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Exploring Nurses' Compliance Behavioural Factors with EHR Data Privacy Policy in Saudi Arabia: A Q-Methodology Study

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Abstract

Background: The widespread implementation of electronic health records (EHRs) worldwide has raised health data privacy and security issues for healthcare providers, patients, and regulators. Yet, relatively little is known about healthcare professionals' intentions to remain complaint with current EHR data privacy policy, and it has not been extensively tested in either general or specific cultural contexts. Many influential factors that potentially influence attitudes and intentions toward data privacy is unknown. Thus, this study explores nurses' behavioural intentions regarding healthcare data privacy.

Aims and objectives: This study aims to explore the driving factors and barriers that influence nurses' intentions to comply with EHR data privacy policies in Saudi Arabia.

Method: This study employed a Q-Methodology approach to investigate nurses' compliance behaviour toward the EHR privacy policy. A series of Q statements (known as a concourse) was constructed from relevant literature review and guided by the Decomposed Theory of Planned Behaviour and Deterrence Theory derived from our scoping review. Participants were then requested to sort these statements to indicate their agreement using a grid, ranging from "strongly agree" to "strongly disagree." This was followed by a post-sorting interview, in which all responses were narratively coded.

Exploratory factor analysis was employed to determine every statement in the Q sample, in order to analyse and group correlation scores for the statements, identifying different factors or positions taken by different nurses in relation to their intentions to comply with EHR data security. Finally, factors were interpreted, complemented by the narrative qualitative views of participants.

Findings: Two factors emerged from the analysis, indicating that nurses in both factors generally value patient privacy. In total, 26 out of 54 nurses were loaded on the two factors, then the post-sorting interview was used to interpret the nurses' sorting activity. The first factor, "Professionally Pragmatic," included 19 nurses who believed that the hospital environment, the desire to benefit patients, and relevant legal consequences played a major role for those who wished to comply with the EHR privacy policy. Consequently, they had to be pragmatic in their policy compliance. The second factor, "Professionally Obligated," included 7 nurses who

believed that hospital and patient-related work obligations motivated them to adhere to the EHR privacy policy.

Implications: This study provides a better understanding of the factors that contribute to nurses' behavioural intentions regarding compliance with EHR data privacy policies. It contributes to current knowledge of the nurses' behavioural intentions regarding compliance with EHR data privacy policies. Several theories were generated from the study's outcomes regarding the factors that influenced nurses' compliance with the EHR privacy policies, which needed to be tested in upcoming studies. Despite the fact that this study examined the level of personal compliance, it is evident that nurses face workplace obstacles in protecting sensitive EHR information.

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List of Abbreviations

BI	Behavioural Intention
CBAHI	Saudi Central Board for Accreditation of Healthcare Institutions
CDS	Clinical Decision Support
CFA	Centroid Factor Analysis
CFIP	Concern for Information Privacy
CMD	Cognitive Moral Development
CPOE	Computerised Physician Order Entry
DoI	Diffusion of Innovation
DT	Deterrence Theory
DTPB	Decomposed Theory of Planned Behaviour
EBP	Evidence-Based Practice
E-health	Electronic Health
EHR	Electronic Health Record
ELM	Elaboration Likelihood Model
EMR	Electronic Medical Record
EV	Eigenvalue
FMHS	UoN Faculty of Medicine and Health Sciences Research Ethics Committee
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HBM	Health Belief Model
HCP	Healthcare Professional
HIM	Health Information Management
HIMSS	Healthcare Information and Management Systems Society
HIPAA	Health Insurance Portability and Accountability Act
HIS	Health Information System
HPPR	Healthcare Professions Practices Regulations
IBT	Information Boundary Theory
ICD	International Classification of Diseases
ICT	Information Communication Technology
ICU	Intensive Care Unit
IS	Information System

ISCI	Information Security Climate Index
ISPC	Information Security Policy Climate
IT	Information Technology
MAE	Medication Administration Error
MENA	Middle East and North Africa
MeSH	Medical Subject Headings
MM	Motivational Model
MoH	Saudi Ministry of Health
MPCU	Model of PC Utilisation
NHS	National Health Service
NT	Neutralisation Theory
P	Population
PBC	Perceived Behavioural Control
PCA	Principle Component Analysis
PCC	Population, Concept and Context
PLS	Partial Least Squares Regression Analysis
PMT	Protection Motivation Theory
POS	Perceived Organisational Support
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
QoC	Quality of Care
R	Rate
RCT	Rational Choice Theory
RP	Represent Population
SAHI	Saudi Association for Health Informatics
SHC	Saudi Health Council
SCT	Social Cognitive Theory
SDT	Self-Determination Theory
SE	Standard Error
SEM	Structural Equation Modelling
SNCA	Saudi National Cybersecurity Authority
STD	Sexual Transmitted Disease
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour

TRA	Theory of Reasoned Action
UK	United Kingdom
UoN	University of Nottingham
US	United States
PRB	Prosocial Rule Breaking
UTAUT	Unified Theory of the Acceptance and Use of Technology
WHO	World Health Organization
XML	Extensible Markup Language

CHAPTER 1
INTRODUCTION

This chapter presents an overview of the electronic health record (EHR) and its advantages and disadvantages and explains the pertinence of contemporary issues of data privacy security in the digital world, with a brief description of the context of Saudi Arabia, which is the main geographical focus of this study.

1.1. The Electronic Health Record (EHR): Emergence and Adaptation

In the early 1960s, the EHR was launched in a few hospitals in the USA, with many different systems created simultaneously by different organisations. The initial focus of the EHR was on the patient's history, lab results, examinations, daily clinical notes, and discharge summary. This platform was commonly dubbed the "Problem-Oriented Medical Record" (Siegler, 2010, Gillum, 2013) where healthcare facilities shifted from an era where physicians depended on cumbersome paper records, their memory, and their mind's capacity to process information to an era where computers stored, processed, and analysed information for the patient and provided knowledge for immediate implementation (Krishnan and Neuss, 2023). Over recent decades, the use of the EHR has grown and improved the healthcare service and public health outcomes worldwide, mainly due to allowing healthcare professionals (HCPs) easy access to well-organised information retrieval systems to assist clinical service delivery (Lorkowski and Pokorski, 2022).

Digitising the health information systems (HISs) around the world became a trend in the last two decades. Whilst the western countries with highly developed healthcare systems were pushing ahead of adopting the eHealth, countries in other parts of the world were also beginning to develop their own systems to harness the impact of such systems. In 2002, the Saudi Ministry of Health (MoH) began an EHR programme initiative, and in 2018 developed a five-year plan to promote equitable access to patient-centred healthcare by extensively incorporating eHealth across the nation. The strategy is in line with the healthcare-related goals outlined in Vision

2030,[1] and the decision led to transforming the healthcare system, with tangible improvements in patient care services as determined by various outcomes (Almazroi et al., 2022).

1.2. Electronic Medical Record (EMR) to EHR

The EMR can be defined as patient medical data in digital formats that are "easy to store, update, and exchange between healthcare institutions – anywhere and anytime" (Anshari, 2019). The EHR is a superset of the EMR, which contains medical and other information related to a patient such as demographic, insurance coverage, and financial information. The EHR is defined as:

> "a repository of patient data in digital form, stored and exchanged securely, accessible by multiple authorized users. It contains retrospective, concurrent, and prospective information and its primary purpose is to support continuing, efficient, and quality integrated health care" (Anshari, 2019).

Anshari (2019) differentiated the EHR from the EMR by emphasising that the former is a health record system that can be accessed by many HCPs and patients, promoting a collaborative approach, while the latter is a medical record system that can only be accessed by HCPs in specific contexts (Singh et al., 2020). The words "EHR" and "EMR" are frequently used interchangeably in the literature, reflecting the lack of standardisation in the health field's vocabulary with regard to these concepts and their operationalisation, but this study is chiefly concerned with the EHR *per se*. While the EHR system has been adopted and utilised extensively in developed countries, its adoption and usage in low- and middle-income countries remains in tentative early stages, or is sometimes still totally absent (Kumar and Mostafa, 2020).

1.3. Navigating the Complex Landscape of EHR Privacy and Security

Amjad et al. (2023) claimed that there is a rapid digitisation of the healthcare sector globally, and the adoption of information technology (IT) in the healthcare sector is a process rather than a destination. Consequently, implementing EHR systems has raised significant privacy issues for HCPs and patients. It is essential to make sure that employees follow information system

[1] Saudi Vision 2030 is the official national socio-economic development plan of the Saudi government, seeking to achieve various goals including private sector development, increased employment of nationals, and digitalization in various fields, including healthcare.

(IS) security and privacy regulations in hospitals to effectively use digital resources (Foth, 2017). Associated with the advent of IT systems handling massive volumes of patient data, scanning general demographic and individual financial information (in addition to medical data) has made data privacy a fundamental element in many organisations' strategic plans (Chuma and Ngoepe, 2022), and organisations have set privacy rules by writing it in the form of official policies to mitigate systemic flaws (Chuma and Ngoepe, 2022).

In the context of the EHR, "privacy" refers to information privacy, signifying a person's ability to choose and control how the formal organisations use their collected personal information, which refers to any items of data that disclose a person's identity or existence. Health information is a subsection of personal information, which includes the patient's name, birth date, insurance information, address, and medical records – all of which contain inherently sensitive information, as well as important financial details. The collection, maintenance, and utilising of this information within EHR forms the basis of the growing concerns about personal health data privacy.

Data security is generally governed by actions mandated by law whereby record holders must take preventative measures to safeguard the personal information they maintain against abuse, damage, loss, illegal access, alteration, or disclosure. This includes any personally identifiable information, regardless of its nature or origin (Sahama et al., 2013, Keshta and Odeh, 2021). Typically, the considerations regarding the information security risks revolve around maintaining confidentiality, integrity, and availability (see Figure 1). Confidentiality assurance involves preventing the illegal divulging of other information, while integrity assurance implies a degree of confidence in the veracity of the supplied data (e.g., that it has never been altered without appropriate authorisation) (Sahama et al., 2013, Watzlaf et al., 2010, Basil et al., 2022, Kim, 2022). Availability assurance guarantees that information is only available to authorised users when needed.



Figure 1: Data Security Components

Source: Murphy (2015)

Data breaches occur when IS users intentionally or unintentionally disclose data, or when unauthorised users access data in relation to the categories outline above, including (1) getting access to sensitive data *per se*, which is called a "confidentiality breach"; (2) getting access to and changing data, which is called an "integrity breach"; and (3) not being able to get to data because the system is down, which is called an "availability breach." The number of data breaches is increasing in the healthcare industry, with more serious and alarming implications than in other industries. Managing and storing patients' data in the HISs is a very complex issue for IT managers, and legacy systems are not typically designed to protect the privacy of data as a fundamental objective (Choi and Johnson, 2019). Thus, this study will focus on the EHR and nurses' compliance behaviour with privacy policies.

1.4. Benefits of the EHR system

The EHR system has several benefits for improving healthcare services. To start with, using the EHR in clinical settings greatly improves the tracking of patients' medical histories, which is particularly useful when patients receive care from different HCPs, spanning different healthcare professions, specialties, and departments (Sutton et al., 2020). Physicians usually check their patients' previous medical conditions, interventions, treatments, and medications before any intervention is given to the patient. As time progress, the data accumulated in the EHR over time can subsequently be used for patient care, including during emergencies (Green, 2017). Studies have found that EHR systems with both clinical decision support (CDS) and computerised physician order entry (CPOE) features not only reduce the need to use paper medical documentation, but also have less frequent medical errors such as medication

administration errors (MAEs). Moreover, EHRs with CDS are found to be empirically associated with an improved compliance among HCPs with evidence-based practice (EBP) in clinical settings, thereby improving general quality of care (QoC) (Menachemi and Collum, 2011, McClenny, 2023).

The EHR helps to save and organise entered data, which reduces the incidences of missing or misplaced data and medical intervention errors. The EHR can enhance QoC and healthcare services – benefiting HCPs, service users, and health organisations more broadly. The EHR aims to make meaningful information from patients' files available to clinicians, epidemiologists, and researchers (McClenny, 2023). HCPs particularly benefit from being able to access patient data anywhere/anytime via the EHR. Ease of access facilitates sharing among multidisciplinary teams, thereby improving collaboration and QoC, and healthcare resource deployment efficiency (e.g., reducing costly repeated tests and x-rays) (Menachemi and Collum, 2011, Gamal et al., 2021).

When HCPs are dealing with critical patients' problems, absent data, or delayed retrieval due to traditional or EHR systems, it has adverse impacts on patient care. McClenny (2023) found that the main cause of medical errors, which cause almost 200,000 deaths per year worldwide, included patients' health information not being readily available. Adams et al. (2021) and Zhu et al. (2021) found that a delay in the retrieving information from external HCPs causes an information gap (i.e., a blind spot for HCPs), which has a negative effect on the quality and/or timeliness of healthcare services subsequently delivered. In general, the EHR helps to avoid such problems (when it is implemented and maintained effectively).

1.5. Drawbacks of the EHR system

Even though implementing an EHR system has several obvious benefits for the healthcare field, there are many drawbacks, such as the prohibitive upfront and ongoing costs of EHR system implementation. This leads to increased healthcare costs for patients in some health systems. However, other researchers have argued that the EHR could save money in the long run, including reduced paper waste and repetitive tests (McClenny, 2023, Zhu et al., 2021).

Furthermore, there is the challenge of resistance among HCPs to transition from paper medical records to EHR systems, because they are accustomed to the use of traditional paper medical records. EHR implementation requires that HCPs change their work flows, behaviours, and

even knowledge and skills, in order to deal with the new system and incorporate it in their clinical practice (Sutton et al., 2020). According to Sutton et al. (2020), HCPs are generally unwilling to acquire the new skills that allow them to work on the new system, and they view it as a pointless and onerous burden to change their working behaviour and documenting process. This is also related to another EHR drawback: that the EHR systems themselves lack standardisation. If HCPs become fully proficient in using one EHR system in one clinical context, they may encounter a different EHR system requiring different processes in another. The literature reiterates that there is no universal design for the EHR to be adopted by healthcare facilities, and different system designs are developed by different vendors. Sutton et al. (2020) concluded that standardised EHR system is an important element to achieve an effective EHR implementation. Moreover, it needs to be aligned and harmonised with the facility's policy and regulation.

In addition, the information security of the EHR poses a threat to healthcare facilities due to the volume of information stored by different HCPs, which causes the healthcare facilities to encounter difficulties in storing and managing patient health data (Tertulino et al., 2024). Thus, the EHR might entail possible threats to patients' privacy, because security breaches might occur in the system – whether due to latent design errors, negligence, or malicious attacks by hackers (Kuo et al., 2014, Lee, 2023). Shah and Khan (2020) noted that the EHR has significant security transmission data and access security concerns. Security transmission data refers to the ability of the healthcare facility to secure the EHR data during the exchange of data (e.g., when uploading or transferring patient data). The access concerns refer to the ability of the healthcare facility to guarantee that the EHR cannot be accessed by unauthorised employees.

A report from the U.S. Department of Health & Human Services (2024) revealed that the number of individual affected from data breaches from 2021 to 2024 had consistently increased each year. In 2021, 987,654 individuals were affected by data breaches; this rose to 1,123,456 in 2022, 1,345,678 in 2023, and 1,234,567 individuals had been affected by data breaches from the beginning of 2024 until July of that year. The most commonly reported type of breach was hacking/IT incidents, comprising 45% of all breaches, and affecting over 500,000 individuals per year. Next, unauthorised access in the second place with 30%, followed by unintentional disclosures at 15%, and lost or theft at 10%. Overall, the hacking and unauthorized access type of breach are the predominant sources of data breaches that affect healthcare organisations.

A recent cyber-attack in the UK targeted Synnovis, a pathology lab in Southeast London, which negatively affected the healthcare services workflows (i.e., blood test processing). This incident was announced by the NHS as regional incident. It impacted over 800 operations and 700 outpatient appointments (NHS, 2024).

According to Sari et al. (2022) tangible and intangible loses can occur in instances of illegal data breaches in a world where data is being seen as a commodity that can be traded for a personal benefit. Breaches of data privacy cause a significant challenge for healthcare systems, including unauthorised access to databases, which fundamentally undermines service users' consumer and human rights, and the threat of malicious theft of data. Sari et al. (2022) found that human factors are the major threat to EHR data privacy and security.

Goldschmidt et al. (2023) stated that healthcare organisations must protect the EHR data. The widespread and easy access to the EHR system within the healthcare field means that a majority of patients' records are *de facto* accessible for both authorised and unauthorised HCPs. Therefore, one of the core EHR requirements is to maintain data in a safe and protected form. However, as Sari et al. (2022) noted, the issue of protecting data privacy is ultimately one of the inherent limitations of the EHR. In the meantime, there is a growing awareness among patients regarding the privacy of their personal information, which presents a challenge for HCPs (Shoniregun et al., 2010, Gamal et al., 2021, McClenny, 2023).

1.6. Importance of Data Security

Data assets are now considered essential resources for healthcare facilities, serving as the foundation upon which administrators and business leaders rely to operate healthcare organisation (Benzidia et al., 2021). The survival of these facilities relies on how the assets are managed, protected, and secured (Benzidia et al., 2021). Many healthcare facilities have started to spend more money to secure IS after losing a substantial amount of money when data breaches happen (Gabriel et al., 2018). Seh et al. (2020) reported that there were 3,912 verified cases of healthcare data breach incidents in the USA between 2005 and 2019, during which approximately 43.38% of all health data was breached. This was considered to be the highest percentage compared to other industries, costing health organisations around 6.45 million USD. Another driving factor for these organisations is the legal consequences that led them to secure their system, as authorities have the ability to suspend their licenses or order substantial compensation payments to victims of data abuse (Foth, 2017). Thus, having good security

strategies at organisations can reduce the cost of legal consequences data breaches while improving customers' trust (Alzamil, 2018).

A recent cyberattack on the change healthcare in the USA had a profound impact on HCPs, healthcare organisations, and patients across the country, and massively disrupted the workflow of healthcare services. These challenges affected 60% of patients, who were unable to authenticate their eligibility for care services; 75% of the patients experienced issues when submitting claims, and 79% of them could not get electronic payment advice. However, these challenges also affected HCPs and healthcare practice. For instance, 80% of practices reported that they incurred financial losses from unpaid insurance claims, and 85% of staff had to work overtime to complete their delayed work. This forced patients to pay out-of-pocket to receive healthcare services that would otherwise have been funded from their medical insurance coverage. Overall, the American Medical Association (AMA, 2024) concluded that this incident revealed the imperative need for vigorous data security and privacy protocols and measures in the healthcare practice to safeguard patients' safety and financial losses.

Healthcare organisations use a wide range of security methods to safeguard patients' data in EHR. According to Kruse et al. (2017) and Keshta and Odeh (2021), EHR security safeguards methods can be divided into three categories (see Figure 2). The administration theme, which focuses on EHR security and privacy policy compliance, relates to procedures to prevent and detect security violations pertaining to conducting audits, sanction policies, workforce security, information access management, security awareness and training programmes, security incident procedures, data security officers, and emergency plans (Ives, 2014, Kruse et al., 2017, Keshta and Odeh, 2021, CISA, 2024, NCVHS, 2023, NIST, 2024, HHS, 2023). The physical theme, which focuses on physical access to the EHR to protect health data by limiting system access with hardware and software, includes approaches such as facility access controls, appointed security duties, security office, access controls over the system and device and media controls (Ives, 2014, Kruse et al., 2017, Lemke, 2013, Keshta and Odeh, 2021, CISA, 2024, NCVHS, 2023, NIST, 2024, HHS, 2023). The technical theme, which focuses on shielding the IS security inside the organisation's grid, consists of (but is not restricted to) virus scanning, data encryption, as well as verification mechanisms, integrity policy, person or entity authentication, transmission security, designation of a qualified information security official, elimination of default passwords, adoption of multi-factor authentication, institution of offline backups, installation of critical patches within a reasonable time and, transparency of impact and

vulnerability disclosures (Ives, 2014, Kruse et al., 2017, Keshta and Odeh, 2021, CISA, 2024, NCVHS, 2023, NIST, 2024, HHS, 2023) (see Table 1).

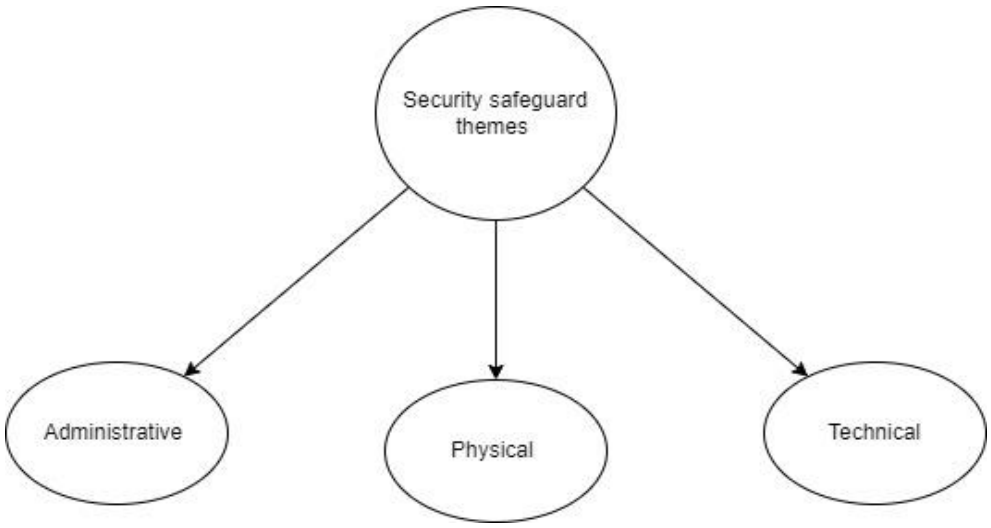


Figure 2: EHR Security Safeguard Themes

Source: (Kruse et al., 2017, Keshta and Odeh, 2021, CISA, 2024, NCVHS, 2023, NIST, 2024, HHS, 2023)

Table 1:EHR Security safeguard themes

Administrative	**Physical**	***Technical***
Implement policies and procedures to prevent and detect security violations	Facility access controls	Access controls
Risk analysis and management	Assigned security responsibility	Entity authentication
Sanction policies	Physical access controls	Audit trails
Chief information security	Workstation use and security	Data encryption
System security evaluation	Radio frequency identification devices	Firewall protection
Workforce security	Device and media controls	Virus checking
Information access management		Integrity policy
Security awareness and training		Person or entity authentication
Security incident procedures		Transmission security
Contingency, business continuity, and disaster recovery planning		Designation of a qualified information security official
		Elimination of default passwords
		Adoption of multi-factor authentication
		Institution of offline backups
		Installation of critical patches within a reasonable time and
		Transparency of impact and vulnerability disclosures

However, He et al. (2021) argued that the discussions about the protection of ISs often revolve around the proposal of technological solutions. While encrypting sensitive information during transmission (i.e., the technological solution) is crucial for preserving confidentiality, data protection encompasses a combination of technological, physical, and administrative measures. Alsharif et al. (2022) argued that data security vulnerabilities are not limited to technical sources, and rather rely on the compliance of individuals who use the systems, whereby risks cannot be completely mitigated by technological means alone. The most frequently reported privacy violation stemmed from the HCPs misusing their privileged access to the EHR system – whether intentionally or unintentionally (Foth, 2017).

