

TO EXPLORE THE CHALLENGE FACED BY ENTREPRENEURS IN THE
IMPLEMENTATION OF ADVANCED BIOMEDICAL TECHNOLOGY IN HEALTHCARE:
THE CASE STUDY OF UK

[Dissertation]

[Name of Writer]

ABSTRACT

The aim of current study is understanding the theoretical perspective related to the challenges faced by healthcare institutions in implication of biomedical technology in healthcare. Moreover, the study is based on identifying various biomedical technologies currently being used in the healthcare industry. Also, the study aims to find the challenges faced by entrepreneurs in the implementation of advanced biomedical technology in healthcare in UK. Additionally, the study focused on recommendations to mitigate the challenges faced by entrepreneurs during the implementation of biomedical technologies in healthcare sector of UK. The study collected primary data using interview from three entrepreneurs and three employees of healthcare sector. The research used qualitative research methodology and specifically thematic analysis to discuss brief perception of entrepreneurs and employees of medical institution related to biomedical technology currently being used in UK and the challenges faced by them on implication of biomedical technology. The results evaluated that major challenges faced by entrepreneurs are lack of accessibility and government intervention in investing in biomedical technologies as most of the investment on research and development of biomedical technology was made by government. However, theoretical perspective on biomedical technology indicated that administrative issues such as maintenance, trained staff, availability of resources and social pressures are the factors the prevents the implication of biomedical technology in health sector. The study concludes that the capacity of entrepreneur for investment and availability of technology differs nation to nation. Thus, the challenges takes place due to inefficiency in either one.

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

Healthcare is a primary sector for any country of the world. The lives of people are directly related with it which gives it a key position for reforms and innovations. The development in digital technology has helped various sectors in improving their spread of information. This is really important in the healthcare sector because the results can be huge (McArthur *et al.*, 2016, pp. 36). The reforms in this sector are changing due to the interest of entrepreneurs in this field.

1.2 Contextual Background

The increase demand in high quality health services has encouraged people all over the world to invest in new technologies that could help the process of diagnosis and treatment of different diseases and ailments. In the past, investors have been more interested in commercial activities such as food and retail industry. However, the capacity in the conventional areas has caused people to invest their time and resources in the healthcare sector (Campbell *et al.*, 2016, p. 4). There have been some reservations due to the accuracy of activities involved in health sector because risk cannot be taken when it comes to a patient's health. However, the development of technology and digitalisation in various procedures has brought great exactness in the work of health sector.

1.3 Research Problem

In this era of digitalization, people want their work done in the fastest and most efficient manner. Moreover, the globalization through the Internet technology has enabled people to become highly aware of the modern tools and systems being used in different professions (Batterham *et al.*, 2016, pp. 3). There have been many studies that discuss the implementation of biomedical technology in healthcare with the aid of other technological innovations (Gordon and Catalini, 2018; Luo *et al.*, 2016; Qi *et al.*, 2017; Ok *et al.*, 2015). Most of the studies discuss on the implementation of advanced biomedical technology within healthcare sector (Darwish, Ismail Sayed and Ella Hassanien, 2019; Miller *et al.*, 2017; Chen and Huang, 2018). However, not much literature is found when searching for the challenges faced by entrepreneurs during the implementation of advanced biomedical technology within healthcare sector. Additionally, not much literature is found that discusses on the challenges faced by entrepreneurs who are planning to implement such technology within the healthcare sector of the UK. Thus, this study aims to address this problem which is faced by the entrepreneurs who enter the health sector and have difficulty in implementing modern techniques in this profession within the healthcare sector of the UK.

1.4 Aims and Objectives

The main of this study is to evaluate the challenges faced by entrepreneurs during the implementation of advanced biomedical technologies within the healthcare sector of the UK. The researcher has identified the following objectives:

1. To study the challenges in the implementation of advanced biomedical technology in healthcare from a theoretical perspective

2. To identify various biomedical technologies currently being employed in the healthcare industry
3. To explore the challenge faced by entrepreneurs in the implementation of advanced biomedical technology in healthcare in UK
4. To provide recommendations to mitigate the challenges faced by entrepreneurs during the implementation of biomedical technologies in healthcare sector of UK

