 10.9% have only completed primary school.

The majority of the properties that were included in my data were coming from Famagusta with 34.8% which is also obvious that most of our foreign tourism in half of the year is based in that area of Cyprus and the fewer responses were from Paphos with 10.9%.

Reaching the main body of the questionnaire would give more emphasis on types and results along with Covid-19.

If they are aware of the current technology models used in the questionnaire, how familiar are they with technology, on a scale of 1 to 5, and how adaptable are they to the 21st century, when technology is changing at an exponential rate? The majority of respondents (34.8% on a scale of 4 out of 5) and none on a scale of 1 to 5 indicated that they were very familiar with it.

This is a bit biased because it is based on their opinion of what they think of themselves, but we assumed they are familiar with everyday technology at least.

Question number 10: if they already have any advanced technology in their hotel/apartment before the pandemic? About 70% (actual 69.6%) did not have advanced technology and the remaining 30% did.

This 30% of already owned technologies are distributed among 14 people, 11 of whom are 4 and 5 stars, which shows that higher quality and reliable hotels were already adapted to technology even before the emergence of Covid-19.

Of the 17 apartments with a 0-star rating, only 2 of them had advanced technology, which is only 11.8%.

The reason for this is explained later, when asked about the disadvantages of these new technological innovations, most of the apartment owners answered that the cost of implementation is their main concern. The reason is that they may never perform properly for this innovation. There is only 1 room or up to 10 that will take a long time to pay off that investment and until it does, they may need to adapt again, so they prefer not to adapt.

Question 11 asks what kind of technologies hotels and apartments were using before Covid-19 and the next question is what kind of technologies they are currently using in Cyprus. This showed an increase in the types of technologies before and after. Even those who had no technology before the pandemic now have at least 1.

Before the pandemic, 45.7% already had digital payments and none of the venues had robots or facial scanning and voice control for room service. This shows that these three technologies have never been a priority for Cypriot hoteliers. However, adding up 43.5% answered that they had none with 45.7% having digital payments, it showed that 89.2%, which is slightly 9 in 10 had digital payments or nothing.

82.6% have implemented digital payments in their venue, and even 0% in Cyprus have implemented Robot or Voice control for room service.

In the next question, we try to find out if they believe that the new technological innovations, they have implemented during the pandemic have a positive correlation with more arrivals. 39.1% agree with the statement that technological applications are helping the hospitality industry to recover, but 15.2% are neutral about whether technology will have a positive impact on the tourist's choice of place to stay.

This 15% may believe that the pandemic as a variable is stronger than technology and that technology alone cannot exist or have a real impact based on arrivals.

We also have a supportive 19.6% who are almost certain that technology does not have a positive impact on tourists' decision to choose where to stay, indicating that customers fear Covid, and technology does not make them feel safe. Residents have other criteria than technology when choosing a place to stay for their holiday or business trip.

Hoteliere appear to be reluctant by more than half of respondents (58.7%) regarding the cost of implementing these technological innovations, but also 21.7% are concerned about whether employees will have the knowledge and be able to use it effectively if they were to be launched.

Furthermore, hoteliers and apartment managers/owners believe that 65.2% of customers require self-check-in/out and none of their guests has ever asked for a robot to serve them. That makes sense from their previous two responses if they had a robot before the pandemic or if they had implemented one. Robots seem to be not a very big demand for the Cyprus Hospitality Industry, as it seems that hoteliers and guests do not prioritize this technology option.

Question 16 is asking hoteliers what age group demands more technology in their venue and far younger people are asking with 43.5% choosing the age range of 19-24 and 47.8% choosing the range of 25-35. It can reveal that many hoteliers have chosen the range of 19-24 by default because younger people are very familiar with it, and their everyday life is based on technology. However, 47.8% is more important illustrating the range of 25-35 which shows that from the younger groups this range is the most applicable to have expectations of technology in hotels because these are the people who have economic independence and can travel more than others. We have the same percentage response of 2.2% for the range of 56 and above but also for the 36 to 45 years which shows that older people that are less familiar with technology are demanding it less than others.

Continue with question 17 if hoteliers believe there is an important technological solution or proposition that does not exist or exists and has not yet been implemented in their hotel, 69.6% left blank or said no to this question, indicating that they are satisfied with what they have been upgraded in their hotel so far or has no other idea that hasn't already been discovered. Others said that digital keys or digital cards as keys should have been implemented or self-check-in/out should be a good option to implement in the future at their venue. There was a discussion about the automatic check-in/out machine, which would be very convenient as it would work 24/7 and there would not have to be a front desk or front desk with physical staff. However, it would also be flexible for visitors to arrive whenever they want without strict time frames. Smart rooms were another response that showed hoteliers are familiar with room service, but others would also like to deploy a facial recognition system on their premises. Also, two people shared that mobile apps should be an innovation they want to adopt, and one mentioned a robot to reduce face-to-face contact.