Therefore, it is crucial to address the interaction between the IS's users and the system itself (Alsharif et al., 2022). There are two other aspects of the interaction process between the users and the IS that are related to the security system measure: proper information privacy management policies and practises, and commensurate education and training for all users of the IS have the potential consequences on their actions (Alsharif et al., 2022). While the technical research aspect might be important to healthcare managers, the employees' compliance behavioural research aspect could be equally vital to managers.

1.7. Research Context: Saudi Arabia

1.7.1. Overview

The concept of privacy is shaped by numerous cultural, political, and policy variances, reflecting prevailing local, national, and regional associations, but with contrasting particularities worldwide (Brandeis and Warren, 2023). Whilst studies have explored health record data breaches in the USA and Western Europe, awareness and research concerning such issues are nascent in the Middle East and North Africa (MENA) region. Therefore, this study focuses on Saudi Arabia, a G20 economy and the largest country in the Gulf Cooperation Council (GCC), with an area of over 2000 km^2 and a population of approximately 36 million. According to the World Bank Group, the gross national income per capita of the country is $30, 447 USD with gross domestic product (GDP) of $1.11 trillion USD (WHO, 2024). In 2020, the Saudi government allocated $39.2 billion USD to the healthcare sector, which was more than the previous year's budget (Gurajala, 2023).

1.7.2. EHR Adoption Status

The MoH launched a five-year strategy plan in 2018 to enhance the healthcare system by widely integrating eHealth system across the country, which aligns with Vision 2030 objectives (Almazroi et al., 2022). Adopting the EHR in Saudi Arabia become a necessity within the healthcare system in order to manage the data velocity generated by health providers who work on different systems with poor interoperability, and also to provide high quality healthcare services to a booming population across the country (Alharbi and Ramirez, 2020). The healthcare system in Saudi Arabia is divided into the public, military, and private sectors. The MoH is the primary government agency responsible for providing and funding healthcare services in Saudi Arabia, supervising 2281 healthcare facilities, in collaboration with additional government entities such as the security and armed forces (Alumran et al., 2021).

The MoH encourages all health organisations to install the new national IT infrastructure, and there is widespread adoption of EHRs and the expansion of a well-developed IT infrastructure in the healthcare field. According to Almarhabi (2016), 75% of the electronic information enterprises the government had been established as of 2016 to apply security and privacy policies to protect sensitive data, but more stringent privacy regulations were needed, and the government had to take action to set and impose privacy regulations and policies to overcome this problem. Despite identification of this needs, and notable efforts to improve EHR deployment in recent years, few studies have explored data breaches in Saudi Arabia.

1.7.3. Data Protection Regulations

Attitudes toward data privacy must be considered within the cultural context of the society in which they are embedded. While the Saudi Arabian community generally values personal space and "real-world" privacy, there is limited concern when it comes to technology and information privacy. Alhalafi and Veeraraghavan (2021) highlighted that Saudi Arabia has a comprehensive legislative system aimed at protecting data, such as anti-cybercrime legislation, alongside health organisations being compelled to adhere to related data protection issues for accreditations, such as with the Healthcare Professions Practices Regulation (HPPR) and the Saudi Central Board for Accreditation of Healthcare Institutions (CBAHI). This context contributes to protecting data privacy in Saudi Arabia. For instance, under Article 1(4) of the Anti-Cyber Crime Law, "data" is defined as any digital materials that use a computer to be processed, saved, transmitted and constructed, such as commands, information, message, voices or images. The consequences of violating this law, according to Articles 3–5, are severe financial penalty, up to three million Saudi riyals, and a maximum of four years in jail.

However, the HPPR in Part 2 states and mandates that HCPs must protect patient data; otherwise, their license is suspended and they are legally prosecuted (Saudi Commission for Health Specialties, 2014). Moreover, the CBAHI accreditation standard (2016) states that the hospital must implement a privacy policy to ensure the confidentiality of patient information as well as protecting it from loss and misuse. Notwithstanding the current privacy legal requirements *de jure*, Elgujja and Arimoro (2019) found that there are still significant health data protection issues, with record management often left to the responsibility of clinicians and there appeared to be significant health data breaches occurring, although the reasons for these are not fully explored.

1.7.4. Patient Confidentiality

According to Alnamlah et al. (2022), patient confidentiality is one of the most important ethical issues to be addressed in the healthcare system in Saudi Arabia. Elgujja and Arimoro (2019) claimed that the policy regarding personal data management is not clear – particularly the medical records in many, if not most, healthcare organisations. Patient records are often left to the responsibility of clinicians who believe they have the right to share patients' information without formal consent or an urgent care need. Health data privacy and security policies are being neglected in many health institutions, and patients' data (and thus their rights) might be breached without their knowledge (Alnamlah et al., 2022).

However, lately the number of patients suing their HCPs has spiked for many reasons, including medical errors, neglecting patient consent due to language barriers, and problems resulting of dealing with the opposite sex due to physical privacy concerns (Almannie et al., 2021). On the other hand, many health organisations try to regulate their staff by establishing and enforcing policies as preventative measures. Thus, the first handbook of health ethics and medical professions, issued by the Saudi Health Council (SHC) was issued in 2003, with the most revised version exploring and specifying tasks in different professions with emphasis on data privacy. This handbook has become the standard of healthcare services quality (Saudi Commission for Health Specialties(2014). It defines the relationship between customers and HCPs in terms of both procedures and privacy, and further explains in detail the patient's right and confidentiality. In addition, it specifies under what conditions and circumstances it is acceptable to reveal personal health information. Recently, the SHC published guidelines regarding telehealth data management that outline how patients' data can be properly handled and protected (SHC, 2023).

1.7.5. Health Data Breach Incidences in Saudi Arabia

To the best of the researcher' knowledge, there is no existing clear report about the number of data breach incidents in the healthcare system in Saudi Arabia. However, according to a report by the Saudi National Cybersecurity Authority (SNCA, (2020), the healthcare field is the third most attacked field worldwide, accounting for 14% of all attacks. Within the context of Saudi Arabia, the "unauthorised activities" category was identified as the primary threat, while illegal disclosure of data ranked fourth. However, according to Alzahrani et al. (2022) reported that 75% of patients had experienced a breach in their health data but there is no exact numbers on the total known data breaches or associated lawsuits.

1.8. The UK and USA Health Data Privacy Regulations

1.8.1. UK NHS' New Role in Safeguarding Patient Data

The UK Secretary of State for Health and Social Care introduced a new rule under the Health and Social Care Act 2012, that outlining the NHS duties to maintain the health information confidentiality, following the NHS transferring its digital functions under "the Health and Social Care Information Centre (Transfer of Functions, Abolition and Transitional Provisions) Regulations 2023." It considers the NHS as the guardian of health and social care data, which obligated to protect patients' digital information. This contains individual data under the UK GDPR and Data Protection Act (DPA) 2018. This new rule provides a detailed outline of how the patient data is governed by the NHS. It also provides a code of practice and internal procedures when dealing with identifiable data. (DHSC, 2023).

1.8.1.1. Health Data Under the UK-GDPR

After Brexit, the UK incorporated the GDPR into their national health data regulation and law under the EU (withdrawal) bill. The GPDR covers and provides protection for health data as it specified it under "personal data." The regulation classifies health data processing on a large scale as "potentially high-risk" – requiring an extra safeguard through conducting Data Protection Impact Assessments (DPIAs). The basic rule is that "GDPR prohibits the processing of data concerning health." Moreover, the GDPR considers the health data as sensitive and pose a risk on the personal's right of freedom. In addition, the GDPR prohibits automation decision-making, which involves profiling health data for legal effects or impacting a person unless this person has given explicit consent or is processing the data for public interest, with taking measures to maintain the data subject's rights. The data subject has the right to access their health information, but controllers are obligated to commence a DPIA when automated processing is being performed that contain profiling (Navarro et al., 2023).However, according to the Information Commissioner's Office (ICO), penalties for data breach in the UK-GDPR can reach "up to £17.5 million or 4% of your annual worldwide turnover, whichever is higher" (ICO).

1.8.1.2. The General Data Protection Regulation (GDPR)

The General Data Protection Regulation (GDPR) establishes the centrepiece of the European Union (EU) data privacy law and regulations. It encompasses 173 recitals and 99 provisions detailing "72 rules relating to the protection of natural persons with regard to the processing of personal data and 73 rules relating to the free movement of personal data"

(Navarro et al., 2023)The GDPR – enforced on May 25, 2018 – introduces how data privacy is approached focusing on the personal data rights and the responsibilities of those who control the data (Navarro-Martínez et al., 2023). The GDPR covers how the personal data is dealt with for both private and public bodies. The are two actors: data subjects and controllers. Subjects refer to a person who her/ his data is processed, while controllers are the entities that possess and process the person's data.

It has six principles:

- 'Lawfulness, fairness and transparency'
- 'Purpose limitation'
- 'Data minimisation'
- 'Accuracy'
- 'Storage limitation' and
- 'Integrity and confidentiality'

These principles are set for the controller entities, and it is their responsibility to comply with them (Navarro-Martínez et al., 2023).

The GDPR provides the data subject with several personal rights, including the right to have access, modification, deletion, transfer, and limit some entities from accessing their data. The GDPR obligates controllers to conduct DPIAs – "risk-based approach to data protection." This risk assessment covers a varying of probability and severity that may result of dealing with data subject. Then, the controllers must take this analysis when they use a new technology to process the data that may violate patient rights and freedoms. Moreover, they must notify patients when their data is at risk of breach (Navarro-Martínez et al., 2023).

1.8.2. The US HIPPA Regulation

Whilst this study targeted the compliance of nurses with the EHR data privacy policy and regulations in Saudi Arabia, it is worthwhile to consider the healthcare data privacy regulations in other developed countries, such as the US. The Health Insurance Portability and Accountability Act (HIPAA) in the US was passed in 1996 with the primary goal of providing sufficient and increasing access to the healthcare services for Americans citizens. The HIPAA privacy rule was established by the Department of Health and Human Services (HHS) to formulate privacy standards pertaining to protected health information (PHI). The main aim of

HIPAA with regard to patient data is to ensure that the patient's health information is protected and properly handled while the healthcare services are properly delivered (Gostin et al., 2009). The HIPPA privacy rule establishes the basic rights of citizens concerning their PHI, which is defined as "individually identifiable health information" that is stored or exchanged by a "covered entity."

"Individually identifiable health information" is data (including demographic data) that relates to:

- "the individual's past, present or future physical or mental health or condition,
- "the provision of health care to the individual", or
- "the past, present, or future payment for the provision of health care to the individual" (OCR, 2022).

According to the HHS website, the "covered entity" refers to the health plan, health clearinghouse, and healthcare providers who process patients' information into electronic form. The security measures set forth in HIPAA ensure the basic requirement to safeguard the electronic PHI through physical, technical, and administrative protection (OCR, 2022).

1.8.2.1. HIPAA Penalties for Noncompliance

The Office for Civil Rights (OCR) in the Department of HHS is in charge of enforcing the HIPPA privacy rule and may conduct compliance reviews and investigations (OCR, 2022). The OCR cooperates with the covered entities to establish these rules. In cases of negligence or failure to comply with the HIPPA privacy rule, a civil monetary penalty will be imposed, with fines ranging from $127 USD to $63,973 USD per violation. This penalty can be reduced or waived if convincing justifications are provided in a written form to explain violations of offences within 30 days.

In more severe cases of willing breaches (e.g., cases of individuals knowingly obtaining or divulging identifiable health information in violation of the HIPPA privacy rule), criminal penalties can be imposed, with fines of $50,000 USD and up to one year of incarceration. These penalties can be increased to $100,000 USD and five years' imprisonment in cases involving false pretences; and $250,000 USD and up to 10 years' imprisonment if the unlawful behaviour includes the selling, handover, or use of PHI for marketing, individual gain, or malevolent harm (OCR, 2022).

1.8.3. Comparing Health Data Regulations in the US and UK-GDPR and Saudi Arabia

Comparing the US and UK GDPR and Saudi healthcare data privacy and security regulations, it is evident that while all countries have established and implemented measures to safeguard patients' information, there is a significant difference between the three countries in their approach and enforcement. In the US, HIPAA provides very detailed and comprehensive regulations and guidelines to protect and safeguard a person identifiable health information, with strict and very clear penalties for noncompliance (OCR, 2022). It also shows and explains the details of how health data can be protected at the physical, technical, and administrative levels, with commensurate safeguards (CISA, 2024, NCVHS, 2023, NIST, 2024, HHS, 2023, OCR, 2022). By contrast, the UK incorporated the EU-GDPR in their local law and regulations. The GDPR provides very detailed and comprehensive regulations and guidelines on the data subject personal's rights of freedoms and includes a very detailed explanation of the responsibilities for the controllers to safeguard the data. Penalties can reach "up to £17.5 million or 4% of your annual worldwide turnover, whichever is higher" (ICO).

On the other hand, Saudi Arabia's health data privacy and security regulations are relatively nascent, albeit evolving. Several laws and regulations, such as Anti-Cyber Crime Law, CBAHI, and HPPR have been implemented to set rules for how HCPs deal with ePHI data, with penalties for noncompliance (Saudi Commission for Health Specialties, 2014, Alhalafi and Veeraraghavan, 2021). Recently, the SHC published guidelines regarding telehealth data management that outline how patients' data can be properly handled and protected based upon the Personal Data Protection Law, which was implemented in 2021 and enforced 2023 (SHC, 2023). It explains and mandates how to improve data governance, preserving electronic records of processing activities, and emphasises data security measures, etc. It is aligned with the SNCA to guarantee that patients' data are confidential, integrity, and available (SHC, 2023).

1.9. Study Rationale

Haried et al. (2019) conducted a meta-analysis to evaluate research development in the HIS field, and concluded that health information security, privacy, and ethics are under-researched areas in this domain. Therefore, a call for proposals was initiated for researchers to conduct more research in this area. In addition, Haried et al. (2019) found that fewer triangulation studies were performed in this field. Researchers were encouraged to apply different methodologies in order to explore this issue further (Haried et al., 2019). However, several studies have explored

data privacy concerns from the patients' perspectives, focusing on how their information was being collected and used (Margulis, 2003, Allen, 1988, McWhirter, 1994). Therefore, this study will seek to investigate the compliance intention of nurses who have access to EHR using the Q-Methodology approach.

Behavioural intention (BI) pertains to the self-instruction whereby an individual decides to execute and enact a specific behaviour, in order to achieve a specific outcome (Triandis, 1979). Ajzen (1991) referred to the concept of BI as "how hard people are willing to try" and "how much of an effort [they] are planning to exert." According to Ajzen and Fisbbein (1974), there is a strong positive association between individuals' intentions to engage in certain behaviours and their attitudes and beliefs. Furthermore, these intentions were shown to have a substantial correlation with actual behaviour (Ajzen and Fisbbein, 1974, Fishbein and Ajzen, 1977). In a meta-analysis by Sheeran et al. (2005) to examine the degree to which intentions are indicative of behaviour within the realm of health-related behaviours, it was shown that intentions had a significant predictive capacity for behaviour. This shows that there is an association between behavioural *intentions* and subsequent behavioural outcomes.

Armitage and Conner (2001) conducted a systematic analysis and synthesis of empirical studies pertaining to the Theory of Planned Behaviour (TPB). They concluded that there was a strong correlation between the BI and actual behaviour (Ajzen, 1991). Andorfer and Liebe (2012) and Carrington et al. (2010) reported that most studies explore intention rather than behaviour. Hence, the stronger a person's intention, the higher the possibility of performing the behaviour. Investigating intention helps researchers predict behaviour in two ways: (1) understanding intention helps researchers predict future plans of actual behaviour and motives (Bratman, 1987); (2) it helps interpret the performed behaviour, as the intention is a cause of much of the actual behaviour (Feinfield et al., 1999).

Focusing on BI in relation to technology use is not sufficient in and of itself to gain an understanding of behaviour in relation to data security. In addition, it is widely accepted that BI in relation to compliance of employees to an organisation's IS regulations and policies must also be explored (Foth, 2017, D'Arcy and Greene, 2014). Non-compliant behaviour towards organisational data privacy policy can cause significant damage to both organisation and employee reputation, and it often leads to financial penalties for both parties (Kwon and Johnson, 2013, Aggarwal and Dhurkari, 2023). Therefore, healthcare organisations must invest in understanding providers' behaviours in compliance with EHR privacy policies. A good

understanding of nurses' intentions toward complying with EHR privacy policies may predict healthcare employees' behaviour of compliance with EHR privacy policies (Ma et al., 2016).

Whilst many different groups are involved in data management, recording, and transfer within the EHR, this study will focus on nurses who work with the EHR for the following reason. There are several potential risks to data privacy and organisation integrity due to the large number of healthcare workers that have access to the EHR, which contains sensitive data. Within healthcare facilities, there are several specialised teams. Health information privacy studies, according to Foth (2017) and Holen et al. (2018), should concentrate attention on a specific hospital population. According to Johnston and Warkentin (2008), the outcomes varied across administrative employees and clinicians because of the diverse environments in which each group worked.

Consequently, addressing the identified research gap, this study focuses on nurses, since they are utilising the EHR more often than other medical professionals in their everyday work, particularly when providing bedside care (Kang et al., 2023). If this group, which comprises the great majority of healthcare personnel, does not take precautions to safeguard their patients' personal information, this might directly compromise the security of their patients as well as the credibility of their clinic. Studies have suggested that nurses are more likely to comply with the EHR privacy and security policies in their organizations due to being committed to their professional and ethical codes at the workplace, whereby they are *ipso facto* more ethically compliant with the system's privacy policy if this is perceived to fall within the ambit of their conventional clinical and ethical responsibilities (Bani Issa et al., 2020). However, the implementation and functionality of the EHR itself can influence their capability to protect its associated data efficiently (Bjerkan et al., 2021).

For instance, challenges that nurses face during the documentation process vary among units, and in relation to how busy units are on any given shift. (Bjerkan et al., 2021) concluded that the EHR system adoption in an organisation is often characterised by some units not changing their documentation process, therefore the nurses' work routines are interrupted by duplicate documentation activities if they try to use the new EHR. Consequently, they typically continue with their legacy paper record documenting habits under such circumstances.

Another challenge identified by Bjerkan et al. (2021) is that the EHR system may pose issues when nurses try to access data, and perceived difficulty or inefficiency of the system can cause

nurses to leave computers logged on (i.e., to avoid logging in and out in conformity with data protection requirements), and to allocate a particular nurse to undertake data entry for the system, documenting their patients' files rather than doing it by themselves.

A third challenge is that when system downtime occurs, nurses shift back to paper medical records, and then leave the latter unguarded due to the perceived extenuating circumstances, even after resuming online data access when the system came online again. Such practices pose a confidentiality data breach (Bjerkan et al., 2021).

Given that most health data breaches occurred as a result of carelessness or abuse by employees, the nurses who are granted access to patient records are typically held accountable for maintaining the confidentiality of that information (Ozer et al., 2020). However, there appears to be a disconnect between the high levels of professionalism displayed by nursing practitioners in respecting patients' physical privacy, and the relatively lax regard they show to patients' data privacy, with intentional information sharing in breach of legal or institutional policies typically being considered expedient and justified to deliver effective care (Petronio and Sargent, 2011, Kang et al., 2023). Therefore, this study will seek to investigate factors influencing nurses' compliance behaviour regarding EHR privacy policy.

1.10. Aim and Objectives

Based on the study rationale explained above, this study aims to:

- ❖ Explore factors in nurses' compliance with EHR data privacy policies in the Saudi Arabian region.

In order to achieve this aim, the following objectives were identified:

- To undertake a scoping review of existing knowledge concerning the topic.
- To assess existing theoretical paradigms used to conceptualise and study this field.
- To undertake a Q-Methodology study, recruiting expert participants.
- To apply factor analysis and discuss the findings.

1.11. Conclusion

Overall, the usage of the EHR system has advantages and disadvantages for health organisations, and there are longstanding data privacy concerns arising among HCPs and other stakeholders. Thus, it is important to investigate data privacy in healthcare facilities within the Saudi context, exploring the BI of HCPs (especially nurses), and specifically their intention to comply with the EHR system policies. Further investigation in this regard is essential to help health facilities to protect EHR data. Thus, this study aims to explore the factors that influences nurses' compliance behaviour with the EHR privacy policy in Saudi Arabia. The following chapter presents a scoping review that explores what is already known in the literature about the factors that influence health care professionals' compliance with EHR privacy policy, as a precursor to presenting the methodology adopted in this study to achieve the stated aim and objectives.

CHAPTER 2:
SCOPING REVIEW

Having explained the background of EHRs in the previous chapter, discussing their benefits and limitations, and examining EHR privacy policies, regulations, and current challenges, the current chapter presents the scoping review undertaken to determine what is already known about the factors that influences the HCPs' compliance with EHR privacy policy. An initial search showed there is a scarcity of materials focusing on the targeted group (i.e., nurses). Thus, the researcher decided that the study would cover all end users of EHR systems who work in the same health sector, as discussed and justified in the scoping review inclusion criteria (Section 2.2).

Chapter 2 is structured following the Joanna Briggs Institute scoping review tool (Joanna Briggs Institute, 2014) . First, it shows the protocols that were followed during conducting the scoping review, beginning by outlining the protocols employed during the review process. Subsequently, it presents descriptive results from the included studies, and then identifies the drivers and barriers factors that influence the HCPs to comply with the EHR privacy and policy. Finally, it identifies the theoretical frameworks identified from the reviewed literature. Relevant theoretical models are explained in more detail in Chapter 3.

2.1. Defining and Aligning the Objectives and Question

2.1.1. Scoping Review Question

What does the literature reveal about factors that influencing HCPs' compliance intentions towards the EHR data privacy policy?

2.1.2. Scoping Review Objectives

1. To identify what is already known about the barriers and drivers that influence HCPs' BI towards EHR data privacy;
2. To explore the theoretical frameworks that underpin the HCPs' BI towards EHR data privacy;
3. To identify the knowledge gaps in the existence literature.

2.1.3. Review Method

This protocol allowed us as researchers to iteratively and deeply investigate the relevant literature (Joanna Briggs Institute, 2014). According to Tricco et al. (2016) the scoping review has an edge over other forms of review, which allows us to explore the breadth of the literature and to identify the available materials in the field. Therefore, the scoping review was found to be suitable to investigate the body of literature for this issue. Scoping frameworks offer standardised steps that researchers followed to conduct a scoping review. The JBI scoping review framework was enhanced by Peters et al. (2015), providing an opportunity to obtain more details of the protocol, therefore it was used to organise this review (see Table 2). This framework helped to cover and detail the how to extract the articles regarding the BI of HCPs toward EHR data privacy. It provided a deeper understanding of the factors that influence HCPs' BI.

