DIGITAL DENTIST

PROVIDING SPECIALIZED CARE THROUGH EFFORTLESS TECHNOLOGY

EXPLORING THE FEASIBILITY OF DIGITALISATION IN
ENHANCING CRM IN DENTISTRY

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DECLARATION

I, Shruti Pitta, declare that the work described in the following dissertation is entirely my own work, unless stated otherwise, and has not been submitted at this or any other college/university, as any type of exercise.

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ABSTRACT:
To survey the new technologies in dentistry and the dentists in Prostodontic/restorative programmes in Ireland and India regarding feasibility of On-board of digital aides into dentistry. The key objectives of this survey were to identify the current trends in Prosthetic dentistry and determine, to how extent these technologies are being implemented. An invitation to participate in an online survey was sent to 45 Prosthodontists and 70 general dentists. The survey took 20 minutes approximately to complete. Chi-Square test was run for this research. The response rate was 43% for Prosthodontists and 62% for the general dentists. Among the respondents, all of them, with an exception of few from India, were aware of the new technologies of CEREC. Less than half of the Prosthodontists (43%) have already incorporated the CEREC technology. When asked if the cost was an issue for preventing the patients to opt for this type of treatment, 75% of them affirmed this response. There was a significant difference among the two groups, when asked about the incorporation of this technique. General dentists reported less usage than 59.8% of the Prosthodontists. Currently only 15% of prosthesis are being processed with the CEREC. Majority of the respondents indicated that they were planning to include digital dental fabrication into their curriculum within the next 5 years. Whereas Only 24% of patients are willing and getting these high-end treatments.

CHAPTER 1: INTRODUCTION
This part illustrates the purpose of the research. A description of objectives and research question are also discussed here. Finally, a sketch of different sections would be developed as a guide for the readers.

For decades, the knowledge of business has been forwarded from one generation to others. Although being a new discipline, Knowledge management has become an asset in developing organisations. One such advancement is the emergence of technology into the field of dentistry, which has opened a large framework of possibilities among the consumers as well as businesses. The aim of these technologically aided services is to provide personalised products and services that would satisfy consumers and increase their loyalty.

Therefore, this research paper shows how a dental organisation can implement new strategies with the help of computer assisted technologies, in order to maximise the treatment options without any effort to the patients. The literature review in this paper is aimed to set basis on varied e-crm aspects and efficiency of the technology based on it. The primary research aims at testing and validating e-crm characteristics. The results from this study would show the contribution of technological advancements that could bring dentists in building stronger relationship with their patients. This research also would contribute to enhance the knowledge among the patients and the dentists in upbringing their businesses by predicting the behaviours and expectations of the patients.
1.1 BACKGROUND:

The success of a business has numerous factors involved—profits, consumer rights, consumer satisfaction, consumer retention. So basically, in short, the success of any business is reliant on consumers. As Drucker (Drucker, 2012) says, customers are the main key and valued aspects of a good practice. The main aim of business is to create satisfied customers. In today’s world, this is further enhanced by digitalisation in the present world. Computer aided technologies are transforming every aspect of human life. Noticeable improvements have been evident due to digitalisation of businesses. One such drastic change and improvement has been implemented in the field of dentistry. The advent of digitalisation in dentistry has made many convenient and delightful options to patients.

Technological advancements continue to evolve according to human needs and the constant constructing and reconstructing competition of the global market. Due to the efficient working systems, newer technologies are being applied in varied industrial sectors (Dwyer et al. 2005). Numerous marketing and management strategies are being adopted by business sectors to maintain their stands in today’s competitive world.

For long term relationships with the consumers, traditional marketing approach has started to focus on products, price and promotions. To have a stable dynamic market, a long-term consumer-dealer relationship is of utmost important competitive criterion. The recent years, internet access and web technologies have enabled and redesigned Consumer Relation Management (CRM) applications into newer and popular form acknowledged as Electronic Customer Relationship (e-CRM).

The other area of interest for this research is Dentistry. Dentistry deals with the problems of tooth, gum and the surrounding bones. It is a significantly specialized branch of medicine that has undergone some tremendous changes in the past decades with the introduction new materials and also newer technologies. Modernized dentistry has been highly profitable through digitalizing the procedures, especially in the field of Dental Prosthesis. The introduction of Computer assisted systems have shown great promise in providing not only feasibility but also reducing workload to the dentists and administrations alike. This essentially allowed to replace the classical approaches in prosthetic dental surgery mainly on dentures, bridges, crowns and implants. The result was quicker treatment procedures, more natural looking prosthesis and most importantly providing utmost satisfaction to the customers.

In the late nineteenth century varied aspects of human life were altered or affected due to the industrial revolution, specifically in areas of science and engineering. Dentistry was one among them. Large number of modifications in the field of dentistry started in the Victorian era. It was such developments and inventions like electricity, that led to innovative complex surgical equipment (Gelbier S., 2005). Another very important development during the 1990’s was the invention of computers. And the use of computers in the field of science and hence dentistry was a staggering aspect (K.I., 2000).

The constant developments in dentistry proceedings with the computer technology has ensured new opportunities in the field of Prosthodontics (Schoenbaum, 2013). The standard workflow or traditional approach in Prosthodontics usually has varied proceedings (Marco F., Fernando Z., 2017), which involves varied regular consequent dental protocols both to the patient and the dental professionals. And the dentists must be on their toes at each visit and keep the dental
technician updated at each stage. Varied procedures involve conventional impressions techniques, fabrication of casts which may be of different materials for example, acrylic. Porcelain, metals. Even after taking utmost care through each stage, at times there still might be slight faults in constructing oral prosthesis (Yuzbasioglu et al., 2014). The establishment of computer aided technologies, in contrast, has been a game changer. These technologies involve less manpower, limited number of dental appointments and the products manufactured have consistent precision (Fasbinder, 2010)

One of the influential components that predict the fate of a practice is the demographics of the patients. Statistics from United States show that the elderly population growth rate has risen from 2000 and 2010 to 15 percentage. Dentists also should be understanding that geriatric patients are at risk and underserved in the oral health arena. According to the U.S. Department of Health and Human Services in 2009, 13% of people aged over 85 lived in nursing homes where attention to not only general health but oral health was ignored. Also, study from Tuft University stated that disabled adults and seniors have numerous dental problems due to lack of care. Traditional approaches in dental surgery for such cases is a hectic job for both the patient and dental professionals. Digital dental care would be most effective way to approach them.

Dentists through the traditional techniques lack to provide effective visual explanations of treatment plans to their patients. Hence, verbal understanding alone is inadequate for the patient to make treatment decisions. Visual illustrations using modern techniques, photographs, 3 – dimension presentation of hard and soft tissues and planning and outcome of treatment procedures can all be carried out using computer systems. Such applications in dental office helps enhanced patient’s decision and interactive communication with dentist. (Canbazoglu et al., 2016). There are varied softwares for dental offices as well as mobile applications (Niemi et al., 2014), through which the patients can get access to a Dentist, get an evaluation and decide which treatment to go for, with all the visual treatment options they have.

Modern technologies have also led to the invention of certain aspects in the form of upgrades in software and hardware techniques in dental field. Computer aided technology created a chairside aide for dental professionals, that enables them to design and customize restorations in a matter of hours (SANNINO et al., 2015). This type of single visit dentistry had become popular in endodontics in the late 1980’s. Such techniques have begun in the field of prosthodontics as well. The changes in the field of Prosthodontics using the modern hardware and software techniques together and making a single visit dentistry would be gamechanger. The result of this evolution would be a mixed analog-digital workflow, providing the best outcome through a combination of best of both techniques (Patel, 2010)

One of the Information Software discussed in this research is “Wellola”. Wellola is the first ever in-house software solutions to communicate with doctors in easy to use approach. Its unique feature allows patients to book in-house consultations, depending on the availability, through video consultations. The software’s secure portal includes online appointment reservations, online therapies, videos consultations without any third-party involvements, unique and integrated payment systems and in compliance with the GDPR data privacy regulations and also tele pharmacy are quite interesting and accessible features. The main aim of this company is to improve efficiency and make available and maximise the resources,
thereby reducing the patient waiting lists and also, the best part, serve the underserved or remote regions.

Secondly this research would talk about CEREC. Every professional practitioner faces the competitive challenges and hence tries to integrate advanced and newer technologies to remain competitive and meet the needs and demands of the people, in this study - patients. CEREC would provide the necessary solutions to such competitors. It would offer a wide range of treatment options and provide comfortable treatments as well. The CEREC spectrum covers three major areas of dentistry: Restorative/Prosthetic, Orthodontics and Implantology. This study mainly concentrates on Prosthodontics/ Restorative dentistry.

This research tries to explore the integration of Wellola and CEREC into dentistry practices for making effortless and time efficient dentistry, thereby creating a positive E-CRM factors in dental field.

1.2 AIM AND OBJECTIVE

The main aim of this study is determining the impact of digitalisation in the field of dentistry and highlighting the importance of these computer aided technologies on the consumer relation management. That agenda is to evaluate the of patient’s attitude towards effectiveness and their preferences towards digitalised dentistry.

The objective is to improve patient – dentist interaction by combining software (like mobile applications) and hardware (like CEREC, CAD/CAM) in dental context. The appropriateness of user centred methodologies would be targeted. It is assumed to offer adapted and personalised services that would satisfy the customer and the business alike. This could also lead to consumer loyalty towards the practice. Hence, securing highest predictable success.

1.3 RATIONALE

The advancements in the field of dentistry and the increased public awareness had led the people and society to be more conscious about their teeth health. Hence, dental professionals need to constantly keep updated not only their skills but also the technological advancements in the field, so that they can offer faster, safe and accurate results to the patients. Hence, securing highest predictable success with least dental protocols.

