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Exploring the Relationship between Technology Adoption Orientation, Capabilities, Service Offering and Patient Satisfaction in General Practice: A Study of 21 Surgeries in the West Midlands

By
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**A thesis submitted in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy in Engineering**

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List of Abbreviations

- GP General Practice
- NHS National Healthcare Services
- PCN Primary Care Network
- RBV Resource- based view
- TAO Technology Adoption Orientation
- WHO World Health Organization

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Declaration

This thesis is the original work of the author, submitted to the University of Warwick in support of the application for the degree of Doctor of Philosophy. Also, this thesis has not been submitted in whole or in part as consideration for other degree qualification at this or any other university.

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Abstract

General Practices (GPs) surgeries are the first point of call when it comes to medical care and the gatekeeping of secondary care (hospitals). Therefore, difficulties in accessing GPs services and obtaining appropriate appointments do apply pressure on the whole healthcare system. With the emergence of Covid-19, the global pandemic raises particular challenges for GPs, where the service has to be delivered to patients when physical contact is not possible.

The adoption of technology is associated with the introduction of new service offerings to meet the new market needs in the volatile market, as discussed in the strategic management literature. The importance of renewal and reconfiguration of firms' resources and capabilities in order to implement a new service offering has been emphasised in the theories of dynamic capabilities view and resource-based view (RBV).

In line with the abductive research logic, which was underlined by the author's critical realism, the research design developed to address two phases: theoretical and empirical. The former aims to explore underpinning theory and applied literature related to develop a conceptual framework to serve as a guide for empirical study. The latter is a case-based research method which is adopted to empirically test the conceptual framework and emerge the new findings.

The research findings concluded that there are three types of surgeries which have different associated characteristics in regard service offering. This research highlights the understandings of the transformation process from service offering (state 1) to (state 2) during Covid-19. Subsequently, the thesis provides the theoretical and practical contributions by developing a conceptual framework that can be used by academic research and practitioners in healthcare sector. Finally, the limitations and future research opportunities are highlighted.

Keywords: Resource-based view, Operational Capabilities, Dynamic capabilities, Technology adoption orientation, service offering, GP patient satisfaction.

1.1 Introduction to the chapter

The introductory chapter provides the foundations for the main body of this thesis by presenting a background and context for this research, as well as describing the route map of the thesis.

Section 1.2 explains the background for the research by providing an overview of the UK healthcare systems and the importance of primary care services within the system. That is followed by particularly defining the role, structure and how general practices operate and the challenges faced because of Covid-19.

Section 1.3 describes the route map for this thesis, highlighting the positioning of this research, as well as the aim and value of this research to the academic domain and practitioners. Then section 1.4 concludes this chapter with proposed structure of this thesis. The structure of this chapter is illustrated in Figure 1.1.

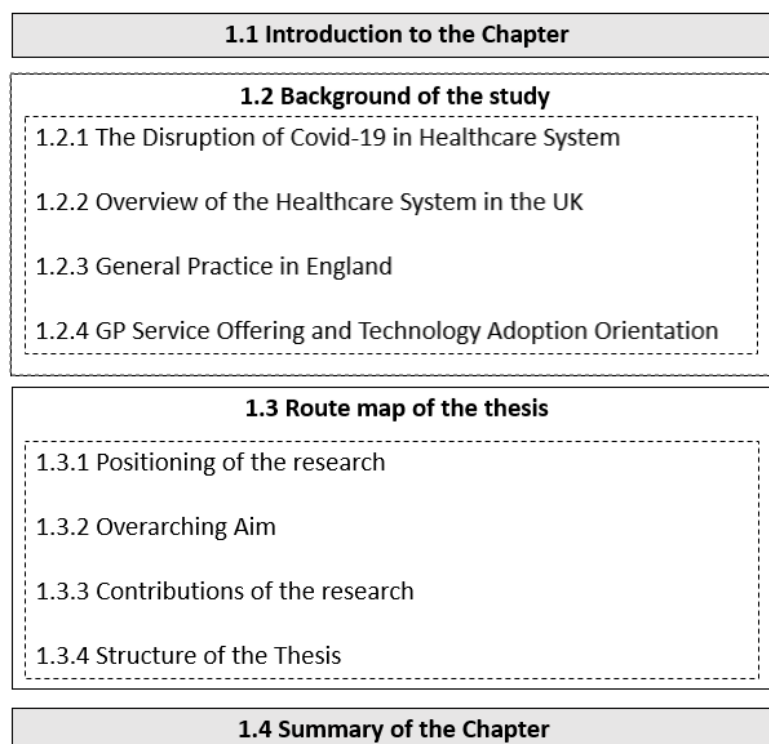


Figure 1.1 Structure of Chapter 1

1.2 Background of the study

This section presents the background knowledge for this study. It starts with the disruption of Covid-19 in healthcare system (see Section 1.2.1), followed by an overview of healthcare

in the UK (see section 1.2.2). Section 1.2.3 discusses the role, structure and operating system of general practice in England.

1.2.1 The Disruption of Covid-19 in Healthcare System

In March 2020, the coronavirus disease (Covid-19) was declared as a global pandemic by the World Health Organization (WHO). The caseloads and the number of case fatality have varied across different countries. Overall, the number of cases have been mostly reported in the USA and European countries. Accordingly, it is important for the Healthcare systems in each country to make radical changes and re-allocate their healthcare resources in order to respond and help to manage the Covid-19 pandemic in their own countries (Anderson et al., 2020).

During the Covid-19, as the patient's first point of contact is the national health system, this had a significant effect on primary care in many countries. The outbreak of Covid-19 has led to unprecedented changes in the current work and behaviour of General Practitioners (GPs), especially in scheduling and delivering both urgent and routine planned care. The emergence of Covid-19 raised particular challenges for GPs in various countries such as Belgium, New Zealand and the UK, where the service has to be delivered to patients when physical contact is not possible and face-to-face consultations had to be minimised (Eggleton et al., 2022 ; Yagiz and Goderis, 2022; Sharma and Javid, 2023). GPs had to manage their workload due to a dramatic increase in telephone and video contacts including same day clinical triage interactions to assess and prioritise patient need, and a decrease in the number of traditional face-to-face scheduled appointments reported (Eggleton et al., 2022).

Prior to the pandemic, the pressure of falling in the numbers of GPs and increasing in the number of older patients, as well as concerns about the access to appointments, in addition to social distancing and infection control requirements, have all limited the capacity to offer face-to-face consultations. The roll-out of the Covid-19 vaccination programme has also heavily involved GPs in providing such service (Access to GP Services | The Nuffield Trust, 2021). Consequently, GPs have accelerated the move to the adoption of triage (pre-assessment to access the right service), online bookings and video/phone consultations (Kulakiewicz et al., 2021).

One of the countries that strongly recommended the use of digital technologies in their healthcare system in order to respond to the sudden change of unexpected circumstance (i.e. Covid-19 pandemic) is the England's National Health Service (NHS). NHS Digital (2016) stated in its General Practice forward view report that the NHS England, in 2015/16, began a multi-million investment programme to support primary care and GP make improvements in premises and in technology. Existing studies in the primary care field provided a generic overview of how technology developments played an important role in enabling GP surgeries to offer different digital health service offering, supported by the evidence of case studies and surveys (Jiwa et al., 2013; Greenhalgh et al., 2016; Newbould et al., 2017; Donaghy et al., 2019b; Hutchings, 2020; Newhouse et al., 2020; Yagiz and Goderis, 2022). However, there is still a lack of comprehensive understanding on the impact of adopting blended digital health service offering (i.e. face-to-face and virtual consultations) on the patient satisfaction during Covid-19 as well as the capabilities required in order to implementing such service offerings (Quintano et al., 2018, Newhouse et al., 2020; Yagiz and Goderis, 2022). In order to explore the existing knowledge gap, Technology Adoption Orientation (TAO) theory, which refers to *“the stage of selecting a technology for use by an organization”* should be applied in primary healthcare as this is related to the patient engagement in the digital health technologies and service offerings (Yagiz and Goderis, 2022).

Accordingly, this thesis will focus on the application of TAO in the context of UK healthcare system (i.e. NHS England), particularly GPs in the England since GPs are an essential part of primary healthcare in UK's healthcare system. The overview of UK healthcare system and General Practices in England will be further discussed in section 1.2.2 and 1.2.3. Finally, the GP service offering and TAO will be discussed in section 1.2.4.

1.2.2 Overview of the Healthcare System in the UK

The National Health System (NHS) in the UK is a unique system from many healthcare systems globally as it is a free publicly- funded system through taxation rather than health insurance (NHS England, 2019b) . People in the UK can choose to attend a private healthcare sector which is available on a small scale (Timmins, 2013).

The NHS began in 1948 with focus on providing care with access based on clinical need, not ability to pay. Originally the centre of the service was the diagnosis and treatment of disease. Later it plays an increasing role in both preventing ill health and improving the physical and mental health of the population (Department of Health, 2013). There are a particular NHS body for each region in the UK. They are NHS Scotland, NHS Northern Ireland, NHS Wales and NHS England. In general, the NHS care is delivered by specialists and resources in all four regions, the role of system design is to define how specialties connect with each other and patients; this is different among these regions. The system's structure and how some of the services are delivered are mainly the differences between the four regional healthcare systems (Doheny, 2015).

This study will discuss specifically on NHS England and figure 1.2 demonstrates the structure of the NHS England and its elements interact. The Department of Health oversees the NHS England. The NHS England and Clinical Commissioning Groups (CCG) are responsible for commissioning primary care services (such as doctors, dentists and pharmacists), secondary care services (such as hospitals, rehabilitative care, and mental health care) and other private companies (Powell). From the 1st of July 2022, integrated care boards (ICBs) replaced clinical commissioning groups (CCGs) in the NHS in England (NHS Digital, 2022c). ICB, expected to bring partners together from across the local system, to work in a collaborative way to look after population health and wellbeing. The last part of the NHS England structure is the regulation part which is carried out by Care Quality Commission and Monitor (Powell).

Structure of the NHS in England

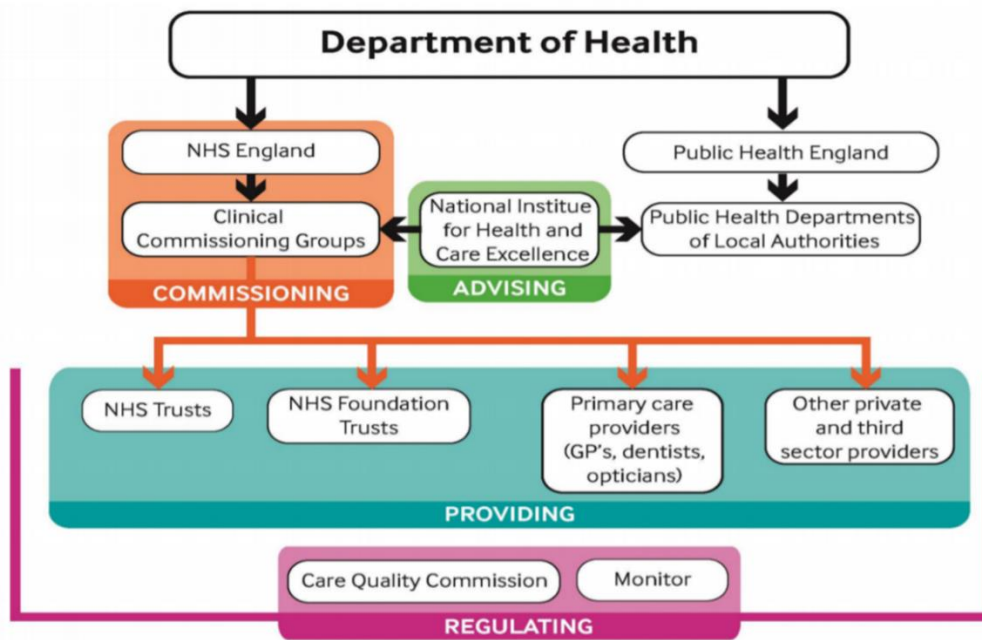


Figure 1.2: Structure of NHS England

The NHS England is a complex system which consists of a wide range of organizations with different roles, responsibilities and specialities. These provision of health services are mainly divided into two major areas: primary healthcare and secondary healthcare. They provide a variety of support and services to the population (Department of Health, 2013). There is other two areas: tertiary care and community health. The former care is for uncommon conditions that need highly specialized doctors such as transplants, plastic surgery and neurosurgery. The community health provides health visiting, sexual health services, child health services and district nursing (NHS Digital, 2021).

Primary healthcare is defined by WHO as the *“essential health care based on scientifically sound and socially acceptable methods and technology, which make universal health care accessible to all individuals and families in a community. It is through their full participation and at a cost that the community and the country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination”* (World Health Organization, 1978). Stretch (2000) in her book explained the structure of Primary care as *“it is usually the first contact a person has with the health services and this is often provided in the community (GPs, dentists, opticians, etc.)”*. (Stretch, 2000; p7). She has also defined the secondary care: as *“usually follows referral from a primary care worker”* (Stretch, 2000; p7). That means the primary care is preventative in nature and it is an approach to providing

healthcare while the secondary care is often curative in nature for advanced interventions that not available in primary care.

1.2.3 General Practice in England

The focus of this study is on the primary care in the NHS England, particularly on GPs surgeries. GP is the first point of call when it comes to medical care and the gatekeeping of secondary care (hospitals) (Beech & Baird, 2020). Therefore, difficulties in accessing GPs services and obtaining appropriate appointments are known to apply pressure on the whole healthcare system. Practices run by generalist doctors (general practitioners) in independent teams with nurses contracted to provide NHS services.

GP surgeries are small organisations independently owned and managed (5-50 staff). The role of the GPs is to look after patients (physical and mental problems) in their homes and within the communities where they live. Their main task is diagnosis and gatekeeping of referrals to specialists in secondary care. They also look after patients with chronic illnesses.

Figure 1.3 demonstrates the historical timeline of GP evolution. GP has changed considerably in terms of its workforce, scope and nature of the services provided, and how it is funded (Baird et al., 2018).

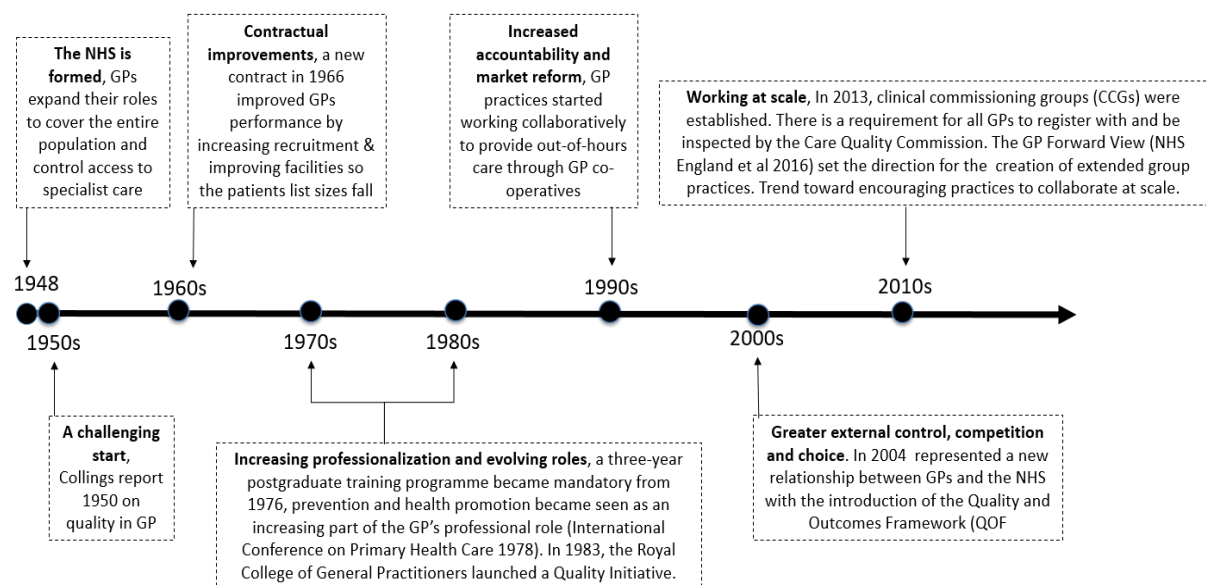


Figure 1.3: The evolution of general practice: a historical timeline- source (Baird et al., 2018)

Following the historical overview on the evolution of GP, it is important to understand how GPs services are commissioned and regulated. To do so, it is vital to understand the

structure of managing primary care services. NHS England and NHS Improvement maintain overall quality of GP services, contracting GP is delegated to CCGs under co-commissioning arrangements. To secure the provision of GPs services the integrated care systems maintain some power direction. GPs stated to work together with community, mental health, social care, pharmacy, hospital and voluntary services in their local areas in the form of primary care networks (PCN). Registration, inspection and monitoring of health and adult social care providers are the responsibility of the Care Quality Commission (CQC) (Kulakiewicz et al., 2021).

1.2.4 GP Service Offering and Technology Adoption Orientation

As mentioned in previous section, generally, primary care centres are the first point of entry into the British healthcare system and the first point of referral to other levels of care - acting like "gatekeepers"(Maxwell, 1992).

Generally, including in order to access GP services, patients have to book appointments and receive an appropriate delivery method (i.e. face-to-face, by telephone, via video and online or home visit) for their consultation (Fulop & Ramsay, 2019). They might also follow triage process. A triage system can assist in managing the demand for face-to-face appointments in primary care (Murdoch et al., 2015), however, it was adopted on a very small scale before Covid-19. In this thesis, GP service offering refers to these three states including triage, booking system and appointment modes.

Historically, GPs appointments have been performed in traditional face-to-face mode. Although, over the last decades there has been a variation in appointment modes such as phone calls, video calls, home visits (Brant et al., 2016; Iacobucci, 2018; Hempel et al., 2018). These different appointment modes have been enabled by new technologies (Llewellyn et al., 2014). Several studies demonstrated that the aim of adopting technologies in various appointment modes is to improve patients' care and accessibility to GPs services (Jen-Hwa Hu et al., 2002; Liddell et al., 2008; Jiwa et al., 2013). Others have stated that it can also produce an effective appointment system (Knight & Lembke, 2013; Carter et al., 2018). This refers to the Technology Adoption Orientation (TAO) as defined in Section 1.2.1 in this thesis.

During Covid-19 pandemic, technology has been increasingly used to support patients. This circumstance has accelerated the use of digital technology such as an online portal providing information and personalised support programmes, remote consultation and digital app for monitoring and surveillance (NHS, 2020). However, in order to implement TAO in GP service offering, multiple resources (i.e. financial resources, infrastructure and workforce) and new capabilities (i.e. staff training, patient's engagement and change management support for staff) are required (Hutchings, 2020).

Accordingly, this thesis will focus on exploring the relationship between TAO and GP service offering by considering the resources and capabilities required as well as patient satisfaction. The following section will discuss the route map for this thesis.

1.3 Route Map of the Thesis

This section discusses the four main elements of the thesis. The first element focuses on the positioning of this research in Section 1.3.1. The second and third elements present the overarching aim and contribution of the research in sections 1.3.2 and 1.3.3. The fourth element demonstrates an overview of the thesis structure in section 1.3.4.

1.3.1 Positioning of the Research

The theoretical discussion in this research is supported by the extant literature review on two concepts; the first concept is the RBV and the second one is the organizational capabilities (operational and dynamic capabilities) which will be discussed in the next chapter.

With the advancements of technologies and innovation in the healthcare setting globally, the evaluation of RBV is vital in recognising that the resources are the steering wheel of the organization and thus utilizing them to their potential is the key to enhance business performance. While to illustrate the relationship between firm resources and capabilities a review of literature on organization capabilities will support the RBV discussion. This research is built on these concepts to evaluate the combination of GPs' resources and capabilities effects on their performance. Specifically, this study views resources in GPs which contribute to the development of a set of capabilities (operational and dynamic) over time.

The relevant stream of applied literature in Chapter 2 extends the theoretical positioning of this research. A discussion on technologies in primary care necessitates a conceptualisation of the booking and delivering appointments process in GP. Based on this discussion, the concept of TAO is applied. By combining the themes of underpinning literature and applied literature in a theoretical model, this research aims to illustrate the relationship between TAO, service offering, capabilities and patient satisfaction. Furthermore, the theoretical model suggests that firms have different levels of capabilities which have been developed over time, particularly after the emergence of Covid -19. Figure 1.4 outlines the core themes in underpinning theories and applied literature that illustrates the theoretical positioning of this research.

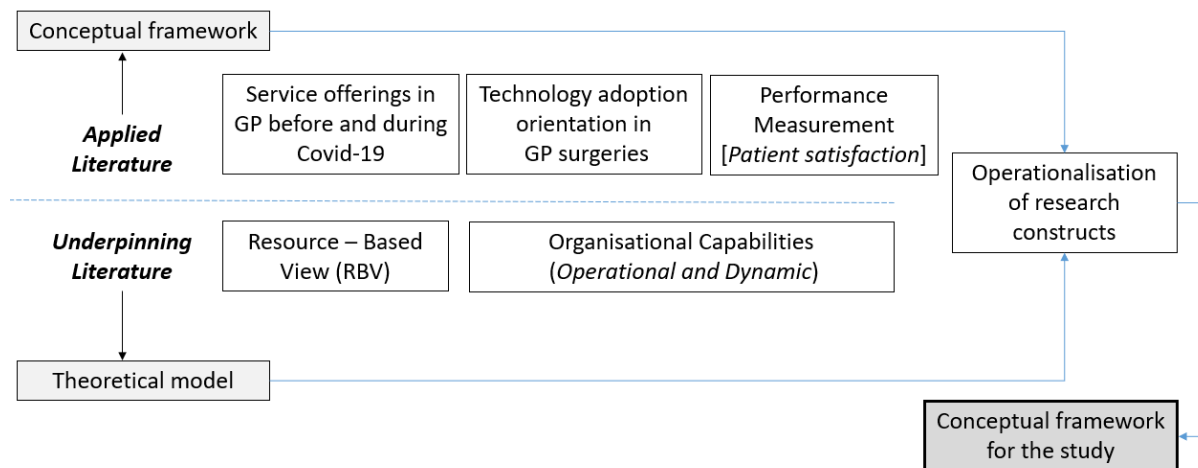


Figure 1.4: Theoretical positions of this research based on core themes in underpinning theory and applied literature.

1.3.2 Overarching Aim

As mentioned in section 1.3.1, this study aims to move a step further by taking the perspective of the RBV and dynamic capabilities in exploring the change of GPs service offering during Covid-19. This study will specifically investigate how GP surgeries can utilise and upgrade their existing resources and the required capabilities to achieve this change in service offering. Taking into consideration the technology adoption orientation (TAO) that support the change by conducting case study research. The context of this study refers to GP surgeries' service offering.

Therefore, in order to address the gap in existing literature, the aim of this thesis is:

‘To explore the relationship between TAO in service offering of General Practice in the scope of resources, capabilities, and patient satisfaction in England’

In order to achieve the research aim, the following research questions are supplementary:

- RQ1: What is the relationship between TAO and the service offering provided by GP surgeries?
- RQ2: What are the resources required for GPs service offering pre- and during Covid-19?
- RQ3: What are the operational capabilities required for GPs’ service offering pre and during Covid-19?
- RQ4: What are the required dynamic capabilities by practices to transit from their pre-Covid-19 service offering to the period of Covid-19?
- RQ5: What is the effect of different TAO surgeries on patient satisfaction?

To answer these five research questions, two phases of research design is adopted, and the conceptual framework was developed from reviewing the literature.

Phase 1 (literature Review) will attempt to understand the role of TAO in supporting different GPs’ service offerings, resource of the GP surgeries and the operational capabilities, and to explore the required dynamic capabilities to support the shift towards blended service offerings during Covid-19 as well as the relationship between TAO and patient satisfaction. In Phase 2, the researcher will conduct case study research through emerging empirical data.

1.3.3 Contributions of the Research

This study contributes to both theory and practice in the field of operation management in the healthcare sector. Regarding the theoretical contribution, it first contributes to the management of planning and delivering GP appointments. Given the immaturity of the field of digital adoption in primary care, this research develops a comprehensive review of how technology was adopted at GP level and its associated characteristics existing in the literature. In addition, the research contributes to the theoretical advancement by introducing the RBV and the organisational capabilities (operational and dynamic) to address the current research gap of TAO in GP surgeries. The application of the

underpinning theories in GP setting expands the research focus into the strategic analysis of the particular firm resource configurations and operational capabilities and highlights the particular types of dynamic capabilities required to transition from traditional service offering to blended service offering. These also support the theoretical and analytical bases to meet the study goals.

This research makes a contribution to practice as it enables the firm to measure the patient satisfaction with their technology-enabled service offering pre- and during Covid-19 in order to improve and increase patient satisfaction. In addition, GP managers can evaluate and reconfigure their existing resources and capabilities to support the transition towards technology-based service offering that Covid-19 has pressured GPs to adopt.

1.3.4 Structure of the Thesis

Following the introduction chapter, Chapter 2 discusses the relevant underpinning theory that provides the theoretical basis for this research. It examines the resource-based view, a strategic management approach for firms to sustain in a dynamic environment and to achieve competitive advantage, as the backdrop for this research. This is followed by a review of the concepts of organisational capabilities, particularly operational and dynamic capabilities.

Chapter 3 provides a review of applied literature in the field of GP service offering and their response to the disruption of Covid-19. Chapter three will also provide an exploration of TAO in healthcare, particularly in primary care in England that charts the phenomena from its origins and its transfer to England onwards; the objective is to build a clear understanding of 'what is TAO' in order to shape and guide the thesis. Understanding the importance of patient satisfaction with GP services will be discussed under the umbrella of performance measurement. This chapter concludes by structuring the conceptual framework of the study by combining underpinning theories (from chapter 2) and applied literature (in chapter 3) and operationalising the constructs.

Within Chapter 4, the research design outlines the knowledge paradigm debate and the researcher's adoption of a constructivist knowledge paradigm. The chapter also outlines a qualitative method research strategy as appropriate for addressing the research questions explaining in detail the methods employed.

Chapter 5 presents a discussion on findings from case study analysis (empirical findings), in relation to the research questions. This chapter includes three embedded units of analysis to cover the findings each in a separate part.

Chapter 6 is the cross-case analysis which combines the findings from the qualitative method approach to data collection and discuss them in the light of emergent patterns and themes, relating these findings back to the literature presented in Chapter 2 and 3.

Chapter 7 concludes the thesis with an overview of the research findings, a discussion of the limitations of the research and implications for research and practice. Figure 1.5 provide an overview of this thesis structure.

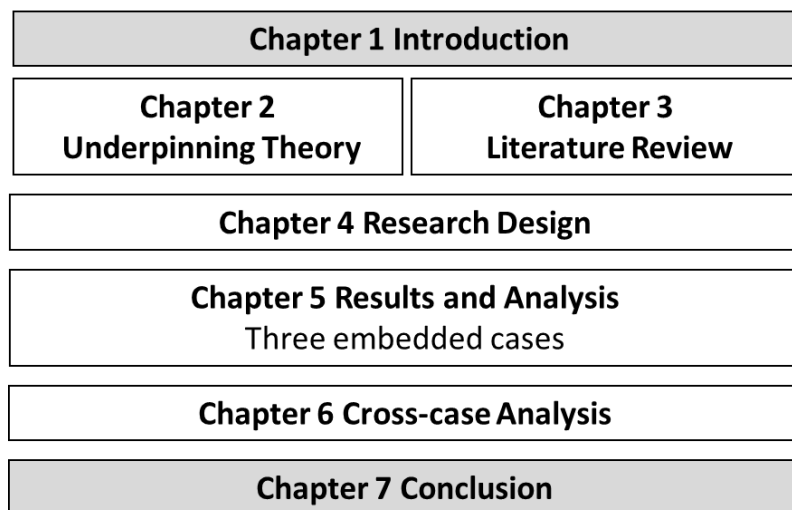


Figure 1.5 thesis structure

1.4 Summary of the chapter:

This chapter provides the background and context for this research, as well as an introduction to the route map for this thesis.

The chapter begins by presenting Covid-19 disruption in healthcare system and its impact on GP service offering is discussed (more details in chapter 3). This explained why it is important to take a perspective of TAO in the context of UK healthcare system. The structure of healthcare system and the historical evolution of GP in England is then described. An overview on how GP works and operate (within the primary care system and withing their services to the patients) is presented to formulate an understanding of GP

roles and challenges. This chapter outlines the application of technologies in healthcare, particularly in primary care in England. The discussion in this chapter then proceeds to describe General Practice's service offering (e.g., appointment mode). Section 1.3 of this chapter explains the positioning of this research in terms of the review of underpinning and applied literature. This is followed by the research aim and contribution of the research. The chapter concludes with a proposed structure for this thesis.

Chapter 2 follows with a discussion on the underpinning theory for this research.

Chapter 2: Underpinning Theory

2.1 Introduction to the chapter

This chapter presents a perspective on relevant strategic management concepts that form the foundation for understanding the existing knowledge supporting this research.

Section 2.2 introduces the theories of the firm's resources, the RBV, a strategic management approach for firms to achieve competitive advantage, this is followed, in section 2.3, by a review of the concepts of organisational capabilities, particularly ordinary/operational and dynamic capabilities.

Section 2.4 provides an overview on planning processes to utilize the practical applications alongside the strategic issues. In section 2.5, the chapter introduces the initial theoretical model based on these discussions. Finally, Section 2.6 provides the summary of the chapter.

The structure of chapter 2 is shown in Figure 2.1.

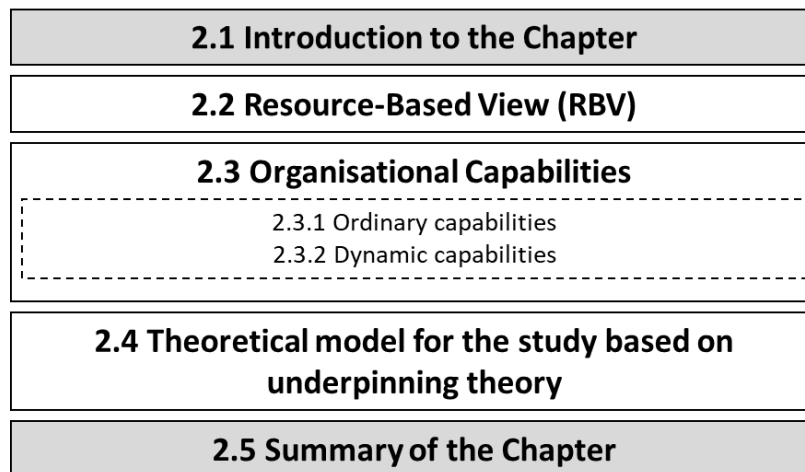


Figure 2. 1: Structure of Chapter 2

2.2 Resource-Based View (RBV)

To understand how GP surgeries can make a transition from their existing operation appointments system pre Covid-19, to a more digitalised system during Covid-19, requires the development of their internal capabilities and resources. Consequently, the RBV and

organization capabilities are considered as appropriate theoretical lenses that support the focus of this research within the strategic management literature.

This study argues that the differences in an organization’s performance are influenced by its activities at firm level; this can shape a firm’s performance and competitiveness in the long term. The RBV provides the internal view that the success or failure of a firm depends on the resource combinations it possesses. Edith Penrose (1959), in her work “The Theory of the Growth of the Firm”, identified a firm as consisting of “a collection of productive resources”(Penrose, 1959; p24). According to Penrose, the firm is not purely an administrative unit, but a collection of productive resources that lead to strategic decisions. Furthermore, she defined two types of resources within a firm: physical resources and human resources. Several authors expanded Penrose’s work like Wernerfelt (1984), who described a firm’s resources as tangible and intangible and stated that a firm is portfolios of resources rather than a portfolio of services and products. Barney (1991) and J. B. Barney (1986) added other characteristics to firm’s resources as heterogeneously and imperfectly mobile. In addition to that the work put in a third type of firm’s resources which is the organizational one. Table 2.1 summarises the three categories of resources.

Table 2.1: Classification of resources in a firm. Source (J. Barney, 1991)

Resource type	Description
Physical capital	Buildings and facilities, physical technology, equipment, geographical location, access to raw materials
Human capital	Training, experience, judgement, intelligence, relationships, insight of individual managers and workers in a firm
Organisational capital	Firm’s formal reporting structure, formal and informal planning, controlling and coordinating systems, informal relationship among the groups within the firm and between a firm and those in its environment

According to Barney (1991), resources from any of the above categories (physical, human, and organisational capital) can achieve a sustainable competitive advantage as long as the resources possess the VRIN attributes and those resources are heterogeneously distributed across firms and persist over time. Table 2.2 describes the characteristics of VRIN attributes. Valuable (V), Rare (R), Imperfectly imitable (I) and Non-substitutable (N). A resource being only valuable or rare does not grant a sustainable competitive advantage. It will be only of

assistance if the resource cannot be imitated by other firms, and it does not have any strategic equivalent available for other firms to exploit and leverage the competitiveness.

Table 2. 2: Characteristics of VRIN attributes for sustained competitive advantage

VRIN attributes	Characteristics
Valuable (V)	Enables firms to exploit the opportunities or implement strategies to improve efficiency and effectiveness and neutralize the threats in the firm's environments
Rare (R)	Means they are not possessed by large numbers of firms and unique for firms to generate competitive advantage
Imperfectly imitable (I)	Firms/competitors that do not own them cannot obtain them
Non-substitutable (N)	Those that do not have strategic equivalents of valuable resources

Later, Barney (1995), evolved his VRIN framework to VRIO framework. The Organised (O) characteristic refers to how a firm is organised in order to exploit and capture VRI resources. Nevertheless, it was argued this characteristic can be understood as the capabilities in the DC view literature (Cardeal & António, 2012). Therefore, the original VRIN characteristics were adopted in this thesis to describe a bundle of unique resources in a firm.

This thesis is in line with the need for VRIN resources for sustained competitive advantage, but firms must also ensure that the resources are continuously developed and renewed (Teece et al., 1997; Ambrosini & Bowman, 2009).

In the early empirical research of RBV theory, there was no clear distinction and adequate definition between “a Resource” and “a Capability” (Hitt et al., 2015). These two terms are used interchangeably among researchers (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993). Grant (1991) provided a clarity between a resource as an input into a firm activity while a capability is how a firm perform an activity. This view was supported by (Amit & Schoemaker, 1993) who advocated that capabilities represent the ability of a firm to develop and exploit its resources. Based on this recognition, combining resources and capabilities showed that resources on their own do not guarantee the creation of value or the realisation of sustainable competitive advantage in a firm (Barney & Arian, 2001). Sirmon et al. (2007) noted that resources must be bundled to create capabilities.

Although, originally RBV theory is developed and applied to the firms in private sector to sustain their competitive advantage, it can still be applied in the context of publicly funded settings (such as the NHS UK) (Ferlie, 2014). From the context of the study, this thesis can

still be considered in line with this view as it is suggested that GPs may possess certain healthcare VRIN resources including technology, booking system and skilled workers/staff are bundled to create certain set of healthcare services capabilities in order to compete with other GP surgeries. Ferlie (2014) suggested that in healthcare settings, VRIN resources needs to be clearly identified on how they are operated with the aim to improve the quality of service (i.e. access to high-quality and efficient care) not for making profit. To conclude, this discussion is to illustrate the link between a firm's resource base and the development of capabilities which will be further discussed in section 2.3

2.3 Organisational Capabilities

The strategic management literature has linked organisational capabilities to firm's development. A capability term has been discussed and used interchangeably alongside other concepts such as knowledge, competence, best practice, skills and routine (Prahalad & Hamel, 1990; Barney, 1991; Amit & Schoemaker, 1993; Pisano, 1994; Caldeira & Ward, 2003). However, these terms are very different (Flynn et al., 2010). Teece et al. (1997) indicated that a capability has a superior way of allocation, coordination and deploying resources in a firm. Dutta et al. (2005) suggested that while resources and output are observable instantly, capabilities are only recognisable through the transformation process, in other words, they considered capabilities as an "*intermediate transformation ability*" of a firm. However, there is no distinction between firm's new capabilities and already existing capabilities. Therefore, Feiler & Teece (2014) provided a difference between existing and yet to be developed capabilities. They explained that the real value in capabilities rely on the firm's ability to choose, improve and bundle its resources (both the tangible and intangible ones) and converting them into the desirable performance goals. This indicates that capabilities development has to be a continuous process which firms manage over time.

In the existing literature, there are various capabilities' definitions that have been used in operation management research. Table 2.3 provides a summary of some of these definitions.

The fundamental theme of the capabilities definitions as shown in table 2.3 is related to the physical ability to handle, arrange or transfer resources within a firm. While Amit & Schoemaker (1993) showed that capabilities can be based on activities related to

information. These capabilities' definitions point up to repetitive organisational processes (Dosi et al., 2001) where coordination is essential (Helfat & Peteraf, 2003; Wang & Ahmed, 2007), while others highlighted organisational routines (Winter, 2003).

Table 2.3 Selected capabilities' definitions

Definitions of "capabilities"	Authors
A firm's capacity to deploy resources, usually in combination, using organizational processes, to affect a desired end. They are information-based, tangible or intangible processes that are firm-specific and are developed over time through complex interactions among the firm's resources. Capabilities are based on developing, carrying, and exchanging information through the firm's human capital.	Amit & Schoemaker (1993; p35)
Socially complex routines that determine the efficiency with which firms physically transform inputs into outputs	Collis (1994; 145)
Capabilities involve organized activity, and the exercise of capability is typically repetitious in substantial part.	Dosi et al. (2001; p4)
The ability of an organization to perform a coordinated set of tasks, utilizing organizational resources, for the purpose of achieving a particular end result.	Helfat & Peteraf (2003; p999)
High-level routine (or collection of routines) that, together with its implementing input flows, confers upon an organization's management a set of decision options for producing significant outputs of a particular type.	Winter (2003; p991)
The efficiency with which a firm uses the resources available to it and converts them into whatever outputs it desires. This suggests that capabilities are an "intermediate transformation ability" between resources and objectives.	Dutta et al. (2005; p278)
A firm's capacity to deploy resources, usually in combination, and encapsulate both explicit processes and tacit elements (such as knowhow and leadership) embedded in the processes.	Wang & Ahmed (2007; p35)
A set of current or potential activities that utilize the firm's productive resources to make and/or deliver products and services	Feiler & Teece (2014; p328)

Capabilities can also be ranked according to their role, importance in the firm as well as to their contribution to a firm's sustainable competitive advantage (Collis, 1994; Danneels, 2002; Zahra et al., 2006; Wang & Ahmed, 2007).

Wang & Ahmed (2007) described the hierarchical view of firm's resources and capabilities. They began with resources element at zero-order level and considered resources as the foundation of a firm and the basis for firm's capabilities. These are the resources which possess VRIN attributes of valuable (V), rare (R), inimitable (I), and non-substitutable (N) as stated by Barney (1991). Moving to level first order, the capabilities represent the ability to deploy resources to attain a desired goal, as the later on their own are unable to sustain a

firm's strong performance. A bundling of the elements (resources and capabilities) of the first two levels creates core capabilities. At this level of second-order, core capabilities are strategically important to a firm's competitive advantage at a certain point in time, until the competitive environment changes. Lastly to address environmental change and to achieve a sustainable long-term performance, dynamic capabilities, which are positioned at the top of the hierarchy at third-order level, represent a firm's constant pursuit of the renewal, reconfiguration and recreating of resources, capabilities and core capabilities

The hierarchy view of firms' resources and capabilities is summarised as shown in figure 2.2

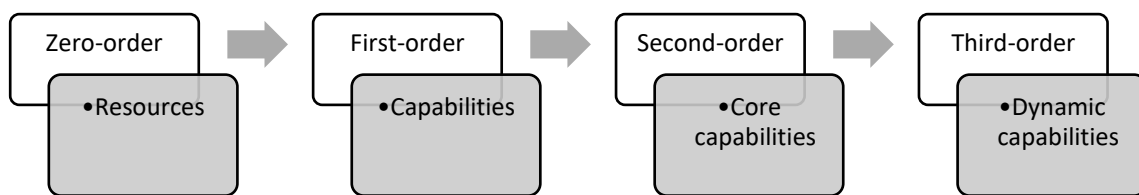


Figure 2. 2: Different levels of organisational capabilities. Source (C. L. Wang & Ahmed, 2007)

Capabilities can provide the firm with competitive advantage over a longer period than the resources as they are harder to be imitated by competitors than resources are (Hayes & Pisano, 1996). Accordingly, capabilities also refer to what an organisation can achieve from learning as well as from organisational resources and histories. They can be measured by the accomplishment of specific performance terms, for example, quality and productivity (Feiler & Teece, 2014). Peng et al. (2008) explained that for firms to realise their contributions to operational performance, their capabilities should undertake continuous learning process. This consists of not only technologies upgrading, but also an upgrade of employee skills and physical capital. Thus, capabilities are linked to managerial choices to define, develop and set organisation routines.

As explained by Teece (2017), firm's capabilities are broadly categorised into two interrelated types: operational (ordinary) capabilities and dynamic capabilities. Operational capabilities are mainly operational in nature. They represent the ability of a firm to use resources like raw materials, labour, skills and technology, to generate products and services (Ahmed et al., 2014). On the other hand, dynamic capabilities are strategic in

nature and fundamental in identifying, developing and coordinating firm's operational capabilities (D. J. Teece, 2017).

In this study, the term "operational capabilities" is being used to reduce confusion with other different terms that have been used interchangeably in the literature. For example, ordinary capabilities (Teece et al., 1997; Augier & Teece, 2009), substantive capabilities (Zahra et al., 2006) and zero-order capabilities (Winter, 2003b); statistic capabilities (Collis, 1994).

2.3.1 Operational Capabilities

Operational capabilities allow a firm to make a living in the present (Winter, 2003); they also enable the firm to perform activities to offer existing products and services (Helfat & Winter, 2011). These capabilities help a firm to do things right (D. J. Teece, 2017) by applying effective operational strategy (Flynn et al., 2010) and by employing a combinations of processes and routines, employee skills, facilities and equipment and administrative synchronisation (Feiler & Teece, 2014). In other words, operational capabilities enable a firm to maintain its position over time and to efficiently generate products and services (Ahmed et al., 2014).

In order for a firm to achieve its desired outcomes, operational capabilities draw on firm resources and practices. They can possibly obtain a competitive advantage, however, these mobile capabilities can be easily imitated and transferred through benchmarking. Linking RBV concept and operational capabilities perspective, can conclude the following: (1) Resources can be configured by operational capabilities, (2) Resources can be deployed efficiently based on operational capabilities, (3) Firms can fulfil market requirements by these capabilities and lastly (4) Operational capabilities can be improved when firm is consistently offering products and services. Figure 2.3 clarifies the relationship between resources, operational capabilities, and product and service offering.

Based on the framework suggested by (Cepeda & Vera, 2007), the construct in figure 2.3 can be operationalised. Their framework is an extension of (Hall, 1992; Hall, 1993) work on linking operational capabilities and intangible resources. Cepeda & Vera (2007) defined five dimensions of operational capabilities within a firm: (1) regulatory such as contracts, intellectual property, (2) positional such as reputation, (3) functional which is the ability to

do specific things, (4) cultural such as attitudes, beliefs and values and (5) knowledge-based value creation which support knowledge as the source of improvements. The first two dimensions categorised as asset-based while the latest three dimensions categorised as process-based.

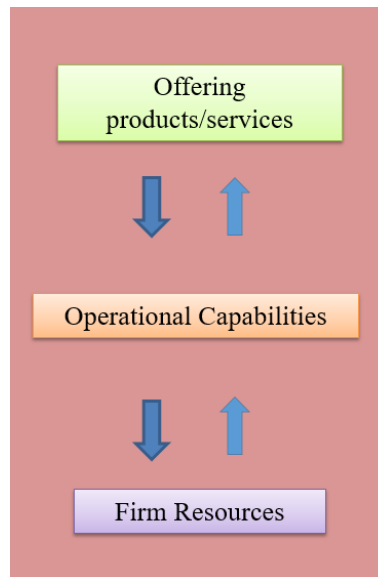


Figure 2. 3: Interrelationship between resources, operational capabilities and product/service offerings

Some empirical studies (Rosenzweig et al., 2003; Devaraj et al., 2007) indicated that operational capabilities do not influence performance directly. However, Feiler & Teece (2014) suggested that they are able to achieve technical efficiency. Eisenhardt & Martin (2000) described operational capabilities as specific defined tasks; this perspective suggests a direct representation of the ability of a firm for designing, developing, producing and delivering products or services by the involvement of managers and skilled employees (Kaplan & Norton, 2008). This involvement shows the importance of effective integration by managers to enable a firm to recognise the value of its operational capabilities (Feiler & Teece, 2014). Operational capabilities can become dynamic capabilities if they produce large amount of changes in a short period of time (Helfat & Winter, 2011). This aligns with their previous work on when to consider firm operational capabilities a dynamic one. They highlighted that when they are able to change firm's resources and maintain being in the firm over time (Helfat & Peteraf, 2003).

To conclude, these views demonstrate that the distinction between operational and dynamic capabilities is based on their nature, as mentioned earlier in section 2.3 and the

speed of change they create throughout a firm. Consequently, although some capabilities match and fit both operational and dynamic capabilities characteristics, they still differ in their purposes and intended outcomes (Helfat & Winter, 2011; Slaouti, 2021).

In this thesis, operational capabilities term refers to the managerial, technical and customer capabilities which firms must own to secure a successful adoption of new technologies. This view is consistent with the references adopted by (Eisenhardt & Martin, 2000b) (Plakoyiannaki & Tzokas, 2002) (Kaplan & Norton, 2008) (Feiler & Teece, 2014) who stated the vital role of managers, skilled technical employees' involvement and the close relationship to customers is strengthening firm's operational capabilities. Hence, in the context of this thesis, it can be referred that GP surgeries must own certain operational capabilities (i.e. managerial capabilities, GPs consultation skills and the capabilities in managing patients) to act on their VRIN resources in order to deliver day-to-day care.

2.3.2 Dynamic Capabilities

The operational capabilities have always been helping a firm to do things right; meanwhile, dynamic capabilities help a firm to do right things at the right time based on change in the environment such as new product development, process development and business opportunities (D. J. Teece, 2017).

Dynamic capabilities concept was first defined in late nineties of the previous century as a *"firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments."* (Teece et al., 1997; p516). This definition considers two main aspects; firstly 'dynamic' term which call attention to renew competencies capacity to achieve change in the firm environment; secondly 'capabilities' term which point up the fundamental task of strategic management in building, integrating and reconfiguring firm resources and competences to fit the change in the environment (Teece & Pisano, 1994).

As dynamic capabilities focus on both core competence perspective (Prahalad & Hamel, 1990) and knowledge acquisition (Grant, 1996), it is said that they can be considered as an extension of the RBV. In other words, dynamic capabilities and RBV concepts both share a similar view that a firm is made of a bundle of resources which are actively important to the development of a firm's competitive advantage. Nevertheless, Winter (2003b) claimed that

the concept of dynamic capabilities extends the view that firm's bundle of resources must refresh continuously, mainly in a swift changing industry. Therefore, these capabilities reflect changes for resources. This discussion has been supported by (Ambrosini & Bowman, 2009) who provided the following definition "*Dynamic capability is not a capability in the RBV sense, a dynamic capability is not a resource. A dynamic capability is a process that impacts upon resources. Dynamic capabilities are about developing the most adequate resource base.*" (Ambrosini & Bowman, 2009; p34).

As illustrated earlier in this section, dynamic capabilities have also been known as "higher-order capabilities" to highlight the different levels of learning abilities between firms (Collis, 1994). Moreover, they have been known as "third-order" capability to emphasise the highest capability level in the hierarchy of capabilities (Wang & Ahmed, 2007).

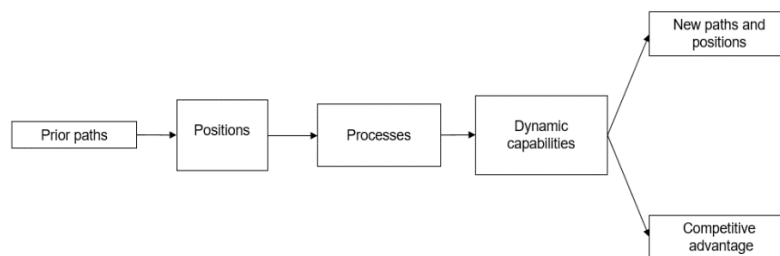
Eisenhardt & Martin (2000) defined dynamic capabilities as "*processes that firms can use to obtain, integrate, reconfigure and release resources, leading to new resources and resource configurations*". Various other definitions of these capabilities have been provided over the years, which align with (Eisenhardt & Martin, 2000) work and suggested that the main theme of these definitions evolve fundamentally around organisational processes and routines. These capabilities were refreshed and updated regularly as well as being deployed to manipulate firm resources over time (Zollo & Winter, 2002; Zahra et al., 2006; Pavlou & El Sawy, 2011; Helfat & Winter, 2011). To summarise the role of dynamic capabilities, Teece (2007) and Augier & Teece (2009) established in their work that these capabilities are able to sense and then seize new opportunities, and to reconfigure and protect knowledge, competencies, and assets with the aim of achieving a sustained competitive advantage.

Peteraf et al. (2013) depicted in their work that a critical issue has been missing from the studies on dynamic capabilities: the two seminal works in this field (Teece et al., 1997) and (Eisenhardt & Martin, 2000), represented a contradictory understandings of the construct's core elements.

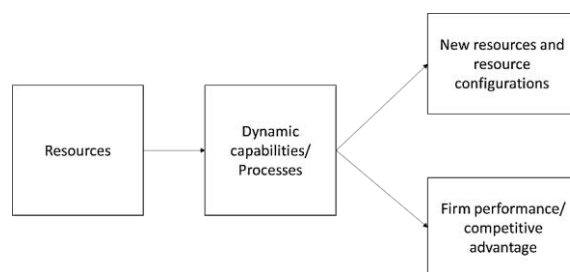
The dynamic capabilities framework presented by Teece et al. (1997) aimed to provide an essential understanding on how to develop competitive advantage in a firm; this framework argued when dynamic capabilities are supported by VRIN resources in addition to a strong processes strategy, firms are able to achieve competitive advantage. The framework

suggested by Teece et al. (1997) is based on three categories of factors: processes, positions, and paths. Firms have their own paths that are influenced by firms' history and previous investments. Variable paths lead to the current firms' positions (the availability of tangible and intangible resources). That affects the strategic processes within firms; hence dynamic capabilities depend on these processes which can alter the current position, driving firms to competitive advantage as well as leading to new paths and positions.

In contrast, the work of Eisenhardt & Martin (2000) represented a process-oriented approach. They defined dynamic capabilities as processes embedded within firms, by which firms resources are manipulated. That results in generating new resources, resource configurations and new value creation strategies. Their work also argued that dynamic capabilities and manipulated resources have a direct impact on firm performance and competitive advantage and also an indirect impact through resource configurations. In comparison with Teece et al. (1997) view, Eisenhardt & Martin (2000) view showed that it is harder to achieve competitive advantage by dynamic capabilities. However, their basic chain of logic is very similar to that of Teece's (Helfat & Peteraf, 2009). The chain of dynamic capability logic based on these two authors is presented in figure 2.4 (a) and (b).



(a) (Teece et al., 1997) view



(b) (Eisenhardt & Martin, 2000) view

Figure 2.4: The chain of logic in dynamic capabilities (a) (Teece et al., 1997) and (b) (Eisenhardt & Martin, 2000) articles. Source (Helfat & Peteraf, 2009)

Teece (2007) later modified his previous framework in Teece et al., (1997) by including a set of activities which focus on three particular types of dynamic capabilities. The categories are sensing, seizing and transforming capabilities. Sensing capabilities refer to the ability of identifying new market, recognise and assess new opportunities based on the knowledge and learning capacities of the firms. When a new opportunity is sensed, firms address this by adjusting or mobilising their existing resources to respond to such opportunities (named as seizing capabilities). Afterwards, transforming capabilities allow firms to continuously renew their resources and regularly transform aspects of the organisation leading to competitive advantage, and to new positions and paths. The modified chain of dynamic capability logic represented in figure 2.5.

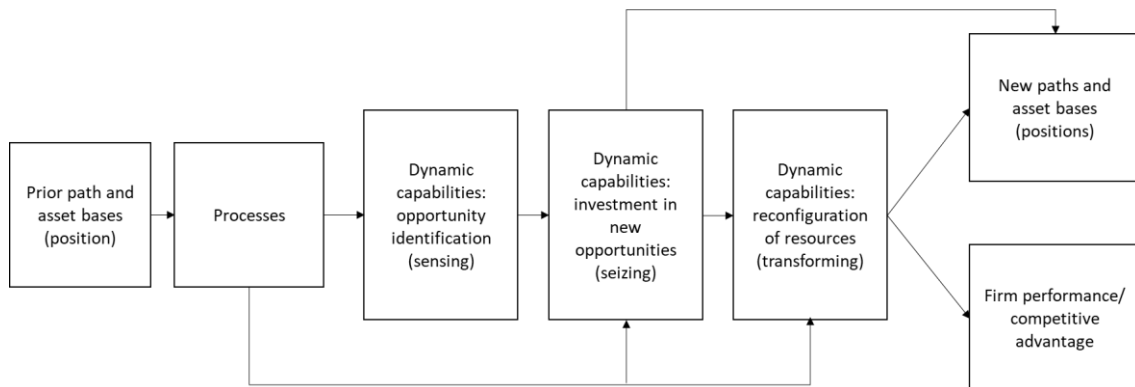


Figure 2.5: Modified chain of dynamic capability logic (Teece, 2007) view

Going back to Teece et al.'s (1997) framework, although it has suggested that dynamic capabilities are existed in rapidly changing environment and enabled firms to achieve sustained competitive advantage, Eisenhardt & Martin's (2000) framework argued that dynamic capabilities can still be found in stable environment where they are simple and required for incremental and continuous improvements of the resource base. This contrasting view was clarified by (Ambrosini et al., 2009b), who suggested that in firms' environment, dynamic capabilities has three levels: incremental, renewing, and regenerative. These different levels are aligned with the view that dynamic capabilities consist of processes and routines.

Incremental dynamic capabilities refer to continuous process. *Renewing dynamic capabilities* represents a periodic process that reflects a firm's ability to purposefully create, extend, improve or modify its resource base. On the other hand, *regenerative dynamic capabilities* are infrequent processes that do not link directly to creating or reconfiguring

firm's resources; however, they are related to the way a firm changes its resources base. Within the three types of dynamic capabilities represented by (Ambrosini et al., 2009b), it can be argued that managers' perception in firms is still a core value to determine what constitutes a stable or a rapidly-changing environment. Perceiving these differences assists in making a distinction between changes in the environment. Figure 2.6 depicts the three types of dynamic capabilities in three levels of environmental states (stable and dynamic and the hyper environment).