The next question 18 is whether there is an advanced technology that would be useful even after the Covid era, with 47.8% choosing self-check-in and only 17.4% choosing Robotics. This result may indicate that people believe that only self-check-in/out would be effective and that robots will not be so important in the future. In my opinion, robots are being studied increasingly to find the most suitable version for the hospitality industry according to the services they offer, and the result of the question does not reflect the general opinion.

To continue with the next question 19, we asked hoteliers regardless of financial considerations whether they would adopt three technological developments in terms of importance. 37% have chosen 1st Auto Download, 2nd Face Control and 3rd Robotic Application. Of the 37% who chose automatic download as the most important, 30% rated it equally as 0 and 4 stars. 8.7% have chosen the Robotic application as a priority Facial Check as second and Automatic download is third. The majority of these responses were

from 5-star hotels, which clearly shows and matches my literature that these high-end hospitality venues want to greet their guests with a smile, not a machine. The robotic application is at the top of the hierarchy, as a robot would have a lot of prestige for its reputation, but it would also be much more useful for them instead of a one-bedroom apartment for example.

The third part of the questionnaire dealt more deeply with the characteristics and number of accommodation spaces. The 20th question was about the number of rooms in the venue, with 41.3% having 101 rooms or more and only 8.7% having 51-100 rooms. This shows a large gap between our data. Our data was mainly collected from large hosting spaces and very small spaces like Airbnb apartments that are more professional or active with their tasks. The middle category of 1-star to 3-star hotels did not respond much with 2 to 100 rooms, respectively.

Question 21 asked about the occupancy rate of arrivals at their accommodation in the last 3 years (2016-2019) before the COVID-19 era. 43.5% answered that they have an occupancy rate of 75% and only 8.7% had 0% indicating that these venues were closed for renovations or did not exist pre-Covid as they had no arrivals.

Next, question 22 asks about the occupancy rate in these difficult times of Covid along with some technological changes in the years 2020 and 2022. Here we have stated from 2020 because that was the actual year, we had the first case of Covid in Cyprus. 41.3% revealed that they had occupancy of up to 25% which shows a very large drop and also the same percentage answered that they had occupancy of up to 50%. This shows a very large decline in the industry, and this matches the world records mentioned above in the literature review.

Even if some hospitality venues have acted faster with some technological innovations, the situation with government restrictions and travel/flight restrictions worldwide is affecting the hospitality industry in Cyprus a lot.

However, the next question concerns the confidence and expectation of arrivals and occupancy rates after the COVID-19 era. 54.3% believe their occupancy will be at a higher level of up to 100%.

At the end of the questionnaire, the hoteliers had suggestions not already mentioned in the questionnaire about technological innovations that can be used for future research. 82.6% answered that they had nothing to suggest. Taking these responses even further, one person elaborated on his answer: "I do not know. This needs good research. Technology is the future, and it will overtake us. It's about knowing and being able to use it properly."

This is very interesting and wonderful that people know that technology is developing very fast and progressing deeply, which in some cases may not be used for the benefit of people.

Only 0.06% said that AI and guest data collection should be used effectively, highlighting that studies worldwide have shown that data will give hoteliers much wider opportunities in marketing and customer experience. One respondent responded that online bookings and live chats with owners are one of the technologies as suggestions, but they are probably not very familiar with them as it already exists in the survey. Another hotelier responded that further studies should be done on Robotics, which shows that people are willing to continue studies on robot services.

# Chapter 8

## Future Proposal for further research

### **Creating a complete digital experience for the traveller and how it will contribute to the completion of their reservation at the hotel**

The digital image of the hotel, starting with its website, plays a crucial role in the perception of potential customers, planning a trip and choosing the hotel. They have already started their experience and their decision to stay at a particular hotel will depend on the challenges they face. It is important that they can quickly locate the site and use its features to help them with this initial experience. It is advantageous to be able to attract new customers using effective digital marketing. Site navigation should also be simple to use on any device (with particular attention to mobile-friendly environments), interactive and use a variety of widgets to allow users to customize their stay. In this way, the hotel will attract the customer's interest and encourage a booking. Additionally, the use of AI technologies is considered particularly superior in hotels because it allows them to operate in an environment that most travellers are already accustomed to and respond to. (Labs, U, 2019).

Every hotel aims to make its guests think, "I wish I was there". The potential guest can tour and experience the hotel from wherever they are on any device and predict the experience they will have there, in advance, through videos or photos (which work like Google Street View). Shaping the traveller's in-hotel experience in light of recent hotel industry data and how this improves a hotel's organizational effectiveness.