1.5 Rationale of the Study

The rationale of this study is to find out the issues faced by business men who invest in innovative technologies for healthcare. In the past, number of studies have been conducted to analyse the problems in healthcare systems including the human resource management procedures, digitalisation and relevant areas (Schopman, Kalshoven and Boon, 2017; Iivari *et al.*, 2017; Manogaran *et al.*, 2017). However, not many studies discuss on the numerous challenges that entrepreneurs face when they plan to invest and implement advanced biomedical healthcare technologies and the actual problems faced by entrepreneurs in bringing advanced biomedical technologies in healthcare within UK are not yet observed by researchers in detail (Thongpravati *et al.*, 2016, pp. 1222). Therefore, the purpose of this study is evaluate the challenges faced during the implementation of advanced biomedical healthcare technology within the healthcare sector of the UK.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Healthcare sector is highly influenced by technological advances in recent years. People from different professions are involved in developing efficient systems for better health facilities (Wilden *et al.*, 2018, p. 51). There are certain problems which people face while bringing these biomedical technologies for public use.

This literature review shall start with the analysis of entrepreneurs in healthcare and then the innovative technologies being used in this sector will be studied. This will be followed by the challenges faced in implementation of such advanced procedures in healthcare and the relevant theoretical framework in the area. Finally, the chapter summary shall conclude this chapter.

2.2 Theoretical Framework

The introduction of advanced biomedical equipment has received a mixed response from the professionals in this field and the public. Hospitals find it difficult to adopt such technologies because they have to shift their systems entirely to welcome the new tools.

In Norway, the adoption of telehealth consultations was less than 1% despite high encouragement from the state towards it (Greenhalgh *et al.*, 2017, p. 156). According to Walia *et al.*, (2019, p. 1238) there are several barriers when it comes to implementing new technologies in health centres because the corresponding laws need to be observed. Moreover, the high complexity of inventions naturally makes them tough to use in common facilities. One cannot guarantee the correct working of a device unless it is tested hundreds of times and in the case of health equipment, the quality assurance has to be greater than usual. Consequently, the biomedical technology invented today shall have to wait for some years before it reaches

widespread use (Setiawan, 2019, p. 847). This gap in the time frame then introduces more inventions so there is always a need for up scale among health facilities all over the world.

2.3 Entrepreneurs in Healthcare

In the study of Salminen *et al.* (2014, p. 456) entrepreneurship is a relatively old concept when it comes to healthcare. There has been important work done during the World War Two by individuals who came to the rescue of injured people. The motivation to serve humanity is an underlying reason why a great number of people wish to enter this field. However, the subdued pace of innovation in healthcare is attributed to the global market in healthcare (Naughton and Foss, 2019, pp. 55-64). Financial factors cause a big hindrance to advanced biomedical technologies being used in widespread health facilities. There are individuals who have developed electronic health services on their own but they cannot be considered effective in every region of this world.

2.4 Innovative Technologies in Healthcare

Thongpravati *et al.* (2016, p. 1222) in their study highlight that Information and Communication Technologies (ICTs) have been used in healthcare has been observed to have huge potential in several domains in the area. From the conventional administrative work to highly advanced surgical treatments, advanced biomedical technologies can play their role in making this sector more efficient. The development of electronic healthcare platforms has enabled users to access services of doctors at any time and location of the world. Modern applications can monitor heart rate, blood pressure, sugar level and many other things which are important for a routine health check-up (Thongpravati *et al.*, 2016, p. 1222). The recent

development in Internet of Things (IoT) and Artificial Intelligence (AI) is still finding its way in health sector on a large scale (Aceto *et al.*, 2018, p. 125). However, the use of advanced biomedical machines for treatment and micro-electronic devices such as sensors and implanted devices used in surgery are widely used all over the world. The huge numbers of intelligent devices allows a non-medical person to check and diagnose majority of problems related to healthcare which is significant indicator of the level of innovation in this profession (Batterham *et al.*, 2016, p. 4).

2.5 Challenges in implementing advanced biomedical technologies in healthcare

The study of Wherton *et al.* (2017, p. 367) stated that the development of advanced medical technologies is not so simple to implement of large scale due to several issues involved in it. The main reason is that patients are usually sensitive when it comes to their health and they are not willing to take risks. The modern systems which can be operated without a person are mostly not trusted by people because of the absence of human beings actually controlling them (Wherton *et al.*, 2017, p. 367). Another issue is the cost connected with advanced machinery for healthcare. The tools used in one region of the world may not be possible in others due to administrative issues such as maintenance, trained staff, availability of resources and social pressures (Davenport *et al.*, 2018, p. 259). Hospitals in Eastern countries find it difficult to purchase and operate advanced medical equipment because people cannot afford such high costs of treatment. Additionally, it is not easy to adopt new systems because people want real world examples of patients who have been tested and cured with such biomedical tools which are obviously not possible if it is introduced recently (Greenhalgh *et al.*, 2017, p. 367).