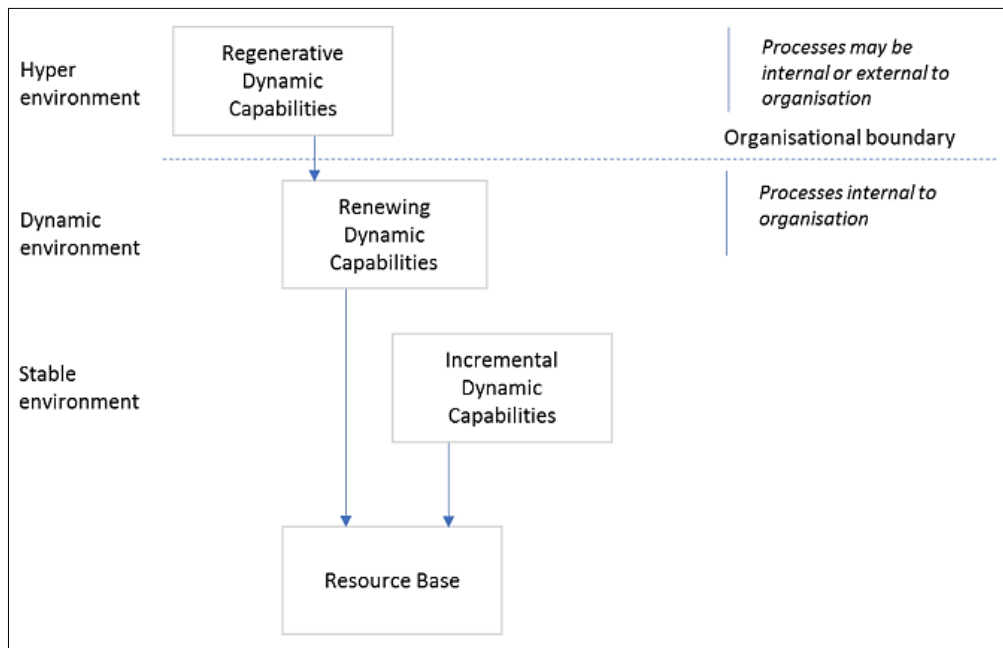


Figure 2. 6: Three types of dynamic capabilities at different levels of perceived environmental states. Source (Ambrosini et al., 2009b)

To sum up, as shown in figure 2.6, the perceived environmental states are related to (1) *stable environment*, slow rate of change, where the resource base would experience incremental improvements and no significant transformation though processes. (2) *Dynamic environment*, it is the level of dynamic capabilities that firms would develop from TAO experience (Zollo & Winter, 2002) and resource base goes through refreshed and renewal process. (3) *Hyper dynamic environment*, rapidly changing business environment, which is featured by threats to firm's competitive advantage, the dynamic capabilities would transform into a new group of dynamic capabilities and a firm would reconfigure the resource base regularly and effectively modify its set of dynamic capabilities (Zahra et al., 2006). These environment states are based on the organisational boundaries represented by the internal and external processes of a firm.

The deployment of any type of dynamic capabilities does not only depend on the type of business environment, but it also relates to the managerial perception of that external business environment competitive position and its product life cycle (Ambrosini et al., 2009b). Furthermore, the identification of firm's threats and opportunities are vital factors influence dynamic capabilities; however, these factors are not dynamic capabilities themselves (Ambrosini & Bowman, 2009). Weerawardena et al. (2014) argued that dynamic capabilities view force firms to develop long-lasting capabilities through knowledge acquisition, dissemination, and interpretation. This concept can be involved within the scope of firm learning activity to perform tasks better and quicker (Teece et al., 1997). In other words, learning is at the core of dynamic capabilities development and some authors consider it as a dynamic capability in itself (Eisenhardt & Martin, 2000; Zollo & Winter, 2002). Others emphasised that for a firm to be able to reconfigure resources, learning is essential (Wang & Ahmed, 2007; Ambrosini & Bowman, 2009) and it is a strategic process when a firm adapts technological change (Vogel & Güttel, 2013). Feiler & Teece (2014) reflected on the development of dynamic capabilities concept over time and suggested that dynamic capabilities enable firms to manipulate their operational capabilities by adapting and innovating whilst operational capabilities manipulate firms' resources and focus on their efficiency.

Based on the above discussion, this thesis employs the views suggested by dynamic capabilities framework presented by Eisenhardt & Martin (2000), dynamic capabilities clusters by Teece (2007) and the categorisation of dynamic capabilities by Ambrosini et al. (2009). Moreover, it identifies specific capabilities of learning, integrating, reconfiguring and improving the resource base.

2.4 Theoretical model for the study based on underpinning theory

On the basis of the previous discussion on dynamic capabilities, this approach aligns with the development of new products and services resulting from the new bundle of resources offered by the firm, particularly in the dynamic environment. Although, some hold the view that this concept might not be applicable in public sector, due to the limited access to resources, laws, and institutions for various stakeholders (Cha, 2014; Ferlie et al., 2016), it is argued that it can still be introduced in the context of public organization in order to improve the quality of public performance as well as eliminating possible risks arising from

unpredictable environments (Hawrysz, 2018). Covid-19 physical contact restriction accelerated the adoption of the dynamic capabilities of healthcare providers to reconfigure their existing resource base. That allows firm (GP surgeries) to develop new services (i.e. phone/video consultations) within the changing environment (to conform with the Covid-19 lockdown restrictions).

Also as discussed in section 2.3.2, the dynamic capabilities can be viewed as hierarchical in nature, which emphasizes the need for incremental changes in a stable environment, or the need to renew dynamic capabilities when the environment is dynamic. Consequently, even in a stable economic environment, the firm's resource base and operational capabilities need to be incrementally enhanced. Conversely, in a dynamic environment, firms with dynamic capabilities are able to upgrade their product and service offerings by renewing their resource base and operational capabilities.

For this thesis purpose, figure 2.7 presents the underpinning theory which can be illustrated by linking the concepts of RBV, operational capability and hierarchy view of dynamic capabilities in order to demonstrate the theoretical framework.

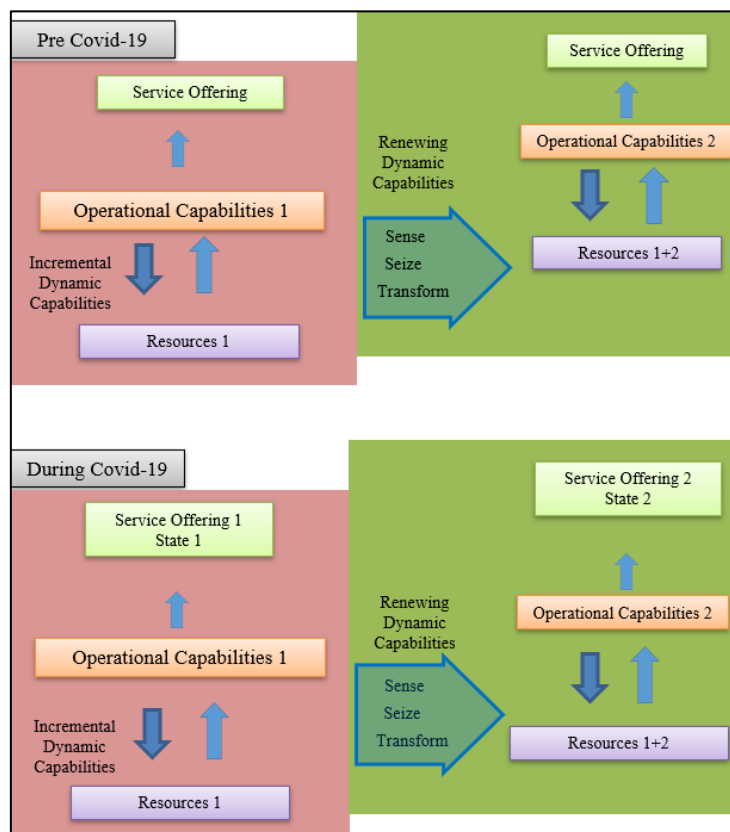


Figure 2.7: Theoretical Model based on underpinning theory

As illustrated in figure 2.7, firms will first upgrade their products and services within the same market, by utilizing their incremental dynamic capabilities. In other words, by enhancing the operational capabilities of the firm to continually satisfy the current market needs, incremental dynamic capabilities enable firms to do a small improvement on their existing resource base and operational capabilities. This results in improved operational capabilities that enhance the existing offering. Normally, an existing offering will be upgraded to a new offering when the business environment is dynamic, and the market needs are evolving to meet new needs. In light of such market changes, a new set of operational capabilities will be required to address such demands.

For the firm to develop new operational capabilities, through the use of renewed dynamic capabilities, it must transform its resource base to create new strategic resources that will develop new operational capabilities. Teece (2007) demonstrated how firm needs to adopt three dimensions of dynamic capabilities (i.e., sensing, seizing and transforming capabilities) in order to support the development of renewing dynamic capabilities that contribute to an upgrade to the position of a new firm. Furthermore, it has been pointed out that dynamic capabilities are path-dependent, which implies that existing resources must be protected while the capability base is being reconfigured. Consequently, the current firm resources and operational capabilities that are advantageous for offering the current offerings will still exist following the updating process.

Based on the context of the research presented in this thesis, GP surgeries mainly focus on offering traditional service offering (state 1) to their patients. Booking system accessed mainly via telephone call to book appointments. These appointments are prominently delivered as face-to-face consultations. Before Covid-19, surgeries may incrementally adjust their existing resources in order to improve their current service offerings or extend the functions of the services to meet the patients' demand such as reducing the patients' waiting times, offering extra vaccination programmes and out-of-hours services. Some surgeries were already in a process of adopting technology and upgrading their digital healthcare services to meet current demand. Nevertheless, during COVID-19, when restrictions applied on healthcare and the technology forced to be implemented in healthcare sector, surgeries tended to put in place an alternative way to deliver service offering (state 2). Surgeries have to be able to respond to such changes in market

environment (Covid-19 lockdown restriction) by transitioning themselves into technology-enabled healthcare providers (this alters the form of consultations) to avoid the need of patients coming into the surgeries. Therefore, dynamic capabilities in addition to the firm resources, operational capabilities serve as the enablers for surgeries to implement new service offering i.e. new forms of consultations (state 2).

The detailed explanation regarding how GP service offerings can be upgraded from state 1 to 2 will be discussed in the next chapter.

2.5 Summary of the Chapter:

This chapter discusses the development of the theoretical model of the study; it started with the theories of firms' resource base and the development of its capabilities (including operational and dynamic capabilities). The chapter also discussed how these two main types of organisational capabilities differ in their purposes and intended outcomes.

This chapter concludes with a preliminary theoretical model developed for this research based on the discussion on underpinning theory.

Chapter 3 now provides the literature review of the thesis.

Chapter 3: Literature Review

3.1 Introduction to the chapter

The purpose of this chapter is to provide theoretical foundation to the context of this study.

The chapter begins by an explanation on the different service offering in GPs before and during Covid-19 in Section 3.2. This is followed by an exploration of TAO to demonstrate the significance of technologies in supporting new service offering to surgeries' patients.

Following this, it addresses the concept of TAO to link it to the research context in healthcare. Barriers and enablers for adopting these technologies were discussed as well.

Section 3.3 addresses how to measure performance in industry and in healthcare and demonstrates the source of patient satisfaction data that are used in this thesis. Section 3.4 introduces a preliminary theoretical model for this research based on the underpinning theory and applied literature discussion in this chapter. The research constructs including firm resources, operational capabilities, and the dynamic capabilities relating to the GPs surgeries are operationalised to provide the detailed preconceptions for the conceptual framework. That is supported by a discussion on the conceptual framework for this study. Lastly, in section 3.5 a summary of this chapter is provided. The structure of this chapter is illustrated in figure 3.1.

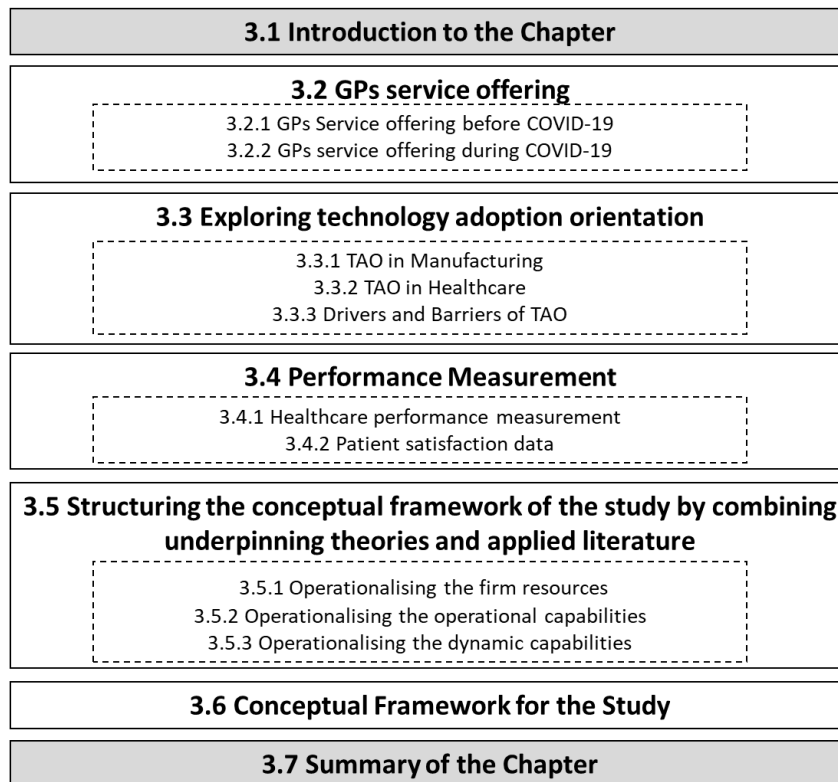


Figure 3.1: Structure of Chapter 3

3.2 GPs service offering

As mentioned in the introduction chapter, typically, primary care centres are the first point of entry into the British healthcare system and the first point of referral to other levels of care - acting like "gatekeepers"(Maxwell, 1992). Wensing et al. (1998) conducted a systematic review of 19 international research studies investigating the following question: "What do patients and the public want from primary care?". The top five themes were: humaneness, competence/accuracy, patients' involvement in decisions, time for care and accessibility. A later study by Coulter (2005) reviewed the research evidence from the UK and internationally to answer the same question. She highlighted five themes: interpersonal care, access – patients want easier and more flexible access to services, choice and continuity, shared decision-making and equity. A five-part model was developed by Baird et al. (2018) which illustrated that in order for GP to deliver effective and comprehensive care, several attributes must be present, and the core one is patient accessibility.

Fundamentally, the accessibility term defines as: “*Access in general practice is about the ease with which patients can obtain appropriate and beneficial care.*” (Baird et al., 2018; p15). In order to access GP services, patients have to book appointments and receive an appropriate delivery method for their consultation (Fulop & Ramsay, 2019). They might also follow triage process. A triage system can assist in managing the demand for face-to-face appointments in primary care (Murdoch et al., 2015), however, it was adopted on a very small scale before Covid-19. Other researchers add later on that, triage is an efficient way to meet the exact patient’s needs (Tymens, 2022; Rodrigues et al., 2022). In figure 3.2 a visualisation of patient’s journey through GP service offering is illustrated. In this thesis, service offering refers to these three states including triage, booking system and appointment modes.

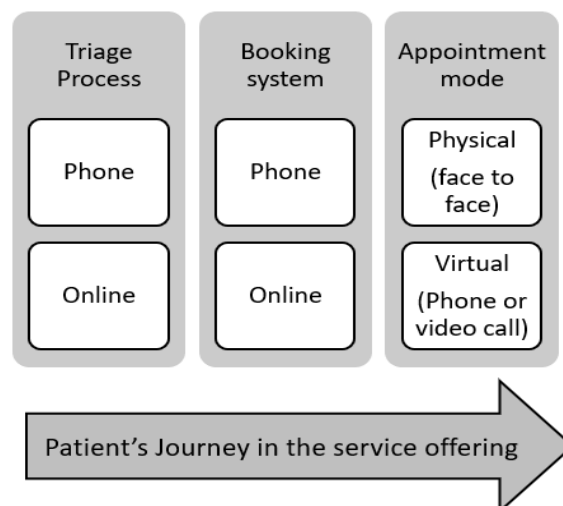


Figure 3. 2: Service offering at GPs surgeries.

In the following two sections, GP service offerings will be discussed over two periods of time (before and during Covid-19). This is because the pandemic has been a cut off event due to the lockdown restrictions that put in place on healthcare system (Homeniuk & Collins, 2021).

3.2.1 GPs Service offering before COVID-19

This study reports on the changes experienced, particularly those in service offering setting, in English GP during the pandemic. Therefore, a run-through on how GPs surgeries used to operate before Covid-19 will be presented in this section. This overview will clarify the

patient journey through service offering that was adopted at surgeries before the global pandemic hit.

In order to address patients' needs, practices have been encouraged to develop flexible access models (Majeed, 2013). As a means of managing demand, telephone triage; in which patients requesting face-to-face appointments are initially offered a call back from a doctor or nurse, is becoming increasingly popular. A telephone call will allow the doctor to assess the need for an appointment and to agree on the most appropriate management plan, including a face-to-face follow-up if necessary (Wilkie & Gray, 2016). Since some patients do not require further contact beyond the telephone call, this system may be more efficient than the usual care arrangement that provides face-to-face appointments without triage (Holt et al., 2016). Although telephone triage offers a potentially useful approach, a significantly lower patient satisfaction rate is recorded and practices showed reluctant attitude toward implementing this process (Gray & Wilkie, 2015).

As a traditional practice, medical appointments have been scheduled by telephone or in person with a scheduling agent. Methods such as these are based on verbal communication with real people and provide maximum flexibility in complex circumstances (Zhang et al., 2014). According to the literature, several studies before Covid-19 identified the benefits and barriers associated with Web-based booking system, as well as the e-triage at GPs surgeries. In addition to, other studies have identified the unmet needs in the current health care environment (Jones et al., 2010; Wang & Gupta, 2011; Zhao et al., 2017). In compliance with NHS policy to digitize access to healthcare, general practices are required to offer online booking to their patients. In spite of this, the use of online booking by patients is low, and there is little evidence as to whether different groups of patients are aware of the service or use it (Gomez-Cano et al., 2020).

Alternatives to face-to-face consultations in primary care have been proposed as a solution to the increased demands on general practitioners. Political leaders and patients are generally in favour of the practice, but professional organizations and practitioners tend to be cautious (NHS England, 2015; Carter et al., 2018; Hammersley et al., 2019). Brant et al. (2016) in their survey to English GPs, found that despite the majority of practices offering telephone consultations on a regular basis, they rarely use email for direct patient care, and

they rarely use internet video consultations. Moreover, the majority of respondents did not intend to implement these methods in the future.

Before the pandemic began, GPs practices were mainly operating their appointment systems on face-to-face basis. NHS Digital (2020a) published in their report that the prominent appointment mode has been face-to-face with (80.8%), whereas online appointments represented only 0.6 of GP appointments. The sample of their study included 300 GP practices in England. Nevertheless, the aim of the NHS Long Term Plan was to offer digital-first primary care to the majority of the population by 2023/24 (NHS England, 2019b), where patients can access primary care remotely using online tools (NHS England, 2020a). In response to the latest contract with GPs, it is stated that they are required to offer online consultations to all patients by April 2020, and video consultations by 2021 (NHS England, 2020b). However, many GPs have been reluctant to implement remote consultations because of concerns about their potential impact, especially on patient privacy, healthcare inequalities and GP workload (Brant et al., 2016; Atherton et al., 2018; Baird, 2019).

In spite of the face-to-face mode dominance on offered appointments at GP surgeries, there have been several studies over the last two decades which called for the use of technology to offer different types of consultations (Jen-Hwa Hu et al., 2002; McKinstry et al., 2009; Campbell et al., 2013; Brant et al., 2016; Zhao et al., 2017). Atherton et al. (2018a) suggested that by utilizing video, telephone, or email consultations, staff workload can be reduced, and patient access increased. Even though some of these alternatives to face-to-face consultations have been established for many years, there is still limited evidence to support their effectiveness in improving access for patients (Knight & Lembke, 2013; Greenhalgh et al., 2016). However, there is emerging evidence that technology can positively impact service access, such as the introduction of GP-led telephone-first approaches that led to an increase in GP visits (Newbould et al., 2017). On operational level, adopting alternatives to face-to-face appointments was limited at GP practices in England before COVID-19 (Carter et al., 2018; Palmer et al., 2018).

However, it is worth noting that by considering GPs, NHS trusts as well as professional setting, it can be argued that that there are some complex dynamics in terms of managerial power within this context (Friedson, 1975). In the context, GPs and professionals tend to have more power in making decisions within the surgeries as they possess the specialised

knowledge, and it is their area of expertise. This is also known as occupational professionalism (Evetts, 2012). However, in the case of making decisions in technology adoption within GP surgeries, it is often made by the managers rather than GPs themselves who are supposed to have autonomy in decision-making. Accordingly, this can create challenges in technology adoption to support their service offerings within the surgeries before Covid-19 and possibly during Covid-19 when there are lockdown restrictions.

In conclusion, as per Covid-19, service offerings adopted minimal technology. It was found the triage process to be very limited, bookings were made primarily over the telephone or in person, and the predominant appointment mode was face-to-face. As part of this thesis, the author will refer to these services offering at this point of time as state 1.

3.2.2 GPs service offering during COVID-19

As a result of the COVID-19 pandemic, healthcare institutions, such as primary care centres, have changed their management and organizational strategies (Pulido-Fuentes et al., 2022). Healthcare systems across the globe have been transformed drastically to better respond to the crisis and force a reorganization of existing, well-established assistive care models. The pandemic has caused concern about the potential reduction of access to and utilization of GP services, as well as its impact on patient care. In order to prevent delay in routine care from GPs among the population most at risk of COVID-19, the governments worldwide introduced telehealth services (Majeed et al., 2020; Hutchings, 2020; Clarke et al., 2020; Javanparast et al., 2021).

Greenhalgh & Shaw (2022) demonstrated in their longitudinal study that general practices responded differently to pandemic-induced disruptive innovation. They shed some light on the reasons why a solution that works well in one practice is not effective in another, and how practices diagnose urgent or serious illnesses in a timely manner by adopting the triage system, either over the phone or as an online form. As part of the triage process, patients are prioritized according to the severity of their conditions. Some of triage processes have been automated using electronic triage systems. Triage online is perceived as convenient and easy to use, but these advantages are often determined by the context in which it is used (Alumran et al., 2020). Through the use of an electronic system, overcrowding and overhead in GP practices can be reduced (Greenhalgh & Shaw, 2022). However, it is

interesting to recognise that the highest levels of online triage use were from younger patients (Eccles et al., 2019).

Jones et al. (2022) in their exploratory study of usability and accessibility of GP online services demonstrated that it was necessary for patients and GPs to make greater use of online services during the pandemic, with mixed reactions from both sides. They examine the GP website in order to better understand how online services might be improved in the future. In most cases, patients access their GP website not in order to obtain information about the qualifications and latest news of the practice staff, but in order to make an appointment or seek advice. Such services are now provided by the majority of GP websites through national providers.

In addition to the dramatic change that occurred in the access of care in GP practices, a similar change has also occurred in the delivery of care by GP practices. In order to prevent the spread of infectious disease, remote consultations have been implemented rapidly (UK Government, 2020). As a result of NHS guidelines, virtual consultations (via telephone, online message, or video) have replaced face-to-face consultations in an immediate effect to secure an adequate response to pandemics (Pulido-Fuentes et al., 2022). Gray et al., (2020) also provided evidence on the immediate reduction of face-to-face appointments, after NHS guidance announcement. In spite of the fact that many consultations during Covid are conducted remotely, the growth in remote consultations has allowed a substantial increase in the total number of consultations, compared with the pre-pandemic period (Green et al., 2022). The remaining interesting question which has been raised by several researchers concerns is how patients feel about the surgery digitalized service they are receiving (Schutz et al., 2022; Jepsen et al., 2022). Therefore, this study is aiming to explore the relationship about TAO, service offering and patient satisfaction.

In conclusion, as during Covid-19, service offerings adopted more technology, it was found that triage process to be more popular, bookings were made over the telephone in addition to online, and the predominant appointment mode was blended. As part of this thesis, the author will refer to these service offerings at this point of time as state 2.

3.3 Exploring Technology Adoption Orientation

3.3.1 TAO in Manufacturing

TAO has its roots in the manufacturing sector, it often requires firm to develop new capabilities (i.e. innovation capabilities) which also requires internal resources in order to successfully adopt TAO (Wonglimpiyarat, 2010). In addition to operating new machines and tools, these manufacturing capabilities may also include managing new processes.

According to Ferlie et al. (2015), firms are required accumulate resources, especially knowledge-based resources to stay competitive in dynamic markets. Hence, it is important for firms to have such dynamic capabilities in order to respond to the adoption of TAO and as a result, firm's financial performance is enhanced.

Various reasons drive manufacturing companies to adopt technology, for instance, to improve product quality, increase productivity, reduce production costs, and to reduce market response time (Small, 2006; Roh et al., 2014). The adoption of technology among manufacturing firms, for example, has also resulted in the creation of complementary capabilities, such as the decision-making process and organizational structure (Banker et al., 2006). Essentially, this study assumes that firms are more likely to change their TAO strategies when they possess the capabilities from previous adoption activities, rather than if they are deprived of these capabilities. This assumption aligns with McAfee (2002) and Sohal et al. (2007) research on firms experience in TAO, which can equip firms with knowledge and skills that enhance their ability to adopt newer manufacturing technologies.

Existing literature on TAO cover wide range of definitions. To clarify, this study refers to TAO as *"the stage in which a technology is selected for use by an individual or an organisation"* (Sharma & Mishra, 2014; p18). For the purpose of this research, TAO considered to be crucial within a firm. This is because, the functional units in a firm must work in concert to ensure that TAO activities are measurable by firm performance. Technical aspects of technologies were not the only focus of empirical studies on TAO, the human aspects also play a significant factor in understanding the process of TAO in a firm. Studies such as these include Venkatesh et al. (2003) who investigated the incorporation of skill training to encourage TAO, Venkatesh et al. (2007) studied social influence processes for technology

acceptance and Low et al. (2011) demonstrated the vital role of senior management support to ensure a smooth TAO.

TAO has been explored historically from two perspective; firstly the individual perspective which focuses on capturing behaviour changes and how an individual perceived usefulness and ease of use when adopting new technologies (Davis, 1989; Straub, 2009). Secondly the organisational perspective which considers the impact of TAO on performance rather than the factors that influence TAO decisions (Sinha & Noble, 2008). Adoption of technology at both the individual and organizational levels can be considered an integral part of the adoption activity. Since the purpose of this study is to examine the impact of TAO on firm performance, it is important to consider the factors influencing adoption activity as relevant prerequisites. Literature discussed various of these factors such as barriers to adoption (Butler & Sellbom, 2002), strategies and internal characteristics of a firm (Darban & Wan Ismail, 2012), and employee involvement (Jonsson, 2000).

Several research on the topic of TAO suggested that it is a process of two-steps (Leonard-Barton & Deschamps, 1988 ; Gallivan, 2001; Machado, 2014). This process emphasised the essential role of decision-makers on a TAO activity. Next, a comprehensive plan is developed to ensure that the adoption of these technologies leads to productive results (Edmondson et al., 2003, Carraher Wolverton et al., 2022). Figure 3.3 presents TAO two-step process in a firm.

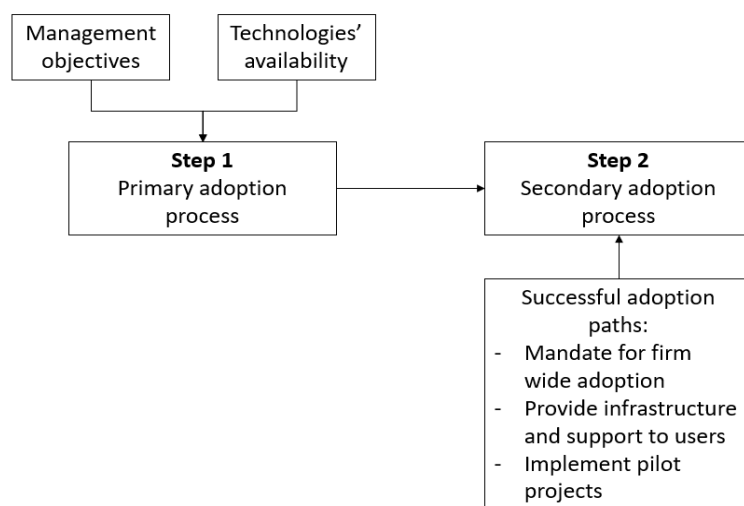


Figure 3.3: Two-step TAO process.

Source: Leonard-Barton and Deschamps (1988); and Gallivan (2001)

As a first step, a firm must identify the business objectives that require the adoption of new technology and ensure that suitable technologies are available in order to meet those objectives, prior to commencing Step 1. Upon establishing these factors, the primary adoption process at the organizational level can begin. Gallivan (2001) explained that there are three paths leading to the secondary adoption process, which is at the individual level, to ensure firm-wide acceptance. As shown in figure 3.2 these paths are a company-wide mandate, a suitable infrastructure and support to users, and evaluation of new process requirements and potential outcomes through the implementation of pilot projects. In order to determine a suitable adoption type for this study, a classification of four different TAO categories is considered. As a result of TAO occurring at the individual and organizational levels, this classification has been developed (Gallivan, 2001). Table 3.1 demonstrates the classification scope.

Table 3.1 the scope of TAO for this study

(Adapted from Gallivan (2001; p54))

		(Organisational adoption) Does the firm implement the TAO?	
		Yes	No
(Individual adoption) Do the employees participate in the TAO?	Yes	Authority-based adoption	Bottom-up adoption
	No	Adoption but no deployment	No adoption

At the individual level, the main question is about the employees' participation in the TAO. On the organisational level, the question is whether the firm is implementing the TAO. From table 3.1, no TAO scenario occurs when neither of the firm implements nor the employees participate. However, when the firm implements while the employees do not take part in the process, it will result in technology deployment rather than adoption. A bottom-up adoption happens when employees push for TAO without support from management. Therefore, as Gallivan (2001) showed, the ideal case scenario is when both top management implement, and employees participate in TAO. This category is highlighted in table 3.1 as authority-based adoption.

To clarify, in this study, the author applies the authority-based adoption as a background context which borrowed from the context of manufacturing sector to apply in healthcare sector, where TAO occurs in both individual and organisational level.

TAO is universally regarded as a vital tool in enhancing the competitiveness and has significant effects on the productivity of firms (Oliveira & Martins; 2011). In their literature review Oliveira & Martins (2011) investigated that this adoption effects will only be realized if, and when, they widely spread and used. Back to the early nineties from last century, Everett Roger's pioneering model of behavioural change was a breakthrough and has been applied to a wide range of practical manufacturing applications. It provided an understanding of behaviour change, including variation in adoption rates of innovation and technology (Everett M Rogers, 1995). Figure 3.4 displays Roger's model curve (1995) which places on a continuum of adoption time potential individual adopters into five categories: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. The timing of the adoption decision is an essential component of this curve.

Early adopters are described as being more "venturesome" (Rogers 1995, p. 263), having access to capital, being able to absorb technical information, and being less risk averse. They can serve as opinion leaders, disseminating information regarding the innovation to those who have not yet adopted it. Whereas later adopters (late majority and laggards) are more cautious and sceptical (Rogers 1995, p. 265), waiting for the innovation to spread widely in order to make use of network externalities. In addition, they are less able to face failure as a result of adopting a novel strategy.

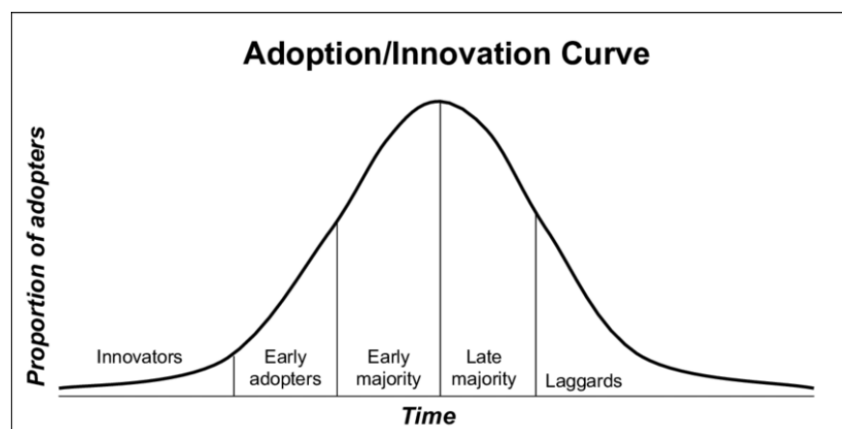


Figure 3.4: Adoption Innovation Curve (Adapted from Rogers, 1995)

There is a need for managers to identify technologies that will improve their organization's entry point on the diffusion of innovation adoption curve. Innovators and early adopters may provide a competitive advantage over early and late majority comers which they would get an advantage over the laggards (Woodside et al., 2017). The role of leadership within

organisations can sort firms between innovators, followers or laggards technology adopters (Hall & Densten, 2010).

The purpose of this study is to understand the adoption of technology (as an interchangeable term of innovation in this thesis) in supporting the transition from service offering state 1 to state 2. Specifically, the author sought to learn why some surgeries adopt this kind of technology earlier than others. To address the problem, the author is considering the factors that drive the time of adoption is the force of the pandemic. To that end, Rogers’s characteristics of early and late adopters to organizations is adopted. For the purpose of simplifying the discussion, surgeries are divided into three types based on the adoption of technology. The time gap between innovators and early adopters is particularly narrow and very difficult to be determined, consequently the author combined them under innovators (I). The same is true for early and late majorities, they are combined under followers (F). In this study, however, laggards (L) can be easily identified, especially when surgeries managers are asked about their future intentions in relation to the adoption of technology. Table 3.2 provides definitions for the three types of technology adopters that will be used in this thesis.

Table 3.2: Types of organization related to the time of TAO decision

Technology adopters	Definition	Reference
Innovators (I) [Innovators and early adopters]	“Innovators are adventurous to try new technology, have significant financial backing, and expertise with technology. Innovators willingly accept potential failures and risk when adopting new technology. Early adopters are typically integrated in the local social system, and act as through leaders within the local social system based on previous knowledge. Early adopters can act as change agents to improve Technology adoption and diffusion.”	(Woodside et al., 2017, p68); (Rogers, 1962)
Followers (F) [Early majority and late majority]	“Early majority will use technology at a point prior to the half-way point of adoption, and typically wait to decide and do not carry a thought-leadership role within the social system. Late majority are more skeptical and cautious of new technology and adopt after the average member within the social system, and typically must be convinced or pressured from others to adopt.”	(Woodside et al., 2017, p68); (Rogers, 1962)
Laggards (L)	“Laggards are the last to adopt new technology, are suspicious of technology and innovators, and focus on past decisions or standards. Many times, by the time a laggard adopts a technology; innovators have already moved on to the next phase of innovation”	(Woodside et al., 2017, p69); (Rogers, 1962)

In the following section, types of TAOs in healthcare will be addressed and in order to specifically discussed TAO in healthcare sector.

3.3.2 TAO in Healthcare

There has been an increasing interest among healthcare organizations around the world in acquiring and implementing telemedicine technology to enhance or extend patient care and services (Jen-Hwa Hu et al., 2002; Free et al., 2010; Negash et al., 2018). With the advent of the digital revolution, telehealth is expanding from clinics to the home, bringing great potential to improve healthcare services (Gentles et al., 2010; Phichitchaisopa & Naenna, 2013; Jeremy M. & Kahn, 2015; Dorsey & Topol, 2016).

Bashshur et al., (2011) explained in their study that telemedicine and telehealth are not clearly defined; they can be used interchangeably. A new set of terms (e-health and m-health) further complicates the situation. It is important to recognize that despite the frequent interchangeability and overlapping of these terms, they have distinct meanings and reflect various trends in healthcare and society in general.

Telehealth was first coined by Bennett and his associates in 1978 to encompass a broader set of activities beyond patient care, such as patient education and provider education (Bennett et al., 1978). The term “*e-health*,” as well as other e-words such as e-education, and e-business were used initially by business and commercial interests in the late 1990s. It is hard to be defined but it can be used under an internet-driven set of applications in healthcare settings (World Health Organization, 2005). Based on the widespread expansion of mobile communication technology and its perceived usefulness in facilitating access to healthcare, the term *m-health* was introduced into the literature in 2003 (Istepanian P, Lamiarayan S, 2005). Lastly, Bashshur et al. (2011) explained that the term of *telemedicine* uses advanced telecommunication technologies to exchange health information and provide health care services across geographic, time, social, and cultural barriers. Building on that, telemedicine acts like an umbrella term for the delivery of healthcare services. It challenges the traditional sine qua non dependence on physical presence and contact between providers and patients for medical/healthcare delivery. This term will be the core on TAO in this thesis, whereas the telehealth, e-health, and m-health are focus-limited and beyond the research scope.

Bashshur et al. (2011) distinguished in their study on telemedicine three aspects or dimensions, namely the functions performed (functionality), the specific applications, and the technological configurations. The *functionality domain* describes the various ways in which the technology may be used to manage patients, including consultation, diagnosis, monitoring, and mentoring. The *technology domain* is related to synchronicity, network design, and connectivity, such as providing different levels of bandwidth and the speed and resolution or quality of service and real time connections. The *application domain* includes processes of care across virtually all basic medical specialties and sub-specialization based on disease entities, sites of care, and treatment modalities. To clarify, the context of this study fits in the function dimension assuming that the technology network/system is stable. Figure 3.5 shows the taxonomy of telemedicine – three-dimensional model.

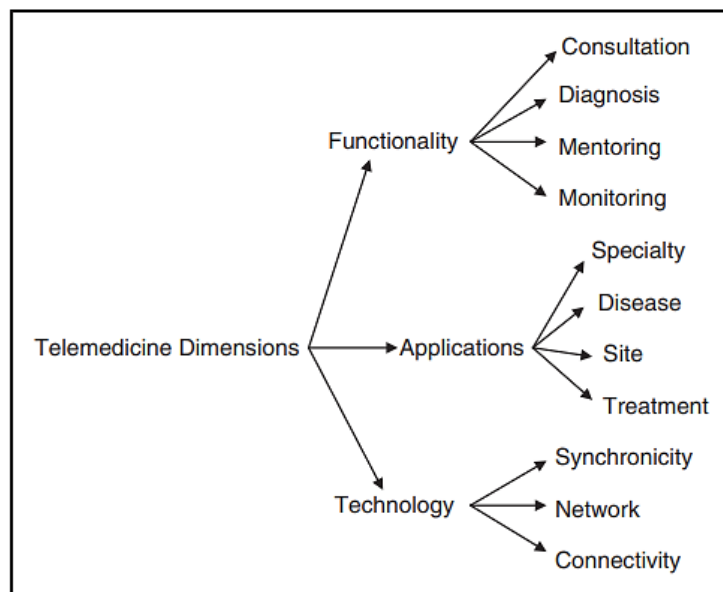


Figure 3. 5: Dimensions of telemedicine and components.

Source (R. Bashshur et al., 2011)

Moving from the perspective where the technology has been applied, to the perspective of its type and function. Literature on TAO in healthcare in this perspective has covered several aspects, such as communication with patients (McKinstry et al., 2009), following and monitoring patients (Gentles et al., 2010), and appointments system (Zhao et al., 2017). However, there are five major types of healthcare related technology have been identified in this study, based on the purpose of the technology.

Llewellyn et al. (2014) categorised these technologies as following: 1) *Diagnostic technology*, which enables treatment or palliative care to take place, by identifying diseases and other conditions. 2) *Therapeutic technology*, that used in treating diseases. 3) *Enhancing technology*, this technology aims to improve human functioning over and above what is needed to cure diseases. 4) *Enabling technology*, also known as assistive technology, mitigates the impact of disease or disability. This includes both personalised equipment such as artificial limbs or spectacles, and universal technologies that address environmental or societal issues, such as wheelchair-accessible entrances. And lastly 5) *Preventative technology*, which reduces the risk or severity of accidents and other social and environmental sources of disease or injury. Due to the non-medical context of this research, this study is investigating within the enhancing technology scope.

Bakhai et al. (2020) presented three main modalities in the enhancing technology field. Firstly, *Online triage* where the patient enters their symptoms and receives algorithmically generated advice, and/or is directed to the right person or service in real-time. Secondly, *Questionnaire based online consultations using a web-based form*, where the patient fills in a form that gathers information about a query which is sent to the clinician (including a photo where applicable). There is no real-time communication. Thirdly, *Video/telephone conferencing* (remote consultations) between a patient and a clinician in real-time.

3.3.3 Drivers and Barriers of TAO

Global healthcare is undergoing a rapid transformation as a result of digital technologies, and a consumer-based movement is growing along with these changes. A significant proportion of the public is actively seeking health information online and using digital technologies to manage their health and communicate with their health care providers (Imison et al., 2016). To address the issue of the growing demand for primary care, as well as to serve populations in remote areas, alternative methods to consult have been considered such as video/telephone calls (Brant et al., 2016). The GP sector in England is facing increasing pressure to improve patient access due to an increase in patient demand within a limited number of facilities (Campbell et al., 2014).

Technology places emphasis on improvement, in other words, staff (clinicians and non-clinicians) within the health sector strive to improve the quality and cost-effectiveness of

the services that are delivered (Bryan et al., 2014; Negash et al., 2018). Cost analyses vary, but telemedicine in primary care is increasingly demonstrated to be cost-effective (Greenhalgh et al., 2016; R. L. Bashshur et al., 2016). Furthermore, technology can be considered as part of the efforts to improve access and shape appointment system to meet the needs of their patients, staff and clinicians (Knight & Lembke, 2013). Newbould et al. (2017) in their evaluation study suggested that the telephone first approach shows that many problems in GP can be dealt with over the phone. As an approach, it is not suitable for every patient or practice, nor is it a panacea for meeting demand. However, this approach did not prove to reduce costs or use of secondary care, on average, despite claims to the contrary.

By adopting technology such as web-based appointment booking, patients are given more freedom in decision making about their preferences and have improved access to non-urgent conditions (Zhao et al., 2017; Ward House, 2017; Mitchell & Kan, 2019). Patients usually chose an in-person visit when scheduling an appointment online through the portal, however, Telemedicine may offer the potential to reach vulnerable patient groups and improve access for patients with transportation, parking, or cost barriers to clinic visits (Reed et al., 2020). Alternative face to face appointments can reduce inefficiencies, and facilitate personalized medicine for patients (Alrahbi et al., 2019; Hategan et al., 2019). Video calls for instance are in line with current evidence for patient care and could offer support and provide information on using a communication channel that suits individual patient needs and circumstances (Internet Videoconferencing for Patient–Clinician Consultations in Long-Term Conditions: A Review of Reviews and Applications in Line with Guidelines and Recommendations, 2019). Information communication technology is increasingly being applied to facilitate communication between healthcare provider and patients (Gentles et al., 2010; Osman et al., 2018; Eccles et al., 2019)

Although organizations and individuals are reluctant to change the status quo, the explosive growth of digital technology globally has led to some changes in healthcare organizations (Mitchell & Kan, 2019; Alrahbi et al., 2019). In spite of the potential benefits of technology, its adoption in the health care sector has been slow and inequitable (Liddell et al., 2008; Iacobucci, 2018).

Resistance to change and concerns about the introduction of alternative methods of consultation are often expressed using proxy reasons; for example, concerns about patient safety (Atherton & Ziebland, 2016)(Mitchell & Kan, 2019). Brant et al. (2016) demonstrated that, despite policy pressure to introduce online video and email consultations, GPs are reluctant to adopt alternatives to face-to-face consultations. Several concerns have been raised about virtual consultations clinical risk and/or less acceptance by patients or staff (Greenhalgh et al., 2016; Murphy et al., 2021), in addition to the technical infrastructure (Donaghy et al., 2019), and logistical and regulatory difficulties they bring (McKinstry et al., 2009; Jiwa et al., 2013; Ware & Mawby, 2015). There are several risks associated with this process, including digital exclusion, inefficiency, technological failure, and possible compromise of the consultation process (Mann et al., 2021). Safeguarding opportunities were further compromised by the loss of continuity and pooling of triage lists (Royal collage of general practitioners, 2020; Dixon et al., 2022). Straub (2009) argued that TAO is a complex process that involves inherently social components. People construct unique yet malleable perceptions of technology that contribute to their decision-making process regarding TAO. In order to drive transformation, new ways of working are required, not new technology itself. Healthcare managers require a transformation programme that is supported by new technology, not the other way around.

To conclude, the COVID-19 pandemic has drastically altered the way in which GPs delivered in many countries. In GPs, it is likely that the delivery model will not return to what it was before the COVID-19 pandemic, and telemedicine is likely to become more prevalent (Baur et al., 2020; Homeniuk & Collins, 2021). In order to ensure continued high-quality care and patient safety, this thesis tends to assess the impact of healthcare provider shift towards more blended service offering on patient satisfaction (overall experiences).

Based on the discussion in this section, it can be understood that some surgeries already adopted technology before Covid-19, even in small scale. Those surgeries are considered in this thesis as innovators who have been exposed to some technological shifts in their service offerings. Followers are the surgeries who undergone though the biggest transformation to reach service offering state 2 as innovators. While laggards have the opportunity (been forced because of Covid-19) to upgrade their service offering state 1, however, in nature they have the tendency to fallback and resist the full transformation.

In Section 2.5, this thesis offered a preliminary theoretical model based on the review of underpinning theory for this research. The model is reproduced as shown in figure 3.6. The theoretical model has been modified to accommodate the contributions of the study to the extant knowledge. These emerging results are illustrated in red, which show to full transformation of followers, while laggards are taken part of the way through. The results in chapter 5 and 6 will provide a reflection on this.

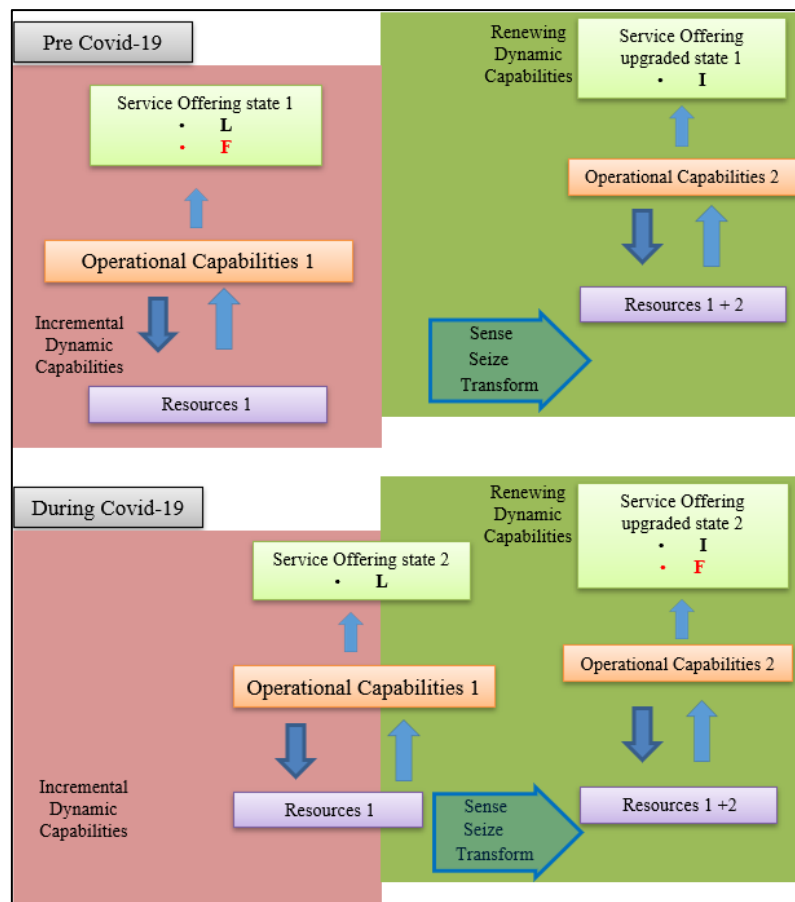


Figure 3. 6: Theoretical model for this research based on the review of underpinning theory and applied literature.

Meanwhile, the literature review throughout this chapter amplifies the role of enhanced technologies in healthcare and their adoption into the GP service offering. This thesis considers that the adoption of technology required to renew firm's stock of resources and capabilities in order to transition the service offering from state 1 to state 2. Additionally, capabilities are referred to throughout this thesis at surgery level.

As discussed in this section, Covid-19 has shifted the ways GP are operated as well as the service offering. Such changes always make an impact on firm performance Accordingly, it is

important to discuss how firm performance should be measured in this context. This will be discussed in more detailed in section 3.4

3.4 Performance Measurement

The performance of any organization can be measured by either "hard" or "objective" measures such as sales, growth, and profits, or "soft" measures such as performance appraisals.(Ambler & Kokkinaki, 1997). The motivation to succeed of organizations has historically been based on financial objectives, such as growth and profit; however, in recent years, organizations have sought other non-financial objectives, such as improving customer service, product quality, and enhancing the quality of the work environment (H. Ansoff, 2007). According to context, the term "performance" has a wide range of definitions. It can be defined as today's action leading to tomorrow's measured results (Lebas and Euske, 2002). In recent years, research has indicated that performance measurement systems have gained a great deal of attention, leading to the development of different frameworks to enable organizations to assess their performance (Biazzo & Garengo, 2012).

The purpose of performance measurement is to determine both the efficiency and effectiveness with which a given task is completed (Fugate et al., 2009; Gligor et al., 2015). While efficiency refers to how well a company uses its resources, effectiveness refers to whether customer requirements are met according to specifications. A discussion of operational performance is often framed in terms of two main perspectives. The first focuses on financial measures such as profit, return on investment, and productivity; the second addresses competitive priorities, such as cost, quality, and delivery (Ghalayini & Noble, 1996). In general, operation management researchers view operational performance from the second perspective because changes and improvements would typically be made in the areas of cost, quality, delivery, and flexibility (Miller & Roth, 1994; Ahmad & Schroeder, 2003; Pagell & Krause, 2004). Das & Narasimhan (2001) supported the second perspective in their study and argued that technologies should be applied to a set of defined process objectives.

Therefore, this thesis adopts that the focus of operational performance is on changes and improvements in cost, quality, delivery, and flexibility. In the context of this study, operational performance in this research refers to the outcome of patient satisfaction with

surgery's adoption of blended service offerings. The performance measurement specifically in the context of healthcare sector is discussed in section 3.4.1.

3.4.1 Healthcare performance measurement

In healthcare sector, organization's performance measurement remains an unresolved issue (Appleby & Devlin, 2005). In the systematic literature review conducted by Adair et al. (2006) showed that healthcare performance literature is diverse and fragmented. In order to be effective, a performance measurement system must be sensitive to changes in both the external and internal environment of the organization (Purbey et al., 2007). Measuring performance in healthcare practice is mostly centred on how performance drives improvements to both strategic planning (Voelker et al., 2010) and patients experience (Mannion & Braithwaite, 2012; Elg et al., 2013). On the potential benefits of performance measurement, Adair-Simpson, et al. (2006) presented a little evidence which existed to guide practice in healthcare.

NHS England (2021) stated that healthcare performance management involves the collection and use of data regularly and rigorously in order to indicate trends and measure service performance. Therefore, measuring performance helps identify areas of good/weak practice, takes action to improve patient care and ensures that the service activities are in line with overall organisational strategy (Hollingsworth, 2008; Elg et al., 2013; Kämäräinen et al., 2016).

In a large and complex system like the NHS, it is difficult to actively promote efficiency. The efficient use of NHS resources is critically important for both patients and physicians. Inefficiency results in the loss of money but, more importantly, it results in the loss of opportunities to save lives and provide care to those in need (Appleby & Thomas, 2000). Jack & Powers (2009) highlighted that NHS complexity is due to demand uncertainty in the field of health-care services and categorized the main areas to focus on when a performance is measured as following: patient satisfaction, financial performance. This study mainly focusses on patient satisfaction. The financial performance is out of the research scope as primary care services including GPs are accessed by public "free of charge to patients" funded by the government (Merrills & Fisher, 2001). Therefore, the patient

satisfaction data is discussed in the following section to explain how this thesis measure the performance of GP surgeries in adopting TAO.

3.4.2 Patient satisfaction data

In this thesis, the author used the emergent data related to patient satisfaction (overall experience) with GP service offering to evaluate whether there is any quantitative evidence of a relationship between adopting technology, service offering, capabilities and patient satisfaction.

This study operationalises “operational performance” in GPs surgeries by considering two areas of performance (Dawson & Rigby-Brown, 2019). Firstly, the practice management area, this study is interested in exploring the TAO which facilitates blended service offering, the motivated and effective practice team. Secondly, patient focus area, such as ease of access and the experience in booking appointments which is included within patients' satisfaction with services. Dawson & Rigby-Brown (2019) mentioned two other areas related to surgeries performance which are the clinical area such as general health and preventive medicine, management of long-term conditions, and clinical management. The other area is external focus area, this includes engagement with public and good partnership working. However, both areas are out of the scope of this study.

NHS England performs an annual questionnaire to public to reflect how primary care services are delivered and how patients experience them. Therefore, for the purpose of this study data of GP patient survey collected from 2019 (before Covid-19) to 2022 (to current year) including in between the pandemic period will be utilised to measure the performance of GP. That is to consider the effect of the COVID-19 pandemic when looking at results over time. Those are secondary data available to public vis the NHS website (NHS England, Patient Survey) [<https://www.gp-patient.co.uk/>]

3.5 Structuring the conceptual framework of the study by combining underpinning theories and applied literature:

The following sections will focus on how the firm’s resources, operational capabilities, and dynamic capabilities are operationalised with the support of applied literature related to service offerings and TAO in GP surgeries pre and during Covid-19. The aim is to provide

detailed “preconceptions” and guiding principles for the framework. As a result, the conceptual framework is ultimately be established to serve as guide for empirical study in this research.

