Master’s Thesis

Electronic Health Record Sharing System in Hong Kong
– *Facilitating and Impeding Factors Influencing Citizens’ Adoption*

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Abstract

This study is a qualitative research on the facilitating and impeding factors that influence Hong Kong citizen’s adoption of Electronic Health Record Sharing System (eHRSS), the principal electronic health record (EHR) system in Hong Kong.

A majority of the previous studies of EHR among information systems (IS) literature either focused within the institutional or technological perspectives, or on the perspectives of healthcare institutions or healthcare professionals. Little research has been done from citizens’ perspective on factors of their adoption of EHR. There is also little research specific to Hong Kong’s circumstances. This research aims to provide an enhanced understanding on the factors that influence citizens’ EHR adoption through looking into eHRSS adoption in Hong Kong. It aims to provide contributions to bridge the knowledge gaps by providing a better understanding on adoption factors from citizens’ perspective, and investigate into whether there are any unique factors applicable to Hong Kong.

In this study, semi-structured interviews had been performed on participants covering various age groups to collect their views and opinions concerning their adoption of eHRSS. With reference to theoretical constructs on user acceptance and adoption, this study identifies four facilitating factors for citizens’ adoption of eHRSS, namely (i) knowledge, (ii) trust, (iii) perceived potential health benefits and (iv) flexibility and “stickiness” of continual use. Four impeding factors for citizens’ non-adoption were also identified, namely (i) difficulty in registration, low level/lack of trust in EHR implementation, (iii) negativity on acceptance of new technology and (iv) perceived difficulty in usage.

In the concluding remarks, way forward for future research has been outlined. Practical recommendations have also been formulated for reference by relevant authorities in administering eHRSS in Hong Kong.

Keywords

Electronic Health Records, Electronic Patient Records, Technological Adoption, Technological Acceptance, Qualitative Research
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1.0 Introduction

Chapter 1 presents the background and problem of the research. It includes a brief overview of the previous research around the electronic health record (EHR), a summary of EHR implementation in Hong Kong through the Electronic Health Record Sharing System (eHRSS), research aim and questions, validity and reliability, as well as scope and limitations. In the final part of the chapter, the thesis structure is presented.

1.1 Background and Problem

In recent years, advancements in information technology has allowed sophisticated digitalisation of healthcare data as Electronic Health Record (EHR) (Steinhubl and Topol, 2015). The Healthcare Information and Management Systems Society defines EHR as “a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting” (Healthcare Information and Management Systems Society, 2018). In a national research in the United States, it is reported that EHR can provide benefits to patients with regard to clinical quality, patient safety and efficiency (King et al., 2013). In a more current investigation with healthcare professionals on the impact of EHR, it has been suggested that EHR can, among other benefits, provide better flexibility in access to information, achieve time saving, and to facilitate information sharing among healthcare professionals (Mohammed et al., 2021).

The Electronic Health Record Sharing System (eHRSS), being the first and principal EHR system in Hong Kong, was introduced in March 2016. It provides an electronic platform facilitating free and lifelong electronic health records for all members of the public. The system enables sharing of EHR among public and private health services upon consent of patients. As of March 2019, more than a million patients are using the system amid Hong Kong’s population of roughly 7.5 million, thus involving a wide range of stakeholders and paramount public interest (HKSAR Government, 2019). In Hong Kong, the eHRSS has been designated by law as principal EHR system implemented in Hong Kong (Electronic Health Record Registration Office, 2021). Therefore, the study of EHR in Hong Kong would only be meaningful through the study of eHRSS. Specific for Hong Kong’s case, the concepts of EHR adoption and adoption of eHRSS are interchangeable given the city’s own specific circumstances.

A review of studies showed that a majority of the previous studies on EHR among information systems (IS) literature focused on the institutional or technological perspectives, such as the aspects of predictive analytics (Lin et al., 2017), benefits and challenges (Bao et al., 2020; Ben-Assuli and Padman, 2020), as well as implementation and professional identities (Boonstra and van Offenbeek, 2017; Greenwood et al., 2019; Kwon and Johnson, 2018; Mishra et al., 2012). Perspective-wise, the majority of academic works focused on the perspectives of healthcare institutions or healthcare professionals. It has been observed that there is only little research from citizens’ perspective on factors of their adoption of EHR (Angst and Agarwal, 2009), or research specific to Hong Kong’s circumstances (Keung et al., 2018). This study is motivated by the knowledge gaps of lack of studies on EHR adoption from citizens’ perspective, or studies that are specific to Hong Kong’s circumstances. By summarising and explaining facilitating and impeding factors influencing citizens’ adoption of eHRSS in Hong Kong, this study aims to provide a better understanding of EHR adoption from citizens’ perspective, while unique factors applicable to Hong Kong would also be highlighted in the discussions.
1.2 Overview of EHR System in Hong Kong

Between December 2011 and February 2012, to prepare for the establishment of its first EHR system, the Hong Kong Government conducted a public consultation exercise to collect citizens’ views and opinions on the eHRSS. Subsequently, a Bills Committee was formed to scrutinise provisions under the “Electronic Health Record Sharing System Ordinance” and the Ordinance came into operation since December 2015. During the planning stage of the eHRSS, the development of eHRSS was set to consist of two phrases of 2009-2010 and 2018-2019 (Legislative Council Secretariat, 2016).

In Hong Kong, the definition of EHR has been defined under Section 2 of the “Electronic Health Record Sharing System Ordinance”, which is set out as:

- In relation to a registered healthcare recipient, means the record for the recipient that is kept under Section 5(2); and

- In relation to a healthcare recipient who was once registered, but is no longer registered, means the record for the recipient that was kept under Section 5(2);

Section 5(2) of the Ordinance states that the system established under eHRSS must keep a record of every registered healthcare recipient containing three items:

- (i) The index data of the recipient;

- (ii) The health data of the recipient provided to the Commissioner [for the Electronic Health Record] in the form and manner specified by the Commissioner; and

- (iii) Any other data or information of the recipient that is, in the Commissioner [for the Electronic Health Record]’s opinion, necessary for the proper functioning of the System (HKSAR Government, 2015).

Further to the above provisions, the content of EHR has been further set out by the Electronic Health Record Registration Office to include nine items, including (i) personal identification and demographic data, (ii) allergies and adverse drug reactions, (iii) diagnosis, procedures and medication, (iv) encounters / appointments, (v) clinical note / summary, (vi) birth and immunisation records, (vii) laboratory and radiology reports, (viii) other investigation reports, and (ix) healthcare referrals (Electronic Health Record Registration Office, 2021).

The preliminary stage covered setting up the eHRSS as a sharing platform connecting all public and private hospitals, such that electronic medical record or electronic patient record systems could be connected with health information systems available in the market. In parallel, relevant legislations on data privacy protection and system security were introduced to facilitate the smooth operation of the eHRSS (Legislative Council Secretariat, 2016). The second stage of development covered introduction of features of radiological image sharing, expanded scope of sharable data, enhancements in patient control or choice, setting-up of a patient portal, and other user functions on Chinese medicine and relevant pilot schemes (Legislative Council Secretariat, 2016).
Under the present arrangement, the Hong Kong Government has laid down five guiding policy principles of the use and development of EHR in Hong Kong (Electronic Health Record Registration Office, 2021): (i) EHR development should be initiated by the Government and should leverage the systems and know-how of the Hospital Authority, (ii) data privacy and system security of eHRSS should be handled with paramount importance and compliance with legal protection, (iii) participation in eHRSS should be compelling but not compulsory for the patient or healthcare provider sides, (iv) the eHRSS should be established on open, pre-defined and common technical standards as well as operational protocols; and (v) development of eHRSS should be on a block-building approach involving public-private partnership.

Concerning the consent model, with the sharing consent of the patient, other than the Hospital Authority and the Department of Health, other participating healthcare providers can also view and upload patients’ medical records onto the eHRSS platform (Electronic Health Record Registration Office, 2021a). With the sharing consent obtained, healthcare practitioners would be able to access patients’ health record under “patient-under-care” and “need-to-know” principles. Access to the above EHR records beyond usual consultation time is also permitted for valid reasons. On the validity of patient consent, patient can either choose “indefinite sharing consent” or “one-year sharing consent”. Patients are permitted to revoke on their granted sharing consent anytime, while previously uploaded health records will be retained and available for access by other healthcare practitioners upon patients’ sharing consent (Electronic Health Record Registration Office, 2021a).

The eHRSS has a privacy protection mechanism on regulating access rights on patient data. Different healthcare professionals have different access levels of data and functions. The designated list of healthcare professionals includes pharmacist, dentist, doctor, midwife, nurse, medical laboratory technologist, occupational therapist, optometrist, radiographer and physiotherapist. Access the relevant parts of EHR has been limited to the relevant professional service under the “need-to-know” principle. On the other hand, patients can authorise access using the Hong Kong identity card or one-time password sent to their mobile phones for authentication. As an additional security feature, all access on EHR will be logged and are subjected to audit and inspection (Electronic Health Record Registration Office, 2021b).

1.3 Previous Research around the Problem

On the realm of study in EHR, a large part of existing academic works is dedicated for the benefits and challenges of EHR implementation. Devkota and Devkota (2014) summarise that among others, the implementation of EHR system can facilitate decreased morbidity and mortality rates, improve medical efficiencies, reduce adverse drug interactions, and decrease healthcare cost in a public level. Separately, the literature review of Ben-Zion et al. (2014) summarise the critical success factors for adoption of EHR. The authors argue that five contextual elements, including external environment, firm strategy, business processes, structure and culture, system features and infrastructure, would pose constant challenges for successful implementation of EHR. On the other hand, four system implementation phases of initiation, build/buy, introduction, and adaptation, would also be detrimental to the successful implementation of EHR systems.

Hägglund and Scandurra (2017) observe that many of the EHR applications developed for patients are either designed with reference to healthcare providers’ perspective or being totally independent from healthcare settings. Despite its importance in leading to usable and useful e-
health applications, there has been generally a lack of patient involvement in designing of electronic healthcare applications.

For Hong Kong’s case, there has only been fragmented research on EHR after the government’s implementation of eHRSS in 2016. In an empirical research on patient users’ acceptance and resistance towards eHRSS by Keung et al. (2018), the authors reviewed various factors influencing the behavioural intention of specialist and normal patients in use of eHRSS. Upon analysis responses from over 240 questionnaires, it has been identified that common factors include performance expectancy and effort expectancy. Specifically, transition costs would be of particular concern for specialist patients, while sunk costs and regret avoidance would be factors of concern for normal patients. The authors suggest that their study reveals two implications. First of all, patients that have to visit specialists regularly constitute a major proportion of eHRSS users. Therefore, it would be essential for the authorities to strengthen eHRSS publicity among normal patients. Also, a major resistance for using eHRSS by specialist patients are the difficulty of registration process, especially for those who have low information technology literacy. It would be useful to encourage patient use by simplifying the registration process for the eHRSS. Separately, Ong and Sabapathy (2020) discuss on the challenges of implementing EHR in Hong Kong on the angle of legal and privacy issues upon implementation. In totality, research on EHR issues in Hong Kong has been minimal.