Table 2: Scoping Review of "*Enhancements*" *Framework proposed by Peters et al. (2015)*

Enhancements Framework 2015
Defining and aligning the objective/s and question/s
Developing and aligning the inclusion criteria with the objective/s and question/s
Describing the planned approach to evidence searching, selection, data extraction, and presentation of the evidence.
Searching for the evidence
Selecting the evidence
Extracting the evidence
Analysis of the evidence
Presentation of the results
Summarizing the evidence in relation to the purpose of the review, making conclusions and noting any implications of the findings

2.2. Developing and Aligning the Inclusion Criteria with the Objectives and Question

2.2.1. Types of Studies

The scoping review's aim was to determine the boundaries of the literature of the investigated topic (Tricco et al., 2016). Thus, all study designs were considered in this review (i.e., quantitative, qualitative, mixed-method, and Q-Methodology studies, etc.) (see Table 3).

2.2.2. Database Selection

Published and unpublished studies in the English language were be included. The search was performed through these Databases; Cochrane library, OVID (MEDLINE, AMED, PsycINFO, EMBASE), SCOPUS, Web of Science and e-theses provided by the University of Nottingham (UoN).

2.2.3. Date Limit

It is important to set a reasonable and rational time limit for a scoping review in terms of the literature that remains relevant to the research. Therefore, the time limit for searching the database started from the year 2003 to until February 2024 when the review was performed (see Table 3). The reason for selecting 2003 as the starting point is that the leading EHR adopting counties such as the UK and USA started implementing related legislation for healthcare during this period. In December 2003, the Secretary of State for Health in the UK announced a plan which was an individual electronic record for every National Health Service (NHS) patient, and the system went live in June 2004 (Powell, 2010). In addition, according to Simborg (2008), in 2004 the President of the USA announced the national EHR adoption plan, and EHR adoption subsequently accelerated globally.

2.2.4. Only EHR or EMR System

It is important to clarify the type of system that will be included in the scoping review. The focus of this review is only to investigate how EHR and EMR system adoption in health organisations affects HCPs' BI to protect electronic health data. Paper medical records were not included in the review. The reason of choosing electronic ISs over the paper medical records is that the former have been found to have more data breaches than paper systems (Ronquillo et al., 2018). Johnson and Goetz (2007) suggested that when originations acquiring a new HIS want to secure their data, attention must shift to users' behavioural activities before building

security tools. Thus, only electronic HISs were chosen to be the system type inclusion criteria (see Table 3).

2.2.5. Subject Area

The main focus in the subject area was on the HCPs' BI regarding electronic health data privacy and security. The researchers suggested that understanding the EHR end-users' BI toward data privacy and security would enrich how health organisations, top management, and stakeholders could protect EHR data (Ma et al., 2016, Foth, 2017) (see Table 3).

2.3. Description of the Planned Approach to Evidence Searching and Selection

Whilst the main study focuses on nurses in Saudi Arabia, this scoping review considered all HCPs worldwide in order to get the broadest sense of the factors that might influence intentions toward data security.

Participants: HCPs (EHR-end users)

Concept: BI of EHR data privacy

Context: Worldwide

2.3.1. Participants

The initial search revealed a scarcity of materials related to the targeted group, specifically nurses. Thus, we sought that the search would cover all electronic health systems end-users who work in the same field. Moreover, several studies covered multiple professional groups, and did not distinguish between them (Angst and Agarwal, 2006, Foth, 2017, Angst and Agarwal, 2009, Johnston and Warkentin, 2008). Therefore, this scoping review considered all studies that included all HCPs interacting with EHR systems, whether clinicians or non-clinicians (see Table 3).

2.3.2. Concept

Foth (2017) asserted that users' compliance behaviour needs to be investigated when applying information commutation systems to ensure that the systems are secured. Thus, the review focused on the HCPs' BI toward EHR data privacy issues (see Table 3).

2.3.3. Context

The benefit of the scoping review is that it provides an overview of this issue on a global scale. Thus, the review is not limited to a specific country, to see if scholars addressed this issue. However, the context of this review was to include any health organisation that implemented an EHR and EMR (see Table 3).

2.3.4. Outcome

A scoping review is generally more open in terms of the types of outcome measures. Thus, this review investigates BI at the individual level. The HCPs' perceptions, attitudes, beliefs, social influences, perceived control, and behavioural intentions (i.e., compliance, protection, violations) regarding electronic health data were the main concern of this review.

2.4. Description of the Planned Approach to Evidence Searching and Selection

2.4.1. Searching, Selecting, and Extracting Evidence

The aim of this review was to get all possible evidence – published and unpublished – related to the main issue. An initial search was carried out through the OVID (MEDLINE) interface web page, to determine articles related to the topic, then articles' titles, abstracts, and Medical Subject Headings (MeSH) terms were used to generate key words for the full search strategy (see Table 4). The UoN Librarian's service was consulted over the search strategy the question on 22/01/2020, objectives and an initial keywords sent. Feedback received in 30/1/2020 included a full search strategy (see Appendix 1: Scoping Review Database Search, Figure 35). The strategy resulted in 416 articles using Ovid (MEDLINE). The full search took place for all selected databases during 30/1/2020 to 4/2/2020.

2.4.2. Updating the Scoping Review

The review was updated on 29/02/2024, and all of the above databases were researched a second time. This resulted in 2,964 articles, plus four more records identified from grey literature. After the research was done, articles were extracted from the databases into EndNote (v. 20, 2022) by the principal investigator. Duplicate articles were removed using EndNote duplicate tool (n = 387). The PRISMA process was used to screen the materials (Page et al., 2021) (Figure 3).

Table 3: Inclusion and exclusion criteria

Criteria	Inclusion criteria	Exclusion criteria	Reasons
Study language	Paper published in English	Paper not in English	Due to the language barriers and literature scarcity
Study design	All study designs	-	Scoping review feature
Participants	HCPs working in healthcare settings with access to EHR and EMR HISs	-	Initial searching revealed a scarcity of materials focusing on the targeted group (i.e., nurses), thus the search covered all EHR systems' end users working in the healthcare sector. Several studies covered more than one HCP group, but did not distinguish between them (Angst and Agarwal, 2006, Foth, 2017, Angst and Agarwal, 2009, Johnston and Warkentin, 2008)
Publication date	2003 to present	Before 2003	UK and USA EHR systems' legislation passed in 2003 and 2004, respectively, followed by global proliferation (Simborg (2008) (Powell, 2010).
Only EHR or EMR system	EHR	Not electronic	Only papers on electronic health systems in healthcare settings were included, which can be described with different terms (e.g., EHR, EMR, and HIS)
Subject area	Data privacy and security Employees' BI	- Only focus on technical. - Solely focused on acceptability, adaptation and usability of EHR or EMR or HIS, and not considering data privacy -Not related to employees' BI -Not related to data privacy and security	The main focus of the subject area is HCPs' BI regarding EHR data privacy and security. Understanding the BI of EHR end users (i.e., professionals) towards data privacy policy can enrich how health organisations, top management, and stakeholders can protect data (Ma et al., 2016, Foth, 2016).
Setting	Any health organisations using EHR or EMR systems No geographical/ national limitation	-	Inherent scope of review.

Table 4: The main search terms

Concept1 **And**	**Concept2** **And**	**Concept3** **And**	**Participants**
Electronic medical record* or electronic health record* or computerised medical record* or computerised health record* or hospital information system* or medical records systems or computerised or electronic health records or EHR	Privacy, computer security or data privacy or data security or data breach or security breach or information breach or privacy concerns* or confidentiality	Perception* or attitude or belief* or issues* or ethics* or behaviour* or behavior	Health personnel* or nurse* or doctor* or hospital employee* or health information management staff

2.5. Charting the Evidence

The literature review question was answered using the PRISMA process to screen the collected articles (Page et al., 2021). The PRISMA flow diagram indicates the selection and documentation of the data extraction process, as shown in Figure 3 (Page et al., 2021). It displays the number of records extracted from the beginning to the end of the screening and review process, as well as the databases searched and the exclusion and inclusion criteria (Table 3).

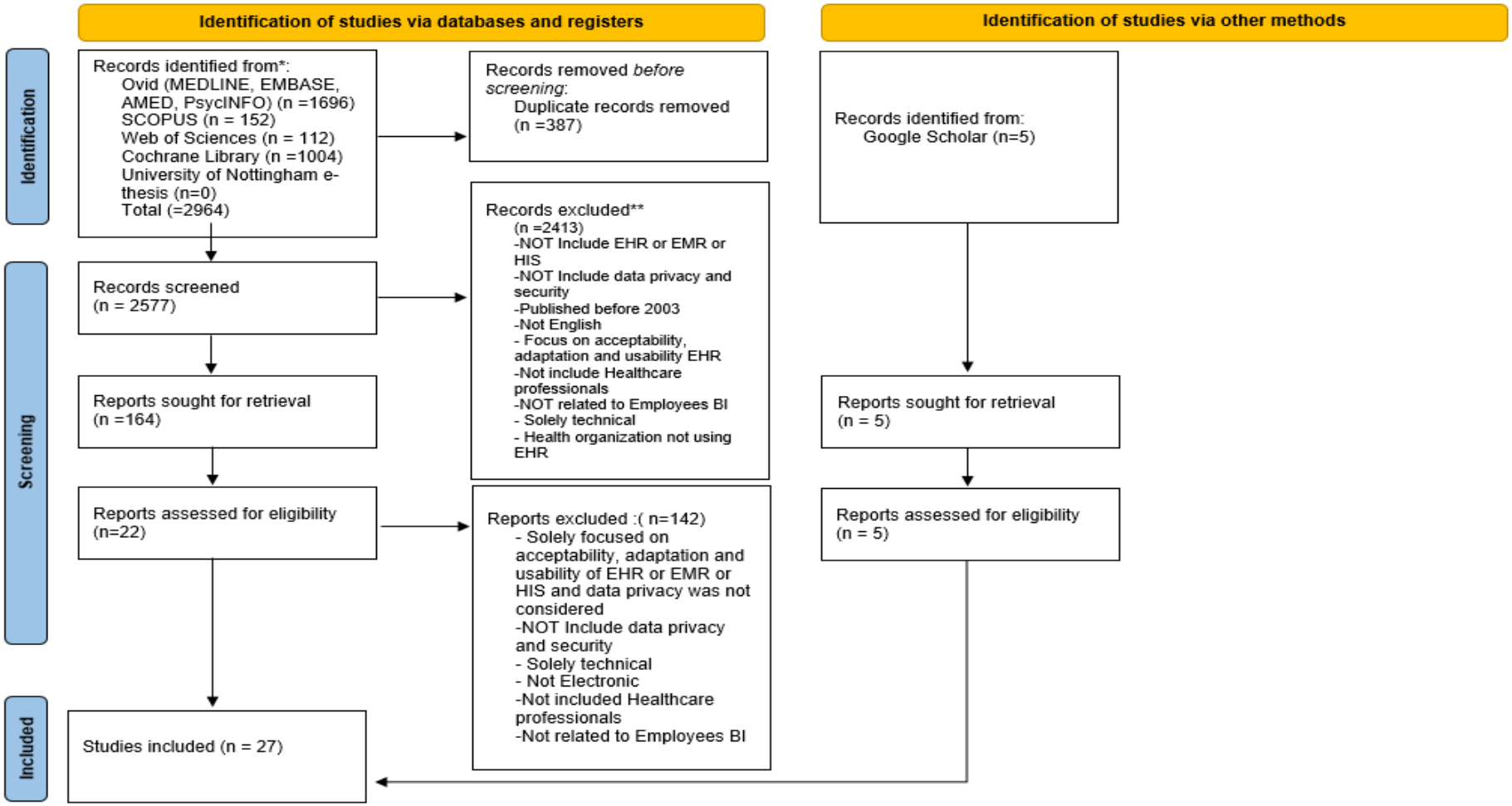


Figure 3: PRISMA flow diagram 1

Source: (Page et al., 2021)

2.6. Collating, Summarising, and Reporting the results

After conducting the search protocol represented in the PRISMA diagram, 27 articles related to the study's main objective were obtained. This section presents the results and evidence of the scoping review, which gives us a better insight into facilitators and barriers factors that influence the HCPs' BI toward EHR data privacy. Hence, the main issue was explored extensively to draw a significant knowledge gap that might exist. The focus of the scoping review was to find the factors that affect HCPs' BI when they use an EHR, or any electronic systems that contain patient information within the healthcare setting. All included studies' aims focused on HCPs' BI toward electronic health data privacy, and were conducted in healthcare organisations that have electronic systems. Moreover, the majority of the studies used quantitative approaches to capture HCPs' BI (see Table 6).

2.7. Summary of the Studies

There are few studies conducted on the factors that influence HCPs' BI toward EHR data privacy globally, which in and of itself presents a research opportunity. Most of the studies on this topic were conducted between 2015 and 2023, which indicates that researchers are becoming increasingly more interested in this field (see Table 5). The summary of the salient features of the reviewed studies shown in Table 6 indicates that the majority of the studies used quantitative methods to explore the respondents' BI; only two studies used qualitative methods (Eikey et al., 2015, Holen et al., 2018). One systematic review (Sari et al., 2022). However, the populations of these articles examined many of the HCPs groups that worked with the EHR. Some of these studies included more than one HCP group (Kessler et al., 2020, Kuo et al., 2019, Kuo et al., 2018, Holen et al., 2018, Foth, 2017, Foth et al., 2012, Johnston and Warkentin, 2008, Fernández et al., 2015, Humaidi and Balakrishnan, 2018a). Some of the studies included only one professional group, such as medical interns (Altamimi et al., 2018), nurses (Ma et al., 2016, Kuo et al., 2017, Lee and Seomun, 2021, Kim et al., 2022, Kang et al., 2023), hospital IT staff (Sher et al., 2017b), health information management (HIM) staff (Sher et al., 2017a), and inter-municipal health employees (Holen et al., 2018).

Overall, 21 out of 27 studies adopted at least one theoretical framework to measure the HCPs' compliance with the EHR policy (Table 6). Seven of the studies tested more than one theoretical framework to examine this issue.

Table 5: Overview of the studies

Variables	Number of Studies	%
Year of publication:		
2003 to 2012	3	11.1%
2015 to 2023	24	88.9 %
Country:		
USA	7	25.9%
Taiwan	7	25.9%
South Korea	3	11.1 %
Germany	2	7.4 %
Saudi Arabia	2	7.4 %
Greece	1	3.7%
Norway	1	3.7%
Spain	1	3.7%
Malaysian	1	3.7%
Indonesia	1	3.7%
Turkey	1	3.7%

2.7.1. Comparing a Recent Systematic Review's Result to our Scoping Review

In the increasingly evolving IT field of healthcare, safeguarding the EHR, or HIS, is important. Thus, understanding the behavioural aspect of HCPs has gained researchers' attention in recent years. A 2022 systematic review was done by Sari et al. (2022) to explore the desirable and undesirable privacy behaviour among the HCPs' when they deal with EHRs. However, we sought to compare our scoping review outcomes with the systematic review done by Sari et al. (2022) based on database selection, search strategies, and inclusion criteria. This can enhance our understanding of the existing literature and inform others who are planning to research this complex area of health information security and policy.

By comparing the two reviews, we noticed that the systematic review that was done by Sari et al. (2022) selected ScienceDirect, Medline/Pubmed, SAGE, IEEE Xplore, and Scopus as databases, while our scoping review searched different databases like the Cochrane Library, OVID (MEDLINE), AMED, PsycINFO, EMBASE, SCOPUS, Web of Science, and e-theses. This may have influenced the number of retrieved studies from both reviews. Sari et al. (2022) reviewed 5,573 studies, reduced to 35 relevant articles, while our review extracted 2,964 studies with 27 relevant studies.

Moreover, another difference was noticed in the search terms and search strategies in both reviews. While Sari et al.'s (2022) review used 9 terms (information security, cybersecurity, behaviour, awareness, compliance, and practice) in healthcare settings, our review used a very extensive search strategy with 56 terms (see Table 4). This reflected on both review retrieved studies, as Sari et al. (2022) reviewed 24 articles that were different from those included in our review, and we found 15 different studies from theirs. Moreover, both reviews had 12 studies in common.

In summary, the differences between the two reviews were due to the choice of databases, search methodologies, and inclusion criteria. Thus, these differences indicated that there is a need for a well-stringent methodology to carry out a future literature review, emphasising the need for investigators to carefully evaluate the impact of their methodological choices on study outcomes. However, after the comparison between Sari et al. (2022) systematic review and our scoping review, the following section presents the extracted studies details, the drivers and barriers, and the theoretical frameworks germane to this study.

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
1	(Altamimi et al., 2018)	The role of neutralisation techniques in violating hospitals privacy policies in Saudi Arabia	To investigate whether neutralisation theory can be used to predict justifications for violation of hospital's privacy policies.	Neutralisation Theory	Medical interns P = 66 PR = 62 R = 92%	Saudi Arabia	Survey	Questionnaire
2	(Entzeridou et al., 2018)	Public and physician's expectations and ethical concerns about electronic health record: Benefits outweigh risks except for information security	To record public and physicians' awareness, expectations for, and ethical concerns about the use of EHRs.	-	Public P = 736 PD = 421 R = 57% Physicians P = 7754 PR = 225 R = 2.9%	Greece	Quantitative survey Online and printed	Questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
3	(Foth, 2017)	Factors influencing the intention to comply with data protection regulations in hospitals: based on gender differences in behaviour and deterrence	To further identify the most significant factors influencing their intention to comply with data protection and the variance in intention between men and women.	-Theory of Planned Behaviour -Deterrence Theory	All staff P = 557 PR = 349 R = 62.6%	Germany	Quantitative survey	Questionnaire
4	(Angst and Agarwal, 2006)	Digital health records and privacy concerns: Overcoming key barriers to adoption	Integrating the Concern for Information Privacy (CFIP) construct with the Elaboration Likelihood Model (ELM) to examine attitude persuasion regarding the use of EHRs when concerns about privacy of information are present in patients.	-Elaboration Likelihood Model -Concern for Information Privacy construct	Clinicians Caregivers or Patients (102 high-involvement, 264 low-involvement)	USA	Quantitative Two experimental purposively selected groups	Online questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
5	(Angst and Agarwal, 2009)	Adoption of electronic health records in the presence of privacy concerns: the elaboration likelihood model and individual persuasion	To investigate this question, we integrate an individual's CFIP with the Elaboration Likelihood Model (ELM), to examine attitude change and likelihood of opting-in to an EHR system.	-Elaboration Likelihood Model -Concern for Information Privacy construct	HCPs P = 366	USA	Quantitative Experimental Randomly assigned groups to single treatment	Online questionnaire
6	(Foth et al., 2012)	Technology acceptance as an influencing factor of hospital employees' compliance with data-protection standards in Germany	Data-protection regulations in German hospitals, based on data-protection laws and internal regulations, must be complied with and taken into account in daily work. However, these regulations are not always respected, as evidenced by the data-protection scandals in Germany of recent years.	-Technology Acceptance Model -Theory of Planned Behaviour	Administrative staff, nurses, physicians, physicians with scientific/research-based work and other health professionals 26 hospitals P = 557	Germany	Quantitative survey	Questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
7	(Johnston and Warkentin, 2008)	Information privacy compliance in the healthcare industry	To illuminate characteristics of both the environment (organisation) and the individual (HCP) and their relevant influence on compliance intentions by leveraging theories from the domains of social psychology, management, and ISs.	Amalgamation : -Theory of Planned Behaviour -Technology Acceptance Model -Unified Theory of the Acceptance and Use of Technology -Self-Efficacy -Perceived Organisational Support	All staff (employees) of organisations that provide healthcare services to individuals (patients) P = 208	USA	Quantitative survey	Questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
8	(Kuo et al., 2018)	Continuance compliance of privacy policy of electronic medical records: The roles of both motivation and habit	To investigate the possible antecedents that will influence hospital employees' continuance compliance with privacy policy of EMRs (motivational and habitual perspectives).	Self-Determination Theory	HCPs Administrative staff P = 350 PR = 320 (valid = 312) R = 93.33%	Taiwan	Cross-sectional design survey	Questionnaire
9	(Kuo et al., 2019)	Deterrence approach on the compliance with electronic medical records privacy policy: The moderating role of computer monitoring	To explore the possible antecedents that will motivate hospital employees' compliance with privacy policy related to EMRs (Secginli et al.) using deterrence theory (DT) perspective.	Deterrence Theory	HCPs Administrative staff P = 350 PR = 310 (valid303) R = 88.57%	Taiwan	Quantitative	Questionnaire
10	(Kuo et al., 2017)	A deterrence approach to regulate nurses' compliance with electronic medical records privacy policy	To explore factors which may tend to inhibit nurses' intentions to violate privacy policy concerning EMR (DT perspective).	Deterrence Theory	Nurses P = 300 PR = 280 (valid 262) R = 93.33%	Taiwan	Quantitative	Questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
11	(Lapke et al., 2017)	The disconnect between healthcare provider tasks and privacy requirements	To shed light on HCPs' attitudes towards privacy with regards to EMRs. Argues that HCPs place a priority on privacy issues given regulatory, fiscal, and reputation repercussions.	Information Boundary Theory	Physicians, nurses, and hospital administrators PR = 148	USA	Quantitative	Questionnaire
12	(Ma et al., 2016)	A survey-based study of factors that motivate nurses to protect the privacy of electronic medical records	To investigate factors that motivate nurses to protect privacy in EMRs, based on the Decomposed TPB (DTPB).	Decomposed Theory of Planned Behaviour	Registered nurses P = 474 PR = 302 R = 63.7%	Taiwan	Quantitative	Questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
13	(Saito et al., 2017)	Health care personnel perception of the privacy of electronic health records	To investigate the perception of privacy healthcare personnel have of EHRs.	-	Nurses, residents, physicians, nurse practitioners, administrative assistants, transporters, technicians, respiratory therapists, and environmental service workers. P = 103 PR = 96 R = 93%	USA	Observational, descriptive study survey	Questionnaire
14	(Sher et al., 2017b)	Compliance with electronic medical records privacy policy: An empirical investigation of hospital information technology staff	To explore the factors that motivate hospital IT staff's compliance with EMRs privacy policy from the theoretical lenses of protection motivation theory and the theory of reasoned action.	-Protection Motivation Theory -Theory of Reasoned Action	Hospital IT staff P = 320 PR = 310 R = 96.8%	Taiwan	Quantitative	Questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
15	(Sher et al., 2017a)	How can hospitals better protect the privacy of electronic medical records? Perspectives from staff members of health information management departments	To examine the influencing factors of privacy protection for EMR by HCPs.	Health Belief Model	HIM staff P = 240 PR = 209 R = 87.08%	Taiwan	Quantitative	Questionnaire
16	(Eikey et al., 2015)	Designing for privacy management in hospitals: Understanding the gap between user activities and it staff's understandings	To understand the IT staff's perceptions of how users protect patient privacy while delivering healthcare and compare them to users' actual behaviours, in order to understand what gaps may exist between the users and IT staff.	-	Interviewed 20 IT staff Observations of EHR users (both clinical and non-clinical)	USA	Qualitative mixed-method	Interviews and observations
17	(Holen et al., 2018)	Barriers to exchanging healthcare information in inter-municipal healthcare services: A qualitative case study	To investigate both the characteristics of communication and information sharing, and the factors that serve as barriers to communication and information sharing for employees in inter-municipal healthcare services.	Unified Theory of the Acceptance and Use of Technology	Inter-municipal health or social service delivery RP =18 participants RP =11 interviewed	Norway	Qualitative case study	Interviews, observations and workshop