3.5.1 Operationalising the firm resources

As discussed in Chapter 2, this study is underpinned by the RBV theory, the context of GP surgeries resources has to be focused in order to operationalise the firm resources. These resources include different types of facilities, assets, people, information and technology, which they support a firm to fulfil its objectives (Hill, 2000; Slack and Lewis, 2015). In addition, the source of what operations or assets that firm develop within its boundary and what is brought from beyond this boundary will be considered (Baines et al., 2009). Accordingly, this thesis operationalises firm resources into three main categories: physical, human and organisational capital resources in order to understand GP surgeries resources in developing TAO and new service offerings.

In terms of the physical capital resources, this refers to tangible resources (i.e., facilities and process and technology). By considering the context of GP surgeries, these physical resources refer to physical facilities and physical environments in supporting the care delivery to patients i.e. examining rooms, equipment, technology (Farrell et al, 2020). Whereas the human capital resources refer to intangible resources (i.e., people, skills, training). By considering the context of GP surgeries, these resources refer to the engagement of GP as well as healthcare professionals in deploying knowledge and experience in deliver routine care (Casebeer et al., 2010). Finally, in terms of organisational capital resources, the focus of this research aims to understand a firm’s decision and its strategic planning regarding what assets that firm develops internally and what is bought externally. The associated key GP resources and their descriptions are illustrated in Table 3.3.

Table 3.3: the operationalisation of firm resources

Practices resources (BVR)	Descriptions	References
Physical capital resources	Examining rooms, equipment, technology	(Baines et al., 2009); (Farrell et al., 2020)
Human capital resources	Staff knowledge, experiences	(Barney, 1991); (Casebeer et al., 2010)
Organisational capital resources	Strategic planning for internal/external resources	(Baines et al., 2009); (Casebeer et al., 2010)

3.5.2 Operationalising the operational capabilities

Operational capabilities term is adopted from (Helfat & Winter, 2011) to be applied in the conceptual framework of this study. The aim of applying this term is to reflect on the firm ability to execute its daily activities.

In operation management research, operational capabilities appeared in several contexts. For instance, as an assessment of the relationships between different performance dimensions (Schoenherr & Narasimhan, 2012), as an evaluation of operational performance (Nand et al., 2013), or as a tool to link between operational performance and organisational strategy formulation (Narasimhan et al., 2005). Those studies do not suggest that there are a room to develop operational capabilities to “winning” capabilities. Nevertheless, the main role of operational capabilities has been creating influence on achieving business objectives by implementing business strategies (Peng et al., 2008; Patel et al., 2012). Therefore, operational capabilities refer to the ability of a firm to integrate tasks to enhance its outcome by the most efficient use of its competencies, technology, and flow of materials (Hayes et al, 1988; Dutta et al., 1999; Kortmann et al., 2014). Operational capabilities have also been referred to as “*the ability of a firm’s operational units to acquire, assimilate, transform, and exploit knowledge from the operations environment*” (Patel et al., 2012; p202).

The diversity of operational capabilities call attention to the ability of human mangers to handle all the mentioned tasks and roles. Managerial skills in both of strategic and tactical management levels are behind the success of TAO in a firm (Lefebvre & Lefebvre, 1997; Dutta et al., 1999). That is true, because of TAO process includes: (1) evaluation activity of technologies technical feasibility, (2) effective management of the progress of TAO, and (3)

operation of the new processes that have been enhanced by TAO; all of which refer to the human skills that lead to the previous technologies adoption (Lioukas et al., 2016).

Pavlou & Sawy (2011b) suggested in their work three dimensions of operational capabilities: technical, managerial, and customer capability. They adopted Pisano's (1994) technical capability definition as the ability to deploy technologies and accumulate technical knowledge in the process. To explain managerial capability, Pavlou & El Sawy (2011b) applied Danneels' (2002) definition as the ability to monitor and report on progress, and manage conflicts within firm's operational activities. Lastly, they extended Day's (1994) work to explain the third element of operational capabilities, customer capability, as the ability to maintain relationship with customers by involving their them and responding to their needs.

In this study, (Pavlou & Sawy, 2011b) has guided the operationalising of operational capabilities. The dimensions which identified are customer, managerial and technical capabilities as described in Table 3.4. In the context of this research the author means by customers is patients.

Table 3.4: the operationalisation of operational capabilities

Operational Capabilities		Description	References
	Customer Capability	The skills, abilities, and processes needed to develop and maintain close relationships with customers.	(Pavlou & El Sawy, 2011) (Day, 1994) (Morgan et al., 2009)
CI	Customer involvement	The ability of the service firm to create the environment for patients to have direct interaction and engage patients in the service production and delivery process	Anning-Dorson (2018); Dash and Meredith (2010)
CR	Customer response	It is the competence of an organization in serving patient needs through effective and quick actions.	(Jayachandran et al., 2004); Dash and Meredith (2010)
	Managerial capability	The ability to administer operational activities by monitoring and reporting progress, designing incentives, and managing conflicts	Danneels (2002); Slaouti (2021)
M	Monitoring	The ability to monitor the progress of TAO effectively.	(Sharma and Mishra, 2014)
I	Involvement	The ability to be actively involved in TAO activities at the working level	(Sharma and Mishra, 2014)
MO	Managing operations	The ability to administer tasks and functions effectively.	(Sharma and Mishra, 2014)
	Technical capability	The capability of a firm or organization to acquire new technologies and technical resources for research and development practices and processes.	Chandran & Rasiah (2013); Helfat & Winter (2011b)
T	Technical capability	The ability to evaluate the suitability of new technologies to processes.	(Yagiz and Goderis, 2022)

By considering the scope of the study, these three operational capabilities were sub-operationalised. In customer capability, within the context of this study, this refers to patient's engagement and involvement in GP's service offerings (Dash and Meredith, 2010). Accordingly, it was sub-operationalised as customer involvement and customer response in this study to understand how GPs engage patient in their service offerings and respond to the change in patients' needs (Yagiz and Goderis, 2022).

In this study, managerial capability refers to the ability of GPs in monitoring and reporting the progress of daily activities when adopting TAO (Sharma and Mishra, 2014). Hence, this capability is sub-operationalised as monitoring (i.e. the ability to monitor the progress activities of TAO adoption), involvement (i.e. the ability to involve TAO in GP working operations) and managing operations (i.e. the ability to administer daily tasks and operations)

In technical capability, this refers to the capability in exploring an appropriate technologies adopted in the context of GPs (Yagiz and Goderis, 2022). Accordingly, this capability is sub-operationalised into technical capability (i.e. the ability to explore the suitability of adopting new technologies as new service offerings).

3.5.3 Operationalising the dynamic capabilities

In order to reach the purpose of this research which is to understand to transition from prominently physical GPs appointments pre Covid-19 to virtual appointments during Covid-19, the dynamic (higher-order) capabilities are required. Because they reflect a firm's ability *"to integrate, build, and reconfigure internal and external competences to address rapidly changing environments"* (Teece et al., 1997; p516). This specific ability is vital to secure a successful TAO. Therefore, dynamic capabilities represent the transformation of a firm's resources and the development of operational capabilities from TAO.

There are, as operational capabilities, various descriptions to dynamic capabilities, thus researchers highlighted challenges in operationalising and measuring dynamic capabilities (Williamson & Haas, 1999; Galunic & Eisenhardt, 2001; Pavlou & Sawy, 2011a). This study adopted Teece (2007; 2018) reference of dynamic capabilities as a set of capabilities that involve the development and orchestration of a firm's resources to address the change in the environment and these need to be aligned with operation of firm's processes. Teece

(2007) suggested that dynamic capabilities are operationalised as sensing, seizing and transforming capabilities. The three operationalised dynamic capabilities and their descriptions are illustrated in table 3.5.

As presented in table 3.5, *Sensing dynamic capability*, focus on the ability to identify, explain and follow new opportunities in the dynamic environment. For surgeries to initiate the transition towards TAO to its service offerings, they need to have this capability to identify opportunities and explore technological possibility to support their need in the Covid-19 period. Thus, the sense category includes market sensing (i.e. the ability to respond to the change in market needs, particularly during the Covid-19) and technology sensing capability (i.e. the ability to recognise the new technologies or the change in TAO to support Covid-19 restriction) (Hutching, 2020).

The focus of *seizing dynamic capability* is to mobilise firm's resources to address opportunities and evaluate them. For surgeries, this capability means the development of the right services as a respond to TAO and to the changes in the environment. Moreover, seize capability refers to the efficiency of customisation and management of the surgeries service provision in order to address new digital services. Thus, the seize category includes digital service development capability (this refers to the adoption of technology in offering new services as a response to new pandemic restrictions) (cf. Hutching, 2020), mass service customisation capability (i.e. the ability to tailor the service that serve various needs of patients (cf. Dash and Meredith, 2010), digitalisation capability (i.e. the ability to deliver healthcare service offering using TAO) (cf. Sharma and Javid, 2023), and network management capability (i.e. the ability to share knowledge as well as engaging all relevant stakeholders within the healthcare offerings (i.e. GPs, patients, patients' family and NHS).

The last category is the transforming dynamic capability, which focus on the firm's ability of continuously reconfigure its resource base by modifying its resources and operating capabilities as required. In the context of surgeries services provision during Covid-19, this capability aims to establish an efficient way to deliver their service supported by TAO, assess risks. Thus, the transform category includes services delivery and processes for developing efficiency gains which refers to the ability to manage sufficient resource – in terms of finances, infrastructure and the workforce while adopting TAO in GP service offerings (cf.

Hutching, 2020), service culture capabilities which refers to the ability to develop new service offerings with the shift in mindset of having digital and service culture (cf. Yagiz and Goderis, 2022).

Table 3.5: the operationalisation of dynamic capabilities

Dynamic Capabilities	Description	References
Sense (SN)	It is defined as the ability to spot, interpret, and pursue opportunities in the environment	Teece (2012); Loureiro et al. (2021)
Market sensing capability	The ability to identify and recognize new market opportunities	Helfat & Winter (2011b); Teece (2007; 2018) Hutching (2020)
Technology sensing capability	The ability to explore and recognize that TAO could support Covid-19 restrictions demand.	Teece (2007; 2018); Yagiz and Goderis (2022)
Seize (SZ)	Refers to the implementation of a sensed opportunity, the mobilizing of resources in order to address an opportunity and capture its value	Teece (2012); Loureiro et al. (2021); Hutching (2020)
Digital service development capability	The ability to develop new service offerings that create value for customers. This involves extending, improving, and introducing newlines of services in accordance with market opportunities (Covid-19 restrictions)	Hutching (2020); Wallin et al (2015); Sjödin et al.(2016)
Mass service customisation capability	The ability to incorporate knowledge of specific customer/patient needs and tailor services to meet various needs of GPs' patients	Dash and Meredith (2010); Sjödin et al.(2016)
Digitalisation capability	The ability to deliver healthcare service offering using TAO.	Sjödin et al.(2016); Lenka et al (2017); Coreynen et al. (2017); Sharma and Javid (2023)
Network management capability	The ability to share digital knowledge as well as engaging all relevant stakeholders within the healthcare offerings (i.e. GPs, patients, patients' family and NHS).	Wallin et al (2015); Gebauer et al. (2017); Huikkola & Kohtamäki (2017); Kattel and Takala (2020)
Transform (TM)	The ability which organizations continuously reconfigure its resource base by altering its resources and operating capabilities as needed	Teece (2012); Loureiro et al. (2021)
Services processes for developing efficiency gains capability	The ability to manage sufficient resource – in terms of finances, infrastructure and the workforce while adopting TAO in GP service offerings	Hutching (2020)); Paiola et al (2013); Coreynen et al. (2017)
Service culture capability	The ability to develop new service offerings with the shift in mindset of having digital and service culture	Yagiz and Goderis, (2022); Ostrom et al (2010); Story et al (2017)

3.6 Conceptual Framework for the Study

In order to develop the conceptual framework for this study, the underpinning theory and the applied literature were systematically combined (see figure 1.4 in chapter 1)

Based on the discussion of underpinning theory and the literature review, the framework in figure 3.7 presents the relationship between operational capabilities (customer, managerial and technical capabilities) and dynamic capabilities (sensing, seizing and transforming capabilities), TAO, services offerings (triage, booking system and appointment modes) with patient satisfaction (secondary data from GP patient survey on NHS England). Two periods of time (before and during Covid-19) will be considered, in order for GP surgeries to upgrade from their existing face to face service offering (state 1) to the blended service offering (state 2).

Surgeries with TAO adoption, based on literature review in Section 3.3.1, are placed in three types (innovators, followers and laggards). Surgeries required to renew their current resources and operational capabilities, while the dynamic capabilities are required, as illustrated in the theoretical model based on the underpinning theory (see figure 2.7), to shift surgeries from service offering state 1 to state 2. In addition, this study uses existing literature to operate and conceptualize details of the research constructs that are presented and developed in the conceptual framework.

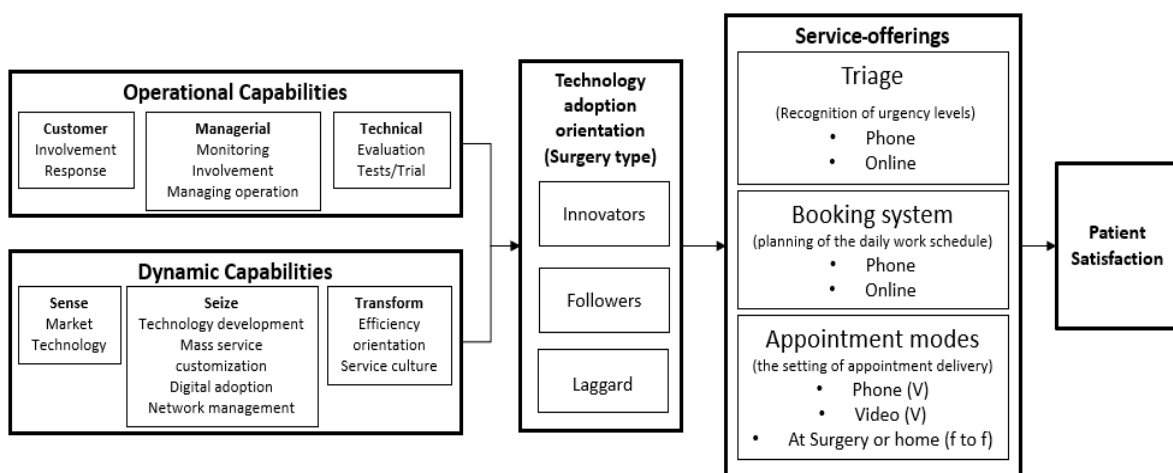


Figure 3.7: Conceptual framework of this study

Based on the discussion in the section 3.3, the conceptual framework and considering Rogers (1962) curve, this thesis will study the relationship between TAO and capabilities:

innovators are the best in adopting technology therefore, they had the least amount of change in their service offerings. Followers have the chance to adopt technology and accordingly transformed towards service offering state 2 by upgrading their operational capabilities and obtaining dynamic capabilities. Lastly, laggards have the same chance as followers to adopt technology within their service offering, but they would fallback afterwards to the traditional face to face service offering and utilise technology at minimal level with less integration or transformation into service offering state 2.

Based on the conceptual framework of this study (as shown in figure 3.7), it can be suggested that this thesis emphasise the need to explore the resources, operational capabilities and dynamic capabilities in GPs service offering pre- and during Covid-19 by considering different types of surgery according to the level of TAO adoption. Furthermore, this study will study the relationship between TAO and GPs service offerings as well as patient satisfaction before and during COVID-19. The process of conducting case study research to explore these study gaps will be discussed in Chapter 4.

3.7 Summary of the Chapter

The purpose of this chapter is to discuss the development of the conceptual framework for this thesis by systematically integrating the theoretical model and conceptual framework with the extended literature. It started with a review on the current literature that define the context of this research project. It reviewed the key concepts of GPs appointments modes pre and during Covid-19 and the role of TAO in facilitating alternative modes. In addition to explore barriers which challenge the adoption process. Performance management was discussed and operationalisation performance measures for this study were presented. In addition to the theoretical model which presented in chapter 2 and the conceptual framework from literature relating to the research construct (i.e., firm resources, operational capabilities, and dynamic capabilities) were combined to operationalise and conceptualise the details of the final framework for the study. To conclude the chapter summarises by providing an emerging framework for this thesis.

Chapter 4: Research Design

4.1 Introduction to the chapter:

The purpose of this chapter is to outline the research design adopted in this research in order to address the research gaps presented in Chapter 1.

Section 4.2 discusses the research philosophical positions and the researcher aim to explain the meaning and importance of ontology, epistemology and methodology in conducting research. More crucially, how these considerations associated with the author’s personal beliefs and the rationale for the selected methodology for the research are explained in Section 4.3.

Section 4.4 introduces the case study research method and describes the benefits of applying this method for this study. Then section 4.5 introduces the process of conducting case study research. The validity and reliability of research design are discussed in section 4.6. Section 4.7 describes the ethical considerations that have been observed in order to conduct this research. Section 4.8 provides a summary of this chapter.

The structure of this chapter is illustrated in figure 4.1.

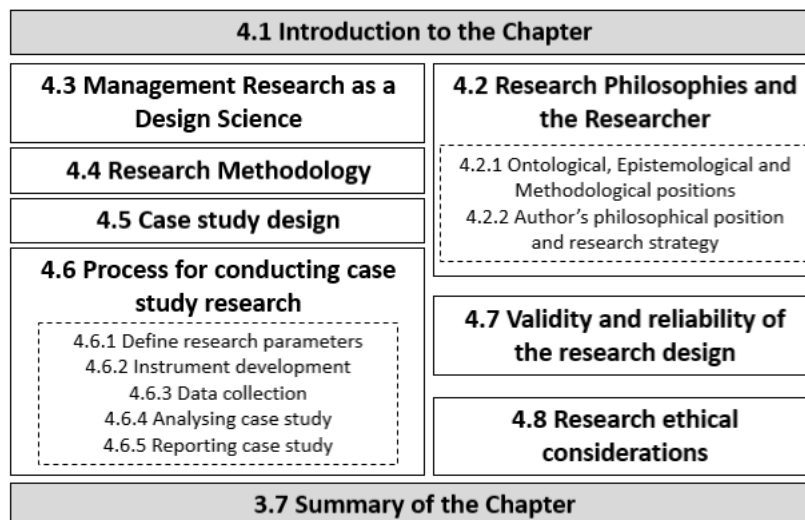


Figure 4.1: Structure of Chapter 4

4.2 Research Philosophies and the Researcher

Research philosophy known as a system of beliefs and assumptions of how researchers develop knowledge in a particular research area (Saunders et al., 2015). These beliefs and assumptions form the guidance that define the empirical phenomena, the realm of knowledge and their interactions. Therefore, each research study, particularly doctoral studies, is based on one or more research philosophies. Blaikie (2007; p10) cited that *“Each research strategy has a philosophical ancestry and foundation and includes ontological assumptions about the nature of reality and epistemological assumptions about how that reality can be known.”* So, philosophy draw the general principles of theoretical thinking, perspectives and self-awareness to possess reality knowledge. Understanding philosophy is essential because social science research can only be relevantly interpreted when there is clarity about the judgments that were taken that affect the research findings. Some of these judgements and conclusions are based on some key philosophical principles. This is especially vital in social science as its presentence within the scientific domain and its application of natural science methods have often been debated. Unlike natural science research, the philosophies in social science research do not generally define specific variables casual relationships in context and over time (Fabian, 2000).

The philosophies provided by social sciences concern with highlighting individualising conceptualisation, and seeking singular assertory propositions, meanwhile natural sciences are concerned with generalising conceptualisations, seeking general apodictic propositions (Blaikie, 1993). Social science philosophies offer methods to conduct the study of people and society and to explain the studied phenomena by frameworks or models taking onto consideration the relationship between the researcher and the objects or subjects being researched (Saunders et al, 2016). To maintain a credible methodological choice, research strategy, and data collection techniques and methods for analysis it is fundamental to consider a suitable research philosophy. Saunders et al. (2015) suggested three main philosophies in the social science research: positivism, interpretivism, and realism and explained that when a researcher select any of these philosophies, it would determine the researcher’s approach in investigating the relationships between located variables.

In social science the phenomenon of study and the researcher are dependent on each other (Orlikowski & Baroudi, 1991), also in social science, the studies are self-interpreting beings

unlike natural science research (Bishop, 2007). Therefore, study's results can often change the characteristics of the phenomenon of study.

Management research applies social science research philosophies to address and identify the diversity and complexity of the firms and the constantly changing environments they are in. For instance, a firm's ability to integrate, design, and reconfigure internal and external skills to address rapidly changing environments, influences the outcome of the research on dynamic capabilities (Teece & Pisano, 1994). Consequently, such a research commitment requests multiple levels of analysis to answer fundamental questions about suitable theories and methods as well as various contingent causal processes (Fabian, 2000). The same phenomena in management research can be explained by different theories, taking advantages from the plurality of theories (Miller & Tsang, 2010). That is in itself reduce the complexity of studying firms in their dynamic and unique environment as well as the necessity of a various range of theories to explain the phenomena. Hence, theoretical assumptions and research philosophies offer an intellectual context for a researcher to conduct research by the development of assumptions and ideas (Blaikie, 2007; 2010).

Research philosophy has three main branches: ontology, epistemology and methodology (Terre Blanche & Durrheim, 1999). These different branches and how they related to social research will be presented in the following subsections.

4.2.1 Ontological, Epistemological and Methodological positions

4.2.1.1 Ontological Positions

All social science research starts from "Ontology", or the '*the science or study of being*' (Blaikie, 1993, p.6). It also can be defined as "*the assumptions which are made about the nature of social reality*" (Easterby-Smith et al., 2002, p.31). Ontology helps researchers realise how certain they can be about the nature of social reality (Blaikie, 1993). This position enables researchers to establish knowledge based on their perceptions on social reality, accordingly, ontological assumptions are apprehensive and concerned with kinds of social phenomena exist, the conditions of their existence, and the way how they are related (Blaikie, 2010). Ontological positions reflect researchers' view of the a particular discipline of study, precisely, every discipline of study is believed to have its particular ontology region (Benton & Craib, 2001). That means each study field has its way of listing, describing and

categorising things, relationships and processes that produce the knowledge of the field (Benton & Craib, 2001).

The ontological positions that are commonly applied in research are objectivism and constructivism. According to ontology concern with the nature of social being, Objectivism is when a researcher should inspect if the social being and their meanings have an existence that is external to social actors. In contrast, constructivism states that the social being and their meanings are being built up from perceptions and actions of social actors (Bryman, 2016). In management literature, both types of ontological positions are often described with the context of “firm”. For instance, firms have rules, regulations, structure and hierarchy representing a reality that is external to the individuals, however, these characteristics are not pre-existing must be worked on and refined continuously (Bryman, 2016). The difference between two contrasting ontological positions is summarised in table 4.1.

Table 4. 1: Ontological positions - Objectivism and Constructivism (Blaikie, 2010)

Ontology – the study of being		
	Objectivism	Constructivism
kinds of social phenomena exist	Social phenomena and their meanings have an existence	Social phenomena and their meanings are continually being
The conditions of their existence,	Pre-existing	worked on and refined continuously
The way how they are related	They are independent of social actors (external)	They are accomplished by social actors (internal)

Gray (2014) in his book “Doing Research in the Real World” expanded the work of (Blaikie, 2010) and compared between the objectivism view of social reality is as a single reality and the world is independent of the researcher's knowledge, hence the world exists. Meanwhile, constructivism view of social reality is as a multiple reality that represent the world; therefore, it cannot be discovered, it has to be constructed by researchers in groups. The objectivist researchers have been challenged by Babbie (2016) who explained that their individual views/experiences are considered subjective whereas the objective truth should not influenced by their own views, feelings, or values. On the other hand, Bryman (2016) advocated that constructivist researchers have to develop subjective explanation of the respective experiences. Consequently, Creswell (2014) emphasised that researchers should focus on the contexts of the study’s participants to understand their historical and social settings when they rely on their view of the phenomenon being studied.

4.2.1.2 Epistemological Positions

Epistemology or the 'study of knowledge' is concerned with all aspects of the scope, validity, and methods of acquiring knowledge. In other words, it is concerned with how we understand the nature of social reality (Blaikie, 2010). It also can be defined as "a theory or science of the method or grounds of knowledge" (Blaikie, 2007; p18). It provides a perspective on how knowledge can be gained, acquired or produced, and how the extent of its transferability can be assessed, bearing in mind, stating the criteria for deciding when knowledge is both adequate and legitimate. That includes clarification of research structure (the type of evidence, source of evidence, and method for analysis data and interpretations) (Blaikie, 2010; Gray, 2014). Therefore, Epistemology is vital as it influences how researchers structured their research in their attempts to discover knowledge.

The epistemological positions that are commonly applied in research structure are positivism and interpretivism. *Positivism* promotes the application of principles and procedures of the natural sciences in the social context (Bryman, 2016) this not necessarily show correlation between being positivism and scientific. The belief is the reality of knowledge derived from experience that typically comprises observed events and objects, it is about to understand how general laws are developed (Blaikie, 1993). Benton & Craib (2001) suggested that positivism can be used to characterise social science research approaches that apply quantitative measurement, large data sets, and statistical methods of analysis whereas it cannot be used when the behaviour and actions of humans in their social contexts to claim positive knowledge (Creswell, 2014). Accordingly, the positivism position in management research is useful in providing reliability (consistency of results obtained) and external validity (applicability of the results to other contexts) because it is constrained by rules meanwhile social actors are free to choose their actions which produce behaviour and actions (K. D. Miller & Tsang, 2010). In contrast, *interpretivism* is on the opposite polar, it is defined as anti-positivist (Blaikie, 1993). It views social reality as the product of its social actors stating that there is a fundamental difference between social and natural sciences (Blaikie, 2010). Scotland (2012) suggested a link between interpretivism and subjectivism of the real world where people follow different ways in constructing knowledge of the same phenomena. This aims to increase the general understanding of the social regularities in a typical context. In doing so, a variety of processes and interpretations of information are

required (Blaikie, 2010). In management research, there has been acknowledgement that positivists accept true knowledge that determined by data only, meanwhile interpretivism researchers do not accept true knowledge that determined by data alone (Bryman, 2016).

In the middle ground between the two epistemologies polars (positivism and interpretivism) is realism. Realism rejects the positivist view but adopts the constructionist view which recognises vital differences between natural and social phenomena (Blaikie, 1993). Realism concerns with a reality where the objects of study “exist and act” independently of the researchers and their activities (Bhaskar, 1986; p5) as well as where the objects has not been observed yet. The realist view considers investigations on both observable and unobservable characteristics of the real world (Bhaskar, 1978). Therefore, Haig & Evers (2016) claimed in their book realism advocates the notion that there is a real world in which individuals are part of. The difference between the three different epistemological positions is summarised in table 4.2.

Table 4. 2: Epistemological positions – Positivism, Realism and Interpretivism

Epistemology – the study of knowledge		
Positivism	Realism	Interpretivism
Social reality consists of discrete events that can be observed by the human senses. The only acceptable knowledge of this reality is that which is derived from experience (Blaikie, 2010; p97).	Reality consists of different layers including both observable and unobservable characteristics (Bhaskar, 1978)	Social reality is regarded as the product of its inhabitants, interpreted by the meanings participants produce and reproduce as a necessary part of everyday activities together (Blaikie, 2010; p99)

4.2.1.3 Methodological positions

It is curial to determine the research methodology after identifying the “what is” ontological and “what it means to know” epistemological positions (D. Gray, 2014). Therefore, research methodology consider as a starting point in order to answer questions posed by theoretical considerations or to come up with a theory from the collected and analysed data (Bryman, 2016). It involves the selection of procedures and methods adopted to gather knowledge as well as justifications for these choices (Crotty, 1998). There are four distinct research logics that provide various approaches of answering research questions: inductive, deductive, retroductive and abductive. Compared to inductive and deductive approaches, retroductive and abductive approaches are based on cyclic or spiral processes, instead of linear logic

(Blaikie, 1993). The linear process supports the positivists' logic while the cyclical process supports the realists' logic (Ackroyd, 2009).

The *inductive research approach* aims to use theory to explain the relationships between variables and concepts, it involves drawing from theoretical concepts to produce hypothesis that can design a research strategy (Saunders et al. , 2016). This approach concerns of generalisation about the nature of relationships between measured characteristics of individuals and the social phenomena (Blaikie, 2010) . It begins with data collection or observations, followed by data analysis then emerging results to formulate general conclusions. Qualitative research use inductive research approach widely which particularly concerned with the context or the environment of the variables being investigated (Creswell, 2014). In contrast, the *deductive research approach* aims to testing available theory, its start point is in reverse order to the inductive approach. It begins with reviewing literature and scanning established generalisations, followed by forming hypotheses then data collection to test whether it rejects or defends these hypotheses. As a result, the theory is modified taking into consideration the research findings. Quantitative research commonly uses deductive research approach. This approach used widely in natural science where existing theories are used as the basis of the research (Creswell, 2014).

Apart from the Positivist logics (inductive and deductive approaches), the Realist logics (abductive and retroductive approaches) are also applicable to help answer research questions. The *abductive research approach* aims to construct the theory, it is particularly useful to quantify meanings and accounts of everyday activities of social actors in order to understand the research problem (Blaikie, 2010). This approach begins with discovering reality constructions and forming the basis by analysing data then giving meanings to the social world and knowledge. The *retroductive research approach* aims to explain the observe regularity by discovering evident processes and locating the real structures and mechanisms (Blaikie, 1993). It begins with the construction of a hypothetical model of mechanisms followed by establishing its empirical phenomena and then finding the real mechanisms which create the observed regularity from the empirical observation (Bhaskar, 1978). This approach suggests that the researcher has to work back from data to produce an explanation using creative imagination and logic of discovery (Blaikie, 2010). Table 4.3 summarises the discussion on methodological positions of deductive, inductive, abductive,

and retroductive, by highlighting their respective aims, and start-to-finish processes for investigation (adapted from Blaikie (2010; p84))

Table 4.3: The difference between methodological positions. Source (Blaikie, 2010)

Methodology – Approaches used to collect data				
	Positivist logic linear process		Realists logic cyclical process	
	Inductive It is commonly applied to “what” questions	Deductive It is used to answer the “why” questions	Abductive It can be used to answer both types of questions.	Retroductive It can be used to answer both types of questions.
Aim	To establish universal generalisations to be used as pattern explanations	To test theories, to eliminate false ones and corroborate the survivors	To describe and understand social life in terms of social actors’ motives and understanding	To discover underlying mechanisms to explain observed regularities
Start	Accumulate observations or data Produce generalisations	Identify a regularity to be explained Construct a theory and deduce hypotheses	Discover everyday lay concepts, meaning and motives Produce a technical account from lay accounts	Document and model a regularity Construct a hypothetical model of mechanism
Finish	Use these ‘law’ as patterns to explain further observations	Test the hypotheses by matching them with data	Develop a theory and test it iteratively	Find the real mechanism by observation and/or experiment

4.2.2 Author’s philosophical position and research strategy

All researchers are affected by their philosophical assumptions when they gather, analyse and use data (Easterby-Smith et al., 2002; Gummesson, 2003; Bishop, 2007). Gummesson argued that “How do we get access to reality and how do we get results that are good fits to reality? Both depend on how we generate, analyse and interpret our data, be it number or words. Statistical tables need interpretation just as badly as data from in-depth interviews and focus groups” (Gummesson, 2003; p486). In order to justify the author choice of methodology, the author’s epistemological position and research strategy need to be well-defined and clarified. The following two sections will explain the author’s epistemological position as a critical realist and the selection of the abductive research approach.

4.2.2.1 Critical realist epistemology

Building up on the discussion in section 4.2.1.2, positivism and interpretivism are two extremes in the epistemology positions. These two positions have different strengths and weaknesses in their way of conducting research. Therefore, realism epistemological position is a middle ground between positivism and interpretivism. Easterby-Smith et al (2018) explained that realism merges between providing causal explanations (positivism views) and the characteristics of social reality (interpretivism perspectives). Fundamentally, it can be argued that any philosophical position can be nominated as 'realist' based on the notion of realism assume that any reality can be discussed and investigated (Bhaskar, 1986). Realism consists of three main types: predicative realism, perceptual realism and scientific or critical realism. They are distinct from each other in their view of the relationship between the reality and objects; Predicative type view the reality is independent of objects, perceptual view that the existence of objects in reality are independent of perception, and lastly scientific or critical realism view the existence of objects of a study in reality are independent of the study itself (Bhaskar, 1978). According to these realism types, the critical realism epistemology is the adopted position as it assumes that the existing reality cannot be reduced to a series of discrete events (M. I. Reed, 2009).

Sayer (2000) presented that the knowledge in critical realism is located in three interconnected layers which each has its own characteristics. Bhaskar (1978) identified these layers or levels of reality as: the empirical, the actual and the real. The empirical contains observable events, experiences and perceptions. The actual includes either observable or unobservable events. The real consists of casual powers, mechanisms and processes that create the events; however, they may not be observed directly. Figure 4.2 shows these three layers of reality illustrated as ellipsis shaped.

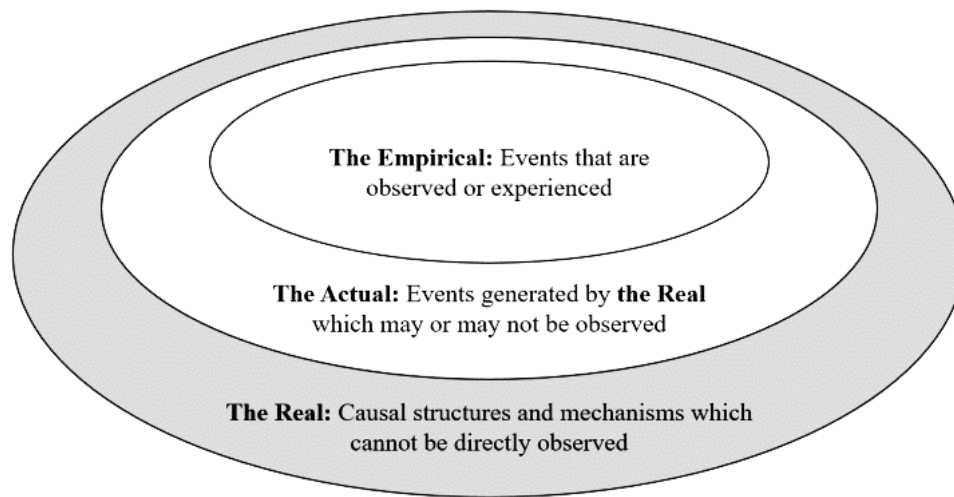


Figure 4. 2: Three layers of reality. Source (Bhaskar, 1978)

As presented in figure 4.2, critical realism goes beyond empiricism, it understands underlying mechanisms of the observable events. That aligns with Blaikie (1993) brief about realist position: *“Realist epistemology is based on building models of such mechanisms such that, if they were to exist and act in the postulated way, they would account for the phenomenon being examined. These models constitute hypothetical descriptions which it is hoped will reveal the underlying mechanisms of reality; these can only be known by constructing ideas about them.”* (Blaikie, 1993; p98). Building up on Van Aken (2004) work, the author of this thesis shared the same view that management as a design science is a perfect match to the critical realist epistemology. This view desire to obtain solution to problems in aim to produce improvements through understanding the observable or unobservable grounded rules and underlying mechanisms.

By being a critical realist researcher in this thesis, the author aims to understand the unobservable underlying mechanisms (resources and capabilities) that generate the observable phenomenon-outcomes (service offering state 2 during Covid-19). This investigation aims to answer the following overarching research question of this study:

“What is the relationship between TAO, capabilities, service offering and patient satisfaction in General Practice?”

4.2.2.2 Methodology selection: The abductive research approach

Based on the methodological positions’ approaches, the abductive research approach will be adopted for this study. It is used for theory building which is fundamentally aimed to

develop the understanding of a new phenomenon as well as theoretical models. This approach will enable the researcher to form associations and differentiate connections and relationships that in other respect are not evident. Moreover, the abductive approach which is in line with the critical realist epistemology will explore a new phenomenon, define and explain themes and patterns then generate a new theory as a result it can be tested (Kovács & Spens, 2005). Figure 4.3 illustrates the three-stage abductive research approach, which is adopted in this thesis, to provide the ability to offer new insights.

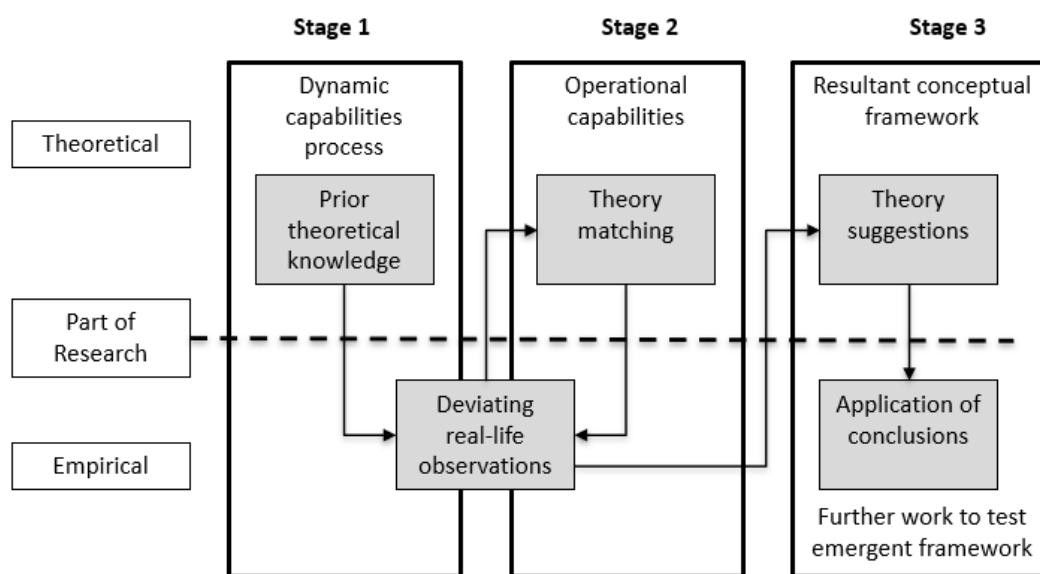


Figure 4. 3: Three stages of abductive research design

As depicted in figure 4.3, stage 1 is the exploration stage, where the researcher focuses on exploring the applicability of “theory” related to resources, dynamic capabilities and planning processes to the “emerging” context of GP surgeries service provisions. Theory matching represents stage 2, which involves the systematic matching of TAO in primary care organisation (GP surgeries) and the resources and capabilities required in implementing those appointment modes during Covid-19. Stage 3 is the theory suggestions; it is the end of the abductive cycle. At this stage the saturation of empirical data is reached, and theory suggestions are made in the form of a conceptual framework.

Dubois & Gadde (2002) and Awuzie & McDermott (2017) explained the principles of the abductive approach and illustrate its cycle stages aim. Building up on the context of this thesis, the aim of stage 1 is to understand the context of service provisions of GP surgeries and the applicability of the theories of resources and capabilities prior to the gathering of

empirical data. The dynamic capabilities process provides provisions to renew skills, processes and routines developed within the frame of operations that determine the operational capabilities to offer new services. The aim of stage 2 is to systematically combine the theory and empirical data where the process is emergent and iterative. At the end of the cycle at stage 3 the focus is to develop a conceptual framework through theory matching and suggestions, the framework is to provide an insight of the resources and capabilities required to shift to service offering/expanding in service offering state 2 at GPs surgeries.

4.3 Management Research as a Design Science

Tranfield & Starkey (1998) identified the key characteristic of management research as its applied nature which concerns of the general problem of design. By its applied nature, management research is deeply embedded among people and organisations, allowing it to become more distinctive than other forms of research. Management research contains two main elements that: design and implementation. The former element concerns of addressing any problems linked to the understanding of organisations and the latter element manages and embeds resources to achieve best tasks performance (Gibbons et al., 1994). Easterby-Smith et al. (2002) in his book explained that in management research the knowledge production process includes awareness and addressing of issues to find solutions that meet the main goal of improving management practice. Many authors studied the nature of the knowledge production process and categorised it in two fundamental branches: mode 1 and mode 2 (Tranfield & Starkey, 1998; Van Aken, 2001a; Van Aken, 2001b; Tranfield, 2002). Table 4.1 summarises the main characteristics of both modes.

Table 4. 4: Knowledge production process – Mode 1 and Mode 2. Source (Gibbons et al., 1994)

knowledge production process	
Mode 1 Organization Theory resulting from Description-oriented research	Mode 2 Management Theory resulting from Prescription-oriented research
Explanatory sciences: research object is "explanandum", testing is incomplete	Design sciences research object is "mutandum", it is tested in context
Problem-focused interested in analysis	Solution-focused interested in design
Research product is the causal model	Research product is the tested and grounded technological rule
Products operate in algorithmic rules like a recipe, and which typically have a quantitative format	Products operate in heuristic rules following logic and used as a design exemplar
Perspective is observer	Perspective is player
Justification is proof	Justification is evidence-based
Suited for conceptual use	Suited for instrumental use
Dependent variable is often some operationalization of overall organizational effectiveness	Dependent variable is rather related to some more operational objectives

As depicted in table 4.4, mode 1 follows a traditional method (academic agenda) and its production aimed the academic community. Practitioners may have access to this knowledge; however, it is long after refinements process. In mode1, the knowledge production process has a clear distinction between theoretical framework and application. Researchers in mode 1 define the problem out of its “messy” context, plan the intervention, apply the intervention and evaluate. On the other hand, mode 2 follows an alternative method, where knowledge production has a constant flow back and forth between the theoretical and the practical. Mode 2 acts as a coupling mechanism between academics and practitioners, resulting in the application of the research (Gibbons et al., 1994). Researchers in mode 2 look at the case when it is solved, reflect on the lessons learnt, use those lessons in the next case then reflect again and so on.

Building on these aspects, the objective of this thesis is explanandum (Mode1), it means aiming to do changes. The researcher will employ knowledge to develop conceptual framework that bridge the gap between theory and practice. More importantly, to produce guiding principles that help practitioners to develop a strategy to satisfy patients’ needs from their GPs appointment system and to improve surgeries performance.

4.4 Research Methodology

This section focuses on the research methodology and data collection resources that are selected to conduct empirical data, followed by refining the theoretical framework.

Research methodology selection is an exercise that is driven by three main factors: (1) research aim, (2) the audience for whom the research findings will be reported, and (3) the researcher's personal experience (Creswell, 2014). In order to support the existed ontological and epistemological beliefs, there are various range of research methodologies to be adopted. In essence, these methodologies can be fitted into two categories: qualitative and quantitative research methodologies. The former is used to generate a theory, while the latter is usually used to test a theory (Bryman, 2016). By considering the aim of this thesis author, which is generating new concepts and theoretical understanding of phenomena, rather than confirming existing theories, the adoption of qualitative methodology is appropriate.

The author of this thesis, as a critical realist, adopts the abductive research approach (see figure 4.3). This approach follows two research design phases: theoretical and empirical.

The first phase of the research design is the theoretical phase, it aims to explore and understand the existing knowledge about the context of this study. The used methodology is a combination of underpinning theories and a traditional literature review. The result of this phase is an establishment of the theoretical framework see chapter 2 and 3. The theoretical phase represents stage 1 in the abductive research cycle. *The second phase* of the research design is the empirical phase, it aims to collect empirical data. The used methodology is the case study research (qualitative method) that fits the aim of this phase. In this phase the pre-developed conceptual framework in phase 1 is identified and continuously refreshed and updated through matching the emerging empirical data. The empirical phase represents stage 2 in the abductive research cycle. The rationales and the details of the selected research methodology are discussed in section 4.5. The author choice of the research methodology is in line with the critical realist epistemology and supports the premise of case study methodology (Dubois & Gadde, 1999).

Before moving ahead with the details of research methodology, figure 4.4 provides a summary of the selected philosophical position and methodology.

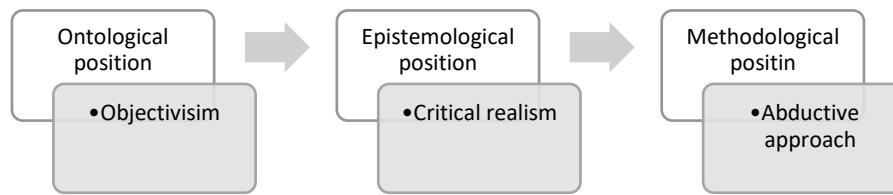


Figure 4.4: Summary of author's philosophical position and methodology selection

4.5 Case study design

Case Study Research is the second phase of abductive research design which aims to conduct an empirical study. Case study method provides the unique explanation of theory development by using in-depth insights of empirical phenomena and their contexts (R. K. Yin, 2009). Case study research is defined as: *“An empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.”* (Yin, 2009; p18). The objective of this thesis is to empirically study the contemporary phenomenon of service offering at GPs surgeries, a phenomenon that is difficult to distinguish from its organisational context. Voss et al. (2002) explained that case study research enables the researcher to spot unanticipated but related issues that can be explored from the cases. This allows and facilitates a further need to reshape the existing theoretical framework by refinement of the theoretical model. This method is usually used also to develop a more detailed understanding of TAO and changing in service offering during Covid-19 compared to the period before the pandemic. Yin (2003) describes case study research as an ‘all-encompassing’ method, a ‘comprehensive research strategy’. In other words, one that should not be limited in definition to a data collection tactic. Yin stated: *“You would use the case study method because you deliberately want to cover contextual conditions – believing that they might be highly pertinent to your phenomenon of study”* (R. Yin, 2003; p13). Therefore, the case study research is adopted as an appropriate research method for the empirical phase of the author’s research design.

The context in which GP surgeries are shifting towards blended service offering during Covid-19 is truly complex spanning within the boundary of the surgery and beyond. They explored rapid technological changes with shallow experience (Pulido-Fuentes et al., 2022;

Wosik et al., 2020), which is the focus of the thesis. This complexity is a result of the lack of theory and well-supported documentations adds further support to a case study methodology (Eisenhardt, 1989; Harrison, 2002). In addition to the necessity to recognise that the research field is still nascent and immature where healthcare organisations are in a phase of digesting the impact of the global pandemic on their operations and delivering services.

One more fit of the case study methodology is related to the nature of the research questions. The research questions vary based on the type of case study: descriptive, explanatory and exploratory. Predominantly, the 'what' questions may either be exploratory (in which any of the research methods could be used) or descriptive (in which surveys or the analysis of archival records would be favoured). On the other hand, the 'how', 'what' and 'why' questions are explanatory which favour the use of case studies, experiments or history (Yin, 2009). Because the main research question of this thesis is an exploratory 'what' question, the case study research is considered to be an appropriate method to explore this research question. Furthermore, the case study method fits well the empirical phase of the author's abductive research approach, this method enables the author to conduct an iterative process where the empirical data are continuously emerging, and the conceptual framework is refined during the data collection and analysis.

Key outstanding strengths of the case study approach are outlined in Bebensat et al (1987); Meredith (1998) and Voss (2002): (1) The phenomenon can be studied in its natural setting, relevant theory can be generated from the gained understanding through observing actual practice; (2) The case study method allows research questions to be answered with relatively full understanding of the nature and complexity of the phenomenon; (3) The case study lends itself to early, exploratory investigations where the variables are still unknown and the phenomenon may not at all understood.

The following section presents the details of conducting case research process.

4.6 Process for conducting case study research

The goal of this section is to explain the case study research process. To ensure the rigor and robustness of the case study research design, the 5-stage process described by Yin (2009) was adopted see figure 4.5.

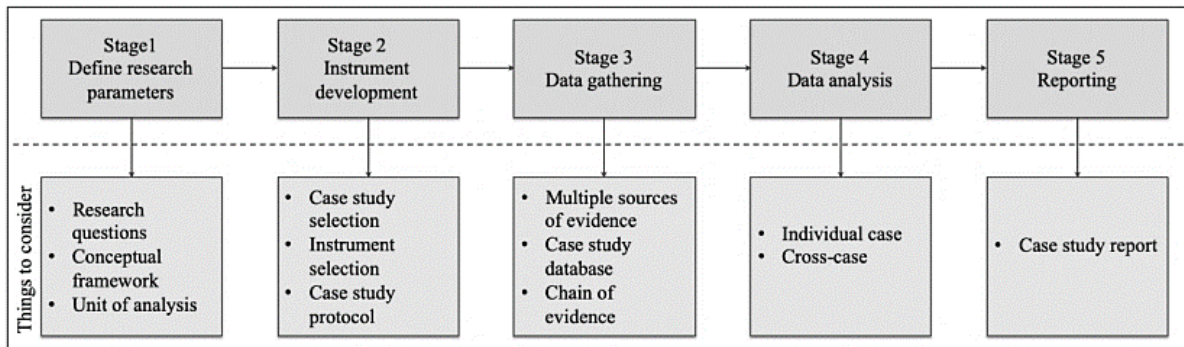


Figure 4.5: The stages of conducting a case study (Yin, 2009)

Despite providing details on how case study research should be conducted in figure 4.5, the author contends that the logic behind it does not fully align with abductive research since it lacks the details of how iterations are conducted in the case study research process. As a result, the author combines the abductive research approach with the process of conducting case study research, suggesting a shift from linear to a more flexible representation of case study research design, as illustrated in figure 4.6.

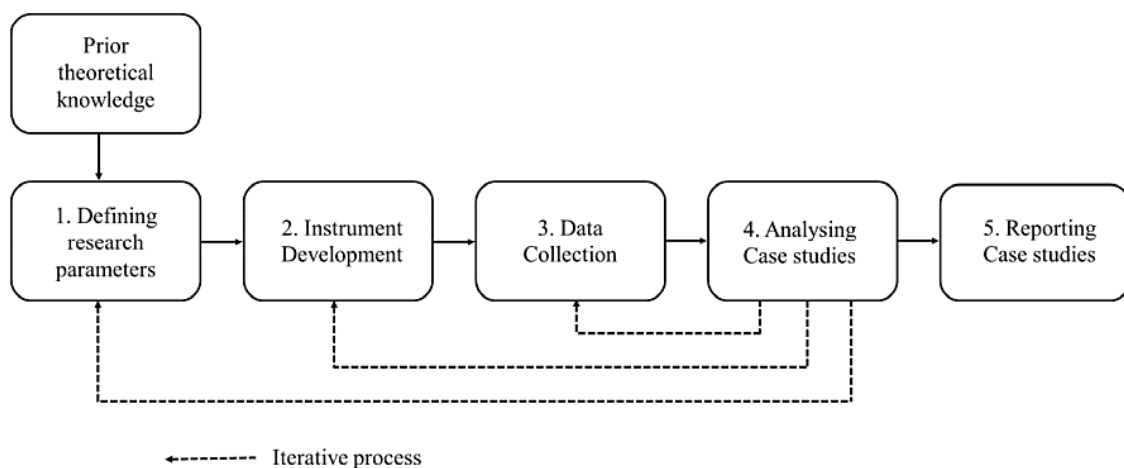


Figure 4.6: The proposed research process in the case study

Using abductive logic, the research process used for the case study defines the parameters of the research from pre-existing theoretical knowledge. Case study research begins with

theoretical phases, which correspond to the first phase of the author's abductive research design. After that, the author develops the instruments, collects data, and analyses it, which correspond to the second (or empirical) phase of the research design. Continuously going back and forth between these stages was an iterative process (this is presented by the arrows in figure 4.6). In this way, theory and reality became more aligned. For example, after conducting interviews, the researcher may revisit the data collection instrument to make changes, such as, revising interview questions for the next interview based on the emerging empirical evidence. That represents the process of theory matching in the abductive research approach stage 2 (Dubois & Gadde, 2002; Kovács & Spens, 2005). In the final stage, the case study results were reported and presented to the targeted audiences. The following sections will further explain the details of each of these five stages, in more detail.

4.6.1 Define research parameters

Yin (2009) suggested that the first stage of the research design is to define the research parameters. At this stage, there are three main components: research questions, establishing a conceptual framework, and unit of analysis. This stage was initially performed as part of the first (or theoretical) phase of the author's two-phase research design prior to conducting the case study.

4.6.1.1 Research Questions

The purpose of this thesis is to identify the resources and capabilities required in enabling the transition to blended service offering during Covid-19. Accordingly, the over-arching research question of the study is set as:

What is the relationship between TAO in service offering of General Practice in the scope of resources, capabilities, and patient satisfaction in England?

The main research question supported by five supplementary research questions as following:

- *RQ1*: What is the relationship between TAO and the service offering provided by GP surgeries?

- *RQ2*: What are the resources required for GPs service offering pre and during Covid-19?
- *RQ3*: What are the operational capabilities required for GPs service offering pre and during Covid-19?
- *RQ4*: What are the required dynamic capabilities by practices to transit from their pre Covid-19 service offering to the period of Covid-19?
- *RQ5*: What is the effect of different TAO surgeries on patient satisfaction?

To address the overarching research question, the RQ1 'what' question reports the empirical domain. It is known as the empirical observable events. Therefore, RQ1 describes the types of service offering which have currently been implemented and identifies their associated characteristics with TAO. This is followed by the two RQ2 and RQ3 'what' questions that describe the 'actual' domain in order to understand the events that make observables events. Accordingly, RQ2 describes the resources which are required by; RQ3 describes the operational capabilities which surgeries have currently developed in relation to TAO. The RQ4 'what' question describes the dynamic capabilities, which refer to the particular capabilities that transition. Finally, RQ5 the final exploratory question describes the impact of the observables events on patient satisfaction.

4.6.1.2 Conceptual Framework

Establishing a conceptual framework is the second component in defining the research parameter. The conceptual framework explains how research questions relate to the scope and purpose of a case study. In light with the first phase of the abductive research design, it implied a systematic matching of the 'prior knowledge' of the resources, operational capabilities, and dynamic capabilities for implementing Technology in GPs service offerings. Also, this mentions to the theoretical phase or phase 1 of the abductive research design for this study. In this respect, the conceptual model developed during phase 1 of the author's abductive research design will provide the overall framework guide for the empirical study. Chapter 3 discussed the rationale and assumptions behind the framework.

4.6.1.3 Unit of Analysis

The unit of analysis is determined by how the 'case' is defined. Yin (2009) stated that "*...your tentative definition of analysis (which is the same as the definition of the "case") is related to*

the way you have defined your initial research questions” Yin (2009, p.30). As a result, a suitable unit of analysis is chosen once the researcher's primary research question is clearly defined. Furthermore, he recommended that existing literature can be utilized as a guide for defining the case and the unit of analysis.

Within the context of this research, the case study is GP surgeries, and the focus will be on the individual surgery level (five units of analysis at the surgery level). It was noticed that the size of these surgeries is different, therefore they are categorized in three groups (large, medium and small).