1.4 Importance and Significance of the Research

The importance of this research is two-fold. First of all, a review of studies has shown that a majority of the current studies on EHR adoption have been taken from the institutional or technological perspective, and through the perspectives of healthcare institutions or healthcare professionals. It is observed that relatively little research has been focused on adoption of EHR from the citizen’s side.

Secondly, the use of eHRSS with current user-base of a million users involves substantial public interest. Given that the eHRSS in Hong Kong has been a relatively new implementation for around five years, scholarly works dedicated for Hong Kong’s case are limited in scope and concept. Existing studies on EHR adoption are also mostly beyond the geographical location of Hong Kong, or unspecific to Hong Kong’s circumstances. After five years since eHRSS’s implementation, a detailed revisit on EHR adoption in Hong Kong would be timely to provide an enhanced understanding on various factors influencing citizens’ adoption.

Therefore, this study aims to bridge such knowledge gaps by focusing on EHR adoption from citizens’ perspective, through the study of eHRSS adoption in Hong Kong.

1.5 Research Aim and Questions

The aim of this research is to provide an enhanced understanding on the various factors influencing adoption of eHRSS from the perspective of citizens in Hong Kong. Accordingly, this research focused on the below two research questions concerning EHR implementation in Hong Kong:

\[ RQ1: \text{What are the facilitating factors that influence citizens' adoption of eHRSS?} \]

\[ RQ2: \text{What are the impeding factors that influence citizens' adoption of eHRSS?} \]
On the above research questions, facilitating factors are defined as the positive factors that influence people to adopt eHRSS. On the other hand, impeding factors are defined as negative factors that lead to citizens’ non-adoptions of eHRSS.

1.6 Scope and Limitations

First of all, a limitation on this study is that the views, concerns and expectations of EHR may be a cultural phenomenon. Therefore, participants from Hong Kong may have vastly different opinions such that the research results may not be directly applied to other geographical locations. Researchers in other locations would have to repeat the research process in their study place to research on their respective EHR issues.

Secondly, by nature of semi-structured interviews, data collected for the research was largely based on the information quality and volume provided by the participants. This research has only a limited number of participants. The scope and breath of information collected during the process may be subjected to such limitations.

Finally, by taking an interpretive approach of this research, the researcher’s prior beliefs, values, interests and assumptions would induce influence on the interpretation (Orlikowski and Baroudi, 1991). With a background from Hong Kong, I may possess pre-defined concepts and views on EHR implementation, as well as cultural and social norms in Hong Kong. Though I strive to maintain a neutral point of view as researcher, during consolidating interview records into thematic segments, categorisation of ideas is somehow subjected to sets of values and assumptions possessed by my good self as researcher.

1.7 Master’s Thesis Structure

With reference to the research aims and questions, this thesis will adopt the below self-explanatory six-step structure in Figure 1.6, leading to detailed discussions and conclusions on facilitating and impeding factors that influence Hong Kong citizens’ adoption of eHRSS. As summarised in the conclusion section, four facilitating factors and four impeding factors influencing citizens’ adoption have been identified.

![Figure 1.7 - Master’s Thesis Structure](image-url)
2.0 Literature Review/Theoretical Framework

Chapter 2 presents the literature review on various aspects of EHR and theories on technological acceptance and adoption. It includes discussions on previous literature on scope of study and definitions of EHR, EHR implementation, factors for adoption of EHR, and benefits and challenges of EHR. Aside from studies from the realm of EHR, literature review on technological acceptance and adoption have also been performed to include important concepts and theories useful for explaining EHR adoption in Hong Kong.

Rowe (2014, p. 243) proposes that a literature review should perform the below functions:

“A literature review synthesizes past knowledge on a topic or domain of interest, identifies important biases and knowledge gaps in the literature and proposes corresponding future research directions.”

Accordingly, this paper would revisit past research on the topic, identify key issues and propose for a way forward from the information systems (IS) perspective.

The search and selection procedures were based on the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses” (PRISMA) approach designed by Liberati et al. (2009), which introduces an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.

A comprehensive search of journals related to the research questions and areas were performed from 1 February 2021 to 28 April 2021 on the journal systems of “Scopus” and “Web of Science”. Given its significance, EHR has been a common subject of study in the field of informatics. Therefore, eight important journals (“MIS Quarterly”, “Information Systems Research”, “Journal of Management Information Systems”, “Journal of the Association for Information systems”, “Information Systems Journal”, “European Journal of Information Systems”, “Journal of Information Technology”, “Journal of Strategic Information Systems”) in the field of informatics (“basket of eight”) have been the primary source of initial research. In addition, literature review on benefits and challenges of EHR has also been performed to compare between citizen perceptions and previous scholarly conclusions.

During the first stage of literature review, the keywords used included “Electronic Health Record”, “Electronic Patient Record”, “E-health” and “Electronic Health”. Search results under this stage formed the ensuing Chapters 2.1 - 2.5. Upon conducting interviews, it was found out that issues on users’ acceptance and adoption of technology were also relevant, such that additional rounds of journal search were performed with the keywords of “Technolog* Adoption”, “Technolog* Acceptance”, “Technolog* Use”, “Trust and Technolog*” and “Trust and System”. Results for literature review under these themes were presented under Chapter 2.6.

Records were first screened such that only relevant papers would be selected. Records were then further screened for title review and assessed for full-text review, such that articles were chosen and included for the literature review of this study. However, search results on the keyword of “electronic health record” or “electronic patient record” with the “basket of eight” have only returned a modest number of 20 related journals, which is summarised in Chapters 2.1 - 2.5 (the full list is available at Appendix - Chapter 8.1). The majority of the
articles from “basket of eight” focus on EHR from the institutional or technological perspective. For example, research have been conducted on aspects of predictive analytics (Lin et al., 2017), benefits and challenges (Bao et al., 2020; Ben-Assuli and Padman, 2020), as well as implementation and professional identities (Boonstra and van Offenbeek, 2017; Greenwood et al., 2019; Kwon and Johnson, 2018; Mishra et al., 2012). Perspective-wise, most of the studies have been conducted with the perspectives of healthcare institutions or healthcare professionals. It has been observed that only little research has been done from citizens’ perspective on factors of their adoption of EHR (Angst and Agarwal, 2009). Therefore, reference is also drawn from other publications, including books and medical or medical-informatics journal, to supplement the literature review. Accordingly, the literature review results are presented by themes below.

2.1 Scope of Study and Definitions of EHR

Kohli and Tan (2016) study the interesting question of how IS researchers could contribute to research in EHR from a medical informatics point of view. In the start of the discussion, the authors performed an overview of various definitions of EHR, and selected three definitions:

Table 2.1 - Definitions of Electronic Health Record (Kohli and Tan, 2016)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Healthcare Information and Management Systems Society</td>
<td>“...a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting.”</td>
</tr>
<tr>
<td>International Standards Organization</td>
<td>“...a repository of patient data in digital form, stored and exchanged securely, and accessible by multiple authorized users.”</td>
</tr>
<tr>
<td>The U.S. Department of Health and Human Services</td>
<td>“[An] electronic version of a patient’s medical history, that is maintained by the provider over time, and may include all of the key administrative clinical data relevant to that person’s care under a particular provider, including demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports.”</td>
</tr>
</tbody>
</table>

Kohli and Tan (2016) observe that although the above highlights the sharing and storage of patient information in digital format over time, no reference has been included in the sharing and usage of patient’s data.

On the other hand, EHR has been referred to in a descriptive manner. Kohli and Tan (2016) summarise that EHR has facilitated the integration of medical history of patients for safe and better medical planning and treatment. On the public health level, aggregate-level EHR combined with data analytics enables both the examination and development of medicines and treatment for chronic diseases. On the other hand, EHR development has been facing social and organizational challenges, such as issues of privacy, interoperability, and security among the three primary stakeholders of patients, providers, and purveyors. Summarising the above, in
regard to the needs and issues of various stakeholders, the authors argue that IS researchers could focus on two primary thematic areas of integration and analytics of EHR in the transformation of delivery of healthcare. They also suggest that IS researchers have been well trained and are in the well-positioned to design, develop, and facilitate the use of EHR in healthcare services amid various challenges in EHR implementation. The authors conclude that IS researchers’ engagement with medical informatics would be essential to further exploit the benefits of EHR and facilitate transforming healthcare delivery.

Ambinder (2005) defines electronic health records as clinical and administrative encounters between healthcare providers and the patient in the course patient care. EHR is a reflection on the practice, job function, as well as knowledge and skills of the healthcare professional, which typically includes data structures and elements of the healthcare providers’ systems. Ambinder (2005) also supplements that EHR could be considered as an integration of a patient’s multiple electronic medical records generated by both the healthcare professional and the patient, with the aim to facilitate optimal management patient and public health.

On the other hand, Yamada (2008) suggests that EHR could be referred as a longitudinal electronic record on patient’s health information generated upon care delivery settings in various instances. Common examples of information contained include a broad coverage of demographics, notes on medical progress and problems, medications records, previous medical history, as well as reports on immunizations, laboratory data, and radiology matters.

2.2 Overview of EHR System Implementations

Further to the overview of EHR implementation in Hong Kong, EHR implementations in the United States and Sweden are also presented to give a broader view of EHR implementation across different areas.

In the United States, the Health Information Technology for Economic and Clinical Health (HITECH) Act passed in 2009 provided the backbone of setting-up of funding for sharing of specified EHR data with public health authorities. Mandated under the HITECH Act, EHR systems certified was designated to perform five functions in two stages: (i) to establish interface with immunisation registries for transmitting electronic data as directed by public health authorities (Stage 1), (ii) to record, modify, retrieve and submit syndromic surveillance data in electronic means (Stage 1), (iii) to record, modify, retrieve and submit reportable clinical laboratory results in electronic means using Health Level Seven standards (Stage 1), (iv) to identify and report cancer cases to the state cancer registry (Stage 2); and (v) to identify and report specified cases to the designated specialised registry (Stage 2) (Friedman et al., 2013).

In parallel, with the passing of the 21st Century Cures Act by the Congress, the Department of Health & Human Services has been empowered to promote innovation as well as access and use of electronic health information. As specified by the act, EHR implementation in the United States are based on three pillars: (i) to facilitate development and use of upgraded e-health capabilities, (ii) to set out transparent expectations for data sharing, including the use of open application programming interfaces (APIs); and (iii) to enhance e-health end user experience and help ease administrative burden (U.S. Department of Health & Human Services, 2018).

On patients’ general rights concerning EHR, the Privacy Rule imposes a general duty for participating institutions to provide patients with “designated record sets” maintained, comprised three items of (i) records of medical and billing histories, (ii) records related to the
enrollment, payment, claims settlement, as well as case and medical management records, and (iii) any other whole or part records by or for the covered entity to make medical decisions in relation to the patients (U.S. Department of Health & Human Services, 2021). In addition, patients possess the right guaranteed by legal provisions to inspect or get a copy of their EHR, regardless of whether the information is stored within the onsite systems or remotely (U.S. Department of Health & Human Services, 2021).