2.6 Chapter Summary

The challenges in the implementation of modern biomedical systems in healthcare sector are highly varied and complex. While the potential benefit of such tools cannot be ignored, its utilization is still a question mark for many countries of this world. People are not willing to spend a fortune on their treatments even if they have the resources because several technologies are new and not tested before. In this review, the researcher has studied the entrepreneurs in this profession, range of innovative technologies being used, the challenges in their implementation and the theoretical framework related to this study. All of the data is taken from resources which lie in the past six years so that the analysis is kept up to date.

CHAPTER 3: METHODS

From the developed research objectives, it can be easily identified that research philosophy of positivism can be helpful in exploring different challenges that are experienced by the entrepreneurs of the healthcare sector in implementing the advanced biomedical technologies. Moreover, the use of positivist research philosophy helped the researchers in deducing the solutions for overcoming the experienced challenges by the healthcare entrepreneurs of the UK. Further, the research used the qualitative method of research so that the study may find descriptive perception of participants related to the research topic.

Moreover, the research used the primary data collection method. This primary data collection technique is considered as an interview that would be conducted from a total of six participants including 3 entrepreneurs and 3 employee working at medical healthcare who own their healthcare institute or are affiliated with any other major healthcare banner. The data was collected through interview where the themes would be made according to the response of the participants. This type of analysis helped the researcher in conducting thematic analysis based on brief perception of participants on the phenomena. Conducted thematic analysis on the collected data helped the research in identifying the brief perception on the challenges faced by the healthcare entrepreneurs in implementing the bio-medical technologies in the overall health care practices. The time horizon for the selected research was based on the longitudinal time horizon so the research can remain valid for the future researchers who plan to conduct research on the same topic in the future time.

CHAPTER 4: ANALYSIS OF FINDINGS

4.1 Thematic Analysis

4.1.1 Role of entrepreneur in encouraging the use of advanced biomedical technology in medical sector

Entrepreneurs are the ones that sees the capacity of investment or future growth in any industry. In terms of medical sectors, entrepreneurs are representator of innovation, as they bring innovative ideas in front of top management to utilise competencies and resources for taking the organisation towards growth (Naughton and Foss, 2019, pp. 55-64). One of the statements from an entrepreneur indicated that:

“I have been an entrepreneur for around eight years, I solely brings creativity in the healthcare sector via investing in modern technology. My particular focus has been on biomedical technology as these technology plays a prominent role in minimising the operational cost of healthcare institution which minimises the pressure from patients related to their cost of healthcare that gives me satisfaction. When medical institution incurs low cost, it leads towards profitability and these biomedical technology such as laser surgery and prosthetics improve the quality of treatment hence attracts more patients which also results in more profit. So I try my best to persuade the usage of advanced biomedical technology at healthcare institution via investing on them to improve the quality of healthcare”.

By analysing the above statement, it can be evaluated that entrepreneurs invest in advanced biomedical technology for improving the quality of healthcare and bring innovation in the treatment process to attract the patients. Moreover, the application of advanced biomedical technology increases the profitability of healthcare institution by reducing the operational cost.

4.1.2 Role of employee working at medical institution in promoting the usage of advanced biomedical technology

According to the study of Aceto *et al.* (2018, p. 125) in literature, the employee working at healthcare institution aims at improving the quality of healthcare by suggesting the usage of advanced biomedical technology. However, one of the themes indicated that:

“As an employee, I believe that usage of advanced biomedical technology brings preciseness in the treatment process. As with my experience, there are considerable surgery that cannot be performed by human but with the use of robotic surgery, those surgeries have now become possible. Thus, I, as an employee’s makes sure that these technologies are employed in our healthcare institution to make the impossible treatments possible”.

By analysing the above statement, it can be evaluated that employee works for improving the process of medical treatment by recommending the use of advanced biomedical technology for doing critical surgeries.

4.1.3 Current status regarding the usage of advanced biomedical technology in healthcare institutions of UK

The integration of technology with medicine brings convenience in the lives of patients and healthcare professionals. As one of the studies in literature highlighted that biomedical technology allows healthcare professional in doing robotic surgery without their presence at a hospital and makes minimally invasive procedures safe. However, employee working at one of the healthcare institution of UK said that:

“Currently, our hospital is initiating robotic surgeries that results in less scarring and minimisation of recovery time for the patients. Also, with the help of biomedical technology, our hospital is able to diagnose the disease on a cellular level that can be managed via the production of antibodies. Moreover, the vaccines has been made that can treat the diseases like malaria, polio, and MMR.