In 2009 a secondary analysis of the English GP Patient Survey was performed. This analysis found that there is a fair impact of surgery size on practice-level performance scores for most practices (Paddison et al., 2012). Therefore, it is important to adjust studies for patient mix and number (which this research intentionally consider). Otherwise, reports of organisational performance may disadvantage those practices (Paddison et al., 2012). Taking into consideration that the resources and capabilities of different surgery's size are vary (finding and analysis in chapter 5 supports this).

An observational study of GPs in England by states that to compare data at practice level, considering the size of practise is essential (Forbes et al., 2019). On the other hand, (Ng & Ng, 2013) argued that the size of surgery does not have a considerable role when the aim of the study is to measure the quality of care, which is not the case in this thesis.

In the recent years, English GPs — which are, traditionally, small — have been encouraged to serve larger populations of registered patients by merging or working collaboratively with each other. As a consequent, the traditional general practice is changing. The aim of large size practises is to transform services both within primary care and beyond. A report from Nuffield trust by Rosen et al. (2016) examines the factors affecting the evolution and impact of large-scale general practice on both staff and patients. Their report shows that size matters through an extensive literature review and national surveys with an in-depth mixed-methods evaluation of contrasting, large-scale general practice organisations. Other observational studies used data on patient experience, practice size, and collaborative working. it showed that increasing the size of the practice population and working collaboratively are linked to changes in access to care.(Forbes et al., 2020 & Varnam, 2021).

In the context of this study, the size of GP practice can indeed affect its performance towards patients. From fieldwork, the researcher found that larger practices may have advantages in term of resources, wider range of service offered and extended opening hours which could contribute to higher patient satisfaction. However, they also face challenges related to coordination, personalized care and patient-provider relationships. On the other hand, smaller practices offer more personalized care and stronger patient-provider relationships but have limitations in term of available services and resources.

To conclude, the categorization of surgeries in this study is based on the size of GP practices, although it's important to note that the relationship with patient satisfaction it is not straightforward and can be influenced by various factors including management, the efficiency of appointment scheduling, waiting times, communication, and overall patient experiences. Therefore, while practice size is a contributing factor, it's not the sole determinant of patient satisfaction (see chapter 7 for study limitations and future research).

Care Quality Commission (CQC) published comparable information on all GP surgeries in England that overall, there is a small, positive relationship between the size of GP practices and the score that they achieve under the Quality and Outcomes Framework (QOF). QOF scores partially determine payments to practices and are used to provide an overall measure of the clinical quality of a GP practice. The report find that small practices achieved the lowest average scores, while large practices achieved the highest. These findings remain even after controlling for differences in the characteristics of the populations and areas that small and large practices serve. However, there is variation across the different domains captured by QOF. It is important to note however that there is significant variation across practices of the same size. Accordingly, the unit of observation will be the surgery level and the unit of analysis will be the service offering via TAO by surgeries. The case study and its embedded units of analysis for this study is illustrated in figure 4.7.

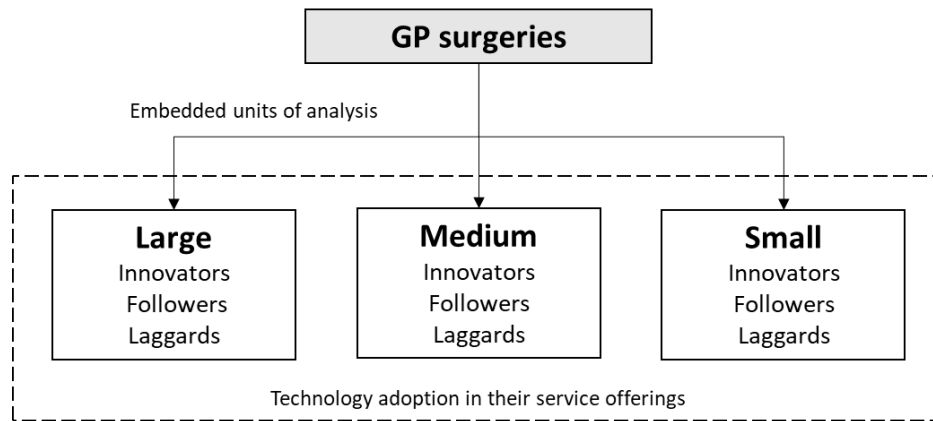


Figure 4.7: A case study and its embedded units of analysis for the study

4.6.2 Instrument development

As a preparation for data collection, Yin (2009) identifies three main components of instrument development: case study selection, instrument selection, and case study protocol.

4.6.2.1 Case study selection (sample and recruitment)

4.6.2.1.1 Sampling

Case selection in this study was carried out through a sampling procedure using empirical settings, events, and social processes as criteria (Patton, 1990). The sampling strategy used in qualitative research operates differently from the sampling strategy used in quantitative research. In that, it is purposeful and emphasizes the unique context of a particular case, as opposed to being based on a random sampling strategy and aiming for a large sample size (Miles and Huberman, 1994).

Considering that this is a qualitative exploratory study, a purposive sampling strategy was chosen. Bryman (2012) explained that using the purposive sampling technique for case study selection, the author selects cases/participants strategically, ensuring that the samples of the cases/participants are relevant to the research questions. Thus, research can gain insights from certain organisations that other organizations cannot provide, such as pioneering in a particular field or industry. Targeting specific organizations is appropriate due to this benefit (Siggelkow, 2007). However, Siggelkow (2007) emphasized on when drawing conclusions from studying 'special' organizations, the researcher should take into consideration the particular insights they provide, which can be used to draw inferences about 'normal' organizations. Unlike random sampling, in which participants may belong to

a variety of backgrounds, ages, and cultures, purposive sampling focuses on those with relevant experience and knowledge (Etikan et al., 2016). Nevertheless, in addition to certain characteristics required of participants, the resulting case sample or participants should be regarded as a convenience sampling, where they meet specific criteria, such as easy access, availability at certain times, and willingness to participate (Bernard, 2002; Harrison, 2002).

As a result, this study explores analytic generalisation, which differs from statistical generalisation in empirical research. Unlike generalizing to a population, analytical generalisation refers to generalizing the results from a particular case to a broader theory (Yin, 2009). According to Yin, this generalisation method aims to compare case study results with previously developed theories. Alternatively, Ridder (2017) suggested that there are two ways to achieve analytical generalization: (a) by corroboration, modification, rejection, or other advancement of theoretical concepts that already existed in the theoretical framework or (b) by identifying new concepts that emerged after completing the case study.

When conducting case studies, it is important to identify specific parameters (Miles and Huberman, 1994), they are considered appropriate for the context of this research and help to inform the level of sampling selected. Taking into account the objective and questions of the author's research, the context, region, PCN, GP surgeries, individuals and secondary data sources were identified as the primary levels of sampling, which need to be deliberated. As a result of these criteria, the specific parameters used for case selection were defined.

In the context of this study, NHS England is the main pool of the research sampling. As mentioned in chapter 1 the four countries of the UK differ in some important aspects of health care organization (Timmins, 2013). In England, there are seven regions who support local systems to provide more joined up and sustainable care for patients: East of England, London, Midlands (East Midlands and West Midland), North East and Yorkshire (Yorkshire & The Humber), North West, South East, South West. The overall quality of care that people receive is mostly of good quality (Powell). CQC (2019) and NHS Digital (2020b) stated that 90% of GP practices were rated as good and 5% as outstanding. As a result, all regions in England can be considered almost at the same level of quality in terms of primary care service provision. Thus, any region in England can be representative to this study. The researcher chose the Midlands (specifically West Midlands) due to the easy access.

Within the region of the West Midlands, there are five Clinical Commissions Groups (CCGs) who represent the healthcare for the local population. Birmingham and Solihull CCG is one of the largest clinically led commissioning organisation in England which run the highest number of appointment in September 2020 (CQC, 2019b; NHS Digital, 2020b; Ingham, 2020). Birmingham & Solihull CCG has 33 primary care networks (PCNs) which bring general practices together to work at scale (Baird, 2019a). Almost all general practices in England are part of a PCN. PCN consist of a small group of practices usually within the same geographical area that work together under the PCN DES contract to gain some of the benefits of working at scale and access to additional funding (Beech & Baird, 2020). There are 164 member practices (main surgeries) which fall into six localities in Birmingham & Solihull CCG: Central, East, North, Solihull, South, West. The targeted Locality within Birmingham and Solihull CCG is the biggest in size (the central locality) which include 7 primary care networks and 52 GP surgery. That will secure a large number of possible participants. If the response rate is low, the researcher will target other localities within the same CCG. The sampling criteria is illustrated in table 4.6.

Table 4.1: sampling criteria

Eligibility Criteria	Inclusion criteria	Exclusion criteria
This study is open to general practices managers who work within PCN in the central locality in Birmingham and Solihull CCG	Any GPs managers within this locality who has worked before and during Covid-19 in primary care organization. (at least three years' work experience)	Any GPs manager who has not witnessed the transition of the operating system when Covid-19 hits.

4.6.2.1.2 Recruitment and Consent

Once ethical approval by the Health Research Authority (HRA project ID: 299771) (REC reference: 21/HRA/5042) was received (Appendix A) an Expression of Interest (EOI) has been distributed to eligible GP surgeries Mangers. Eligible participants who have responded to the EOI call will be approached in order to confirm their participation in the study. At the point of recruitment, potential participants provided with the participant information leaflet (Appendix B), which outlined the research study; following that they were given the opportunity to discuss any queries. Once they agreed to take part, they were asked to complete a consent form (Appendix C). The recruitment strategy, which was initiated through the EOI call, was based on the research aim (understanding the role of TAO in GPs

service offering). The chosen recruitment strategy aimed to be inclusive and targeted, while minimizing bias as shown in table 4.7

Table 4. 2: SWOT analysis for recruitment strategy

Strengths	Weaknesses	Threats	Opportunities
Recruitment approach 1. Direct contact with general practices managers			
-Quick response -More personal -More inclusive -Less biased	-Time-consuming (for GP manager and researcher)	-Receptionists "Gate-keepers" -Miscommunication of the study concept on the phone -No response/ unreturned calls	-Tailored explanation of the Study -Feasible in a specific geographical area
Recruitment approach 2. EOI call dissemination via professional bodies' regional groups			
-More targeted -Less biased approach -Professional bodies' support strengthening study's status	-Slow response (via third party) -Less personal Currently low uptake and activity of LPFs is low at the moment -Membership to professional bodies is not mandatory (independent)	-Emails could be considered as "spam" or "junk" -No response or unreturned follow-up email -Low response due to participants' low interest in involvement with local teams	-Engagement of larger organisations' local teams with the project -Direct contact with groups' leaders could encourage promotion of EOI call
Recruitment approach 4. EOI call dissemination via professional network of contacts			
-More targeted -More personal -Quick response	-More biased approach	-No response or unreturned calls/emails -Potentially slow response (via third party)	-Tailored explanation of the study -Using social networks (e.g., twitter) to make EOI call more inclusive and less biased

As such, the EOI call was circulated directly to GPs managers (option 1; more inclusive and personal option) and to GPs' local professional bodies' teams (option 2; more inclusive and less biased option).

It is important to note that each case study is investigated through a single interview (which is combined with archival and documents' data); yet, some surgeries (medium and large surgeries) state that they can include a rather large number of other individuals.

The justification behind why only one informant was used (surgery's manager), and why that informant is the best possible to represent and validate the collected data is that decisions about technology adoptions and service offerings are very likely to be made

collegially, and arguably they come with significant internal tensions – from the interview protocol in the third section (technology adoption) see appendix D. The interviewees were asked if they make the decisions solely (top-down figure) in the organisational level or based on being a team supervisor. In surgeries, the approach is mainly depending on having a discussion with the team and the surgery's manager possesses a bird's eye view of the team. This is supported based also on some argument from 'team performance' literature (DeChurch & Mesmer-Magnus, 2010 ;Mathieu et al., 2013; Mathieu et al., 2019).

A Meta-Analysis of Different Forms of Shared Leadership-Team Performance Relations (D'Innocenzo et al., 2014) found a strong influence of the level of task complexity on the relationship between shared leadership and performance. Interestingly, however, this influence shows that teams performing tasks with higher levels of complexity (in the context of this study it is technology adoption) exhibit lower effects of shared leadership on team performance.

To moderate the biases from a single source of information although it is representative to the team in each surgery. The author implemented a triangulation process with archives and documents, explicit criteria when selecting interviewees (see sampling criteria table 4.6) and transparent reporting. Triangulation refers to the use of multiple methods or data sources in qualitative research to develop a comprehensive understanding of phenomena (Patton, 1999). It also viewed as a qualitative research strategy to test validity through the convergence of information from different sources.

Denzin (1978) and Patton (1999) identified four types of triangulations: (a) method triangulation, (b) investigator triangulation, (c) theory triangulation, and (d) data source triangulation. All of the four types aim to reduce the biases of a single data collection source. In this study, data source triangulation is adopted. Carter et al. (2014) claimed that this method would increase the validity of the collected information. Next section will expand more on the other sources of data collection.

4.6.2.2 Instrument Selection

While conducting case studies, Yin (2009) suggests six sources of evidence that can be used: documentation, archival records, interviews, direct observations, participant observations and physical artefacts. Additionally, he argues there is no better evidence source than the

others and that they should be considered complementary. The following table 4.8 in Yin (2009, p.102) analyses the six different evidence sources or instruments and identifies their strengths and weaknesses.

Table 4. 3: The six sources of evidence Analysis (Yin, 2009)

Source of evidence	Strengths	Weakness
Documentation	<ul style="list-style-type: none"> - Stable: It can be reviewed repeatedly - Unobtrusive: not created as a result of the case study - Exact: Contains exact name, references, and details of an event - Broad coverage: a long span of time, many events, and many settings - 	<ul style="list-style-type: none"> -Retrievability: can be low due to difficulty to find - Biased selectivity, if the collection is incomplete - Reporting bias: reflects the (unknown) bias of the author - Access: may be deliberately blocked
Archival Records	<ul style="list-style-type: none"> - [Same as those for documentation] - Precise and usually quantitative 	<ul style="list-style-type: none"> - [Same as above for documentation] - Accessibility due to privacy issues
Interviews	<ul style="list-style-type: none"> - Targeted: focuses directly on the case study topic - Insightful: provides perceived causal inferences and explanations 	<ul style="list-style-type: none"> - Bias due to poorly constructed questions - Response bias - Inaccuracies due to poor recall - Reflexivity: interviewee gives what interviewer wants to hear
Direct observations	<ul style="list-style-type: none"> - Reality: covers events in real-time - Contextual: can cover the case's context. 	<ul style="list-style-type: none"> - Time-consuming - Selectivity: difficult to broad coverage - Reflexivity: action may proceed differently because it is being observed - Cost: hours needed by human observers
Participant observations	<ul style="list-style-type: none"> - [Same as those for direct observation] - Insightful into interpersonal behaviour and motives 	<ul style="list-style-type: none"> - [Same as above for direct observations] - Bias due to investigator's manipulation of events
Physical Artefacts	<ul style="list-style-type: none"> - Insightful into cultural features - Insightful into technical operations 	<ul style="list-style-type: none"> - Selectivity - Availability

This study uses three sources of evidence (documentation, archival records, and semi-structured interviews). When possible, semi-structured interviews are used as the primary source of data collection. By conducting interviews, the interviewer gets the perspective of the participants on the research context as well as an explanation of the research questions. Nevertheless, Yin (2009) stated, it is important to note that interviews have the disadvantage of causing bias due to poorly constructed interview questions, interviewer response bias, and poor interviewee recall and reflexivity.

As a result, a semi-structured interview protocol was developed to mitigate these risks. In a semi-structured interview, the researcher achieves both a thorough discussion of the topic and main points of the research questions, as well as the ability to follow up on the interviewee's responses with additional questions (Easterby-Smith et al, 2018). In order to minimise the possibility of bias through a poor interviewee recall or reflexivity, archival records and documentation were also used for triangulation of data as secondary sources of evidence in addition to the semi-structured interviews.

4.6.2.3 Case Study Protocol

It is crucial to develop a protocol for case study research to increase its reliability and to guide the researcher in collecting data, primarily for multiple case study. Furthermore, it will help the researcher stay focused on the research topic. Yin (2009) recommends that a case study protocol contain the following four components: (1) An overview of the case study, (2) Data collection procedures, (3) Interview protocol and (4) Reporting protocol.

Firstly, an overview of the case study. In this section, background information about the case study should be provided (Yin, 2009). Hence, the first part of the case study protocol outlines the research questions for the case study, the relevant background readings (literature review chapter) and the conceptual framework for the case study.

Secondly, data collection procedures. Data collection activities are outlined in this section, indicating their key phases. Three main phases are followed for case study research in the study. During phase 1, the data collection process begins with preparation for fieldwork, including gaining access to key organizations or interviewees and making sure adequate resources are available. In phase 2, interviews are conducted, and secondary data sources are gathered. This is the main study phase, which aims to explore the surgeries specific resources, operational capabilities and also the upgrade (dynamic) capabilities required to transition from their traditional service offerings to blended service offerings. Phase 3 is a verification phase which involves the main informants of the firm to confirm the findings and conclusions of the study. In Table 4.9, the details of the three phases of the study are described.

Table 4. 4: Phases of the study

Phase	Main Objectives	Roles of people to be contacted or interviewed Documents to be reviewed
Phase 1 Preparation	<ul style="list-style-type: none"> -To gain access to and obtain a commitment from surgeries - Finalise the approach, resources and timings for the main study 	<ul style="list-style-type: none"> - The point of contact of surgeries, also known as the gatekeeper - Secondary data resources including surgery official website and access NHS England and CQC reports
Phase 2 Main Study	<ul style="list-style-type: none"> - To understand the characteristics of every surgery - To understand the service offering (how it operates) - To understand surgery’s resources and operational capabilities - To understand the capabilities required to transition to blended service offering 	<ul style="list-style-type: none"> - Managers of GP surgeries - Key informants identified during the scoping study (e.g., digital transformation) - Secondary data resources (NHS Digital and CQC reports)
Phase 3 Verification	<ul style="list-style-type: none"> - Verify the analysis and findings of the study 	<ul style="list-style-type: none"> - The key informants, who were previously interviewed in main study

Thirdly, the interview protocol questions. This section considered as the most critical components of the case study protocol. Interview questions were based on this protocol when it came to conducting the actual interviews. In general, there are a number of key headings that serve as topic guides, followed by more specific and detailed questions. The overview of the interview protocol, which is divided into four stages is presented in Table 4.10. The four main stages are: interview checklist, introduction, interview questions and end of the interview.

Table 4.5: An overview of the interview protocol

Stage	Actions	Extra Details
Stage 1 Interview checklist	In this stage, all items required to conduct the interview are listed on the checklist	These items include laptop, recorder, printed copy of interview protocol, notebook and pen.
Stage 2 Introduction	In this stage, the recruitment strategy will be followed including the distribution of Participant Information leaflet and consent form (see section 4.6.2.1.2 Recruitment and Consent)	<ul style="list-style-type: none"> - If the interviewee prefers not to be recorded, the interviewer will need to ensure that the key information related to the research question is noted during the interview and repeated if necessary. - A contact sheet should also be established as soon as possible after the interview by the interviewer
Stage 3 Interview questions	Research context is the first part of the interview questions. These questions are associated with personal history, organisational background and service offerings (RQ1), in order to understand the real-life context of the study.	<ul style="list-style-type: none"> - Personal History: Role and history - Size of the surgery (patient list and staff) - Location of the surgery and deprivation status. - Service offering before and during Covid-19
	The second part of the interview questions relates to the strategic resources (RQ2), the operational capabilities (RQ3)	<ul style="list-style-type: none"> - Strategic resources: physical, human and organisational resources. - Operational capabilities: Managerial, technical and customer capabilities.
	Understanding the dynamic capabilities is the third part of the interview questions (RQ4)	Dynamic capabilities: <ul style="list-style-type: none"> - Sensing - Seizing - Transforming
Stage 4 End of interview	In this stage, the interview will be concluded and finalised. The interviewee is also asked for the contact information of prospective participants mentioned during the interview.	The interviewees will be thanked for participating in the study and asked if they would like to be informed of the study's results.

Fourthly, reporting protocol section. It outlines how the case study results and findings will be finalised. In this thesis the main audiences for the case study report are the case surgeries, Royal collage of general practitioners, academic community and practitioners. This will be detailed in Section 4.6.5 reporting case studies (the fifth stage of the case study research process). For this study protocol see Appendix D.

4.6.3 Data collection

Data collection is part of conducting fieldwork. As identified by Yin (2009), there are three fundamental principles that help optimum the benefits that may be derived from using

different sources of evidence as well as strengthening the data collection phase. They use multiple sources of evidence, create a case study and maintain a chain of evidence. The following sections discuss how these principles apply to this thesis' data collection stage.

4.6.3.1 Use of Multiple Sources of Evidence

The case study research was primarily conducted through semi-structured interviews, and the interview protocol was developed in accordance with that instrument. The interview guide was piloted by members of the supervisory team. Based on the obtained HRA approval, all the conducted interviews were online via Teams. Therefore, the area for conducting the interviews had to be covered with an Internet connection. 100% of the participants gave permission to record their interviews.

Interviews were recorded using a digital audio recorder and then transcribed by the author on Microsoft® Word; to enable the accuracy of the contact notes. In cases of uncertain details or when additional detail was required, they were compared with the actual interview dialogue. Then the lead supervisor accuracy checked the first two interviews. The author also took additional notes during the interviews. In order to capture the main points of the notes taken through the interview, a contact summary sheet should be established (Miles and Huberman, 1994). Within 24 hours of each interview, a contact summary sheet was developed that outlined the main questions and main themes or issues raised. Figure 4.8 shows the format of the contact summary sheet, provided by Miles and Huberman (1994).

Fieldwork - Contact Summary Sheet

Interviewee		Contact sheet no.	
Job title		Date	
Contact details		Location	

<p>1.0 Interview Background</p> <p>2.0 Main Issues or Themes Arising</p> <p>3.0 Summary of Information Gathered</p> <p>4.0 Other Salient, Interesting, Illuminating or Important Aspects</p> <p>5.0 New/Outstanding Questions for Next Visit</p> <p>6.0 Secondary Data</p>
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Figure 4. 8: Contact Summary Sheet Template

A triangulation of the data was carried out based on secondary data such as archival records (e.g., data flow charts) and documentation (e.g., CQC reports), as appropriate. Reddy & Agrawal (2012) suggested that there is greater potential to obtain information about the firm from secondary resources.

The researcher access historical records and documents that offered unique insights into past (before COVID-19) until the recent year (2022) on “The Characteristics of service offering in relation to TAO before and during covid-19” [triage, booking system and appointment modes]. For instant CQC publish publicly performance review on every surgery annually. Also, NHS England publish GP patient survey annually. Then during the interview [bear in mind the manager fit the sampling criteria] the same questions were repeated to collect qualitative data. The author re-contacts the expert interviewee, that helped to confirm and validate the collected secondary data, provide further details and also aids data triangulation (Yin, 2009).

4.6.3.2 Create a Case Study Database

The author established a case study database to organize and document the primary and secondary data sources. All interviews’ files were anonymised and stored in a password-protected folder. The hard copies of the hand-written notes were retained until the end of the PhD; digital anonymised copies of handwritten notes will be archived for at least 10

years (as per University of Warwick). Each interviewee was assigned a pseudonymised code against the case number in order to reference the specific case study. For example, the interviewees coded as profession years of experience (in current role)-case study reference number (e.g., GP-03-07 was for a GP surgery manager who was part of the third case study and had been practicing for 7 years). Contact notes and audio-recorded interviews were also numbered in line with the interviewees that helps to trace back to them when needed. The same coding process followed in secondary resources (including documentation and archival records). An example of the case study database is illustrated in table 4.11.

Table 4. 6: Summary of the case study database

Interviewee	Date	Duration (Minutes)	Reference
PM-01-17	20/07/2022	43	R1-01, F1-01, T1-01, C1-01
PM-02-23	22/07/2022	44	R2-02, F2-02, T2-02, C2-02
PM-03-05	15/09/2022	37	R3-03, F3-03, T3-03, C3-03
PM-04-03	13/09/2022	38	R4-04, F4-04, T4-04, C4-04
PM-05-05	13/09/2022	84	R5-05, F5-05, T5-05, C5-05
PM-06-03	22/07/2022	51	R6-06, F6-06, T6-06, C6-06
PM-07-19	20/09/2022	44	R7-07, F7-07, T7-07, C7-07
PM-08-05	22/09/2022	35	R8-08, F8-08, T8-08, C8-08
PM-09-26	16/09/2022	35	R9-09, F9-09, T9-09, C9-09
PM-10-10	27/09/2022	63	R10-10, F10-10, T10-10, C10-10
PM-11-09	26/09/2022	54	R11-11, F11-11, T11-11, C11-11
PM-12-10	23/09/2022	38	R12-12, F12-12, T12-12, C12-12
PM-13-15	28/09/2022	39	R13-13, F13-13, T13-13, C13-13
PM-14-31	04/10/2022	38	R14-14, F14-14, T14-14, C14-14
PM-15-13	27/09/2022	40	R15-15, F15-15, T15-15, C15-15
PM-16-17	29/09/2022	52	R16-16, F16-16, T16-16, C16-16
PM-17-14	07/10/2022	45	R17-17, F17-17, T17-17, C17-17
PM-18-03	27/09/2022	69	R18-18, F18-18, T18-18, C18-18
PM-19-08	28/09/2022	75	R19-19, F19-19, T19-19, C19-19
PM-20-04	03/10/2022	47	R20-20, F20-20, T20-20, C20-20
PM-21-03	25/10/2022	48	R21-21, F21-21, T21-21, C21-21
R - Recorded audio file, F –Field notes, T- Transcript, C – Contact Sheets			

4.6.3.3 Maintain a Chain of Evidence

It is important to demonstrate the reliability of information in a case study by providing a chain of evidence (Yin, 2009). This allows the audience to draw any relevant conclusions

from initial research questions to final case study findings. For this study, the chain of evidence is provided by the documents (i.e., contact notes, transcripts from the audio recordings and secondary data) saved in the case study database, which clearly support the findings in the case study report. The essential part that illustrates a chain of evidence is the case contact notes. Afterward, the contact notes, transcripts, and secondary data were analysed and incorporated into the case study reports. For each case, the chain of evidence was shown. In the following two sections, the author will discuss in detail how to analyse and report case studies in this thesis.

4.6.4 Analysing case study

The approach to analysing case studies for this thesis corresponds to the reporting protocol. Essentially, the research may start from developing a general strategy as a guide through data analysis, after which the analytic techniques can be considered (Yin, 2009). See Appendix E for an example of a data analysis of service offering and TAO according to the transcript of contact.

The author analyses Archives and documents as well, by examining the material for contextual details that shed light on the historical operation system in the surgery. The interviews were transcribed, and the responses were analysed. The researcher then identified recurring themes.

The Data Comparison is followed. The researcher compared information obtained from archives and interviews. Then identified areas of agreement and discrepancies among the sources. The author also looked for cases where interviewee's accounts corroborate or enhance the details found in archives. Finally, an integration and synthesis process were adopted. The author integrated findings from all resources to create a comprehensive table (combine historical context, personal perspectives, and factual data). Then synthesized insights and draw connections between data resources to fit the surgery in the right category.

4.6.5 Reporting case study

Case study research concludes with dissemination, which involves reporting and presenting the results to the target audience (Yin, 2009). In light of the literature review, the author disseminated the initial conceptual framework to the wider academic operations

management research community at the EurOMA International Conference in 2019. The results of the case studies were submitted and presented to the POMS international conference in 2022. The details of disseminated publications are detailed in Table 4.12.

Table 4. 7 Publications of the research findings

Academic Publication	
Conferences	Description
Hadeed, R. Godsell, J. and Day, S. (2019). "Analysing supply chain strategies in healthcare from patient flow perspective: A systematic literature review"	Accepted and presented at the EurOMA 2019 international conference in Helsinki, Finland
Hadeed, R. Godsell, J. and Agca, O. (2022). "The impact of Covid-19 on TAO in primary healthcare: An empirical study"	Accepted and presented at the 6th World Conference on Production and Operations Management (World P&OM Nara 2022)

4.7 Validity and reliability of the research design:

Voss et al. (2002) suggested an association between the researchers who bring a strong interest into a field and the strong bias in the application of their research methods. Full transparency of inferences and analysis will also help to provide evidence that the findings as reliable (Miles and Huberman, 1994) and thereby minimising any unintentional bias.

In section 4.6, an overview of the 5-stage case study research process has been explained in detail. Four basic tests which are commonly used in the field of social research were used to assess the rigor of the research design. Many textbooks summarize these tests, according to Yin (2009; p40):

1. Construct validity: Identifying correct operational constructs for the concepts which are being studied.
2. Internal validity: Developing a causal relationship, by which certain conditions are believed to lead to other conditions, as distinguished from spurious relationships.
3. External validity: Establishing the domain to which the findings of the study can be generalised.
4. Reliability: Illustrating that the processes of the study (e.g., data collection procedures) can be repeated, with the same results.

As shown in table 4.12, these four tests correspond to different phases of the case study research. To ensure that the quality of the study was maintained in this thesis, this model was utilized in order to make sure that appropriate tactics were used in the case study.

Table 4. 8: Case study tactics for four design tests

Test	A phase of case study	Case Study Tactic	Adopted for this PhD study	How the tactic is adopted
Construct Validity	Data collection	<ul style="list-style-type: none"> • Use multiple sources of evidence. • Establish a chain of evidence. • Have key informants review a draft case study report. 	Yes Yes Yes	Access to surgeries archives, documents and setting interviews. See chain of evidence (Appendix E)
		<ul style="list-style-type: none"> • Use a case study protocol. 	Yes	The protocol of the case study is attached (Appendix D)
Reliability				
Internal Validity	Data analysis	<ul style="list-style-type: none"> • Do pattern-matching. • Do explanatory building. 	Yes Yes	See (Appendixes I, I*, I**, J, J*, J**)
External Validity	Research design	<ul style="list-style-type: none"> • Obtain HRA approval. 	Yes	See (Appendix A)

Numerous arguments have been made about the appropriate number of case studies that should be used. As Eisenhardt (1989) advocates, theory building should involve four to ten cases, on the other hand, Dyer & Wilkins (1991) argue that some of the most significant studies that have advanced the understanding of organizations use just one case. They stated: *“to assume that a single case cannot be a useful unit of analysis for theory building ignores important exceptions”* (p.614). An argument is presented by Voss et al. (2002) that the fewer case studies provide a greater opportunity for in-depth observation.

Given the context of the case study in this research, as it is specifically investigating GP surgeries the number of cases will be one, however, to provide a balance between the depth of study and the external validity of the approach coupled with the researcher’s available time frame 21 surgeries were interviewed. It is reached when no new insights and dimensions emerge from comparing additional cases (i.e., theoretical saturation) (Benjamin, et al., 2018) . Taking into consideration the list size of each surgery, they were categorised in three embedded cases (more details in the next chapter). The case study approach used in this way strengthens the defensibility of knowledge claims of the document analysis (encompassing document analysis data).

4.8 Research ethical considerations

This research has addressed ethical concerns thoroughly. As mentioned in section 4.6.2.1.2, an ethical approval for conducting this study was applied for before data collection began. As this study is to be conducted in healthcare setting HRA approval was required. To obtain HRA approval it was necessary to contact the HRA queries line. From the information the author provided, it was advised that the study would not require REC Opinion but would require HRA Approval. The author followed the instruction and created a project account on this website <https://www.myresearchproject.org.uk/help/hlphraapproval.aspx>. A full IRAS application was developed, and the approval was obtained (see appendix A)

In addition to HRA approval, the research protocol, the participant information leaflet (PIL) and the consent form were provided to the research office at Warwick University. According to university guidelines and regulations, the research protocol was developed. The protocol discussed the context of the research, the research design, as well as ethical considerations during data collection, data analysis, and the publication of the findings, such as the confidentiality of individual participants and the identity of the GP surgeries managers. In the PIL a number of details were explained, including the purpose of the research, data security, anonymity of participants and their organisations in the research outputs, withdrawal rights and information dissemination. Interviews were conducted only after participants signed a consent form which was sent out to individuals to ensure that they were aware of how the research and their rights.

The application submitted for ethical approval by the Biomedical & Scientific Research Ethics Committee (BSREC) of the University of Warwick, and ethical approval was granted to this research. The reference number is BSREC 57/20-21 dated 31/03/2022 (see Appendix F).

4.9 Summary of the chapter

This chapter presented the author's philosophical position as a critical realist. Accordingly, this epistemology supports the transdisciplinary mode-2 approach to management research that is promoted by the author, and in particular van Aken's (2001a; b; 2004) view of management research as a design science. On the basis of these arguments, the author adopted the three-stage abductive research approach, proposing two phases of research design. They are the development of a conceptual framework and empirical study.

In the first phase, the author explores and understands the existing knowledge about TAO and service offering in GP surgeries combined with underpinning theories in order to develop a conceptual framework as a guide for empirical research phase. In the second phase, the conceptual framework is empirically tested. Case study method is used to collect empirical data and iterate the framework based on theory matching.

As a result, the refined conceptual framework was established as a new theory suggestion. After discussing the philosophical solutions, the process for conducting case studies was discussed as presented in Yin (2009). In order to ensure rigor in the research design, construct validity, internal validity, external validity, and reliability tests have been used.

Chapter 5: Results and Analysis

5.1 Introduction to the chapter

This chapter presents findings from the case study research. The case study findings relate to all research questions. Three embedded case studies are investigated in this chapter under five embedded unit of analysis within each case. It focuses on the TAO in relation to service offerings pre and during Covid-19, surgery resources, operational capabilities, dynamic capabilities required to offer state 2 of service offerings during Covid-19 and patient satisfaction.

Essentially, the three embedded case studies offer rich and insightful descriptions of the reality of TAO in offering services to patients pre and during Covid-19 through the experiences of practice managers, thus facilitating theory building (Eisenhardt, 1989; 1991).

Following the introduction, section 5.2 presents an overview and a presentation of the embedded case studies selected for analysis. Section 5.3, 5.4, 5.5 presents accordingly the results of small, medium and large surgeries (list size-related). Section 5.6 presents the summary of the chapter. Figure 5.1 shows the structure of chapter 5.

5.1 Introduction to the Chapter
5.2 Overview and Presentation of embedded case studies
5.3 Results of Small
<div style="border: 1px dashed black; padding: 5px;"> 5.3.1 The characteristics of service offering in relation to TAO 5.3.2 Practice resources in relation to TAO 5.3.3 Operational capabilities to deliver the service offering 5.3.4 Dynamic capabilities required to transition between different service offerings 5.3.5 The relationship between patient satisfaction and TAO 5.3.6 Summary of small results </div>
5.4 Results of Medium
<div style="border: 1px dashed black; padding: 5px;"> 5.4.1 The characteristics of service offering in relation to TAO 5.4.2 Practice resources in relation to TAO 5.4.3 Operational capabilities to deliver the service offering 5.4.4 Dynamic capabilities required to transition between different service offerings 5.4.5 The relationship between patient satisfaction and TAO 5.4.6 Summary of medium results </div>
5.5 Results of Large
<div style="border: 1px dashed black; padding: 5px;"> 5.5.1 The characteristics of service offering in relation to TAO 5.5.2 Practice resources in relation to TAO 5.5.4 Operational capabilities to deliver the service offering 5.5.5 Dynamic capabilities required to transition between different service offerings 5.5.5 The relationship between patient satisfaction and TAO 5.5.6 Summary of large results </div>
5.6 Summary of the Chapter

Figure 5. 1: Structure of Chapter 5

5.2 Overview and Presentation of embedded case studies

The researcher aimed to conduct interviews in CCG of Birmingham and Solihull. The demographic profile of all surgeries in the central locality is very similar. Surgeries are distributed in the inner city with a high level of deprivation and mixed ethnicity. Therefore, surgeries were categorized on the basis of patients' list size (number of the registered patients in the surgery). It takes approximately 45 to 60 minutes to conduct an interview with the managers of surgeries. The researcher recorded and transcribed each interview verbatim, and analysed it manually, as described in chapter 4. The interview protocol followed in this study can be found in Appendix D.

On NHS Digital website under the "Patients Registered at a GP Practice" tab, it is mentioned that since 2018 the average list size of GP practice in England is about 6000 patients. Consequently, surgeries in the first embedded case study and labelled as 'small', they are selected for a similar list size which is less than 6000 patients (NHS Digital, 2022d) and have

three or less full time GPs. However, despite the apparent similarities between small surgeries, the interviews soon revealed that their relationship with TAO before and during Covid-19 is not similar. Therefore, the comparative case study is an effective approach since it prompts consideration of the differences between the surgeries in order to help determine why a similar list size surgeries in similar demography leads to different results (Pettigrew, 1992). The second embedded case study is labelled as ‘medium’. It includes surgeries which has a medium size patients list (i.e., between 6000 to 10000 patients) and have four to six full time GPs. The third and final embedded case study is labelled as ‘large’. It includes surgeries with list size covers over 10000 patients and have more than six full time GPs. Each embedded case study contains surgeries from different TAO in relation to their service offering. Appendix G provides a chain of evidence on the distribution of the participated surgeries in this study. Table 5.1 presents an overview of the case studies selected for analysis.

Table 5. 1: Cases overview

	Small	Medium	Large
Surgery list size	Less than 6000 patients	6000 to 10000 patients	Over 10000 patients
Number of GPs	From one and up to three full time GPs	More than three and up to six full time GPs	More than six full time GPs
Number of interviews	8	8	5
Date case study took place	From June 2022 to October 2022		

The findings of each embedded case study are organized in five sections. Each section reflects on the research questions accordingly. The first section presents the role of TAO in supporting different states of service offerings pre and during Covid-19 and the intention of future plans regarding service offering (different characteristics of service offering). The second section relates specifically to the surgeries resources including physical, human and organisational capital of each surgery. The third section relates to operational capabilities in relation to TAO. The fourth section presents findings related to required dynamic capabilities by practices to transit from their state 1 of pre COVID-19 service offering to state 2 during COVID-19 of service offering. The fifth section presents the relationship between TAO and patient satisfaction.

The TAO classifications are based on the diffusion of innovation theory as mentioned in chapter 3, which suggests that the adoption of new technologies follows a predictable pattern across different types of organizations. It's important to note that an organization's position in this spectrum can change over time based on its internal and external factors, as well as the evolving technological landscape.

In the context of adopting technology at GPs practices, innovators are surgeries that embrace new technologies early on (before COVID-19, often taking risks to gain a competitive edge). Followers are surgeries that observe innovators and adopt technologies once they've been proven effective (Government rules pushed for it). Laggards are slow to adopt new technologies and may only do so when absolutely necessary (COVID-19 rules) or when their competitors have already implemented them successfully (this is not the case in this study). The classification is part of the technology adoption lifecycle theory.

Several studies provided classification of innovators, followers, and laggards organizations in adapting technology, they showed that categorization can be based on various measures and criteria (Calantone et al., 2002; Tohidi & Jabbari, 2012; Jahanmir & Lages, 2016; Edwards-Schachter, 2018). These measures can help differentiate organizations within the spectrum of technology adoption, but it's important to note that the classification may not be rigid. Organizations can transition between categories over time based on internal and external factors, leadership changes, market dynamics, and technological advancements.

In the context of this study, the researcher used learning and adaptability and leadership vision measure as (intention for future of TAO on appointment modes). Resources allocation measure as (use of triage system) this system which distribute patients to the right resource and the right time and right mode for their appointments. Adoption speed and openness to change measure as (use of virtual appointments). Table 5.2 presents the TAO categorization measures that help define these categories:

Table 5.2 TAO categorization measures

	Innovators	Followers	Laggards
Adoption speed (Edwards-Schachter, 2018)	tend to adopt new technologies rapidly, often as soon as they become available.	adopt technologies after they've been proven effective,	adopt technologies much later, sometimes only when they're necessary.
Openness to change (Edwards-Schachter, 2018)	are more open to embracing change and disruption that new technologies bring.	are willing to change but may require more evidence of benefits,	are resistant to change and prefer sticking to established practices
Resource allocation (Calantone et al., 2002)	allocate significant resources, including budget and personnel, to research and implement new technologies	allocate resources once they see a clear benefit,	may allocate minimal resources for technology adoption
Leadership vision (Jahanmir & Lages, 2016)	often have visionary leadership that recognizes the potential of technology to transform the organization	Followers' leadership sees the value in technology but may need more convincing,	while laggards' leadership might be resistant to change.
Learning and Adaptability (Jahanmir & Lages, 2016)	have a culture of continuous learning and adaptability	needed to see effective outcomes to adopt	may exhibit slower learning curves and less willingness to adapt.

Table 5.4 presents how the participated surgeries are categorized to innovators, followers, or laggards according to TAO at their surgery level. The colouring code that has been used in the table 5. 3 is explained as following.

Table 5.3: Colouring code for surgeries TAO categorization

Use of virtual appointments	Colour code	Use of triage system pre-covid	Colour code	Intention for future for appointments mode	Colour code
Less 10%	L	No	L	Return to offer majority face to face	X (I or F) stick to the initial category
10% of appointment are virtual	F	Partially	F	Give choice	X (I or F) stick to the initial category X(L)
Over 10%	I	Yes	I	Offer majority virtual	X (L)

According to the interviewees' answers, surgeries were highlighted in the preadapted colour as explained in table 5.3 and been represented in table 5.4. Table 5.4 shows the distribution of the surgeries in the TAO categories.

Table 5.4 Surgeries distribution according to TAO categories

Use of triage system	Use of virtual appointments	Intention for future	Surgery	Innovators (I)	Followers (F)	Laggards (L)
Green	Green	Blue	1S	X		
Orange	Orange	Grey	2S			X
Orange	Orange	Grey	3S			X
Orange	Orange	Grey	4S			X
Orange	Orange	Grey	5S			X
Orange	Orange	Grey	6S			X
Green	Green	Blue	7S	X		
Yellow	Yellow	Blue	8S		X	
Yellow	Yellow	Blue	1M		X	
Orange	Orange	Grey	2M			X
Yellow	Yellow	Blue	3M		X	
Orange	Orange	Grey	4M			X
Orange	Orange	Grey	5M			X
Yellow	Yellow	Blue	6M		X	
Green	Green	Blue	7M	X		
Green	Green	Blue	8M	X		
Orange	Orange	Grey	1L			X
Green	Green	Blue	2L	X		
Yellow	Yellow	Blue	3L		X	
Yellow	Yellow	Blue	4L		X	
Yellow	Yellow	Blue	5L		X	

The reader should note that the write up of each embedded case study differs in length and details and this is a natural reflection of the different approaches to using technology taken by the surgeries and the different stages in their TAO journey where a more innovators

approach should naturally present the researcher with more experiences and information to draw upon.

5.3 Results of Small

As presented in table 5.1, this embedded case study includes surgeries with list size less than 6000 patients (the smallest list size is 3000 patients). In these surgeries, there are between 3 and 20 staff members, including both clinical and non-clinical personnel. Eight surgeries fit within the criteria of this embedded case study, see appendix G.

5.3.1 The characteristics of service offering in relation to TAO

The focus of this section is on state 1 and state 2 of service offerings that surgeries offered to patients before and during Covid-19. Service offering (State 1) represents the period pre Covid-19 where mainly most of the services were delivered by face to face with minimal use of technology. In March 2020, the UK government applied restrictions on the nation where physical contact was prohibited. During the first wave of Covid-19, all GP surgeries in England suspended their face-to-face services. While service offering (state2) represents the period during Covid-19 where a shift towards blended offerings was adopted. The study investigated the enhanced-TAO at GPs surgeries by exploring the use of triage system via phone or online and the surgery's appointment booking system via phone or online as well. Furthermore, the offered appointments modes, either by the traditional way which is face-to-face or virtually over the phone or video calls. The conference calls are operated by software helps everyone involved in a patient's care to communicate. This software was adopted on national level in England called (Accurx). Through Accurx platform clinicians can send SMS messages, patient surveys and referrals. The software provides reminders of appointment and holds video consultation. Table 5.5 provides a chain of evidence of from transcripts to data analysis (The data analysis of service offering in small surgeries according to the transcripts). Table 5.5 presents the Characteristics of service offering in relation to TAO before and during covid-19.

Table 5.5 Characteristics of service offering in relation to TAO

Characteristics of service offering			Small							
			1S	2S	3S	4S	5S	6S	7S	8S
Pre covid-19 Service offering state 1	Triage	Online	✓		-	-	-	-	✓	
		Phone	-		-	-	-	-	-	
	Booking system	Online	✓		-	-	-	-	-	
		Phone	-	✓	✓	✓	✓	✓	✓	
	Physical face-to-face	Fully – 100%	-	✓	✓	✓	✓	✓	-	✓
		Not fully	✓	-	-	-	-	-	✓	-
	Virtual	phone call	✓	-	-	-	-	-	✓	-
		video call	✓	-	-	-	-	-	✓	-
During covid-19 Service offering state 2	Triage	Online	✓	-	-	-	-	-	✓	✓
		Phone	-			-			-	
	Booking system	Online	✓	✓	✓	✓	✓	✓	✓	✓
		Phone	-	✓	✓	✓	✓	✓	✓	✓
	Physical face-to-face	First wave	-	-	-	-	-	-	-	-
		After 4 months	✓	✓	-	✓	✓	✓	✓	✓
	Virtual	phone call	✓	✓	✓	✓	✓	✓	✓	✓

Then, table 5.6 summaries service offering by small surgeries in relation to TAO before and during Covid-19. The same process of developing the analysis is followed in medium and large surgeries in the coming sections.

Table 5. 6: Characteristics of GP surgeries service offering pre and during Covid-19 – Small

Service Offering			Small Surgeries			
			All	I	F	L
State 1 Pre Covid-19	Triage	Online		✓		
		Phone				
	Booking system	Online		✓		
		Phone	✓			
	Physical Appointments face-to-face	Fully – 100%			✓	✓
		Not fully		✓		
	Virtual Appointments	phone call		✓		
video call			✓			
State 2 During Covid-19	Triage	Online		✓	✓	
		Phone	✓			
	Booking system	Online	✓			
		Phone	✓			
	Physical Appointments face-to-face	Fully – 100%				
		Not fully	✓			
	Virtual Appointments	phone call	✓			
video call		✓				

As illustrated in table 5.6, service offering (state 1) pre Covid-19 in regard of triage system over the phone seems to be not popular between all types of surgeries. Some surgeries followed certain criteria to prioritise some age group (under 5 and over 70s) and urgent needs of the on the day appointments.

“You know it was only really basic NOT triage, it was only for on the day appointments” (PM-05-05)

“No triage: We haven't got a set of questions. However, the doctor gives us a criteria. You put the children in, you put the elderly in” (PM-15-13)

“We didn't have any triaging system before COVID. It was just anybody who wanted an appointment, ring us and got an appointment.” (PM-12-10)

Only Innovators offered online triage to their patients.

“Patient can send short video about their conditions via our secure e-mail and the clinician act accordingly. But since Covid we have this facility for video consultation” (PM-16-17)

All the surgeries share the same key feature which is booking appointments was always over the phone pre Covid-19.

“We do.... booking appointments was just routine appointment where you can call and book normally the earliest available appointment will be on three days for days, one week max....

when you call to book appointment, normally the receptions will not ask for the reason.”

(PM-11-09)

Innovators offered online appointment booking alongside the phone appointment booking.

“Online booking stopped a lot of telephone calls coming to the practice. We've also always used e-mail. You want to know anything you're not sure, just e-mail us. So, we generated a culture that the telephone isn't always ringing.” (PM-02-23)

Followers and laggards were operating fully face to face appointments before Covid-19. No virtual mode was on offer to patients.

“Before COVID we were 100% face to face. We never ever used telephone consultation or video consultation” (PM-11-09)

“You're looking at 100% face to face. Initially what happened was that the GP practices were doing face to face appointments. Then there was a push to having online access, which means that you either do telephone or video. That was taken negatively by patients. It wasn't very popular ...They prefer to talk to a human rather than a machine” (PM-19-08)

However, Innovators differ from the rest of the sample as they were offering a proportion of virtual appointments alongside the traditional mode which is face to face.

“Before COVID.... A choice of whether you wanted to telephone a face to face, and they were all bookable online” (PM-02-23)

“It was 90% face to face appointment and only 10% between telephone and video consultation” (PM-16-17)

Service offering (state 2) as demonstrated in table 5.2, the Followers have a huge transformation by adopting triaging system online and over the phone.

“There was a triage system, but the patients did not look well to it. when COVID hit us all of a sudden everybody accepted that, and everybody became digitalized in triage and booking appointments” (PM-19-08)

Some laggards made a small improvement step by adopting phone triage which they never used pre Covid -19.

“After COVID, do not need or at best probably 80% of appointments do not need face to face. We can do a lot of it over the telephone or via pictures or video consult ... now you are planning for categories who should come face to face and sort it out like triage over the phone” (PM-12-10)

Others stayed reluctant and stated that they will not adopt triage system at the foreseen future.

“Triage is probably not within our scope” (PM- 15-13)

Whereas innovators kept doing triage, but they enhanced the service during Covid -19.

“It was our decision, and we move forward always and keep doing triage” (PM-02-23)

During Covid-19 all surgeries made similar development in regard of their appointments booking system. It is the first time that followers and laggards offer an online booking system, which was not available prior to Covid-19. This is in addition to the ability to book appointments over the phone.

“We made sure that it was fully digital. And because we're NHS, we call the Red centric people, the app and the accuracy came.... we start offering online booking” (PM-19-08)

“One thing that came out of COVID that it might have been there before, or it might have been introduced since that is called Accurx.... to be able to do that online booking” (PM-15-13)

It should be noted, however, that one of the innovators is discontinuing this service and requiring its patients to book appointments only online.

“I want to stop a lot of telephone calls coming to the practice. We've also always used e-mail. You want to know anything you're not sure, just e-mail us or check online. So, we generated a culture that the telephone isn't always ringing.” (PM-02-23)

During Covid-19 all surgeries stopped offering fully face to face appointment mode. In other words, all surgeries introduced virtual mode to their service offering including telephone and video consultations.

“After COVID, we've shifted through about 70% of the appointments do not need or at best probably 80% of appointments do not need face to face. We can do a lot of it over the telephone or via pictures or video consult” (PM-12-10)

“But we change from face to face to virtual either telephone consultation or video consultation” (PM-16-17)

“During COVID, the doctors did phone calls. A lot of people respected the rules about keeping at home and they didn't come out... We were able to do video calls” (PM-15-13)

The likelihood of changes in the blended service offering (state 2) are persisting in the future was asked to all surgeries. Table 5.7 presents the finding of post Covid-19 services offerings. All surgeries introduce the element of flexibility where they give their patients a choice of modes when they request an appointment.

Table 5. 7 The likelihood of appointments modes offered in future – Small

The current offered appointment modes	Small Surgeries		
	I	F	L
Offer a majority of Physical mode face to face			✓
Give Patients the choice Clinics will be split by modes	✓	✓	✓
Offer a majority of virtual mode phone or video calls	✓	✓	

Some surgeries are neutral, they will keep operating upon their patients requests neither push towards more virtual nor back to more physical.

“We will continue on with it like half/half, some of the patients are so used to it that they request for telephone - video consultations only. Even now, at the moment clinics are split, so we offered the choice in the morning: “Would you like a face to face? Would you like the telephone or video consultation?” And the patient has a choice to make” (PM-09-26)

“Now 60% face to face and 40% between telephone and video consultation. So, we listen to the patient. They have the chance.... if they need to see the doctor face to face or can be sorted through telephone. So, the patient requested. We have emergency slots as well for observation. Doesn't know which ones fits them. We assign a correct slot for them either telephone or video or face to face. Because you have some population have certain problem

and they don't know whether this should be face to face or telephone. We help them and we assign the correct slot for them” (PM-16-17)

“Now that we come back from COVID, I would say it's 50-40% face to face. The reason being is that a lot of patients prefer online and video, especially the working class. So, then what also happens is that they became part of that and then we had V Consult app and then you can book online. Then we had a PCN from virtual pharmacy that you can call. There all those kinds of things were taken positively. After COVID and the service is started to get utilized.... That's what we're doing 50-60% video and telephone and photographs are only working in the sense that you do the triage, you have the conversation. Is there a need for you to be seen? Yes. Then come in and we have those face-to-face appointments as well.” (PM-19-08)

Laggards offer their patients a choice of either physical or virtual mode at the time of booking although the default offered mode is the physical one.

“Some of the changes have come as a real good positive and you know that's the way to go forward. We need the technology, we need to be like that to be more productive, to be more cost effective, to be really a better service, to provide a better service but also it reinforced certain basic principles of GP, you know, of general practice, which were we really do need to see the patients as well. We changed the way we did things and now we want to go back, however, we're going to open up more online consultations will be really good.” (PM-05-05)

“Now we are back to normal. Majority of our appointments I would say over 75% if not more are face to face, for example today 7 telephone appointments only out of 70 something appointment available. So, it's only a small percentage of phone calls.... We're back to normal unless the patients really need a phone call for this or that” (PM-11-09)

“Now, this surgery adopted, if the patient wants to be seen face to face, they can. And that was months ago. And we've been seeing them since face to face, if that's what they want for a long time” (PM-15-13)

Innovators keep pushing toward more utilisation of technology in running patients appointments.

“The future is going to be more digital. We already do. Soon as we came out of lockdown, we offered patients the choice if they want to be seen face to face, they can. And for the future, I will keep offering these video and telephone calls as first choice” (PM-02-23)

5.3.2 Practice resources in relation to TAO

This section will focus on the surgery resources that is required to provide service offering (state 2) during Covid-19. It will discuss the physical, human and organisational resources needed for implementing the enhanced technology within the surgery. The findings of these resources are presented in table 5.8.

Regarding the physical capital resources, surgeries from all types required additional laptops for their staff to operate remotely. Even the innovators ones as the proportion of the virtual service offering have sharply increased.

“We needed the laptops because if they ever closed, closed the building, then we have the tools you know to continue” (PM-05-05)

“We have got them now. It took quite a while because I have to put certain procedures in place.... We needed more and then staff started getting sick. So, we didn't have enough supply of laptops. You have to give the doctors if they were isolate but well enough to actually do the telephone consultation. So, it's very difficult, very challenging.” (PM-09-26)

“They did provide us with laptops as soon as mainly we requested them within two days. We have laptops because the doctors were working from home and because they have to put the smart card on. So, we need something that can be compatible with the requirements” (PM-11-09)

Furthermore, all surgeries needed a special software to run their video calls and communicate remotely with patients.

“During Covid-19 we went completely Accurx. It was a fantastic piece of software that I think all practices have it.... If the doctor wanted to have a video consultation with them just a link sends it through” (PM-12-10)

“One thing that came out of COVID that it might have been there before, or it might have been introduced since that is called Accurx. We use that tool; it has been absolutely brilliant.