The U.S. has a high adoption rate of EHR. As of 2015, 96% of all non-federal acute care hospitals and 78% of office-based physicians have already implemented the designated certified health IT system for EHR implementation (Department of Health & Human Services, 2018).

For Sweden’s case, Moll et al. (2018) summarises that Swedish citizens are provided with the national online portal Journalen for accessing their patient-accessible EHR (PAEHR). The PAEHR service fetches patients’ EHR information via a national level health information exchange platform, thereby providing citizens with a one-for-all point of access regarding their EHR. Information available from the PAEHR service includes (i) number of healthcare providers patients have visited, and (ii) EHR system in use by their healthcare providers. Nonetheless, patient access towards their EHR is not without limitation and would depend on whether healthcare operations have been received from public or private healthcare providers.

Hägglund et al. (2018) suggest that such characteristics of the Swedish EHR system have been formulated on the principles of equal access and autonomy among various Swedish regions. As a result, responsibility for healthcare provision has been shared among the central government, county councils and municipalities. While the county councils always act as the principal healthcare provider, there also exist private healthcare providers which are often funded by the public and form an integrated component of the Swedish national healthcare system. Such decentralized organization structure of the Swedish system means that each provider would decide on its own information technology and EHR system to be adopted, thus causing low interoperability between various EHR systems. Therefore, the PAEHR system implemented through the national Health Information Exchange (HIE) platform established since 2013, has allowed a single connective point for client applications and patient access. Also, the safe access to the PAEHR service is achieved through the national patient portal of 1177.se. As of April 2021, approximately 4 million users have accessed the personal e-services on 1177.se, representing approximately two-fifth of Sweden’s total population (Inera, 2021).

2.3 Factors for Adoption of EHR

In the study of EHR adoption, Angst and Agarwal (2009) integrate patient’s concern of information privacy (CFIP) with the elaboration likelihood model (ELM) to study changes in attitude and intention for opting-in for EHR systems. The study used experiment method where interactions of over 350 participants were collected and analysed. The authors summarise that first, CFIP, together with argument framing and issues involvement are interacting components and would affect user’s adoption of EHR. Second, attitudes towards EHR use and CFIP would be directly influential on EHR adoption. In their concluding remarks, the authors suggest a major finding with both theory and practice implications, that an appropriate message framing can positive alter individuals’ attitudes of EHR adoption, even when they are highly concerned for privacy issues.
McGinn et al. (2011) study the challenges of EHR from the perspective of barrier from patients. The authors outline that major barriers include perceived usefulness, privacy and security issues, accuracy, risk and benefit, motivation as well as patient-practitioner interactions.

Separately, Pirtle and Chandra (2011) outline that EHR adoption would be impacted by privacy and security concerns. In particular, it is of importance to patients that the medical data on EHR is secure and would not be used for marketing purposes.

Mathai et al. (2020) summarise that factors influencing patient’s adoption in EHR may extend on the Decomposed Theory of Planned Behaviour, where security concern, privacy concern and perceived health literacy are involved. Among various factors, attitude and subjective norm are the most significant factors directly influencing patient adoption.

Greenwood et al. (2019) study the transformative effect of how highly skilled medical professionals react to the increasing adoption of enterprise systems within their organizations. The research focuses on how EHR implementation would affect physicians’ decisions to continue their practice at their respective hospital. The research results suggest that when enterprise systems serve as complementarities for professionals, it would lengthen their duration of practice at their respective organization significantly. However, when technological adoption are disruptive and pressure professionals to change their routines, this would lead to pronounced leaving of the professionals. The authors also observe that these effects would be strongly moderated by individual and organizational characteristics, such as the human capital circumstances, competition level for the area, and prevalence of past disruptions.

Bao et al. (2020) focus on the dimension of EHR on the adoption of health portal. Their study focuses on how the availability of health portals for patients’ online access of their medical records, which has become increasingly popular, could impact on patient’s health outcomes. Based on the theory of effective use, the researchers examine the connection between portal use and subsequent incidence of patient hospitalizations. Research findings from the study indicates that portal use can bring multi-dimension improvements in patient health outcomes, including reduced frequency of hospital and emergency visits, risk of re-admission as well as length of each stay. In this connection, the authors suggest that relevant healthcare institutions should take note of such positive impacts brought by portal use in improving patient-provider engagement and the health outcomes of chronic disease management.

Though less related to EHR issues specifically, Boonstra and van Offenbeek (2017) study the general of software procurement process by institutions and examine the above through studying how a large healthcare provider selected a supplier for EHR within the tendering processes. Studies results reveal that although most of the senior medical staff displayed preference over a particular software package, a relatively unknown supplier was ultimately selected after an extensive tendering process. In evaluating their decision-making processes, the authors suggest that functional and economic norms of rationality would precede over political rationality within software selection workflow.

2.4 Benefits of EHR

It has been observed that EHR has always been studied within the perspective of healthcare institutions or healthcare professionals, while little research has been done from the specific angle from citizens’ aspect.
First of all, EHR is essential to facilitate predictive analytics. Lin et al. (2017) study how healthcare predictive analytics using EHR from can support clinical decision making in providing personal and preventive healthcare. In view that patients with chronic diseases commonly face multiple adverse health incidents, using the design science paradigm and a newly proposed Bayesian multitask learning (BMTL), the authors suggest that a set of baseline models could be established to facilitate healthcare providers for multifaceted risk profiling and modelling of arbitrary events. In their concluding remarks, the authors suggest that the study provides insights in the realm of EHR in developing an EHR analytics approach for risk profiling. On the other hand, Ben-Assuli and Padman (2020) base on EHR analytics and examine how readmission risk may progress over multiple emergency department visits by patients with chronic disease. They study patients’ early stratification into distinct trajectories based on related frequencies and drew conclusions between these trajectories and patient characteristics. Accordingly, the authors investigate how time-stable and time-varying covariates could predict future readmission by patients. In their research findings, the authors suggest that longitudinal risk stratification would facilitate early identification of specific patient groups following various trajectories upon admission for emergency care.

Coorevits et al. (2013) focus on the benefits of EHR for clinical research. The authors summarise that EHR would be essential to facilitate design and execution of clinical trials for new medicines. They point out that EHR systems would allow exchange of information with interoperability and clinically validated information structures, thereby enabling more consistent and comprehensive recording and sharing of data among patient groups. Therefore, Coorevits et al. (2013) summarise that a major benefit of EHR in a public health perspective is that patients’ healthcare may be improved in the long run.

Separately, Hillestad et al. (2005) provide a comprehensive outline of the benefits brought by EHR implementation in three aspects: efficiency savings from the public health perspective, as well as safety and health improvements from patients’ perspectives. On the efficiency-saving side, EHR can facilitate communication, coordination, measurement, and decision support for healthcare operations. In addition, EHR implementation can facilitate identifying potentially high-leverage areas for improving health care, such as chronic illnesses. Accordingly, cost-saving, health care efficiency and safety can be achieved simultaneously. Concerning patient safety, EHR can provide better hospital and ambulatory care by making patients’ medical information available to physician at the time of checking past medical history and drug ordering. The EHR system can warn against potential interactions with patient’s drug use, track steps and provide an extra protection mechanism for identifying and eliminating errors.

2.5 Challenges of EHR

Hripcsak and Albers (2013) study the challenges of EHR implementation in its complexity context. The authors point out that EHR contains continuous variables and huge number of discrete concepts. Systematic record and maintenance of data, involving formal definitions, classification hierarchies, and inter-concept relationships, would pose great challenges for EHR implementation. In addition, it is common for EHR to contain local variation of terminology and variations of definitions over time. Also, symptoms and thought processes within the EHR are often recorded as narrative notes where meaningful manipulations of such health data would require complex natural language processing.

On privacy and ethical issues, Coorevits et al. (2013) suggest that the use of EHRs for clinical research would inevitably involve legal and ethical challenges. Therefore, it would be important
to maintain a balance such that scientific research could be progressed while patient privacy would not be compromised. The differences in laws and ethical approaches across different geographical locations have created various pragmatic issues for EHR data usage in clinical research.

On implementation challenges, Kwon and Johnson (2018) discuss on the certification mechanism in the United States called “meaningful-use attestation” as an initiative to promote EHR adoption and better protection of patient’s sensitive healthcare data from the side of healthcare providers. The authors suggest that impacts brought by meaningful-use attestation would be contingent with both the nature and timeframe of data breaches. Accordingly, the authors conclude that meaningful-use attestation can facilitate healthcare providers to establish technical and administrative safeguards. Meanwhile, continued security investment and rolling updates are also essential due to the expiry nature of static security certification mechanisms.

Concerning professional identity, Mishra et al. (2012) study EHR assimilation and evolution of physician identity by investigating the two salient physician identities of healthcare provider and physician community. Research results suggest that both physician community identity reinforcement and physician community identity deterioration would have direct influence on the assimilation of EHR systems, which are in turn moderated by governmental influence.

2.6 Technological Adoption by Users

Rogers (1962) formulates the “Diffusions of Innovation Theory” in explaining people’s adoption of new technology. He describes diffusion as the process for which an innovation is being transmitted through different channels over a period time within members of a social group. In essence, the four main elements in the underlying processes are (i) innovation, (ii) communication channels, (iii) time, and (iv) the social system.

Under the “Diffusions of Innovation Theory”, Rogers (1962) formulates the “Innovation-Decision Process” to explain a chain of actions and choices over time where an individual or organization evaluates an innovation and decides whether to incorporate or not the innovation into established practices. The “Innovation-Decision Process” includes five stages of (i) knowledge, (ii) persuasion, (iii) decision, (iv) implementation and (v) confirmation. Knowledge refers to the situation when an individual gains knowledge about an innovation’s existence and learns of how it works. Persuasion refers to the stage when an individual begins to form a positive or negative attitude towards the innovation. The third stage of decision refers to the process where the individual performs to adopt or reject the new idea. This will move to the implementation where the innovation is subsequently adopted for application. The final stage of confirmation refers to the reinforcement of an innovation-decision previously made.

The five-stage model of the Innovation-Decision Process is presented in Figure 2.6.1 below:

![Figure 2.6.1 - Model of Stages in the Innovation-Decision Process (Rogers, 1962)](image)
Separately, Rogers (1962) also observes that users can be classified by degree of innovativeness. Innovativeness refers to the degree of whether an individual or an organization adopts new ideas earlier than the other members of a system. Based on standardised percentage of respondents from their studies, the author argues that distribution of technological users can be approximated and divided into five adopter categories: (i) innovators, (ii) early adopters, (iii) early majority, (iv) later majority and (v) laggards. An illustration of the classification is presented in Figure 2.6.2 below:

To explain technological adoption, Davis (1989) formulates an explanation model named “Technology Acceptance Model” (TAM). The model suggests that two theoretical constructs, namely perceived usefulness and perceived ease of use, acted as fundamental determinants of system use by users. The author defines perceived usefulness as the degree of belief on whether usage of a particular system would enhance performance. Towards this end, a system with high degree of perceived usefulness would mean a system where users believe that it would bring a positive use-performance relationship. On the other hand, the author defines ease of use as the degree for which users would envisage that using a particular system would be free from difficulty or great effort. Therefore, a system perceived to have high degree of ease of use would be more likely to be accepted for users. The author also suggests that attitudes would not fully mediate the effects of perceived usefulness and perceived ease of use in shaping user behaviour.