Visitors' digital experience does not stop when they have already organized their trip. The speed of everyday life makes the traveller look for solutions concentrated in one point, in a button, in a voice command. (Martijn, 2019).

So, one suggestion is to make the hotel room smart so you can use an app to control every aspect of it. Hotel guests will be able to install it on their phone or use a specialized mobile device found in their room, such as a unique concierge tablet, to centrally control all room functions. These include contactless check-in and check-out, smart lighting, music control and temperature control. In addition, the guest's mobile phone will have a personalized entry key for the hotel room. In addition, the guest will be able to digitally order room service through the menu that will appear on the screen of their room, allowing their digital signature

Along with guest convenience, it is also important to reduce the environmental impact because, for example, the customer will be able to check the air conditioning just before arriving to make sure it is at the right temperature without wasting energy by leaving it on. In addition, the hotel's operational procedures, such as the cleaning requirements that may be present in the hotel rooms at any given time, will be better organized. Although important statistical conclusions for hotel management can also be drawn from the long-term analysis.

The above can also be combined with the use of AI systems, chatbots and devices such as Siri and Alexa, to answer customer searches related to the hotel and their destination. Leading the way to the optimization of the overall experience of visitors and its role in the after-sales services of a hotel, but also in shaping the provided future services. (Kutty, R. and Kutty, R., 2022).

The guest experience continues even after leaving the hotel. By gathering data from guest preferences, hotels can be guided to perfect a hotel's future service offerings based on what the customer wants from them. This can be achieved by the proper use of the above IoT tools, artificial intelligence, and smart hotel applications, which will have to work together. Then, based on these and with targeted Digital Marketing and customer engagement, they can be guided to convert hotel guests into loyal customers and ambassadors. (Siteminder, 2020).

### **Research and information.**

Hotels need to be able to collect feedback and data in order to understand guests and improve processes. Although they may not be immediately obvious in this case, facial recognition software can be very helpful. Businesses can use the technology to conduct market research and determine precisely how many people are in a given area at any given time. In addition, it can be used to extract information about customers by observing their facial expressions, which can reveal information about their mood, age, and gender. Privacy options are available with facial recognition technology.

Many people worry that their data is being sold to other businesses against their will and dislike the idea that businesses can track their every move. As a result, the hospitality industry must take these problems seriously and implement data protection measures. Giving users the option to enable or disable the facial recognition service may be one of the best solutions in some cases. Therefore, in order to avoid the integration of identification technology, those operating in the hospitality industry must first consider data protection laws.



# Conclusion

Considering that potential customers are looking for the best digital experience and that COVID-19 has accelerated the digital transition of every industry, the digital hotel no longer looks like a choice and a trend, but a necessity in an era where everything changes and looks for an already up-to-date hotel. Preparedness can be created by taking advantage of the time gap that the pandemic forces us to live through. If customers are looking for and leveraging digital tools, why shouldn't hotels be too?

## Why are new technologies important for hotels and businesses?

New machine learning-based systems like this will play a key role in recovering losses in the post-pandemic era. They are especially useful when:

- Automatic revenue management
- Micro-target marketing
- Fare forecast
- Seasonal demand forecast
- Competitive price
- Tailored and personalized experience

In the future, we can expect to see more bots designing personalized guest experiences and travel packages based on AI and machine-learned customer preferences.

Hospitality is one of many industries knocked hard by the pandemic, redefining the customer experience. As privacy and health regulations tighten, affected businesses will have no choice but to turn to technology. For this reason, the industry must develop and implement innovative trends to meet consumer expectations and improve employee satisfaction.

We are entering a new era where technological innovation stimulates exciting new opportunities for the hospitality industry. The future will be an exciting time for hotel management graduates, as previously unimaginable opportunities are being created every year. (Torrens Blog., 2022).

The more visitors you can track and identify, the quieter your data is. Most hotel owners have invested in physical security, including improved hygiene practices, hands-free technology and design layouts that encourage social distancing. But cybersecurity is an equally pressing priority. The app platform should have a section detailing rules and regulations regarding completely private guest features, the use or sale of customer data, and the consequences of violating them.

When potential customers are planning a trip and choosing a hotel, their perception of the hotel is heavily influenced by its digital presence, which starts with its website. As of now, they are on their journey and the COVID-19 crisis will no doubt spur innovation, without undermining the scope of the disaster. Technology adoption will accelerate faster than initially expected, drastically changing the hospitality industry. New levels of personalized hospitality are made possible by smart technology, which benefits both customers and staff. Hoteliers can emerge from this crisis with fresh, better, and more compelling standards of care if they have the necessary creativity, money, and security. (Jaffer, Z., 2021)

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# *Appendix A*

## *Questionnaire*

### **Part A: Intro (WarWarm-questions):**

I am Markos Kountouris, and I am studying Enterprise Risk Management at the Open University of Cyprus my dissertation thesis focuses on how new technologies in hotels can restore tourism opportunities and reduce risk in an era of a pandemic. The purpose of this research is to offer solutions to the hotel industry so people can feel more comfortable staying in a hotel. Your personal information would be used ONLY for research purposes and would be dealt with confidentiality. Answering this questionnaire will take less than 10 minutes. Thank you in advance.