They are able to send text messages, they can do video calls, they can take pictures, incorporate them into their records.... to be able to do that online stuff.” (PM-15-13)

“We implemented new system. We have software, which is from NHS England, Accurx, which can submit some photos or do telephone consultations or video consultations through this software. So, this wasn't available before COVID this happened during COVID.” (PM-16-17)

Only followers needed an update to their telephone system where they could link staff mobiles to the system and work from home.

“We had Red-centric telephone system is very good. We were able to put an app on a mobile phone. So, we were able to take the calls at home and it was still get recorded into our systems into our telephone system. So, it was like ringing the surgery. The phone call would come on to our app and we had our own login and password. That was brilliant. That allowed us to work.” (PM-19-08)

Regarding human capital resources, innovators needed no additional human resources due to the maturity and familiarity they had in delivering alternative appointments before Covid-19.

“Really nothing much changed apart from the fact that we just stopped the face to face during the first phase of COVID... When you've only got one GP, it is so easy to just pop down. I'll just check with the Doctor. We know most of the patients. Yes, we have a lot of students, but we still got to know our patients and we know all the older ones and the secretary, I mean she'd been there 20 years and me 23 so. And it was very easy to manage one GP. I see how it is more difficult in a larger setting and you lose a little bit of that continuity of care, there are going to be challenges.” (PM-02-23)

In order to implement the new software laggards and followers needed some technical assistants.

“We were struggling with IT and trying to get them “can you please urgently contact us?” Many staff need to work remotely, etc. later, we have to train one of our staff members to learn most of the IT stuff that he would be able to do that at home rather than waiting for IT when needed.” (PM-09-26)

“We've always had a Midlands and Lancaster It assistance, with new software we needed support at the beginning” (PM-05-05)

During COVID-19, laggards expressed a need for both non-clinical and clinical staff to provide blended service offering (state 2) to patients.

“We needed extra staff in reception area to deal with patients calls” (PM-09-26)

“During COVID can't find doctors (clinicians) and we're really struggling for good receptionist cover for our staff haven't left.” (PM-05-05)

The organisational capital resources focus on the surgery structure, the innovators surgeries mention no need to apply any changes regarding their staff working shifts or utilizing the surgery rooms in a different way as pre Covid-19 as they have a previous experience even though on a small scale. However, followers and laggards mentioned restructuring their surgeries.

“No need for extra staff or rooms, we found a way because what we did is like at the beginning of the pandemic, I came up with an idea of having bubble. Did you hear about the school bubble? We've done it before, which means I didn't have two doctors working on the practice at the same time. One doctor will be working from home. The other doctor will be here face to face. If the doctor from home thinks the patient needs to be seen, he will book him in, where the other doctor will see him. That's mainly because if one of the doctors falling ill, the other one is saved, and they can come and run the practice. I've done this not only for the doctors. I've done it also for reception staff. So, two staff are working together for two days and then I will not see any of them for 10 days. Then the other two were like so for. I know if one of them have COVID, the other one has to isolate with her. So, I will not lose the whole of the stuff at the same time which work perfectly.” (PM-11-09)

“We changed the shift pattern. We needed less people compared to what we had before. But what we did was in order to ensure that they were safe, and they don't get COVID, and we have less staff. We separated the staff. Some were at home and others would come and then

we would have like 2 at the front or one at the front and one working in another room. We made the changes that we needed to make within the parties. We had an amber room, an isolation room where the patients can be seen face to face should they need to and the PPE. So we have to ensure that if there's one person in the building, there's others working, if they had COVID, they'd be at home doing all that kind of clinical work. If there were fit enough to. We were just like fully functioning. Some working from home, some working from the practice. It was good because it was different way than we were.” (PM-19-08)

Table 5. 8: Required resources for surgeries to provide service offerings (state 2) – Small

Practices resources (BVR)		All	Small Surgeries		
			I	F	L
Physical capital resources	Additional Laptops	✓			
	Update Telephone system			✓	
	Accurx Video and texts system	✓			
Human capital resources	External technical support			✓	✓
	Non- Clinicians				✓
	Clinicians				✓
Organisational capital resources	Restructure the surgery			✓	✓
	Keep the structure		✓		

5.3.3 Operational capabilities to deliver the service offering

In this section the required operational capabilities to provide service offering (state 2) in GPs surgeries are discussed. Three operational capabilities are covered in this study, customer, managerial and technical capabilities see (Appendix I) for coding the capabilities.

To begin with the common operational capabilities between the three types of surgeries. In terms of customer capability, the area of customer involvement (CI1) is common between all surgeries types where surgeries demonstrated direct involvement with patients by running in house survey in addition to tracking GP patient survey on NHS England website.

“Every month I receive a patient survey which automatically runs via the app. My GP app, which sends a patient a questionnaire after consultation. Are you happy with the service?

Are you happy with the way you booked the appointment? And then.... I share all the patient's feedback, positives and negatives. And we have a discussion. Now the demand to see what the patients want at the end of the day; I tell them we are providing a service. These are our customers, even if they are not actually physically giving you money. If we

don't look after them at some point, we're going to lose them and then we'll be out of business.” (PM-11-09)

“It takes a while to behaviour to change, and change is not easy for anybody, whether it's practice staff or whether it's patients.... On how good the services or the technology...., there's in house surveys, there's the NHS England survey that is done, more survey, Google reviews and the nhs.net. We've got loads of stuff to focus on and involve the patient.” (PM-19-08)

In terms of the common managerial capability, three capabilities are discussed, the ability of monitoring, involvement, and coordinating.

Firstly, the monitoring capability is common among the three types of surgeries which is the ability to monitor and report progress. Managers showed ability to monitor how patients book their appointments over the phone and through the online booking system (M1 and M2). By analysing these data, managers can better understand how services are performing and how to improve them.

“It is important to monitor data. How many phone calls are coming in, how many appointments have been booked using online services. Any difficulties patients are having.” (PM-02-23)

“We offer booking online; I do monitor this so I can see that it's increasing. So compared to last year, I think I've done the search recently to compare to last year on the year before. 700 patients booked throughout all the year 700 have booked through one month now recently. So that's a big jump.” (PM-11-09)

“If you look here experience of making an appointment is 61%, national is 56. ICS is 47. We are at 61, so that's pretty good. It's through this data that we look at how we're going to improve the service and what is it that they want to do. We put this together, we make a plan, we take it to the clinical and non-clinical meetings then we take it to the PPG, and then the finalized plan is produced and then it's put up on our website to share with everybody” (PM-19-08)

Managers also monitor their patients' online registration to understand their acceptance or struggle in using technology to access service offering (M3).

“The other thing is when we saw the number of patients who were registering for the online services, especially for the prescription services, how high that went in a few first few months of COVID hitting. However, we had trialled some appointment booking service at that point, but it wasn't used as much as it ought to have been used.” (PM-12-10)

“And I do run a search once a month and see that the number of patients registered online because it's a registration that we have to authorize the number of patients registered online have increased the number of patients.” (PM-11-09)

“When we did a survey on how many people contact us through this website to find it one to two per day, that means they struggle using IT technology to help them to access our services.” (PM-16-17)

The ability to be actively involved in TAO activities at the working level is the involvement capability. Patient education is a key factor in facilitating blended service offering during Covid-19 (I1). Managers mentioned that the ability to educate and set patients perception about GPs service is an essential task in order to operate successfully during Covid-19 restrictions.

“I do believe in patient education. I'm a firm believer because when I first started my practice management....is to empower patients. One they take charge of their health. Two they understand what they need to do and there's no worries and that reduces admissions. But with things like digital mandate that the NHS digital app has really helped. We downloaded that onto the patients' mobiles, refer the patient, they start doing all that kind of stuff there. If you don't want to go out this is at the comfort of your own home and you're making small life changes and that prevents you from coming into the surgery regularly.” (PM-19-08)

“...and I think that's where people need to be educated that your GP is not making money off you. Every time you visit, it's not something they're gaining. Whether you come 100 times or 10 times, or one time or none. It's the same flat rate.” (PM-05-05)

The second common involvement capability is team working ability (I4). All surgeries types discussed the importance the ability of managers to be available on request and to provide a quick response to the team. Since the surgeries are small and had fewer staff members

than other surgeries in the other two embedded case studies, informal meetings and instant communication were possible.

“We have a WhatsApp group, all the clinicians. We have a separate receptionist group. you can't cover shifts, put it under group and I will sort it instantly.” (PM-05-05)

“We do share learning. We've also got a WhatsApp group.... To share what you do here, what you do that.” (PM-12-10)

*“I do speak to the staff all the time, we do have like 5 minutes brief every morning and in the evening how was it today, who's happy, who's not and then we'll take it from there and they always change our appointment system all the time continuously just to update with them.”
(PM-11-09)*

“We are a small surgery. That means we're small in size and the building. You're hearing the big earth surgeries that they don't get to talk to their colleagues. We might not be very good at having monthly meetings, but that's because we share all the time. So, if something goes wrong, I'll say this went wrong. Can you all make sure that we don't do this again? Or that was really good? What happened?” (PM-15-13)

Managing operations is the ability of managers to administer tasks and functions effectively. It is another common managerial capability among all this category' surgeries. Some managers clarify this as the ability to balance between doctor-led approach and doctor-delivered (know-how of service providers) (MO1).

“There is actually Doctor delivered and Doctor LED. So, we were doctor LED service, but the doctors don't deliver everything here. It's just not plausible to do that. And actually, the balance between those two things is really key because if people and this mentioned the media coverage, I want to see a GP actually, why you don't ask to see the right person to manage the query or the concern that you have rather than a specific person who might not be the right person. The doctor might not be the right person. They're not always the right people to take care of the concern that you have. And that's really key, isn't it?” (PM-19-08)

“We've got a skill mix as well, it's not just GPs. We've got clinical pharmacists, first contact practitioners. We've got PA's (physician associates). We have a triaging system in the morning. So basically, patients when they're calling in will be put with the appropriate condition to be able to deal with things. And sometimes patients don't like that. We just want to speak to the doctor. We just want to do this. It's really difficult” (PM-12-10)

To manage operation effectively, managers demonstrate the importance of understanding the patient population, the demographics. In other words, it is know-how of patients (MO2). All surgeries emphasized on this capability practically when providing blended services to patients.

“We have a lot of students from Scotland and Wales and they're not on the same system, now going to waste so much time and effort having to print records that I could have just picked the folder up with the medical records and emailed it instead of printing out” (PM-02-23)

“We had a problem because we are in a city area. It had to be downloaded on the mobiles. what we did was we had an iPad for medical students... So, through that iPad what we did was we showed the patients videos on how you download it. If they gave us permissions. One of the receptionists would go out and then download it onto their phone and sort everything out for them. Give it to them and say that this is how you book, but it will be in the language that they can speak and understand. And we also had literature as well in that in our waiting area, we also had a new screen where videos are played. So that's educational in English. While they're sitting in the waiting area, they're getting all the information that they need.” (PM-19-08)

“You have to realize the patient population, the demographics, and the area where sometimes they're not highly educated. I believe in patient education. The thing is, sometimes you go to a doctor and if they don't leave without a prescription, they got upset. And there's a complaint. They want to be seen in this area.” (PM-05-05)

“Each practice has their own population and kind of patients. I would say like another practice within our PCN, they deal with homeless, track addicts, Alcoholics. So, whatever I can implement in our practice is difficult to do in other practices.” (PM-11-09)

All surgeries are aware of regulatory compliance and safety aspects by NHS (MO3). The main risk associated with the implementation of Accurx software is the privacy of patient data, as this service requires remote access to some sensitive data (e.g., age, personal address, health issues, family history....). Hence, the process has to be established in order to ensure the patients privacy concern has been addressed.

"I think the best one is in an NHS App at the moment I think because the government is supporting it strongly and secure." (PM-11-09)

Some surgeries managers believe that having the same system at national level will reduce any risk while sending patients recode over to another system.

"... NHS sort of give you in one hand and say you need to be advising patients this is how they do that and then they create more workload and that data protection and record sharing. I think stream more streamlining of services across England... Now we should all be on exactly the same. It works better if everybody's on the same system and using the same technology platforms. I just saying that can cause more issues, so that would be may I, I'd take away the choice and say you having it and this one works the best and offers the best solutions for patients at the end of the day, that's the most important thing is the patient. And are they being served well." (PM-02-23)

In terms of last sub-category of the technical capability, which is the managers ability to evaluate the suitability of new technologies to processes. There is unanimous agreement among all managers on this capability. They shared the same key point which is the ease of use of the enhanced technology such as triaging forms, surgery website or App (T2).

"I think they loved it. Everybody knows how to use it. When everybody got onto it in terms of the telephone, it was easier for them to deal with people over the telephone rather than face to face in person." (PM-12-10)

"This Accurx was really good, really useful. It's given us a new way of working as well or an additional way of working. If somebody wants a sick note, they don't have to come in for it. We can send it on and it's just so easy. We don't have to go into another tool to send it. It's just all in this one tool. So that has been really brilliant and so probably cut down a little bit of work." (PM-15-13)

“So easy to use. It's not that difficult and we use telephone consultation before, so not massively change in terms of telephone consultation. It's only video consultation being updated to better software.” (PM-16-17)

Following the presentation of the common operational capabilities of the three types of surgeries, a number of similarities were noted between the Followers and the Innovators. The first capability relates to customer capability, the customer involvement (CI2). Both innovators and followers displayed the ability to create the environment for the customer to have direct interaction and engagement by running a constant patient participation group (PPG). In this kind of meeting managers offer close contact with patients and explore their most recent needs and alter the surgery services accordingly.

“We look at how we're going to improve the service and what is it that patients want to do. So, we put this together, we make a plan, we take it to the clinical and non-clinical meetings then we take it to the PPG, and then the finalized plan is produced and then it's put up on our website to share with everybody.” (PM-19-08)

“From my personal perspective, I can see how the battle goes for practices that were very set in their ways, where the very set patient list and a higher rate of elderly patients. However, I know people in their 80s can book appointments online or did their prescriptions. So, you know there are variants there, I knew that from our PPG meeting” (PM-02-23)

Secondly, in the involvement capability, followers and innovators share two sub-categories. Involvement (I2), the ability to identify the limitation of technology and operate accordingly. they expressed the opinion that some clinicians were reluctant or unsatisfied with the virtual appointment modes in diagnosing illnesses.

“They found it very daunting, and they were afraid because you have a telephone and video consultation. Have you diagnosed this patient correctly? Because some of the images you can't see so clearly, you can't see as if you physically see a rash. It was really challenging.... We were reporting on the actual worried about the correct diagnosis on the video teleconference.” (PM-16-17)

And involvement (I3), the ability to manage change, the surgeries recognised change resistance. Either because of the language, culture or age barrier.

“We have emergency slots as well for observation. Doesn't know which ones fits them. We assign a correct slot for them either telephone or video or face to face. Because you have some valuation which elderly population can't, they have certain problem, and they don't know whether this should be face to face or telephone. We help them and we assign the correct slot for them.” (PM-16-17)

“It takes a while to behaviour to change, and change is not easy for anybody, whether it's practice staff or whether it's a patient. Adopting technology is difficult, to be honest. I think Covid has been fantastic in the sense that I'm so glad we didn't have a choice. I think if we had a choice, we would be nowhere confident with the technology, as confident as we are now.... The thing is, sometimes you go to a doctor and if they don't leave without a prescription...They got upset. And there's a complaint. They want to be seen in this area. The language barrier is an additional one” (PM-19-08)

“With elder population, which can't use the IT. It was really challenging for us to operate video or phone call” (PM-16-17)

The last subcategory is the technical capability (T3). Managers indicated the reliability as a measurement of the ability to evaluate the suitability of new technologies to processes.

“It's easy to relay and use.... With the texting before, if I send a text to someone now, I can tell Accurx to include whatever I've sent into the consultation into their notes. So, I'm not often do additional work. it's all good.” (PM-02-23)

“I evaluate Accurx, on the basis how many clicks you have to do and how easy it is to use and if you need a long training. It is reliable and accurate, it's self-explanatory and there's less clicks in it.” (PM-19-08)

It is only innovators who possess the last two capabilities, the first one being customer response (CR1), which refers to an organization's ability to respond effectively and quickly to customer needs. This is demonstrated by innovators' ability to respond to patient feedback

“It would be patient feedback. Feedback is just as important and also monitoring physical things.... Any difficulties patients are having we can reflect on and improve” (PM-02-23)

The second one is technical capability (T1), where managers have the ability to evaluate the suitability of new technologies to processes by responding to patients complaints.

Innovators measure the suitability by the number of complaints they would receive for their patients.

“And everyone's got used to that now. We don't hear any complaints about like at all.” (PM-16-17)

See appendixes on how the data analysis progressed (I, I*, I**, J, J* and J**). The table 5.9 below show the final analysis results.

Table 5. 9: Operational Capabilities – Small

Code	Operational capabilities	Theory	Practice	All	I&F	I
CI1	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engagement in delivery process	Provide patient survey	x		
M1	Monitoring	The ability to monitor the progress of TAO effectively	Monitor the number of Phone calls	x		
M2	Monitoring	The ability to monitor the progress of TAO effectively	Monitor the number of booked appointments using online services	x		
M3	Monitoring	The ability to monitor the progress of TAO effectively	Monitor the number of patients registration for the online services	x		
I1	Involvement	The ability to be actively involved in TAO activities at the working level	Provide Patient education (Perception of service)	x		
I4	Involvement	The ability to be actively involved in TAO activities at the working level	Team working ability	x		
MO1	Managing operations	The ability to administer tasks and functions effectively	Ability to balance between doctor-led approach and doctor-delivered (know-how of service providers)	x		
MO2	Managing operations	The ability to administer tasks and functions effectively.	Understand the patient population, the demographics (know-how of patients)	x		
MO3	Managing operations	The ability to administer tasks and functions effectively.	Follow NHS regulatory compliance and safety	x		
T2	Technical capability	The ability to evaluate the suitability of new technologies to processes	Test the ease of technology use	x		
CI2	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engagement in delivery process	Run constant meetings with patient participation group (PPG)		x	
I2	Involvement	The ability to be actively involved in TAO activities at the working level	Ability to identify the limitation of technology		x	
I3	Involvement	The ability to be actively involved in TAO activities at the working level	Ability to manage change		x	
T3	Technical capability	The ability to evaluate the suitability of new technologies to processes.	Test the reliability of this technology		x	
CR1	Customer response	It is the competence of an organization in serving customer needs through effective and quick actions.	Respond to patient feedback by action			x
T1	Technical capability	The ability to evaluate the suitability of new technologies to processes.	Respond to patients complaints when they use this technology			x

5.3.4 Dynamic capabilities required to transition between different service offerings

The purpose of this section is to describe the specific capabilities required to successfully transit to service offering (state 2). Various capabilities were categorized according to different dimensions or stages of dynamic capabilities (sensing, seizing and transforming capabilities). Table 5.10 presents the findings and analysis of dynamic capabilities in small (see Appendix J) for coding dynamic capabilities.

The analysis begins with the common dynamic capabilities between the three types of surgeries. In sensing capabilities, the technology sensing capability (SN2) is in common where managers had the opportunity to explore the possibilities offered by their local PCNs or CCG as part of NHS England support prior to the arrival of Covid-19. However, Followers and laggards never adopted such technologies before Covid.

“We didn't really use Accurx at all. Everything was face to face. Appointment led, clinical led like face to face. I did think we are quite behind. Because our PCN director likes technology and I come from a different background. I haven't always been in primary care. So, we got the software instantly” (PM-05-05)

“Around five years ago, I received a phone call from NHS Digital. And they told me someone wants to speak to you about how low intake your patients with technology, about booking appointments online and having video consultation. I don't care if we are low. I don't care for percentage is 5% because of our patients are not registered online. They will not do it. I don't care. Not interested. She said it's affecting your figures. I said that's fine. I know our population. Nothing I can do about that. I'm not going to change it. Now, I would say now 75% of our appointments are booked online.” (PM-11-09)

“Video consultation was a discussion at the time. Whether it would work or not. We were a bit hesitant about it and what we've had several meetings about video consultations with patients and often that service and things like this is all pretty cold with. And will we have enough? You played any of that? But nothing implemented before Covid.” (PM-09-26)

In term of seizing capabilities all surgeries showed ability to provide additional customised service support, it is called mass service customisation capability (SZ2). SZ2 requires running collecting data (e.g., patients surveys) in order to tailor the offerings to suit the large variety of patients' needs. The main focus of the surgeries is to increase patients online registration so they will be able to access their services.

"Because we have some valuation which elderly population can't, they have certain problem, and they don't know whether this should be face to face or telephone. We help them and we assign the correct slot for them." (PM-16-17)

"We do regular meeting to continue on from twice weekly to every week where every situation is discussed including the use of new technology and how things are working and to deal with each patient's concern. I do it myself. Then messages come to me, I ring them personally and discuss with them, try and help them sort it out" (PM-09-26)

Another common seizing capability is the digitalisation capability (SZ3), which is related to utilising the connected service (different modes of appointments availability) and the enabler technology to facilitate service delivery. Previously, the majority of the surgeries managed their appointments booking over the phone by offering mainly face to face appointments without triage process. However, during Covid they have been doing this by online booking in addition to the phone booking and with Accurx software they can communicate quicker with patients and meet their needs by triaging. Accordingly, surgeries have to have the ability of using data analytics to extract useful information from the patients requests and spotting the trends to meet their demand.

"It is more on the day appointments after COVID comparing to before COVID. [sharing screen with the author] ... this there's some follow-ups, there's some that are on the day appointments, but on the day, appointments are good. Everybody can be seen if we get telephones calls which are dropped. What we tend to do is the staff ring them up to see how they can help. If we don't have an appointment, but we'll say that it wouldn't chewing back, but from my data systems we can see how many if patients have repeatedly called or will be calling those patients. You see a pattern? There is a data analysis of it" (PM-19-08)

"I do run a search once a month and see that the number of patients registered online because it's a registration that we have to authorize the number of patients registered online

have increased the number of patients. We are booking online; I do monitor this because recently, we started offering messaging service, which means that the patient can send us a message either admin request or clinical request to see that they have issues and they want an advice and then we assign the messages that arrive to me and then I assign them to one of the doctor if it's clinical or if it's admin I will refer it to the admin team and they will deal with it.” (PM-11-09)

There are two common transforming capabilities in this category. Firstly, the services processes for developing efficiency gains capability (TM2), it is related to the ability to provide electronic prescriptions. One of the advantages surgeries have gained from Covid-19 is the shift toward electronic prescriptions, which has reduced the number of appointments requested and the number of calls coming into the surgery to locate prescriptions. Additionally, this service stopped the printing of prescriptions and cut of patients journeys to the surgery. Mangers believe that will have a positive impact on the environment.

“I think 100% of our prescriptions are electronic. We don't print any prescriptions. We haven't, I can't remember the last time we printed a prescription. That less wastepaper you you're not using the power you want to generate that prescription, and it's just streamlines the service and fast. You just go to your pharmacy, pick it up because they already got it.”

(PM-02-23)

“Before COVID prescriptions were always printing those and we were handing them out. We hardly ever do that at all because everything goes electronic, and everybody has got used to that. And everybody likes it. They don't have to come here for a prescription. They go straight to the chemist. And that is been a really good tool. And I think it's cooked down on fraud as well for calling and use the phone in inefficient way.” (PM-15-13)

“We have many patients access to the electronic record, also many patients don't know how to do it so my admin team always helps the patients access their record, show how to request prescriptions and choose the right service.” (PM-16-17)

The second common transforming capability is the service culture capability (TM3). As a result of Covid-19 restrictions and the available technology via NHS, surgeries focus on meeting patients demand while responding to emerging technological trends, hence, they

need to have an agile culture in order to continuously improve their offering and keep up with the dynamic market needs and technological trends.

“We've advertised a lot via notices, websites etc to our new patients that registered in the online application form is there and then reception check it when they get that and then they actually checked the last page and make sure that, if they don't understand it, then they'll explain it to them and sometimes patients they want to copy more blood results and they haven't copy App. Just that constant education, that's how we've dealt with it, really constant improvement.” (PM-09-26)

“If you don't want to go out, this is at the comfort of your own home and you're making small life changes and that prevents you from coming into the surgery regularly. It takes a while to behaviour to change, and change is not easy for anybody, whether it's practice staff or whether it's patients.” (PM-19-08)

“that's another good thing which I'd forgotten about. So obviously, some could work from home like the doctor could do his telephone calls and they provided us with two laptops at the surgery and they were able to work from home. And that is a benefit now as well because if you get one of the doctor's ringing in sick, we can suddenly say to the other doctor: can you cover from home now and do telephone calls, no list of appointments will be cancelled.” (PM-15-13)

“We do share experience and cases when we meet. We had a cancer review meeting last week and then we start looking into what methods have you implement to make sure that the patients have been seen and then we start sharing ideas.” (PM-11-09)

“Now we've a lot of complaints from patients to say why aren't we going back to face to face as we did? We should be going back. The government, obviously, publicity that the government might issue, media doesn't help when they're saying GP should be going back to face to face. That doesn't help us at all, and it's really difficult to try and explain to a patient that actually you don't need to face to face for this or you don't need to face it. But on the other hand, we've got a mixture of patients, some who are very happy to do everything over the telephone, and others are absolutely I need to come in. I don't think I'm being dealt with properly if I don't have a face to face”. (PM-12-10)

Laggards and followers shared two seizing capabilities. Firstly, the digital service development capability (SZ1), where manager had to create services to align with the Covid restrictions and technology. Surgeries had to own and develop this capability by meeting patients' needs and provide blended service offering (state 2) during Covid-19.

“When COVID hit us all of a sudden everybody accepted that and everybody became digitalized, and everybody taught each other how this all works.” (PM-19-08)

“When first COVID hit. It went to from 99% face to face to 99% the other way. Some of the changes have come as a real good positive and you know that's the way to go forward. We need the technology to be more productive, to be more cost effective, to be really a better service, to provide a better service but also it reinforced certain basic principles of GP, you know, of general practice, which were we really do need to see the patients as well. We changed the way we did things.” (PM-05-05)

It was necessary for all of the surgeries to upgrade to the new software during the pandemic (see section 5.3.2) as well as limiting physical contact with patients in the first wave of the COVID-19. Innovators either acquire the software before Covid-19 or needed an update to their own system.

“... and really nothing much changed apart from the fact that we just stopped the face to face during the first phase of COVID” (PM-02-23)

“Transition was not that difficult, we used telephone consultation before, so not massively change in terms of telephone consultation. It's only video consultation being updated to better software.” (PM-16-17)

The second common seizing capability is the capability related to training on digital skills (SZ8). Followers and Laggards had to provide a basic training for patients on the functionality of digital services.

“We had a problem because we were in a city area. It had to be downloaded on the mobiles. So, what we did was we had an iPad for medical students. Tthrough that iPad what we did was we showed the patients videos on how you download it. If they gave us permissions. One of the receptionists would go out and then download it onto their phone and sort everything out for them. Give it to them and say that this is how you book, but it will be in

the language that they can speak and understand. In our waiting area, we also had a new screen where videos are played. So that's educational in English. While they're sitting in the waiting area, they're getting all the information that they need.” (PM-19-08)

“Patients will say I don't know how to leave. We say, coming to the practice will be happy to help. And they come into the practice. We sit up on their phone, one off the set” (PM-11-09)

Followers have unique seizing capability which is a capability related to staff training on digital skills (SZ7). Mangers provides new ways of training for staff (online and interactive)

“We were able to put an app on a mobile phone to take the calls at home and it was still get recorded into our systems into our telephone system. It was like ringing the surgery. The phone call would come on to our app and we had our own login and password. That was brilliant. That allowed us to work. We ensured that the MAP sensor everybody's masked and they had their aprons on.” (PM-19-08)

Some laggards facilitate IT trainings to their staff but in a basic way.

“I basically train them up in terms of how they could access, initially it was: Can we really do this online? I think everybody welcomed it once it was actually established and they've seen the benefits of it. And a lot of doctors, mine included, have said we would never have been able to implement this system prior to COVID.” (PM-12-10)

“We trained one staff member, and we gave him the full responsibility of any other queries.” (PM-09-26)

Other laggards did not offer IT assistant nor support for staff due to the manageable size.

“Basically, IT came into hand over the laptops and once they set it up for staff to use it at home there was no training required because there was no new tech. There was nothing new on there. It was all the stuff that they were familiar with anyway, so they didn't need any training.” (PM-15-13)

“We didn't mind the mistakes I said, don't worry, I will cover whatever I can and help you and Doctor Mann will help with all the clinical work that made. I think the fact that we had a

good leader really that it may be a lot easier that you are going to be encouraged rather than penalized. It does make it difficult. Big difference.” (PM-05-05)

A comparative analysis of innovators and followers reveals five capabilities that differentiate them from the laggards ones. In the sensing capability, they shared marketing sensing (SN1). It is when managers sensed a shortage of doctors and realised that the service offering (state 1) will not sustain the increased demand on GPs.

“So, we had huge gap in the staffing and clinician as well. Doctors are very hard to find any doctor to refute. We have to go to through the visa. It is a program by the government to employ the doctor from abroad or we need technological support.” (PM-16-17)

“I see how it is more difficult in a larger setting and you lose a little bit of that continuity of care and just being able to get an answer and deal with the patient and park it. So yeah, there are going to be challenges due to doctors shortage in general, technology might be a key” (PM-02-23)

In the seizing capability, they shared three subcategory capabilities. Firstly, the digitalisation capability (SZ4) which relates to the managers ability to display benefits of technology utilization to patients as a necessity to access service offering (state2). That encourages patients to register online (facilitating quicker services and communications). Furthermore, to accept the shift towards more triaging, online booking and virtual appointments where their needs will be met as the same level of care as the face-to-face mode.

“If you book an appointment using your mobile phone on the app, you can cancel your appointment without ringing us” (PM-02-23)

“During COVID the service is started to get utilized especially for working class patients.... it's taken positively and video and telephone and photographs are only working in the sense that you do the triage, you have the conversation. Is there a need for you to be seen? Yes. Then come in and we have those face-to-face appointments as well.” (PM-19-08)

Secondly, network management capability (SZ5), which means increase the visibility of the surgery network to enable the system to divert patient needs to the right service. Accordingly, surgeries have to expand their team to include other non-clinicians in order to meet patients non-clinical needs. Surgeries have to proactively deliver appointments to

patients as soon as they can. This requires surgeries to have the capability of effective communication within their network and ensure the visibility of real-time patients demand among the team to meet patients' various needs.

"You look at the fact that you're coming a lot. And then you realize while talking to them, they might need a health and well-being coach, they give them an hour, but if it's financial or mental health or anything like that, then the social prescriber can support them and the best thing about health and well-being coach is the fact that they can they spend that time with them." (PM-19-08)

"As I explained, because we are filtering it [Patient request] and triaging it.... there is a patient demand because of first wave of Covid, the backlog patients are demanding more, more appointments required, we must respond accordingly" (PM-02-23)

"Especially with younger population, which can use the IT. With the patient can do of a photo or video short video for their condition and send it to the clinician. Clinician can easily diagnose and send them the requested treatment or referral, and if the clinician feel you need to see sufficient face to face these standard editions back message can be spoke for face-to-face appointment. So, this definitely increase the patient access. Same with the telephone, with the patient call the clinician and the clinician feel after the phone call, he needs to see the patient face to face. The clinician books the patient to face to face appointment." (PM-16-17)

Thirdly, the capability related to staff training on digital skills (SZ6) which means by training the administration staff on digital skills, they will be able to remotely support patients and facilitate service offering (state2).

"It's through data that we look at how we're going to improve the service and what is it that they want to do. We put this together, we make a plan, we take it to the clinical and non-clinical meetings then the finalized plan is produced and then it's put up on our website to share with everybody." (PM-19-08)

"I think due to the increased volume of IT equipment and add-ons Accurx and apps and everything else, I think large practices especially they need to have somebody on site one maybe two days a week from an IT perspective and the CCG may look at that and think that

will be expensive. However, I think it will pay for itself when the problems before we start emailing, there's another one and another problem. If I'm trying to do something on the computer that is patient related and it doesn't work. To me, that's top priority because now it's affecting that patient.” (PM-02-23)

In terms of transformation capabilities, followers and innovators share two capabilities. The first one is the services processes for developing efficiency gains capability (TM1). Managers showed the importance of simplify the service requesting via the surgery website and phone App which supported by NHS.

“Just as we entered COVID and even if you used that today would take you to the same app. However, it's now called the Birmingham and Solihull Health app. You can see your prescriptions or do you prescriptions book appointments, see medical Records. Look at your test results. So that's stopped a lot of telephone calls coming to the practice.” (PM-02-23)

“We made sure that it was fully digital. And then because we're NHS, the App and the Accurx came. We fully utilise our booking system for the right needs by triaging.” (PM-19-08)

The second shared transforming capability is the service culture capability (TM4). It is related to managers ability to embed a constant improvement culture.

“There is always a fall-back option, and one hopes that we don't actually hit that have to go back to that fall back option, hence there's always a risk assessment and done for every part. I am trying to sustain continuous improvement” (PM-02-23)

“The thing is during COVID, everybody embraces the change, and everybody just got on with whatever we needed to do. Just put your head down and just do it because we need to get through the day, and we need to sort it out our system. It was all united, we did things together, and encourage every little improvement as long as it is constant” (PM-19-08)

Table 5. 10: Dynamic capabilities – Small

Code	Dynamic capabilities	Practice	All	L&F	F	F&I
SN2	Technology sensing capability	Explore technological possibilities from external partners	x			
SZ2	Mass service customisation capability	Provide additional customised service support	x			
SZ3	Digitalisation capability	Focus on data management	x			
TM2	Services processes for developing efficiency gains capability	Provide Electronic prescriptions	x			
TM3	Service culture capability	Embed digital and agile mindset (staff and patient)	x			
SZ8	Capability related to training on digital skills	Provide basic training for patients on the functionality of digital services		x		
SZ1	Digital service development capability	Create services to align with the Covid restrictions and technology		x		
SZ7	Capability related to training on digital skills	Provide new ways of training for staff (online and interactive)			x	
SN1	Market sensing	Sense a shortage of doctors				x
SZ4	Digitalisation capability	Ability to display benefits of technology usage to patients				x
SZ5	Network management capability	Ability to increase the visibility of patients' needs				x
SZ6	Capability related to staff training on digital skills	Provide training to the administration staff on digital skills to remotely support patients				x
TM1	Services processes for developing efficiency gains capability	Simplify the service requesting via the surgery website/App				x
TM4	Service culture capability	Embed constant improvement culture.				x

5.3.5 The relationship between TAO and patient satisfaction

This section provides a quantitative analysis of secondary data collected from NHS England platform. These data are accessible by public. NHS England run an annual questionnaire to public to reflect how primary care services are delivered and how patients experience them. For the purpose of this study data of GP patient survey collected from 2019 (before Covid-19) to 2022 (to current year) including in between the pandemic period (see Appendix K). That is to consider the effect of the COVID-19 pandemic when looking at results over time. Figure 5.2 presents cumulative distribution graph of the small surgeries (I, F, L) and the scores for the patients satisfaction from 2019 to 2022. Looking at the graph, we can see that the distribution lines for surgeries types of 'I', 'F', and 'L' are remarkably similar, in their

trend. The line representing 'I' is the highest over the years as well as the line of 'F' reaching the same peak in 2021, however, 'L' line is at the bottom and lower than the peak in 20%. In light of this, we are able to confirm that: There is quantitative evidence of the influence of TAO, that enable surgery's service offering during Covid-19, on the patient satisfaction. In other words, the specific nature of the GP as 'I' is the reason why they have better service offerings.

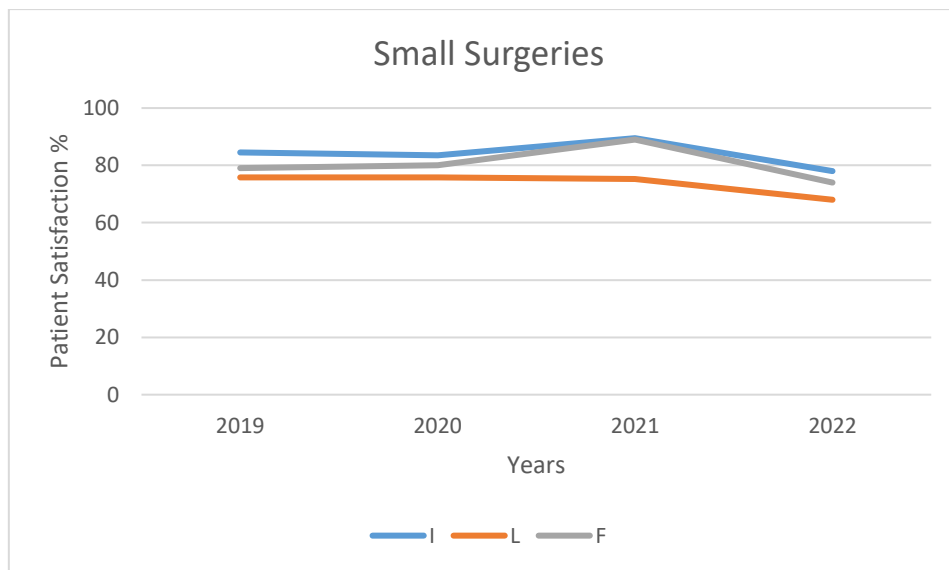


Figure 5. 2: Cumulative distribution graph of the small surgeries (I, F, L) and the scores for the patient satisfaction

The 2022 survey was conducted from 10 Jan to 11 Apr 2022. This was after a rise in Covid-19 cases in Dec 2021 but as restrictions were being eased. The 2021 survey took place during the third Covid-19 lockdown. This wider context (explain the drop of the satisfaction score) has been taken into account when looking at results over time.

5.3.6 Summary of small results:

This section provides an overview on 'small' embedded case study findings. Consequently, the results analysed the constructs developed during the template analysis. The results started with the analysis of the characteristics of service offering (state1) and (state2) as presented in the conceptual framework. The findings showed that service offering (state 1) in regard of triage system over the phone seems to be not popular between all types of surgeries. Only Innovators offered online triage to their patients. All the surgeries share the same key feature which is booking appointments was always over the phone. Innovators

offered online appointment booking alongside the phone appointment booking. Followers and laggards were operating fully face to face appointments before. No virtual mode was on offer to patients. However, Innovators offered blended appointment modes.

In service offering (state 2), followers joined innovators and have a huge transformation by adopting triaging system online and over the phone. Some laggards made a small improvement step by adopting phone triage and stayed reluctant by not adopting triage system at the foreseen future. Whereas innovators kept doing triage, but they enhanced the services. During Covid-19 all surgeries offer an online booking system. This is in addition to the ability to book appointments over the phone. It should be noted, however, that one of the innovators is discontinuing this service and requiring its patients to book appointments only online. In state 2 surgeries stopped offering fully face to face mode. Followers and laggards upgraded to blended appointment modes. The element of flexibility towards blended offering appeared at all surgeries. Innovators keep pushing toward more utilisation of technology in running patients' appointments. Followers will keep operating upon their patients requests neither push towards more virtual nor back to more face-to-face mode. Laggards' surgeries offer a choice of either of appointment mode at the time of booking although the default offered mode is the fallback to face to face.

Regarding the firm resources in state 2, surgeries from all types required physical capital resources, like additional laptops for their staff to operate remotely. Even the innovators ones as the proportion of the virtual service offering have sharply increased. Also, Accurx software is needed to run video calls and communicate remotely with patients. Only followers needed an update to their telephone system where they could link staff mobiles to the system and work from home. Innovators needed no additional human resources due to the maturity and familiarity they had before Covid-19. In order to implement the new software laggards and followers needed some technical assistants. Laggards expressed a need for both non-clinical and clinical staff to provide blended service offering (state 2). In organisational capital resources, followers and laggards had to restructure their surgeries (staff working shifts or utilizing the surgery rooms in a different way). Innovators apply no changes to the structure.

Regarding the operational capabilities, figure 5.3 presents a summary of operational capabilities obtained by surgeries in state 1 and in their upgrade to state 2 during Covid-19.

In essence the common operational capabilities (CI1, M1, M2, M3, I1, I4, MO1, MO2, MO3, T2) between innovators, followers and laggards represents state 1. These common capabilities enable laggards to move part way towards state 2. On the other hand, they enable followers to go the whole way towards state 2. That is why in state 2 the finding showed that only followers share some capabilities with innovators (CI2, T3, I2, I3) and they have to work on obtaining the only innovators unique capabilities (CR1, T1) to fully transform to state2.

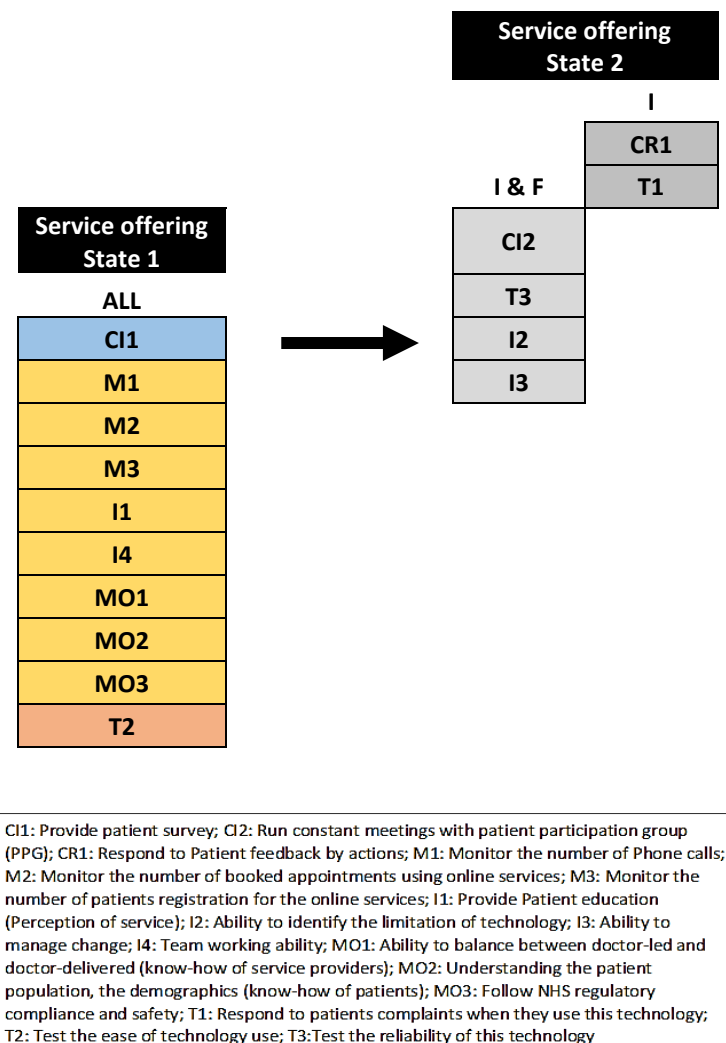
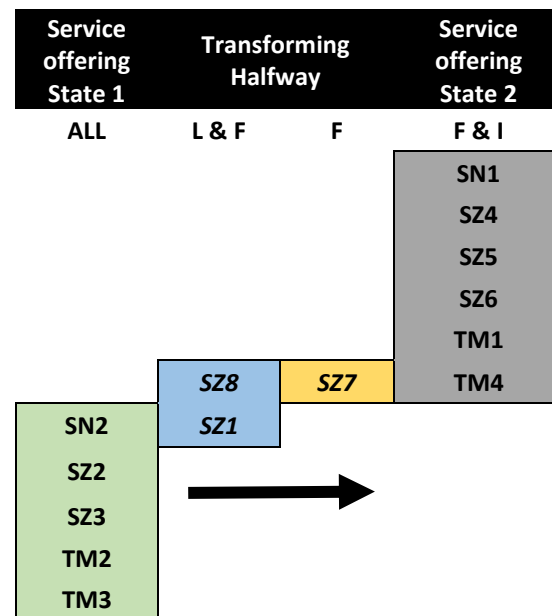


Figure 5. 3: Operational capabilities required in service offering state 1 to state 2

Regarding the dynamic capabilities required by surgeries to successfully achieve transition from service offering (state 1) to (state 2) during Covid-19, were analysed in accordance with sensing, seizing and transforming capabilities with the key additional insights. Figure

5.4 presents a summary of dynamic capabilities obtained by surgeries in state 1 and in their upgrade to state 2. In essence the common dynamic capabilities (SN2, SZ2, SZ3, TM2, TM3) between innovators, followers and laggards represents state 1. These common capabilities enable laggards to move part way towards state 2. On the other hand, they enable followers to go the whole way towards state 2. In the transforming way laggards and followers shared (SZ1, SZ8) and followers only obtained (SZ7). However, that does not mean innovators does not own the capabilities of the transforming halfway state. Hence, they demonstrated that they already owned it to operate blended service offering even before Covid-19. In state 2 the finding showed that followers share some capabilities with innovators (SN1, SZ4, SZ5, SZ6, TM1, TM4) to fully transform to state 2.



SN1: Sense a shortage of doctors; SN2: Explore technological possibilities from external partners; SZ1: Create services to align with the Covid restrictions and technology; SZ2: Provide additional customised service support; SZ3: Focus on data management; SZ4: Ability to display benefits of technology usage to patients; SZ5: Ability to increase the visibility of patients' needs; SZ6: Provide training to the administration staff on digital skills to remotely support patients; SZ7: Provide new ways of training for staff (online and interactive); SZ8: Provide basic training for patients on the functionality of digital services; TM1: Simplify the service requesting via the surgery website/App; TM2: Provide Electronic prescriptions; TM3: Embed digital and agile mindset (staff and patient); TM4: Embed constant improvement culture

Figure 5. 4: Dynamic capabilities required to transit from service offering state 1 to state 2

5.4 Results of Medium

As presented in table 5.1, this category includes surgeries with list size between 6000 and 10000 patients. In these surgeries, there are between 15 and 30 staff members, including both clinical and non-clinical personnel. The matrix of TAO has been applied to categorise the surgeries (see appendix G)

5.4.1 *The characteristics of service offering in relation to TAO*

The focus of this section is on state 1 and state 2 of service offerings that surgeries offered to patients before and during Covid-19. The study investigated the enhanced-TAO at GPs surgeries by exploring the use of triage system via phone or online and the surgery's appointment booking system via phone or online as well. Furthermore, the offered appointments modes, either by the traditional way which is face-to-face or virtually over the phone or video calls. The conference calls are operated by software helps everyone involved in a patient's care to communicate. This software was adopted on national level in England called (Accurx). Table 5.7 summaries service offering in medium surgeries in relation to TAO before and during Covid-19.

Pre Covid-19 triage system seems to be not in use in both forms (phone and online) by laggards. Innovators and followers offered telephone triage by following certain criteria to prioritise some age group (under 5 and over 70s), meet urgent needs of the on the day appointments or to smooth the patient journey.

"Before Covid, we've got a very good triaging system over the phone for on the day calls."

(PM-14-31)

"There were certain appointments that they could bring people in. And after speaking to them we decide on actions. I think we already ran a triage system. So, it wasn't. Maybe that's why it made it quite easy to go fully into that system when Covid hit" (PM-04-03)

"We were actually doing telephone consultations and we were actually doing triaging. So, for example if you had a UTI infection. Rather than book you with a Doctor Who all he's going to do is tell you to see the nurse and provide a urine sample, we would tell you to bring in the urine sample. Get it analysed. So, when the doctor saw it, he could prescribe you something. You know which would say one appointment because you're only seeing the

doctor once rather than twice. Which would be quicker and easier for you because you're getting a response back a lot sooner.” (PM-20-04)

All the surgeries share the same key feature which is phone booking appointments pre Covid-19. Only innovators offered online booking system in addition to the phone one.

“There would have used some online booking and maybe some online prescription requests, very minimal I think technology that would have used before Covid.” (PM-07-19)

“Before COVID we had Accurx system which was the texting service for them... Our patients were able to book direct into practice into the surgery themselves without contacting us and they can order their medication and things like that through that that system as well. 80% of our patients were signed up to the SMS online... they didn't have to queue in the mornings. They could see all the appointments exactly the same as our reception staff could.” (PM-14-31)

As illustrated in table 5.11, before Covid-19, none of the followers and laggards surgeries offered virtual appointment modes. They were operating on only face-to-face mode.

“Prior to COVID, it was all face-to-face appointments, so patients would call up booking and be seen. And home visit.” (PM-04-03)

However, Innovators offered virtual mode alongside the traditional face to face mode. The virtual mode was telephone calls only, video calls were not on offer to patients.

“Pre Covid, it's mainly face to face and would do a couple of phone appointments a day” (PM-08-05)

“We were doing phone calls appointments before Covid and to be honest with you, there's a little bit more proactive by doing telephone consultations” (PM-20-04)

“Prior to Covid, most of our appointments were face to face. We did used to do some telephone calls; we did a lot more home visits and but no video calls.” (PM-14-31)

By moving to service offering (state2) during Covid 19, innovators continue offering online and over the phone triage system. It is notable that laggards joined innovators and followers in adopting triage system on a wider scale, practically, triaging over the phone.

“We have been triaging as well on Friday afternoons during COVID. We had upgraded much before COVID where we have a good dashboard, we’ve been using triage over phone all the time.” (PM-03-05)

Some innovators have upgraded and upscale the triage system to add on an online option as well in aim to cut down unnecessarily face to face appointments.

“All the appointments are triaged by the doctors and patient will put in a form on the website. This will go through to the GP, and they triage and let us know what they want their appointments if it's to be face to face or if it can be done over the phone.” (PM-08-05)

“We do have patients who can either ring for an appointment, but they also have an online form that they can complete for an appointment... but to be fair it is actually practice website, they need to consult with Doctor and then when you go through to that, you've got three options, medical issue, admin issue or other information.” (PM-13-15)

“We stopped the online when the pandemic hit [first wave] we felt that people getting mad. We control it by phone. We've got a very good triaging system. Then we implemented that. We improved the online system then we back again to online.” (PM-14-31)

“We're already, you know, embracing the new technology because we were already using what we could prior to COVID. a form for you to fill in. You could fill that form and send it back to me. It's a bit more than just the text message service. But I can also now send you a video link. YouTube messages translated in Community languages which were sending out to people which are having a bigger impact on them accessing services because if it's in their own language.” (PM-20-04)

During Covid-19 followers and laggards made similar development in regard of their appointments booking system. They offer an online booking system, which was unavailable prior to Covid. This is in addition to the ability to book appointments over the phone.

“We had upgraded much before COVID where we have a good dashboard where we can find out exactly how many phone calls are coming in then monitor them and look at the demand and we'll find the capacity to solve the demand.” (PM-03-05)

“We do have patients who can either ring for an appointment, but they also have an online form that they can complete for an appointment. I think for a number of patients they like

the fact that they've got an online form and they don't have to ring. But then you've got others that don't really like it at all. And then find it difficult to get through to the surgery.

It's a bit of a mixed bag, but to be fair.” (PM-04-04)

During Covid-19 all surgeries stopped offering fully face to face appointment mode. In other words, surgeries introduced virtual mode to their service offering including telephone and video consultations.

“People still needed to be seen so early days of Covid, the majority was call-backs and telephone triage. But if the doctor felt a patient needs to be seen not for COVID symptoms, would they go to red sites.” (PM-01-17)

Some innovators did not adopt video calls mode. That is because of they believe that technology is still not reliable and video consultations are not popular within their population.

“Whereas now we have a number of options available to us that we can offer. And unfortunately, the video conference calls don't necessarily work with all the patients and that's the challenge in itself. And obviously when you're dealing with technology issues and trying to run a very tight clinic, that doesn't always work. So, the preference here at the practice is telephone and face to face.” (PM-07-19)

“It's mainly phone at the moment, but if the doctor feels that they need to be seen face to face, they will bring them in on the same day, It's all phone. It's not video, people do not like it.” (PM-08-05)

Table 5. 11: characteristics of different appointments modes offered at GP surgeries pre and during Covid-19 – Medium

Service Offering			Medium Surgeries			
			All	I	F	L
State 1 Pre Covid-19	Triage	Online		✓		
		Phone		✓	✓	
	Booking system	Online		✓		
		Phone	✓			
	Physical Appointments face-to-face	Fully – 100%			✓	✓
		Not fully		✓		
	Virtual Appointments	phone call		✓		
		video call				
State 2 During Covid-19	Triage	Online		✓		
		Phone	✓			
	Booking system	Online	✓			
		Phone	✓			
	Physical Appointments face-to-face	Fully – 100%				
		Not fully	✓			
	Virtual Appointments	phone call	✓			
		video call	✓			

The likelihood of changes in the blended service offering (state 2) are persisting in the future was asked to all surgeries. Table 5.12 presents the finding of post Covid-19 services offerings. All surgeries types introduce the element of flexibility where they give their patients a choice of modes when they request an appointment.

“We will just carry on as we're going, the people you want face to face will get the face to face. The people who are happy with doing it online or on the telephone will do that. We're different to other surgeries. The only difference is we sort of cater around the patient's, whereas other surgeries tend to have “We're going to do this time. We're going to do this and try to fit you into their box”. We don't have a box here.” (PM-20-04)

“We have split our patients, our appointments in half. We do half face to face, half telephone call and our reception staff asked the patients in the morning what is it they would prefer, did they prefer telephone? Some of them are quite happy with the telephone. They like it. They don't want to come to surgery. And some of them, they do want to be here, even though they perhaps don't need to be, it could be dealt with over the phone, but they feel better by being seen. We split them up.” (PM-14-31)

“I don't think we can quite get back all to face to face right now, but maybe we can offer more of a choice because it is a point of contention with some of the patients that they don't have that option. I think we're still trying to move forward.” (PM-07-19)

Laggards tend to return to the old fashion mode face to face as a respond to the resistance of their population and doctors.

“Well, we have come back face to face, mostly because it hasn't worked for some doctors. And the population, the demographics we got here. They prefer face to face, so we have opened up face to face since July. Most of the doctors are doing it” (PM-03-05)

On the contrast, followers tend to encourage their patients towards more virtual modes.