On the other hand, other external factors would influence on user intention and attitude only through an indirect way through influencing perceived usefulness and ease of use. Accordingly, the original TAM can be illustrated by Figure 2.6.2 below:

---

**Figure 2.6.2 - Adopter Categorisation on the Basis of Innovativeness (Rogers, 1962)**

**Figure 2.6.3 - Technology Acceptance Model (Davis, 1989)**
In addition, with reference to prominent user acceptance literature and many relevant competing models, Venkatesh et al. (2003) propose a “Unified Theory of Acceptance and Use of Technology” (UTAUT) to explain user acceptance of technologies. This is an ambitious integration of eight prominent models, i.e. (i) Theory of Reasoned Action, (ii) Technology Acceptance Model (TAM), (iii) Motivational Model (MM), (iv) Theory of Planned Behaviour (TPB), (v) Combined TAM and TPB, (vi) Model of PC Utilization, (vii) Innovation Diffusion Theory and (viii) Social Cognitive Theory, to formulate a unified model that would integration various elements. The proposed UTAUT was then validated empirically in respect of information technology acceptance.

Under the UTAUT, the authors identify four major determinants of intention and usage, i.e. (i) performance expectancy, (ii) effort expectancy, (iii) social influence, and (iv) facilitating conditions, as well as four moderators of key relationships, i.e. (i) age, (ii) gender, (iii) experience and (iv) voluntariness. In totality, the authors argue that the three pillars of performance expectancy, effort expectancy, and social influence are influential on behavioural intention to use a technology. On the other hand, behavioural intention and facilitating conditions would be determining factors for technology use. The proposed UTAUT is illustrated under Figure 2.6.4 below:

![Figure 2.6.4 - Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003)](image)

In addition, Venkatesh et al. (2003) suggest that UTAUT would provide an essential tool for managers to assess the likelihood of success for introduction of new technology, which provides insights on various drivers of acceptance. This would facilitate better design interventions such as training and marketing targeted at user groups that are less inclined to new technology adoptions.

On the other hand, given its unique circumstances of EHR implementation in Hong Kong, eHRSS is primarily an e-government service. Therefore, theories on e-government services adoption are also important in relation to the study of eHRSS adoption by Hong Kong citizens.
Concerning citizen trust and acceptance of e-government services in a broader sense, Carter and Bélanger (2015) have previously studied on the general issue of citizens’ willingness to adopt the technological innovation of e-government services. Constructing from the Technology Acceptance Model, Diffusions of Innovation theory and web trust models, the authors formulate a detailed “E-Government Adoption Model” to outline influencing factors of citizens’ adoption of e-government services. It is suggested that the three core predpecting factors of usage of electronic services provided by the government are perceived ease of use, compatibility and trustworthiness, with compatibility identified as the most significant factor. On compatibility, the authors suggest that citizens will be more likely to use government e-services if such services are compatible with the established ways that citizens prefer to interact with others. Concerning perceived ease of use, the authors borrowed Davis (1989)’s concept and referred it to the extent to which a user believes that usage of a particular system would be free of effort. Research results suggested that citizens’ intentions to use e-government services are related to the perceived ease of use. Finally, with regard to trustworthiness, the authors suggest that this element consists of two constructs: trust on the Internet and trust on the government. In totality, high levels of perceived trustworthiness would positively influence citizens’ intentions to use e-government services. An illustration of the “E-Government Adoption Model” is presented by Figure 2.6.5 below:

Figure 2.6.5 - Variables of Citizen Adoption of E-Government Services  
(Carter and Bélanger, 2015)

In view of the above three factors, Carter and Bélanger (2015) suggest some recommendations for authorities to encourage usage of e-government services. Regarding compatibility, authorities should be mindful that information and services are provided in way that is consistent with citizens’ daily interactions with the government. Also, interfaces and interactions within various government services should look similar or be launched with standard interfaces across services to achieve compatibility. For perceived ease of use, the authors suggest that the e-services provided should be easy to navigate, with clear and organised information presented to address citizens’ needs. Also, provision of services should always enable users to locate information they need quickly and effortlessly to avoid user frustration. On trustworthiness, the government should identify components of benevolence, integrity and competence as goals of service provision. The authorities should also emphasise that they are concerned with the desire and ability to provide citizens with quality information and services at addressing citizen needs.
2.7 Implications from the Literature Review

This literature review covers various issues of EHR, including scope of study, overview of implementation, factors for adoption, as well as benefits and challenges. Various issues of EHR has been included to facilitate formulation of research findings in Chapters 4 and 5. From the literature review, it is observed that most of the previous research focus on EHR have been on the institutional or system-design sides, or from the perspectives of healthcare institutions or healthcare professionals. There has only been little research from citizens’ perspective on adoption of EHR, both from leading IS journals and other medical/medical informatics journals.

Separately, eHRSS can be considered as a new technology. Therefore, IS concepts in relation to technological acceptance and adoption may be useful in studying and explaining citizens’ adoption of eHRSS. As a result, an extended literature review has been performed on technological acceptance and adoption.

While it is noted that the theoretical constructs of “Innovation-Decision Process” under the “Diffusions of Innovation Theory” (Rogers, 1962), “TAM” (Davis, 1989), “UTAUT” (Venkatesh et al., 2003) and “E-Government Adoption Model” (Carter and Bélanger, 2015) have relevance in studying and explaining various factors influencing citizens’ adoption of eHRSS in Hong Kong, the theoretical constructs by Rogers (1962) and Davis (1989) have been formulated rather distantly in a relatively earlier stage of information technology development. In addition, the theoretical constructs by Rogers (1962) and Davis (1989) have been further developed and covered by the Venkatesh et al. (2003) and Carter and Bélanger (2015) - while the UTAUT has roots from TAM, the E-Government Adoption Model is stemmed from TAM and “Diffusions of Innovation theory”.

Given such overlap, only the theoretical constructs of Venkatesh et al. (2003) and Carter and Bélanger (2015) have been used in this study. The theoretical constructs have been used as a basis for thematic analysis, and subsequently been referred to in formulation of findings and conclusions. The “Diffusions of Innovation Theory” by Rogers (1962) and TAM by Davis (1989) have been considered but were found unsuitable for this study and hence not used in the analysis process.
3.0 Methodology

Chapter 3 presents the methodology framework for the research. This research is qualitative case study aiming to provide a holistic view of factors for citizens’ EHR adoption in Hong Kong. Semi-structured interviews have been performed to collect information from participants across different age groups. This chapter presents the general research design, various aspects of data collection and analysis, validity and reliability, as well as research ethics.

3.1 Methodological Tradition

This study adopts the interpretivist paradigm. According to Reeves and Hedberg (2003), the interpretivist paradigm is stressed on putting analysis in context. Such paradigm concerns with drawing an understanding of the world from subjective experiences of individuals, using meaning oriented methodologies such as interviewing or participant observation, relying on a subjective relationship between the researcher and participants. According to Kaplan and Maxwell (1994), by adopting the interpretive paradigm, the research does not define dependent and independent variables in the pre-research stage, but rather concerns on the full complexity of human sense making with respect to the emerging situation. As this research bases on interpreting the subjective experiences and observations by participants to draw an understanding of citizens’ adoption of eHRSS in Hong Kong, this research follows an interpretive approach.

3.2 Methodological Approach

Case study has been adopted as the research methodology so as to provide a holistic view of factors for citizens’ EHR adoption in Hong Kong. According to Yin (2009, p.18), a case study can be described as:

“An empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”.

The choice of case study fits the research topic of EHR as a recent technological development in electronic health. With eHRSS’s implementation since 2016, factors for its adoption would be a recent and contemporary issue worth studying. Given that eHRSS is an important element of the medical system in Hong Kong, the study subject is also related to real life context as the medical system is relevant to all citizens. In addition, boundaries between EHR adoption and context are not clearly evident and requires research effort.

In addition, the adopted research methodology is a qualitative case study, which is instrumental in nature. Baxter and Jack (2008) suggest that the qualitative case study methodology would allow researchers to study complex phenomena within their contexts. Especially, Baxter and Jack (2008) point out that if this approach is applied correctly, it would be an essential method for health science research to develop theory, evaluate programs, and develop interventions. As my study concerns healthcare issues, this methodology with multiple data sources such as interviews and documentation, would be instrumental to understand the bigger research question at hand. Specifically, the interviews will aim at collecting citizen’s experiences, views and concerns for adoption of eHRSS.
As summarised by Baxter and Jack (2008), different terms could be used to describe a variety of case studies. Yin (2009) suggests that case studies can be categorised as explanatory, exploratory, or descriptive. An explanatory case study would be used if the researcher would like to seek to explain the presumed causal links in real-life interventions that are too complicated for survey or experimental strategies. Meanwhile, descriptive case study would describe an intervention or phenomenon with real-life context. Nonetheless, such research purposes are not mutually exclusive.

This study would be a case study that is both explanatory and descriptive. It aims at studying and providing an enhanced understanding on various aspects on factors influencing citizens’ adoption of eHRSS in Hong Kong. It is also descriptive in outlining citizen’s opinions and concerns in the use of eHRSS in Hong Kong.

3.3 Methods/Techniques for Data Collection

Baxter and Jack (2008) summarise that a hallmark of case study research is to adopt multiple data sources which would enhance data credibility. Potential data sources may include, documentation, interviews, direct observations, participant-observation, etc. Data collected would be integrated to give out a holistic understanding of the phenomenon studied. Accordingly, interviews have been conducted with both users and non-users of eHRSS to give a holistic study on both facilitating and impeding factors. Literatures on EHR and user adoption, as well as information briefs have also been referred to in formulating research results.

This study conducted semi-structured interviews to obtain qualitative information from participants. Normally, qualitative interviews involved unstructured and few open-ended questions so as to collect views and opinions from participants (Creswell and Creswell, 2017). On the other hand, under the Covid-19 pandemic, the legal restrictions in Hong Kong forbade meeting-ups of over two people at the time of conducting interviews (HKSAR Government, 2021). Therefore, in-depth interviews were conducted in one-on-one format for data collection. In addition, comments on EHR might involve personal medical information or views which are private in nature. Therefore, one-on-one setting could ensure better protection of participant’s privacy and also to encourage them to raise out ideas without reservations.

Although this study is mainly based upon interview results and literatures, content from information briefs prepared by the Legislative Council of Hong Kong had also been referenced of to see if there are relevant information useful for research on the topic. Upon a search for concerned documents, no summative informative on citizens or users’ perspectives was available regarding the design process of eHRSS. Therefore, reference could not be drawn on whether the government has conducted studies on citizens or users in designing for eHRSS implementation.