1. Choose your hospitality venue type: Multiple Choice (MC) (Hotel, Apartment)
2. Hotel/ Apartment (Airbnb) name:
3. Hotel (Star) Rating (when applicable)-Apartment (0 stars): (scale 0 to 5)
4. Hotel Manager's Name that the Questionnaire was answered by:
5. Please select your age group: MC:
  - Below 25
  - 26-35
  - 36-45
  - 46-55
  - 56 and above.



6. What is your educational Level? MC: Primary Education, Diploma, bachelor's degree, Master's Degree, Further Studies (Qualified).

7. Geographical location of the hotel: MC: Nicosia, Limassol, Larnaca, Famagusta, Paphos

**Part B: Main Body:**

8. Can you please tell me how familiar and experienced you are with Technology from 1 to 5? (Scale 1 to 5)

9. Did you have any advanced technology in your hotel/apartment before the pandemic? MC: Yes/No

10. What kind of technologies you were using in your hotel/ apartment before the pandemic? MC:

- Mobile Apps
- Self-Service Kiosk (Self-check-in/ out machines)
- In-room technologies services
- Digital Payments
- Robots
- Chatbots
- Digital Contactless Services (Key Cards)
- Facial Scanning
- Voice control for room service

11. What kind of technologies are you using in your hotel/ apartment now? MC:

- Mobile apps
- Self-service kiosk self-check-in/out machines)
- In-room technologies
- Digital payments
- Robots
- Chatbots
- Digital contactless services (key cards)
- Facial scanning
- Voice control for room service

12. Do you believe that the new innovative technological solutions that you have embraced during the Covid era are impacting positively the tourist decision in choosing your hotel/apartment? MC: Strongly Agree, Agree, Disagree, Strongly Disagree, Neutral

13. What are the Disadvantages (Cons) of these new technological advances to your hotel? MC:

- Implementation Cost (Buying Cost)
- Maintenance Cost
- Knowledge level of customers with technology
- Knowledge level of employees with technology

14. What is the type of technology that consumers demand to feel safe during the pandemic and after their stay? MC: (Contactless key cards, Self-check-in/out, Robotics)
15. Is there a specific age group of consumers that demand more technological implementations than others? Age groups multiple choice: 0-18, 19-24, 25-35, 36-45, 46-55, 56 and above
16. Is there any technological solution/ suggestion that you believe is important but not existing or has not been implemented yet? If yes? Explain further.
17. Is there any technological innovation that will be useful even post-Covid era? (Contactless key cards, Self-check-in/out, Robotics)
18. If you had the chance of unlimited spending on technology adaptation. How will you order by importance the solutions that are shown below? MC: (1 most important, 2 less important)
  - 1) Robotic Application, 2) Automatic Reception, 3) Facial Check
  - 1) Robotic Application 2) Facial Check, 3) Automatic Reception
  - 1) Automatic Reception 2) Robotic Application 3) Facial Check
  - 1) Automatic Reception 2) Facial Check 3) Robotic Application
  - 1) Facial Check 2) Automatic Reception 3) Robotic Application
  - 1) Facial Check 2) Robotic Application 3) Automatic Reception

### **Part C: Characteristics of the Hotel/ Apartment**

19. How many rooms does the hotel/ apartment have? MC:
  - Apartment
  - 2-10 rooms
  - 11-50 rooms
  - 51-100 rooms
  - 101 and above
20. Up to what occupancy % was your hotel/ apartment arrivals in the last 3 years (2016-2019) before the Covid era?
  - 0%
  - 25%
  - 50%
  - 75%
  - 100%
21. Up to what occupancy % were your arrivals in your hotel/ apartment during Covid (2020-2022) era along with the technological advances?
  - 0%
  - 25%
  - 50%
  - 75%
  - 100%

22. Up to what occupancy % is your expectation of arrivals to your hotel/apartment after the pandemic?

- 0%
- 25%
- 50%
- 75%
- 100%

23. Is there any suggestion in your opinion that was not referred to above regarding technological innovations that can be used for future research? Long answer