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
18	(Fernández et al., 2015)	Analysis of health professional security behaviours in a real clinical setting: An empirical study	The objective of this paper is to evaluate the security behaviour of healthcare professionals in a real clinical setting.	-	All HCPs RP =180 participants	Spain	Quantitative	Questionnaire
19	(Humaidi and Balakrishnan, 2018a)	Indirect effect of management support on users' compliance behaviour towards information security policies	To identify significant factors and provide a clearer understanding of the nature of compliance behaviour in the health sector environment.	Theories of Planned Behaviour	All HCPs RP=454 participants	Malaysian	Quantitative	Questionnaire
20	(Ozer et al., 2020)	The Relationship between the Nurses' Perception of Electronic Health Records and Patient Privacy	To examine the relationship between the nurses' perception of electronic health records and patient privacy regarding patient information and socio-economic variables.	-	217 nurses	Turkey	Quantitative	Questionnaire

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
21	(Kessler et al., 2020)	Information security climate and the assessment of information security risk among healthcare employees	To assess the Information Security Climate Index (ISCI), information security motivation, and information security behaviours among HCPs	- Organisational Climate literature - Information Security Climate Index	Certified nursing assistants, dentists, pharmacists, physician assistants	USA	Quantitative	Likert-type scale survey
22	(Alanazi et al., 2020)	Theory-based model and prediction analysis of information security compliance behaviour in the Saudi healthcare sector	To investigate the usefulness of a theory-based model and determine the predictors of information security compliance behaviour among healthcare workers at government hospitals in the Kingdom of Saudi Arabia.	-Theory of Planned Behaviour -Deterrence Theory -Protection Motivation Theory -Cognitive Moral Development -Diffusion of Innovation -Rational Choice Theory	All HCPs RP =433 participants	Saudi Arabia	Quantitative	Survey

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
23	(Kuo et al., 2021)	Hospital Staff's Adherence to Information Security Policy: A Quest for the Antecedents of Deterrence Variables	To investigate important factors influencing hospital staff's adherence to Information Security Policy (ISP)	Deterrence Theory	All HCPs RP = 299 participants	Taiwan	Quantitative	Survey
24	(Lee and Seomun, 2021)	Structural model of the healthcare information security behaviour of nurses applying protection motivation theory	To create and prove a model of nurses' healthcare information security (HIS).	The protection motivation theory (PMT)	RP = 252 nurses	South Korea	Quantitative	Questionnaire
25	(Sari et al., 2022)	Information Security Behaviour in Health Information Systems: A Review of Research Trends and Antecedent Factors	To review the literature on antecedent factors of information security related to the protection of health information systems (HISs) in the healthcare organization.	-	All HCPs	Performed in Indonesia	Systematic Review	-

Table 6: Summary of the studies

N	Citation	Title	Aim	Theoretical Framework	Background		Research	
					Participants	Context	Design	Tools
26	(Kim et al., 2022)	Prosocial rule breaking on health information security at healthcare organisations in South Korea	to understand home healthcare nurses' current experiences in obtaining outside clinical information at the point of care and the type of clinical information they most desire in their patients' health information exchange profile	Prosocial Rule Breaking (PRB)	RP = student nurses 153	South Korea	Lab Experiment (scenario)	Questionnaire
27	(Kang et al., 2023)	Nurse information security policy compliance, information competence, and information security attitudes predict information security behaviour	To investigate the relationships between nurses' information security policy compliance, information competence, and information security attitudes, which are factors that influence information security behaviour.	Theory of Planned Behaviour (TPB)	RP= 200 clinical nurses	South Korea	Quantitative	Questionnaire
Note: P = population, RP = represent population, R = rate. Several studies did not provide details regarding the study' population.								

This review explored compliance intention, attitude, perception and awareness, and protection intention and violation intention. The extracted articles from Table 6 were categorised based on each study's objective and the researcher's understanding of the articles (see Table 7). This categorisation helped in simplifying the findings and rendering them more concise, enabling easy recognition of the highlighted key concepts from the literature. The majority of the studies included in this review measured HCPs' BI towards EHR data privacy. They were grouped into four groups: compliance intention group, attitude, perception and awareness group, and protection intention and violation intention (see Table 7). Twelve of the studies focused on the HCPs' compliance intention factors that contributed to follow the EHR data privacy policy. Ten of the studies focused on HCPs' attitudes, perceptions, and awareness toward the EHR privacy policy. Three studies focused on the HCPs' protection intention (i.e., intention to protect EHR data). Finally, two studies focused on the HCPs' violation intention toward the EHR policy (see Table 7). The next section presents and discusses the drivers and barriers influencing HCPs' intention regarding EHR data privacy policy.

Table 7: Study categories based on BI

BI	Included Studies	No.	%
Compliance intention	(Sher et al., 2017b) (Johnston and Warkentin, 2008) (Foth et al., 2012) (Kuo et al., 2018) (Kuo et al., 2019) (Lapke et al., 2017) (Kuo et al., 2017) (Humaidi and Balakrishnan, 2018b) (Alanazi et al., 2020) (Kuo et al., 2021) (Sari et al., 2022) (Kang et al., 2023).	12	46.15%
Attitude, perception and awareness	(Angst and Agarwal, 2006) (Angst and Agarwal, 2009) (Entzeridou et al., 2018) (Saito et al., 2017) (Eikey et al., 2015) (Holen et al., 2018) (Fernández et al., 2015) (Kessler et al., 2020) (Ozer et al., 2020) (Kim et al., 2022)	10	34.6%
Protection intention	(Ma et al., 2016) (Sher et al., 2017a) (Lee and Seomun, 2021)	3	11.5%
Violation intention	(Foth, 2017) (Altamimi et al., 2018)	2	7.6%

2.8. Scoping Review First Objective: Factors Influencing HCPs' BI Toward EHR Data Privacy

The extracted studies from the review indicated some of the individual, social, and organisational factors that were major influencers of HCPs' BI regarding EHR's privacy policy. Foth (2017) stated that behavioural factors played an essential role in the HCPs' compliance intention with EHR data privacy policy and regulations. However, Chua et al. (2017) argued

that these factors differ from context to context, and from country to country. In the following subsections the driving and barrier factors covered in the reviewed studies are reported.

2.8.1. Drivers

2.8.1.1. Gaining Personal Benefit

Gaining personal benefit and personal recognition is one of the drivers that led to higher compliance intention to data protection regulations (Foth, 2017, Kuo et al., 2018, Sher et al., 2017a, Alanazi et al., 2020). Lapke et al. (2017) reported that HCPs try to protect health information if they feel appreciated for their compliance. This implies that healthcare organisations that use ICT within their premises need to create a rewarding environment to encourage the system's end users to follow the rules. Kuo et al. (2018) found that a hospital staff member's habit was positively connected to the continuous intention to follow data protection regulations. Hence, if an organisation succeeds in building a rewarding system and makes it a habit for the workers, the data protection regulations and policies are less likely to be violated (see Table 8).

2.8.1.2. Resource and Training Availabilities

Resource availability is another factor that facilitates a higher level of compliance with data protection regulations (Foth, 2017, Kuo et al., 2018, Alanazi et al., 2020). According to Ma et al. (2016) indicated that the availability of software and hardware that are affiliated with the hospital EMR system encouraged privacy protection behaviour among nurses in Taiwan. Moreover, training and availability of information have been shown to be essential for a high level of adherence to data protection regulations among HCPs in Germany (Foth, 2017) (see Table 8).

2.8.1.3. Social Influence

Social influence is an important factor that affects HCPs' BI to follow data privacy policy and regulations (Foth, 2017, Ma et al., 2016, Foth et al., 2012, Sher et al., 2017b, Kuo et al., 2017). According to Kuo et al. (2017) and Ma et al. (2016), nurses were more likely to influence other nurses not to commit an unlawful acts if they knew how to utilise the EMR. Sher et al. (2017b) affirmed that peer influence between IT staff in hospitals and adherence to privacy policy was effective, but this depended on how the management handled and valued the privacy environment in the hospital. On the other hand, Foth (2017) argued that peer influence was low among HCPs regarding adherence to data protection rules. Many scholars agree that supervisors

and top management and peers have a significant influence on the intention of HCPs to accept the data privacy policy and regulation (Foth, 2017, Ma et al., 2016, Foth et al., 2012, Sher et al., 2017b, Kuo et al., 2017). Thus, information security social pressure in health settings exerts a clear impact on HCPs' behaviour (Kessler et al., 2020) (see Table 8).

2.8.1.4. System Monitoring and Consequences

EHR monitoring was considered to be a driver for the HCPs' compliance. According to Kuo et al. (2019), HCPs could be deterred to not violate the EHR privacy policy if the policy stated and communicated to them that the IS was actively monitored, and that any unethical or illegal activities and non-compliance would be detectable by using an audit trail. Kuo et al. (2017) stated that nurses' intentions to violate EMR privacy policy could be deterred if their organisations audit and inspect employee use of the EHR, as this made them feel accountable for their actions. Moreover, the severity and certainty of sanctions were effective in reducing non-compliance behaviour towards data privacy policy among HCPs within healthcare organisations (Kuo et al., 2019, Kuo et al., 2017). Sher et al. (2017b) reported that IT staff had the intention to protect EHR data increased when they thought that they might lose their jobs in the case of a data breach. Thus, the more HCPs are worried about the consequences of violating data policy, the more likely they are to follow EHR policy privacy.

In contrast, Altamimi et al. (2018) argued that sanction and punishment tactics sometimes cannot solely prevent the HCPs' violation behaviour towards EHR data privacy. Furthermore, while Kuo et al. (2019) suggested that if health organisations monitor their HCPs' activities on the computer, this can reduce inappropriate system usage behaviour, they also stated that routine computer monitoring might influence HCPs' performance negatively due to feelings of suspicion, which could increase pressure on them (see Table 8).

2.8.1.4.1. Resource Availability, Social Influence, and System Monitoring in Health Organisations

The concepts of resources availability, social influences and system monitoring are mutually complementary and interrelated, and all of them can collectively create a supportive environmental culture within healthcare organisations to encourage HCPs' compliance with the EHR privacy policy. Providing adequate computers to HCPs can potentially decrease their need for sharing the devices with others, which can potentially decrease the risk of involuntarily privacy breaches (Foth, 2017). Contemporaneously, social pressure and computer monitoring

conducive to compliance would still apply, regardless of the device used (Kuo et al., 2019, Kuo et al., 2017, Kessler et al., 2020). This could foster a culture and technical privacy awareness and social accountability in the facility, which could enhance the HCPs' compliance with the EHR privacy policy.

2.8.2. Barriers

2.8.2.1. Compliance with the Policy Increases Workload

Workload is a key barrier to HPCs' compliance with the policy. Kuo et al. (2018) argued that the compliance with EHR data privacy policy sometimes has an invisible pressure on HCPs. Holen et al. (2018) found that HCPs were concerned about complying with privacy and security regulations, which affected workflow, even if encouraged to provide care services. Also, Foth (2017) indicated that there was a major concern about HCPs' compliance with data protection within health organisations due to the wide range of EHR usage, which increased the workload and changed the workflow (Foth et al., 2012).

Angst and Agarwal (2006) asserted that HCPs are concerned that privacy issues might obstruct their work routine, which can cripple the system usage that has been implemented. Interrupted workflow because of complying with the EHR policy caused some HCPs to adopt habitual behaviours such as walking away from computers without logging off or copying patient information, even though they were aware of the pertinent privacy regulations (Eikey et al., 2015, Kessler et al., 2020). In this vein, there were some beliefs that the quality of healthcare services (i.e., clinical care) would be undermined by stringent information privacy protection regulations (e.g., if HCPs had to devote more time to logging off the system etc.).

2.8.2.2. Lack of Computer Skills

A lack of computer skills – such as logging in and off from the system and changing passwords – can hinder HCPs from properly running the electronic health system. According to Ma et al. (2016), nurses were concerned about their technical abilities to guard EMR data privacy. Sher et al. (2017b) suggested that hospitals should equip HIM staff with suitable and sufficient skills to operate software and hardware in a way that ensures data privacy is protected. Sher et al. (2017a) found that when IT staff at the hospital feel that the management counted on their skill to protect EMR data, their compliance intention to data regulations increased accordingly.

Table 8 is a summary of all the factors drawn from the literature. It shows the drivers and barriers identified and links these factors to the extracted theoretical frameworks' constructs. This table informs the process of selecting the theoretical framework for this study, as explained in the following chapter.

Table 8: Drivers and barriers

Drivers and Barriers	Relationship with Constructs	Model Constructs	Definition	Studies
1- Gaining a personal benefit and personal recognition	An advantage for the recipient or anything the recipient considers to be a gain or advantage.	**Perceived usefulness**	This refers to the extent to which the employee believes that using a specific application increases his or her job performance (Davis, 1989).	(Kuo et al., 2018) (Foth et al., 2012)
2- Resource and training availabilities	**Resources availability** is the access to the right resources for a given project at a given time with the necessary skill sets (in case of people) or the necessary technology (in case of nonhuman resources).	**Facilitating conditions**	This implies degree to which an individual believes that organisational and technical infrastructure exists to support the use of a system (Venkatesh et al., 2003).	(Kuo et al., 2018, Ma et al., 2016, Holen et al., 2018)
3- Social influence (co-workers and supervisors)	**Social influence** is the change in behaviour that one person causes in another, intentionally or unintentionally, as a result of the way the changed person perceives themselves in relationship to the influencer, other people and society in general.	**Subjective norm (peer and supervisors)**	This is one's perceived expectation from employee's key referents to perform the behaviour of interest (Ajzen, 1991).	(Sher et al., 2017b, Ma et al., 2016, Foth et al., 2012, Holen et al., 2018, Foth, 2017, Kuo et al., 2017)
4- System monitoring and consequences	**Fear of being caught violating regulations:** feeling surveyed and susceptible to detection. **Threat of being punished:** Employees know that the law and regulation state the consequences of breaking the law and feel threatened.	**Detection certainty** **Punishment severity**	Processes detecting data breaches (Li et al., 2010). Preventing individuals from criminal behaviour; understanding consequences (Williams and Hawkins, 1986, Straub and Welke, 1998, D'Arcy et al., 2009).	(Foth, 2017, Sher et al., 2017b, Sher et al., 2017a, Kuo et al., 2017)
5- Workload (compliance with the policy increases workload)	A strict policy increases workload and makes it hard for an employee to perform tasks easily	**Perceived ease of use**	The extent to which the employee believes that performing a behaviour of interest is free of effort (Davis, 1989).	(Ma et al., 2016, Foth et al., 2012, Kuo et al., 2018)
6- Lacking computer skills	**Lacking computer skills** is the inability to utilise computers and technology efficiently.	**Self-efficacy**	The belief in employee's capabilities to execute the course of action required to perform particular behaviours.	(Sher et al., 2017b, Ma et al., 2016, Johnston and Warkentin, 2008, Sher et al., 2017a)

2.9. The Scoping Review's Second Objective: Theoretical Frameworks Used by other Studies

This objective of the scoping review is to explore the theoretical frameworks that were used to examine the HCPs' compliance behaviour toward the EHR privacy policy in related studies. This objective was set to help in selecting a theoretical framework for our research. Thus, steps were set up based on what came out from the scoping review, to ensure selection of the most relevant model for the research. The first step, previously stated, was the first objective of the scoping review: to reveal several driver and barriers factors (see Table 8). Then, these factors from Table 8 were analysed in order to screen out the extracted models to help in selecting a model for this project. Finally, the researcher discusses pertinent theoretical frameworks and theories in Chapter 3, to make sure that the most relevant theoretical framework was selected for the study. The extracted theories from the scoping review are presented in brief in **Error! R eference source not found.**, showing the frameworks' aims, summaries, relevance to the field, and brief critique.

The scoping review revealed that 21 out of 27 articles used at least one theoretical framework (see Table 9). This resulted of 18 theories and theoretical frameworks were used to investigate the HCPs intention to comply with the EHR privacy policy (see Table 10). The endless technology adapting and changing in businesses models poses a huge threat to businesses in relation to data breaches (Lai, 2016), but novel services needed to be offered to customers. Many theories and theoretical models of behaviour and technology acceptance have been used to examine the HCPs' BI to comply with the EHR privacy and security policy. These theories and theoretical models have been widely deployed in healthcare and educational research to investigate technology end-users' intentions (Anderson and Schwager, 2003). Most studies analysed in this scoping review used more than one theoretical framework, which were adopted from different fields – such as psychology, criminology, and technology disciplines. However, it was found that the most frequent theoretical frameworks used in HIS field to predict BI were two models: TPB and Deterrence Theory (DT) (see Table 10). All extracted theoretical frameworks and theories are discussed and evaluated in Chapter 3 in detail.

Table 9 shows the extracted theories that were used in examining the HCPs' compliance intention toward the EHR privacy policy. It shows the theories constructs and other information that extracted from the study.

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background / Participants	Summary
1	(Altamimi et al., 2018)	Intention to violate hospital information privacy policies	0.374	Neutralisation: appeal of higher loyalty, condemn of condemners, denial of injury, defence of necessity, defence of necessity, denial of responsibility, metaphor of ledger	Neutralisation Theory	Medical interns P = 66 PR = 62 R = 93.9%	-Small sample cannot verify if the theory is a perfect fit to predict intention. -R^2 is low, but it is significant. -Focusing on criminology side.
2	(Foth, 2017)	Data-Protection compliance	0.508 TPB = 0.472 F = 0.560 M = 0.440	Attitude, subjective norm, perceived behavioural control (PBC) (punishment severity, detection certainty)	-Theory of Planned Behaviour -General Deterrence Theory	All staff P = 557 PR = 349 R = 62.6%	-TPB: Predicts its' factors, with moderate $R^2 = 0.47$ -GDT: factors did not show effect. -Gender: showed difference between male = 0.44 and female = 0.56 Response rate: above moderate = 62.6%
3	(Angst and Agarwal, 2006)	Attitude change	-	Argument quality, issue involvement, CFIP	-Elaboration Likelihood Model -Concern for Information Privacy	Clinician caregivers and patient s (102 high-involvement, 264 low-involvement)	-No mention of R^2 in results. -Only focuses on change attitude.
4	(Angst and Agarwal, 2009)	Opt-In intention: Post-Attitude	0.876 ELM = 0.255	Argument frame, issue involvement, CFIP	-Elaboration Likelihood Model	Health professionals P = 366	-Overall $R^2 = 0.88$ is high, but ELM $R^2 = 0.25$ is low, but significant. -Only focuses on change attitude.

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background / Participants	Summary
5	(Foth et al., 2012)	Intention to comply with data protection regulations	0.482	Attitude, subject norms, perceived usefulness, perceived ease of use (data protection level: perceived severity of data abuse, perceived probability of data abuse)	-Technology Acceptance Model -Theory of Planned Behaviour	Administrative staff, nursing staff, physicians, physicians with scientific/research-Based work and other health professionals at 26 hospitals P = 557	First time to use TAM for BI with R^2 = 0.48. -Needs more testing to validate model, even though model appropriate. -Combined two models, focused on TAM. -TPB was only used to draw questions to examine participants.
6	(Johnston and Warkentin, 2008)	HIPAA compliance behaviour	0.37	Behavioural intent, self-efficacy Perceived organisational support: organisational status (size), occupational Type	Amalgamation - Theory of Planned Behaviour, Technology Acceptance Model, UTAUT, models of Self-Efficacy and Perceived Organisational Support	All staff (employees) of organisations that provide healthcare services to individuals (patients). P = 208	-Used several theoretical frameworks, R^2 = 0.37 considered significant but low.

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background / Participants	Summary
7	(Kuo et al., 2018)	Continuance of privacy policy compliance intention	0.87	Habit, self-Efficacy, satisfaction, perceived usefulness, facilitating conditions	Self-Determination Theory	HCPs Administrative staff P = 350 PR = 320-Valid = 312 R = 93.33%	-SDT: high R^2 = 0.87, considered significant to predict dependent factor. -Only highlights motivation side.
8	(Kuo et al., 2019)	Intention to comply	0.663	Sanction severity, sanction certainty, computer monitoring	Deterrence Theory	HCPs Administrative staff P = 350 PR = 310 (valid = 303) R = 88.57%	-DT R^2 = 0.66, above moderate, significant to predict dependent factor. -Focuses on punishment side

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background / Participants	Summary
9	(Kuo et al., 2017)	Intention to violate privacy policy	0.65	punishment severity, punishment certainty, detection certainty, subjective norm	Deterrence Theory	Nurses P = 300 PR = 280 (valid 262) R = 93.33%	-DT: above moderate R^2 = 0.65, significant to predict dependent factor. -Focuses only on punishment side
10	(Lapke et al., 2017)	**Revealing:** Exoteric Redemptive **Withholding:** Political Protective	-	Exoteric revealing, Redemptive revealing, Political withholding, Protective withholding	Information Boundary Theory	Physicians, nurses, and hospital administrators PR = 148	-Did not mention R^2 in results. -Only focused on motivation of revealing or withholding valid information. -Most independent factors non-significant
11	(Ma et al., 2016)	BI	0.82	Attitude: (perceived usefulness perceived ease of protection, compatibility), Subjective norm: (peer influence, superior influence) PBC: (self-efficacy, facilitating conditions)	Decomposed Theory of Planned Behaviour	registered nurse P = 474 PR = 302 R = 63.7%	DTPB model's R^2 was significantly high, with 82%. -Only tested one group. -Focused on BI. -Covered more than one aspect. -Used only one theoretical framework.

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background / Participants	Summary
12	(Sher et al., 2017a)	Intention to protect EMR privacy	0.45	Perceived barriers, self-efficacy, cues to action, perceived susceptibility, perceived severity, perceived benefits	Health Belief Model	HIM staff P = 240 PR = 209 R = 87.08%	HBM's R^2 was significantly moderate, with 0.45. -Did not account for other factors influencing health behaviour. Environmental factors outside an individual's control may prevent engagement in desired behaviours -Did not consider the impact of emotions on health-related behaviour.
13	(Sher et al., 2017b)	BI	0.75	Threat appraisal: (fear arousal, perceived vulnerability, perceived severity); Coping appraisal: (response efficacy, self-efficacy, response cost, subjective norm)	Protection Motivation Theory Theory of Reasoned Action	Hospital IT staff P = 240 PR = 209 R = 87.08%	PMT's R^2 significantly high (75%), indicating high degree of validation for theoretical framework.