3.3.1 Sampling of Participants

Concerning the sampling, Creswell and Creswell (2017) pointed put that the ideal case would be to draw a random sample such that individuals would be equally subjected for being drawn for study. However, given the time commitment required for conducting in-depth qualitative study with individual participants, the less desirable form of convenience sampling approach would be adopted in which respondents are invited based on convenience and availability.
To achieve such aim, participants were approached from my workplace. Attention was drawn to select a fair mix of both genders, and age group of 20 - 60 were fairly distributed so as to ensure collection of data covering a wider spectrum of participants. A mix of users and non-users were invited to interviews to collect information from both sides of the spectrum.

3.3.2 Interview Process

Interviews were conducted between 26 March 2021 and 19 April 2021 such that nine participants were interviewed. Each interview lasted between 30 to 45 minutes. All interviews followed a semi-structured setting such that I asked the participants guided questions as listed in Appendix - Chapter 8.2, then prompted them to give their other personal views, and asked them follow-up questions on the aspects of “What”, “Why” and “How” related to the research. In response to participants’ feedback, I also prompted them with relevant information of eHRSS as appropriate and asked them of their views. A summary of the profile of interview participants is presented under Table 3.3.2:

Table 3.3.2 - Profile Summary of Interviewed Participants

<table>
<thead>
<tr>
<th>Participants</th>
<th>eHRSS User</th>
<th>Gender</th>
<th>Age Group</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1</td>
<td>No</td>
<td>M</td>
<td>50s</td>
<td>26 March 2021</td>
</tr>
<tr>
<td>Participant 2</td>
<td>No</td>
<td>M</td>
<td>20s</td>
<td>26 March 2021</td>
</tr>
<tr>
<td>Participant 3</td>
<td>Yes</td>
<td>F</td>
<td>60s</td>
<td>27 March 2021</td>
</tr>
<tr>
<td>Participant 4</td>
<td>No</td>
<td>M</td>
<td>30s</td>
<td>1 April 2021</td>
</tr>
<tr>
<td>Participant 5</td>
<td>Yes</td>
<td>M</td>
<td>30s</td>
<td>7 April 2021</td>
</tr>
<tr>
<td>Participant 6</td>
<td>Yes</td>
<td>F</td>
<td>50s</td>
<td>8 April 2021</td>
</tr>
<tr>
<td>Participant 7</td>
<td>Yes</td>
<td>F</td>
<td>40s</td>
<td>13 April 2021</td>
</tr>
<tr>
<td>Participant 8</td>
<td>No</td>
<td>F</td>
<td>50s</td>
<td>14 April 2021</td>
</tr>
<tr>
<td>Participant 9</td>
<td>No</td>
<td>M</td>
<td>20s</td>
<td>19 April 2021</td>
</tr>
</tbody>
</table>

During the conduction of interviews, note-taking was performed to collect all necessary information. Given the sensitive issue of health-related comments, voice recording was not used throughout the interview process to encourage participants to give out their comments and opinions more freely. After the interviews, participants were invited to stay while short summaries of the interview notes were prepared immediately. The summaries were then presented to the participants for their confirmation on whether the content was accurate and in order.

3.4 Methods/Techniques for Data Analysis

In performing data analysis, interview notes were first transcribed and consolidated. Then, the transcribed notes of comments and remarks by participants were summarised such that they were categorised with keywords such as “knowledge”, “registration”, “trust”, “security”, “ease of use”, etc. Then, the notes were separated into two main categories, namely facilitating factors and impeding factors. Given that gathered information from participants were rather distinct in
nature, no sub-categories were created. The factors were grouped by abstraction into seven distinct themes presented in Chapter 4.

Afterwards, the facilitating factors and impeding factors were analysed with reference to theoretical constructs of Venkatesh et al. (2003) and Carter and Bélanger (2015) on user acceptance and adoption. Building upon the theoretical constructs, facilitating and impeding factors influencing citizens’ adoption of eHRSS were identified. Detailed analysis is presented in Chapter 5.

3.5 Validity and Reliability

On qualitative validity issue, Creswell and Miller (2000) suggest that validity is a strength of qualitative research and is based on determination of whether research findings are accurate from the standpoint of researcher, participants, or readers. Key concepts of validity include trustworthiness, authenticity, and credibility. Creswell and Creswell (2017) supplement that, among others, some steps can be taken by researchers to ensure research validity. First of all, member checking can be performed to check on the accuracy of qualitative findings. One way of conducting this process is to present the specific descriptions or themes to participants and allow them to determine whether they are accurate accounts. Secondly, the researcher may use rich, thick descriptions to convey research findings. Such arrangement would move readers to research settings and bring an element of shared experiences during the discussion. Thirdly, the researcher may clarify the bias that he/she brings to the study. This refers to an open and honest self-reflection to alert readers. While reflexivity is a core characteristic of qualitative research, a good qualitative research should contain the researcher’s comments on how his/her background would shape interpretation findings.

To ensure research validity, the practical guidance by Creswell and Creswell (2017) have been taken into account during the research process. First, member checking has been conducted to ensure accuracy of formation of themes. As outlined in Chapter 3.3.2 - Interview Process, note-taking was performed during the interviews. Upon finishing of the interviews, the participants were requested to stay while summary notes were prepared immediately. Then, the brief summaries were presented to the participants for their confirmation before they left. Secondly, rich and thick descriptions were used to convey research findings. As presented in Chapter 4 - Empirical Findings, seven broad themes have been formulated to group related content and concepts. Finally, on clarification of research bias, it has been honestly reflected in Chapter 1.5 - Scope and Limitations that background of researcher would shape interpretation findings. Therefore, research findings and formulations are subjected to sets of values and assumptions possessed by my good self as researcher.

On qualitative reliability issue, it refers to how a researcher strives to ensure whether the research approaches are reliable (Creswell and Creswell, 2017). It has been suggested by Yin (2009) that a good practice for qualitative research is to document the detailed procedures of case studies so as to include as many steps as possible. It would also be useful to set up a detailed case study protocol and database such that other researchers can make reference of. On the other hand, Gibbs (2007) suggested that the researcher should perform transcript checking to avoid mistakes. Also, there should be a consistency in the definition of codes during the coding process.

Accordingly, detailed procedures of this case study have been outlined in Chapter 3 - Methodology to list out detailed steps involved in this research. On the accuracy of transcripts,
it has been mentioned above that participants have been invited to confirm on interview summaries shortly after the interviews ended. In the discussion section of **Chapter 4 - Empirical Findings**, a short definition of each theme is identified before presenting empirical results in interviews so as to ensure consistency in the coding process.

### 3.6 Ethical Considerations

Ethical considerations are of paramount priority to research and this research has followed the guidelines set up by the “Good Research Practice” published by the Swedish Research Council. First of all, the research process complied with stipulated ethical standards (Swedish Research Council, 2017). At all times, data collected for analysis has remained confidential. All data collected has been stored properly and securely. The interview data is set to be destroyed after research results being registered and published in DIVA with the examiner’s approval.

On the other hand, this research ensures that the research is useful, reliable, and of good quality (Swedish Research Council, 2017). From the usefulness dimension, the research knowledge is set to lead to innovative ideas and hypotheses for future research, or insightful considerations for political decisions. For the quality dimension, academic research principles that are generally recognised have been be adopted. The research includes a clear aim to study on interesting questions and research methods used have been explained. For the quality dimension, arguments have been formulated clearly with relevance to concluding remarks. The research strives to maintain a clear and ordered structure with good documentation.

During the course of data collection, informed consent was obtained from participants before the start of the research process (Swedish Research Council, 2017). Participants was informed that they were the research subject, and written consent were obtained before the interviews. The participants were also informed that the research was intended for the degree thesis of Master in Information Systems (1-year). Also, the privacy and confidentiality of participants had been be respected, and all participants were clearly informed that they could withdraw anytime without explanations.

Robson and McCartan (2016) suggested that informed consent in qualitative research should involve four steps. First of all, the researcher should explain to the participants on what the study would involve. Then, the participants should be allowed sufficient time to decide on the participation, while at least 24 hours’ time is recommended. Thirdly, the participants should be provided with a consent form. Finally, the research should check and reconfirm that the participants are fully understandable on the research, their role in the study, and any possible implications for them. Participants were free to object and withdraw their consent anytime without giving any reasons. They could also amend and correct their personal data according to their wish. The principles suggested by Robson and McCartan (2016) have been followed all along in the research.

Accordingly, the informed consent form used throughout this research, modelled on Robson and McCartan (2016)’s example, has been attached in the **Appendix - Chapter 8.3**.
4.0 Empirical Findings

Chapter 4 presents the empirical findings by summarising and analysing the content taken from interviews of participants. The empirical findings are presented by dividing information from interviews into respective themes, namely (i) knowledge of eHRSS, (ii) registration process of eHRSS, (iii) trust level on EHR implementation, (iv) perceived potential health benefits, (v) flexibility and “stickiness” of continual use of EHR, (vi) acceptance of new technologies and (vii) perceived difficulty in usage.

4.1 Overview of Empirical Findings

Upon collection of information from participants, interview notes were summarised and consolidated using the analysis methods outlined in Chapter 3.4. Accordingly, seven concepts have been summarised for discussion:

- Theme 1 - Knowledge of eHRSS
- Theme 2 - Registration Process of eHRSS
- Theme 3 - Trust Level on EHR Implementation
- Theme 4 - Perceived Potential Health Benefits
- Theme 5 - Flexibility and “Stickiness” of Continual Use of EHR
- Theme 6 - Acceptance of New Technology
- Theme 7 - Perceived Difficulty in Usage

Following the prepared interview questions, participants provided detailed accounts on their views, reflections and recommendations concerning eHRSS adoption in Hong Kong. As both eHRSS users and non-users have been included in the participant pool, information on both facilitating and impeding factors could be collected for analysis.

4.2 Theme 1 - Knowledge of eHRSS

The first theme identified is “knowledge of eHRSS”. This refers to whether citizens have known of the availability of eHRSS as EHR implementation in Hong Kong, or the availability of a national-wide system for EHR implementation.

Both Participant 2 and Participant 4 had not heard about the eHRSS before the interviews. My interviews with them were the first instance that they learned about the availability of EHR service in Hong Kong.

“I don’t know that there is such service before this interview. This is the first time that I have heard about eHRSS.” - Participant 2

“I have never seen any advertisement or publication on eHRSS, thus do not learn about the availability of such system... However, health authorities may place advertisements on televisions, railway and bus stations, newspapers and social media sites to let citizens learn about such service.” - Participant 4

On the other hand, as current users, both Participant 3 and Participant 6 did not learn about eHRSS through their own. Both of them learned of the service during medical visits.
“I was introduced of the eHRSS by a medical practitioner upon a visit to the hospital for medical follow-up” - Participant 3

“I learned about eHRSS when I was instructed to sign-up for it by healthcare professional upon a clinic visit... To me the promotion efforts on eHRSS by the government is minimal and insufficient. I have never seen advertisements or promotion on such service, it is difficult for citizens to learn that such service exists” - Participant 6

4.3 Theme 2 - Registration Process of eHRSS

The second theme identified is “registration process of eHRSS”. This refers to the process where a citizen attempts for but is either unsuccessful or successful to register for the eHRSS service.

Participant 1 is a non-eHRSS user and he explained that difficulty in registration would be an important factor for him not to adopt the eHRSS.