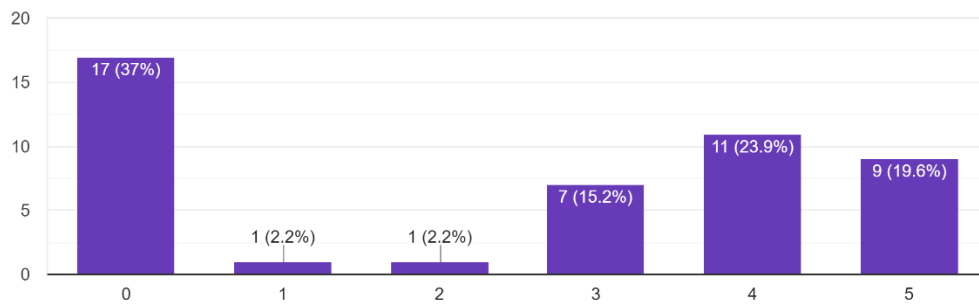
# Appendix 2

The image shows a screenshot of a survey interface. At the top left, it says "46 responses". On the right, there is a green plus icon and a vertical ellipsis. Below this is a red bar with the text "Not accepting responses" and a toggle switch that is currently turned off. Underneath the red bar is a section titled "Message for respondents" with the text "This form is no longer accepting responses". Below this is a text input field with the label "Hotel/Apartment (Airbnb) name:" and a small "46 responses" indicator. At the bottom, there is a list of hotel/apartment names in a scrollable container:

- Anthea Hotel Apts
- Olympic Lagoon Resort Ayia Napa
- Narcissos Villas Apartments
- Nissi Beach Apartments
- Cosmelenia Hotel Apts
- Kanika Hotels
- Louis Althea
- Louis Hotels
- One Bedroom Apartment with swimming pool

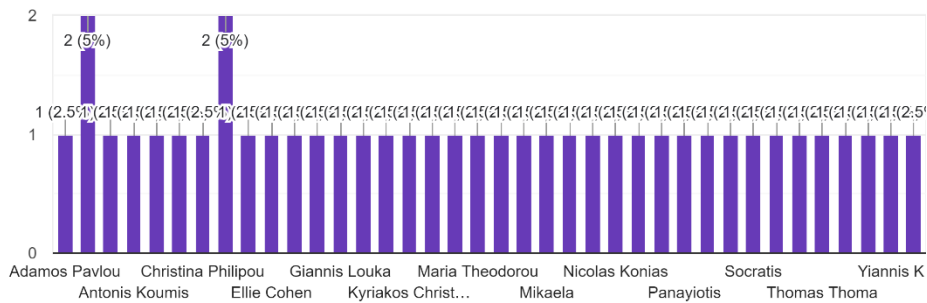
### Hotel (Star) Rating (when applicable) - Apartment (0 Stars)

46 responses



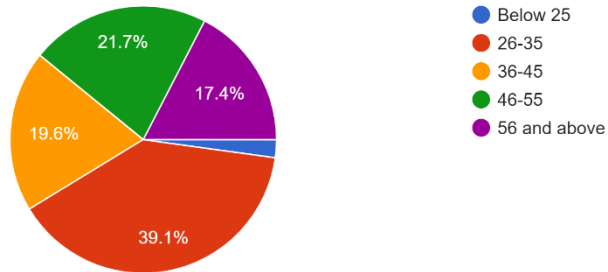
### Hotel Manager's Name that the Questionnaire was answered by:

40 responses



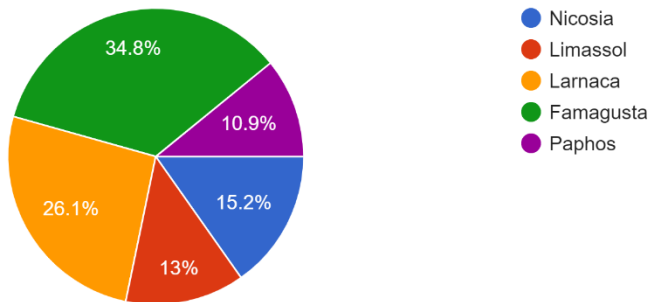
Please select your age group:

46 responses



Geographical location of the Hotel

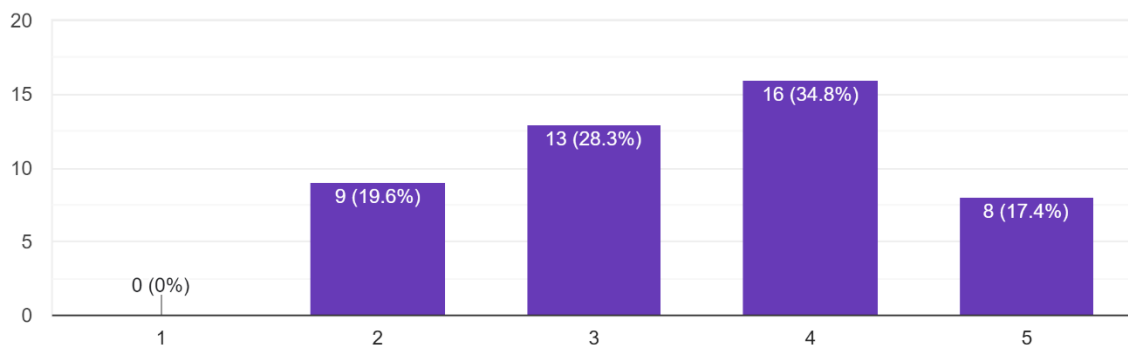
46 responses



What is your educational Level?

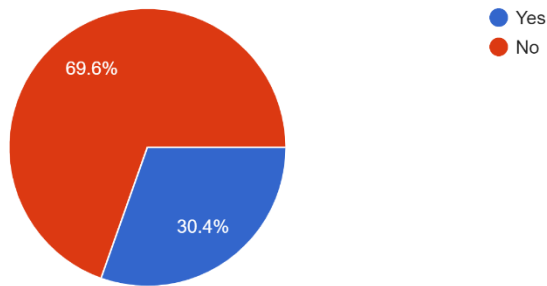
Can you please tell me how familiar and experienced you are with Technology from 1 to 5?

46 responses



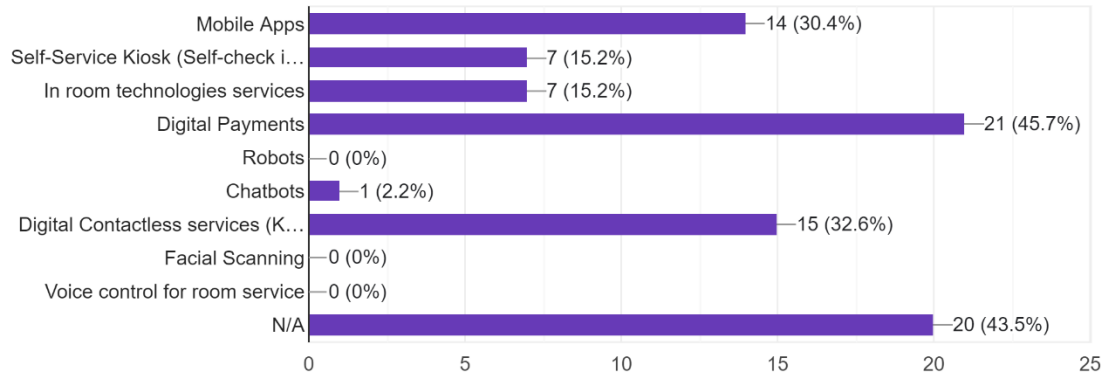
Did you have any advanced technology in your hotel/apartment prior to the pandemic?

46 responses



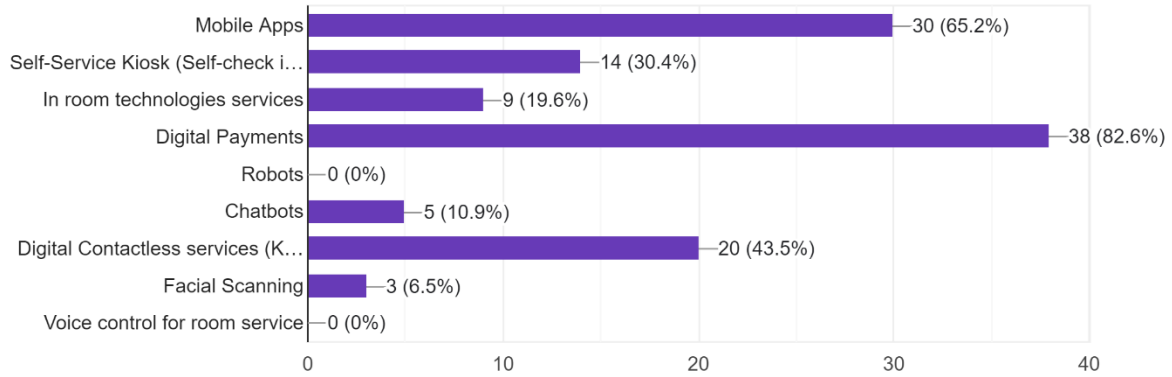
What kind of technologies you were using to your hotel/ apartment before the pandemic?