1.4 SIGNIFICANCE

With the use of this digital revolution in dentistry, not only the dental professionals would be able to be manufacturing and fabricate high quality prosthesis, but also will be able to maintain loyalty of the patients and retain them for long time. This can potentially take the profession to an entirely new direction.

1.5 RESEARCH QUESTION:

In this paper, the researcher will try to critically analyse and explain how dentists or dental administrators witness their relationship with patients based on virtual and computer
assisted systems. This research is not only about technologies in the industry but the state of CRM through advances of technologies. This paper also discussed about how digitalization can be integrated into CRM strategies. Hence, the title: “Exploring the feasibility of digitalisation in enhancing Dental CRM”

The working question for this dissertation is as follows:

“How is the influence of Digital On-Boarding on CRM in the field of Prosthetic Dentistry?”

The study’s focus is to review articles and journals and assesses the practical applications of digital technologies on patient – doctor relationship. The focus is mainly on Ireland and India. The patient-doctor relation is attempted only when the patient badly feels the need of a dentist. Hence, the digitalisation would make the relation better and furthermore improve the dental services in India.

1.6 SCOPE:

Digitalisation in the field of dentistry is more than a hype. The future is now. Waiting for the right moment and time would push you back to decades from your success. When appropriately implemented and executed, the return on investment is not only excellent but increased joy in practising dentistry with ability to deliver satisfactory patient results would be achieved.

1.7 SUITABILITY OF THE RESEARCH:

This topic and area of study are of most interest to the researcher. The researcher aims to set up a dental organisation. To better understand the suitability of the topic, the researcher’s background and academic history of the researcher are explained below:

1.7a ACADEMIC BACKGROUND

The researcher has experience of three years in the field of dentistry and two years in clinical administration. She obtained her Bachelor’s in Dental Surgery from India and is pursuing Master’s degree in Business Management from Dublin Business School. MBA from DBS has helped her to meaningfully foster the knowledge on the areas of interest especially in clinical administration.

1.7b: LEARNING STYLE:

During the academic year in Dublin Business School, the students were to submit a self-assessment survey based on University of Virginia on the Locus of Control and also Kiersey Temperament Sorter survey based on Myers – Briggs Type Indicator (MBTI). And the questionnaire revealed that the researcher is Thinker, Intuitive, Judger according to MBTI and has both internal and external locus of control according to the survey by University of Virginia. Which indeed is true about the researcher. As the researcher is cautious, needs information and planning to do any work. Thinks before doing anything and, judges and assesses the situation before hand and works sincerely to bring out a bigger perspective.

1.7c WORK BACKGROUND:

The researcher has carried out internship in India in Dentistry and three years of official dentist experience from Hyderabad, India. And later, two years and on-going experience as a Practice Manager of a dental organisation in Dublin, Ireland. Among the two years of experience in Managing the clinic, the researcher had to look into the criterion to assess
and maintain consumer relationship and to create and try to implement and adapt newer strategies.

1.8 CONTRIBUTION OF THE RESEARCH: From this research, knowledge will be enhanced regarding the current trends to analyse and maintain consumer relationships in dental health sector. The researcher will mainly focus on the dentists and the administration point of view, instead of the consumers point of view in this study. The advancement of technologies and the consumers raging pace with the virtual world these days, would help in predicting the study objective. This research would be most helpful for the researcher as, she already has a family run business and would also like to set up her own dental organisation, both of which would be benefitted if the current trends in study prove to be successful in maintaining and retaining consumer relationship within the businesses. The researcher’s past experiences and the studies from Dublin Business School would hopefully be helpful in adding value to the E-CRM process and for the researcher herself as well.

1.9 RECIPIENTS OF THE STUDY: The researcher of this dissertation are as follows:

- **Main Recipients:**
  - 1st recipient: Dublin Business School (the researcher is a full-time student in MBA)
  - 2nd recipient: The researcher’s supervisor, Professor Paul Taaffe
  - 3rd recipient: Dentists from Ireland and India
  - 4th recipient: The researcher herself (Shruti Pitta) – pursuing MBA from Dublin Business School

- **Secondary recipients:** Dental related practitioners – practice managers in dental clinics, dental nurses, dental technicians and dental organisations, who generously accepted to contribute for this study.

1.10 CONTENTS OF RESEARCH: The dissertation is divided into five chapter as follows:

- **CHAPTER 1: INTRODUCTION:** It is an overall outline of the thesis that includes varied parts of the area of research, aims and objectives, research question and scope of research etc.,

- **CHAPTER 2: LITERATURE REVIEW:** This part of the study overviews the entire academic material read and used for this study by the researcher regarding this topic. Also, this literature review is divided into CRM and E-CRM descriptions, classifications, strategies. The TMA models and IDT Theories of E-CRM are also discussed and finally the IS - Wellola and the CEREC application of dental field are explored and explained.

- **CHAPTER 3: METHODOLOGY FOR THE RESEARCH:** This part of dissertation illustrates how exactly the researcher is going to carry out the study or the research and tries to find out the answers for the research and meet the objectives.

- **CHAPTER 4: ANALYSIS OF THE FINDINGS:** The researcher will record and translate all the findings from the collected data and analyse them. SPSS coding would be done here to illustrate the results.
CHAPTER 5: FUTURE RECOMMENDATIONS: From the above obtained findings researcher would try to conclude and provide few possible insights and self-reflections about the overall understanding and experience about the study through Dublin Business School.

CHAPTER 2: LITERATURE REVIEW:

One of the significant changes in the 21st century in dentistry is the shift from dentist–oriented system to a more patient oriented system. Ever since, the health-related quality has been constantly being concentrated and evaluated. To achieve the best outcomes, the need to supplement traditional approaches with advancing technologies has been emerged. Aim of this collaboration is not only to provide better treatment opportunities (Locker and Allen, 2007), but also to have better doctor – patient relationship. The Prosthodontic branch of dentistry is being concentrated in this paper. Tradition approach in prosthodontics is being dominated by the digital advancements in dental technology. These in turn are giving a huge turnover to the dental practices. In this research paper, we are going to concentrate on the patient–doctor relation or the CRM aspect of dentistry due to involvement of digitalisation.

Customer Relation Management (CRM) has always had its focus on the business’ perspective and not on the service – orientation or the consumers (Hannu S., 2013). This paper seeks to explore the future research aspects, through CRM focusing on the digital aspect of prosthodontics. The company might be existing for generations but the main aspect that drives the business is the customer.

Profit and success of business are majorly based on customer satisfactory issues.

For the past four decades, the business strategies and conduct have been observed to take major dramatic changes. In the recent years, the shift from traditional to electronic business can be observed a lot because of the influence of internet. The dealings in e-business can be done through electronic mails, World Wide Web (WWW) and information systems (Khan and Khawaja 2013). Considering today’s customers are becoming more knowledgeable and to retain those customers, companies nowadays are heavily investing of technologies. Based on this, CRM has surfaced as a source for implementing relationship marketing among and within the companies and also with the consumers (Plakoyiannaki and Tzokas, 2002)

The main aim of any firm in e-marketing, according to Alhaio (Ahmed, Robinson and Elsony, 2009) is to maintain consumer relationship. With suitable e-CRM strategies and implementation: enhanced consumer loyalty, effective marketing, efficiency, expense reduction and enhanced consumer support can be achieved (Ab Hamid Cheng et al. 2011). As, Azlia and Noor (Noor et al., 2018) say, it is worthy enough to note that through the internet and technologies in industries, consumer loyalty, satisfaction and most importantly because of the above two, retention of consumers can be achieved (Rahman and Fatma, 2015).

Studies regarding prediction of e-CRM on consumer loyalty and satisfaction by Lee-Kelley, Gilbert et al, 2003, Khan and Khawaja, 2013, Miremadi et al. 2012(khan and Khawaja, 2013) will be reviewed here. Definitions of CRM and e-CRM and then the relation between consumer satisfaction and e-CRM would be explained. And finally, selective studies would be reviewed, and the article would be finalized by stating the academic benefits of this research.
2.1 LITERATURE THEME: e-CRM and DENTISTRY

The term “electronic commerce” encompasses many activities through computer technologies and internet, including inter-organisational transactions of information, financial transactions (adeleer, 2006). The impact of the internet has made considerable amount of differences in businesses (theo, 2003). Similarly, e – CRM would a potential tool for conducting business in dental sector as well.

Loyalty and patient retention is one of the types of loyalty marketing in CRM strategy. Loyalty marketing is an approach focuses on growing new customers and retaining existing customers, by providing quality, quality service and promotions. This discipline has been around in the business field since ages, but it just being a model, became a medium of marketing and advertisement. Implementation of this model would be leading to strong links between customer loyalty and businesses. One of such marketing theories is the “Loyalty Effect and Loyalty Rules” by Frederick F. Reichhleld (Lawson- Body and Limayem, 2004).

Most of the evidence of impact of internet and digitalised dentistry on CRM is available in described studies only, not in practicality (Papastathopoulou and Avlonitis, 2000). There is little existing literature based on this type of study in Hyderabad. But the degree to which digitalisation is used by dental offices has been talked and praised about. It is well known for improving the interactive communicational capabilities thereby, enhancing the customers. However, it is only speculated. In this paper, the conceptual model would be tested based on digitalisation of dentistry and customer satisfaction

DEFINITION OF e-CRM:

In literature E-CRM has varied definitions. Jutla et al,(Ngai, 2005) defined E-CRM as an business element or a consumer relationship maintenance element for e-business. According to Purba in 2001 (Hamid, Mousavi and Partovi, 2009a) “E-CRM is an implementation of internet- based technologies to attain CRM”

The business environment in the current digital economy has evolved into a competitive world based on the abilities of speed, innovation and modelling strategic association with players in the industries along with the consumers. Companies small or large are competing way effectively than before because of newer technologies and of course the internet. According to Maroofi (Hamid, Mousavi and Partovi, 2009b) and Anderson and Srinivasan, (2003), the value added and modified services in today’s competitive world where the crucial elements like communication, information and co-ordination can be easily and rather effectively, carried out through the most efficient low budget internet technologies.