“Government hospitals/clinics have long queues at all times... It would be inconvenient to register for the service there with so many people.” - Participant 1

During the course of interview, I briefed the participant that registration could also be partially done through online or paper-form registration through mailing/fax. I also showed him a copy of the registration and consent form. The participant commented that it was not previously known to him that registration could be completed online. In addition, he raised the issue that the registration was complicated.

“The consent document of 9-pages is just too complicated and annoying to patients. In addition, the document is printed in small fonts and contains legal and medical terms. Such arrangement is discouraging to potential users. Also, the elderly might have difficulty to comprehend all terms therein and might prone to blindly ‘accept all terms’ without full knowledge about the sharing and usage of their personal and medical data.” - Participant 1

Participant 3, as a user of the eHRSS, also mentioned her discontent for the registration process.

“I carried out my registration process on the governmental eHRSS website. At the course of registration, I mistakenly thought that the registration would be simple, and everything could be completed online. After filling in all information on the registration form, I was very surprised to learn that I would have to bring my identity card at the eHRSS Registration Office/designated centres for activation of the service.” - Participant 3

Though she understood that such arrangement might serve as an additional personal data protection measure, such arrangement is user-unfriendly. This was exacerbated by the fact that the designated activation locations only operated between work hours and was inconvenient for people at work.

“The government can reform its current practice with information technology to provide a more user-friendly registration experience. A reasonable arrangement
would be to prompt the user to upload a scanned copy of the identity card or to use e-signature as proof of identity. In this way, the registration process could be completed online in one go.” - Participant 3

Participant 6 shared that at the first instance she was not quite sure about how to register for eHRSS. She was advised by healthcare professionals to register by the service but did not receive assistance from them for the registration process. Therefore, she sought assistance from her daughter for helping with the registration process.

“It would be useful if registration instructions could be made in pamphlets, or step-by-step tutorials can be made into videos. This will well facilitate aged persons who are usually not good at using new information technologies.” - Participant 6

Participant 8 explained her experience of withdrawal from the registration process due to system complications.

“I tried to register for eHRSS online. However, I later learned that the online registration was only partial and in-person follow-up was necessary before I could use the service. I felt frustrated and abandoned the registration process.” - Participant 8

Afterwards, she received no feedback or follow-up contacts from the authorities prompting her to resume the registration. As time passed by, she also forgot about the registration and left that aside.

4.4 Theme 3 - Trust Level on EHR Implementation

The third theme identified is “trust level on EHR implementation”. The trust level on EHR implementation is two-fold. First, it refers to the trust level in the EHR system, including trust level on privacy protection, security standards of data handling and management. Secondly, it refers to trust on government or authorities, such as the trust level on the government, or trust on storage of health data in the manner of a centralised public database.

Participant 2 explained that he was reluctant to use the eHRSS due to distrust of the sufficiency and certainty of privacy protection offered by the service.

“I could still recall the recent 2019 the data breach by the largest airline in Hong Kong. The data breach made me sceptical on the safety of personal data being held by third parties. On the other hand, I have seen news of data breaches of social media sites by hackers. Such data breaches made me uneasy to put my sensitive health files on a centralised data-management platform under eHRSS.” - Participant 2

I asked him follow-up question on whether it would matter concerning privacy issues if the consent sharing would include public/private healthcare providers. He advised that trust on security standards by private healthcare providers posed even more concerns for him as he had less confidence on the standard of data handling and management compared with public service. However, he added that he would be willing to try out for EHR if such security issues could be addressed properly.
Participant 4 pointed out that he was not enthusiastic with the idea of a national-wide database for EHR. Generally, he was not very trustful of the authorities. He opposed to the idea of setting-up any means of centralised database storing citizens’ sensitive data. He raised concern on any possible mismanagement of his health data.

“Personal health data is very private to me. Storing my health data in a centralised database sounds a bad idea to me as I have no control of how my data can be protected. In any event, I would like to minimise exposure in any means so I would not adopt the eHRSS.” - Participant 4

Participant 6 remarked that she was not quite sure on privacy concerns for eHRSS usage.

“I possess a general trust in medical professionals and government. I recognise that the eHRSS is provided by public authorities so it should be safe for use.”
- Participant 6

Participant 7 shared that the EHR system run by the government would bring her much confidence on both privacy protection and data handling. She furthered that

“Government officials of Hong Kong have high integrity levels. I always feel comfortable for my health records to be stored with a public provider, rather than private service contractors.” - Participant 7

4.5 Theme 4 - Perceived Potential Health Benefits

The fourth identified theme of perceived potential health benefits refers to citizens’ perception on how using eHRSS would bring them potential benefits on their health.

Participant 3 explained that she registered for the eHRSS as a result of her previous medical experience.

“I suffered from severe drug allergy some years ago. I have been advised by a medical practitioner that eHRSS would help record my allergy details and prevent that from recurring in the future.” - Participant 3

Recalling the negative health issues caused by drug allergy, she agreed that eHRSS would be useful for her. As a result, she eventually registered for the service.

Participant 6 pointed out that a major reason for her joining of eHRSS service is to facilitate her medical follow-up. She shared that

“I have chronic heart disease which requires regular medical check in the hospitals. I was prompted by healthcare professionals in clinics to register for the service before undergoing a medical examination. Therefore, I signed up for the eHRSS three years ago.” - Participant 6

While she was not quite sure about the underlying operations or mechanisms that how the eHRSS worked at the time of registration, she was advised that the system could allow her doctors to clearly see her medical history and assign medicine or treatment accurately. Towards this end, she opined that the eHRSS service was satisfactory and she had not experienced any
major problems thus far. On the other hand, Participant 6 also suggested that age was a concern for her adoption of EHR.

“As my age continues to increase, I would be more likely to have deteriorating memory or even dementia. Accordingly, my memory on my various health details or records might not be accurate as I become older. Therefore, using the eHRSS would be a good preparation for me to prepare the future. It facilitates doctors and other medical professionals to follow-up on my case upon admission and treatment.”
- Participant 6

Participant 7 advised that she opted for eHRSS use as a result of the Covid-19 outbreak. She shared that she registered for the system to prepare for her subsequent injections of the Covid-19 vaccinations in early 2021. She shared that

“I registered for the service because eHRSS could provide accurate information to vaccination officers in case any medical incidents arise. Actually, my intention to be vaccinated for Covid-19 is the major drive for me to register for eHRSS service.”
- Participant 7

Though vaccination is a single event, she has nonetheless given perpetual authorisation anyway and would continue to use the eHRSS service afterwards.

Throughout the interviews, none of the participants have mentioned issues on public health benefits as driving factors for their EHR adoption.

4.6 Theme 5 - Flexibility and “Stickiness” of Continual Use of EHR

The fifth identified theme is flexibility and “stickiness” of continual use of EHR. Flexibility in this context refers to freedom of choosing length of sharing of health data within eHRSS at citizen’s preference. “Stickiness” of continual use refers to citizen’s tendency to continue using the eHRSS after first registration.

Participant 5, as user, shared his appreciation for the availability of two options for healthcare data sharing upon eHRSS registration.

“I appreciate the availability of both ‘one-year consent’ and ‘perpetual consent’ when registering for eHRSS. Such availability of choices is very flexible. Some users may want to enjoy the benefits of EHR for a short term, like those who only need to undertake one-off operation, while not yet decided on long-term use. Also, the availability of choices makes users feel respected.”
- Participant 5

He also believed that many users would display such intention for not bothering to alter their chosen validity period of sharing consent period with the system after adoption.

“Users are always lazy... Registration with EHR use would be ‘sticky’ and there would be little tendency for users to out-out again... The possible revocation of consent would be as complicated as the registration process. Therefore, I would never want to go through the tedious formalities for opting out in the future unless there are any serious problems in the future.”
- Participant 5
Participant 7 explained that she opted-in for the system because of learning the health benefits brought by EHR. She considered these benefits to be long term so she would be unlikely to consider for possible opting-out.

“As the benefits brought by eHRSS would not alter over time, I would not plan to opt-out until any incident arises.” - Participant 7

It is also interesting to note that regarding although eHRSS provides options for one-year and perpetual agreement concerning expiry period of sharing of electronic health records, all user participants, i.e. Participants 3, 5, 6 and 7 have all opted for the perpetual sharing option.

4.7 Theme 6 - Acceptance of New Technology

The sixth theme identified is acceptance of new technology. This refers to citizens’ sense of approval of reception upon encounter of a new technology.

Participant 4 shared that he was not an accepting person for technologies.

“I am never a technology fanatic... I always find new technologies troublesome for using and I am generally reluctant to try out new technologies... Therefore, I am also not interested to try out for eHRSS.” - Participant 4

However, he suggested that with availability of incentives, he might be willing to have a try.

“Though personally I am not in interested in using eHRSS... The government may be more effective in attracting more citizens to adopt eHRSS if incentives (such as registration gift packs or cash coupons) could be provided upon eHRSS registration. In fact, with enough financial incentives available, I may be interested to give out a try too.” - Participant 4

On the other hand, Participant 8 commented that given her advancing age, she was rather unmotivated to try out for new technologies. She stated that

“Things have been going good without using the eHRSS... I currently experience no problems in medical visits or follow-ups. If things are working fine, I am not interested to fix anything.” - Participant 8

Participant 9 also shared his view from young people’s perspective.

“I am at a young age, so I seldom visit the doctors. Also, I envisage that I would not be a frequent visitor to the hospital with the next one or two decades. Therefore, the need to use eHRSS is remote for me at the time-being... There is little drive for me to register for this new technological service at a relatively young age.” - Participant 9

4.8 Theme 7 - Perceived Difficulty in Usage

The final theme identified is perceived difficulty in usage. This generally refers to citizens’ apprehension of difficulties that they may encounter in using eHRSS.
Participant 7 shared her perceived difficulty when using an application associated with eHRSS.

“I have heard from somewhere that users can check medical appointments, medication record, and the use of the Health Care Voucher using the mobile application of ‘eHealth App’ dedicated for eHRSS. However, once I have downloaded the application, I found the interface user-unfriendly and looked difficult to use. The menus inside the app was not well arranged so I could not use it to check out my appointment records. Despite repeated attempts, I was unable to use the application properly... Such usage difficulty would be discouraging for people with little information technology knowledge to utilise the eHRSS.” - Participant 7

Participant 8, who had tried for registration but ceased due to registration difficulty, also mentioned that she was concerned with the potential difficulty of using the new technology of EHR. During the interview, I briefed her that the usage of the eHRSS was primarily by healthcare professionals while citizens as users normally have relatively less exposure to the system. Nonetheless, she explained that she perceived difficulty to use eHRSS service.

“The system looks difficult to use and a pain to me... I have difficulty even to use the basic functionalities of my smartphone so using the eHRSS service would be too much for me... Actually, I have little preference in adopting or using new information technology. If the eHRSS service is difficult to use, I will give up using it.” - Participant 8

Participant 9 added that although he always welcomed and was willing to try out new technologies, he did not feel excited or motivated to adopt the eHRSS.