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background / Participants	Summary
14	(Holen et al., 2018)	User behavioural-BI	-	Performance expectancy, effort expectancy, social influence and facilitating conditions	Unified Theory of the Acceptance and Use of Technology	Inter-Municipal health-Or social service delivery, either as project leaders, employees of an inter-Municipal team, or as persons related to the ICT aspects of inter-Municipal services (n = 18)	-Did not give further details.
15	(Humaidi and Balakrishnan, 2018a)	User Compliance Behaviour	0.52	perceived behavioural control (self-efficacy (SE) and management support components) and the trust factor	Theories of Planned Behaviour	RP = 454 HCPs	The model has R2 = 0.52, considered a moderate in predicting the dependent factors.
16	(Kessler et al., 2020)	ISCI, information security motivation, and information security behaviours	-	Information Security Climate (Practices, Importance, laxness), Demography (Occupational category)	Organisational Climate literature and Information Security Climate Index	HCPs: nursing assistants (CNAs), dentists, pharmacists, physician assistants (PAs)	-Did not give further details.

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background Participants	Summary
17	(Alanazi et al., 2020)	Information security compliance behaviour	0.78	Cost of compliance/ noncompliance	Rational Choice Theory, Cognitive Moral Development, Diffusion of Innovation	RP = 433 HCPs	-Did not give further details.
18	(Kuo et al., 2021)	Intention to comply with the hospital information security policy	0.7	Management support Punishment severity Security, education, training, and awareness programmes auditing effectiveness Punishment certainty	Deterrence Theory	RP = 299 HCPs	DT has R2=0.7, above the moderate, which was significant to predict the dependent factor. -It focuses on punishment side
19	(Lee and Seomun, 2021)	Securing patients' healthcare information (DSB)	0.77	HIS intention, threat appraisal (intrinsic rewards, extrinsic rewards, severity, vulnerability), Coping appraisal (response efficacy, self-efficacy, response costs)	The protection motivation theory	RP = 252 Nurses	The model has R2=0.77, considered a significant to predict the dependent factor

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background / Participants	Summary
20	(Kim et al., 2022)	Prosocial intention to disclose patient's health information	0.89	Disease severity, impact on others (family and patient), impact on the self situational empathy, responsibility to disclose, control variable (gender, age, academic year, rule awareness)	Prosocial Rule Breaking	RP = 153 student nurses	The model has R2=0.89, considered a significant to predict the dependent factor
21	(Kang et al., 2023)*	Information Security Policy Compliance Behaviour	0.94	Information security policy compliance Informatics Competence Information Security Attitude	Theory of Planned Behaviour	RP =200 clinical nurses	The model has R2=0.94, considered a significant to predict the dependent factor.
1	(Altamimi et al., 2018)	Intention to violate hospital information privacy policies	0.374	Neutralisation: appeal of higher loyalty, condemn of condemners, denial of injury, defence of necessity, defence of necessity, denial of responsibility, metaphor of ledger	Neutralisation Theory	Medical interns P = 66 PR = 62 R = 93.9%	-Small sample cannot verify if the theory is a perfect fit to predict intention. -R^2 is low, but it is significant. -Focusing on criminology side.

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13	(Sher et al., 2017b)	BI	0.75	Threat appraisal: (fear arousal, perceived vulnerability, perceived severity); Coping appraisal: (response efficacy, self-efficacy, response cost, subjective norm)	Protection Motivation Theory Theory of Reasoned Action	Hospital IT staff P = 240 PR = 209 R = 87.08%	PMT's R^2 significantly high (75%), indicating high degree of validation for theoretical framework.
14	(Holen et al., 2018)	User behavioural-BI	-	Performance expectancy, effort expectancy, social influence and facilitating conditions	Unified Theory of the Acceptance and Use of Technology	Inter-Municipal health-Or social service delivery, either as project leaders, employees of an inter-Municipal team, or as persons related to the ICT aspects of inter-Municipal services (n = 18)	-Did not give further details.

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background Participants	Summary
15	(Humaidi and Balakrishnan, 2018a)	-		perceived behavioural control (self-efficacy (SE) and management support components) and the trust factor	Theories of Planned Behaviour	RP =454 HCPs	-
16	(Kessler et al., 2020)	ISCI, information security motivation, and information security behaviours	-	-	Organisational Climate literature and Information Security Climate Index	HCPs: nursing assistants (CNAs), dentists, pharmacists, physician assistants (PAs)	-Did not give further details.
17	(Alanazi et al., 2020)	Information security compliance behaviour	0.78	Cost of compliance/ noncompliance	Rational Choice Theory, Cognitive Moral Development, Diffusion of Innovation	RP =433 HCPs	-Did not give further details.
18	(Kuo et al., 2021)	Intention to comply with the hospital information security policy	0.7	Management support Punishment severity Security, education, training, and awareness programmes auditing effectiveness Punishment certainty	Deterrence Theory	RP =299 HCPs -	DT has R2=0.7, above the moderate, which was significant to predict the dependent factor. -It focuses on punishment side

Table 9: Comparison of theoretical models used in reviewed studies

N	Citation	Dependent Variable	R^2	Significant Predictors	Theory	Background Participants	Summary
19	(Lee and Seomun, 2021)	-	-	-	The protection motivation theory	RP =252 Nurses	-
20	(Kim et al., 2022)	-	-	-	Prosocial Rule Breaking	RP =153 Student nurses	-
21	(Kang et al., 2023)*	-	-	-	Theory of Planned Behaviour	RP =200 clinical nurses	-
Note: P = population, RP = represent population, R = rate. Several studies did not provide details regarding the study' population							

Table 10: List of theories and theoretical models used in the included studies

Theories and Theoretical Frameworks	Frequency	Studies from Scoping Review
1. Protection Motivation Theory (PMT)	2	(Sher et al., 2017b, Lee and Seomun, 2021)
2. Neutralisation Theory (NT)	1	(Altamimi et al., 2018)
3. Prosocial Rule Breaking (PRB)	1	(Kim et al., 2022)
4. Elaboration Likelihood Model (ELM)	2	(Angst and Agarwal, 2006) (Angst and Agarwal, 2009)
5. Self-Determination Theory (SDT)	1	(Kuo et al., 2018)
6. Information Boundary Theory (IBT)	1	(Lapke et al., 2017)
7. Health Belief Model (HBM)	1	(Sher et al., 2017a)
8. Cognitive Moral Development (CMD)	1	(Alanazi et al., 2020)
9. Rational Choice Theory (RCT)	1	(Alanazi et al., 2020)
10. The Information Security Climate Index and Organisational Climate Literature	1	(Kessler et al., 2020)
11. Concern For Information Privacy (CFIP) Construct	1	(Angst and Agarwal, 2006)
12. Theory of Reasoned Action (TRA)	1	(Sher et al., 2017b)
13. Theory of Planned Behaviour (TPB)	6	(Foth, 2017, Foth et al., 2012, Johnston and Warkentin, 2008, Kang et al., 2023, Kim et al., 2022, Humaidi and Balakrishnan, 2018a)
14. Decomposed TPB (DTPB)	1	(Ma et al., 2016)
15. Deterrence Theory (DT)	4	(Foth, 2017, Kuo et al., 2017, Kuo et al., 2019, Kuo et al., 2021)
16. Technology Acceptance Model (TAM)	2	(Foth et al., 2012, Johnston and Warkentin, 2008)
17. Diffusion of Innovation (DoI)	1	(Alanazi et al., 2020)
18. Unified Theory of the Acceptance and Use of Technology (UTAUT)	2	(Johnston and Warkentin, 2008, Holen et al., 2018)

2.10. The Scoping Review's Third Objective: Knowledge Gap

The scoping review's results indicated that there are fewer studies conducted on the factors that influence HCPs' BI toward EHR data privacy globally. Most of the studies on this topic were conducted in more recent years – between 2015 and 2023 – which indicates that researchers are becoming more interested in this field (see 2.7, Table 5). Kuo et al. (2018) in Taiwan and Sher et al. (2017b) in the USA asserted that researchers need to perform more studies to understand the factors that influence HCPs' BI towards EHR data privacy in different contexts. These factors change from facility to facility, and from country to country, due to prevailing socio-cultural differences and divergent regulations (Eikey et al., 2015). Hence, there is an

opportunity to fill this gap by conducting more research on different HCPs groups (including in Saudi Arabia in the context of this study).

Saudi Arabia has recently made significant developments in the healthcare sector, especially with the automation of the HIS. This automation posited a risk towards data privacy issues because of HCPs' behavioural activities. The rapid adoption of EHR is raising concerns among healthcare organisations toward data privacy in Saudi Arabia. The authorities are imposing privacy regulations and policies to mitigate the EHR flaws (Almarhabi, 2016), but little is known regarding the HCPs' compliance behaviour toward the EHR privacy policy in Saudi Arabia, and only two studies explored HCPs in this field to the best of our knowledge (Altamimi et al., 2018). They suggested that more studies needed to conduct to explore the factors that influence the HCPs' BI towards EHR data privacy in the country. Awareness and understanding of the drivers and barriers that influence nurses' BI regarding EHR data privacy would aid future research to shape interventions for this context.

The scoping review also reveals that quantitative approaches dominate research on compliance intentions in EHR data privacy policy, which is considered to be a complicated field. Researchers suggest a different approach other than quantitative to understand the investigated issue from a different perspective is needed (Altamimi et al., 2018). Therefore, this project used the Q-Methodology, which is an independent methodology generally considered analogous to a mixed-method approach, to fill this gap. This methodology captures the nurses' subjectivity in a systematic way, meeting the strong need for more investigations regarding the factors that influence nurses' compliance intention toward EHR privacy policy in local contexts such as Saudi Arabia.

This project targets one vital group, nurses in Saudi Arabia, as studies on data privacy have not yet been conducted among these particular HCPs. Researchers have recommended that future research in terms of BI with respect to health information privacy should focus on one occupational group inside the hospital (Foth, 2017, Holen et al., 2018). Nurses represents a large portion of HCPs (Top and Gider, 2012), and they play a critical role in providing healthcare services directly to patients (Musen and van Bemmel, 1997). The implementation of the EHR at hospitals has changed nurses' daily routines, as they can access and complete a patient's confidential information through the EHR (Kerr, 2009). Thus, exploring the drivers and barriers that influence nurses' compliance intention to EHR privacy policies – which will ultimately help healthcare organisations to provide an enabling environment for nurses to

follow these policies. In recent years, the body of literature on this topic has increased, which shows the importance of HCPs' BI to adhere to privacy policy (Ma et al., 2016, Foth, 2017). Overall, this study's results contribute to the body of the literature that researchers can use for future inquiries.

2.11. Aims, Objectives, and Research Questions

This research aims to explore the behavioural factors that motivate or hinder nurses' intentions to follow EHR data privacy regulations in Saudi Arabia. This will be executed by exploring the nurses' various beliefs, attitudes, and perceptions.

2.11.1. Research Question

What are the behavioural factors that influence nurses' compliance intentions toward EHR data privacy policy?

2.11.2. The Objectives of the Study

1. To develop and apply the Q-Methodology using nurses in Saudi Arabia as participants to explore the behavioural factors that influence the nurses' compliance intentions towards EHR data privacy policy in a real-world context.
2. To provide recommendations based on the findings of the study that can be used by management, stakeholders, and authorities when adopting new technology or writing a new EHR privacy policy.

2.12. Relationship Between Scoping Review Outcomes and Chosen Methodology

This section shows the how the scoping review's outcomes inform the chosen Q-Methodology of this study. To begin, the scoping review directly contributes to the Q-Methodology in terms of generating the concourse, which is a foundational aspect of Q-Methodology. The concourse is a series of statements that represent a basic understanding of the researched phenomena, formed by collecting varied types of information, frameworks, and theories in a particular field (Van Exel and De Graaf, 2005, Ramlo, 2016b). Thus, to generate the concourse, the scoping review outcomes were used to create the concourse statements. Then, this concourse went through iterative processes to establish a Q-Set, which was used to perform the Q-Sorting experiment on participants (Hayne, 1998). More details about the Q-Methodology steps can be

seen in section 4.3.4. The drawn concourse statements can be seen in Appendix 2.2: Concourse Generation and Q-Set Process.

Moreover, one of the intentions of the scoping review was to indicate what methodologies were used in the existing literature that investigated the compliance behaviour topic. As shown in Table 6, the quantitative methodology comprises the majority of studies in the existing literature. Some scholars from the current literature advised using a different approach (e.g., mixed method) than that of quantitative methodology, which may reveal new perspectives and results or at least verify their findings (Foth, 2017, Ma et al., 2016). Therefore, the researcher selected the Q-Methodology because it has an advantage in exploring the nurses' subjectivities regarding compliance intention toward EHR privacy policy in a more holistic way than other methodologies. More justification for the methodology of this study is presented in Chapter 4.

2.13. Summary

The scoping review identified 27 studies relevant to the subject, based on searching seven databases, using the PRISMA 2020 flow process to screen and extract records. These studies were conducted in different geographical areas and contexts. Six major factors were extracted from the scoping review; gaining personal benefits, resources and training availabilities, social influence, system monitoring, the policy increases workload, and lack of computer skills. These factors were used to direct the researcher's focus to select a suitable framework for this research from the 21 identified theoretical frameworks, as discussed in the next chapter.

CHAPTER 3
THEORIES AND THEORETICAL MODELS

This chapter presents and discusses the theoretical frameworks that were identified from the scoping review reported in the previous chapter. In addition, it presents the justifications of the selection of the theoretical framework for the current study. Finally, it shows the how the scoping review's outcomes inform the selected methodology deployed in this research. The following section presents 18 theories and theoretical frameworks used to investigate the HCPs' compliance with the EHR privacy policy identified from the scoping review. A visual presentation of the theories and theoretical frameworks can be seen in Section 2.9, Table 10.

3.1. Theories and Theoretical Frameworks

3.1.1. Protection Motivation Theory (PMT)

The PMT illustrates how assessment processes when facing a perceived challenge or danger might affect a person's behavioural response in relation to protective motives (Rogers, 1975). The postulation in PMT is composed of two cognitive mediating components: (1) threat appraisal, which is the capability to assess the probability of the threat occurring and its severity; and (2) coping appraisal, which refers to the ability to deal with and avoid the perceived threat (see Figure 4). Moreover, fear arousal measures how much fear is inspired in the person perceiving the threat, which is an emotional reaction to threat appraisal that may cause the individual to undertake protective actions (Milne et al., 2000, Maddux and Rogers, 1983). However, as Rogers (1975) asserted, an individual may not engage in any protection behaviour, and PMT responses depend on the individual and particular work environment and situation. Sher et al. (2017b) applied the PMT to identify how HCPs might be driven to protect themselves when triggered by their assessment of a danger. This theory could be useful for understanding how HCPs can prevent EHR breaches and respond to them if they do occur.

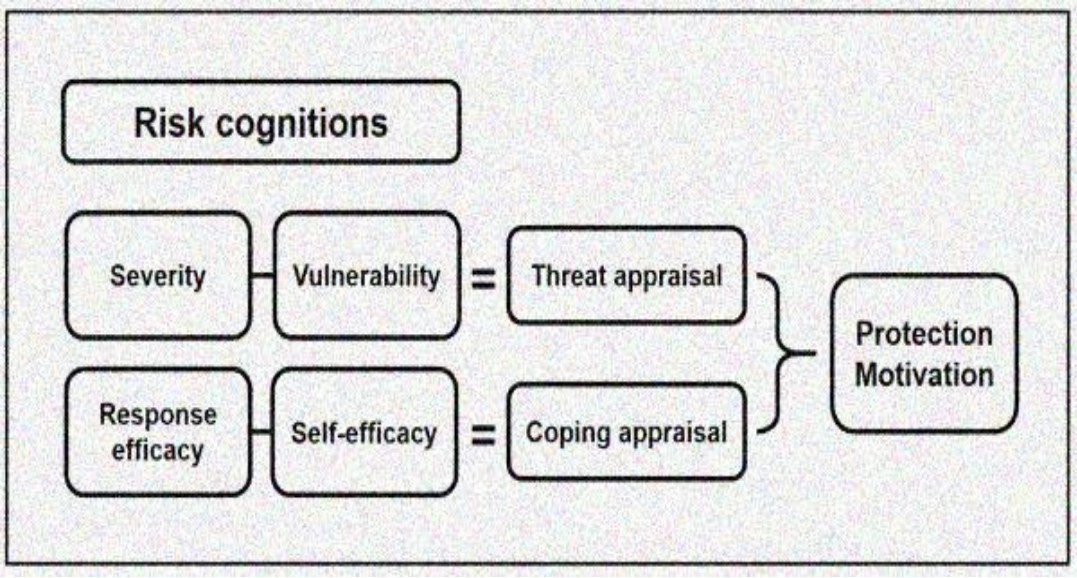


Figure 4: Drawing of Protection Motivation Theory (PMT)

Source: (Maddux and Rogers, 1983) cited in (Moran et al., 2018)

3.1.2. Neutralisation Theory (NT)

The NT pertains to the cognitive processes by which people bend the rules to reconcile committing crimes. It was initially developed as a way seeking to understand criminal behaviour among young people (Sykes and Matza, 1957). The NT postulates that criminals use different techniques to rationalise their illegal behaviour before or after committing a crime. In the NT, five techniques are used to describe the delinquency justifications among individuals who violate social norms: (1) denial of responsibility; (2) denial of injury; (3) denial of victim; (4) condemning the condemners; and (5) appeal to higher loyalties. This theory is widely used and cited in criminology science (Copes, 2003), but it is only focused on the criminal side of a person (Barlow et al., 2013). According to Minor (1981) NT fails to define an accurate causation relationship between the reason for acceptability and criminality, or to account for adolescents' moral assessments of criminal behaviour. However, Altamimi et al. (2018) applied the NT to identify the justifications that medical interns may use when they violate EHR privacy policy, ranging from what they might perceive to be innocuous oversights to active criminal activities.

3.1.3. Prosocial Rule Breaking (PRB)

PRB refers to the deliberate violation of a rule, policy, or prohibition with the goal of benefiting stakeholders (Morrison, 2006). Prosocial behaviours are activities that are carried out with the goal of promoting the well-being of others or a group (De Groot and Steg, 2009). The term

"rule" in this context refers to a clearly defined policy, ban, or regulation inside formal organisations or government bodies. These rules outline the duties and standards that members must follow in order to carry out their job effectively (Morrison, 2006).

Previous research on prosocial behaviour (Eisenberg and Spinrad, 2014, Penner et al., 2005) highlights the need of investigating the interaction between several elements related to prosocial behaviours and establishing a comprehensive and integrated knowledge. Previous research has revealed elements linked to circumstances, motivation, personal connections, and tendencies in PRB activities. Past research indicates that these variables have an impact on prosocial behaviour. However, Kim et al. (2022) try to use the PRB to provide a comprehensive understanding of the complex prosocial rule-breaking behaviours shown by student nurses, which involve the interplay of several factors.

3.1.4. Elaboration Likelihood Model (ELM)

The ELM was introduced by Petty and Cacioppo (1981). It refers to a dual mechanism theory that explains the changing of attitudes. It posits two persuasion routes that formulate attitudes – peripheral and central – which are anchored in opposing themes on a continuum reflecting the likelihood that cognitive effort will be required to process a message (Schumann et al., 2011). Persuasion processing massage takes place through the peripheral pathway when the possibility of elaboration is minimal (Cialdini et al., 1981). Persuasion via the peripheral route necessitates a minor cognitive effort, rather than relying on peripheral indicators such as integrity and heuristics (Cialdini et al., 1981)p. 365). On the other hand, the central route of persuasion requires a high likelihood of elaboration to process information, which leads to a stable attitude (Cialdini et al., 1981) p. 365). However, the ELM has been criticised for oversimplifying the central and peripheral persuasion paths (Petty and Cacioppo, 1986, Sunmade, 2008), which needs more experimental testing and improvement. Nevertheless, Angst and Agarwal (2006) used the ELM to measure factors causing HCPs to change their attitudes toward HIS privacy.

3.1.5. Self-Determination Theory (SDT)

The SDT is a micro theory that pertains to people's motivational behaviours and to what extent they need to innately psychologically for self-growth. It focuses on people's self-determination and self-motivation behaviours. Five minor theories emerged from the SDT paradigm: organismic integration, causality orientation, cognitive evaluation, basic needs, and goal

content theory (Reeve, 2012). The SDT distinguishes two types of motivation: intrinsic motivation, which refers to the enjoyment that a person gets from performing a specific behaviour; and extrinsic motivation, which comes from an outside reward, for example, when a person performs a specific action that results in a positive separable outcome (Van Assche et al., 2018). Kuo et al. (2018) used the SDT to examine HCPs' motivational intrinsic and extrinsic to comply with the EHR privacy policy.

3.1.6. Information Boundary Theory (IBT)

The IBT originated from research investigating the effect of surveillance technology on staff privacy (Stanton and Weiss, 2000). According to Petronio (1991), the model predicts an individual's motivation to divulge or refuse valuable information through the given rules of "boundary opening" and "boundary closure." The focus of boundary opening was on two things: "exoteric" data disclosure, to earn or consolidate profits; and "redemptive" data disclosure to avoid or alleviate losses. Boundary closure focuses on the "political" – such as withholding information to earn or consolidate profits, while "protective" refers to information withheld in an attempt to avoid or minimise damage. The IBT was used to predict HCPs' motivation to disclose or conceal the health information (Stanton and Weiss, 2000).

3.1.7. Health Belief Model (HBM)

The HBM is a model that focuses on health behaviour change, and which focuses on an individual's social and psychological aspects (Strecher and Rosenstock, 1997)p. 113). It emerged from theories in cognitive psychology in the early 20th century (Glanz et al., 2015)p. 76). It postulates that people's beliefs regarding health problems illustrate their engagement in health prompting behaviour (Becker et al., 1978). The HBM's constructs are: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, self-efficacy, and other variables such as social and demographical factors (Strecher and Rosenstock, 1997)p. 114). This model seeks to forecast an individual's health-related behaviour (e.g., beliefs and attitudes) and does not count for a person's habitual behaviour. It is mainly focused on behaviour related to the eponymous dimension of health. When applying this theory to investigate HCPs' compliance behaviour with EHR privacy policy, HCPs may form a coping response to potential EHR breaches by taking measures to safeguard EHR privacy and prevent such breaches altogether.