Most common tendency of any business is the marketing of the newer technologies and internet in their business. As Ab Hamid et al. (2010) says, only through accessibility, product information and value-added services, consumer loyalty and satisfaction can be achieved. With developing technologies, the maintenance and enhancement of the consumer relation, requires collaboration of industries with the consumers, for instance: social media or mobile applications. It costs five times the effort to retain an existing consumer than to find and get a new consumer(Haque, Dey and Khurdiya, 2011). Thus, it takes a noble approach or a strategy in building a long-term sustainable value relationship (Gordon, 1997).
A study conducted by Scullin et al (2002), illustrates the companies attain massive ROI (Return of Investments) and increased consumer loyalty through successful use and implementation of e-CRM. According to Kumar and Vikraman (2011), through successfully implemented e-CRM techniques, the access of services and the product information to consumers can attained more conveniently and in a less expensive way compared to the traditional means. E-CRM allows consumers to do the self-services on internet, thereby reducing work of the employees. E-CRM allows the consumers to be the active and important participants in service and purchase processes. This way the consumer feels more authorized to control and manage the procedures and by this the company attains knowledge of the consumers and their management. The consumers do not feel restricted in communicating and associating anymore. They can be connected with the organisation throughout and even after the business hours. In short, Consumers in e-CRM do most of the work for themselves (Ellatif and Mohamed, 2007) (Chandra, Strickland 2004).

Bergeron (Bergeron, 2004) in his book, illustrates E-CRM as CRM on web that involves e-commerce activities by the use of internet-based crirerion. Dyche in 2001 (Valmohammadi, 2014), proposed two main categories of E-CRM:

- ANALYTICAL E-CRM: Entailing technology for processing big quantities of consumer data is analytical e-CRM.
- OPERATIONAL E-CRM: The consumer touch points like fax, sales, e-mails etc., are linked via operational e-CRM

E-CRM is not simply about the technologies and softwares, it is about bringing into line the processes in a business the consumer strategies that are assisted by technology and software. E-CRM is about process and people, according to Rosen (2001) (Daghfous and Barkhi, 2009). There are about five E-CRM study zones, according to Fjermestad and Romano (2003) namely:

- E-CRM human factors
- E-CRM Markets
- E-CRM technology
- E-CRM business models
- E-CRM knowledge management.

The theory behind this sequence is that at every stage in the process of purchase, the consumers would wan to use only particular factors of the E-CRM (Khalifa and Shen 2005). Similarly, according to Feinberg et al., (2002) and Lu, (2003), E-CRM generally tends to serve pre-sales information, post-sales support and e-commerce service areas of the process. The immediate assessment shows the e-CRM functions that mimic the company efforts in order to satisfy the consumer needs, based on the lifecycle of the above three stages.

E-CRM CUSTOMER SATISFACTION:

Previously businesses used to and had to invest on products and strategies were based on pricing, design and distribution, but now we can see a dramatic shift from marketing strategies to consumer satisfaction and retention. As Disney reported in the year 1999, “The need to meet consumer’s expectations and retaining the loyalty of consumers has become a critical aspect as the organisations are becoming more and more consumer focussed”.

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According to Kelley et al (2003), the newer marketing strategies and activities involving e-mails, e-forms, chat rooms etc., that aims at improving and enhancing the consumer relationship is E-CRM. Authors Reichheld and Schefter in 2000, Anderson and Mittal in 2001 and also Yang and Peterson in 2004, found empirically in their study that the definitive objective of E-CRM is gaining loyalty of consumers that would lead to repeated purchases and thereby increased profitability. Long term relation brings many potential benefits for many services in varied industries. For example in the health care sector, long term relation with patients leads to referrals from the existing patients, thereby increased profits. A study was conducted by Alhaiou et al. in 2009, on online consumers transaction cycle to learn about the E-CRM credibility. The study described the loyalty of online consumers through E-CRM features. The study revealed that there was 64.3% loyal online consumers, proving reliability, loyalty and retention through E-CRM process. Studies also revealed that one of major consequence of E-CRM was consumer loyalty (Reichheld and Schefter in 2000). At the purchase stage of E-CRM, consumers normally, already make their decision before proceeding to the next stage of transaction.

At the post-purchase stage, the important business element, success comes to play. Ross (2005), describes that the success of the company is based on consumer services, by keeping in track the feedbacks and the level of consumer satisfaction. This is an important phase in the transaction cycle, as this shows the experience of the consumers after purchases are made. The stages of study of the effect of E-CRM on loyalty was done by Alhaiou et al. (2009). The outcome was positive and the relationship between at purchase features of E-CRM and the consumer loyalty were significantly co-relative.

ADOPTION OF NEWER TECHNOLOGIES:

Innovation of newer technologies are growing each day. But unlike innovation of technologies, the adoption of any technology into practice seems to be a rather continuous and a slow process (Hall and Khan, 2003). Different perspectives come into play, while adopting newer innovations, as they combine the new marketing strategies and fast changing technologies. The theoretical frameworks provide reliable arguments and enable the practitioners and managers to gain better understanding about the application of newer technologies and that could be used in an effective manner. The recent study in embracing of Information technologies and it use have motivated the desire to predict the successful marketing factors (Lynn et al, 2002). But still E-Marketing or E-CRM is still relatively new in health sectors. Hence there is a need to have clearer understanding as well as opportunities through E-CRM and how these technologies can be used in a more effective way than relying n the traditional approaches (El-Gohary, 2009).

Although there are many, theories on adoption of technologies, in this study we focus on Technology Acceptance Model (TAM) by Davis (1989) and the Innovation Diffusion Theory (IDT) by Rogers (1995)

TECHNOLOGY ACCEPTANCE MODEL (TAM):

The traditional Four P’s of Marketing: Product, Price, Place and Promotion is being replaced by Consumer Relationship Management (CRM). Despite the stable growth in the number of E-CRM installations, studies indicate that 60% of them are failures. System use is an important indicator of a successful Information Systems (IS) Implementation. Often this is co-related
with the attitude and behavioural intentions of the users. To explain and analyse any particular Information Systems, Technology Acceptance Model (TAM) is necessary.

Technology Acceptance Model (TAM) was proposed in 1989 by Davis. It explains the usage, acceptance and adoption of information systems. Davis referred a theory called Theory of Reasoned Action (TRA) that was developed by Ajzen and Fishbein (1980), to develop this TAM model. Davis in 1989 used the TRA theory in his study to show that the beliefs influences the intentions and behaviours. Moreover, according to Ledere, et al 2000, this belief-attitude-intention related behavioural relation can be used to predict the acceptance of IT. Based on that Davis predicted that, IT adoption is affected by user-related beliefs. Thus, he constructed the TAM model on the following beliefs:

- **PERCEIVED BELIEFS** – which is “the degree to which the person believes that using a particular system would enhance his work performance” (Davis 1989)
- **PERCEIVED EASE OF USE** – “the degree to which a person believes that using a certain system would be free of effort” (Davis, 1989)

Also there are two more components of this model apart from the above two:

- Attitude towards IT use
- Behavioural intention to use IT

The above figure illustrates the components of Technology Acceptance Model (TAM). But TAM cannot be helpful without proper attributes of innovation factors or IS innovation factors, as it does neither specifically address the external influences (social influence, consumer, suppliers etc.,) nor even the economic factors. Thus, it requires the study of TAM integrated with Innovation Diffusion Theory, IS innovation model and thereby concluding practitioners to use effectively the assistance of diffusion of e-CRM in businesses and organisations.

**INNOVATION DIFFUSION THEORY (IDT):**

Innovation Diffusion Theory (IDT) is considered one of the most popular and accepted concepts by researchers. IDT was introduced in 1983 by Rogers. According to Rogers (1989) “The process of communicating the innovations through certain channels over time among the...
social system members” is Diffusion, whereas, “an idea or a practice that is apparently used as new by a member or a unit of adoption” is Innovation.

Innovation Diffusion Theory originally had five categories and was illustrated in a bell -shaped graphical curve image. Rogers even estimated the percentage of each category which form the proportions of the bell- curve. The following figure illustrates the five original categories by Rogers of innovation Diffusion Theory:

The diffusion or adoption of newer technologies is a slow continuous process. For instance, the drastic increase in the amount of medical information in the recent years, has led the health care sectors to utilize information systems to enhance health care services. From the health care business perspective, Patients are the manor consumers, who receive the health care services directly and realistically. Though there have been few studies of information system adoption and critical dramatic factors through them, there still have been cases wherein few have specifically explored the E-CRM adoption and the consumer satisfaction through it. To illustrate this, varied studies were proposed where an integration model of organisational and system related conditions were incorporated, for determining the adoption of E-CRM in health care sectors. According to Shin -Yuan, 2010, the outcome f these studies indicated that the size of the health sector, innovation of executives, IS and knowledge management capabilities of the staff have relatively significant influence on the adoption of E-CRM. The results also reveal the suggestions to increase the likelihood of E-CRM adoption to researchers and the health sectors.