“I am actually quite open to use new information technologies... But you know from experience that government software and e-services are always poorly designed and difficult to use. User experience is always troublesome and unsatisfactory with a bulky service. Therefore, using eHRSS is likely to be cumbersome. With these factors, I am simply not interested in trying out for eHRSS.” - Participant 9

4.9 Summary

In relation to my research questions, nine semi-structured interviews were performed. Interview notes were then consolidated and analysed as outlined earlier. Factors that influence citizens’ adoption of eHRSS have been be summarised into seven themes, which can be further divided into facilitating and impeding factors. With reference to the theoretical constructs presented in Chapter 2, formulation of findings and an outline of facilitating and impeding factors influencing citizens’ adoption of eHRSS in Hong Kong are presented in Chapter 5.
5.0 Discussion

Chapter 5 presents a discussion of how empirical findings can map with the research questions. With reference to literatures on user acceptance or adoption of technologies, empirical findings from Chapter 4 are analysed in relation with my research aims and mapped in relation to the two research questions.

5.1 Formulation of Findings

In formulating findings from empirical results, reference has been made with regard to various established theories on user acceptance or adoption presented under the literature review in Chapter 2. In particular, concepts of “Unified Theory of Acceptance and Use of Technology” (Venkatesh et al., 2003) and “E-Government Adoption Model” (Carter and Bélanger, 2015) have provided insights in identifying facilitating factors and impeding factors for citizens’ adoption of eHRSS. It is also observed that some factors identified are not covered by the above theories and may be unique in explaining Hong Kong’s circumstances.

5.2 Findings in Relation to Research Question 1

First of all, with regard to the first research question of “What are the facilitating factors that influence citizens’ adoption of eHRSS?”, it is found that the Themes 1, 3, 4 and 5 are all relevant to the research question as presented under Table 5.2:

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Themes Related to the Research Question</th>
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<tbody>
<tr>
<td>RQ1: What are the facilitating factors that influence citizens’ adoption of eHRSS?</td>
<td>Theme 1 - Knowledge of eHRSS</td>
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<td></td>
<td>Theme 3 - Trust Level on EHR Implementation</td>
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<td></td>
<td>Theme 4 - Perceived Potential Health Benefits</td>
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<td></td>
<td>Theme 5 - Flexibility and “Stickiness” of Continual Use of EHR</td>
</tr>
</tbody>
</table>

In summary, (i) knowledge, (ii) trust, (iii) perceived potential health benefits and (iv) flexibility and “stickiness” of continual use have been identified as the four pivotal facilitating factors for citizens’ adoption of eHRSS. Detailed analysis is presented in the ensuing sections.

5.2.1 Knowledge

First of all, knowledge of eHRSS is the first pivotal factor of citizens’ adoption of eHRSS. In Hong Kong, there has been a lack of publicity and promotion on eHRSS. It is common for general public not to know about eHRSS, or not to learn about the system until introduced by healthcare professionals or within healthcare institutions. Without knowledge on eHRSS, the subsequent chain of actions under the “Innovation-Decision Process”, i.e. adoption of eHRSS in the context of this research, could not be made possible. Thus, knowledge of eHRSS is identified as the first facilitating factor for citizens’ adoption of eHRSS.
5.2.2 Trust

From participants’ responses, regarding trust level on EHR implementation, findings from participants suggest that confidence in services provided by the government is facilitating for eHRSS adoption. Empirical findings also suggest that users might be willing to test for eHRSS if security and data protection issues could be addressed properly. Findings from this research is compatible with the “E-Government Adoption Model” by Carter and Bélanger (2015). According to the model, trustworthiness includes both aspects of trust in Internet and trust on government. Trustworthiness is among others one of the three most important factors influencing citizens’ usage of electronic government services. Applying to the context of participants’ responses, it could be mapped with confidence and security of data handling and management (trust on the Internet), as well as privacy protection and data handling by the government (trust on the government). Towards this end, trust is identified as the facilitating factor for citizens’ adoption of eHRSS.

5.2.3 Perceived Potential Health Benefits

On potential health benefits towards patients, participants from the study suggest that envisagement for potential health benefits are one of the principal driving forces for their EHR adoption. While participants are not aware of benefits of EHR adoption in the public health context, some participants acknowledge the personal potential health benefits brought to them by EHR adoption, such as better medical safety, easier medical follow-up, and safety benefits during vaccination process. These benefits are driving force for their EHR adoption. The factor of perceived potential health benefits is compatible with UTAUT by Venkatesh et al. (2003). Venkatesh et al. (2003) argue that performance expectancy is one of the three key elements that influence behavioural intention and hence use behaviour. Perceived potential health benefits are interchangeable with users’ performance expectancy, and therefore can be adopted to explain users’ adoption of eHRSS. Overall, the factor of perceived potential health benefits is thus identified as the third facilitating factor for citizens’ adoption of eHRSS.

5.2.4 Flexibility and “Stickiness” of Continual Use of EHR

It has been suggested that the availability of “one-year consent” and “perpetual consent” upon eHRSS registration is welcomed by prospective users. Users can choose the health information sharing period according to their needs and preferences. The availability of choices also provides a sense of respect. Such flexibility provided is a factor for adoption of eHRSS. In addition, responses from participants suggested that all of them have opted for the perpetual option rather than the one-year option concerning expiry period of sharing of electronic health records. Upon interviews, those participants respond that registration for eHRSS is usually “sticky” and would automatically prompt for continued use. Such findings suggest that users’ adoption in the first place would be likely to lead to continued use. In totality, flexibility and “stickiness” of continual use of EHR are identified as the fourth and final facilitating factor of citizens’ adoption of eHRSS.

5.3 Findings in Relation to Research Question 2

With regard to the second research question of “What are the impeding factors that influence citizens’ adoption of eHRSS?”, it is summarised that Themes 2, 3, 6 and 7 are all relevant to the research question as presented under Table 5.3:
Table 5.3 - Research Question 2 and Themes Related to the Research Question

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Themes Related to the Research Question</th>
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<tbody>
<tr>
<td><em>RQ2: What are the impeding factors that influence citizens’ adoption of eHRSS?</em></td>
<td>Theme 2 - Registration Process of eHRSS</td>
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<tr>
<td></td>
<td>Theme 3 - Trust Level on EHR Implementation</td>
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<td></td>
<td>Theme 6 - Acceptance of New Technology</td>
</tr>
<tr>
<td></td>
<td>Theme 7 - Perceived Difficulty in Usage</td>
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</table>

In totality, the four impeding factors influencing citizens’ adoption of eHRSS are identified as (i) difficulty in registration, (ii) low level/lack of trust in EHR implementation, (iii) negativity on acceptance of new technology and (iv) perceived difficulty in usage. Detailed analysis is presented in the ensuing sections.

5.3.1 Difficulty in Registration

Regarding ease of registration, participants have voiced their experiences that complications in registration for eHRSS have led them to give up for the sign-up process, despite their initial interest in using the service. Difficulty in registration falls into the concept of effort expectancy by Venkatesh et al. (2003). It is suggested that effort expectancy can be defined as the degree of ease related to system usage, which borrowed three constructs from existing models in effort expectancy, including perceived ease of use, complexity and ease of use. Finally, Carter and Bélanger (2015) suggest that citizens’ intention to use e-government services would correlate negatively with difficulty in use. Summarising the above findings, it would be suggested that difficulty in registration is deemed to be an impeding factor leading to citizens’ non-adoption of eHRSS.

5.3.2 Low Level/Lack of Trust on EHR Implementation

Participants raise concerns that a low level or lack of trust on system security/government services would be detrimental to citizens’ adoption of EHR. This includes a general distrust of privacy protection, security standards of data handling and management, distrust on the government, or generally on the issue of placing sensitive health data in a centralised database. This echoes with findings by Carter and Bélanger (2015) that trustworthiness is pivotal on citizens’ willingness to adopt technological innovations of e-government services. A low level or lack of trust on EHR implementation, is thus identified as the second impeding factor for citizens’ non-adoption of eHRSS.

5.3.3 Negativity on Acceptance of New Technology

Some participants from the study do not possess an open mind towards technology adoption. A negative acceptance of new technology would be impeding for citizens to accept technological innovations. Separately, participant opinion suggested that reluctance to adopt new technology is just a matter of personal preference. Therefore, apart from degree of innovativeness, personal preference would also be influential on acceptance of new technology. Summarising the above, it is argued that negativity on acceptance of new technology is an impeding factor for citizens’ non-acceptance of eHRSS.

On the other hand, one participant expressed that he did not opt for EHR because he was still young and health benefits for adoption seemed remote for him. Therefore, negativity on
acceptance of new technology may also be interrelated with the theoretical constructs of performance expectancy by Venkatesh et al. (2003).

5.3.4 Perceived Difficulty in Usage

It has been voiced by participants that perceived difficulty of EHR use has been causing their reservation to sign up for eHRSS. As pointed out by Venkatesh et al (2003) and Carter and Bélanger (2015), negativity in perceived ease or effort in usage would be impeding towards people’s adoption of eHRSS. Towards this end, perceived difficulty in usage is also identified as an impeding factor leading to citizens’ non-adoption of eHRSS.

However, it is important to note that perceived difficulty in usage is subjective and may not equate the actual difficulty in usage in an objective sense. Information from participants suggested that there is a gap between their perceived difficulty and the actual difficulty in using eHRSS from patient’s side. It is common for users or prospective users to lack a comprehensive understanding on their technological knowledge required for using eHRSS.

5.4 Summary and Observations

From the literature review, findings from Venkatesh et al. (2003) and Carter and Bélanger (2015) have respectively outlined possible factors for adoption of technology or e-government services. With information collected from participants, much of the empirical findings from this research overlap significantly with their various proposed factors. Four factors are identified as facilitating factors influencing citizens’ adoption of eHRSS: (i) knowledge, (ii) trust, (iii) perceived potential health benefits and (iv) flexibility and “stickiness” of continual use. On the other hand, four factors are identified as impeding factors: (i) difficulty in registration, (ii) low level/lack of trust in EHR implementation, (iii) negativity on acceptance of new technology and (iv) perceived difficulty in usage. It has also been observed that the issues flexibility and “stickiness” of continual use have not been mentioned in the above literatures. Such factor is therefore suggested to be specific for explaining EHR adoption in Hong Kong.

In addition, summarising interview results from participants, none of them have raised “compatibility” and “social influence” as factor for their adoption of EHR. Venkatesh et al. (2003) suggest that social influence is one of the three driving factors in shaping behavioural intentions and use behaviour. Carter and Bélanger (2015) suggest that compatibility is the most important factor for citizens’ adoption of e-government services. From empirical results, “social influence” and “compatibility” have not been shown as significant factors in influencing EHR adoption in Hong Kong. However, as this research only invited a limited number of participants, information collected might be limited in scope. Whether “social influence” and “compatibility” would also serve as facilitating factors influencing citizens’ adoption would remain as an interesting area for future research.
6.0 Conclusion

Chapter 6 presents the conclusions of the research. Through a series of semi-structured interviews, facilitating and impeding factors that influence citizens’ adoption of eHRSS in Hong Kong have been identified. This chapter also presents recommendations for authorities, research challenges encountered and avenues for further research.