3.1.8. Cognitive Moral Development (CMD)

CMD *per se* is referred to as social constructions of what is perceived to be moral; it represents the progressive evolution of a person's sense of what is right and wrong, shaped by their religious or ethical beliefs, societal views, and history of behaviour (DeSantis, 2020). The theory pertains to the application of fundamental concepts to decide the appropriate course of action in a given circumstance. Moral judgement theory comprises six phases spread over three stages: pre-conventional (Phases 1 and 2), conventional (Phases 3 and 4), and post-conventional (Phases 5 and 6). These phases relate to variables in society, cultural backgrounds, a person's norms, and prevailing rules (Myyry et al., 2009). According to Kohlberg's theory of justice, which underpins CMD (Kohlberg and Hersh (1977), these phases reflect changes in someone's framework of thought about ethics and moral reasoning over time, in response to their experiences and active cognition.

The theory claims that a person's progression via these phases ought to continually move forward, due to every phase being implicitly built upon and incorporating the knowledge acquired in previous phases. In addition, there is no assurance that a person will ultimately achieve the third and ultimate phase (DeSantis, 2020). Gilligan (1993) criticised Kohlberg's theory of justice on the grounds that it represents a male-centric approach to a problem, embedding physiological and cognitive implications of the male voice (e.g., a predisposition toward the "rational" and a relatively dearth of empathetic consideration), therefore ethical choices arising from this voice may emphasise defending the rights of others and upholding justice. Conversely, the female voice is care-oriented and centred on the requirements of others – consequently, the protection of relationships with others is emphasised in moral decision making. Therefore, the theory is criticised for not applying to females, because it only emphasises the male voice (Gilligan, 1993).

3.1.9. Rational Choice Theory (RCT)

The RCT is a set of rules and methods used by sociologists to understand a person's choices and behaviour. The method has been the standard in economics for quite some time, however, over the past few years, it has also found increasing use in the fields of sociology, politics, and anthropology. The RCT proposes that people evaluate advantages and disadvantages when contemplating alternatives on a rational "cost-benefit analysis" basis, sifting through "potential choices to reach a decision" (Scott, 2000). It also implies that rational self-motivated behaviour

will improve the economy as a whole. The RCT is based on three concepts: “rational actors, self-interest, and the invisible hand” (Levin and Milgrom, 2004).

The RCT theory is the idea that choices made by people will lead to the actions of society as a whole. People are motivated based on several simultaneous interests among the several possibilities they have. It assumes that these inclinations are “complete and transitive.” Completeness pertains to the person’s capability to state the choice they favour (i.e., they favour option A over option B, option B over option A, or are indifferent to both options). Alternately, transitivity occurs when a person poorly favours A over B and B over C, resulting in a decision that the person poorly favours A over C. Then, logically, a person will conduct an independent cost-benefit analysis based on a range of criteria in order to identify their optimal course of action (Scott, 2000).

Critics have argued that RCT overly simplifies people’s behaviour, because it assumes that people are always perfectly logical, and does not consider how feelings, social rules, and cultural factors affect their behaviour. For instance, Blau (1997) argued that the RCT cannot decipher the behaviour of individuals, but it demonstrates how the societal structure of the social setting affects a person’s life choices. Herfeld (2020) argued that rational choice theory arguments have been characterised by conflict and doubt regarding the object of study, and that there are multiple socioeconomic versions of RCT. The concept of instrumental rationality can be applied to a broad spectrum of societal scenarios, such as those in which a number of behavioural, informational, and cultural variables are supposed to impede rational decision-making. However, the RCT was used to predict the HCPs’ technology awareness and social aspects regarding health information security compliance (Alanazi et al., 2020).

3.1.10. The Information Security Climate Index (ISCI) and Organisational Climate Literature

The management of organisations plays a crucial role in the Information Security Policy Climate (ISPC), and the organisational climate is defined as a complex concept comprising several elements that can influence staff attitudes (Dong et al., 2021, Ifinedo, 2018). An effective organisational environment has a substantial impact on employees’ motivation to comply with data security policies. There are several organisational climate factors – such as the beliefs and controls of upper management – that can considerably impact the staff’s compliance with information security policy (Kessler et al., 2020, Ifinedo, 2018). Organisational climate is a complex element that entails accumulating traits that influence the

attitudes of workers either directly or indirectly. The organisational climate has had a significant impact on staff drives to obtain the best results (Neal et al., 2000). The constantly changing character of the organisational climate includes several factors with major impacts on attitudes among workers.

3.1.11. Concern for Information Privacy (CFIP) Construct

The CFIP scale was founded by Smith et al. (1996) in the field of offline direct advertising. It included 15 components and four dimensions: gathering, mistakes, secondary use, and unauthorised access to ISs. Each level reflected a privacy risk for a certain sort of information abuse. They reported that people disagreed in their concerns about (1) data collection (2) data representation (3) data usage for the reason it was collected, and (4) data use by an unauthorised outsider. They utilised this scale to assess a person's worry about organisational information privacy practices, since they deemed information privacy a significant ethical problem of this digital era. Angst and Agarwal (2006) used the CFIP constructs to predict the HCPs' attitudes and beliefs toward health information privacy.

3.1.12. Deterrence Theory (DT)

DT is commonly used in the IT field to explain employees' suspicious activities, or build systems to deter such activities (Lebek et al., 2013). The theory refers to the internal forces of fear in an individual that are created by external forces (i.e., law and regulations) and which deter people from performing unlawful activities (Hupert et al., 1996). Emerging from a criminology paradigm, DT was built upon the trade-off between profit and loss that any person should think about when trying to commit a crime (D'arcy and Herath, 2011). The DT model constructs that predict BI include punishment severity, certainty, and swiftness (see Table 11). Thus, deviant behaviours could be deterred by using these constructs (Williams and Hawkins, 1986). The model has succeeded in reducing unlawful behaviour among employees who work on the IS, which gives them access to sensitive information.

Three of the studies included in the scoping review (Chapter 2) used the DT model, which has been found to have high explanatory power for BI (Foth, 2017, Kuo et al., 2019, Kuo et al., 2017) (see Table 12). The theory has a drawback in that it focuses only on the deterrence side, and does not consider other behavioural factors (D'arcy and Herath, 2011). Thus, combining the DPTB and DT models might help to understand the drivers and barriers that influence nurses' BI towards EHR data privacy policy in this study, as discussed in the next section.

However, the DT combined with DTPB model were selected as the theoretical basis for this study. More details about the rationale for this selection are expounded in Section 3.3.

Table 11: The DT Model Constructs

Constructs	Definition	Citations
Detection certainty	Referring to an individual's perception of the probability of being caught due to the commission of unlawful behaviours	(Li et al., 2010)
Punishment severity	Preventing an individual from criminal behaviour from understanding the consequences	(Williams and Hawkins, 1986, Straub and Welke, 1998)
Punishment certainty	Pertains to nurses' perceived probability of being punished is related to noncompliance with stated EMR privacy policy	(D'Arcy et al., 2009)

Table 12 Studies used the DT

Citations	Study's Objective	Model	Field	Variance
(Kuo et al., 2017)	To explore factors driving compliance with EMR privacy policy among HCPs	DT	Health field (HCPs/ BI/EMR)	65%
(Kuo et al. (2019)	To explore factors inhibiting violation of EMR privacy policy among registered nurses	DT	Health field (nurses/ BI/EMR)	66%
(Foth (2017)	To identify the most significant factors that stimulate HCPs' BI to comply with data protection in hospital	TPB/ DT	Health field (HCPs/ BI/data production in hospitals)	47% Both models 51.8%
Note: The explained variance pertains to the discrepancy in the model's variables which can be explained and calculated statistically by the model's constructs				

3.1.13. Theory of Reasoned Action (TRA)

TRA is one of the most dominant theories used to predict people's behaviour in the realm of social science, which was originally developed by Ajzen and Fishbein (1975). It has two major constructs: attitudes and subjective norms that are used to predict behaviour (see Figure 5). Attitude is defined as the positive and negative of a person's feelings when performing a certain behaviour, while a "subjective norm" is the perception of the person about what others think what he/she have to perform or not to perform a specific action (Ajzen and Fishbein, 1975)p. 216, 302). The TRA is a universal model that can be used for any study of behaviour. The main problem is that it was not made to study how people use technology. Correspondence is another

limitation of the TRA theory. In order to make a specific prediction of intention and attitude, there must be correspondence between an action, a timeframe, and the situation (Davis et al., 1989). The TRA has been successfully used to predict the HCPs' adherence with the EHR privacy policy, albeit using only the subjective norm construct (Sher et al., 2017b).

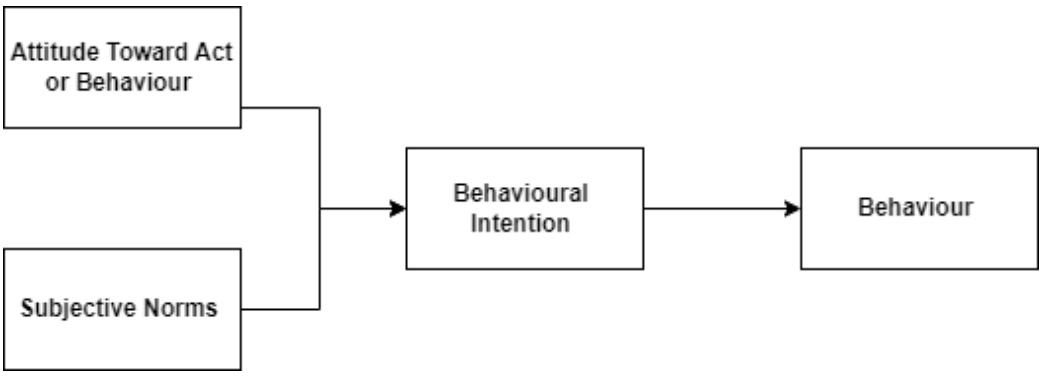


Figure 5: Theory of Reasoned Action (TRA)

Source: Fishbein (1979)

3.1.14. Theory of Planned Behaviour (TPB)

The TPB is an extension of the TRA, which postulates that a person's behaviour could be anticipated by their perceptive self-control, attitude, beliefs, and intentions (Ajzen, 1987). Perceived behavioural control (PBC) refers to a person's perceived of how easy or difficult it would be for them to undertake or refrain from a specific behaviour. However, it does not ponder external factors such as economic and broader environmental factors that may have a direct instrumental influence on behavioural outcomes (Truong, 2009) (see Figure 6).

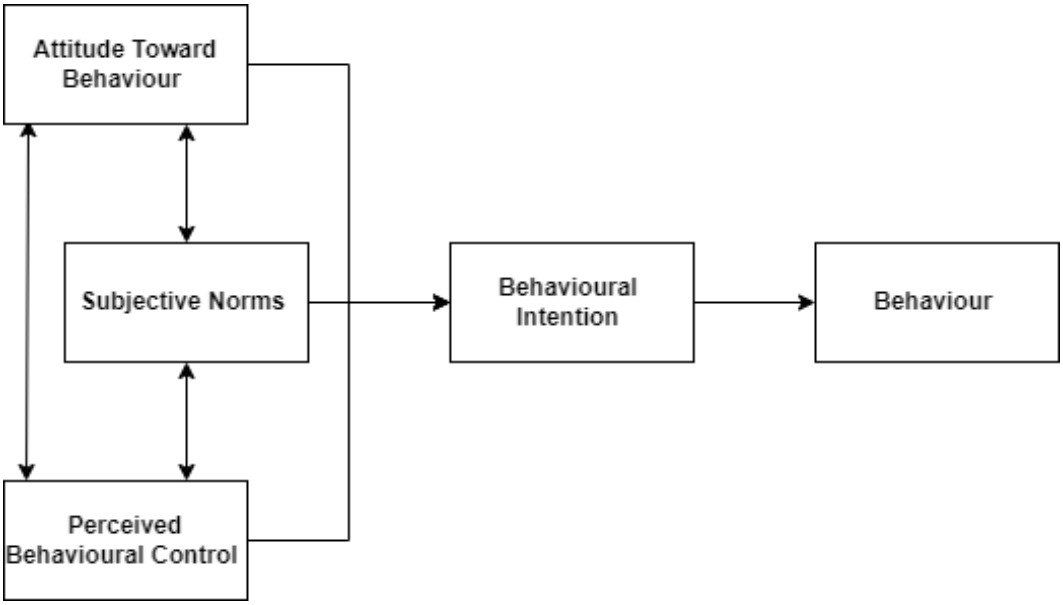


Figure 6: Theory of Planned Behaviour (TPB)

Source: (Ajzen, 1987)

3.1.15. Decomposed Theory of Planned Behaviour (DTPB)

The DTPB model is an extended theory from the TPB introduced by Taylor and Todd (1995b), which has strong explanatory power for individual behaviour (Mun et al., 2006, Chau and Hu, 2001, Hung et al., 2012, Taylor and Todd, 1995b). It focuses on a person's usage behaviour, and it can be applied to technology (see Table 14). The DTPB model uses three beliefs as multidimensional antecedents—attitude, subjective norm, and PBC—to predict an individual's BI (Taylor and Todd, 1995b). In the literature review carried out for this study, several works were found which showed that the model has good explanatory power to predict HCPs' BI towards EHR usages (Mun et al., 2006, Chau and Hu, 2001, Hung et al., 2012).

Ma et al. (2016) found that the DTPB predicted the motivational factors that motivate nurses' BI to protect the EHR data privacy, with high explanatory variance (82%). The explained variance pertains to the discrepancy in the model's variables, which can be explained and calculated statistically by the model's constructs (Hamilton et al., 2015). In addition, several studies have affirmed that the model has a good explanatory power to predict professionals' behaviour intention to acceptance IS (Mun et al., 2006, Chau and Hu, 2001, Hung et al., 2012). Mun et al. (2006) used the DTPM model to understand the BI of physicians to accept technology, which explained their usage BI with 57%. A study done by Chau and Hu (2001) investigated physicians' usage behaviour of the telemedicine using the DTPB model, which

showed a better explanation variance than TAM and TPB, with 42%, 40%, and 32%, respectively (see Table 13).

Table 13: Studies Using the DTPB Model

Citations	Study's Objective	Model	Field	Variance
(Ma et al. (2016)	To examine the factors that motivate nurses' BI to protect EHR data.	DTPB	Health field (nurses/BI/ EHR data protection)	82%
(Mun et al. (2006)	To understand the BI of physicians to accept technology.	DTPB	Health field (physicians /BI/ EHR usage)	57%
(Chau and Hu (2001)	To investigate physicians' use of telemedicine using	DTPB	Health field (physicians /usage/ EHR)	42%
(Hung et al. (2012)	To examine physicians' BI towards the use of an electronic system in Taiwan	DTPB	Health field (physicians /BI/ EHR usage)	51.8%
Note: The explained variance pertains to the discrepancy in the model's variables which can be explained and calculated statistically by the model's constructs				

Early studies by Ajzen (1985) and Taylor and Todd (1995b) found that an individual's BI could be explained through the constructs displayed in Table 14 and Figure 7 illustrates the constructs of the DTPB model.

Ajzen (1985) and Taylor and Todd (1995b) found that an individual's BI can be predicted through the following constructs. One of the constructs is an attitude construct, which means an individual's evaluation the behaviour of the interest. The second is a subjective norm construct, which refers to social influence to perform or not to perform the behaviour of interest. Subjective norms are an individual normative beliefs, shaped by the influences of peers and superiors (Ajzen, 1991). The final construct is PBC, which implies a person's perception of the availability of the resources to perform a specific behaviour, which can be explained in relation to controlling beliefs, self-efficacy, and facilitating conditions (Ajzen, 1991, Taylor and Todd, 1995b).

The DTPB model has several advantages, pointed out by Taylor and Todd (1995b). First, the relationship between the constructs is apparent, which makes it easy to use and understand. In addition, it can be applied in different fields due to the enriched factors, which can tackle the

other traditional models' problem. Finally, the DTPB model is clearly identified and specified the tested factors in relation to BI. Therefore, the DTPB model and DT were used in this study and the justifications is presented in section (3.3).

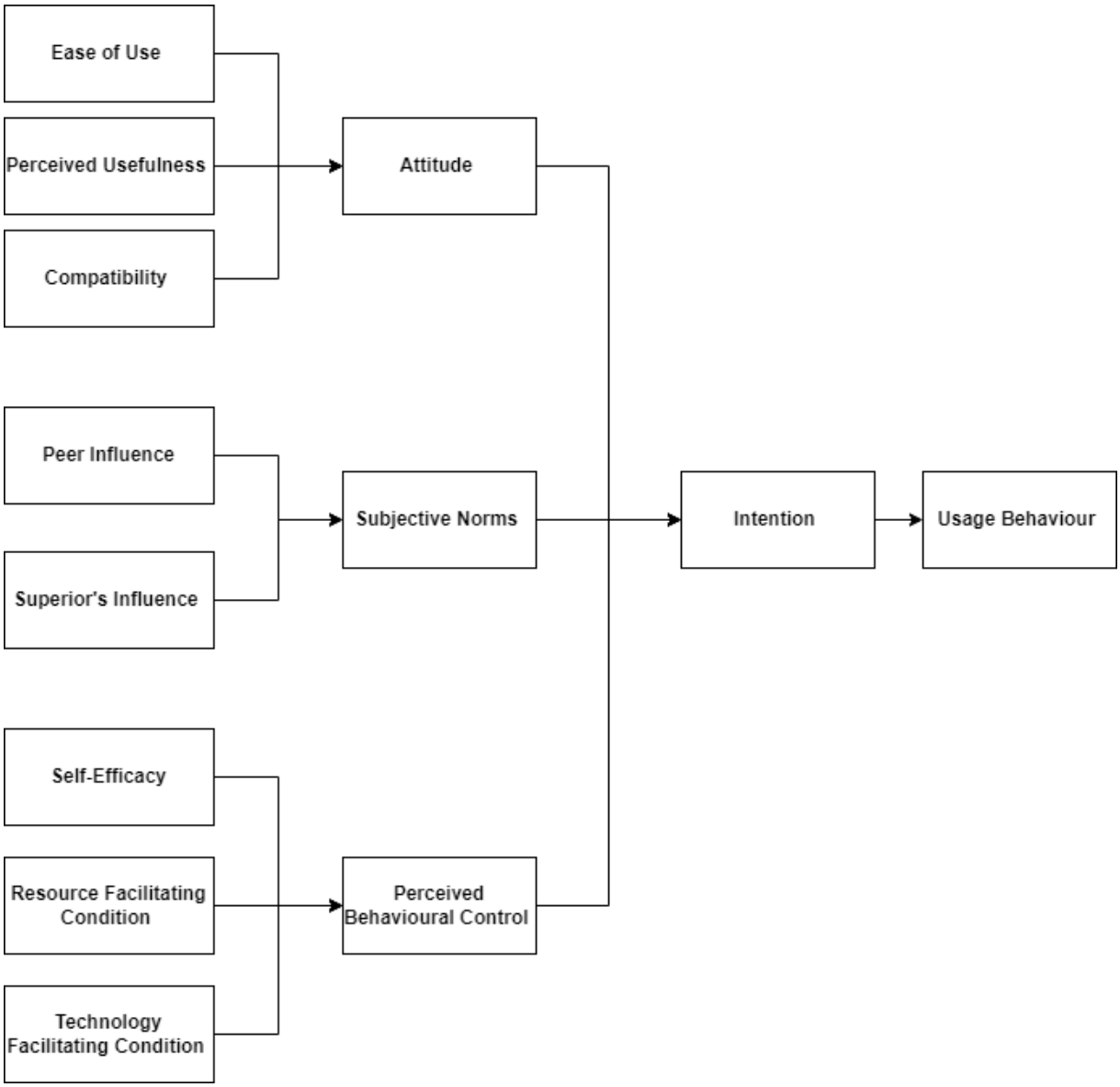


Figure 7: The DTPB Model

Source: (Taylor and Todd, 1995a)

Table 14: The DTPB Model Constructs

Constructs	Definition	Citations
Subjective norm	"The perceived expectation from employee's key referents to perform the behaviour of interest"	(Ajzen, 1991)
Peer influence	"The effect of peers in individual intention to perform certain behaviour"	(Fishbein and Ajzen, 1980) (Taylor and Todd, 1995b)
Superior influence	"The effect of superior in individual intention to perform certain behaviour"	(Fishbein and Ajzen, 1980)
Perceived behavioural control	"Employee's perception of existing resources and opportunities to perform particular behaviours"	(Ajzen, 1991, Taylor and Todd, 1995b)
Self-efficacy	"The belief in employee's capabilities to execute the course of action required to perform particular behaviours"	(Taylor and Todd, 1995b)
Facilitating conditions	"The degree to which an individual believes that organisational and technical infrastructure exists to support the use of a system"	(Venkatesh et al., 2003)
Attitude:	Employee's evaluation of the behaviour of interest	(Taylor and Todd, 1995b)
Perceived usefulness	"The extent to which the employee believes that using a specific application increases his or her job performance"	(Davis, 1989)
Perceived ease of use	"The extent to which the employee believes that performing a behaviour of interest is free of effort"	(Davis, 1989)
Compatibility	"The extent to which the employee believes the system is consistent with their existing values, previous experiences, and current needs"	(Taylor and Todd, 1995b, Maddux and Rogers, 1983)
BI	"A person's subjective probability that he will perform some behaviour"	(Fishbein and Ajzen, 1977)

3.1.16. Technology Acceptance Model (TAM)

The TAM aims to anticipate the adoption and employment of IT among users as an evolution from the TRA. In addition, the TAM aims to understand the wide variety of people's behaviour when adopting technology. The TAM's constructs include perceived usefulness and perceived ease of use, and the attitude construct was omitted to accurately explain a person's intent to use technology (Figure 8). Later, Venkatesh and Davis (2000) expanded TAM to TAM 2 by including external social and cognitive mechanism components, such as subjective norm, voluntariness, experience, image, work relevance, outcome demonstrability, and output quality. Moreover, Venkatesh and Bala (2008) extended TAM and TAM2 to TAM3, which added factors that are associated with organisational process factors. From the literature review, this model was found to be used by two studies that examined the HCPs' compliance with the EHR privacy policy. Surendran (2019) claimed that the TAM model is a powerful model, which can

predict technology acceptance and usage, but Momani and Jamous (2017) argued that in the cultural dimension it cannot anticipate people's behaviour. Nevertheless, the TAM has been used to predict the HCPs intention comply with the EHR privacy policy (Foth et al., 2012, Johnston and Warkentin, 2008).