Later Rogers identified that there are eight diffusion research types: earliness of knowing regarding innovations, rate of adoption into systems, opinion leadership, diffusion networks, use of communication channels, innovation consequences. The figure below illustrates the components of Innovation Diffusion Theory (IDT)
The Innovation Diffusion theory was discussed in 1903 by a French sociologist Gabriel Tarde and later adopter character were introduced by Ryan and Gross in 1943. This theory of Diffusion of Innovation is regarded as a valuable model for guiding technologies changes and innovations, where innovation would itself be modified and meet the requirements of all the adopters across varied levels. It stresses the importance of peer networking and communication (June, 2011). The goal of the theory is not only to make the people to move within the adopter categories but to assess the innovated technologies and create such an innovation which meets the requirements of all the adopters. (SOURCE: June, 2011)
Diffusion theory can be very important as it can serve administrators, informatics experts and technologists and people who would like to have changes. The theory’s targets change considering all the involved stakeholders are entangled within robust strategies and to implement innovative changes. The theory fits dental informatics very well and would provide good planning strategies for innovation related to dental informatics.

**CONSUMER STRATEGIES:**

According to Rubin (1997), the companies must identify various consumer segments to approach their needs. Thus, consumer strategy infers or defines the necessary micro or macro – segmentation. Hence, the developmental strategy of businesses relies on the overall assessment of business. Value Creation Process in CRM also suggest the transformation of developmental strategies into softwares (Frow and Payne, 2005). The so called “value proposition” is usually an internal aspect but Greenberg (2004), only few companies have a strong and written proposition values.

Payne and Frow, 2006 explains that Multi-Channel integration process indicates all the touch points both physical and virtual must be manages among the consumers and companies and decide and implement the best combination to experience the best satisfaction of both consumers and the firm. Wide variety of channels provides varied channels to satisfy consumers. Integration of varied channels would help the companies to collect and assess the data about consumers and provide a chance to enhance their capabilities to satisfy consumers.

**2.2 LITERATURE THEME: ON-BOARDING ANALOG AND DIGITAL**

Traditionally in Prosthesis, dentures were fabricated using blocks of wood (Artopoulou et al., 2006) and then progress was made to taking impressions using Plaster of Paris (Birnbaum and Aaronson, 2008)The long journey from prosthesis made out of gold, porcelain and vulcanisation to the introduction of elastomeric and resin materials had been very long (Schmitt SM, 2009)

As time progressed, improvements and developments were noticed not only in the approach and materials but also technically. Digital imaging has become the alternative to conventional film imaging technique. CAD/CAM were introduced into dentistry, which were earlier used in designing cars and aircrafts (Gupta, Luthra and Kukreja, 2018) Then progressive application of CAD/CAMS led to manufacturing of prosthetics with great accuracy (Carvalho, Gonçalves and Tanomaru-Filho, 2007)

The use of these digitalised technique’s main strategy is production of optimized high-quality restorations by the use of biocompatible materials. Such continuous evolution of CAD/CAM has led to a seemingly impossible single - visit dentistry in Prosthodontics.

With the application of advanced technical aids, dentists are getting convinced that integration of computers with dental practice could improve the productivity and accuracy with ease. Patient’s monitoring could be done with intra oral aides with hair side computers. The corresponding administrative and clinical features could be easily integrated through digitalised dentistry (Brennan, 2002)
Digitalised dentistry has provided virtual aides not only to the patients but also to the trainees, who unlike the traditional approach learn to conduct operation under supervision, now are able to train through these audio-visual aides. These procedures would be variably effective and less time consuming (Marras et al., 2006)

Wellola:

Wellola was first started in 2014, by Sonya Neary. It is a communication portal for businesses to fit any healthcare sector. The software was made for the access of the remote and needy. The founder realized the software’s biggest need was in the mental healthcare sector. they started developing face-to-face consultations, online therapies etc., and created a secured product aimed at psychiatrists. This idea started to be very interesting and can be employed into varied health care sectors. Much literature cannot be gained regarding this topic as it is rather a very new concept and there was no research is done on it yet.

The best features and advantages of Wellola can be noted as follows:

- Improved efficiency
- Provide assistance with varied resources
- Facilitate reduction of waiting lists
- Reach remote to underserved areas
- Online consultation benefits – face to face consultations
- User friendly

CEREC:

The fabrication of conventional dental preparations using manual procedures in clinics and then sending them off to dental technicians is an usual routine seen in dental practices. The patient has to attend the clinic at least for three visits, over the course of a month, for the prosthetic tooth to be done. This process is tedious and time taking for both the dentists and the patients. However, few studies have shown that the conventional approaches through technicians are bringing unsatisfactory results among the patients, thereby disrupting the dentist-patient relationship (Gary et al. 2015). Also distortion and expansion process of the materials used for the process are noted to reduce the precision of the prosthesis (Patzelt et al., 2014)

Intraoral scanners (IOS) are gadgets for taking direct optical impressions in varied fields of dentistry. Like other three-dimensional (3D) scanners, they anticipate a light source (laser, or all the more as of late, organized light. The views of the dento - gingival tissues are also captured by imaging sensors and these can be easily handled by the examiners. These point are then triangulated by a similar programming, making a 3D surface model. The 3D surface models of the dento - gingival tissues are the consequence of the optical impression and are the ‘virtual’ option in contrast to customary mortar models.

Due to advancing technologies dental prosthesis techniques have accomplished a dramatic turn from their conventional to digital based fabrications in the recent years. Digital impressions could be taken with the help of computer assisted systems known as CAD/CAM. These digital acquisition systems in the dentistry allows dentists to capture images in three-dimensional view, completing the digital workflow. CAD/CAM that is currently being used among most of
the practices was developed about 30 years ago, but its existence and usage has been recently recognized.

The system of CEREC was developed by combining both software and hardware and since the launch it has shown great clinical improvement and efficiency. The three – dimensional program designs have significantly showed improved chairside workflow.

DIADVANTAGES:

✓ Price
✓ Additional training required by dental practitioners
✓ Few numbers of users
✓ Size of the equipment
✓ Acceptance by dentists and patients
✓ Relationship with the dental technicians is affected

ADVANTAGES OF CEREC:

✓ Providing the prothesis in a single appointment
✓ In-office prosthetic/restorative procedures
✓ Providing enhanced and varied options than the conventional
✓ Assures clinical longevity
✓ CONVINIENT PROCEDURE:

The ability to capture all the data of the patient, and thus attaining their 3D models, without utilizing traditional physical impressions, is one of the benefits of optical impressions. Truth be told, the normal traditional impressions can cause distress for the patients, because of the bother and hardship from the materials for impression (regardless of whether conventional or individualized. A few patients (for example patients with solid gag - reflex, or kids) show up not to endure the exemplary system. For such patients, displacing regular impression materials with light is a preferred option; optical impression is in this way refreshing and least inconvenient approach. It Optical impression diminishes uneasiness altogether when contrasted with conventional physical impression. Truth be told, it dispenses with the requirement for materials and impression plate, which are frequently unwelcomed by the patients. Patients will in general incline toward optical impressions instead of traditional impressions, as revealed by few studies.

✓ TIME EFFICIENT

A few investigations have shown that most of the times, optical impressions are time-productive, as they empower decrease of the working occasions (and in this manner costs) when contrasted with customary impressions. In spite of the ongoing innovative headways in IOS, with the most recent equipments presented in the market empowering the catch, it doesn't give the idea that the significant contrasts in time effectiveness originate from the demonstration of establishing a connection itself (a full-curve sweep may take 3– 5 min, like that required for traditional impressions. With optical impressions, there is no compelling reason to pour stone throws and acquire physical mortar it is conceivable to email the 3D virtual models, records of the patient
legitimately to the dental research facility without the need to convey anything by means of dispatch or normal mail. This empowers the sparing of a lot of time and cash amid the working year. For dental facilities prepared to plan and make of chair side prosthetic fabrication efforts, the documents have shown that optical impressions might be brought into PC helped structure (CAD) programming; when the reclamation configuration is finished, the records can be exchanged to PC helped fabricating (CAM) programming and put into the processing machine. The rebuilding efforts (in various materials) in this manner got will be described and prepared for clinical application

✓ ENHANCED CLINICAL STRATEGIES
✓ Another advantage presented by the utilization of optical impression is clinical improvement. When the expectation to absorb information has been finished, the utilization of IOS may present further clinical focal points, solving impression-production in complex cases, for instance within the sight of different inserts or extreme undermines that may render the discovery of a regular impression troublesome and treacherous. In addition, if the clinician isn't happy with a portion of the subtleties of the recorded optical impression, they may erase them and recover the impression without rehashing the whole system; this viewpoint is efficient

For the clinician, optical impression permits the skipping of a generally unavoidable traditional impression depends on the location of physical impressions and consequent throwing of gypsum models with an efficient impact. The end of customary impression materials converts into direct investment funds for the clinician, with diminished consumables costs.

EASY COMMUNICATION WITH TECHNICIANS:
With IOS, the clinician and the dental professional can survey the nature of the impression continuously. Actually, the dental specialist can email it to the lab, and the expert can check it precisely. In the event that the dental specialist isn't persuaded of the nature of the got optical impression, he/she can promptly demand that the clinician make another with no loss of time and without calling the patient for a second arrangement. This angle rearranges and reinforces correspondence between the dental specialist and dental professional.

optical impressions have a few points of interest over traditional impressions: among them, the most significant is the decrease of patient pressure and uneasiness. numerous patients today have uneasiness and a gag reflex and in this manner don't endure the ordinary impressions procedures; in these cases, utilizing light to substitute plate and materials is a perfect arrangement. Optical impressions, also, are time-proficient and can streamline clinical techniques for the dental specialist, particularly for complex impressions (in patients with undermines or potentially in oral implantology, when various inserts are there). Moreover, optical impressions allot with models, sparing reality, and take into consideration better correspondence with the dental specialist. At last, IOS improve correspondence with patients are in this way a ground-breaking promoting device for the advanced dental facility. On the other hand, the disservices of utilizing optical impressions are the trouble in identifying profound edge lines in arranged teeth, the expectation to learn and adapt, and the buying and overseeing costs.
As to when contrasted with regular impressions, optical impressions are similarly precise for individual reclamations or 3–4-component connects on common teeth and on inserts; on the other hand, ordinary impressions still give off an impression of being the best arrangement as of now for long-range rebuilding efforts, for example, fixed full curves on characteristic teeth and inserts (with a higher number of prosthetic projections).