6.1 Conclusion

This research aims to provide an enhanced understanding on the factors that influence citizens’ adoption of eHRSS in Hong Kong. In this study, semi-structured interviews had been performed on participants covering various age groups to collect their views and opinions concerning their adoption of eHRSS.

With reference to theoretical constructs of Venkatesh et al. (2003) and Carter and Bélanger (2015) on user acceptance and adoption, factors of citizens’ adoption and non-adoption of eHRSS are summarised upon information collected from participants. Four factors are identified as facilitating factors influencing citizens’ adoption of eHRSS, namely (i) knowledge, (ii) trust, (iii) perceived potential health benefits and (iv) flexibility and “stickiness” of continual use. In contrary, four factors are identified as impeding factors, namely (i) difficulty in registration, (ii) low level/lack of trust in EHR implementation, (iii) negativity on acceptance of new technology and (iv) perceived difficulty in usage. It has been observed that the empirical findings from this research overlap significantly with existing theories, though unique factors have also been identified for explaining EHR adoption in Hong Kong.

6.2 Contributions

This study investigates various issues of eHRSS adoption in Hong Kong in its context so as to retain a holistic understanding. It focuses on bridging existing theories, as well as to identify research agendas, gaps and opportunities for research development of the area.

Gregor (2006) proposes that information systems theories can be classified to address for four central goals: (i) analysis, (ii) explanation, (iii) prediction, and (iv) prescription. He also suggests that five interrelated theories are relevant from the IS perspective: (i) analyzing, (ii) explaining, (iii) predicting, (iv) explaining and predicting, and (v) design and action.

This research sought to identify various factors influencing citizens’ EHR adoption, through study of eHRSS adoption within the settings of Hong Kong. As summarised in the literature review, few existing scholar works have been done from citizens’ perspective on factors of their adoption of EHR, or specific to Hong Kong’s circumstances. It is also observed that the majority of past academic works on studying EHR adoption focused on the institutional or technological perspectives, or on the perspectives of healthcare institutions or healthcare professionals. Therefore, this research bridges the knowledge gaps by providing a detailed study on the adoption of eHRSS from citizens’ perspective.

On the prescription side, it is expected the above study has provided an enhanced understanding on both facilitating and impeding factors that influence citizens’ adoption of eHRSS. It is also
proposed that such factors identified may provide reference value for authorities in implementation of eHRSS.

6.3 Recommendations for Authorities

With regard to the findings from the two research questions, some practical recommendations are drawn and presented in Appendix - Chapter 8.4 for reference by authorities of Hong Kong responsible for administering eHRSS.

6.4 Research Challenges

As explained under Chapter 3.2.2 - Interview Process, with regard to the sensitive issue of health-related comments, note-taking was conducted in lieu of voice recording throughout the interview process. To ensure research validity and reliability, summaries from interview notes were prepared immediately and confirmed with participants shortly after the interviews. The summarising processes were time-pressing for the researcher. While each session lasted between 30-45 minutes, a minimum of 10 minutes for each session had been allocated for participants to read in detail and make necessary amendments. Such confirmation processes made up a considerable fraction of each session with participants.

6.5 Areas of Further Research

First of all, concerns and expectations of EHR maybe a cultural phenomenon. Therefore, various factors influencing EHR adoption beyond Hong Kong may yield different results from this study. While there has been little research on EHR adoption from citizens’ perspective, either in Hong Kong or beyond, it is suggested that future researchers in other geographical locations would bring a more comprehensive understanding in factors that influence citizens’ adoption of EHR.

Secondly, Venkatesh et al. (2003) and Carter and Bélanger (2015) have respectively listed social influence and compatibility as important factors influencing users’ adoption of new technologies. However, such factors have not been shown in findings from participants. Given that the sampling size of this research only cover nine participants, the sampling may not be broad enough to cover the opinions from a wider population. It would also be useful for future research to study the connections between social influence and compatibility with EHR adoption for an extended investigation on this subject.

Finally, this research focused on various factors on citizens’ adoption of EHR. In the context of system design, ease of registration and trust level on EHR implementation are identified as two of the four pivotal factors affecting citizens’ adoption of eHRSS. Therefore, competence of design and implementation of eHRSS as system itself is an equally important topic. On the other hand, there has been little research on EHR in Hong Kong from the perspective of system design. In this connection, research on system design and enhancement would be likely to provide meaningful contributions in this knowledge gap and provide insights to improve EHR adoption and implementation in Hong Kong.
7.0 References


HKSAR Government, 2021. Government begins to relax social distancing measures in gradual and orderly manner. [online] Available at:


## 8.0 Appendix

### 8.1 Literature Review on Related Articles from the “Basket of Eight”

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
<th>Year</th>
<th>Journal</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>Trajectories of repeated readmissions of chronic disease patients: Risk stratification, profiling, and prediction</td>
<td>Ben-Assuli, O. and Padman, R.</td>
<td>2020</td>
<td>MIS Quarterly</td>
</tr>
<tr>
<td>6</td>
<td>Electronic health records: How can researchers contribute to transforming healthcare?</td>
<td>Kohli, R. and Tan, S.</td>
<td>2016</td>
<td>MIS Quarterly</td>
</tr>
<tr>
<td>7</td>
<td>Adoption of electronic health records in the presence of privacy concerns: The elaboration likelihood model and individual persuasion</td>
<td>Angst, C. and Agarwal, R.</td>
<td>2009</td>
<td>MIS Quarterly</td>
</tr>
<tr>
<td>10</td>
<td>How does the implementation of enterprise information systems affect a professional's mobility? An empirical study</td>
<td>Greenwood, B., Ganju, K. and Angst, C.</td>
<td>2019</td>
<td>Information Systems Research</td>
</tr>
<tr>
<td>No.</td>
<td>Title</td>
<td>Authors</td>
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<td>Journal</td>
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<tr>
<td>15</td>
<td>An analysis of the adoption of digital health records under switching costs</td>
<td>Ozdemir, Z., Barron, J. and Bandyopadhyay, S.</td>
<td>2011</td>
<td>Information Systems Research</td>
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<tr>
<td>18</td>
<td>Studying the multilevel impact of cohesion versus structural holes in knowledge networks on adaptation to IT-enabled patient-care practices</td>
<td>Raman, R. and Grover, V.</td>
<td>2020</td>
<td>Information Systems Journal</td>
</tr>
<tr>
<td>20</td>
<td>Shaping a buyer's software selection process through tendering legislation</td>
<td>Boonstra, A. and van Offenbeek, M.</td>
<td>2018</td>
<td>Information Systems Journal</td>
</tr>
</tbody>
</table>
8.2 Interview Questions

- What do you know about the eHRSS in Hong Kong?
- Have you opted to use the eHRSS?
- If yes, which type of consent do you give (one-year/indefinitely)?
- What are the reasons behind your choosing of the consent period?
- What are the factors that you choose to use the eHRSS?
- What are your concerns for using/not using the eHRSS?
- What factors would stop users from using the eHRSS (for current users)?
- Other follow-up questions
8.3 Informed Consent Form

Informed Consent Form

Title of Project:
Electronic Health Record Sharing System in Hong Kong – Development of a Push-and Pull Framework for Citizen Adoption*

Name of Researcher:
Hok Ki CHAN - Student of 1-Yr Master in Information Systems, Linnaeus University

1. I have read and understood the attached information sheet giving details of the project.

2. I have had the opportunity to ask the researcher any questions that I had about the project and my involvement in it, and understand my role in the project.

3. My decision to consent is entirely voluntary and I understand that I am free to withdraw at any time without giving a reason.

4. I understand that data gathered in this project may form the basis of a report or other form of publication or presentation.

5. I understand that my name will not be used in any report, publication or presentation, and that every effort will be made to protect my confidentiality.

6. I understand that the research is intended for the degree thesis of Master in Information Systems (1-year), and research results would be registered and published in DIVA (http://lnu.diva-portal.org/smash/search.jsf?dswid=4982) after the examiner’s approval. The interview data is set to be destroyed after the thesis has been graded and upload onto the DIVA database.

7. For any questions or access to/correction of personal data provided in this form, please contact the researcher at hc222fi@student.lnu.se or +852 92429215.

____________________
Participant’s signature
Participant’s name:
Date:

____________________
Researcher’s signature
Researcher’s name: Hok Ki CHAN
Date:

(Adapted from Robson and McCartan, 2016)

*Retitled to “Electronic Health Record Sharing System in Hong Kong – Facilitating and Impeding Factors Influencing Citizens’ Adoption” upon submission.
**Information Sheet**

**Overview of Electronic Health Record Sharing System**

“Developed by the Hong Kong Government, the Electronic Health Record Sharing System provides an electronic platform that aims to build up free and lifelong electronic health records for all members of the public:

- Enable two-way sharing among public and private healthcare providers
- Voluntary participation, territory-wide and patient-oriented
- Participants’ health records are stored in encrypted electronic format
- An information technology platform for implementing healthcare public-private partnership programmes”

*(Electronic Health Record Registration Office, 2021)*


**Interview Questions**

- What do you know about the eHRSS in Hong Kong?
- Have you opted to use the eHRSS?
- If yes, which type of consent do you give (one-year/indefinitely)?
- What are the reasons behind your choosing of the consent period?
- What are the factors that you choose to use the eHRSS?
- What are your concerns for using/not using the eHRSS?
- What factors would stop users from using the eHRSS (for current users)?
- Other follow-up questions
### 8.4 Recommendations for Authorities

<table>
<thead>
<tr>
<th>Areas of Recommendations</th>
<th>Recommendations for eHRSS Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td>• To enhance citizens’ knowledge, promotional efforts may be placed in health institutions, such as hospitals, clinics, public offices, etc. Setting-up of registration kiosks in these locations may also enhance citizen knowledge.</td>
</tr>
</tbody>
</table>
| **Ease of Registration** | • The eHRSS registration process may be reengineered with better user experience design/implementation to make it easier for citizens’ use.  
• Service kiosks may be set-up with customer representatives to assist prospective users to register for eHRSS. |
| **Trust Level on EHR Implementation** | • Authorities should be vigilant to ensure its management of eHRSS can continuously live up to citizen expectations  
• On system architecture and security, the authorities can explain the security features and privacy protection mechanisms of eHRSS to address citizens’ concerns. |
| **Potential Health Benefits upon EHR Adoption** | • Authorities may disseminate the potential health benefits of using eHRSS to prospective users. |
| **Flexibility and “Stickiness” of Continual Use of EHR** | • Authorities should retain the availability of options on sharing consent periods to address citizen expectations.  
• Exit surveys may be conducted for opted-out users to collect information of their dissatisfaction/reasons for opting-out for continuous service improvement. |
| **Acceptance of New Technologies** | • Incentives/financial incentives may be facilitating to encourage eHRSS registration.  
• Some population groups (such as the elderly) may traditionally have lower acceptance of new technologies. Additional resources may be allocated for such groups to address for their needs and concerns. |
| **Perceived Difficulty in Usage** | • Simplified websites/mobile applications with adoption of simple graphics (such as icons, images) may be introduced to address perceived difficulty in usage. |