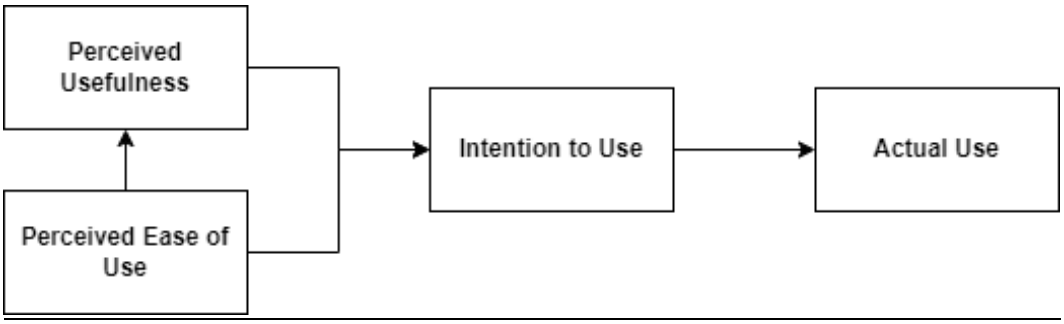


Figure 8: Technology Acceptance Model (TAM)

Source: (Venkatesh et al., 2003)

3.1.17. Diffusion of Innovation (DoI)

The DoI attempts to decipher the ways novel concepts and innovations propagate throughout an industry or social structure. The theory provides an understanding of the variables that affect the velocity of diffusion, including product features and client distinctions. It is frequently used for estimating the market impact of new products. It is used to study the field of IT innovations, including adoption, implementation, and usage (Presscott, 1995). There are many critiques of the DoI theory. Onkvisit and Shaw (1989) contend that there is inadequate proof of its applicability in the business world, and that those in marketing have largely disregarded it. According to MacVaugh and Schiavone (2010) the theory has constraints because it is influenced by technological, social, and educational conditions and works within the person surrounding, and its society. Bui (2015) examined the theory to find that the fundamentals of diffusion principles require additional research to demonstrate how these processes intersect to produce diverse diffusion sequences.

3.1.18. Unified Theory of the Acceptance and Use of Technology (UTAUT)

The UTAUT provides a more comprehensive description of acceptance technology processes than other models by merging eight models, encompassing the following: TRA, TAM, TPB, Combined TAM-TPB, Social Cognitive Theory (SCT), Motivational Model (MM), Model of PC Utilisation (MPCU), and DoI (Venkatesh et al., 2003). It has been used in different fields that adopted technology. Empirical testing revealed that it accounts for 70% of the variance in

predicting how people perceive technology, and 50% of the variance in how they use technology. Its constructs include BI, which is a direct contributor to technology acceptance. In addition, the constructs effort expectancy (EE); performance expectancy (PE); social influence (SI); and facilitating conditions (FC) predict usage. Other controlling variables (age, gender, experience, and voluntariness) are also suggested (Venkatesh et al., 2003) (see Figure 9). Khechine et al. (2016) reported that UTAUT is precise, reliable, and resilient in its ability to predict technological adoption and usage, but research using UTAUT has not reached statistically significant, directionally consistent, or quantitatively large conclusions; nevertheless, it has been used to predict HCPs' compliance intention with EHR privacy policies.

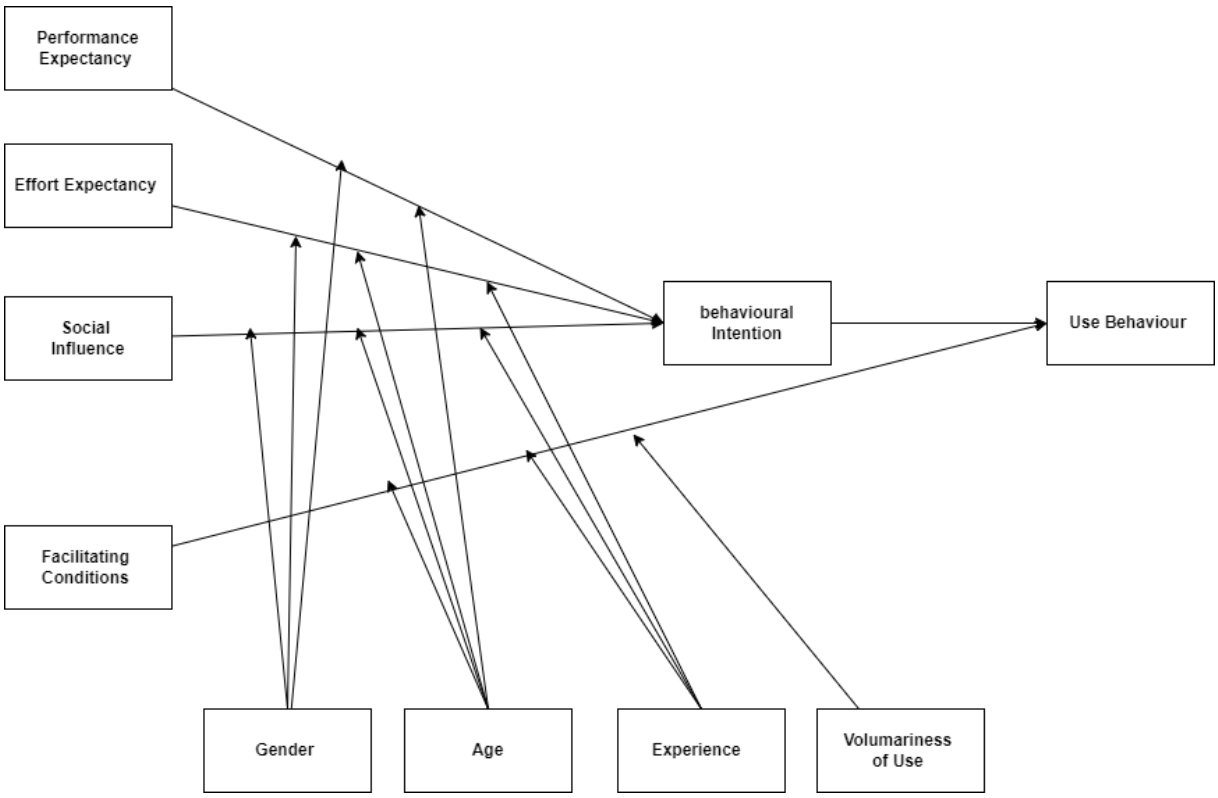


Figure 9: UTAUT

Source: (Venkatesh et al., 2003)

3.2. Comparing Technology Acceptance Models

3.2.1. TRA, TPB, TAM, and DTPB

As previously mentioned, the majority of the adoption technology's theoretical frameworks were built upon two models: the TRA and TPB models (Fishbein and Ajzen, 1977). Another important model is the DTPB model, composed of three models: the TPB, TRA and TAM. The

TRA model originated from the social-psychological field and is used to examine an individual's motivational factors to predict a specific behavioural activity (Fishbein and Ajzen, 1977). It was built on two factors – attitude and subjective norm – to predict a person's BI. The TAM emerged from the TRA model and has been used widely in the IT field (Fishbein and Ajzen, 1977, Venkatesh et al., 2003). It is based on two constructs: perceived usefulness and perceived ease of use. These constructs examine a person's ICT use (Venkatesh et al., 2003). TRB is an extension of the TRA, and both can be used to predict a person's behaviour (Ajzen, 1991). TPB's constructs include attitude, subjective norm and PBC (Ajzen, 1991).

3.2.2. DTPB versus TAM

Taylor and Todd (1995b) compared the DTPB and TAM models to determine the optimal choice in explaining the usage of IT. The authors found that the DTPB model was more accurate than TAM by 2%, which means that the DTPB model can explain the studied subjects more accurately than the TAM model (Kripanont, 2007). Furthermore, the DTPB model has this advantage over TAM because it combines attitude, subjective norm, and PBC, which has been found to significantly determine people's behaviour (Ajzen, 1991). Moreover, the attitude constructs in the DTPB model are also present in TAM, which can be used to explain an individual's IT behavioural usage (Kripanont, 2007). Thus, the DTPB model was found to be more comprehensive to explain IT usage, which is attributable to its consideration of the influence of the control and normative beliefs to understand an individual's BI (Taylor and Todd, 1995b). Taylor and Todd (1995b) stated that if the focus is social and controlling factors when deploying a system into practice, the DPTB model would be useful to manage the IT usage in an organization.

Furthermore, Taylor and Todd (1995b) noted that the DTPB model has several advantages over other behavioural models that are used to explain a subject matter. First, the relationship between the constructs is clear, which makes it easy to use and understand. Second, the model has multidimensional belief constructs, and each one of them measures different aspects of the subject matter. Third, it can be applied in different fields due to its enriched factors that cover different aspects. Thus, it can tackle the challenges of other traditional models with fewer constructs. Finally, the DTPB model identifies and specifies the tested factors in relation to BI. Therefore, this model was found to be a best fit for this project due to its explanatory power and alignment with the extracted drivers and barriers factors.

3.3. Justification for Combined DTPB and DT Models

This section discusses the justification for using the DTPB and DT models in this research, and the reasons why both models combined serve as the theoretical framework lenses with which to conduct a comprehensive Q-Methodology study. The integrated model concept is built upon the outcomes obtained from the included studies.

The findings reviewed showed that the drivers and barriers factors varied. There were individual and social factors as well as policy and regulation factors that influenced HCPs' BI towards EHR data privacy policy. Thus, integrating these two frameworks, in this case, can be helpful to cover the outcome factors because one model cannot. To support this, many studies in the review integrated at least two models to test BI (Foth, 2017, Foth et al., 2012, Johnston and Warkentin, 2008, Sher et al., 2017b). Moreover, Lebek et al. (2013) analysed the models used in the context of data security and BI, and found that the TPB and DT models were more frequently used compared to other models to assess employees' BI to follow IS privacy and security policy. While the TPB model elucidates a person's intention to accomplish a particular behaviour, the DT model suggests that some deviant behaviour can be dissuaded using certain swift and severe chastisements that can play a role in decreasing undesirable behaviour (Williams and Hawkins, 1986). There are two primary justifications for using the DTPB model for this study.

First, the model is one of the best behavioural models for predicting people's intentions, due to which it is used in many different contexts, often as an extension to the TPB model. Ajzen (1991) stated that the intention aspect of the TPB model is one of the best predictors of behaviour. Therefore, given its wide applicability in a number of quite related areas of behaviour prediction, there is a strong justification for using it in this study. The two models have been used to predict a wide range of behaviours, such as consumer and leisure decisions (Warshaw and Davis, 1984), and academic activities and achievement (Manstead and Van Eekelen, 1998, Sheeran et al., 1999).

Second, the DTPB model has an advantage for interpreting the investigated phenomena, due its explanation power which can effectively explain the subject matter, as was shown in these studies (Mun et al., 2006, Chau and Hu, 2001, Hung et al., 2012, Ma et al., 2016). Bagozzi (1992) stated that any model that interprets more variance, as the DTPB model does, is the best model to investigate phenomena. The DTPB model is superior to other theoretical models, such

as the TAM and TPB model, in explaining phenomena. Taylor and Todd (1995b) confirmed that the DTPB model could provide a specific illustration of the investigated phenomena, because it has several constructs that investigated the issue specifically, whereas other models such as TPB and TAM provide a general illustration of the phenomena because it has few constructs which give less specific details regard the investigated the issue. Hence, any model that is more specific in explaining phenomena is more valuable for researchers (Taylor and Todd, 1995b), which applies to the DTPB model.

The established recent application of TPB (Foth, 2017) and DTPB (Ma et al., 2016) used to examine employees' compliance intention with EHR privacy policy showed that these models have high explanatory power, with a variance of 50% and 82% retrospectively. Therefore, the researcher used the DTPB model as the main theoretical framework in this study because it explores the issue more concretely and has been previously used to investigate the same issue. Even though the DTPB model fits for the study, it is still part of the investigated issue is not covered by the model.

Other factors emerged from the literature, such as strict legislative and regulatory factors, which come from an IS security context, which are not covered by the DTPB model. These factors influence HCPs' compliance intention regard EHR data privacy policy, because some of the data regulations state the penalties that will be applied in case of HCPs violate EHR privacy policy (Foth, 2017, Kuo et al., 2017). Hence, researchers who investigate employees' BI regard compliance with data policy and regulation in the IS context tend to combine TPB or TAM models with DT, to cover data regulation and law aspects (Lebek et al., 2013). Foth (2017) combined the TPB and DT models to investigate HCPs' compliance intentions regarding data privacy regulations in Germany.

The reason for choosing DT in the IS context is that the information security management standards – which require policy, guidelines, and training programmes – are built upon this theory. DT has strong practical implication in the IS security field because the ISO/IEC 27002 Information Security Management Standard was built upon this theory (Theoharidou et al., 2005). The Standard recommends policies, training programmes, and guidelines that mainly define the consequences and sanctions of employees' misuse of an organisation's IS. Also, the standard recommends that censoring system access and performing assessment mechanisms by increasing detection certainty can prevent security violations by employees. The idea of using DT in this practice as a theoretical framework is therefore solid (D'arcy and Herath, 2011), as

it explains deviant behaviour more than other models (Trang and Brendel, 2019), such as DTPB. The adaptation of DT in this study is necessary because it covers the deviant behaviour part that the DTPB model cannot cover in this study.

However, using DT by itself is not recommended, because of its small size effect (Cohen, 1983). Abed and Weistroffer (2016) suggested that future studies that plan to use DT need to consider integrating the theory with other models, to enhance understanding of compliance behaviour. It also gives inconsistent results regarding the size effect in studies that used DT as the primary model (D'arcy and Herath, 2011). Moreover, Pratt et al. (2006) performed a meta-analysis and found that the DT size effect was strong in the studies that were performed on the organisational offenders. Therefore, DT will support this study in investigating deviant behaviour, since it has been used in recent practice (Foth, 2017, Kuo et al., 2019, Kuo et al., 2017).

This study adopted the DT constructs (detection certainty and punishment severity) and combined them with the DTPB model, since these recent studies used a similar integrated model that attempt to explain the violation intention of the information security policy (Hu et al., 2011, Siponen et al., 2010); compliance intention with information security policy (Herath and Rao, 2009a, Herath and Rao, 2009b, Al-Omari et al., 2012, Foth, 2017); misuse intention of the IS (Straub Jr, 1990, D'Arcy et al., 2009, D'Arcy and Greene, 2014); and security effectiveness of the IS (Kankanhalli et al., 2003). The two models have shown a high prediction power separately in different studies that investigate HCPs' compliance intention regarding EHR privacy policy, with a variance of 82% for the DTPB model (Ma et al., 2016) and 65% (Kuo et al., 2017) and 66% (Kuo et al., 2019) for the DT model. These reasons justified the decision to integrate these models in examining nurses' BI toward compliance with EHR privacy policy in this research.

The integrated model is built upon the drivers and barriers factors that arose from the scoping review (see Table 8), which were found in the literature to be positively influential to the HCPs' compliance intention with EHR privacy policy. After extracting the factors from the literature, they were mapped out on the DTPB model and the DT model and tailored to fit the research models constructs (see Figure 10). The research model is similar to the integrated framework from Foth (2017) study, which combined the TPB and DT to examined the HCPs behavioural compliance with the EHR privacy policy (see Figure 11), using the DTPB model, which is an

extension of the archetypal TPB model. Thus, the integrated model is performed and analysed in this project.

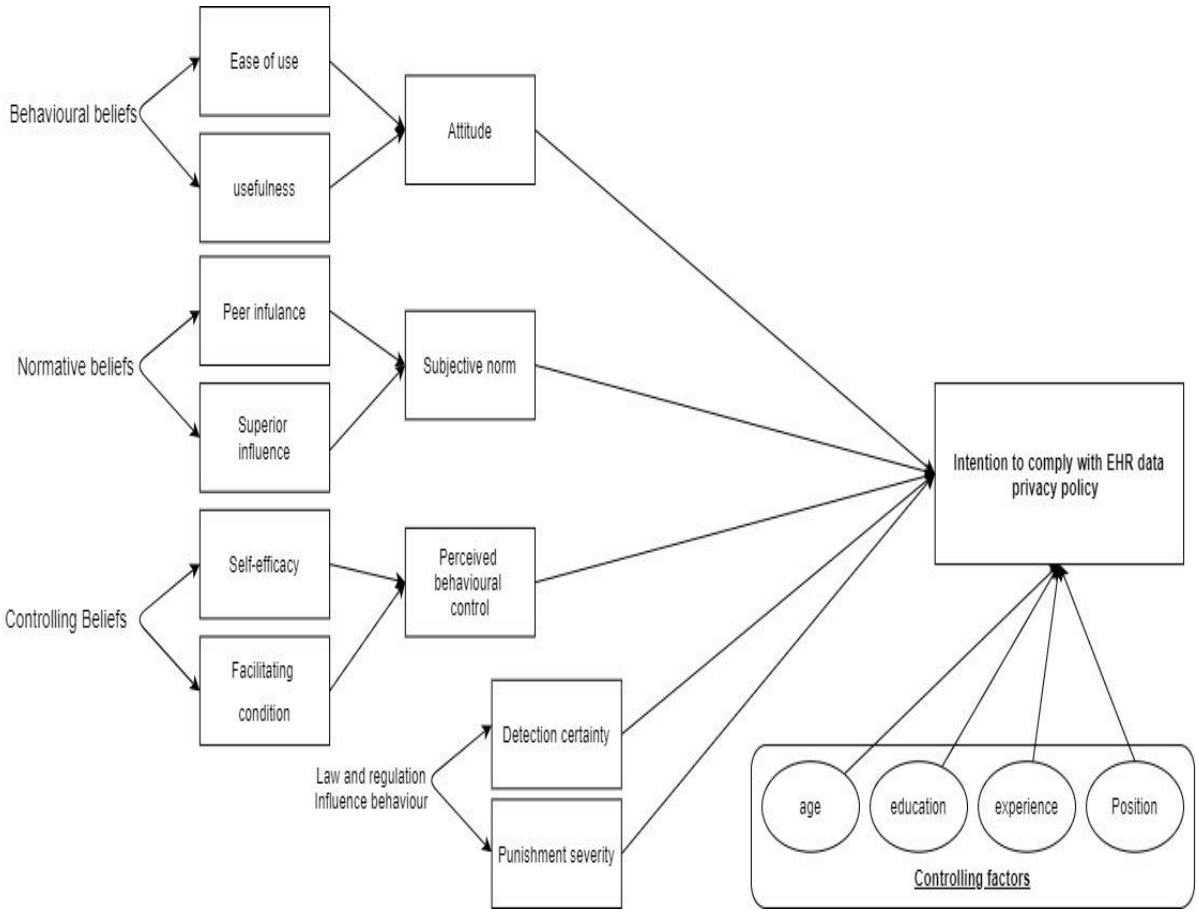


Figure 10: The Research Model

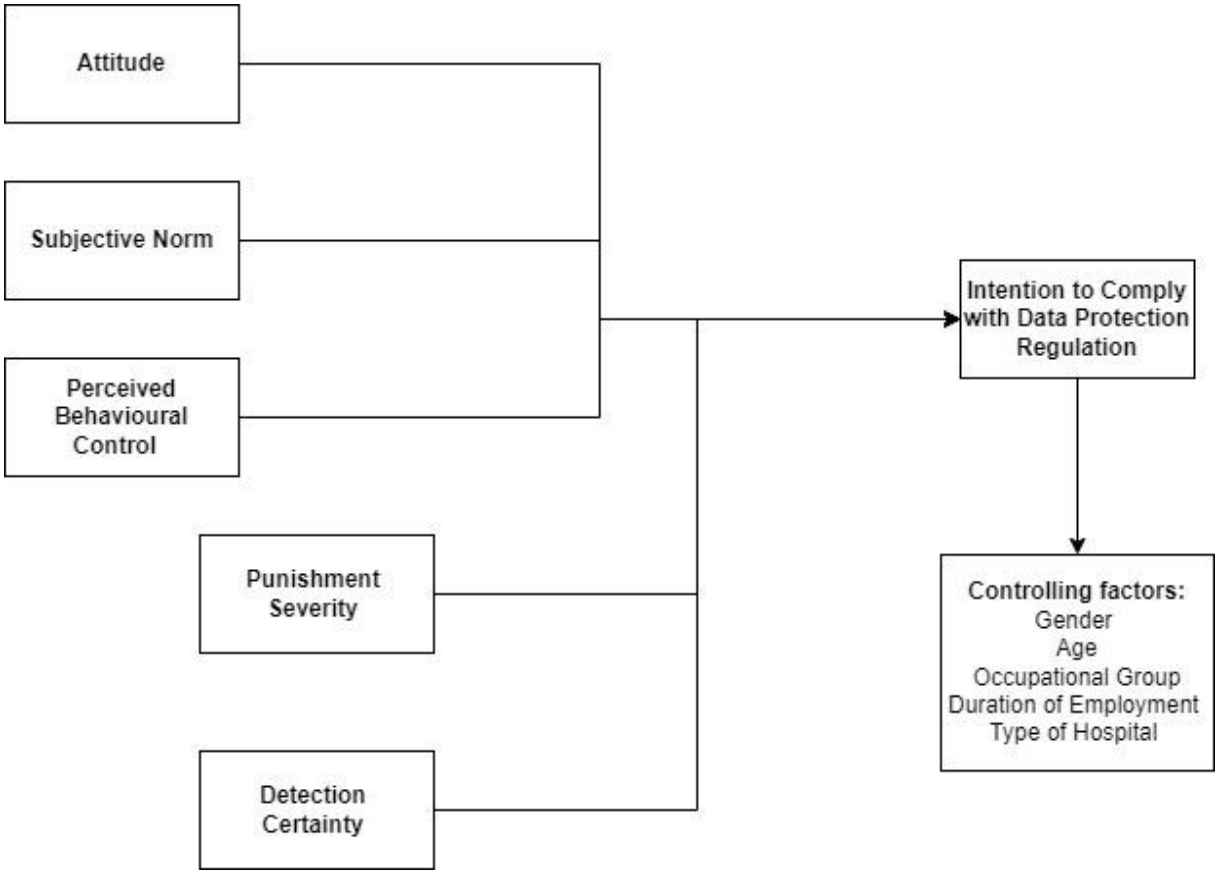


Figure 11: Integrated Framework

Source: Foth (2017)

3.4. Summary

This chapter explained various theories and models developed to conceptualise people's behaviour toward compliance with the EHR privacy policy, to assess adherence with policies when using the technology among individuals. Choosing a specific theory or theoretical framework model to guide the study's process depends on what came out of the literature review and what has been used to investigate the research issue. Depending on the constructs of each model and theory, the prediction of a person's behaviour has been evaluated from various perspectives. Based on past studies, these ideas and models were produced via a process of inquiry. These ideas were derived from behavioural research that included psychological and sociological research. Then, these models and theories were used in accordance with the research and study objectives. The majority of them were adjusted to answer the research questions and meet the study's objectives. Finally, the DTPB and DT models were chosen to underpin this study.

CHAPTER 4
RESEARCH METHODOLOGY

4.1. Introduction

This chapter explains the methodology and methods that were conducted in this study, with the fundamental purpose of exploring the factors and motivations that influence nurses' BI to comply with EHR privacy standards. It describes the research philosophy, and argues why possible alternative philosophical paradigms may not be the best fit. Next, it presents the Q-methodology and its benefits and drawbacks, and then shows the method and tools used to answer the research question. Finally, it shows the analysis process undertaken to interpret the results.