The IOS at present accessible financially contrast as far as exactness; along these lines, the most recent age equipments may have more extensive signs for clinical use, while the most experienced have less clinical signs. This is a significant viewpoint to be considered before purchasing an IOS, notwithstanding different highlights, for example, the requirement for opacization, checking speed, wand measurements and probability of getting in-shading pictures. In fact, the IOS can be incorporated in a shut framework, creating restrictive records just, or can be open, delivering documents that can be opened utilizing any CAD programming. In the last mentioned, there will be more prominent flexibility of utilization, however an incorporated exclusive framework can without a doubt be useful for the less-experienced client.

At long last, the current clinical uses of IOS are incredibly wide, as these gadgets can not exclusively be utilized in fixed prosthodontics to get the virtual models expected to fabricate an entire scope of prosthetic rebuilding efforts (single crowns, fixed incomplete dentures) on characteristic teeth and inserts, yet in addition in implantology for guided medical procedure and in orthodontics. At present, the writing does not bolster utilizing IOS for manufacturing long-length rebuilding efforts, for example, fixed full curves upheld by common teeth or inserts. Sooner rather than later, the dentogingival data caught with IOS will be added deep down tissue data gotten by CBCT. Alongside the data of the patient's face caught with a face scanner, this will enable clinicians to coordinate diverse record designs into a solitary model that can be utilized for careful, prosthetic and orthodontic arranging: this will be the 'virtual patient'.

The principle benefits of Cerec, compared with the hot press and curing procedures as portrayed by Pissis(2006), is the prosthesis fabrication in one visit. Even then, the hot squeezed system is still being used (Lander and Dietschi in 2009).

The discovery of X-beams by W. C. Roentgen in 1985, revealed a new period in medication and dentistry. Thirty after six years, strategies for the generation of cephalometric radiographs were acquainted to the dental practitioners by Broadbent and Hofrath. And it remained nearly unaltered as of not long ago. Broadbent stresses on the significance of the positioning and arrangements to accomplish non-distorted radiographs when taking the parallel and posteroanterior cephalometric radiographs. Cephalograms have been generally utilized in clinical executions and as an examination method to assess development and treatment plans. The way that a customary head films lessen 3D articles to 2-dimensional view is first and the most significant reason. At the point when 3D objects are shown in a 2-measurement, structures uproot as vertically and on a level plane in extent to their sitance from the film.

Loads of cephalometric examinations have been created to help analyze skeletal and dental malocclusions and dentofacial deformities. With the presentation of 3D imaging, clinicians have had incredible chance to assess anatomic structures 3-dimensionally in orthodontic practice. A few specialists led 3D imaging looks into, and Singh and Savara[29] revealed the
primary 3D examination about development changes in maxilla. PC virtual products along with the 3D facilitates better treatment options

3D imaging strategy has been improved to be in use in various regions of sciences. With the enhancement, old photogrammetric procedures have been acquainted give an increasingly broad and precise images. Utilizing at least one set of perspectives, a 3D model can be built and observed from any points of view and estimated from any direction. In 1944, Thalmann-Degan recorded facial contrasts after orthodontic treatment. This was the most early clinical reports about this type of imaging. Computerized imaging has come into market along with the internet improvements and has provided with quicker, and more progressive developing sequences.

2.3 LITERATURE THEME - DIGITAL DENTIST GLOBALLY:

World economics in 2013 mentioned in its report that 10% increase in digitalisation in any field in any country would bring 0.75% growth in the GDP per capita. In a report by Mc Kinsey in 2013, it was reported that digitalisation accounts for 3.4% of GDP on an average.

Dental market is an attractive market globally, through which there is millions of revenues is generated. More and more dental clinics are been established each year, with the raise of awareness and growing demand. The population between the age groups of 18 to 40 years are suffering from oral healthcare problems and dentistry is becoming a new trend.

Varied technological aides that are being used in the field of prosthodontics according to Van der Zande and Marieke, 2015 accounted to 93.2% to patient information and history, 82.4% accounted to financial administration. Even before 2005, dentists started using these technologies. By 2010, there were 55% of online appointment system users according to Marieke, 2015. The clinical and diagnostic technologies among oral radiographic procedures that have been adapted by dentists, according to Van der Zande and Marieke, 2015, account to 57.2% in digital OPG’s (Orthopantomograms), 26.4% intra oral cameras, scanners 12%, 8.4% account to digital 3D imaging and CAD/CAM (CERAC).

Meeting the needs of billions of people and the population growing at the rate of 1% per second is a very challenging task (Ciara, 2018). A study in Netherlands in the year 2015, by Ronald C. G., and Irene H.A., shows that the dental professionals were using administrative technologies more than the clinical technologies. The range varied from 93.2% to 6.8% respectively. 22.5% were low technology users, whereas 46.2% were intermediate technology users. Those using low technological had to devote more time per year for professional activities than those who regularly are utilizing technology (Ronald C.G). High technology users were able to see more patients compared to the low technology users in the same amount of time.

According to Isabella M, 2018, Smartphone and applications are contributing a lot in the technological enhancement in the oral health care in the recent years. Smartphones have become popular not only to access internet but also for continuous data transfer, accessibility and multimedia capability (Pinheiro et al 2015). The use of mobile phones for dental access has become a reality. Some major countries like Australia and Canada, have developed a mobile application software where all the basic on-goings in dental office can be carried out at home. Taking pictures, skype/video calling with the dentist, treatment plan and management are associated in this mobile app (Collado-Borrell et al., 2016). Information and communication have proved to be a critically important component in the field of dentistry.
The current generation is born surrounded by technology. Hence, mobile applications significantly contribute to a new way of approach. Currently, computer systems and smartphones are easily accessible to most of the people globally (Al-Musawi et al., 2016). This society would be very much beneficial utilizing these smartphone services. The dental softwares thus would be more patient oriented related to self-care and easy information access to this generation.

2.4 LITERATURE THEME – DIGITAL DENTIST IRELAND and INDIA

The course of digital information sharing, and networking concerned with dentistry has become a global phenomenon (Brennan, 2000). This recent technological trend began to change the dynamics of dental health delivery all over the world. It has been offering new opportunities to enhance levels of patient care and is redesigning the business models internet is a quite new phenomenon in India, it is expected to contribute 4.6% of GDP (BCG and IAMA, 2015). In a 2010 study conducted in India by Ajay A., unexplored potentials were discussed by presenting different articles in different specialities. The focus was mainly for accessibility and cost of dental services.

Digital literacy in India, among student population accounted to 56% based on a study by (Saxena et al., 2018), in 2018. These students had internet access all the time. Almost 94% of students owned mobile phones according to a survey in 2018. Out of which 46.5% had dentistry related applications in their smartphones. Nearly 80% of post graduate dental students believed in social media, for their professional contacts and studies. 89% of students were very keen on e-learning implementation in the curriculum, which India is lacking. Not only students but people of all age groups are dependent on their smartphones these days.

Not much research or literature have been done in digital dentistry in Ireland and India, but 40 -55% of dental professionals are utilising the aspects of digitalisation. CAD/CAM’s are being used in prosthodontics as well as orthodontics in India. But most of the dentists are still stuck with the traditional approaches. This research would be helpful for them to understand the concepts, importance and ease of digital aides in dentistry, which would help both the dentists and the patients with satisfied results. This would further enhance more people to visit the dentists more often, than only attending the dental offices when it is utmost needed.

2.6 CONTEXTUALISING THE LITERATURE

The days of the analog dental prosthesis workflow are now outnumbered. Immensely evolved software systems, their flexibility and the speed at which the process take place are much better manufactured compared to analog techniques. That’s the new reality. The opportunity to transfer your expertise to a digital platform is undenying offer. Professionals who have adopted these digital approaches are working more efficiently in a predictably achieving results and in a clean environment. Furthermore, in the words of Justin Marks “Unless you want to retire in 5 to 10 years, you need to cope up with technologies.”

With the availability of audio – visual aids, practical knowledge could be delivered to the patients. Virtual reality of viewing treatment modalities would be very handy to the patients to make decisions regarding the treatments.

With the applications of digitalised techniques in dental practice, dental professionals will be able to improve the accuracy and restoration of dental appliances. The integration of dental practice with the computer aided technologies will be helpful in managing not only treatments but also finances.
CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

“Research is systematic, critical and a self-critical enquiry that aims to contribute to the advancement of knowledge and wisdom”

Creswell (2008)

A useful start points, comprising of process of steps in order to gather and analyse information to enhance the knowledge of understanding is Research (Bassey, 1999). Research methodology is varied stages of methods employed to undertake the study in a systematized path. Methodology refers to the strategy, philosophy and the way of approaching the study. This process usually comprises of basically three phases:

- Ask
- Find
- Report

This chapter will reflect the strategy, philosophy and approach and also the reasons why these methods were chosen. The design of the research will be detailly discussed- the method employed, how and why this data was collected, where was it collected and how was it analysed, all of these would be discussed here.