“We have made a conscious decision that we will still do a majority of phone calls. Only in the last few weeks, we've created a face-to-face session, just to see how it works, see how people want to come in.... So, it's working quite well at the moment, but that's a work in progress to see how it how it goes, but I don't think we'll ever go back to everybody face to face.” (PM-01-17)

“I think it's more time effective. We get to see more patients by doing virtual and making sure then that the face-to-face appointments that we do have are for the patients they're needed for. So, you frequent flyers, it's easier to have a quick telephone call with them rather than them coming in and eating into sort of face to facetime, which then couldn't run clinics behind” (PM-04-03)

Table 5. 12: The characteristics of likelihood appointments modes offered post Covid/currently – Medium

The current offered appointment modes	Medium Surgeries		
	I	F	L
Offer a majority of Physical mode face to face			✓
Give Patients the choice Clinics will be split by modes	✓	✓	✓
Offer a majority of virtual mode phone or video calls	✓	✓	

5.4.2 Practice resources in relation to TAO

This section will focus on the firm resources that is required to provide service offering (state 2) during Covid-19. It will discuss the physical, human and organisational resources

needed for implementing the enhanced technology within the surgery. The findings of these resources are presented in table 5.13.

Regarding the physical capital resources, surgeries from all types required additional laptops for their staff to operate remotely. Even the innovators ones as the proportion of the virtual service offering have sharply increased.

“We needed extra laptops for people to work from home” (PM-20-04)

“We've had initially delay in supplying laptops. When people were off sick. They couldn't come into work to provide any laptops to work from home” (PM-03-05)

Furthermore, all surgeries types needed a special software to run their video calls and communicate remotely with patients.

“During Covid we've been using Accurx. I know some practices used Accurx for admin, meds, and prescriptions and things like that. We actually used it for everything. So, patients could actually put in all their details as to what their medical issue was and then that would be booked in as a telephone appointment” (PM-13-15)

“We find a way that using our Accurx is like a text messaging service in the NHS, so we can other patient I can send you an accurate message or I can send it two ways in that I can send it to you with a form for you to fill in. You could fill that form and send it back to me. It's a bit more than just the text message service.” (PM-20-04)

Some innovators did not need the software, as they have it before Covid hits.

“At the very start, we were very lucky in the fact that we already had a system for our doctors to work from home. We have tokens that used to fit into the computers. It wasn't brilliant because they couldn't do electronic prescriptions and things like that, but they could at least access the e-mail system from home. For our practice, we were a little bit more advanced than some of them. I know a lot of practices were really struggling.” (PM-14-31)

Regarding human capital resources, all surgeries requested technical support, although innovators have the maturity and familiarity with technology, they needed some IT support to get issues sorted in a faster rate.

“Because we employ younger people, they already very tech savvy... But we have the right people to deliver. It's all just about workforce planning. And making sure that you've got the IT. We were doing this before because the problem is although we get IT services from the NHS. You have to log a job. Then somebody will get back to you in 2 days well. We can't wait that long. We try and employ staff. We've got some basic skills and they fixed those problems without going through the NHS system because it's so cumbersome.” (PM-20-04)

“We need IT support. The challenges are different in so in primary care, they don't have the same IT infrastructure as in the NHS, they don't have access to the resources they need so easily and that makes it challenging in itself just running a day-to-day clinic” (PM-07-19)

Whereas in laggards and followers it was predictable to find that managers show their need for technical assistants in order to implement the new software.

“Sometimes support from the IT wasn't great as well. It took longer than it should have. Maybe they were struggling with stuff as well.” (PM-03-05)

During COVID-19, laggards and followers expressed a need for both non-clinical and clinical staff to provide blended service offering (state 2) to patients.

“We're always going to recruit because we're just getting more and more patients and you need the people to mainly reception. That's obviously frontline and the phones go in and that type of thing we are trying to do.” (PM-01-17)

“We were really limited on staff even though that they weren't sick, they were still able to work from home. And I think the tech especially on the technology side, the phone suppliers for instance that we already had a system in place where we could answer telephones from home if needed” (PM-04-03)

The organisational capital resources focus on the surgery structure. Laggards introduce no changes to the structure of the surgery during Covid-19. Meanwhile, the innovators and followers mention a need to apply some changes regarding their staff working shifts or utilizing the surgery rooms in a different way as pre Covid-19 as they are providing service offering (state 2).

“The whole practice had to have a complete restructure, but fortunately, we've always had our admin staff working one shift at our reception as well, so that they also are aware of

what's going on at all times. Anyone of us, including myself can go into that role and do it and know that we can, because if you haven't done it for a very long time, it's a big shock.”

(PM-14-31)

“We did have a couple of outbreaks here. Our whole reception team had to isolate. And all of our admin team who have never done reception, there was quick crash training, and we were all downstairs dealing with the patients face to face and the girls were at home answering the phones remotely and I think it was good as well because everyone sees what everyone else does when they're not here” (PM-04-03)

Table 5. 13: Required resources for surgeries to provide service offerings (state 2) – Medium

Practices resources (BVR)		Medium Surgeries			
		ALL	I	F	L
Physical capital resources	Additional Laptops	✓			
	Update Telephone system				
	Accurx Video and texts system	✓			
Human capital resources	IT assistant	✓			
	Non- Clinicians			✓	✓
	Clinicians			✓	✓
Organisational capital resources	Restructure the surgery		✓	✓	
	Keep the structure				✓

5.4.3 Operational capabilities to deliver the service offering

In this section the required operational capabilities to provide service offering (state 2) in GPs surgeries are discussed. Three operational capabilities are covered in this study, customer, managerial and technical capabilities (see Appendix I) for coding operational capabilities.

To begin with the common operational capabilities between the three types of surgeries. In terms of customer capability, the area of customer involvement (CI1) is common between surgeries, managers demonstrated direct involvement with patients by running in house survey in addition to tracking GP patient survey on NHS England website.

“We've done patient surveys just to find out how they feel about the access to appointments, what else is available to them” (PM-07-19)

“We try to cater around patients and equipment to the extent that we're open on the weekend. We look at NHS patients survey results” (PM-20-04)

The three types of surgeries possess the customer response capability (CR1), which refers to an organization's ability to respond effectively and quickly to customer needs. This is demonstrated by managers' ability to respond to patient feedback

"All we can do is just review and listen to the feedback that we receive. And then if there's ways of kind of tweaking the system then we'd do that." (PM-13-15)

"I tend to judge things on how much feedback I get from patients, so I mean, it's hard to evaluate it." (PM-01-17)

"We hear from the patients about what it is that they're unhappy at, that what would they like to see changed? And we do really try to adapt those things. We've been listening to the patients, offering them a phone appointment or a face-to-face appointment because we've heard that they've said." (PM-07-19)

In terms of managerial capabilities, surgeries have the monitoring capability in common which is the ability to monitor and report progress. Managers showed ability to monitor how patients book their appointments over the phone (M1)

"I mean, I do look at the phone system to see the workload on it, but that's a very good question." (PM-01-17)

"We monitor our phone lines to see how many phone calls we're getting. We do get some of the missed calls and see if reception staff has to take the phone call." (PM-03-05)

The ability to be actively involved in TAO activities at the working level is the involvement capability. Patient education is a key factor in facilitating blended service offering during Covid-19 (I1). Managers mentioned that the ability to educate and set patients perception about GPs service is an essential task in order to operate successfully during Covid-19 restrictions.

"We believe in first it's engaging the patient. Educating the patient and then empowering the patient." (PM-20-04)

"It wasn't too bad. Once people had realized this is how we're going and it's not going to change back, 99% accepted it. So, I think that's the main thing is set the patients perception about services" (PM-01-17)

To manage operation effectively, managers demonstrate the importance of understanding the patient population, the demographics. In other words, it is know-how of patients (MO2). All surgeries emphasized on this capability practically when providing blended services to patients.

“And the population ... the demographics we got here. They prefer face to face, so we have opened up face to face since July.” (PM-03-05)

“We got a social prescriber because we've got a certain section of the community who are isolated, the elderly, the children are moved out, they've got nobody to talk to, so they just make an appointment. There's nothing medically wrong with them... then when you are dealing with ethnic minority people who are new to the country, you need to understand your population” (PM-20-04)

All types of surgeries are aware of regulatory compliance and safety aspects by NHS (MO3). The main risk associated with the implementation of Accurx software is the privacy of patient data, as this service requires remote access to some sensitive data (e.g., age, personal address, health issues, family history....). Hence, the process has to be established in order to ensure the patients privacy concern has been addressed.

“There're so many safeguarding concerns with GP practice. And particularly for patients with drug abuse or mental health concerns” (PM-07-19)

“We're very diplomatic area, so we do majorities me and the partners. But then if we think it might have an effect, well it will have an effect on the rest of the staff, but we then sort of say, well we want to introduce this. Practically if that align with NHS regulation.” (PM-01-17)

The last common capability between surgeries is the technical capability (T1), where managers have the ability to evaluate the suitability of new technologies to processes by responding to patients complaints. Managers measure the suitability by the number of complaints they would receive for their patients.

“My personal view, if I get a lot of complaints, something's not working, but if I don't this means it's working” (PM-01-17)

“Not everybody is ready for changes, so that's the main problem we've had and not everybody is keen to learn new things. So that's where we found the problem and the gap,

they keep complaining and we keep persistent because we had to use technology. And eventually they learned, and they are quite good at it” (PM-03-05)

“If they are complaining a lot, you've got these complaints. That's mean there is something wrong. We need to change, isn't it? There's a lot less complaints now than there was before COVID. we've managed to change things to benefit the patients, it's obvious because we're not getting that many complaints as we used to.” (PM-14-31)

Following the presentation of the common operational capabilities of the three types of surgeries. A number of similarities were noted between the followers and the Innovators. The first capability relates to customer capability, the customer involvement (CI2). Both innovators and followers displayed the ability to create the environment for the customer to have direct interaction and engagement by running a constant patient participation group (PPG). In this kind of meeting managers offer close contact with patients and explore their most recent needs and alter the surgery services accordingly.

“We do meet on a regular basis just to review the appointment system that we have in place. I think feedback is probably one of the best ways to do that, we did tweak them slightly, but I think one of the other ways is probably the patient participation group is just having discussions with them. We get those that will like it and those that don't. But you can never please everybody. I think all we can do is just review and listen to the feedback that we receive. And then if there's ways of kind of tweaking the system then we'd do that” (PM-13-15)

“We're different to other surgeries. The only difference is we sort of cater around the patient's, whereas other surgeries tend to have “We're going to do this time We're going to do this” and try to fit you into their box. We don't have a box here. We listen to our PPG” (PM-20-04)

“We keep in contact with our patients by PPG, we listen and try to change if possible or explain to how and why to them.” (PM-04-03)

In the involvement capability, followers and innovators share three sub-categories. Involvement (I2), the ability to identify the limitation of technology and operate accordingly.

they expressed the opinion that some clinicians were reluctant or unsatisfied with the virtual appointment modes in diagnosing illnesses.

“The doctors are quite keen now to move back to more face to face than telephone at the moment” (PM-07-19)

“We've got two partners that are both in their 30s, both sort of raring to go and let's get technology up and running. So yes, that is our next step. I think it's quite refreshing, really. However, the rest of the doctors are reluctant about virtual appointments.” (PM-01-17)

The other subcategory is involvement (I3), the ability to manage change, the surgeries recognised change resistance. Either because of the language, culture or age barrier.

“Because people make a mistake, or the NHS makes a mistake about it when it really translates information in on the Community languages of the cost. When it does translate it, it's always in the written form and the assumption is. That the people are educated in their own language. Well, if you wrote to my dad, who passed away last year in his own language, he wouldn't be able to read it because he was a farmer, so even translating into their own language doesn't overcome the real barrier which is the communication skills, but by being able to send you a video clip in your language.” (PM-20-04)

“I think it's a generation that like to see people face to face. They don't like the technology. They like a personal touch. And there was a lot of them that were still grateful. They got phone calls, but there was the few that don't want to discuss it over the phone. I want to see the doctor.” (PM-04-03)

The last subcategory in involvement capability is team working ability (I4). Managers discussed the importance the ability of being available on request and to provide a quick response to the team.

“With the social prescribing and all the other things, we work closely with other organizations that we sign posts to our pharmacist across the road and has been great as well. And I've referring over there for certain things. So actually, the amount of people that are having problems seen and addressed quicker It's definitely increased by teamwork power” (PM-04-03)

“We've got two paramedics at the moment... they do the home visits; they can review patients with minor ailments, and they can do some of the chronic disease management reviews. We've got our own pharmacist, a PCN pharmacist and a technician. They will deal with all the prescriptions, medication reviews, safety alerts. There's paramedics and pharmacist and technicians in other sites as well. We do have a good range of staff members, all work as a team.” (PM-13-15)

“We did lots of staff meetings, we have a WhatsApp group in this surgery (managers and partner's WhatsApp group). I used to do a debrief every morning, anything that we thought we were struggling with, it just gave the staff that time to say look, I'm struggling with this, and we could talk about it and work it out.” (PM-14-31)

Part of the managerial capability is Managing operations, which is the ability of managers to administer tasks and functions effectively. Some managers clarify this as the ability to balance between doctor-led approach and doctor-delivered (know-how of service providers) (MO1).

“I think it's more time effective. We get to see more patients by doing that and making sure that the face-to-face appointments we do have are for the patients they're needed for. So, you frequent Flyers, it's easier to have a quick telephone call with them rather than them coming in and eating into sort of face to FaceTime, which then couldn't run clinics behind.... Obviously, there were some patients as well that don't have access, but what we did do is we sort of pulled out a list of all of our vulnerable, almost elderly, frail patients and our social prescribers we're calling and doing sort of weekly check-ups on them. And you're OK if you got everything.” (PM-04-03)

“We were actually doing telephone consultations and we were actually doing triaging. So, for example if you if you had a UTI infection rather than book you with a Doctor Who all he's going to do is tell you to see the nurse and provide a urine sample, we would tell you to bring in the urine sample. Get it analysed. So, when the doctor saw it, you could prescribe you something. You know which would say one appointment because you're only seeing the doctor once rather than twice. Which would be quicker and easier for you because you're getting a response back a lot sooner. We were doing these sorts of things before, but we just managed to upscale it with COVID” (PM-20-04)

In terms of technical capability, which is the managers ability to evaluate the suitability of new technologies to processes. There is unanimous agreement among innovators and followers managers on this capability. They shared the same key point which is the ease of use of the enhanced technology such as triaging forms, surgery website or App (T2).

“Accurx is not really difficult to use, it's literally just three buttons. And then for the reception staff, it was more or less just making sure it was set at the right time to come on in the morning and then be able to switch it off at night and then restart at the right time the next day.” (PM-13-15)

“I tend to judge things on how easy to learn using it [Accurx]”. (PM-01-17)

There are three operational capabilities that distinguish medium size innovators from followers and laggards. The first two are managerial capabilities and particularly monitoring ones. (M2) is the ability to monitor and report progress. Managers showed ability to monitor how patients book their appointments through the online booking system. By analysing these data, managers can better understand how services are performing and how to improve them.

“Accurx, is something that we've kept because we've been able to pull data off, which has given us a good idea of what the DNA rates are compared to where we were before and the number of booked appointments via this software” (PM-13-15)

Managers also monitor their patients' online registration to understand their acceptance or struggle in using technology to access service offering (M3).

“80% of our patients were signed up to the SMS online. We had a huge push to try and get our patients to sign up to it because there were lots of benefits for them to access our services” (PM-14-31)

The last unique capability of innovators is the technical capability (T3). Managers indicated the reliability as a measurement of the ability to evaluate the suitability of new technologies to processes.

“We've all experienced these conference calls and Internet drops out and then the pressures on and I think particularly with patients, if their anxiety goes up because they can't get on a conference call and it's it just adds to frustration particularly in GP practice where there's a

lot of pressure on GPs to provide for appointments. And they just don't want to go down that route. And if it fails the first time, they're not likely to go back to it. I will not offer video calls as they are not reliable yet.” (PM-07-19)

Table 5.14 presents the findings and analysis of operational capabilities in medium surgeries.

Table 5. 14: Operational Capabilities – Medium

Code	Operational capabilities	Theory	Practice	All	I&F	I
CI1	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engagement in the service delivery	Provide patient survey	X		
CR1	Customer response	It is the competence of an organization in serving customer needs through effective and quick actions.	Respond to patient feedback	X		
M1	Monitoring	The ability to monitor the progress of TAO effectively.	Monitor the number of Phone calls	X		
I1	Involvement	The ability to be actively involved in TAO activities at the working level	Provide Patient education (Perception of service)	X		
MO2	Managing Operation	The ability to administer tasks and functions effectively.	Understand the patient population, the demographics (know-how of patients)	X		
MO3	Managing Operation	The ability to administer tasks and functions effectively.	Follow NHS Regulatory compliance and safety	X		
T1	Technical	The ability to evaluate the suitability of new technologies to processes.	Respond patients complaints	X		
CI2	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engagement in the service delivery process	Run constant meeting with patient participation group (PPG)		X	
I2	Involvement	The ability to be actively involved in TAO activities at the working level	Identify the limitation of technology		X	
I3	Involvement	The ability to be actively involved in TAO activities at the working level	Ability to manage change		X	
I4	Involvement	The ability to be actively involved in TAO activities at the working level	Team working ability		X	
MO1	Managing Operation	The ability to administer tasks and functions effectively.	To balance between doctor-led approach and doctor-delivered (know-how of service providers)		X	
T2	Technical	The ability to evaluate the suitability of new technologies to processes.	Test the ease of this technology use		X	
M2	Monitoring	The ability to monitor the progress of TAO effectively.	Monitor the number of booked appointments using online services			X
M3	Monitoring	The ability to monitor the progress of TAO effectively.	Monitor patients registration for the online services			X
T3	Technical	The ability to evaluate the suitability of new technologies to processes.	Ability to test the reliability of this technology			X

5.4.4 Dynamic capabilities required to transition between different service offerings

The purpose of this section is to describe the specific capabilities required to successfully transit to service offering (state 2). Various capabilities were categorized according to different dimensions or stages of dynamic capabilities (sensing, seizing and transforming capabilities). See Appendix J, for coding dynamic capabilities. Table 5.15 presents the findings and analysis of dynamic capabilities in medium.

The analysis begins with the common dynamic capabilities between the three types of surgeries. In sensing capabilities, the technology sensing capability (SN2) is in common where managers had the opportunity to explore the possibilities offered by their local PCNs or CCG as part of NHS England support prior to the arrival of Covid-19. However, Followers and laggards surgeries never adopted such technologies before Covid.

“Prior to COVID, it was all face-to-face appointments, so patients would call up booking and be seen and home visit” (PM-04-03)

“100% face-to-face and some emails... We had upgraded much compared to before COVID where we have a good dashboard, online access” (PM-03-05)

In term of seizing capabilities all surgeries showed ability to provide additional customised service support, it is called mass service customisation capability (SZ2). SZ2 requires running collecting data (e.g., patients surveys) in order to tailor the offerings to suit the large variety of patients' needs. The main focus of the surgeries is to increase patients online registration so they will be able to access their services.

“You can never please everybody. I think all we can do is just review and listen to the survey results that we receive. And then if there's ways of kind of tweaking the system then we'd do that.” (PM-13-15)

The common transforming capability is the services processes for developing efficiency gains capability (TM2), it is related to the ability to provide electronic prescriptions. One of the advantages surgeries have gained from Covid-19 is the shift toward electronic prescriptions, which has reduced the number of appointments requested and the number of calls coming into the surgery to locate prescriptions. Additionally, this service stopped the

printing of prescriptions and cut of patients journeys to the surgery. Mangers believe that will have a positive impact on the environment.

“It does improve the access because now you can go online and order your medication. If you've got repeat medication, you don't have to ring the surgery you can do it electronically.” (PM-20-04)

“Repeat medical prescription which they can be dealt over the phone. It's better that way rather than them coming in. It's all paid and free appointments toothers.” (PM-03-05)

Laggards and followers shared three seizing capabilities. Firstly, the digital service development capability (SZ1), where manager had to create services to align with the Covid restrictions and technology. Surgeries had to own and develop this capability by meeting patients' needs and provide blended service offering (state 2) during Covid-19.

“COVID has made it better, like using video consultations and actually sending patients straight away, some text messages and getting the pictures back as well” (PM-03-05)

“I think it's more time effective. We get to see more patients by doing that and making sure then that the face-to-face appointments that we do have are for the patients they're needed for.” (PM-04-03)

Secondly, the capability related to staff training on digital skills (SZ7). Mangers provides new ways of training for staff (online and interactive)

“Everything was online again. Nothing in person. They've had few trainings and whoever had any problems we were trying to help them with it as well.” (PM-03-05)

“Yes, some training sessions, I think they all have got on with because I think it was gradual changes. It wasn't instant, even though the pandemic was instant. You know, things had to grow with that” (PM-04-03)

Thirdly, the capability related to training on digital skills (SZ8). Followers and Laggards had to provide a basic training for patients on the functionality of digital services.

“A bit of a family affair with technology. We just try and support people. I'll just say to people, look just pop in and we'll show you what you should be doing so and a lot of the girls on the reception are very helpful” (PM-01-17)

“We had to reinforce and keep persistent because we had to use it, and patients learn it at the end” (PM-03-05)

Followers surgeries has a unique seizing capability, the capability related to staff training on digital skills (SZ6) which means by training the administration staff on digital skills, they will be able to remotely support patients and facilitate service offering (state2).

“We have our business continuity plans in place anyway. I think learning from COVID, we are more prepared. Staff in reception trained well to the use of working remotely, being able to implement that immediately. I've got two members of staff mainly to support patients” (PM-04-03)

A comparative analysis of innovators and followers reveals ten capabilities that differentiate them from the laggards. In the sensing capability, they shared marketing sensing (SN1). It is when managers sensed a shortage of doctors and realised that the service offering (state 1) will not sustain the increased demand on GPs.

“What we were doing before the doctor talks to you, he can triage in terms of priority and urgency without wasting an appointment.” (PM-20-04)

“Pre COVID, we've settled on a mixture of GPs and a first advanced nurse practitioner. It has actually improved our patient access. We suffer a shortage of doctors” (PM-01-17)

They also shared technology sensing capability (SN3), the ability to focus on continuity of patient record rather than of care.

“We have now social prescriber; we reroute some calls to the social prescriber. We then free up more of the doctor's time to deal with the serious people who need to be dealt with. And those patients got the care they need but not with the GP they used to” (PM-20-04)

“Additionally, the social prescribing ... we work closely with to referring over some patients there for certain things. So actually, the amount of people that are having problems seen and addressed quicker It's definitely increased.” (PM-04-03)

In terms of seizing capabilities, innovators and followers shared digitalisation capability (SZ3), which is related to utilising the connected service (different modes of appointments availability) and the enabler technology to facilitate service delivery. Previously, the majority

of the surgeries managed their appointments booking over the phone by offering mainly face to face appointments without triage process. However, during Covid they shifted to online booking in addition to the phone booking and with Accurx software they can communicate quicker with patients and meet their needs by triaging. Accordingly, surgeries have to have the ability of using data analytics to extract useful information from the patients requests and spotting the trends to meet their demand.

“I couldn't really say without looking at the figures. We've looked at because what we tried to do is we tried to deal with by embracing the technology, we're able to deal with our patients on the day.” (PM-20-04)

“We sort of pulled out a list of all of our vulnerable, almost elderly, frail patients and our social prescribers we're calling and doing sort of weekly check-ups on them, especially at the height of the pandemic, making sure they were in touch with the local services to drop food shopping. It is sort of how I use data in my practice” (PM-04-03)

They also share the digitalisation capability (SZ4) which relates to the managers ability to display benefits of technology utilization to patients as a necessity to access service offering (state2). That encourages patients to register online (facilitating quicker services and communications). Furthermore, to accept the shift towards more triaging, online booking and virtual appointments where their needs will be met.

“Our main aim with technology is to try and stop people phoning in and to use other ways of doing it because the phones in the morning are absolutely ridiculous.” (PM-01-17)

A significant feature of the medium sized surgeries is that the managers work on displaying to the staff the benefits associated with the use of technology, this is known as digitalisation capability (SZ4*).

“They all accepted it really well when they realised it made life a lot easier. Benefits to staff” (PM-01-17)

“We showed patients how it improved the access by doing it online anyway because they write down exactly what was wrong and it's triaged by the doctor on the same day, the access is better.” (PM-08-05)

The last shared seizing capability is network management capability (SZ5), which means increase the visibility of the surgery network to enable the system to divert patient needs to the right service. Accordingly, surgeries have to expand their team to include other non-clinicians in order to meet patients non-clinical needs. Surgeries have to proactively deliver appointments to patients as soon as they can. This requires surgeries to have the capability of effective communication within their network and ensure the visibility of real-time patients demand among the team to meet patients various needs.

“Just to give you an example of that, now if somebody was to come to us and say that they are pregnant, what the procedure we do now is to get a pregnancy test. Then we can send them the square picture that you can scan and answer those four or five questions, it will do yourself referral to the midwife and access the services without ever seeing a doctor. Where is in the past you book an appointment with the doctor, he would then tell you to have an appointment with the nurse who would do a pregnant test, which would delay the time before you got to the midwife. And it's more confidential” (PM-20-04)

“We've got two paramedics they do the home visits; they can review patients with minor ailments, and they can do some of the chronic disease management reviews. We've got our own pharmacist, a PCN pharmacist and a technician. They will deal with all the prescriptions, medication reviews, safety alerts.” (PM-13-15)

In terms of transformation capabilities, the first shared capability is the services processes for developing efficiency gains capability (TM1). Managers understood the importance of simplify the service requesting via the surgery website and phone App which supported by NHS.

“We're just currently working with a company to help us sort triage that is more important, appointments at the front desk and give the doctors a little bit of assistance, probably that calls for itself in a resource that the doctors need to look at those forms that the patients have completed and then decide whether there's any actions to take. We will be able to weed out some of the lesser urgent things that might make the service a bit more efficient” (PM-07-19)

“Via Accurx, patients simply could actually put in all their details as to what their medical issue was and then that would be booked in as a telephone appointment.” (PM-13-15)

The second transforming shared capability is a unique one for medium category. The services processes for developing efficiency gains capability (TM2*), it is related to managers ability to run virtual clinics (focused theme).

“We invite our diabetes patients and say the doctor's got a one hour. Teams meeting on blood pressure or cholesterol or HBA 1C. it will be about a 15-minute presentation, and then the rest of it will be like question and answer. So those stupid questions that you didn't want to waste the doctor's appointment time with.... and the patients more willing to accept it.”

(PM-20-04)

“We've had lots of new services that have come in that have helped us change the pathway of our patients. like within this area, we have lots of mental health patients. We've brought in a mental health person so the staff have been able to direct them down a different path that would be more meaning to more helpful to them because sometimes it's just support that the patient is needing via virtual clinics and the doctor hasn't got that time to support.”

(PM-14-31)

The third shared transforming capability is the service culture capability (TM3). As a result of Covid-19 restrictions and the available technology via NHS, surgeries focus on meeting patients demand while responding to emerging technological trends, hence, they need to have an agile culture in order to continuously improve their offering and keep up with the dynamic market needs and technological trends.

“I think phone conferencing and all of those things will continue to be part of the NHS going forward. I think it helps for working people who struggle to get out of work and to go to appointments, the phone thing really works, whereas the elder population and particular nervous, anxious types of patients, they want to be involved in and they want to see someone so that there's probably a balance to be had.” (PM-07-19)

“It's working quite well at the moment, but that's a work in progress to see how it how it goes, but I don't think we'll ever go back to everybody face to face, we need to be flexible”

(PM-01-17)

The last shared transforming capability is the service culture capability (TM4). It is related to managers ability to embed a constant improvement culture. It was necessary for all of the

surgeries to upgrade to the new software during the pandemic (see section 5.3.2) as well as limiting physical contact with patients in the first wave of the Covid-19. Innovators and followers surgeries show persistence trails to either acquire or upscale TAO into their own system.

“We were doing these sorts of things before, but we just managed to upscale and keep improve it with COVID and like I said, we didn't have the benefit of that Accurx before.” (PM-20-04)

“It was challenging. I think there was a lot of fear at the beginning but working together and like say having good leadership within the practice, reassured the staff and pushing forward” (PM-04-03)

Table 5. 2: Dynamic capabilities – Medium

Code	Dynamic capabilities	Practice	All	L&F	F	F&I
SN2	Technology sensing capability	Explore technological possibilities from external partners	x			
SZ2	Mass service customisation capability	Provide additional customised service support	x			
TM2	Services processes for developing efficiency gains capability	Provide Electronic prescriptions	x			
SZ1	Digital service development capability	Create services to align with the Covid restrictions and technology		x		
SZ7	Capability related to staff training on digital skills	Provide new ways of training for staff (online and interactive)		x		
SZ8	Capability related to staff training on digital skills	Provide basic training for patients on the functionality of digital services		x		
SZ6	Capability related to staff training on digital skills	Provide training to the administration staff on digital skills to remotely support patients			x	
SN1	Market sensing	Sense a shortage of doctors				x
SN3	Technology sensing capability	Ability to focus on Continuity of patient record rather than of care				x
SZ3	Digitalisation capability	Focus on data management				x
SZ4	Digitalisation capability	Ability to display benefits of technology usage to patients				x
SZ4*	Digitalisation capability	Ability to display benefits of technology usage to staff				x
SZ5	Network management capability	Ability to increase the visibility of patients' needs				x
TM1	Services processes for developing efficiency gains capability	Simplify the service requesting via the surgery website/App				x
TM2*	Services processes for developing efficiency gains capability	Run virtual clinics (focused theme)				x
TM3	Service culture capability	Embed digital and agile mindset (staff and patient)				x
TM4	Service culture capability	Embed constant improvement culture				x

5.4.5 The relationship between patient satisfaction and TAO

This section provides a quantitative analysis of secondary data collected from NHS England platform (as mentioned in section 5.3.5). These data are accessible by public. NHS England run an annual questionnaire to public to reflect how primary care services are delivered and how patients experience them. For the purpose of this study data of GP patient survey collected from 2019 (before Covid-19) to 2022 (to current year) including in between the pandemic period. That is to consider the effect of the COVID-19 pandemic when looking at results over time (see Appendix K).

Figure 5.5 presents cumulative distribution graph of the small surgeries (I, F, L) and the scores for the patients satisfaction from 2019 to 2022. Looking at the graph, we can see that the distribution lines for surgeries types of 'I', 'F', and 'L' have the same peak of patient satisfaction in 2021. That explains that patients are more satisfied with the upgraded service offering, taking into consideration, that 'I' has the highest score in the peak and 'L' has the lowest one. The line representing 'I' is the highest over the years followed by the line of 'F' then 'L' line is at the bottom. In light of this, we are able to confirm that: There is quantitative evidence of the influence of TAO, that enable surgery's service offering during Covid-19, on the services effectiveness. It is measured by the scores of patient satisfaction with surgery services. In other words, the specific nature of the GP as 'I' is the reason why they have better service offerings.

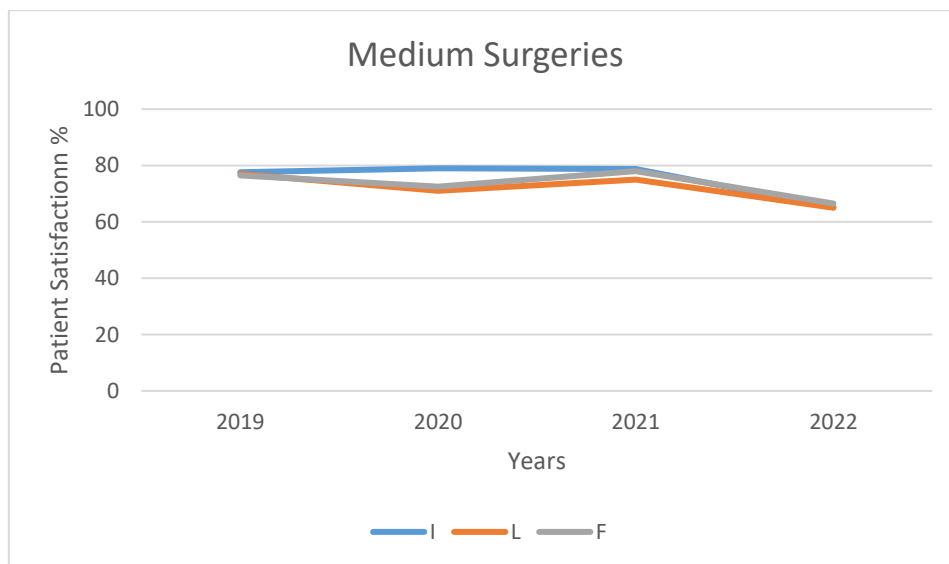


Figure 5. 5: Cumulative distribution graph of the medium surgeries (I, F, L) and the scores for the patients satisfaction

The 2022 survey was conducted from 10 Jan to 11 Apr 2022. This was after a rise in Covid-19 cases in Dec 2021 but as restrictions were being eased. The 2021 survey took place during the third Covid-19 lockdown. This wider context (explain the drop of the satisfaction score) has been taken into account when looking at results over time.

5.4.6 Summary of medium results:

This section provides an overview on medium findings. Consequently, the results of the case study analysed the constructs developed during the template analysis. The results started with the analysis of the characteristics of service offering (state1) and (state2) as presented

in the conceptual framework. The findings showed that service offering (state 1) in regard of triage system, innovators offered phone and online triage to their patients, followers offered only telephone triage and laggards never have a triage system in both forms (phone and online). All the surgeries share the same key feature which is booking appointments was always over the phone. Innovators offered online appointment booking alongside the phone system. Followers and laggards were operating fully face to face appointments, no virtual mode was on offer to patients. However, Innovators surgeries offered blended appointment modes.

In service offering (state 2), followers and laggards joined innovators by adopting triaging system over the phone. Whereas innovators surgeries kept doing triage in both forms, but they enhanced the services in aim to cut down unnecessarily face to face appointments. During Covid-19 all surgeries offer an online booking system. This is in addition to the ability to book appointments over the phone. In state 2 surgeries stopped offering fully face to face mode. Followers and laggards upgraded to blended appointment modes. Some innovators did continue to offer video calls mode. That is because of they believe that technology is still not reliable and video consultations are not popular within their population. The element of flexibility towards blended offering appeared at all surgeries. Innovators and followers keep pushing toward more utilisation of technology in running patients appointments. Laggards surgeries tend to return to the old fashion mode face to face as a respond to the resistance of their population and doctors.

Regarding the firm resources in state 2, surgeries from all types required physical capital resources, like additional laptops for their staff to operate remotely. Even the innovators ones as the proportion of the virtual service offering have sharply increased. Also, Accurx software is needed to run video calls and communicate remotely with patients. None of the surgeries reported a need to new telephone system. In order to implement the new software, additional human resources (technical assistants) at laggards, followers and innovators needed. Laggards and followers expressed a need for both non-clinical and clinical staff to provide blended service offering (state 2). In organisational capital resources, innovators and followers had to restructure their surgeries (staff working shifts or utilizing the surgery rooms in a different way). laggards apply no changes to the structure.

Regarding the operational capabilities, figure 5.6 presents a summary of operational capabilities obtained by surgeries in state 1 and in their upgrade to state 2 during Covid-19. In essence the common operational capabilities (CI1, CR1, M1, I1, MO2, MO3, T1) between innovators, followers and laggards represents state 1. These common capabilities enable laggards to move part way towards state 2. On the other hand, they enable followers to go the whole way towards state 2. That is why in state 2 the finding showed that only followers share some capabilities with innovators (CI2, I2, I3, I4, MO1, T2) and they have to work on obtaining the only innovators unique capabilities (M2, M3, T3) to fully transform to state 2.

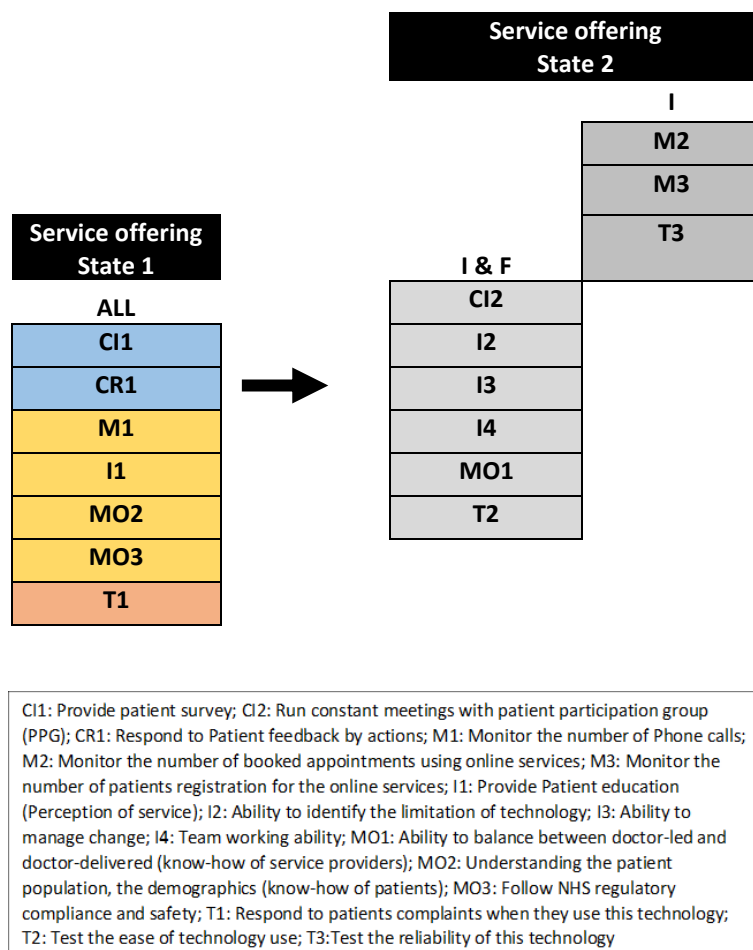


Figure 5. 6: Operational capabilities required in service offering state 1 to state 2

Regarding the dynamic capabilities required by surgeries to successfully achieve transition from service offering (state 1) to (state 2) during Covid-19, were analysed in accordance with sensing, seizing and transforming capabilities with the key additional insights. Figure 5.7 presents a summary of dynamic capabilities obtained by surgeries in state 1 and in their

upgrade to state 2. In essence the common dynamic capabilities (SN2, SZ2, TM2) between innovators, followers and laggards represents state 1. These common capabilities enable laggards to move part of the way towards state 2. On the other hand, they enable followers to go the whole way towards state 2. In the transforming way laggards and followers shared (SZ1, SZ7, SZ8) and followers only obtained (SZ6). However, that does not mean innovators does not own the capabilities of the transforming halfway state. Hence, they demonstrated that they already owned it to operate blended service offering even before Covid-19. In state 2 the finding showed that followers share some capabilities with innovators (SN1, SN3, SZ4, SZ4*, SZ5, TM1, TM2*, TM3, TM4) to fully transform to state 2.

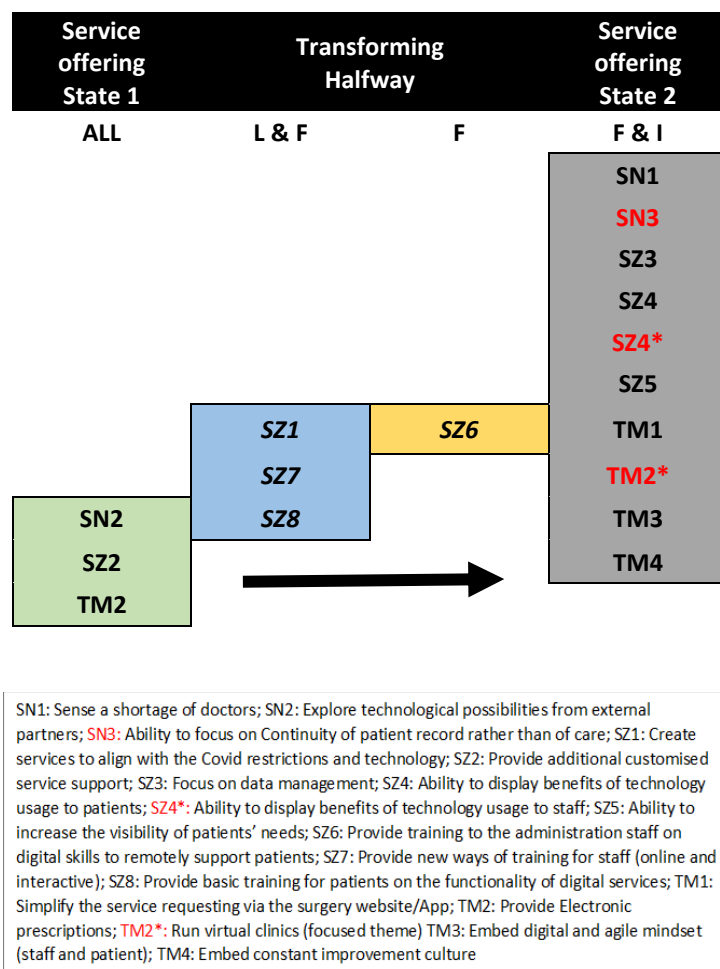


Figure 5. 7: Dynamic capabilities required to transit from service offering state 1 to state 2

5.5 Results of Large

As presented in table 5.1, this category includes surgeries with list size more than 10000 patients (the largest list size is 17500 patients in this category). In these surgeries, there are between 25 and 80 staff members, including both clinical and non-clinical personnel. The matrix of TAO has been applied to categorise the surgeries (see Appendix G)

5.5.1 The characteristics of service offering in relation to TAO

The focus of this section is on state 1 and state 2 of service offerings that surgeries offered to patients before and during Covid-19. The study investigated the enhanced-TAO at GPs surgeries by exploring the use of triage system via phone or online and the surgery's appointment booking system via phone or online as well. Furthermore, the offered appointments modes, either by the traditional way which is face-to-face or virtually over the phone or video calls. The conference calls are operated by software helps everyone involved in a patient's care to communicate. This software was adopted on national level in England called (Accurx). Table 5.12 summaries service offering in large surgeries in relation to TAO before and during Covid-19.

Pre Covid-19 triage system seems to be not in use in both forms (phone and online) by laggards and followers surgeries. Innovators surgeries offered telephone triage only by following certain criteria to prioritise some age group (under 5 and over 70s), meet urgent needs of the on the day appointments or to smooth the patient journey. Online triage has not been developed at this stage in innovators surgeries.

"No, we didn't have the triage system before Covid" (PM-21-03).

"We realized way before COVID probably two or three years that we needed to triage all of our patients" (PM-10-10)

All the surgeries share the same key feature which is phone booking appointments pre Covid-19.

"To book up pre Covid either by coming to GP surgery or over the phone as well and that was always the case" (PM-21-03)

“Pre COVID it was ring up the practice and the Governor List GP rings you back. A decision would be made if you needed to be seen, and then who you would need to be seen by” (PM-10-10)

As illustrated in table 5.16, before Covid-19, none of the laggards offered virtual appointment modes. They were operating on only face-to-face mode.

“Before COVID, it was 100 % face to face and nothing to technology” (PM-06-03)

However, Innovators and followers offered virtual mode alongside the traditional face to face mode. The virtual mode was telephone calls only, video calls were not on offer to patients.

“Both (face to face and telephone calls) no video calls... Before Covid” (PM-10-10)

“Before COVID we used to have telephone consultations. But I would say they were very minimal roughly about 10%.” (PM-17-14)

By moving to service offering (state2) during Covid 19, innovators have upgraded and upscale the triage system to add on an online option as well in aim to cut down unnecessarily face to face appointments.

“Telephone triage: because pre COVID it was unsophisticated. It was just on the phone, nothing else. And of course, if you couldn't deal with it on the phone, we called the patient in because that was where we were.... Now all updated and we use Accurx for online booking” (PM-10-10)

The most significant progress has been made by followers surgeries as they have gone from state 1 which offered no triage option to state 2 which offers two options (online and telephone triage).

“We started bringing in what was happening while telephone triage can address some of the issues, the doctors or the clinicians, who wants to see the patients to have a full history and then see their symptoms. During the COVID pandemic, we also introduced something called online or raising the request through our website.” (PM-18-03)

It is notable that laggards joined innovators and followers in adopting triage system on a wider scale, only triaging over the phone.

“Triage did not start till 2020, 2 January we started that. No online triage in our practice”

(PM-06-03)

During Covid-19 all surgeries made similar development in regard of their appointments booking system. They offer an online booking system, which was unavailable prior to Covid. This is in addition to the ability to book appointments over the phone.

“Now we have option for online request, and you can book up over the phone as well” (PM-21-03)

During Covid-19 all surgeries stopped offering fully face to face appointment mode. In other words, surgeries introduced virtual mode to their service offering including telephone and video consultations. All surgeries offered telephone calls; however, video calls are an option in innovators and followers.

“Face to face by default. Unless the patient chooses to have a telephone or a video consultation.” (PM-17-14)

Table 5. 3: characteristics of service offering (state 1 and 2) pre and during Covid-19 – Large

Service Offering			Large Surgeries			
			All	I	F	L
State 1 Pre Covid-19	Triage	Online				
		Phone		✓		
	Booking system	Online				
		Phone	✓			
	Physical Appointments face-to-face	Fully – 100%				✓
		Not fully		✓	✓	
Virtual Appointments	phone call		✓	✓		
	video call					
State 2 During Covid-19	Triage	Online		✓	✓	
		Phone	✓			
	Booking system	Online	✓			
		Phone	✓			
	Physical Appointments face-to-face	Fully – 100%				
		Not fully	✓			
Virtual Appointments	phone call	✓				
	video call		✓	✓		

The likelihood of changes in the offered appointments modes are persisting in the future was asked to all surgeries. Table 5.17 presents the finding of post Covid-19 services offerings. All surgeries introduce the element of flexibility where they give their patients a choice when they request an appointment.

Innovators will keep pushing toward online services.

“What we've done differently probably post COVID is we've tapped it up even more. So now we've got quite a sophisticated website and that website allows people to actually request appointment, put information in that appears on a portal that we have on our side. We are more digitalized” (PM-10-10)

Followers and laggards will bring face to face as a default; however, the element of flexibility will continue in their service offering.

“I think at the end of day, we do know that if we adopt technology to some extent, we can get these more appointments for the needy patients” (PM-18-03)

Table 5. 4: The characteristics of likelihood appointments modes offered post Covid/currently – Large

The current offered appointment modes	Large Surgeries		
	I	F	L
Offer a majority of Physical mode face to face			✓
Give Patients the choice. Clinics will be split by modes	✓	✓	✓
Offer a majority of virtual mode. phone or video calls	✓	✓	

5.5.2 Practice resources in relation to TAO

This section will focus on the firm resources that is required to provide service offering (state 2) during Covid-19. It will discuss the physical, human and organisational resources needed for implementing the enhanced technology within the surgeries. The findings of these resources are presented in table 5.18.

Regarding the physical capital resources, followers and laggards required additional laptops for their staff to operate remotely.

“We did not have much access to work from home or you know we did not have enough IT equipment laptops compatible” (PM-17-14)

Innovators have enough to face the huge shift of the blended service offering (stat 2)

“We have enough tech in the building for the GPs to actually shift to working completely at home. We've got a cloud-based phone system...it was a novelty element. We didn't struggle

because we originally already had about 10 laptops in the practice that could use away from my desk. So, we already have that because we used to do remote working for bits and pieces anyway” (PM-10-10)

Furthermore, all surgeries needed a special software to run their video calls and communicate remotely with patients.

“Just as COVID was humming along... we had just started this program, Accurx. You know that it could do videos, it could do texting and all that stuff.” (PM-06-03)

Regarding human capital resources, innovators needed no additional human resources due to the maturity and familiarity they had in delivering alternative appointments before Covid-19. In order to implement the new software none of the three types of surgeries needed technical assistants.

During COVID-19, laggards and innovators expressed a need for both non-clinical and clinical staff to provide blended service offering (state 2) to patients.

“Right now, we are hiring physician associates and another clinical pharmacist.... We get more staff we can do more” (PM-06-03)

“During COVID, because we have to look after the patients.... there was a struggling with staffing issues due to the with people being sick” (PM-21-03)

The organisational capital resources focus on the surgery structure, all surgeries mentioned the need to apply some changes regarding their staff working shifts or utilizing the surgery rooms in a different way as pre Covid-19.

“We got to protect our people and stuff. So, we had to come up with all this new way of working and which actually most of the way it worked out quite well.” (PM-21-03)

“Is it about throwing bodies to meet the demand or is it the trained people structurally doing things? I say if you take a balance of both aspects, it will be successful. Just because I'm getting 100 calls in the morning at 8:30 to because that's the peak time, 8:00 to 8:30 they call at the end of day. If I have five receptionists that if I have 10 receptionists, the thing they have is only 100 appointments. They're not going to get anything more than that or 150 appointments, right?” (PM-18-03)

Interestingly all large surgeries mention lack of funds and financial support, that might be linked to the large list size they are dealing with where variety of needs are bigger compared to medium and small surgeries.

“Our funds in my opinion are not fit for purpose anymore. It paid GP a very minimal amount per patient per year and with unlimited service level, the patient can have 10 appointments, 20 appointments, 100 and a year for the same money.” (PM-17-14)

Table 5. 5: Required resources for surgeries to provide service offerings (state 2) – Large

Practices resources (BVR)		Large Surgeries			
		Common	I	F	L
Physical capital resources	Laptops			✓	✓
	Telephone system				
	Accurx	✓			
	Video and texts system				
Human capital resources	IT assistant				
	Non- Clinicians - admin			✓	✓
	Clinicians			✓	✓
Organisational capital resources	Restructure the surgery	✓			
	Keep the structure				
	Lack of Funds	✓			

5.5.4 Operational capabilities to deliver the service offering

In this section the required operational capabilities to provide service offering (state 2) in GPs surgeries are discussed. Three operational capabilities are covered in this study, customer, managerial and technical capabilities. See Appendix I for coding operational capabilities. Table 5.19 provide a summary of the operational capabilities analysis findings.

To begin with the common operational capabilities between the three types of surgeries. In terms of customer capability, the customer involvement (CI1) is a common capability where surgeries demonstrated direct involvement with patients by running in house survey in addition to tracking GP patient survey on NHS England website.

“I always provide in house survey in addition to NHS survey to keep the interaction with patients.” (PM-18-03)

“A specific group who prefer phone calls like mainly working class and young people would prefer it, so we provide a choice I know that from our patient survey” (PM-21-03)

“If you look at our patient survey during COVID, the satisfaction went up because it didn't really get down, but everyone else's went down. If you know what I mean because it wasn't a huge change for our patients” (PM-10-10)

Surgeries also share customer response (CR1), which refers to an organization's ability to respond effectively and quickly to customer needs. This is demonstrated by managers' ability to respond to patient feedback.

“We got feedback from patients then we work on t how to improve things when possible” (PM-06-03)

“I have always feedback from our patients. So, it's pretty much to the same level before covid with the exception of patient who wants telephone or virtual consideration because it suits their lifestyle.” (PM-17-14)

In terms of the common managerial capability, three capabilities are discussed, the ability of monitoring, involvement, and managing operations.

All monitoring capabilities are common among the three types of surgeries. They are the ability to monitor and report progress. Mangers showed ability to monitor how patients book their appointments over the phone (M1)

“Therefore, I monitor the calls coming to surgery to book an appointment and try to get these calls less.” (PM-06-03)

Mangers demonstrate ability to monitor the online booking system (M2). By analysing these data, managers can better understand how services are performing and how to improve them.

“I am keen on monitoring online booking system. An example, if patients want to cancel online. The cancel is immediately removed from the system and so that appointment is available for someone else. So, there's less wastage in the system, because those appointments will get reused at that point, whereas before the patients were just DNA” (PM-10-10)

Managers also monitor their patients' online registration to understand their acceptance or struggle in using technology to access service offering (M3).

“To monitor the flows at the practice, so if we see the data, we are kind of monitoring ourselves... we are a technology oriented PCN and we use a technology in the right way, and we keep it consistent” (PM-18-03)

All involvement capabilities are common among the three types of surgeries. They are the be actively involved in TAO activities at the working level. Patient education is a key factor in facilitating blended service offering during Covid-19 (11). Mangers mentioned that the ability to educate and set patients perception about GPs service is an essential task in order to operate successfully during Covid-19 restrictions.

“We're in a culture of I need it now. So, if something happens, I need it now. I need my prescription now. I need my letter for my child. Now. I need everything now. There is an education period. Click and collect, isn't it? Click and collect or go to an Amazon locker and your prescription will be there. I do agree there is a huge education piece and I think that's the thing that will make this different. If we can get the education piece done for people to realize what is important, what isn't important to understand the service and understand the demands on the service, that kind of things” (PM-10-10)

“On another note, educating your patients is a must, mainly to set their expectations from the services” (PM-06-03)

Mangers show the ability to identify the limitation of technology and operate accordingly (12). They expressed the opinion that some clinicians were reluctant or unsatisfied with the virtual appointment modes in diagnosing illnesses.

“Most GPs if you ask them, don't like video consultations. They don't mind telephone triage and dealing with a little cough or something over the phone and just dealing with that over the phone. But if it's more than that, I think they want them in the room. So, we reduce the video calls, and we are keeping the triage” (PM-10-10)

“Some patients would love to have online consultation is suits me. I don't have to travel. I don't have to take time off from work, there's so many advantages and obviously sometimes like it. I think we have to respect patient to see in and unless at the clinical reason who sometimes think it is not as effective as face to face in diagnoses. So, we do triage before” (PM-17-14)

In regard of the ability to manage change (I3), the managers recognised change resistance. Either because of the language, culture or age barrier.

“That's a human behaviour, isn't it? When you look into the change management and a human goes through the cycle of changes. So, there will be always retaliation because of not just resistance of change, actually.” (PM-21-03)

“Here you sometimes you may have to use language as a native means to connect to the patients. You need to do that and that helped us because I had a staff who can speak up to 8 to 9 languages. So that helped us for us to handle different types of issues” (PM-18-03)

The last common involvement capability is team working ability (I4). All surgeries types discussed the importance the ability of managers to be available on request and to provide a quick response to the team. Since the surgeries are large and had more staff members than other surgeries in categories 1 and 2, communication is vital.

“For person with the management experience comes around and actually put things in much better structured way. Where clinician has to just worry about the clinics that look after the patients mainly. and that's how it's been working with us. In my management team, I have a couple of more admin team and I have clinical manager as well as a clinical background and a manager who looks after they start routers and stuff like that and that way, we essentially are running the whole surgery, making sure they're smooth execution of the replaces. We are working quite closely together on a daily basis” (PM-21-03)

“There is always a sharing, and you know we have a WhatsApp group. If there is any problem, they will post on that and then one of us will respond.” (PM-18-03)

To manage operations effectively, managers demonstrate the importance of understanding the patient population and the demographics. In other words, it is know-how of patients (MO2). All surgeries emphasized on this capability practically when providing blended services to patients.