46 responses



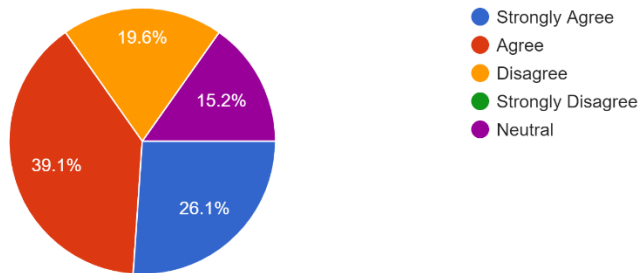
### What kind of technologies are you using in your hotel/ apartment now?

46 responses



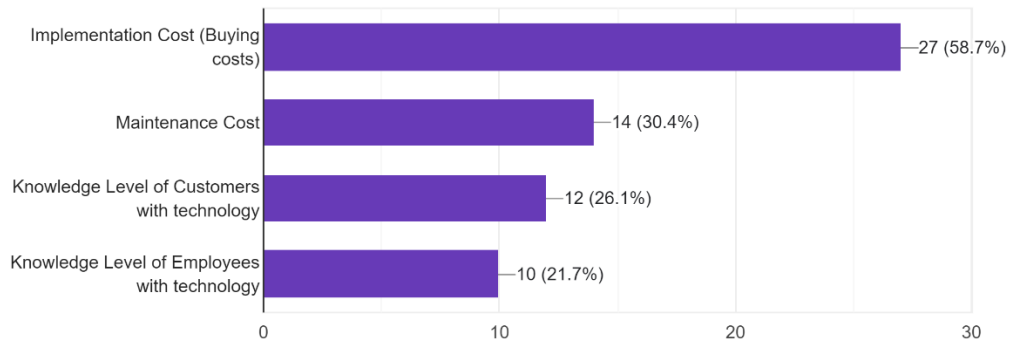
### Do you believe that the new innovative technological solutions that you have embrace during the Covid era are impacting positively the tourist decision in choosing your hotel/apartment?

46 responses



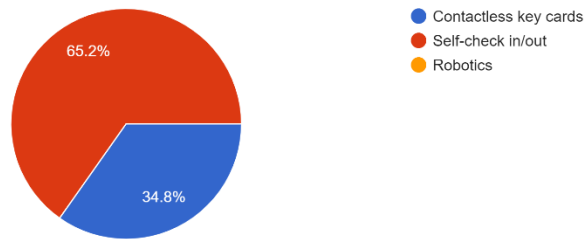
### What are the Disadvantages (Cons) of these new technological advances to your hotel?

46 responses



### What is the type of technology that consumers demand in order to feel safe during the pandemic and after at their stay?

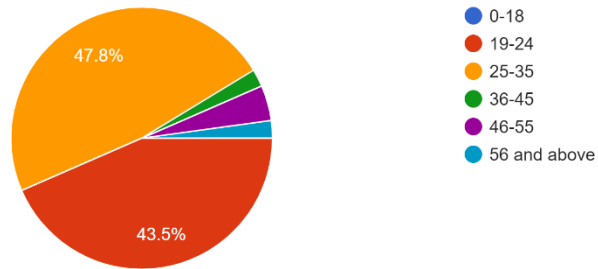
46 responses





Is there a specific age group of consumers that demand more technological implementations than others?

46 responses



Is there any technological solution/ suggestion that you believe is important but not exist or has not been implemented yet? If yes? Explain further

28 responses

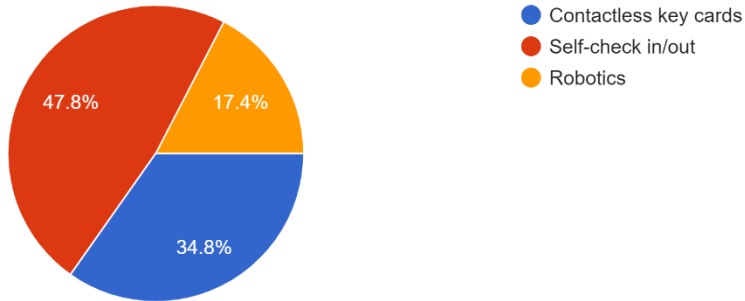
- no
- No
- N/A
- Yes
- Mobile apps for booking events within the hotel
- Smart Computer Technology
- Face ID
- Mobile Apps/Smartrooms
- A self check in/ out mechanism would make the running of the business easier, since personnel can be used in other areas of the property. Also, for customers would be more beneficial because of the 24/7

A self check in/ out mechanism would make the running of the business easier, since personnel can be used in other areas of the property. Also, for customers would be more beneficial because of the 24/7 convenience, without any time restrictions on time of arrival or check out-making it more convenient for everyone
Not Informed
Self check in and check out
Exist but not implemented yet in our Hotel: Digital Key cards and updated Mobile App
Digital Key cards on phones
Guests knowing they have spots reserved for them upon arrival. Also, robots to reduce person to person or face to face contact.
not sure