For this study, Prosthodontics among the Dentists was aimed as the main study group. Both Prosthodontists and general dentists was considered for the research. The main strategy was to aim the cases with prosthetic replacements. A collective methodology was used to assess the effectiveness of digitalisation in Prosthodontics and thereby gaining some insights on doctor-patient relationship. The qualitative approach of the study was carried out through an online survey. And the information collected through this was interpreted using manual procedures and represented in the form of tables or graphical representations. And thereby the effectiveness of digitalisation on a dental practice and CRM was evaluated and interpreted.

RESEARCH ONION:

For this study, the Research Onion would be used as a way of depicting the methods of choice of data collection, the opted research philosophies and approach. According to (saunders, 2012), the research onion can be diagrammatically. Below FIGURE 5: RESEARCH ONION: SAUNDERS et al., 2012 pp.164
3.2 RESEARCH APPROACH AND PHILOSOPHY:

This study would be based on quantitative approach. Here, the approach of research to be implemented would be that of inductive approach. As the research topic is concerned with the creating a new framework from the existing data. The research question would be utilised to narrow down the scope of study. Inductive approach is usually focuses on exploring new theories and phenomenon using the existing research (Saunders, 2012).

Many Qualitative research variants are usually associated with interpretive philosophy (Denzin and Lincoln, 2005; Saunders, 2012). Interpretivism is defined as that which would be implemented in order to formulate facts that are obtained from the secondary research, according to Wills (2007). Here we are using interpretivism, as comparing the techniques in traditional and digital Prosthodontics and analysing them according the importance of them in business would have a positive stimulus on the practice. These elements may not be entirely quantifiable, hence using the qualitative approach.

The first stage of research would be gathering all the relevant secondary data through academic articles, journals, books. The second would be gathering the data through questionnaires and interviews from the participants and trying to interpret the outcome.

3.3 RESEARCH STRATEGY:

For this study, the combinations of classic research tools - questionnaires would be used (Sarantakos and Silvermann, 2013) The questionnaires will be distributed among the dental professionals that have been using the digital technologies in dentistry as well as try to gain gain access with the patients that have undergone prosthodontic treatments with either conventional or digital modes. Complimentarily, interviews would be conducted, consisting of an equal number of representatives.

INTERVIEWS- (If permitted) the complimentary approach of interviews are opted as they give us the opportunity of in-depth insights and open discussions. More formal and easy interaction would be always preferable for any study (Sarantakos, 2005). The flexible format of interview will help us explore the data that cannot be achieved by questionnaires. The only major drawback with the interviews would be that it would give us subjective results.

3.4 RESEARCH DESIGN

This research would be using quantitative data instead of qualitative data, as there will be numeric data (Bell, 2005; Sarantakos, 2013). A qualitative strategy is applied here as research involves a series of different attributes or variables that need to be interpreted. Triangulation is the method that would be used in this research as it gives different viewpoints to the objectives of the research (Altrichter, 2008). Also, triangulation would be very useful in this research as it aims at collaboration of varied variables from two very distinct industries.
The study would be designed as a randomized controlled trial for the comparison of two types of dental prosthetic treatment modalities – analog versus digital approaches. Patients with digitally treated and those conventionally treated would be analysed based on the workflows. Other features that would be analysed would be time, cost effectiveness and majorly the patient satisfaction towards the treatment and the dentist.

The research would be carried out within 3 months. The time allocation would be as follows:

- Sending out questionnaires: 30 days
- Analysing the data: 20 days
- Drafting the report: 20 days
- Final report: 10 days

3.5 INSTRUMENTS DESIGN:

For this research, there will be two sets of questionnaires, one designed for the dental professionals and the other for the patients. The first part in both the designs would be basically covering the concepts of demographic data, age and gender.

The questionnaires for the patients would be as (if permitted):

- Questionnaire related to the type of Prosthetic treatment undertaken
- Questionnaire related to the approach of treatment (analog or digital)
- Questionnaire related to access of Software applications.
- Questionnaire related to the satisfaction with the treatment outcome, etc.,

EXAMPLES OF QUESTIONNAIRE:

1. Are you satisfied with treatment?
2. Did you experience any discomfort during the treatment process?
3. Does the Prosthesis function well?
4. Are you pleased with the aesthetic result?
5. Is the treatment cost completely justified?
6. Would you repeat the treatment again if necessary?
7. Would you go back to the same dentist?
8. Which procedure do you prefer manual or digital?

The questionnaires for the dental practitioners:

The questionnaire related to dental professionals would be related to the ease of technological aides being used, the preference between conventional and digital approaches in dental prosthesis and most importantly the patient – dentist relation with the digital technologies in dentistry.

- Questionnaire related to the approach of Prosthetic treatment
- Questionnaire related to access of Software applications
- Questionnaire related to the satisfaction with the treatment outcome, etc.,
INTERVIEWS: Interview scripts for both the groups will be related to satisfactory outcomes of the process and technological aides used, use of software or mobile applications, effective delivery systems.

3.6 SAMPLING

As a part of the study, two separate groups of participants would be selected. As the relation between two groups has to be observed, the method of stratified sampling technique would be used (Kirby et. al, 2000). Participants would be selected on specific criterion – Dental professionals that are using only traditional approach or digital approach or both and the patients that have undergone prosthetic dental treatments with conventional approach and those got treated by digital approach (Shruti, 2018).
First group of study population will be the dental professionals from varied practices across, India. The sample size of 50 dental professionals would be preferred, making sure that all the dental professionals are related to the field of Prosthesis. The second group would be the patients who got prosthodontic treatments done by either conventional or digital aides. The size of the second group would be around 100 participants. However, the size of the group does not matter as they have to individual questionnaire.
Most of the communication with the participants would take place through e-mails. There may also be a few direct participants so that face-to-face interviews are possible.

3.7 DATA COLLECTION

The questionnaires to the participants would be approached through e-mails and returned by e-mails. This would take place in a course of 3 to 4 weeks. Interviews would be done face-to-face or through skype or telephonic interviews (if permitted). Full transcripts of questionnaires and interviews would be recorded. All the data collected by above ways would be preserved and the privacy and confidentiality would be maintained.

3.8 DATA ANALYSIS

The analysis of data can be done using software like SPSS etc., but depending on the amount of respondents. Also, since this study is more qualitative based mostly manual interpretation would be done. The results would be analysed manually, and the results of the questionnaires and interviews would be presented in form of charts or tables.

3.9 RESEARCH ETHICAL ISSUES:

Research ethics is of utmost important in any study. There are several ethical issues that need to be taken into consideration in this research. The foremost important one is the participant’s informed consents (both dental professionals and the participants). The next most important aspect is the privacy and confidentiality of the identities of the participants. In addition to privacy and confidentiality, the dental professionals have to have strict policy of access to their patient’s treatment charts for research purposes. All the Information that would be collected has to be used only for academic purposes.
3.10 LIMITATIONS

Several problems and challenges are encountered while doing a research. First challenge would be gaining a sufficient number of participants for the study. There might be turn down of approvals to do the questionnaires or interviews in a few instances. Obtaining permissions for the research would be a challenging task.

The approach to data collection has to be the least time consuming and easy access to the participants. In terms of methodology, as we are considering small group, a broader insight in the study may not be gained. The results may be more generalized.

Limited availability of evidence for the impact of e-CRM in dental field. This would lead in doing primary research in a short duration of time. With the time constrains, this might lead only to a broad study instead of a focussed study.

Also limited availability of literature of digital dentistry in Hyderabad would be major drawback. The portability of mobiles and tablet devices due to either location constrains or people’s knowledge on internet (Saunders, M.,2012) and technology would also be the main barrier. As a developing country India is still lacking complete accessibility of internet facilities. Hence, access of internet facilities might lead to inability to use the advanced dental technical systems for a digitalised dentistry and also people’s access to this technology in certain areas might also be limited. This would impact the study a lot. Proper data would not be collected from certain regions or people leading to incomplete research (Shruti, 2018).

CHAPTER 4 – ANALYSIS OF THE FINDINGS:

A. FINDINGS:

This part of the research presents the findings and analysis of the findings based on the primary research. Its aim to provide the total view of the research in findings for the discussion. The primary research was done to gain quantitative assessment. A group of altogether 115 questionnaires were sent to both prosthodontist and general dentist. Research was not possible with patients due to ethical and confidentiality issues. Out of 115, there were only 79 respondents. Out of the 79 members, 43% of respondents were prosthodontists and 62% were general dentists. the questionnaires were made in google forms and the forms or the questionnaires were sent via e-mails and few through whatsapp phone numbers. All the data gathered was uploaded in the excel spread sheet. Pie-charts were obtained from the data gathered. All the finding were explained with the help of pie-charts. Statistical analysis using SPSS were run and Chi-Square test was done to evaluate the hypothesis. The results were analysed.

4.1 BACKGROUND:

This section of the findings analyses the socio-demographic attributes in the study. The attributes in the research are gender, age and nationality (IRELAND or INDIA). The aim of considering the demographics in the study is to know who the respondents of the study are. This would probably help us to gain knowledge about the different in opinions, if any, among the old and the young experts and also among different countries.

4.11 GENDER
Among the 79 respondents who participated in the questionnaire, the largest number of respondents were males about 46. However, women percentage was also not quite low. There were about 30 of female respondents and also a 3% of respondents who did not want to reveal their gender.

![Gender Pie Chart]

**FIGURE 6: GENDER OF THE RESPONDENTS**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>30</td>
<td>38</td>
</tr>
<tr>
<td>Male</td>
<td>46</td>
<td>58.2</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>100</td>
</tr>
</tbody>
</table>

**TABLE 1: GENDER OF THE RESPONDENTS**

4.1.2 AGE:

This section is helpful in revealing which generation or younger or the older experts have participated in this research and which group have been utilising these technologies.