“Our services are to do with the size of the practice and the demographics and the demand and the age.” (PM-10-10)

“We are in a very deprived area of Birmingham. The demographic is very inner city. We have deprived patients. But what I have noticed is that most of our patients have more social issues rather than medical issues. That would affect the shape of our services” (PM-06-03)

“Many of my population miss their health check appointments. What I am doing is Health check at the same time with vaccination. I believe is going to make a big breakthrough for us next year in terms of optimizing the appointments.” (PM-18-03)

All surgeries are aware of regulatory compliance and safety aspects by NHS (MO3). The main risk associated with the implementation of Accurx software is the privacy of patient data, as this service requires remote access to some sensitive data (e.g., age, personal address, health issues, family history....). Hence, the process has to be established in order to ensure the patients privacy concern has been addressed.

“On NHS side, like a digitally wise transformations that are happening, we are saying that actually now when patient move between one side to another side, the notes can be sent electronically before it used to go manually by post, security wise is better” (PM-21-03)

“We as a PCN around the same clinical system we made that decision to avoid any discrepancy. We all five practices now have got the same website implementation. So, the advantage we have is that I have access to all the five practices to see how the data is going. We kind of support each other. That all be aligned with NHS regulations.” (PM-18-03)

The ability to monitor the progress of TAO effectively by coming over the high level of bureaucracy (MO4) is a capability found in large surgeries only.

“They impose certain things which is generally going to cause the workload more, but we don't see them translating into greater benefits for patients. There is a lot of bureaucracy on that” (PM-18-03)

“GP workload is increased, but it has nothing to do with the patient demand. The problem is the bureaucracy that's now come with everything it has gone absolutely beyond a joke. I've been there for long enough. The level of bureaucracy is just unbelievable.” (PM-10-10)

“We are stuck with the bureaucracy. Best working system through surgery where system can talk to each other. Because that will reduce so much of inefficiency within the system” (PM21-03)

In term of technical capability, which is the ability to evaluate the suitability of new technologies to processes. Managers measure it by the number of complaints they would receive for their patients (T1).

“We didn't plan for COVID, but of course it meant our patients didn't see a huge change. I mean they still mourned if they couldn't come in every five minutes to whatever cause, I got these kinds of complaints. Of course, the building was locked in a period of time, but it was locked in the shortest period that we could, and it didn't really change our appointments.”

(PM-10-10)

“The whole idea that we're trying to keep things very patient centric, probably and putting ourselves in the place of the patient, we look at the complaints, that if I need for my doctor today, do I have an option for that then yes, we have option for that. And if I want to, if I'm not free today, but I want to go home and see my doctor next week, do I have option for that and then we are providing that option as well” (PM-21-03)

“We respond to complaints and work on changes, such as I would love to have online consultation suits me. I don't have to travel or to take time off from work.” (PM-17-14)

They also measure it by the ability to test the technology ease of use (T2) There is unanimous agreement among all managers on this capability. They shared the same key point which is the ease of use of the enhanced technology such as triaging forms, surgery website or App.

“It's not about how sophisticated your system is. If the usability is not there, this is where I give an analogy back to iPhone and Steve Jobs. The success of iPhone is because of the usability. If that usability is not there, it's going to fail. I had my own doubts for this website to fail, thinking that language is the barrier, but that is not the case.” (PM-18-03)

“Easy guided website, when they send an issue of medical in admin. We used to send it back to them and say this is a medical issue. Please put it back in the medical section and we will get it sorted for you, which we did so slowly but surely, suddenly the admin issue went down and moved the medical issue, it doesn't matter, but at least they were trained to do that”

(PM-06-03)

“Now we've got quite a sophisticated website... and that website allows people to actually request appointment, put information in that appears on a portal that we have on our side. And the clinician goes through and does the telephone triage from what the request and our patients are really getting used to that now because of course they can type a load of information easily.” (PM-10-10)

Following the presentation of the common operational capabilities of the three types of surgeries. A number of similarities were noted between the followers and innovators. The first capability relates to customer capability, the customer involvement (CI2). Both innovators and followers displayed the ability to create the environment for the customer to have direct interaction and engagement by running a constant patient participation group (PPG). In this kind of meeting managers offer close contact with patients and explore their most recent needs and alter the surgery services accordingly.

“I am keen of running PPG, it is an informal way to contact our patients and come closer to their problems.” (PM-17-14)

“What helps the surgery is patients understanding of our services, we talk to them in PPG meetings in addition to us listening to them, you see it is two ways communication.” (PM-10-10)

Managing operations is the ability of managers to administer tasks and functions effectively. It is another common managerial capability between innovators and followers surgeries. Managers clarify this as the ability to balance between doctor-led approach and doctor-delivered (know-how of service providers) (MO1).

“A decision would be made if you needed to be seen, and then who you would need to be seen by, because we got from physicians, so ships through to a GP or a nurse or even the HRA, depending on what it was. We have a various range of clinicians to deliver mainly” (PM-10-10)

“You can imagine with this volume of patients; we have like a duty doctor system. And all-over sufficient staff are trained in kind of taking some information and let. So, the duty doctor sits with the reception team and as the calls come, the reception team will take the information as much as they can. They'll put the patient call on hold and they will speak with

duty doctor, and she will decide. Book with physical therapist, our pharmacist or GP doctor or book it with me. I will sort this out. So basically, we filter the demand and release pressure on GPs” (PM-17-14)

The last technical capability shared between innovators and followers is ability to determine technology reliability (T3). Mangers mentioned that the technology would be suitable for their practice if it is reliable.

“I think our practice was quite lucky to offer our patients livvi service as well. So, we if you look at our website, we still offering Livvi appointments, like video call after filling a triage form, as they are reliable and very efficient.” (PM-17-14)

“There was also photos of rashes and photos of anything like that. That was communicated backwards and forwards. And we're still doing that by using that Accurx mainly as the main source, and that's heavily used as by everybody now, a technology you can rely on” (PM-10-

10)

Table 5. 6: Operational Capabilities – Large

Code	Operational capabilities	Theory	Practice	All	I&F
CI1	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engagement in the service delivery	Provide patient survey	x	
CR1	Customer response	It is the competence of an organization in serving customer needs through effective and quick actions.	Respond to patient feedback	x	
M1	Monitoring	The ability to monitor the progress of TAO effectively.	Monitor the number of Phone calls	x	
M2	Monitoring	The ability to monitor the progress of TAO effectively.	Monitor the number of booked appointments using online services	x	
M3	Monitoring	The ability to monitor the progress of TAO effectively.	Monitor patients registration for the online services	x	
I1	Involvement	The ability to be actively involved in TAO activities at the working level	Provide patient education (Perception of service)	x	
I2	Involvement	The ability to be actively involved in TAO activities at the working level	Ability to identify the limitation of technology	x	
I3	Involvement	The ability to be actively involved in TAO activities at the working level	Ability to manage change	x	
I4	Involvement	The ability to be actively involved in TAO activities at the working level	Team working ability	x	
MO2	Managing Operation	The ability to administer tasks and functions effectively.	Ability to understand patient population, the demographics (know-how of patients)	x	
MO3	Managing Operation	The ability to administer tasks and functions effectively.	Follow NHS regulatory compliance and safety	x	
MO4	Managing Operation	The ability to monitor the progress of TAO effectively.	Come over the high level of bureaucracy	x	
T1	Technical	The ability to evaluate the suitability of new technologies to processes.	Respond to patients complaints by actions	x	
T2	Technical	The ability to evaluate the suitability of new technologies to processes.	Ability to test the technology ease of use	x	
CI2	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engagement in the service delivery	Run a constant patient participation group meeting		x
MO1	Managing Operation	The ability to administer tasks and functions effectively.	Focus to balance between doctor-led approach and doctor-delivered (know-how of service providers)		x
T3	Technical	The ability to evaluate the suitability of new technologies to processes.	Ability to determine technology reliability		x

5.5.5 Dynamic capabilities required to transition between different service offerings

The purpose of this section is to describe the specific capabilities required to successfully transit to service offering (state 2) during Covid-19. Various capabilities were categorized according to different dimensions or stages of dynamic capabilities (sensing, seizing and transforming capabilities). See Appendix J for coding dynamic capabilities Table 5.20 presents the findings and analysis of dynamic capabilities in large.

The analysis begins with the common dynamic capabilities between the three types of surgeries. In sensing capabilities, the technology sensing capability (SN2) is in common where managers had the opportunity to explore the possibilities offered by their local PCNs or CCG as part of NHS England support prior to the arrival of Covid-19. However, Followers and laggards never adopted such technologies before Covid.

“I can only talk about myself and talk about the PCN that we are working hard to do things in a right way and providing the services to our patient. For us without Covid, it might take even another 10 years, not one or two years or two forced everyone to find a way and do it.”

(PM-21-03)

“COVID has made everyone to go for a telephone consultation at least for until the COVID vaccination came. We were less technology before regarding triage and booking system”

(PM-18-03)

In term of seizing capabilities, the digitalisation capability, data management (SZ3) is in common. It is related to utilising the connected service (different modes of appointments availability) and the enabler technology to facilitate service delivery. Accordingly, surgeries have to have the ability of using data analytics to extract useful information from the patients requests and spotting the trends to meet their demand.

“I understand the need for data to act accordingly” (PM-10-10)

“We kind of adopted the same technology and we turn to monitor our data performance at a PCN level, which is one of the requirements from ICB and NHS England that's called the Direct Enhanced Specification contract, that will increase the visibility of patients flow” (PM-

18-03)

There are two common transforming capabilities. The first one is the services processes for developing efficiency gains capability (TM1). Managers showed the importance of simplify the service requesting via the surgery website and phone App which supported by NHS.

“We have a system here whereby patients get notified by text that they have appointment, and they can reply back with if they don't want the there's less wastage in the system, they can also see their appointment, they'll get reminded by the app. But at least our texting allows, and it's automatic.” (PM-10-10)

“We have everything in place for the patients, they can cancel with the message. They can log into online into their portal and cancel from there. So obviously from the patients perspective, if they can engage with the primary care better.” (PM-17-14)

“Patients nowadays everything is on their mobile. They even want to book their appointments on the mobile, cancel, request services” (PM-06-03)

The second capability it is related to the ability to provide electronic prescriptions (TM2). One of the advantages surgeries have gained from Covid-19 is the shift toward electronic prescriptions, which has reduced the number of appointments requested and the number of calls coming into the surgery to locate prescriptions. Additionally, this service stopped the printing of prescriptions and cut of patients journeys to the surgery. Mangers believe that will have a positive impact on the environment.

“Electronic prescription It gives you more flexibility as well, no calls no headaches. Environment friendly as well. Travel to surgery has been reduced.” (PM-21-03)

“Everyone gets electronic prescriptions automatically, it is a revolution, no more printings, no calls” (PM-10-10)

“Two-way benefits, to us and to patients, of electronic prescriptions that came out of Covid. No more misuse to our phone system and less travel to patients” (PM-17-14)

Laggards and followers shared four seizing capabilities. Firstly, the digital service development capability (SZ1), where manager had to create services to align with the Covid restrictions and technology. Surgeries had to own and develop this capability by meeting patients' needs and provide blended service offering (state 2) during Covid-19. It was necessary for all of the surgeries to upgrade to the new software during the pandemic (see

section 5.3.2) as well as limiting physical contact with patients in the first wave of the COVID-19.

“During Covid we had to adopt. We had to come up with all this new way of working.... We learned the lesson patient got used to new way of working ago and so a lot of people actually still like we are open fully for face to face anyone wants face to face they can book a face to face anyone want to video consultation they can do a video consultation. But still, some people actually ask for only phone consultation.” (PM-21-03)

“Before COVID we used to have telephone consultations. But very minimal.... Now we had a like a mix of appointments or somewhere online to be booked” (PM-17-14)

Secondly, the digitalisation capability (SZ4) which relates to the managers ability to display benefits of technology utilization to patients as a necessity to access service offering (state2). That encourages patients to register online (facilitating quicker services and communications). Furthermore, to accept the shift towards more triaging, online booking and virtual appointments where their needs will be met as the same level of care as the face-to-face mode.

“One thing I tend to do is when I'm trying to introduce the first three months, I understood that just having one traditional access, which is telephone and then closing the doors and then making everybody to wait is not going to work. I need to find a suitable platform so that the patients don't need to wait or to at least their concerns are heard, we are working on pushing them to register online.” (PM-18-03)

The third seizing capability is related to staff training on digital skills (SZ7). Managers provides new ways of training for staff (online and interactive).

“It has better use the liberation of the resources. Most importantly, train the staff properly, give them small and focused tasks, because they have to lead the change with you.” (PM-21-03)

“Workforce is a huge challenge in the primary care. we are trying every possible avenue. To get the manpower that we need to deliver what we need to deliver for our patients. Training the current staff is important, they will support the patients at the end.” (PM-17-14)

The last common seizing capability is the capability related to training on digital skills (SZ8). Followers and Laggards had to provide a basic training for patients on the functionality of digital services.

“Patients have to be trained. So, if you don't train them to be direct to what they want, it won't happen. Let them see the benefits” (PM-06-03)

“I trained my patients. For example, they raise their request and then they were promptly addressed. It was like a word of mouth. It caught like a fire. The people actually started even without we even formally publicized the patients, relatives. Those people came to know. Then they started raising this one and then average. We started getting around 50 to 60 requests a day to begin with. It went up to 100 and then now it is stabilized at 72 to 75.”

(PM-18-03)

In the followers, it was demonstrated that they possess two unique seizing capabilities. In the digitalisation capability, they displayed the use of technology to their staff (SZ4*).

“I kind of pre educated the staff to say that we're going to bring something new. It'll have some overhead to begin with.... but it will benefit you. Staff are sceptical, they said, it's covered. It's going to be difficult. I said you don't need to worry about it. I will keep on informing you about the progress. Until it is done and showed the benefits” (PM-18-03)

Also, in they demonstrated the capability related to staff training on digital skills (SZ6) which means by training the administration staff on digital skills, they will be able to remotely support patients and facilitate service offering (state2).

“Training the administration staff on digital skills to remotely support patients was a priority in our practice.” (PM-17-14)

A comparative analysis of innovators and followers reveals seven capabilities that differentiate them from the laggards. In the sensing capability, they shared marketing sensing (SN1). It is when managers sensed a shortage of doctors and realised that the service offering (state 1) will not sustain the increased demand on GPs.

“We have short shortage of GP, shortage of clinicians, shortage of practice nurses, well known fact if they start doing the right things only and technology do the non-clinical things”

(PM-10-10)

“We need to have those nurse appointments, so we are kind of now trying to get the health kiosk which will measure your weight to BP height and other things are and then it will send as an automated data feed into our clinical system. So, we are thinking, this kind of things can create more appointments as we are short of clinicians before Covid” (PM-18-03)

The other sensing capability is the technology sensing capability, which is the ability to focus on Continuity of patient record rather than of care (SN3). That will help to absorb the spikes in the patients’ demand.

“Our practice offers our patients online consultation services (Livvi app), the only disadvantage of these alternatives is you will see a GP or a doctor who probably you haven't seen before. There's no continuity of care BUT most importantly is continuity of records and they can only do limited stuff because obviously they can only solve your imminent problem” (PM-17-14)

“We're a big surgery probably quite technically advanced compared to most places, because we're quite interested in tech, where some places are not. We're probably quite sophisticated, trying a brand-new clinical system at the moment and that kind of stuff we we're quite prepared to play with stuff if what I mean and see if it actually works. We want our patients to be seen, I focus on of continuity of records. A new mentality.” (PM-10-10)

In term of seizing capabilities, surgeries showed ability to provide additional customised service support, it is called mass service customisation capability (SZ2). SZ2 requires running data collection (e.g., patients surveys) in order to tailor the offerings to suit the large variety of patients’ needs. The main focus of the surgeries is to increase patients online registration so they will be able to access their services.

“We collect data to modify our services to meet the needs of a wide variety of patients. It is the primary objective of the surgery to increase online registrations so that patients can access services online” (PM-17-14)

“We got Accurx quite early on literally day one because I also sit on the CCG's digital program board, so I'm a bit more aware of the IT was coming. Basically, we put that on the system and then of course, we started the digital element of the communication and the

pictures and all of that sort of stuff that literally started day one, took the patients a while to get used to, looking at our data but they got there.” (PM-10-10)

Moreover, followers and innovators share network management capability (SZ5), which means increase the visibility of the surgery network to enable the system to divert patient needs to the right service. Accordingly, surgeries have to expand their team to include other non-clinicians in order to meet patients non-clinical needs. Surgeries have to proactively deliver appointments to patients as soon as they can. This requires surgeries to have the capability of effective communication within their network and ensure the visibility of real-time patients demand among the team to meet patients various needs.

“The best way of working is that you actually give those things which are nonclinical to nonclinical person to deal with that.” (PM-10-10)

“If the clinical and nonclinical expansion, in my view goes hand in hand it's going to help to free some unneeded GP appointments by physio therapist or social prescriber” (PM-18-03)

In terms of transformation capabilities, followers and innovators share three capabilities. Managers adopt some services processes for developing efficiency gains capability (TM2*). They show ability to run virtual clinics (focused theme). The aim is to target a certain group of patients in an efficient way.

“We run a walk with your GP session, one hour every Wednesday afternoon for diabetic patients, they exercise with their GP and talk about concerns” (PM-10-10)

“Cycling clinic is very popular for people who are overweight, we do clinics just for smoking patients to support and do health check” (PM-18-03)

The second common transforming capability is the service culture capability (TM3). As a result of Covid-19 restrictions and the available technology via NHS, surgeries focus on meeting patients demand while responding to emerging technological trends, hence, they need to have an agile culture in order to continuously improve their offering and keep up with the dynamic market needs and technological trends.

“If the GP is doing the phone consultation, at least that make sure that person has a control session that they I'm not relying on the patient to actually appear because when they're not appear, they're wasting 10 to 15 minutes of the GP time, which could have been utilized for

someone else.... Because GP called them, and they pick up the phone and they have a consultation. So that has in that regard, it has become more productive actually. The flexibility of the system and GP mindset” (PM-17-14)

“We've had a lot of pushbacks from the website. They don't understand it. They don't use. But we've just persevered with it. And try to plant flexible mindset.” (PM-10-10)

The third shared transforming capability is the service culture capability (TM4). It is related to managers ability to embed a constant improvement culture.

“System improvements are different way of working. Something could be more efficient, but they know they're used to that, and they don't want to move from there so that these are normal human behaviour. You have it, you have that kind of resistance, and you move on and that's what we do as a management that especially when you have a mindset of continuous improvement which we are trying to do” (PM-17-14)

“You start surviving and then you start excelling, that is what we are doing within our PCN and the good thing about our PCN is that me, we tend to work pragmatically. We tend to do things in such a way that we don't worry about what happens as a noise in the media. For us, at the end of day, if we are able to use technology and have been able to automate and take out some of the clinician admin work, we'll be happier on that day. These are the outcomes which make us happy. Keep improving” (PM-18-03)

Table 5. 20: Dynamic Capabilities – Large

Code	Dynamic capabilities	Practice	All	L&F	F	F&I
SN2	Technology sensing capability	Explore technological possibilities from external partners	x			
SZ3	Digitalisation capability	Data Management	x			
TM1	Services processes for developing efficiency gains capability	Simplify the service requesting via the surgery website/App	x			
TM2	Services processes for developing efficiency gains capability	Provide Electronic prescriptions	x			
SZ1	Digital service development capability	Create services to align with the Covid restrictions and technology		x		
SZ4	Digitalisation capability	Display benefits of technology usage to patients		x		
SZ7	Capability related to staff training on digital skills	Provide new ways of training for staff (online and interactive)		x		
SZ8	Capability related to staff training on digital skills	Basic training for patients on the functionality of digital services		x		
SZ4*	Digitalisation capability	Display benefits of technology usage to staff			x	
SZ6	Capability related to staff training on digital skills	Training the administration staff on digital skills to remotely support patients			x	
SN1	Market sensing	Sense a shortage of doctors				x
SN3	Technology sensing capability	ability to focus on Continuity of patient record rather than of care				x
SZ2	Mass service customisation capability	Provide additional customised service support				x
SZ5	Network management capability	Increase the visibility of patients' needs				x
TM2*	Services processes for developing efficiency gains capability	Run Virtual clinics (focused theme)				x
TM3	Service culture capability	Embed digital and agile mindset (staff and patient)				x
TM4	Service culture capability	Constant improvement culture.				x

5.5.5 The relationship between patient satisfaction and TAO

This section provides a quantitative analysis of secondary data collected from NHS England platform (as mentioned in section 5.3.5). These data are accessible by public. NHS England run an annual questionnaire to public to reflect how primary care services are delivered and

how patients experience them. For the purpose of this study data of GP patient survey collected from 2019 (before Covid-19) to 2022 (to current year) including in between the pandemic period (see Appendix K). That is to consider the effect of the COVID-19 pandemic when looking at results over time.

Figure 5.8 presents cumulative distribution graph of the small surgeries (I, F, L) and the scores for the patients' satisfaction from 2019 to 2022. Looking at the graph, we can see that the distribution lines for surgeries types of 'I' and 'L' are very similar in their trend. Certainly, the value score of 'I' line has been higher 'L' line all over the years. That can be explained as 'I' patients are more satisfied with the upgraded service offering that 'L' patients. Surprisingly, line 'F' started with the highest patient satisfaction score in 2019. Then it suffered a sharp decline from 2020 to 2021. That is a result of the changes which 'F' surgeries are trying to implement and patients resistance. After a while (from 2021 to 2022) of TAO, the line 'F' is the highest in 2022, followed by the line of 'I' then 'L' line is at the bottom as expected. In light of this, we are able to confirm that: There is quantitative evidence of the influence of TAO, that enable surgery's service offering during Covid-19. It is measured by the scores of patient satisfaction in surgery services. In other words, the specific nature of the GP as 'I' is the reason why they have better service offerings.

The 2022 survey was conducted from 10 Jan to 11 Apr 2022. This was after a rise in Covid-19 cases in Dec 2021 but as restrictions were being eased. The 2021 survey took place during the third Covid-19 lockdown. This wider context (explain the drop of the satisfaction score of 'I' and 'L') has been taken into account when looking at results over time. However, 'F' needed this time to excel their capabilities and reduce patients' resistance.

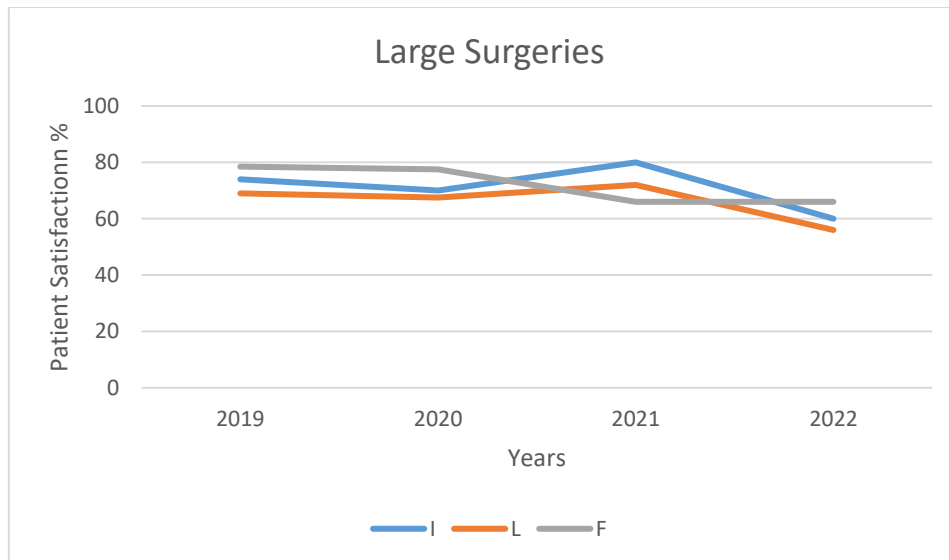


Figure 5. 8: Cumulative distribution graph of the large surgeries (I, F, L) and the scores for the patients satisfaction

5.5.6 Summary of large results

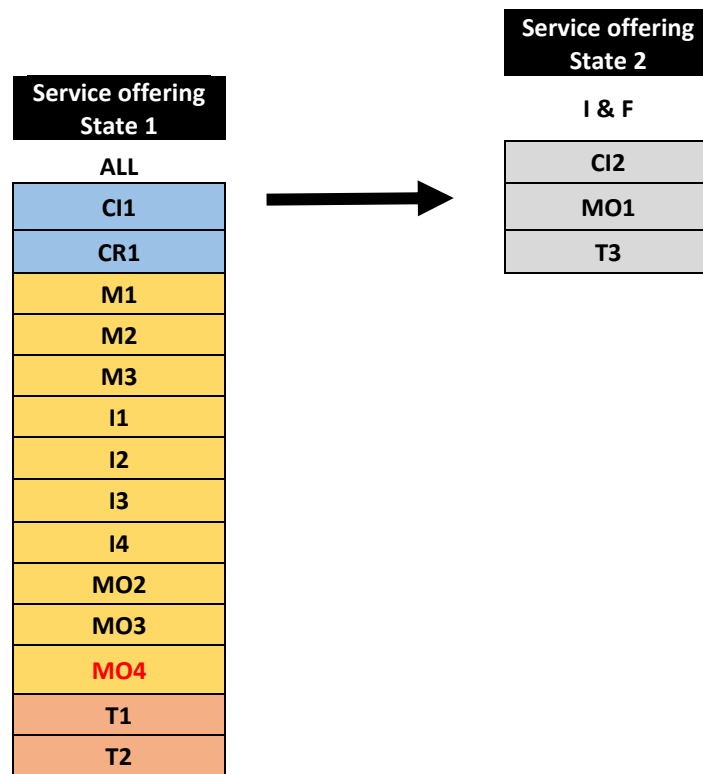
This section provides an overview on large findings. Consequently, the results of the case study analysed the constructs developed during the template analysis. The results started with the analysis of the characteristics of service offering (state1) and (state2) as presented in the conceptual framework. The findings showed that service offering (state 1) in regard of triage system over the phone seems to be only popular in innovators. Followers and laggards did not offer triages pre Covid-19. All the surgeries share the same key feature which is booking appointments was always over the phone. None of the surgeries offered online appointment booking. Laggards were operating fully face to face appointments. However, in the case of large surgeries followers joined Innovators in offering blended appointment modes.

In service offering (state 2), followers joined innovators and have a huge transformation by adopting triaging system online and over the phone. Laggards made a small improvement step by adopting phone triage and stayed reluctant by not adopting online triage system in the foreseen future. Whereas innovators surgeries kept doing triage, but they enhanced the services. During Covid-19 all surgeries offer an online booking system. This is in addition to the ability to book appointments over the phone. In state 2 surgeries stopped offering fully face to face mode. Laggards upgraded to blended appointment modes by offering only phone calls. Innovators and followers added on video calls to their virtual modes. The

element of flexibility towards blended offering appeared at all surgeries. Innovators keep pushing toward more utilisation of technology in running patients appointments. Followers and laggards in this category keep operating upon their patients requests neither push towards more virtual nor back to more face-to-face mode.

Regarding the firm resources in state 2, followers and laggards required physical capital resources, like additional laptops for their staff to operate remotely. Innovators were well prepared and had extra resources. However, all surgeries needed Accurx software to run video calls and communicate remotely with patients. None of large surgeries needed an update to their telephone system. Innovators needed no additional human resources due to the maturity and familiarity they had before Covid-19. In order to implement the new software laggards and followers did need technical assistants because they have big number of staff, so this need was met internally. Laggards and followers expressed a need for both non-clinical and clinical staff to provide blended service offering (state 2). In organisational capital resources, all surgeries had to restructure their surgeries (staff working shifts or utilizing the surgery rooms in a different way). Interestingly, only in this category, surgeries demonstrated lack of funds and the need to financial resources.

Regarding the operational capabilities, figure 5.9 presents a summary of operational capabilities obtained by surgeries in state 1 and in their upgrade to state 2 during Covid-19.



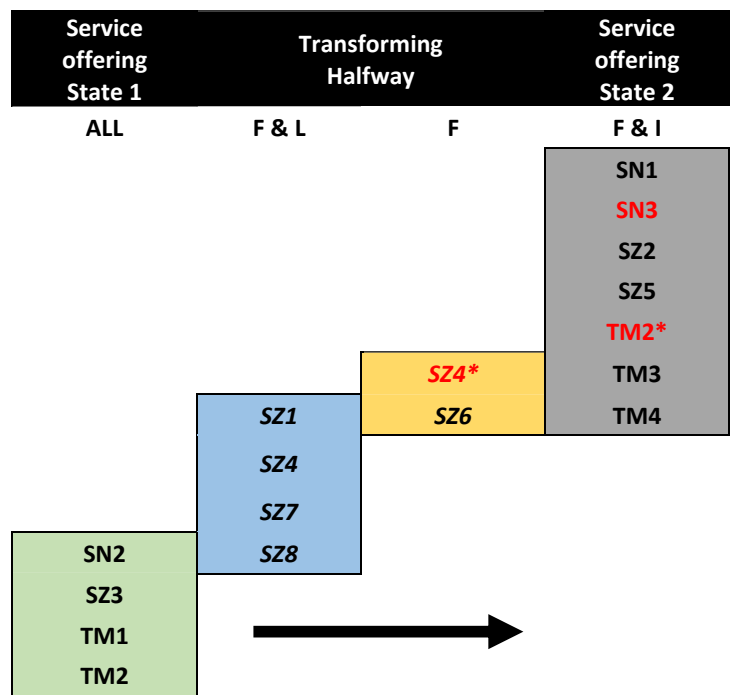
CI1: Provide patient survey; CI2: Run constant meetings with patient participation group (PPG); CR1: Respond to Patient feedback by actions; M1: Monitor the number of Phone calls; M2: Monitor the number of booked appointments using online services; M3: Monitor the number of patients registration for the online services; I1: Provide Patient education (Perception of service); I2: Ability to identify the limitation of technology; I3: Ability to manage change; I4: Team working ability; MO1: Ability to balance between doctor-led and doctor-delivered (know-how of service providers); MO2: Understanding the patient population, the demographics (know-how of patients); MO3: Follow NHS regulatory compliance and safety; MO4: Ability to come over the high level of bureaucracy (*Large surgeries only*); T1: Respond to patients complaints when they use this technology; T2: Test the ease of technology use; T3: Test the reliability of this technology

Figure 5. 9: Operational capabilities required to deliver service offering state 1 to state 2

In essence the common operational capabilities (CI1, CR1, M1, M2, M3, I1, I2, I3, I4, MO2, MO3, MO4, T1, T2) between innovators, followers and laggards represents state 1. These common capabilities enable laggards to move part way towards state 2. On the other hand, they enable followers to go the whole way towards state 2. That is why in state 2 the finding showed that only followers share some capabilities with innovators (CI2, MO1, T3) and they to excel them to fully transform to state2.

Regarding the dynamic capabilities required by surgeries to successfully transition from service offering (state 1) to (state 2) during Covid-19, were analysed in accordance with

sensing, seizing and transforming capabilities with the key additional insights. Figure 5.10 presents a summary of dynamic capabilities obtained by surgeries in state 1 and in their upgrade to state 2. In essence the common dynamic capabilities (SN2, SZ3, TM1, TM2) between innovators, followers and laggards represents state 1. These common capabilities enable laggards to move part of the way towards state 2. On the other hand, they enable followers to go the whole way towards state 2. In the transforming way laggards and followers shared (SZ1, SZ4, SZ7, SZ8) and followers only obtained (SZ4*, SZ6). However, that does not mean innovators does not own the capabilities of the transforming halfway state. Hence, they demonstrated that they already owned it to operate blended service offering even before Covid-19. In state 2 the finding showed that followers share some capabilities with innovators (SN1, SN3, SZ2, SZ5, TM2*, TM3, TM4) to fully transform to state 2.



SN1: Sense a shortage of doctors; SN2: Explore technological possibilities from external partners; SN3: Ability to focus on Continuity of patient record rather than of care; SZ1: Create services to align with the Covid restrictions and technology; SZ2: Provide additional customised service support; SZ3: Focus on data management; SZ4: Ability to display benefits of technology usage to patients; SZ4*: Ability to display benefits of technology usage to staff; SZ5: Ability to increase the visibility of patients' needs; SZ6: Provide training to the administration staff on digital skills to remotely support patients; SZ7: Provide new ways of training for staff (online and interactive); SZ8: Provide basic training for patients on the functionality of digital services; TM1: Simplify the service requesting via the surgery website/App; TM2: Provide Electronic prescriptions; TM2*: Run virtual clinics (focused theme) TM3: Embed digital and agile mindset (staff and patient); TM4: Embed constant improvement culture

Figure 5. 10 Dynamic capabilities required to transit from service offering state 1 to state 2

5.6 Summary of the chapter

This chapter provides an overview and the case study of small, 2 and 3 results for offering services pre and during Covid-19. Consequently, the case study results analysed the constructs developed during the template analysis and their interrelationships. The results started with the analysis of each category generic characteristics of their service offering state 1 and 2. Following this, the chapter presented the analysis of extra required resources to meet the transition to state 2 needs. Then the analysis of the results of operational capabilities based on the framework for classifying operational capabilities into customer, managerial and technical capabilities. They were categorised into common capabilities between innovators, followers and laggards' surgeries, common capabilities between followers and innovators and innovators only unique capabilities. Following this, the applicability of dynamic capabilities in each category context was concluded. The applicability of sensing, seizing and transforming capabilities was categorised into common capabilities between innovators, followers and laggards' surgeries, common capabilities between followers and laggards, followers only unique capabilities and lastly common capabilities between followers and innovators. The concluding part of each category was a summary supported by framework of the interrelationships among the constructs used in the analysis, based on the inputs from across the constructs, the chapter concludes with an emerging conceptual framework that presents the capabilities and underlying mechanisms required by surgeries to upgrade its service offering state 1 to state 2.

Chapter 6: Cross-case analysis

6.1 Introduction to the chapter

A cross-case analysis has the advantage of providing the opportunity to identify literal replication between the analysed embedded cases. This is a more compelling argument, and the overall study is considered to be more robust and reliable. In literal replication cases, the results are similar. As a consequence of this similarity in all or most of the cases, a preliminary theory may be substantially supported. The contexts of the three embedded cases, small (section 5.3), medium (section 5.4), and large (section 5.5), which were discussed earlier are different; it is therefore possible that some areas will be similar, and others will be different. For the purpose of cross-case analysis, pattern matching is used to compare empirically based patterns.

This chapter brings the three embedded units (small, medium and large) together. It focuses on the comparison and analysis of empirical evidence collected from all embedded units against the conceptual framework developed in Chapter 3. The structure of this chapter reflects the conceptual framework, as well as the research aims and questions.

Section 6.2 focuses on answering the first research question which involved identifying the different types of service offering, based on TAO on the empirical findings.

Sections 6.3 and 6.4 focus on answering the second and third research question, respectively. These involved the discussion of the surgeries' resources and the operational capabilities based on the empirical findings of the case study. Section 6.5 focuses on answering the fourth research question which discusses the particular dynamic capabilities of the three dimensions: sensing, seizing and transforming, required to transition between different service offering. Section 6.6 answers the fifth research question which aims to outline the relationship between TAO and patient satisfaction. Lastly, section 6.7 presents a summary of the chapter. Figure 6.1 shows the structure for chapter 6.

6.1 Introduction to the Chapter
6.2 The characteristics of service offerings in relation to TAO
6.3 The surgeries resources
6.4 The operational capabilities
6.5 The dynamic capabilities
6.6 Patient satisfaction analysis
6.7 Summary of the Chapter

Figure 6. 1: Structure of Chapter 6

6.2 The characteristics of service offerings in relation to TAO

This section mainly focuses on discussing RQ1: What is the relationship between TAO and the service offering provided by GP surgeries?, based on the results of the case study and three embedded units of analysis. In this section, by comparing the empirical findings to the theory and conducting the cross-case analysis of the same surgery type, the research question will be answered. Table 6.1 presents the characteristics of different service offering in relation with TAO pre and during Covid-19.

Table 6. 1: the characteristics of service offering in relation with TAO

Service Offering			Small Surgeries				Medium Surgeries				Large Surgeries			
			All	I	F	L	All	I	F	L	All	I	F	L
State 1 Pre covid-19	Triage	Online		✓				✓						
		Phone										✓		
	Booking system	Online		✓				✓						
		Phone	✓				✓				✓			
	Physical Appointment face-to-face	Fully – 100%			✓	✓			✓	✓				✓
		Not fully		✓				✓				✓	✓	
	Virtual Appointment	phone call		✓				✓				✓	✓	
		video call		✓										
State 2 During covid-19	Triage	Online		✓	✓			✓				✓	✓	
		Phone	✓				✓				✓			
	Booking system	Online	✓				✓				✓			
		Phone	✓				✓				✓			
	Physical Appointment face-to-face	Fully – 100%												
		Not fully	✓				✓				✓			
	Virtual Appointment	phone call	✓				✓				✓			
		video call	✓				✓					✓	✓	

Then table 6.2 display the final cross case analysis of the characteristics of different service offering in relation with TAO pre and during Covid-19. Based on the literature related to TAO (particularly enhanced technology) there are three types of surgeries. The type of the surgery related to the time of making the decision on implementing TAO. In service offering (state 1) pre Covid-19, the empirical evidence suggested that the three types of surgeries within the three embedded units corresponds with the theory finding.

The characteristics of service offering state 1 in regard of triage, only Innovators provided this service to their patients. With regard booking system, all types of surgeries across the embedded units have phone booking system, while only innovators in small and medium offered online booking system. Followers and laggards were providing only face to face appointment mode. Innovators only provided a proportion of virtual appointments, from the empirical evidence, it was mainly phone calls. Only innovators in small surgeries offered video calls. Followers in large surgeries were in fully face to face, where they offered a very

small proportion of phone calls. The author did not consider them as innovators, as they have been behind in regard of other service offerings (triage and booking system).

Table 6.2: Cross case analysis of the characteristics of different service offering in relation with TAO

Service offering			All	I	I&F	F	F&L
State 1 Pre Covid-19	Triage	Online		Small & Medium			
		Phone		Large			
	Booking system	Online		Small & Medium			
		Phone	X				
	Appointments face-to-face	Fully – 100%					X
		Not fully		X		Large	
	Virtual Appointments	phone call		X		Large	
		video call		Small			
State 2 During Covid-19	Triage	Online		X		Small & Large	
		Phone	X				
	Booking system	Online	X				
		Phone	X				
	Appointments face-to-face	Fully – 100%					
		Not fully	X				
	Virtual Appointments	phone call	X				
		video call	Small & Medium			Large	

In summary, service offering state 1 has a minimal TAO. Followers and laggards have not offered triage, online booking system nor virtual appointment mode. Innovators own the element of technology, offering some blended services offering. However, innovators in small surgeries have the potential to offer more personalised services and may upgrade to higher level of blended service offering in the future. That is supported by empirical evidence as this surgery is a trail surgery to any technological development.

In service offering state 2, the empirical evidence suggested that the three types of surgeries integrated technology in their service offering to meet the restrictions of Covid-19. In regard of triage, in the form of phone calls, it is uniformed across the three types of surgeries within the embedded units. Whereas the online form of triage, it is offered by innovators (small, medium and large) in such an upgrade to this service. It is interesting to collect empirical evidence that followers from small and large surgeries are offering online triage. There are two similar upgrades across all embedded units; firstly, it is the add on

online booking system to the telephone booking system. Secondly, all surgeries transformed to blended appointments modes via phone calls. All types of surgeries in small and medium practices offered a proportion of video calls as well. However, only followers and innovators in the large practices, offered video calls. Laggards in this group were reluctant to fully transform to service offering state 2.

In summary, service offering state 2, has a more TAO. Followers and laggards have on offer telephone triage, online booking system in addition to the phone booking system, and virtual appointment mode. Even followers in large and small practices are trying to shift completely to state 2, as they adopted online triage as well. Innovators own the element of technology, they upscale and upgrade their offering into more enhanced blended services offering.

6.3 The surgeries resources

This section focuses on discussing RQ2: What are the resources required for GPs service offering pre and during Covid-19? by considering the physical, human and organisational capital resources based on the results of the case study and three embedded units of analysis. Table 6.3 displays the finding from cross case analysis of surgeries resources in relation with TAO.

Table 6.3 Cross case analysis of surgeries resources in relation to TAO

		Small Surgeries				Practices resources (BVR)		Medium Surgeries				Practices resources (BVR)		Large Surgeries				
		All	I	F	L			All	I	F	L			All	I	F	L	
Physical capital resources	Laptops	✓				Physical capital resources	Laptops	✓				Physical capital resources	Laptops			✓	✓	
	Telephone system			✓			Telephone system						Telephone system					
	Accurx	✓					Accurx	✓					Accurx	✓				
	Video and texts system						Video and texts system						Video and texts system					
Human capital resources	External technical support			✓	✓	Human capital resources	IT assistant	✓				Human capital resources	IT assistant					
	Non-Clinicians				✓		Non-Clinicians			✓	✓		Non-Clinicians			✓	✓	
	Clinicians				✓		Clinicians			✓	✓		Clinicians			✓	✓	
Organisational capital resources	Restructure the surgery			✓	✓	Organisational capital resources	Restructure the surgery		✓	✓		Organisational capital resources	Restructure the surgery	✓				
	Keep the structure		✓				Keep the structure				✓		Keep the structure					
														Lack of Funds	✓			

As illustrated in table 6.4, in term of physical resources, innovators needed less resources, compared to followers and laggards. Accurx software is required in all surgery types across the embedded units. Need for laptops is a uniform trend to all followers and laggards, whereas the need for laptops was only evident in innovators in the small and medium surgeries. In term of human resources, innovators across the embedded cases require no additional support in this area, apart from technical support in medium practices. It is expected to see this empirical evidence as their staff has been exposed to provide blended service offering even before Covid-19. In contrast, laggards demonstrated a need to all the human resources, due to being the latest to adopt technology (forced by Covid-19).

Table 6. 4: Surgeries resources in relation with TAO

Practices resources (BVR)		All	I	I&F	F	F&L	L
Physical capital resources	Laptops	Small &Medium				Large	
	Telephone system				Small		
	Accurx Video and texts system	x					
Human capital resources	IT assistant	Medium				Small	
	Non- Clinicians				Medium &Large		Small &Medium &Large
	Clinicians				Medium & Large		Small &Medium &Large
Organisational capital resources	Restructure the surgery	Large		Medium		Small	
	Keep the structure		small				Medium
	Lack of Funds	Large					

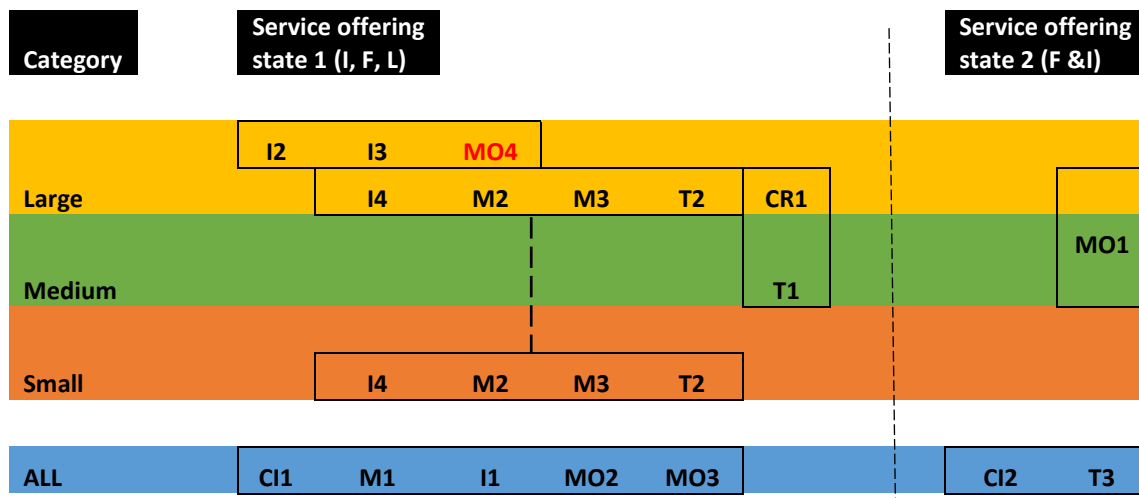
Followers show the same behaviour in regard of the need of human resources to be able to make the shift towards service offering state 2. In term of organisational resources, followers mainly across the three embedded units support their transformation to state 2, by restructuring their surgeries. No clear pattern for innovators and laggards has been noticed in restructuring or keeping the structure for their surgery. All surgeries types in large expressed the lack of funding as an obstacle in TAO, and the availability of the financial support can ease their shift towards state 2. These empirical findings align with the literature (Karali et al., 2019)

6.4 The operational capabilities

This section focuses on discussing RQ3: What are the operational capabilities required for GPs service offering pre and during Covid-19? by considering the customer, managerial and technical capabilities, based on the results of the case study and three embedded units of analysis. See Appendix L

Eisenhardt & Martin (2000) and Feiler & Teece (2014) classification of operational capabilities was used to determine the operational capabilities of all the surgeries. There are various operational capabilities that support the services offered by the surgeries. In light of the empirical evidence, it can be concluded that these capabilities partially uniform across the surgeries. There is some variation based on the type and the size of the surgery (MO4 is only in the large surgeries). According to figure 6.1, surgeries' various operational capabilities are outlined across its categories between service offering state 1 and state 2.

As illustrated in figure 6.2, surgeries from all categories and types have in common CI1, M1, I1, MO2 and MO3, to be able to provide service offering state 1 and to transform part of the way towards state 2. Small surgeries share I4, M2, M3, T2 with large ones, while they do not share any particular operational capabilities with medium ones. Large surgeries share CR1 and T1 with medium ones; they also have their unique capabilities I2, I3, MO4. To simplify this descriptive analysis, large laggards lack MO1, CI2, T3 if they want to transform fully to state 2. Medium laggards in addition to MO1, CI2, T3, they lack I4, M2, M3, T2, I2, I3. Small laggards in addition to MO1, CI2, T3, lack CR1, T1, I2, I3.



C1: Provide patient survey; C2: Run constant meetings with patient participation group (PPG); CR1: Respond to Patient feedback by actions; M1: Monitor the number of Phone calls; M2: Monitor the number of booked appointments using online services; M3: Monitor the number of patients registration for the online services; I1: Provide Patient education (Perception of service); I2: Ability to identify the limitation of technology; I3: Ability to manage change; I4: Team working ability; MO1: Ability to balance between doctor-led and doctor-delivered (know-how of service providers); MO2: Understanding the patient population, the demographics (know-how of patients); MO3: Follow NHS regulatory compliance and safety; MO4: Ability to come over the high level of bureaucracy (**Large surgeries only**); T1: Respond to patients complaints when they use this technology; T2: Test the ease of technology use; T3: Test the reliability of this technology

Figure 6. 2: Operational capabilities across the embedded cases

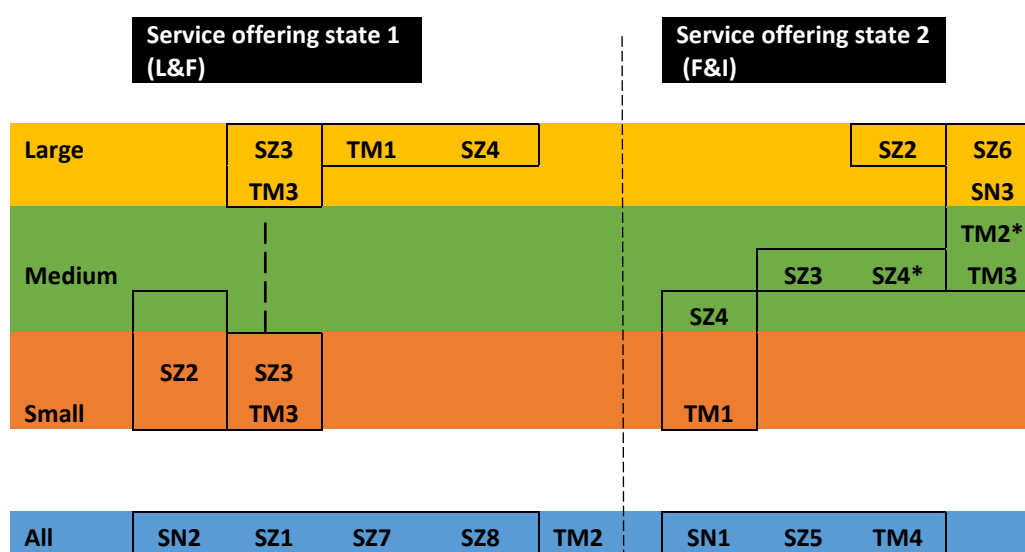
In other words, laggards that transition to state 2 require less operational capabilities when they are large; they require more operational capabilities when they are small and require the most when they are medium. The reflection on this finding is that large surgeries have big number of staff and a management system which is well-structured, so it can steer towards changes in service offering in a more manageable way. Small surgeries have a small team of employees which is easier to manage, because there are fewer in number to oversee and coordinate, and they tend to be in the same location, but they lack mainly the technical support.

Followers that transition to state 2 require CR1, T1 when they are small. When they are medium, they need M2, M3, T3. It is worth noting that, when they are large, they only need to excel to C12, T3, MO1. Innovators are already in state 2.

6.5 The dynamic capabilities

This section focuses on discussing RQ4: What are the required dynamic capabilities by practices to transit from their pre Covid-19 service offering to the period of Covid-19? ? The emerging case study findings from the three categories will be discussed with reference to the extant literature and the dynamic capabilities view, focusing on three dimensions of dynamic capabilities: sensing, seizing and transforming capabilities. See Appendix M.

According to figure 6.3, surgeries' various dynamic capabilities are outlined across its categories between service offering state 1 and state 2.



SN1: Sense a shortage of doctors; SN2: Explore technological possibilities from external partners; SN3: Ability to focus on Continuity of patient record rather than of care; SZ1: Create services to align with the Covid restrictions and technology; SZ2: Provide additional customised service support; SZ3: Focus on data management; SZ4: Ability to display benefits of technology usage to patients; SZ4*: Ability to display benefits of technology usage to staff; SZ5: Ability to increase the visibility of patients' needs; SZ6: Provide training to the administration staff on digital skills to remotely support patients; SZ7: Provide new ways of training for staff (online and interactive); SZ8: Provide basic training for patients on the functionality of digital services; TM1: Simplify the service requesting via the surgery website/App; TM2: Provide Electronic prescriptions; TM2*: Run virtual clinics (focused theme) TM3: Embed digital and agile mindset (staff and patient); TM4: Embed constant improvement culture

Figure 6. 3: Dynamic capabilities across the embedded cases

In term of sensing capabilities, based on the empirical evidence, all surgeries need to possess both market and technology sensing to start delivering service offering 2. Small surgeries need to develop two sensing capabilities in order to transit to blended service offering. However, medium and large ones need three sensing capabilities; the additional

one is SN3. It belongs to technology sensing capability and aligns with the fact that medium and large surgeries have bigger list size compared to small ones. Therefore, the ability to focus on continuity of patient record, rather than of care, can help in smoothing the patients journey and providing a sooner appointment.

Based on the empirical evidence, it can be concluded that the sensing capabilities are uniform across followers in all categories. Laggards from all categories had SN2 but lack SN1. Innovators from all categories have SN1, and they already provided that even before Covid-19; they offered blended services to meet their big demand and come over the shortage of doctors SN2. Innovators' service offering to their patients, at that point of time, might not yet be realised as a need.

In term of seizing capabilities, based on the empirical evidence, it can be concluded that the seizing capabilities are uniform across followers in all categories. Small surgeries need to develop eight seizing capabilities in order to transit to blended service offering. However, medium and large ones need nine seizing capabilities; the additional one is SZ4*. It aligns with the fact that medium and large surgeries have a bigger number of staff compared to small surgeries. Therefore, displaying the benefits of technology usage to staff is essential.

Laggards from all categories have SZ1, SZ7 and SZ8. Consequently, for small laggards to transit all the way to state 2, they require SZ4, SZ5 and SZ6. They already have SZ3 in common with large laggards, and SZ2 in common with medium laggards. For medium laggards to transit all the way to state 2, they need SZ3, SZ4, SZ4*, SZ5, SZ6. For large laggards to transit all the way to state 2, they need SZ2, SZ4*, SZ5 and SZ6. Overall, it can be noticed that medium laggards are finding the transition more challenging. They are lacking in total half of the required seizing capabilities to enable the shift to state 2.

It is important to highlight that staff training on digital skills capability emerged during the empirical analysis. It includes training the administration staff on digital skills to remotely support patients, providing new ways of training for staff (online and interactive) and basic training for patients on the functionality of digital services SZ6, SZ7 and SZ8 respectively. Within this capability, managers need to train staff in digital skills in order to understand how to create value to service offerings and how to work cross-functionally. In addition, the different levels of training should be given to staff, depending on the level of digital

knowledge required, while basic training should also be given to patients, so they have a fundamental understanding of how the blended service offering works.

In term of transforming capabilities, based on the empirical evidence, it can be concluded that all the transforming capabilities are uniform across followers in all categories. Small surgeries need to develop four transforming capabilities in order to transit to blended service offering. However, medium and large ones need five transforming capabilities, the additional one being TM2*. It aligns with the fact of medium and large surgeries have bigger list size compared to small ones. Therefore, they have bigger group of patients with similar morbidities and the ability to run virtual clinics (focused theme) is an efficient method to free up appointments for the GP.

Laggards in all categories have TM2. Small laggards need TM1 and TM4 to fully transform and sustain state 2. Medium laggards own only TM3, so they need TM1, TM2* and TM4. That means the full transformation process for medium surgeries is challenging. Large laggards require TM2* and TM4 to complete their transformation to state 2. TM4, the constant improvement culture, is a common missing capability in laggards at any category. It is a predictable result, and it aligns with their likelihood of falling back to a more traditional service offering.

To conclude cross-case analysis discussion on the relationship between TAO and capabilities, Surgeries with laggards TAO use a narrow set of dynamic capabilities that only enable a partial transition to service offering state 2.

Based on figure 6.3, it is noted easily that laggards used the least number of dynamic capabilities which was empirically collected. They have to own additional capabilities if they wish to complete their transformation to blended service offering and resist falling back to the traditional service offering. As a result, a first proposition that moves beyond GPs and NHS is formulated as following.

P1: Organisations with laggards TAO have narrow set of dynamic capabilities that only enable a partial transition to more advanced service offering

Surgeries with followers TAO use a broad range of dynamic capabilities that enable a full transition to service offering state 2. As illustrated in figure 6.3 and building on the empirical

data analysis, followers from all the embedded case studies are obtaining the most dynamic capabilities in their full transformation process towards blended service offering. As a result, a second proposition that moves beyond GPs and NHS is formulated as following.