- Self service check in/ out
- Self check in
- Cards as keys

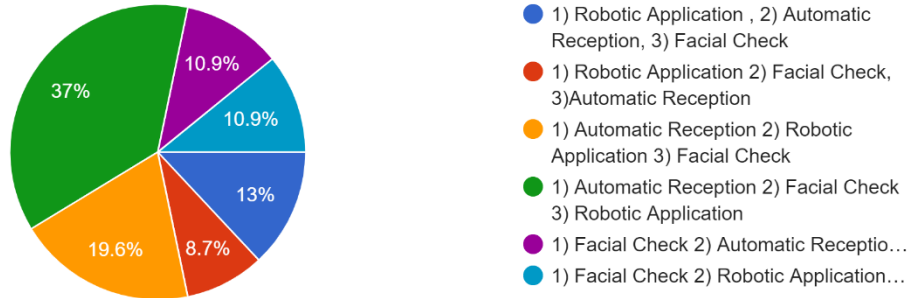
Is there any technological innovation that will be useful even post Covid era?

46 responses



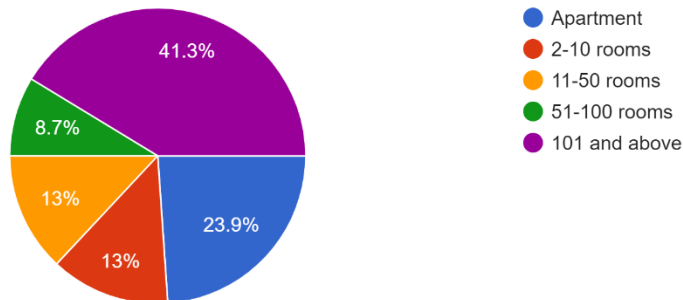
If you had the chance of unlimited spending on technology adaptation. How will you order by importance the solutions that are shown below? (1 most important 2 less important)

46 responses



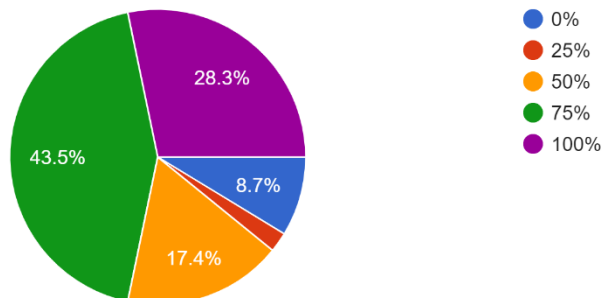
How many rooms does the hotel/ apartment have?

46 responses



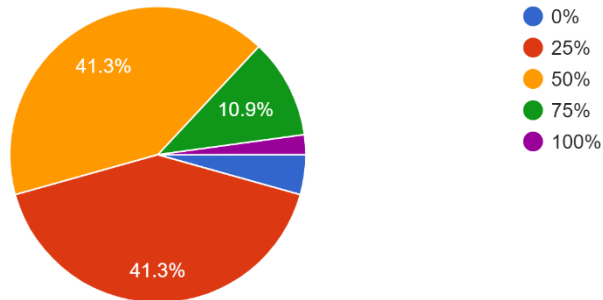
Up to what occupancy % was your arrivals in your hotel/ apartment the last 3 years (2016-2019) before Covid era?

46 responses



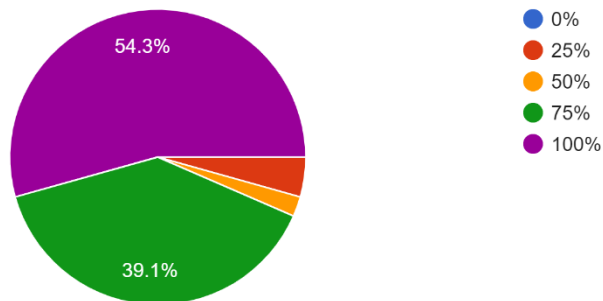
Up to what occupancy % was your arrivals in your hotel/ apartment during Covid (2020-2022) era along with the technological advances?

46 responses



Up to what occupancy % is your expectation of arrivals to your hotel/apartment after the pandemic?

46 responses



Is there any suggestion in your opinion that was not referred above regarding technological innovations that can be used for future research

46 responses

- No
- no
- N/a
- N/A
- None
- Online reservations and live chats with the owners
- Smart operating computers that will help at the overall maintenance of the premises
- i have no suggestions
- self charged mini bars

- i have no suggestions
- self charged mini bars
- I dont know. It needs a good research about it. Technology is the future and it will overtake us. The point is to know and be able to use it correctly!
- further studies on robotics
- No idea what will be discovered in the future
- Artificial Intelligence using Data from visitors
- AI
- AI