![Age Pie Chart]

**FIGURE 7: AGE OF THE RESPONDENTS**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-45</td>
<td>43</td>
<td>54.4</td>
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<tr>
<td>45-60</td>
<td>28</td>
<td>35.4</td>
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</table>
TABLE 1: AGE OF THE RESPONDENTS

<table>
<thead>
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<th>Over 60</th>
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<tbody>
<tr>
<td>Total</td>
<td>79</td>
<td>100</td>
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</tbody>
</table>

4.1.3 NATIONALITY

Difference in nationality was recorded to note which country was following with the trend. Hence, two different countries, Ireland and India were considered in order to know the significant approach towards digitalisation.

FIGURE 8: NATIONALITY OF RESPONDENTS

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRELAND</td>
<td>44</td>
<td>55.7</td>
</tr>
<tr>
<td>INDIA</td>
<td>35</td>
<td>44.3</td>
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<tr>
<td>Total</td>
<td>79</td>
<td>100</td>
</tr>
</tbody>
</table>

TABLE 2: NATIONALITY OF RESPONDENTS

Wellola:

Wellola is a software application that has been recently introduced. So for this study, we wanted to record how many have heard and how many are using this software.
FIGURE 9: HOW MANY HAVE HEARD AND USING WELLOLA

From the above figures, we can deduce that: Wellola being a new technological application, has not been heard of and not much used as well. Only 53.2% have heard about the Wellola company or the application and less than 10%, 7.7% to be precise, have used it, according to the research.

FIGURE 10: USAGE AND USER FRIENDLYNESS

Most of them are unaware of this company according to the figure and hence, most of them were unable to decide if the application would be helpful or not.

FIGURE 11: RELIABILITY

Although most of them are unaware of the application, still about 41.6% believe that this would be a better opportunity to adapt by the companies in order to retain customers and this would improve customer relationship management.

CEREC:
CEREC Usage was predicted for this research. The above figures illustrate that about 68.4% have heard about CEREC and about 29.5% have used it. Although the percentages show variance, most of them are opting for CEREC, rather than the traditional approach.

The above figure shows that almost half the people would be preferring or opting for CEREC than the traditional or conventional approaches. About 47.7% of the dentists have proposed that CEREC would be a reliable option. The rest 27.6% said they still prefer the traditional. The traditional approach was opted mostly by the age groups of 45-60 years and over 60 years. so the present generations are willing to opt for more convenient technologically based approaches.
FIGURE 14: CONVENIENCE

The above figure illustrates that more than 50% of people agree that this procedure, CEREC, is most accommodating and convenient for the patients.

FIGURE 15: COST FACTOR

When asked about the cost factor, most of them approved that the cost is the most influencing factor. 63.6% said that cost factors influencing the patient’s opinions. 57.1% depict that if the cost was exempted, most of the patients would be happy to opt for this procedure.

FIGURE 16: CRM and CEREC

This above figure illustrates that by use of CEREC approach most of the organisations can improve their Customer relationship management. 33.3% of people strongly agreed, 26.9% agree on this and 35.9% were left undecided.
Hence, from the above research we can conclude that CEREC and newer friendly approaches would be preferred and also influence the customer relationship management. But the study had limited number of values and reveals that due to its low number of outputs, a certain analysis may not be attained.

ANALYSIS:

The aim of this research was to analyse the newer technologies in the field of dentistry, if they are in use and how are they or how would influence the CRM and enhance E-CRM of the organisations.

The E-services has become a very critical marketing strategy for many of the organisations today. The cost-effective approach, technical support and customer service systems are all a positive feature of this E-CRM. The vastly pacing technological aides in CRM have made organisations interestingly efficient.

On the basis of the above research, one might be able to depict the efficient technological systems and their influence on customer relationship management. If considered, the theoretical aspect of the study, we can conclude that the CEREC would be the most appropriate, convenient and feasible approach both for dentists and patients. Also, this can have its influence on consumer relations. The time efficient factor, easy of process would definitely bring out a positive prospectus for improving and maintaining customer satisfaction and thereby customer loyalty.

But when considering the practical implications, that we can draw from the study, the newer technologies or the newer E-CRM approaches are not in practice in most of the cases. The technologies, according to the study, being limited and also in a small population, the researcher cannot decipher much from it. The study reveals most of the practitioners are still using the traditional approaches, even though they prefer the advanced techniques. One of the most important drawbacks is the cost factor. Cost factor is influencing both the dentists and patients according to the study.

Hence, much conclusion cannot be devised from the above study as most of the recipients have not used the technologies and therefore cannot decipher if these would enhance the E-CRM factors.

RESULTS: The response rate was 43% for Prosthodontists and 62% for the general dentists. Among the respondents, all of them, with an exception of few from India, were aware of the new technologies of CEREC. Less than half of the Prosthodontists (43%) have already incorporated the CEREC technology. When asked if the cost was an issue for preventing the patients to opt for this type of treatment, 75% of them affirmed this response. There was a significant difference among the two groups, when asked about the incorporation of this technique. General dentists reported less usage than 59.8% of the Prosthodontists. Currently only 15% of prosthesis are being processed with the CEREC. Majority of the respondents indicated that they were planning to include digital dental fabrication into their curriculum within the next 5 years. Whereas Only 24% of patients are willing and getting these high-end treatments.
STATISTICAL ANALYSIS

For a descriptive analysis, Chi-Square test were computed. Furthermore, graphs were plotted of the data obtained.

HYPOTHESIS:

Ronald Fischer first introduced the approach of hypothesis testing. Hypothesis is a statistical approach used in making statistical assessments and decisions using an experimental data. Hypothesis testing is usually an assumption that is made about the population

- **Null hypothesis:** its is hypothesis that assumes that the observations are due to a chance factor. Null hypothesis usually is denoted by

  \[ H_0: u_1 = u_2 \]

  Here the null hypothesis groups that are considered are the technology assisted systems and CRM

- **Alternative hypothesis:**
  Contrary to the null hypothesis, this hypothesis gives the results from the real effect

Chi-Square test:
The Chi-Square test is usually done for testing the relationships between two or more categorical variables. The null hypothesis of the chi-square reveals that there would be no relation among the variables.

TEST 1: Relation between reliability and the technologies (reliability or newer technological applications)
TABLE 3: TRADITIONAL VS CEREC

The results from the above Chi-Square reveal that there is a relation among the two categories. While 47% preferred the newer technologies and 28% opted for traditional ways. 37% of them say the technologies would be reliable. The p-value here signifies that the values or variables are independent of each other and there is statistically relation among the two variables.

Since the value of p is < 1 the null hypothesis can be rejected.

TEST 2: Based on the cost influence which would the patients prefer:

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>329.769(^a)</td>
<td>88</td>
<td>.000</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>116.542</td>
<td>88</td>
<td>.026</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 105 cells (97.2%) have expected counts less than 5. The minimum expected count is .01.

TABLE 4: COST FACTOR

From the above results we can deduce that the two factors are co-related. The procedure for the treatments are opted based on the cost factor. Almost 52% people agreed that the cost would be major influencing factor for opting newer technologies. Since the p-value is less than 0.05 we can reject the null hypothesis.

TEST 3: E-CRM and TECHNOLOGIES:

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>198.140(^a)</td>
<td>30</td>
<td>.000</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>42.230</td>
<td>30</td>
<td>.068</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 36 cells (85.7%) have expected counts less than 5. The minimum expected count is .01.

FACTOR 5: E-CRM VS TECHNOLOGIES

From the above results we can co-relate the two variables. The reliability and influence of the technologies used by the dental practitioners enhance the customer relationship management. The p-value also here is < 0.05, hence we can reject the null hypothesis.
DISCUSSION AND FUTURE RECOMMENDATIONS:

The following would be the recommendations that can be drawn from the findings and analysis of the study. Further recommendation of research is suggested to concentrate on CRM issues in health sectors. The concluding factor is that the organisations CRM approach is at the very basic level and requires a solid effort to enhance the CRM initiatives in future. As the organisations CRM initiatives are at a very basic stage, they need to focus on it to reap profits.

Even though Customer Relation Management’s duties are confined to marketing and sales, the administration has to consider CRM strategies besides only marketing strategies. According to Kale in 2004, the company’s failure is dependent on CRM planning and strategies of the organisations as the future of the company is based mainly on the consumers. The primary research that was undertaken, has comes across a few loop sides of organisations in CRM initiatives. In order to achieve a successful CRM, the organisations must be willing to utilize all the available resources that come under CRM.

CONSUMER FOCUS: At present the organisations in the study, are being able to identify only few criterions which can be considered as insufficient according to patients – Cost factor or time factor are majorly neglected. The organisations need to take measures to improve the CRM. Few of the organisations are still using the same old traditional approaches for CRM strategies. One of the organisations is completely based only on referrals from the patient or the WORD-OF-MOUTH from the existing patients. This approach is worth but does not always bring profits. Assessment of Customer satisfaction, improving on the marketing strategies, getting in pace with the competitive world by trying on varied innovations need to be embraced by this sector of health industry. Organisations have a have customers, as the key focus to build consumer relationship (Yim,2005)

ORGANISATION OF CRM: this health sector needs to put its focus on CRM strategies. All the consumers requirements are to meet by utilising the appropriate CRM resources (Ryals, 2002). Lack of knowledge on CRM and the benefits it provides is to be considered. The staff had to be trained for improving the consumer relationships. Lack of awareness Of CRM among the staff and also lack of knowledge on the upcoming technologies can all be considered as drawbacks. Successful CRM can be achieved, if the staff culture is more consumer focussed (Russell, 2002)

Management of Knowledge: the primary research depicts that in this health care sector, one of the major lacking components in CRM is the knowledge management. Most of the organisations are just trying to make profits and not considering the patients point of view. Or if they did consider the patient’s point of view, they are not upgrading to the newer systems of the CRM. Either way, one or the other party is getting affected. Development needs to be considered and done in order to achieve successful CRM (Yim, 2004)

Technology CRM: The study on this topic was found out to be not upto the standards of the CRM. The outcomes reveal that the systems that the organisations are sticking to do not even have or are not CRM assisted.