P2: Organisations with followers TAO have a broad range of dynamic capabilities that enable a full transition to advanced service offering

Surgeries with innovators TAO use a narrow but enhanced set of dynamic capabilities to strengthen the transition to service offering state 2. As noted from figure 6.3, innovators and laggards both use a narrow set of capabilities. Innovators, however, use this set to boost and escalate their blended service offering, whereas laggards use it to transform part of the way towards the ultimate blended service offering. As a result, a third proposition that moves beyond GPs and NHS is formulated as following.

P3: Organizations with innovators TAO have a narrow but enhanced set of dynamic capabilities to strengthen their advanced service offering.

6.6 Patient satisfaction analysis

This section focuses on discussing RQ5: What is the effect of different TAO surgeries on patient satisfaction? The emerging case study findings from the three embedded cases will be discussed with reference to the extant literature. Covid-19 provided a catalyst for laggards and followers in accelerating the move to blended service offering, because it removed the ability to provide face to face service offering. Figure 6.4 presents a cumulative distribution graph of the surgeries (I, F, L) from all categories and the scores for the patients' satisfaction from 2019 to 2022. Looking at the graph, we can see that the distribution lines for surgeries types of 'I', 'F' and 'L' are very similar in their trend. Clearly, the value score of 'I' line has been the highest, and this was to be expected. The innovators had provided some blended service offerings before Covid-19, and all they have done during the pandemic has been to upgrade and scale up their services.

'F' line has the middle value score of patient satisfaction, not reaching the peak of score as 'I' line due to lack of maturity. However, it is merging it in 2022. This can be explained as followers sustained the required capabilities and are shifting fully to state 2. 'L' line represents the lowest patient satisfaction over all the years, as laggards have the tendency

to prefer more traditional face to face service offering and fallback after having the opportunity to transform to blended service offering.

In regard the score of patient satisfaction in 2022, it is lower than expected. This drop of the value of patient satisfaction was discussed in the empirical part of this study. Several managers believe that the main issue is the perception of patients that digitalised service offerings would be quicker at any given time they request a service. Also, simply the score reflects resistance of change, rather than claiming that technology can add nothing to service offerings.

In light of this, we are able to confirm that: There is quantitative evidence of the positive influence of TAO during Covid-19 on patient satisfaction until 2021; then there is a sudden drop by 2022, which appears difficult to understand. Some explanations were provided about this in sections 5.3.5, 5.4.5 and 5.5.5.

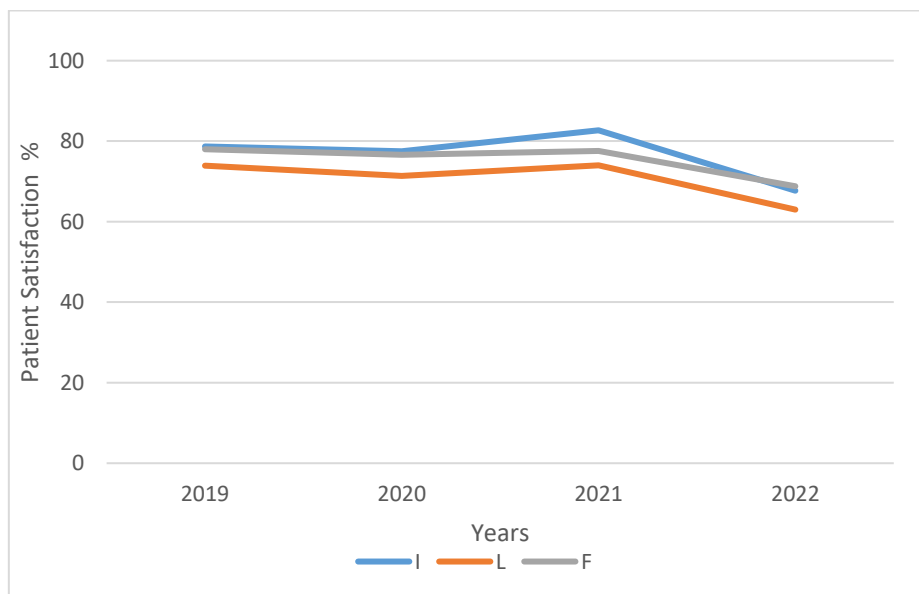


Figure 6. 4: The relationship between TAO and patient satisfaction

To conclude this section and as illustrated in figure 6.4 until 2021, Surgeries with laggards TAO have the lowest level of patient satisfaction without any changes. Figure 6.4 shows that laggards maintained the lowest level of patient satisfaction all over the period of Covid-19, they had a slight increase in 2021, that is due to their partial transformation to blended service offering. Then a drop happened in 2022. As a result, a fourth proposition that moves beyond GPs and NHS is formulated as following.

P4: Organizations with laggards TAO have the lowest level of customer satisfaction with minimal changes to their service offering.

Surgeries with followers TAO start their patient satisfaction between innovators and laggards, then settled at the same level of satisfaction as innovators. It is confirmed in figure 6.4, that followers took a place between innovators and laggards. They merged with innovators in 2020 and did not reach the same peak as innovators, due to some difficulties in the full transformation process towards blended service offering. Then a drop happened in 2022. As a result, a fifth proposition that moves beyond GPs and NHS is formulated as following.

P5: Organizations with followers TAO start their customers satisfaction between innovators and laggards, then settled at the same level of satisfaction as innovators after providing advanced service offering.

Surgeries with innovators TAO have the highest level of patient satisfaction, and they maintain that during the disruption of Covid-19. Innovators sustained the highest level of patient satisfaction all over the period of Covid-19, even with a peak in 2021. It was expected to maintain that peak or maybe witness a continuous increase of patient satisfaction; however, the same scenario of followers and laggards is repeated here, with a drop in 2022. As a result, a sixth proposition that moves beyond GPs and NHS is formulated as following.

P6: Organizations with innovators TAO have the highest level of customer satisfaction, and they maintain that during the disruption.

6.7 Summary of the chapter

This chapter discusses the key findings that emerged from the empirical data (by integrating the empirical findings from 21 surgeries) with respect to the extant literature. These provide insightful data that support certain aspects and contradicts or extends various others in relation to the current body of knowledge.

In addition, the cross-case analysis was conducted to discuss the similarities and differences across the three embedded cases.

From the empirical analysis in the context of service offering by surgeries, it is shown that the characteristics of these services support the literature. In terms of the firm resources, the case study findings indicate that the majority of the findings are in line with the literature that accepts the service offerings being refined based on the empirical analysis.

Regarding the operational capabilities (customer, managerial and technical) are refined based on the case study findings. In terms of the capabilities related to the three main dimensions of dynamic capabilities (sensing, seizing and transforming) a new capability is emerged to seizing capabilities during the empirical analysis. Additionally, A set of the propositions were formulated.

Finally, regarding TAO in relation to the patient satisfaction supports the literature for all types of surgeries until 2021, then there has been a drop which was difficult to understand. Moreover, another set of propositions were formulated.

Chapter 7: Conclusion

7.1 Introduction to the chapter

The purpose of this chapter is to outline the conclusions that have been drawn from the results of this research. Section 7.2 reviews each research question and discusses how each one was addressed based on the empirical findings. A discussion of the theoretical and practical contributions of this thesis is provided in section 7.3.

Following this, the limitations of the study and recommendations for future research are discussed in section 7.4. Section 7.5 provides a summary of the chapter. The structure of chapter 7 is shown in figure 7.1.

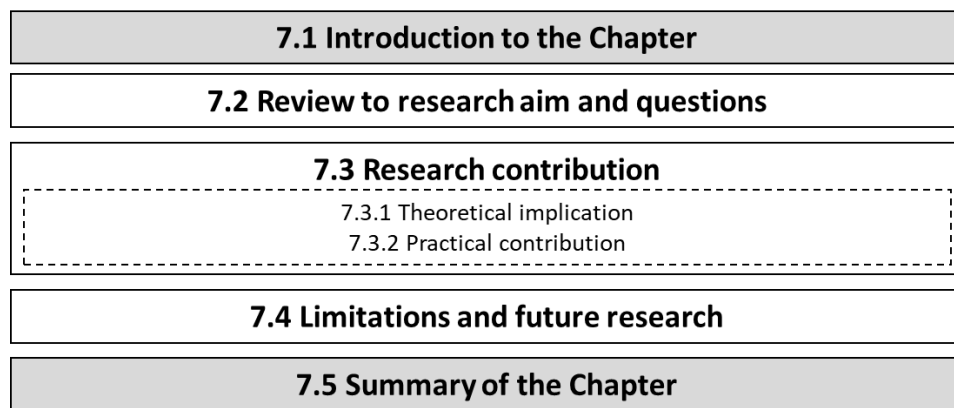


Figure 7. 1: Structure of Chapter 7

7.2 Review to research aim and questions

This research aims to establish the empirically tested conceptual framework which enables the understanding of the relationship between TAO, capabilities, service offerings and patient satisfaction. In this thesis, three types of surgeries relating to TAO are identified (innovators, followers and laggards). This thesis also identifies the characteristics of service offering state 1 and 2, surgery resources and operational capabilities which align with the three surgery types. In addition, the particular dynamic capabilities required to help followers and laggards to transition to service offering state 2, and innovators to upgrade and upscale to state 2, are investigated.

Accordingly, the overarching question was to explore the relationship between TAO and the service offering provided by surgeries.

In this thesis, fresh empirical evidence is provided regarding the surgeries who wish (some of them had) to respond to Covid-19 disruption and adopt technology in order to upgrade their existing face to face service offerings to blended ones. The research aims and questions are detailed below:

The aim of this thesis is: To explore the relationship between TAO in service offering of General Practice in the scope of resources, capabilities, and patient satisfaction in England'

- RQ1: What is the relationship between TAO and the service offering provided by GP surgeries?
- RQ2: What are the resources required for GPs service offering pre and during Covid-19?
- RQ3: What are the operational capabilities required for GPs service offering pre and during Covid-19?
- RQ4: What are the required dynamic capabilities by practices to transit from their pre Covid-19 service offering to the period of Covid-19?
- RQ5: What is the effect of different TAO surgeries on patient satisfaction?

In line with the argument proposed by several studies before Covid-19, which identified the benefit of TAO to deliver unmet needs and absorb the increased demands in the current healthcare environment (Zhao et al., 2017; Carter et al., 2018; Hammersley et al., 2019), this thesis presented a comprehensive review of service offering enabled by TAO in GP surgeries. It also reviewed the service offering in GP within the context of TAO in healthcare, as discussed by (Llewellyn et al. ,2014; Imison et al., 2016; Bakhai et al., 2020). Three types of surgeries are determined according to Rogers's (1962) innovation curve which guides the empirical testing, in order to address research questions.

To address RQ1, in line with GP service offering literature, which they are fragmented, the empirical test confirmed that service offering (state 1) pre Covid-19 were mainly operating without triage (if it is implemented, it was over the phone), booking appointment was in person or over the phone, and appointments mode was face to face predominantly. In service offering (state 2) during Covid-19, all surgeries were forced to limit their traditional

services and upgrade to operate with triage (over the phone and online), booking system is online in addition to old fashioned one, and appointment modes are more blended with virtual ones. Moreover, the empirical findings provide additional insight in regard the future intention of surgery and the likelihood of being persistent on the changes that they acquired by Covid-19. This insight suggests that by utilising technology and upgrading to blended service offering, surgeries are offering flexibility and provide the patients with a choice.

It has also been suggested in the literature that firms must align their resources and capabilities in order to achieve competitive advantage in competitive environments (Godsell et al., 2010). Accordingly, the theories of RBV and dynamic capabilities (Barney, 1991; Teece, 2007; Winter, 2003) suggest that surgeries can leverage TAO and shift to service offering state 2, which helps to address RQ2, RQ3 and RQ4, respectively.

In terms of the firm resources (related to RQ2), the literature focused on physical resources (examining rooms, equipment, technology), human resources (staff knowledge, experiences) and organizational resources (formal and informal reporting structure, planning) (Barney, 1991; Baines et al., 2009).

The empirical findings were in line with the literature, where laggards and followers surgeries required more resources than innovators to be able to make the shift towards blended service offering. Mainly, they needed software, laptops and IT assistance. The empirical evidence further discussed that many surgeries adopt a hybrid approach (restructure their surgeries) to obtain the benefits from both absorbing the huge demand of patients in the mornings and cut the need for extra staff to meet that demand.

With regard operational capabilities (related to RQ3) which draw on surgery resources, the literature suggested to focus on customer capability (customer involvement and customer response), managerial capability (monitoring, involvement, and managing operations) and technical capability (Day, 1994; Danneels, 2002; Jayachandran et al., 2004; Morgan et al., 2009; Pavlou & El Sawy, 2011b; Helfat & Winter, 2011b; Chandran & Rasiah, 2013; Anning-Dorson, 2018; Slaouti; 2021). The empirical findings are mostly in line with the literature. The empirical evidence collected indicates that more detailed proxies were listed in each capability as following: In term of customer capability, customer involvement is included, the empirical findings discussed two proxies (CI1 & CI2). In managerial capability, when

monitoring is concerned, three proxies are discussed (M1, M2, M3); for involvement, four proxies are outlined (I1, I2, I3, I4), and in managing operation, three proxies are found (MO1, MO2, MO3). In large surgeries there is an additional proxy (MO4). In technical capability, three proxies are discussed (T1, T2, T3). Laggards shared several capabilities with followers and innovators; on the other hand, from empirical evidence they lacked many other operational capabilities, which reflects on the difficulties they were facing in the shift towards blended service offering. Furthermore, although followers may start by adopting technology, they still lack some operational capabilities owned by innovators.

With regard the dynamic capabilities (related to RQ4), they are associated with Teece's (2007) three dimensions of dynamic capabilities (sensing, seizing and transforming capabilities). The empirical data collected are in line with the literature and further emerged the capability related to staff and customer training on digital knowledge (with three proxies SZ6, SZ7, SZ8), to seizing capabilities. In addition, it also outlined the details and provided the insights of each capability based on the empirical analysis.

Additional proxies were added to each capability, that reflect the richness of the empirical evidence. In small surgeries, digitalisation capability includes SZ3 and SZ4. Services processes for developing efficiency gains capability includes TM1 and TM2. Service culture capability includes TM3 and TM4. Three additional proxies, that are owned by innovators and followers, are outlined in medium and large surgeries. They are empirical insights provided from this study: SN3 (in sensing capability) where surgeries have the ability to focus on continuity of patient records rather than continuity of care. SZ4* (in seizing capability), it is the ability to display the benefits of technology usage to staff. TM4* (in transforming capability), reflects on the ability of managers to run virtual clinics under specific theme, targeting a group of patients who shared the same medical problem.

To address RQ5, secondary data of patient satisfaction were collected from NHS England website. The order of level of patient satisfaction (from highest to lowest) by innovators, followers and laggards respectively, aligns with the literature suggestions. However, there is a drop of the score of patients satisfaction after TAO, which is difficult to understand. That might be linked to patient perception of blended service offerings to be more instant rather than more efficient and effective.

7.3 Research contribution

7.3.1 *Theoretical implication*

Strategic management theory suggests that a firm's resources and capabilities must be aligned with the changing business environment in order to deliver a competitive business model. The RBV and dynamic capabilities view theories provide the basis for this concept. According to the dynamic capabilities view, firms can achieve a sustainable competitive advantage by focusing on the dynamism of their business environments and the particular resources they possess (Barney, 1991; Wernerfelt, 1984). As described in the underpinning theory, the dynamic capabilities view discusses how firms evolve, not only in response to changing market requirements in a dynamic environment, but also to small changes in static environments (Ambrosini et al., 2009). It is necessary to have incremental dynamic capabilities to adapt the resource base in order to meet market demand in static environments. In contrast, renewing capabilities allow firms to upgrade their resource base in order to provide new services in response to new market demands. In light of this, the rationale behind this thesis is to contribute to the area of renewing dynamic capabilities which assist the upgrade of the existing resource base and enhance the firm's operational capabilities to offer new services.

In accordance with the context of this study and the empirical evidence, the disruption of Covid-19 has led to surgeries needing to evolve in the dynamic environment. This requires surgeries to upgrade their resource base and have a new set of operational capabilities in order to transition to blended service offering. Therefore, the contributions to theory from this thesis are established from the emergent underpinning theoretical lens and the empirical evidence from the case study findings.

Based on the empirical findings, this study makes three theoretical contributions to the primary care and GP services literature. First, it has provided a holistic view of the characteristics of service offering by surgeries with relation to TAO. This is beyond a certain service by GP; it represents the patient journey through service offering (triage, booking system, appointment modes) combined together. The review is a further step in understanding the relationship between TAO and service offering in the lens of Covid-19 disruption. It also extends the view of current knowledge of blended service offering which

is still in its infancy (Majeed, 2013; Gomez-Cano et al., 2020; Green et al., 2022; Jones et al., 2022).

Second, by using the theoretical lenses of the RBV and dynamic capabilities view, this study revealed twofold of contributions. Part one is about the strategic requirements (surgery resources and operational capabilities) that help to adopt technology in their service offering. This study suggests that upgrading surgeries' existing resources and capabilities, or renewing those resources and capabilities, is a necessity to align with the changes that came in force from Covid-19 disruption. Part two is regarding the results of the empirical findings which generate new insights on the linkages between capabilities, TAO and service offering that move beyond the specific context of application. This research analyse the influence of the Dynamic capabilities (DCs) associated with TAO for offering blended services and improving patient satisfaction at practice level. This study proposed TAO as a functional competence/ capability which mediate relationship between DC to facilitate blended service offering with practices' patient satisfaction.

This research also structures the key dynamic capabilities that help surgeries to transit to the blended service offering around Teece's (2007) three dimensions of dynamic capabilities (sensing, seizing and transforming) which are based on different studies of the current digital services literature (e.g. Schroeder and Kotlarsky, 2015; Story et al., 2017; Huikkola and Kohtamäki, 2017; Hasselblatt et al., 2018; Kohtamäki et al., 2019). During empirical analysis, this study contributed a new capability to the digital services in healthcare literature: the capabilities related to the staff and customer training on digital skills to the seizing capabilities. Furthermore, the additional insights of the key processes embedded within this capability are provided. Additional capabilities were required for medium and large surgeries to support their transition to service offering state 2. Additionally, the study empirically tested different sets of dynamic capabilities according to surgery's relationship to TAO in ways that had never been explored before in the healthcare literature.

7.3.2 Practical contribution

This study advocated the importance of surgeries responding to the Covid-19 disruptions, by adopting technologies in order to develop a new service offering (blended). More specifically, three key practical contributions emerged from the theoretical and empirical

findings to provide insights to surgery managers, as they are responsible for utilizing technologies in their service offerings and deciding on the delivery method of their service offerings as well.

First, the study emphasised the importance of the link between TAO and service offerings; hence, surgery managers are recommended to consider both concepts together in order to capture the most benefits from TAO initiatives. A taxonomy of service offerings in relation to TAO is developed, along with the associated characteristics, to provide potential upgrade and enhancement for laggards to make a decision based on their current offerings and external dynamic environments. The principal contention of this research is that the managers need to be aware of different patients requirements related to different service offerings and how their surgeries can be transformed in order to meet the increased demand and improve patient satisfaction. To conclude this point, this thesis demonstrates that surgeries with better TAOs are able to translate this into better service offerings.

Second, TAO in surgeries service offerings does not guarantee a competitive advantage. In order to gain the benefits of enhanced technologies and turn them into meaningful services, surgery managers need to develop certain resources and capabilities. This research provides practical insights into the necessary resources and capabilities specific to each type of surgeries (innovators, followers and laggards), considering their list size as well. These include the main physical, human and organisational resources, and the particular capabilities that are required by surgeries to initiate and sense the opportunity of TAO in service offerings until successfully shift from the traditional face to face offerings to blended service offering.

Third, by using the theoretical lenses of the RBV and dynamic capabilities view, this study revealed the strategic requirements (surgery resources and operational capabilities) that help to adopt technology in their service offering. This study suggests that upgrading surgeries' existing resources and capabilities, or renewing those resources and capabilities, is a necessity to align with the changes that came in force from Covid-19 disruption. Mainly, innovators own all the operational capabilities and lack or need an upgrade to some resources (Accurex). Laggards and followers started to undertake some adjustment to their existing resources (extra staff, additional laptops and update telephone system) and to renew some resources (Accurex). The empirical evidence also suggests that in the case of

laggards, they require a broader set of operational capabilities, compared to followers, to be able to start the transition to service offering state 2 (medium-sized surgeries face the most challenge to do so). Large laggards mainly require the ability to come over the high level of bureaucracy in their system in regard to implementing technologies. These capabilities need to be developed to reach the same desired goal which is to be flexible and quickly respond to evolving demand.

Fourth, six testable propositions were formulated in sections 6.5 and 6.6 as a product of the empirical findings, to move beyond the limited context of GPs and NHS and look for more generalizable (or transferrable) propositions to other organizations in other sectors.

Finally, figures 6.2 and 6.3 are developed as a guide for laggards to upgrade from a traditional service offering to blended service offering. These two figures provide a comprehensive and consolidated view of the operational and dynamic capabilities corresponding to each type of surgeries in relation to TAO. Based on the empirical evidence, laggards should be able to use this framework to help them fully transform to blended service offering.

7.4 Limitations and future research

In spite of the fact that every practical effort has been made to ensure that the rigor and reliability of this study have been ensured, there are inevitably some limitations, which are described below. It is also pertinent to note that these limitations present opportunities for further progress in the area of GP service offering, so future research suggestions will be provided to supplement the current research.

First, by reflecting on the demographic characteristics of the 21 GP practices, a range of urban practices were included, covering an inner-city geographical area and mainly in a high range of deprivation scores. All the participated practices served community with high proportion of patients from ethnic minority backgrounds. This naturally limits the generalisability of the findings derived from the case study and the framework that the results come from. Therefore, the investigation of practises from different demographics (rural) could result in the discovery of different resources and capabilities. This issue can therefore be addressed in a future study, by identifying and analysing the empirical data from surgeries in several locations (e.g., rural, affluent), which also have been disrupted by

COVID-19. In addition to the demographic consideration in future research, this study did not involve within the tested relationships, the influence of some parameters, like the average age of surgery's patients, the number of consultations that have been delivered during Covid-19, nor the waiting time to get an appointment after the process triage assessments. In future research, these parameters can be tested and reflection on the future results and this study can be addressed.

Second, this thesis identifies the main firm resources (i.e., physical, human and organisational resources) and capabilities (i.e., operational and dynamic) that are essential to the transition of various surgery types from service offering state 1 to state 2 revealed by the empirical findings of this study. In accordance with the theory of RBV and dynamic capabilities views, these resources may exhibit VRIN characteristics, which are considered to be sources of competitive advantage. Despite this, the research did not investigate, nor did provide sufficient details concerning the level of VRIN characteristics in those firm resources that were examined in the empirical study. To address this, future research can identify VRIN resources criteria to assess associated resources and capabilities outlined in the conceptual framework.

Third, there is a limitation associated with the methodological approach used in the study. It is significant to note that this study adopted an abductive research approach which was grounded in critical realism. As a result, the conceptual framework that emerged required further validation. This can be undertaken by empirically testing the framework, utilizing either a qualitative method (to further explore and provide additional insights into the details of the research constructs presented in the emerging framework) or a quantitative method (to further identify the relationship between each resource and capability and the transition to blended service offering).

Fourth, also in the methodology section, it is important to mention that data collection based on a single informant, the researcher tried to follow the triangulation process by adding extra sources (surgery documents and archives). However, to outline this limitation, in future research the researcher can run focus group between GPs managers to discuss the results and collect additional data.

Fifth, in accordance with the findings of the study, three types of surgeries with TAO are outlined, and their impact on patient satisfaction (regarding accessing services and how/when the services were delivered) is examined. It was difficult to understand the drop in patient satisfaction after the peak in 2021. Some reasoning was supported by NHS England in regard of the time when the patient survey was distributed (just after an ease of lock down period). Another reasoning might be that at the beginning of the pandemic people were in support and admiration of NHS services (high wave of emotional support), then the satisfaction dropped down when restrictions were eased, and the demand of patients sharply increased, which put service offerings under pressure. Therefore, the drop of patient satisfaction may not be related to TAO in service offering. Hence further investigation will be recommended to obtain a clearer understanding. Additionally, generalizations may be limited across different measures of surgery's performance, such as efficiency. The validity and evaluation of other performance measures (like effectiveness of blended service offering) could be investigated further in future research.

Sixth, another aspect in need of further research is the sustainability of service offering state 2. A longitudinal study of the types of surgeries discussed could provide more in-depth information on impediments and success determinants, which could form the foundations of wider implementation.

Finally, wider study of this phenomenon across England and the UK could provide comparative data to demonstrate contingency of this service offering state 2 on a national level and enable comparisons on an international level.

7.5 Summary of the chapter

The purpose of chapter 7 is to conclude this thesis. The thesis' key findings were summarised by reviewing the research objective and research questions in light of the empirical evidence that emerged. It is followed by an examination of the contribution to both theory and practice. Taking the perspective of RBV, operational capabilities and dynamic capabilities view theories, the research examines the transition of GP surgeries service offering from state 1 to state 2 during Covid-19.

Regarding the practical contribution, the chapter addresses how this research contributes knowledge to the GP surgeries managers who planning to transit to service offering state 2.

Additionally, figures 6.2 and 6.3 serve as guidance for laggards to fully transit to blended service offering. Lastly, a number of limitations have been discussed, as well as how these limitations suggest future research opportunities that complement the findings of this work.

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Appendix

Appendix A: HRA Approval



Prof Theodoros N. Arvanitis
Professor of Digital Health Innovation & Director of the
Institute of Digital Healthcare
University of Warwick
Institution of Digital Health Innovation
Lord Bhattacharyya Way
University of Warwick
CV4 7AL

Email: approvals@hra.nhs.uk

13 January 2022

Dear Prof Arvanitis

**HRA and Health and Care
Research Wales (HCRW)
Approval Letter**

Study title:	The impact of Covid-19 on technology adoption in primary care: Evaluating GPs appointment modes prior and during Covid-19
IRAS project ID:	299771
Protocol number:	N/A
REC reference:	21/HRA/5042
Sponsor	Warwick University

I am pleased to confirm that [HRA and Health and Care Research Wales \(HCRW\) Approval](#) has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, [in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.](#)

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?

HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report

(including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see [IRAS Help](#) for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?

HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to [obtain local agreement](#) in accordance with their procedures.

What are my notification responsibilities during the study?

The "[After HRA Approval – guidance for sponsors and investigators](#)" document on the HRA website gives detailed guidance on reporting expectations for studies with HRA and HCRW Approval, including:

- Registration of Research
- Notifying amendments
- Notifying the end of the study

The [HRA website](#) also provides guidance on these topics and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?

Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **299771**. Please quote this on all correspondence.

Yours sincerely,
Alex Thorpe

Approvals Manager

Email: approvals@hra.nhs.uk

Copy to: Mrs Carole Harris, Sponsor's Representative

Appendix B: Participation Information Leaflet



Participant Information Leaflet for the key informants involved in the process of offering different appointment modes before and during Covid-19

Study Title: The impact of Covid-19 on technology adoption in primary care: Evaluating General Practices' appointment modes prior to and during Covid-19

Investigator(s): PhD student (researcher): Reem Hadeed
Academic supervisors: Professor Janet Godsell and Professor Theo Arvanitis

Introduction

You are invited to take part in a research study. Before you decide, it is important to understand why the research is being done and what it would involve for you. Please take the time to read the following information carefully.

Please don't hesitate to contact me/ us, if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

Who is organising and funding the study?

This project is not funded by any organisations, and no external funding is being received. The study is part of the University of Warwick PHD course: "Engineering, RWMA-H7A2 (2017 - 2022)", WMG (Warwick Manufacturing Group)

What is the study about?

With the emergence of Covid-19, the global pandemic raises particular challenges for General practices (GPs), where the service has to be delivered to patients when face-to-face consultations are no possible.

Many of the technologies adopted during the first phase of the pandemic were already well established, but not widely implemented. However, modern (or advanced) technology has become more prevalent, having enabled the provision of healthcare through alternative appointment modes.

This study aims to explore the shift, for both patients and clinicians, from traditional face-to-face appointments to remote ones delivered via phone, video and online systems during the Covid-19 pandemic. The study is about practices that have already utilised technology prior to Covid-19, and have managed to extend their service delivery by utilising virtual appointments during the pandemic.

By conducting a case study research, the aim is to reach a better understanding of the impact of virtual appointments on the effectiveness and efficiency of GP performance before and during Covid-19, by looking at their resources and capabilities.

What would taking part involve?

After the consultation by email about when would be a suitable time for you to participate in this study. This participant information leaflet and a consent form (the other attachment in the email) are as we agreed to be circulated to you prior to the interview. The forms need to be completed should you decide to take part. The consent form will be returned to me (Reem Hadeed) at r.hadeed@warwick.ac.uk before the interview begins.

The interview will take place virtually (over a tele-conference - Microsoft Teams meeting). The interview will run for 45-60 minutes and will include a variety of questions related to primary network/ surgery structure. The majority of questions will look to explore different appointment options, before and during Covid-19. In addition, there will be questions on the way which technology and other capabilities have helped to support the change of appointment modes.

You are free to answer and to refuse any question. The interviews will be audio recorded by myself (Reem Hadeed). The transcription will also be performed by myself (Reem Hadeed)

Do I have to take part?

Participation in this study is completely voluntary and choosing not to take part will not affect you in any way. You can also choose to withdraw your participation at any time, without giving a reason, by contacting one of the research team. Further details about withdrawing from the study are provided later on in this document.

What are the possible benefits of taking part in this study?

The study will help to allow a clear understanding of technology adoption in supporting different appointment modes in primary care, specifically at General practices, and capabilities required to support and deliver these various modes. Your participation will facilitate the measurement of the effectiveness and efficiency of different appointment modes. It will also support the investigation on the transition mechanism of appointment modes from pre to during Covid-19.

What are the possible disadvantages, or risks, of taking part in this study?

The study will take 45-60 minutes of your own time. No risks or disadvantage taken; you have the right to withdraw at any time if you feel uncomfortable.

Expenses and payments

No expenses or payments are to be paid to participants. A thank you email will be sent.

Will my taking part be kept confidential?

Yes, taking part is confidential. The data will be collected in person through the interview and will be audio-recorded. All collected data will be stored on an encrypted, University of Warwick internal cloud where it will be shared with my supervisor Professor Janet Godsell. Participants will be given a study number in order to protect their identity, and the code linking this will be stored separately to the research data.

In the researcher's dissertation and any future publications, the direct quotes may be used to report the results. However, the reported data will be pseudonymised to protect the original identity of the participants. The pseudonymised data will only be available to the other researchers that will have joint-publication with me.

What will happen to the data collected about me?

As a publicly-funded organisation, the University of Warwick have to ensure that it is in the public interest when we use personally-identifiable information from people who have agreed to take part in research. This means that when you agree to take part in a research study such as this, we will use your data in the ways needed to conduct and analyse the research study.

We will be using information from you in order to undertake this study and the researcher will act as the data controller for this study. We are committed to protecting the rights of individuals in line with data protection legislation (GDPR). The University of Warwick will keep the information for 2 years after the study has finished.

Research data will be pseudonymised immediately after data collection. This means all direct and indirect identifiers will be removed from the research data and will be replaced with a participant number. The key to identification will be stored separately and securely to the research data, to safeguard your identity. You will be free to withdraw at any time, without giving a reason and this will not affect you or your circumstances in any way.

Data Sharing

The data will not be shared outside the University.

Your rights to access, change, or move your information after the interview are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. The University of Warwick has in place policies and procedures in order to keep your data safe.

This data may also be used for future research, including impact activities, following review and approval by an independent Research Ethics Committee, and subject to your consent at the outset of this research project.

For further information, please refer to the University of Warwick Research Privacy Notice which is available here:

<https://warwick.ac.uk/services/idc/dataprotection/privacynotices/researchprivacynotice> or by contacting the Legal and Compliance Team at GDPR@warwick.ac.uk.

What will happen if I don't want to carry on being part of the study?

Participation in this study is entirely voluntary. Refusal to participate even without giving a reason will not affect you in any way.

If you agree to participate, you may withdraw from the study at any time, by emailing the researcher (Reem Hadeed) on r.hadeed@warwick.ac.uk. Your withdraw decision will get in effect immediate.

If you withdraw from the study, it will often not be possible to withdraw your data which has already been collected, after it has been anonymised [after two weeks from your actual interview] To safeguard your rights, we will use the minimum personally-identifiable

information possible and keep the data secure in line with the University's Information and Data Compliance policies.

If you decide to take part in the study, you will need to sign a consent form, which states that you have given your consent to participate.

What will happen to the results of the study?

Prior to any distribution of results, these will be discussed with the person in charge to establish whether the data is restricted or not. It is anticipated that none of the data will be restricted, given the nature of the project and the type of data that is involved.

The results will be used and discussed in the researcher's dissertation, as part of the program. The results will also be used in any journals that the researcher plans to publish, and it may be discussed at any conferences or seminars that the researcher will attend.

Who has reviewed the study?

This study has been reviewed and given favourable opinion by the University of Warwick's **Biomedical & Scientific Research Ethics Committee (BSREC): BSREC 57/20-21**

Who should I contact if I want further information?

If you have any questions about any aspect of the study, or your participation in it, not answered by this participant information leaflet, please contact:

Reem Hadeed: Email: r.hadeed@warwick.ac.uk

Professor Janet Godsell: Email: j.godsell@warwick.ac.uk

Professor Theo Arvanitis: Email: t.arvaniti@warwick.ac.uk

Who should I contact if I wish to make a complaint?

Any complaint about the way you have been dealt with during the study, or any possible harm you might have suffered, will be addressed. Please address your complaint to the person below, who is a senior University of Warwick official, entirely independent of this study:

Head of Research Governance

Research & Impact Services

University House

University of Warwick

Coventry

CV4 8UW

Email: researchgovernance@warwick.ac.uk

Tel: 02476 575733

If you wish to raise a complaint on how we have handled your personal data, you can contact our Data Protection Officer who will investigate the matter: DPO@warwick.ac.uk.

If you are not satisfied with our response or believe we are processing your personal data in a way that is not lawful, you can complain to the Information Commissioner's Office (ICO).

Thank you for taking the time to read this Participant Information Leaflet

Appendix D: Study/Interview Protocol

Semi- structured Interview Schedule (GP surgery manager)

Section	Topic	Points to address	Questions
1	General Information about the participant	Name: Job roles: Position: Amount of time with the surgery:	What is your name? What do you do? What is your position in the surgery? How long have you been working?

The main study Schedule

Section	Topic	Points to address	Questions
1	GP surgery demography	List size: Rurality: Employee number: Offered services: Deprivation:	How many patients are registered at your surgery? Is your surgery location urban or rural? How many employees do you have? (Clinicians who can run an appointment) What are the available services at your practice? Is the location of your surgery affluent or deprived?
2	Appointments modes	Different types of appointments modes offered by surgery: F2f or virtual	What are the offered appointments modes at your practice before Covid-19? How the appointment work? Who runs the appointment? Specify the virtual app! How do you set up this app? What are the offered appointments modes at your practice during Covid-19? (<u>Changes in proportions</u>) How likely are those changes to persist once practices return to more normal ways of working?
3	Technology adoption	Types of technology adoption: - <u>Organisational adoption:</u> - <u>Individual adoption:</u> Using Technology:	Have you used any type of technology related to appointments modes before Covid-19? Can you name it please? Do the employees participate in the technology adoption? (Training, facilitating, making decisions)

		<p>The dominant mode of GP contacts was face-to-face pre Covid-19, with a comparatively small number of other modes.</p> <ul style="list-style-type: none"> - <u>Telephone-based GP contact</u> <p>There is a range of telephone models by different names (e.g. telephone consultations; telephone triage; call centres)</p> <ul style="list-style-type: none"> - <u>Video consultations</u> - <u>Online patient diagnostic and e-consultations</u> (e.g., WebGP, SystemOnline, MyGP24/7, e-consult). 	<p>How the proportion of each of these modes has changed from prior to during Covid-19?</p> <p>Have you found it challenging to implement each of these modes?</p> <p>How was the reception of these modes from both clinicians and patients?</p> <p>Which appointment modes do you intend to continue post Covid-19?</p>
4	Practices Resources (BVR)	<p>Practice Resources:</p> <ul style="list-style-type: none"> - <u>Physical capital resources</u> - <u>Human capital resources</u> - <u>Organisational capital resources</u> 	<p>Physical (e.g., examining rooms, equipment)</p> <p>Human (e.g., training, experience, staff's knowledge)</p> <p>Organisational (e.g., formal and in formal reporting structure and planning)</p>
5	Operational capabilities	<p>Operational capabilities:</p> <ul style="list-style-type: none"> - <u>Managerial capabilities</u> <p>The ability to administer operational activities by monitoring and reporting progress, designing incentives, and managing conflicts</p> <ul style="list-style-type: none"> - <u>Technical capabilities</u> <p>The capability of the practice to acquire new technologies and technical resources for research and development practices and processes.</p> <ul style="list-style-type: none"> - <u>Customer capabilities</u> <p>The skills, abilities, and processes needed to develop and maintain close relationships with patients.</p>	<p>How do you monitor the progress of technology adoption in your surgery? Are you actively involved in technology adoption activities at the working level? How do you administer tasks and functions?</p> <p>How do you evaluate the suitability of new technologies?</p> <p>How do you determine basic performance of new technologies?</p> <p>How do you create the environment for the patients to have direct interaction and engagement in the offered service delivery process? How your practice serves patients' needs? (e.g. effective, quick actions)</p>
6	Effectiveness and efficiency measures	<p>Effectiveness of the alternative modes</p> <p>Efficiency of the alternative modes</p>	<p>Improve both access and patients care? Increase of consultations volume? Decrease of GP workload?</p> <p>Patterns of Attendance? Any reducing of the incidence of cancelled or missed appointments</p>

7	Dynamic Capabilities	<p>Sense: is defined as the ability to spot, interpret, and pursue opportunities in the environment.</p> <ul style="list-style-type: none"> - Identify new market opportunities - Explore technological possibilities <p>Seize: refers to the implementation of a sensed opportunity, the mobilizing of resources in order to address an opportunity and capture its value</p> <ul style="list-style-type: none"> - service development capabilities - Mass service customization capabilities - Digitalisation capabilities - Network management capabilities <p>Transform: the activity by which organization continuously reconfigure its resource base by altering its resources and operating capabilities as needed</p> <ul style="list-style-type: none"> - Services methodologies and processes for developing efficiency gains - Service culture development - Risk management, mitigation and pricing 	<p>How can you identify the new opportunities in the healthcare system from service delivery (appointments modes) offerings?</p> <p>When and how does your surgery introduce technology adoption to its service offerings?</p> <p>Are there any other capabilities related to this category?</p> <p>How do you create services that aligns with new pandemic restrictions and technology adopting in your surgery?</p> <p>How do you ensure that the service offered fits with patients' individual needs?</p> <p>How does your surgery utilized technology adoption to fit with service offerings</p> <p>How your surgery manages the knowledge sharing and collaboration with the service partner in their service network?</p> <p>Are there any other capabilities related to this category?</p> <p>How do your organisation continuously re-align/reconfigure the current resources or improve the current set of capabilities in order to successfully implement the enhanced technology? (e.g., develop service culture, mitigate risks)</p> <p>Are there any other capabilities related to this category?</p>
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Appendix E: Data Analysis – Chain of Evidence of the transcript of contact

Surgery Name	List Size	Employee Number	Telephone triaging	Years of work	Interviewee
XXX	5400 Patients	15	No	9 years	PM-11-09

The data analysis of Service offering and technology adoption according to the transcript of contact

Appointment modes and technology adoption		
Theory	Practice	Supporting information from questions
Service offering pre-Covid-19	Face to face On the day and pre-bookable appointments No triage	before COVID we were 100% face to face. We never ever used telephone consultation or video consultation because of the type of population that we have. There was no chance that you can tell I am any with all the respect to everyone, any 70 years old man go to the online and just have a consultation online. This is not acceptable, or they will not take this at all. We do have two ways of booking appointments and No1 was just routine appointment where you can call and book normally the earliest available appointment will be on three days for days, one week max. This is our team like when you say oh, it's my day off next week and I want to on this day will book you in or in the earliest available appointment in three days, four days-time. We do have appointments that will be released in on the day at 9:00 o'clock in the morning and these are saved for the patients with emergencies if something happened during the night and you need to be seen in the next day, but when you call to book appointment, normally the receptions will not ask for the reason. It's a routine appointment. However, on these emergencies they will ask. They don't need details, but they need to give a brief idea because some patient they think sick leave is an emergency and sick leave is not an emergency. This is something you should have booked in advance.
Service offering during Covid-19	Virtual appointments Some triage Online booking system	Accurx mainly the one that we start using after Covid-19
How likely these changes to be persistence in the future? Tend to fallback		Now we are back to normal. Majority of our appointments I would say over 75% if not more are face to face, for example today 7 telephone appointments only out of 70 something appointment available. So, it's only a small percentage of phone calls and mainly these phone calls, we have a reason for them like it's cannot be a person that needs a physical examination. They either want to discuss the recent tests, the recent medication that they took and maybe they're not happy with or, get them side effects, sick notes, anything that you can deal with over the phone then that's fine. She will be happy to do that. We're back to normal unless the patients out of Birmingham and they really need a phone call for this or that.

Appendix F: BSREC – Full ethical approval



WARWICK
THE UNIVERSITY OF WARWICK

Biomedical and Scientific Research Ethics Committee
Kirby Corner Road
Coventry
CV4 8UW

Thursday, 31 March 2022

Mrs Reem Hadeed
WMG
University of Warwick
Coventry
CV4 7AL

Dear Mrs Hadeed,

Application Reference: BSREC 57/20-21

Title: The impact of Covid-19 on technology adoption in primary care: Evaluating GPs appointment modes prior and during Covid-19

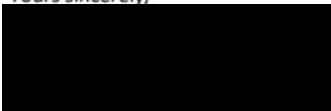
Thank you for submitting your revisions to the Biomedical and Scientific Research Ethics Committee (BSREC) for consideration. We are pleased to advise you that, under the authority delegated to us by the University of Warwick Research Governance and Ethics Committee, **full ethical approval for your project is hereby granted, subject to the conditions outlined in [Appendix 1](#).**

Any substantial changes to any aspect of the project will require further review by BSREC and the PI is required to notify the BSREC as early as possible should they wish to make any such changes. The BSREC Secretary should be notified of any minor amendments to the study.

Should issues arise during the course of the project that present risks to the safety and wellbeing of participants, these must be reported to BSREC. In such an event, recruitment and research activity must be halted until the appropriate actions have been taken, as agreed in consultation with BSREC.

I would like to take this opportunity to wish you all the best with your study.

Yours sincerely,



Professor David Ellard
Chair, Biomedical and Scientific Research Ethics Committee

Appendix G: Participated surgeries distribution in the relation of embedded case studies and coded interviewee

Type of Surgery		
Innovators	Followers	Laggards
1S PM-02-23	8S PM-19-08	2S PM-05-05
7S PM-16-17	1M PM-01-17	3S PM-09-26
4M PM-07-19	3M PM-04-03	4S PM-11-09
5M PM-08-05	3L PM-17-14	5S PM-12-10
6M PM-13-15	4L PM-18-03	6S PM-13-15
7M PM-14-31		2M PM-03-05
8M PM-20-04		1L PM-06-03
2L PM-10-10		5L PM-21-03

L: Large embedded case study; M: Medium embedded case study; S: Small embedded case study

Appendix I: Operational capabilities coding

Operational Capabilities	Code	Theory	Proxy from empirical data
Customer Capabilities	CI1	Customer involvement	Provide patient survey
	CI2	Customer involvement	Run constant meetings with patient participation group (PPG)
	CR1	Customer response	Respond to Patient feedback by actions
Managerial Capabilities	M1	Monitoring	Monitor the number of Phone calls
	M2	Monitoring	Monitor the number of booked appointments using online services
	M3	Monitoring	Monitor the number of patients registration for the online services
	I1	Involvement	Provide Patient education (Perception of service)
	I2	Involvement	Ability to identify the limitation of technology
	I3	Involvement	Ability to manage change
	I4	Involvement	Team working ability
	MO1	Managing Operation	Ability to balance between doctor-led and doctor-delivered (know-how of service providers)
	MO2	Managing Operation	Understanding the patient population, the demographics. (know-how of patients)
	MO3	Managing Operation	Follow NHS regulatory compliance and safety
	MO4	Managing Operation	Ability to come over the high level of bureaucracy (Large surgeries only)
Technical Capabilities	T1	Technical	Respond to patients complaints when they use this technology
	T2	Technical	Test the ease of technology use
	T3	Technical	Test the reliability of this technology

Appendix I* Data Analysis of operational capabilities [stage 1] for small surgeries (same process was followed for medium and large surgeries)

Code	Operational Capabilities	Theory	Practice	All	I	F
CI1	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engage the customer in the service production and delivery process	-Patient survey	✓		
CI2	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engage the customer in the service production and delivery process	-PPG			✓
CR1	Customer response	It is the competence of an organization in serving customer needs through effective and quick actions.	-Respond to Patient feedback		✓	
M1	Monitoring	The ability to monitor the progress of technology adoption effectively.	-Number of Phone calls	✓		
M2	Monitoring	The ability to monitor the progress of technology adoption effectively.	-Appointments have been booked using online services	✓		
M3	Monitoring	The ability to monitor the progress of technology adoption effectively.	-Patients registration for the online services	✓		
I1	Involvement	The ability to be actively involved in technology adoption activities at the working level	-provide Patient education (Perception of service)	x		
I2	Involvement	The ability to be actively involved in technology adoption activities at the working level	-Identify the limitation of technology		✓	✓

I3	Involvement	The ability to be actively involved in technology adoption activities at the working level	-(Ability to manage change)		✓	✓
I4	Involvement	The ability to be actively involved in technology adoption activities at the working level	(Team working ability)	✓		
MO1	Managing operations	The ability to administer tasks and functions effectively.	-Balance between doctor-led approach and doctor-delivered (know-how of service providers)			
MO2	Managing operations	The ability to administer tasks and functions effectively.	-Understanding the patient population, the demographics. (know-how of patients)	X		
MO3	Managing operations	The ability to administer tasks and functions effectively.	Regulatory compliance and safety aspects by NHS	✓		
T1	Technical capability	The ability to evaluate the suitability of new technologies to processes.	-Respond Patients complaints		✓	
T2	Technical capability	The ability to evaluate the suitability of new technologies to processes.	-Ease of use	✓		
T3	Technical capability	The ability to evaluate the suitability of new technologies to processes.	-Reliability		x	✓

Appendix II* Data Analysis of operational capabilities [stage 2] for small surgeries (same process was followed for medium and large surgeries)

Code	Operational Capabilities	Theory	Practice	All	I	F
CI1	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engage the customer in the service production and delivery process	-Patient survey	✓		
M1	Monitoring	The ability to monitor the progress of technology adoption effectively.	-Number of Phone calls	✓		
M2	Monitoring	The ability to monitor the progress of technology adoption effectively.	-Appointments have been booked using online services	✓		
M3	Monitoring	The ability to monitor the progress of technology adoption effectively.	-Patients registration for the online services	✓		
I4	Involvement	The ability to be actively involved in technology adoption activities at the working level	-Team working ability	✓		
MO3	Managing operations	The ability to administer tasks and functions effectively.	Regulatory compliance and safety aspects by NHS	✓		
T2	Technical capability	The ability to evaluate the suitability of new technologies to processes.	-Ease of use	✓		
CI2	Customer involvement	The ability of the service firm to create the environment for the customer to have direct interaction and engage the customer in the service production and delivery process	-PPG			✓
T3	Technical capability	The ability to evaluate the suitability of new technologies to processes.	-Reliability			✓
I2	Involvement	The ability to be actively involved in technology adoption activities at the working level	-Identify the limitation of technology		✓	✓
I3	Involvement	The ability to be actively involved in technology adoption activities at the working level	-Ability to manage change		✓	✓
CR1	Customer response	It is the competence of an organization in serving customer needs through effective and quick actions.	-Respond to Patient feedback		✓	
T1	Technical capability	The ability to evaluate the suitability of new technologies to processes.	-Respond Patients complaints		✓	

Appendix J: Dynamic capabilities coding

Dynamic capabilities	Code	Theory	Proxy from Empirical data
Sensing Capabilities	SN1	Market sensing	Sense a shortage of doctors
	SN2	Technology sensing capability	Explore technological possibilities from external partners
	SN3	Technology sensing capability	Ability to focus on Continuity of patient record rather than of care
Seizing Capabilities	SZ1	Digital service development capability	Create services to align with the Covid restrictions and technology
	SZ2	Mass service customisation capability	Provide additional customised service support
	SZ3	Digitalisation capability	Focus on data management
	SZ4	Digitalisation capability	Ability to display benefits of technology usage to patients
	SZ4*	Digitalisation capability	Ability to display benefits of technology usage to staff
	SZ5	Network management capability	Ability to increase the visibility of patients' needs
	SZ6	Capability related to staff training on digital skills	Provide training to the administration staff on digital skills to remotely support patients
	SZ7	Capability related to staff training on digital skills	Provide new ways of training for staff (online and interactive)
	SZ8	Capability related to staff training on digital skills	Provide basic training for patients on the functionality of digital services
Transforming Capabilities	TM1	Services processes for developing efficiency gains capability	Simplify the service requesting via the surgery website/App
	TM2	Services processes for developing efficiency gains capability	Provide Electronic prescriptions
	TM2*	Services processes for developing efficiency gains capability	Run virtual clinics (focused theme)
	TM3	Service culture capability	Embed digital and agile mindset (staff and patient)
	TM4	Service culture capability	Embed constant improvement culture

SN3, SZ4, TM2* are only in medium and large surgeries*

Appendix J* Data Analysis of dynamic capabilities [stage 1] for small surgeries (same process was followed for medium and large surgeries)

Code	Theory	Interviewee answers	All	L&F	F	F&I
SN1	Market sensing	Sense a shortage of doctors				X
SN2	Technology sensing capability	Explore technological possibilities from external partners	x			
SZ1	Digital service development capability	Create services to align with the Covid restrictions and technology		X		
SZ2	Mass service customisation capability	Provide additional customised service support	x			
SZ3	Digitalisation capability	Data Management	x			
SZ4	Digitalisation capability	Display benefits of technology usage to patients				x
SZ5	Network management capability	Increase the visibility of patients' needs				x
SZ6	Staff training on digital skills Capability	Training the administration staff on digital skills to remotely support patients				x
SZ7	Staff training on digital skills Capability	Provide new ways of training for staff (online and interactive)			X	
SZ8	Staff training on digital skills Capability	Basic training for patients on the functionality of digital services		X		
T1	Services processes for developing efficiency gains capability	Simplify the service requesting via the surgery website/App				x
T2	Services processes for developing efficiency gains capability	Provide Electronic prescriptions	x			
T3	Service culture capability	Embed digital and agile mindset (staff and patient)	x			
T4	Service culture capability	Constant improvement culture.				x

Appendix J** Data Analysis of dynamic capabilities [stage 2] for small surgeries (same process was followed for medium and large surgeries)

Code	Theory	Practice	All	L&F	F	F&I
SN2	Technology sensing capability	Explore technological possibilities from external partners	x			
SZ2	Mass service customisation capability	Provide additional customised service support	x			
SZ3	Digitalisation capability	Data Management	x			
TM2	Services processes for developing efficiency gains capability	Provide Electronic prescriptions	x			
TM3	Service culture capability	Embed digital and agile mindset (staff and patient)	x			
SZ8	Capability related to staff training on digital skills	Basic training for patients on the functionality of digital services		X		
SZ1	Digital service development capability	Create services to align with the Covid restrictions and technology		X		
SZ7	Capability related to staff training on digital skills	Provide new ways of training for staff (online and interactive)			X	
SN1	Market sensing	Sense a shortage of doctors				X
SZ4	Digitalisation capability	Display benefits of technology usage to patients				x
SZ5	Network management capability	Increase the visibility of patients' needs				x
SZ6	Capability related to staff training on digital skills	Training the administration staff on digital skills to remotely support patients				x
TM1	Services processes for developing efficiency gains capability	Simplify the service requesting via the surgery website/App				x
TM4	Service culture capability	Constant improvement culture.				x

Appendix K: Chain of evidence from secondary data resources to data analysis

Small Surgeries								
	1S	7S	2S	3S	4S	5S	6S	8S
2019	91	78	60	72	92	69	86	79
2020	85	82	54	82	84	80	79	80
2021	93	86	60	75	78	81	82	89
2022	78	78	58	77	68	59	78	74

Figure 5.2	I	L	F
2019	84.5	75.8	79
2020	83.5	75.8	80
2021	89.5	75.2	89
2022	78	68	74

Medium Surgeries								
	7M	8M	2M	4M	5M	1M	3M	6M
2019	68	73	77	92	80	92	61	75
2020	69	74	71	83	85	84	61	84
2021	62	73	75	93	86	87	69	80
2022	54	63	65	59	85	75	58	65

Figure 5.5	I	L	F
2019	77.6	77	76.5
2020	79	71	72.5
2021	78.8	75	78
2022	65.2	65	66.5

Large Surgeries					
	1L	2L	3L	4L	5L
2019	79	74	81	76	59
2020	67	70	79	76	68
2021	75	80	71	61	69
2022	56	60	61	71	56

Figure 5.8	I	L	F
2019	74	69	78.5
2020	70	67.5	77.5
2021	80	72	66
2022	60	56	66

Appendix L: Chain of evidence of from data analysis to cross-case analysis

Operational capabilities across the three embedded case studies (L, M, S)

	All	S	M	S&M	M&L	Service offering
CI2	x					State 2 only
T3	x					State 2 only
CR1		x				State 1 for M&L
T1		x				State 1 for M&L
M2			x			State 1 for S&L
M3			x			State 1 for S&L
I4			x			State 1 for S&L
T2			x			State 1 for S&L
I2				x		State 1 for L
I3				x		State 1 for L
MO1					x	State 2 only

Appendix M: Chain of evidence of from data analysis to cross-case analysis

Dynamic capabilities across the three embedded case studies (L, M, S)

	All	S&M	S&L	M	M&L	L
SN2	x					
SZ1	x					
SZ7	x					
SZ8	x					
SN1	x					
SZ5	x					
TM4	x					
SZ2		x				
TM2		x				
SZ4		x				
TM1		x				
SZ3			x			
TM3			x			
SZ3				x		
SZ4*				x		
SZ6					x	
SN3					x	
TM2*					x	
TM3					x	
TM1						x
SZ4						x
SZ2						x