By examining the above response, it has been found that currently, UK medical institutions are using robotic surgery via utilisation of advanced biomedical technology. Furthermore, the orthopaedic internal fixation device is being used to repair the broken bones without the presence of human surgeon.

4.1.4 Challenges experienced by employees and entrepreneurs of UK in employing advanced biomedical technology in healthcare sector

The major challenge faced by entrepreneurs of UK in encouraging the use of advanced biomedical technology in healthcare sector is the involvement of government and lack of funding (Wherton *et al.* 2017, p. 368). Additionally, the study of Greenhalgh *et al.* (2017, p. 369) regarded that employees tend to face difficulty in using advanced biomedical technology that stops the healthcare institution in utilising advanced biomedical technology. Although, one of the respondents stated:

“One of the issues that I always encounter is lack of accessibility in research and development of biomedical technology. I, as an entrepreneur believes, that these biomedical technology would replace the service of human and substantially increase the quality of healthcare. However,

research on these technology demands extensive investment that does not provide profit. Hence, huge entrepreneurs prevent investing in such projects.”

By analysing the above statement, it has been interpreted that lack of accessibility minimises the drive of entrepreneurs for investing in these biomedical technology. Moreover, the limited accessibility limits employees in learning the implication of such biomedical technology.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1 Discussion

The results indicated that entrepreneur and employees plays an important role in promoting the use of biomedical technology in healthcare sector of UK. The research explores the level of challenges that are being faced by the entrepreneurs in healthcare for delivering and using the bio-medical technologies in their healthcare centres. This is because every challenge faced by the entrepreneurs of healthcare are different from one another. Gordon and Catalini (2018) has identified that with the use of biomedical technologies in the healthcare sector the entrepreneurs can easily access the big data analytics for their patients and then can easily develop good healthcare practices that were supportive of the potential growth. It was also discussed by Qi *et al.*, (2017) that mentioned challenges of using the bio-medical technologies can be mitigated when the entrepreneurs start their business operations after consulting the right regulating authorities and right technology vendors. This practice of consultancy can make the entrepreneurs familiar with the working of bio-medical technologies that only benefit their business after been successfully implied.

It was also discussed by Ok *et al.* (2015) the determination of drug usage for the patients with the bio-medical technology data will ease the functions of entrepreneurs in running their healthcare institutes because the data of the patients and other physician credentials will be safeguarded from theft through the use of effective electronic security system. The use challenge of the increase in the business costs can be removed when the entrepreneurs will think about the long term successful operations of their healthcare institute.

5.2 Conclusion

The current research can be concluded in an easy manner by acknowledging that every entrepreneur in the healthcare industry experiences different challenges in using the bio-medical technologies for supporting its operations effectively. It was discussed in the literature that many studies provide benefits of using the biomedical technologies in the healthcare sector but they fail in giving explanations about how to mitigate the experienced challenges by the entrepreneurs. The current research uses the positivism research philosophy that helps the current research in collecting the primary data through the use of interview and developing the research results with the use of thematic analysis.

The developed results explain the fact that every challenge of implementing bio-medical technology in healthcare is important for finding a remedy. This is because there is no significant relationship among the discussed challenges so the remedies must be developed with the establishment of workable strategies. In the discussion part, it was discussed that the entrepreneurs should be making effective strategies for implementing the technologies so that the level impact received from challenges can be minimised in an effective manner. It was further discussed in the discussion part that the entrepreneurs should have their meeting with the technology development authorities and the previous members of the healthcare sector for identifying the right way to avoid the challenges while implementing the bio-medical technologies.

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Appendix

Interview Questions

- Q1) What role do you have as an entrepreneur or an employee at your healthcare institutions?
- Q2) What challenges do you face in implementing advanced biomedical technology in your healthcare institutions?
- Q3) What kind of advanced biomedical technology are currently being used at your healthcare institutions?
- Q4) How these advanced biomedical technology are providing benefit to your healthcare organization?
- Q5) How do you think you can counter the restrictions being imposed on employing advanced biomedical technology at your healthcare institutions?
- Q6) Do you think your healthcare institution would drive towards growth in future by employing advanced biomedical technology?