Therefore, the above are a few components needs to be considered and make CRM a possible application into the organisations. The research firmly suggests that, in order to have a successful CRM, involvement and implementation of not only the basic but also advanced
CRM approaches. Before attaining any expertise on CRM, organisation involvement in CRM is of utmost importance.

Since the research was done only in a small population, the recommendations may not be very feasible, as many numbers, of considerations like the place and culture, underdeveloped or developed etc., might come into the picture. This research may not be recommended or may not be viable in few cases like, smaller regions or technologically underdeveloped areas. Though there were quite interesting finds from the primary research, there were few limitations in conducting the researcher in the study had to limit the data finding to questionnaire only to dentist and not to patients.

CRM has always been a mainstream subject marketing which can deliver critical advantages, for example, cost decrease, increment in esteem that an organization is offering to its clients providing customer satisfaction and a more prominent increment in income through better comprehension of its clients and market contenders (Pan et al. 2003).

Customer Relationship Management has numerous points of view and definitions that outline its attempting to introduce a comprehensive system for overseeing client connections by becoming more acquainted with the clients and their needs better, speaking with them all the more viably and endeavouring to satisfy these requirements (Payne, 2005) Since CRM is tied in becoming acquainted with clients and their needs better, it is implementing actualizing explicit Information and Communication innovations that extends inside an association to process authoritative information to gain better knowledge of the clients and their needs. It is currently workable for associations to execute progressively successful and complex innovation answers for preparing client related information since PCs, internet and technologies are presently unmistakably increasingly growing and less expensive contrasted with what they used to be, with a limitlessly expanded capacity limit. Also, organizations and associations would now be able to store huge measures of information about their clients on electronic frameworks that can impart all the more viably with people and other PC frameworks utilizing advances for the Internet. Organizations in all areas, presently draw their clients on the World Wide Web and client information to convey useful goods and services to make organisations prepared to be profitable in this competitive and advantageous world (Gretzel, 2010). In this manner, CRM presents openings, prompting higher superior competitive advantage.

These days organizations progressively are emphasizing on innovation for empowering a client centered relationship advertising technique. The web has given a stage to convey crm work on the web. It implies cooperation of E-CRM. E means to electronic or web connected crm. E-crm is a determined factor to improve client satisfaction strategies, retention and concentrating on consumer loyalty. As per a few studies, organizational loses are majorly because of their loss of customers within the 5 years that it covers 5 to 10 times as much expense to acquire another client as to keep and existing one. E-crm is the mix of web with crm implies crm benefits likewise conveys the services on internet too. It holds client by coming to his or her satisfactory level and allows organization to satisfy its objective like organization needs to expand frequency, loyalty and increase interaction and transactions by the conduct of customer's.

Patients center a significant part in supporting the accomplishment of human services association. In tending to the issue, suppliers and patient's perspective varies from one another. Patients particularly have their own judgment about the administration they see. Patients' likes
are difficult to meet despite the fact that suppliers giving numerous offices and administrations. Consequently, giving a superior administration than the patients expects can help to better nature of medicinal services. In addition, CRM is seen as one technique for associations to hold and keep up the connection among associations and clients.

The research was done to know about the relationship among E-CRM with consumer loyalty and client devotion or in other sentence, for representing assurance of E-CRM on consumer loyalty and client steadfastness which is the point of E-CRM in current marketing. By exploring the related literature as referenced before in this logical article, there are a few points to think about which are: right off the bat, CRM is more development and E-CRM is for picking up client reliability in present day.

REFLECTIONS:

Doing Research through Dublin Business School was not only very learning experience, but also enjoyable and rewarding. My personal experience as a post graduate student definitely influenced my work in the project. I had a real impact on this project. It was not only interesting but also very influential. I now see myself as both a learner and contributor towards education. Even though I have very little experience and expertise in this field, I was hopefully able to cope up with the all modules. I soon realized I required skills for historical analysis.

I was wadering at the beginning of the research process, not knowing where to start. But eventually picked up the pace, attended library classes, had group discussion. All the school environment has helped me a lot.

Reflecting back on the past the 12 weeks, I could only hope the rigorous amount of work would prove to be empowering for the study.
BIBLIOGRAPHY:


APPENDICES

APPENDIX 1: SURVEY QUESTIONNAIRE:

Digital Dentist

PROVIDING SPECIALIZED CARE THROUGH EFFORTLESS TECHNOLOGY

EXPLORING THE FEASIBILITY OF DIGITALISATION IN ENHANCING CRM IN DENTISTRY

To survey the new technologies in dentistry specifically in Prosthodontic/restorative fields, in Ireland and India. This research is regarding the feasibility of On-board of digital aides into dentistry. Also this research mainly focuses on consumer relation management in the field of digital dentistry. The questionnaires are regarding Wellola and CEREC in dental fields. Wellola is an online application wherein patients and dentists can communicate with each other. Online appointments and online consultations can be made from anywhere. Whereas CEREC is a new in-office 3D treatment planning, scanning and fabrication of Dental Prosthesis. Based on this survey, the selected population would be evaluated based on the approach of dental prosthetic treatment and reliability on that technique (traditional or digital). This study would contribute to enhance the knowledge among the dentists, in upbringing their businesses by predicting the behaviors and expectations of the patients. All the data collected through the data collection methods would be kept confidential. The data collected for this study would be used purely for academic studies only.
1. Please select your gender

- Female
- Male
- Prefer not to say
- Other...

2. Please select your age group

- 25-45
- 45 – 60
- Over 60

3. Please select your country of living

- India
- Ireland
4. What do you think are the best qualities of Wellola?

- Easy accessibility
- Online appointments
- Video conferencing with patients
- Online treatment Planning
- All the above
- Other...

Would you say it is reliable?

- Yes
- No
- Other...

6. How many patients are communicating through wellola?
7. Will the patients be opting for CEREC for its faster treatment option, if the cost factor is exempted?

- agree
- Disagree
- undecided
- Other...

8. According to your understanding, do you think CEREC would be helpful in building customer relationship?

- strongly agree
- agree
- disagree
- strongly disagree
- undecided
4. From your experience and understanding which do you prefer for dental prosthesis fabrication?

- Traditional approach
- CEREC
- Other...

5. From your understanding, do you think CEREC would be accommodating for patients?

- strongly agree
- agree
- disagree
- strongly disagree
- undecided
- Other...
7. In your understanding would you recommend Wellola application for dental practices
   ○ Yes
   ○ No
   ○ UNDECIDED
   ○ Other...

8. According to your understanding, do you think Wellola would be helpful in building customer relationship?
   ○ strongly agree
   ○ agree
   ○ disagree
   ○ strongly disagree
## APPENDIX 2 – GNATT CHART

<table>
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<tr>
<th>ACTIVITY UNDERTAKEN</th>
<th>Research Methods</th>
<th>Dissertation</th>
</tr>
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<td>Oct</td>
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- Research and finalize research question (inc hypothesis) and literature search
- Write and finalize literature chapter
- Research and decide on methodology
- Write / finalize methodology chapter
- Biblical approach process
- Meet with supervisor
- Develop data collection tools
- Revise and edit data collection tools
- Test data collection tools
- Contact suitable respondents for research investigation
- Data Analysis
- Write / finalize research chapter
- Write / finalize discussion, conclusions & abstract
- Compile final overall draft (inc. References, appendices, etc.)
- Editing and editing and more editing
- Final proofing
APPENDIX 3: INFORMED CONSENT FORM
PROJECT TITLE: DIGITAL DENTIST

PROJECT SUMMARY: This research mainly focuses on consumer relation management in the field of digital dentistry. The selected population would be evaluated based on the approach of dental prosthetic treatment undergone and reliability on that technique. Thus, gaining some insight on patient-doctor relationship.

By signing below, you are agreeing that: (1) you have read and understood the Participant Information Sheet, (2) questions about your participation in this study have been answered satisfactorily, (3) you are aware of the potential risks (if any), and (4) you are taking part in this research study voluntarily (without coercion).

_________________________________  ____________________________________
Participant’s signature                  Participant’s Name (Printed)

______________SHRUTI PITTA______________
APPENDIX B: INFORMED PARTICIPANT CONSENT

PROJECT TITLE: DIGITAL DENTIST

WHAT WILL HAPPEN: In this research work, the participants’ experience and knowledge about the dental techniques both conventional and digital would be recorded. The satisfactory quotient would also be recorded. All this gathered data would be updated in a research paper or report. In this the patient’s identity and privacy will be kept confidential.

TIME COMMITMENT: This whole study would take place in around 10 – 12 weeks. The questionnaires or interviews for data collection from the participants would take around 10-15 minutes each.

PARTICIPANTS’ RIGHTS: The participants in this study have the right to withdraw from being a part of the research at any time of the research process. Participants also have the right to access the data anytime and have the right to destroy the particular data if he or she is not willing to participate. They also have the right to refuse to respond to any question. They have the right to know about the proceedings of the study.

CONFIDENTIALITY/ANONYMITY: The data collected for this study would be used purely for academic studies only. The details will not be revealed to anyone except my supervisor. All the data would be saved in my personal computer with security.

FOR FURTHER INFORMATION
I or / and [Supervisor name] will be glad to answer your questions about this study at any time. You may contact my supervisor at … (provide email and DBS phone).