4.2. Q-Methodology Overview

Before going into details about the research epistemology and the Q-Methodology steps, it is necessary to give an overview of the component of Q-Methodology. According to the Q-methodology literature, William Stephenson established Q-Methodology in the 1930s, and defined it as a mixed-method that measures subjectivity objectively (Onwuegbuzie and Frels, 2015, Watts, 2005, Wint, 2013, Cross, 2005). The Q-Methodology contains quantitative methods (e.g., statements sorting activities) and qualitative methods (e.g., post-sorting interview questions) to systematically and subjectively look into people's viewpoints on specific topics (Neilson et al., 2020). The Q-Methodology is helpful in comprehending the individuals' behaviour and attitude in health contexts (Akhtar-Danesh et al., 2008). This methodology allows the researchers to look into people's internal world, which can transforms subjective viewpoints into objective results (Simons, 2013, Brown, 1980). The Q-Methodology contains five main steps, as adumbrated below from (Ramlo, 2021)p. 2) (see Figure 12):

1. Concourse generation, whereby the researcher gathers statements about the investigated phenomena from all kinds of knowledge sources such as literature and media.
2. Generating a Q-Set, using the generated concourse, refining its statements into smaller numbers of statements that cover the topic.
3. Participants selection (P-Set), purposively sampling to get the broad viewpoints across the targeted population.

4. Q-Sorting activities and post-sorting interview, in which the participants explain the extreme end of their sorting statements.
5. Factor analysis and interpretation, in which the researcher uses both the Q-Sort activity and the post-sorting interview to determine and generate the major viewpoints arising from the participants.



Figure 12: Steps in conducting a Q study

Source: (Watts and Stenner, 2005)

The Q-Methodology steps are discussed in further details later, including the rationale for choosing Q-Methodology and the associated research philosophy, concourse generation, Q-Set development, participants' selection, Q-sort, and factor analysis and interpretation. This methodology and its consequential steps are utilised in this study to explore nurses' behavioural factors that influence their compliance with the EHR privacy policy.

4.3. Positioning Q-Methodology within Research Philosophy

The methodology demonstrates a scientific and rigorous approach on how researchers can measure individuals' subjectively, which is contrary to the positivist method's assumptions (Akhtar-Danesh et al., 2008). The Q-Methodology has been widely used in various scientific fields recently due to its ability and utility in subjective research (Stephenson, 1953). According to Watts and Stenner (2005) and Danielson (2009), the concourse in Q-Methodology is able to keep and to guide participants through a specific topic with clear ideas and views, which gives a profoundly robust and holistic technique – by gathering all statements around a particular topic and actively engaging participants in the topic by testing their prior knowledge. According to Stephenson (1953), it has the edge over other methodologies, allowing investigators to seek out the perspectives of participants on a particular subject subjectively, then analyse their reactions as factors, using the quantitative method, and correlate individuals.

As some scholars contemplate, the Q-Methodology is a unique and different methodology (Dziopa and Ahern, 2011, Webler et al., 2009a, Stenner and Rogers, 2004). The Q-Methodology is supposed to be a balancing of both quantitative and qualitative methods in the social sciences (Ellingsen et al., 2010). However, some researchers who lean towards more

traditional (particularly quantitative) approaches consider it to be essentially a qualitative approach, thereby suffering from over-contextualisation and limited application in EBP. Conversely, researchers who lean towards qualitative and more in-depth analysis (e.g., in anthropological studies) see it as an essentially quantitative approach (Davis and Michelle, 2011). The qualitative method depends on the ability and understanding of participants to tell a story about a topic, and for subsequent researchers to authentically assay and represent this information. The Q-Methodology, on the other hand, depends on the analysis and explanation of the factor. This method uncovers why and how the person believes, from their perspective, which makes it more germane to this study (i.e., to explore nursing perceptions). The Q provides a potential overall view to participants by gathering the most important a gamut of thoughts on the research question (Watts, 2012, Stenner et al., 2000b, Wint, 2013).

4.3.1. Research Philosophy

All research endeavours, according to Creswell and Clark (2011), are impacted by philosophical assumptions about the nature of the world and how we collect information about it (Spector et al., 2002). The method in which scholars comprehend and view the universe, as well as the philosophy that shapes their perspective, is known as a paradigm. A paradigm is supported by any group of specialists who share similar values, views, and assumptions about the nature of reality and knowledge. Patton (2002)p. 69) pointed to an alternate word for this notion: weltanschauung ("worldview"), which can be characterised as "a method of reflecting on and constructing a comprehension of the numerous complex parts that comprise the current world." Various philosophical tenets, such as pragmatism, post-positivism, constructivism, and interpretivism, guide the organisation and execution of social science research (Table 15). Their differences are revealed in six dimensions of research philosophy, as outlined by (Creswell and Clark, 2011):

- Ontology: the study of theories on the nature of existence.
- Epistemology: the presumptions of knowing, how humans perceive the world and gain knowledge, and the relationship between the person who perceives things and the perceived objects.
- Axiology: the research of the function of principles in rational research.
- Methodology: the procedures used to acquire the data from the study settings.
- Rhetoric: the common interpretation of the language employed in scientific inquiries.

Axiology, ontology, epistemology, methodology, and rhetoric are viewed differently by each paradigm. For instance, post-positivism, a well-established approach to social research, is strongly associated with quantitative techniques, which emphasise precision, transferability, reliability, and reproducibility. Knowledge is based on objectivity, standardisation, deductive logic, and organisation. According to post-positivist researchers; these are important elements of the research process, since they are seen to be logically consistent phases of the study itself (Creswell and Clark, 2011).

However, post-positivism has its detractors, especially in the attempt to define laws, where positivism fails to take into account the irregular nature of people's behaviour or the culture and beliefs of people that are key determinants in the presence and application of laws. This leads to the establishment of regulations by researchers that are not necessarily consistent with social science. The scientist's function is limited to collecting and interpreting facts, on the basis of which rules and regulations are developed. Still, the rule cannot be used in every situation, because the same observation does not always work (Chalmers, 1999).

Howell (2013) elaborated on Popper's (1994) opinion that any kind of absolute rule impedes a theory's development and stunts its adaptability and evolution. In addition, anti-positivists have underlined the obvious distinctions between people's social life and the natural universe. The rules of natural sciences, for instance, are distinct from all purportedly arbitrary human behaviour. In addition, Bogen (2014) argued that positivist research studies could not even study a multitude of variables since the positivists could not quantify them.

According to Creswell and Clark (2011), pragmatism is a paradigm that bridges the gap between traditional social scientists' who have well-established ways of relying on scientific methodology and modern social scientists, who use more practical, naturalistic methods that emphasise non-intervention. The concept of pragmatism – from which the pragmatist research paradigm derives – promotes a wide variety of research methodologies that may be used to investigate a research issue and question (Maxcy, 2003). According to Tashakkori and Teddlie (1998), the pragmatic research paradigm endorses the use of any methodological or philosophical stance that is appropriate to the study topic at hand.

The use of mixed-methods (i.e., combining quantitative and qualitative methods within a single study) is often associated with a pragmatic approach to research (Creswell and Clark, 2011), in which the results of the study that practically answer the research questions are considered more

germane than the doctrinaire implications of the study's methodology. Formal and informal forms of discourse are used in pragmatism. The pragmatic paradigm holds that inquiries into experience may be directed toward either a single or various realities (Creswell and Clark, 2011). Many pragmatic theorists argue that reality is an independently existing part of people's experience; however, because this reality is embedded in the natural world, it can only be known via a person's experience.

Morgan (2013) contends that pragmatic philosophy is founded on the premise that reality is socially produced, and most pragmatists believe that reality is socially constructed. Notably, specific types of social construction seem to be more reflective of personal experiences than others (Creswell and Clark, 2011). Evidently, pragmatism is not a combination of constructivism and post-positivism; rather, it rejects both theories on the grounds that reality is neither objective nor arbitrary. "What works" consists of truth from a pragmatic viewpoint (Dewey, 1974) p. 198).

In light of several studies reviewed previously in the scoping review about the EHR privacy policy, this study could have used a non-experimental design to investigate the factors that influence nurses' BI regarding compliance with the EHR privacy policy. This requires a research paradigm and methodology with tools that are able to extensively study the current data, and appropriate for the given context and circumstance. The Q-Methodology was chosen to conduct this study. The epistemology in Q-Methodology assumes that individuals' viewpoints have a structured array, which can be clearly mined from the study. This is clear in the Q-Methodology, which allows the participants to arrange the statements on a funnel grid about the investigated issue in the Q-Sorting exercise, and then they reflect on them in the post-sorting interview, which shows their opinion about the phenomena.

The Q-Methodology is categorised as a mixed-method approach, through the lens of the pragmatist perspective, because it has quantitative and qualitative elements (Creswell and Clark, 2011). As mentioned above, Q-Methodology was originally developed to rigorously and objectively assess subjectivity (Stephenson, 1953). Q-Methodology is a mixed method approach that encompasses philosophy, theory, and procedure in addition to statistical analytic tools for the Q-Sorting. Mixed-methods research integrates quantitative and qualitative approaches, which may avoid possible drawbacks related to employing only a qualitative approach (i.e., interviews and focus groups), or a quantitative approach (i.e., survey) (Bryman,

2006). Creswell and Clark (2011) and Onwuegbuzie and Frels (2015) consider the Q-method to be perfectly suited for mixed-method study approaches.

Table 15: Paradigms comparison.

Paradigm	**Definition**	**approach**	**Brief description**
Positivist	It refers to the reality that is and actual knowledge.	Quantitative	It is captured through an objective process to ensure the process can be replicated (Park et al., 2020). It has been used to study empirical research that captures quantitative data using, for example, questionnaires and other tools (Su, 2018). The health research environment is complicated and has a mix of qualitative and quantitative data, hence, this paradigm is not fully suited for the health sector (Noyes et al., 2019, Moore et al., 2017).
Interpretivism	It states that there are multiple realities that can be debated between scholars (Alharahsheh and Pius, 2020)	Qualitative	This paradigm is an inductive approach that applies to qualitative studies that try to investigate an individual and social structure deeply (Alharahsheh and Pius, 2020). The paradigm has a limitation in that it concludes in a higher degree of subjectivity that leads to an inability to generalise the findings (Potrac et al., 2014).
pragmatism	It concentrates on what works for the study, as well as on subjectivity, which captures individual action, behaviour, and wording meaning in order to analyse the data objectively (Frey, 2018, Shannon-Baker, 2016, Bryman, 2016)	Mixed methods	The mixed-methods approach combines the two paradigms. "Researchers who use a mixed-methods approach are usually labelled as pragmatists, which gives scholars freedom in the study because it is not devoted to one epistemology" (Johnson and Onwuegbuzie, 2004).

4.3.2. Q-Methodology's Advantages

Barker (2008) illustrated that Q-Methodology has a benefit which allows researchers to formulate a concept about a specific subject based on testing participants' views on a topic and then later explain why they chose this rather than enforcing a specific framework on participants. Kitzinger and Rogers (1985) observed that the "Q-sorting exercise allows the participants' viewpoints to be seen in a way that is not affected by the researcher interpretive ability or by personal bias. The Q-Methodology aims to capture subjective views with an objective approach. There was no imposing any structure or limitations on the subjectivity that

they bring to the ranking of the statements, but you are providing an overall set of statements that they use to express this subjectivity, which is why the concourse and subsequent Q-Set is important." Q-Methodology provides a comprehensive, vigorous, and in-depth method to participants, which allows them to actively involved in building significance meaning to statements that taken from their work environment. Also, according to Bartlett and Deweese (2015) and Hughes (2012), it helps in describing the participants' viewpoint and finds the differences and similarities within a group of participants subjectively. In addition, it encourages the researcher and the participants to strengthen their relation in terms of participants engaging in the study by giving them freedom in the sorting activity and expressing their views (Q-sort) (Wint (2013). Furthermore, the strength of Q-Methodology is that the researcher can collect different views of a point from different groups around one subject (Plummer, 2012).

In the Q-Methodology, usually the findings (i.e., factors arrays) are interpreted using the abdicative mode, whilst traditional qualitative methods depend on the ability of the participant to narrate their prospective context, and or the researcher to authentically report this. The abdicative mode helps to reduce the researchers' subjectivity when analysing and interpreting participants' views. Moreover, McKeown (1988) stated that adopting qualitative methods to explore participants' subjectivity, which rely on the interpretation of participants and researchers, may not reveal the true viewpoint of the subject (Barker, 2008). Nonetheless, Q-Methodology has qualitative and quantitative methods which allow researchers to reflect the actual participant's subjectivity when researchers analyse the data. This makes the Q-Methodology suitable for this research. The nurses who interact with EHRs may have differing perspectives on how to comply with the privacy policy involved.

4.3.3. Q-Methodology's Limitations

Every methodology has limitations, and the Q-Methodology particularly suffers in relation to two issues:

- Sample size and generalisation
- Reliability and validity

Van Exel and De Graaf (2005) dismissed the generalisation of Q-study's findings, because it uses small numbers of participants who represent their subjective viewpoints, which means generalisation can be considered very limited for findings arising from the use of this

methodology. The focus here is on subjectivity, which is the participant's view within the group rather than the sample percentage. On the contrary, Watts (2012) and Stenner et al. (2000a) argued that Q-Methodology is not focused on statistical generalisation but rather semantic generalisation, which describes the clustering of participants' opinions that may be examined by a wide-range survey. Most Q-research is exploratory and does not use a sample size randomly. The generalisation in Q studies is not common beyond the direct participants, and it is not grounded on the statistical distribution of the participants in the extracted factors. The Q studies' value is not about the generalisation of the findings – it is about the findings themselves, and uncovering the common opinion among the participants (Valenta and Wigger, 1997)p. 504).

Second, it has been argued that Q-Methodology has validity and reliability limitations. This does not apply to the methodology – due to not having outside criteria and the focus on people's understanding of a specific topic view (Valenta and Wigger, 1997)pp. 51-53). This means there is no external scale used in the Q-method to judge a participant's viewpoint, whether this view is right or wrong, and validity is used differently in this methodology. However, Valenta and Wigger (1997) recognise two kinds of validity in Q-Methodology, which are face and content validity, and they confirm that validity in Q-Methodology differs from R-methodology. Face validity in Q-Methodology comes in the Q-samples, which aids in modifying the words and grammar in the Q-sample statements to make them readable. Content validity in Q-study comes to develop the Q-sample items by the experts who can modify the items and after the piloting the Q-statements (Valenta and Wigger, 1997, Watts and Stenner, 2012a).

Moreover, it relies on the researcher broadly covering the researched issue as the participants vocalised it when the statements were provided to them. In order to increase content validity, experts' advice was usually provided after the pilot study. It is essential to recruit a participant who has knowledge about the investigation issue to assure the validity of the pilot study. The Q-sorting exercise is totally subjective and symbolises the participants' viewpoints. Thus, there is no specific criterion that could evaluate the participant's viewpoint on a specific statement (Brown, 1986); hence, all participants' Q sorts are valid, and represent their opinions regarding the investigated issues.

Scholars have placed less importance on reliability in Q-Methodology, which differs from quantitative studies. Also, they argue that the frequent use of Q-sort on participants explains the reliability of their viewpoints instead of the reliability of the method itself. This

demonstrates a diverse application of the reliability concept in quantitative research. Valenta and Wigger (1997) stated that using the same Q-statements on the same participants in different time periods shows an 80% correlation coefficient or higher for the retest reliability.

4.3.4. Steps in the Q-method Process

This section explains the steps of Q-Methodology undertaken to conduct research in more detail.

4.3.4.1. The Concourse

The starting point for any Q study is the generation of a concourse. This is essentially all statements that have been verbally said or written around a specific topic (Van Exel and De Graaf, 2005, Ramlo, 2016b). Researchers have suggested that this process should begin by looking at existing literature about the investigated phenomena, to gather initial concourse statements (Watts and Stenner, 2012a)pp. 59-60). This includes all kinds of published and unpublished literature, such as interviews and websites, etc. (Valenta and Wigger, 1997, Paige and Morin, 2016). While the literature provides a foundation for generating the concourse in Q-Methodology, expert consultation can improve the robustness of the concourse and Q-Set, and is considered an inherent and necessary aspect of Q-Methodology (Ma et al., 2021).

Two ways to develop the concourse have been identified: naturalistic and quasi-naturalistic approaches. In the naturalistic approach, statements are derived from sources designed for Q-study, while in the quasi-naturalistic approach, statements are derived from different sources and not mainly designed for Q-studies. Researchers who use Q-Methodology always aim at the beginning to generate a large number of statements (concourse), which can be later reduced and refined during the pilot process. Concourse generation contains personal, expert experience, and interviews with the targeted workforce. Drawing the concourse statements from the literate usually follow structured approaches: inductive and deductive. The deductive method refers to the usage of an existed theory that fits the research, while the inductive method refers to the examination of the extracted statements to construct a framework from the literature

4.3.4.1.1. The Creation of the Concourse in this Study (Method)

This study used the structured inductive approach to generate the concourse of this study (Brown, 1980, Petit dit Dariel, 2011). The concourse in this study was generated from the EHR privacy policy literature review, using the DPBT and DT as lens to extract the statements (see CHAPTER 3, Section 3.3, Figure 10). This study utilised eight articles from the scoping review,

as discussed in Chapter 2 to draw the concourse (Foth, 2017, Ma et al., 2016, Sher et al., 2017b, Foth et al., 2012, Johnston and Warkentin, 2008, Kuo et al., 2018, Kuo et al., 2017, Sher et al., 2017a). This resulted in 122 statements, after which the removal of duplicate statements left 79 statements (see Appendix 2.2: Concourse Generation and Q-Set Process, Table 39).

The DPBT and DT frameworks underpinned the development of the concourse in this study (see CHAPTER 3, section 3.3, Figure 10). The statements were categorised according to the selected models to guarantee the investigated issue well covered. This consist of five major themes and six sub themes (Table 16). Dariel (2011) and Rogers (1991) stated that while utilising framework models, it is crucial to keep in mind that preconceived categories should not be utilised for future data interpretation, because they do not assess designated categories. In other words, the chosen frameworks helped to structure the concourse (everything that is known about the subject) into a number of manageable themes. These themes tend to form the basis for the Q-Set questions that are distilled and refined from the concourse (see the Appendix 2.2, Table 39 and Table 40). However, the ways participants use their subjectivity to sort the Q-Set may well generate new themes and these should not be constrained by the original theory and the framework used to create the Q-Set. Kramer et al. (2003) stated that in Q study, the data analysis and interpretation only concerns about the participants' Q-sorts and their reflection and it not about examine the frameworks that were used to draw the Q-Set.

Table 16: Concourse major themes and sub-theme

Major Themes	**No. Statements**	**Sub-themes**	**No. Statements**	**Controlling Factors**	**No. Statements**
Attitude	4	Ease of use	5	Age	1
		Perceived usefulness	4		
Subjective norm	4	Peer influence	3	Education level	1
		Superior influence	2		
Perceived behavioural control	4	Self-efficacy	2	Working position	1
		Facilitating condition	2		
Detection certainty	3	-	-	Experience	1
Punishment severity	3	-	-	-	-

4.3.4.2. Q-Set

Once the concourse has been collected, the next step is to create a subset series of representative statements known as the Q-Set that reflect the breadth and coverage of the concourse (Hayne, 1998). Watts and Stenner (2012a) explained that the aim of Q-Set item generation is to create comprehensive statements to cover the research question. There are many different methods to generate the Q-Set, which means there are no rigidly prescribed methods to follow. Watts and Stenner (2012a) said that the Q-Set needs to be tailored based on the requirements of the research question. Wint (2013) came to conclusion that the operation of collecting a Q-Set usually comes from a wider and comprehensive concourse in which several sorts of categorisation process evolve, in which statements are clustered into main and sub-main categories or themes.

Stainton Rogers (1995) noted that a Q-Set's statement number should be between 40 and 80 statements, which has become a standard. Kerlinger (.1969) suggested that a good range of items is between 60 and 90. However, there is scant evidence in the literature to justify either of these opinions. Watts and Stenner (2012a) argued that they achieved satisfying results with only 40 items. Therefore, the researcher set 40 items as a minimum, because fewer items might threaten the adequate coverage of the research question, and set 90 items as a maximum because more items would make the sorting activity very demanding (Watts and Stenner, 2012a).

The Q-Set needs to be checked and examined by experts, and a pilot study is recommended to guarantee face and content validity (Watts and Stenner, 2012a). Face validity refers to adjusting the words and grammar in the Q-sample statements to make them readable (Akhtar-Danesh et al., 2008, Valenta and Wigger, 1997). Content validity refers to modifying the items and after the piloting the Q-statements by experts. The purpose of the face and content validity is to ensure that the statements are understandable and covering the participants' viewpoints (Brown, 1980). Hence, the Q-Set statements' wording, grammar and readability may be edited or modified by the expert team or the pilot subjects to during the face and content validation. Watts and Stenner (2012a) stated that the nature of the statements in terms of clarity and conciseness is essential for the Q-Sets, but it's not necessary to standardise the length and presentation of the items in general. Achieving comprehensive coverage of the research question is impossible, as words or statements may have varying meanings and semantic connotations for different individuals (Rogers, 1991). However, the following section shows the practical Q-Set development of this study.

4.3.4.2.1. **Q-Set Development and Pilot Study (Method)**

After duplicated statements were removed from the concourse, 79 statements were discussed with two experts in the area of the EHR at the School of Health Sciences, UoN. The statements underwent an iterative process of editing and modifying to fit the research question, which reduced to 66 then reduced to 40 statements (see Appendix 2.2: Concourse Generation and Q-Set Process, Table 39). During this phase, a universal statement was set to be read by participants every time and before the sorting of the 40 statements. For example, the participants started by reading this statement: "*My compliance with EHR privacy policy and practise is influenced by…* '[My age],' '[My experience of working with the EHR],'" etc. This example was used to modify all Q-Set statements bearing in mind the statement covered the research question and it does not lose the meaning.

After obtaining 40 statements, consulting other experts was necessary in order to validate the Q-sort content. The researcher contacted five experts in the field of healthcare and the EHR privacy regarding the statements to validate the content of the statements against the DTPB and DT models. The selection criteria for the experts involved their professional skills, knowledge, and experience with the EHR, in addition to their academic qualification and research contributions. This approach guaranteed that their feedback could improve the Q statements' content and validity.

The experts were also consulted for face and content validity. Their comments and feedback on the statements were addressed and changes were made to the statements. Watts and Stenner (2012a) stated that it is vital to improve the content and validity of the Q-sort items by consulting at least one expert in the same field of the study, who helps in refining the statements and ensuring an adequate coverage of the research question.

All five experts have the knowledge about the EHR or were working closely with EHR system from Saudi Arabia. One works as an assistant professor at Kind Saud University Medical City, one works as a health administration and health informatics lecturer at Jeddah University, two were professional nurses who worked at the MoH, and one is a medical physician at the King Abdullah Medical City. This phase resulted in 40 statements. After addressing the five experts' comments and the statements were modified, it was reviewed again by two experts from the School of Health Sciences, UoN, to ensure the Q-Set was ready for the piloting (see Appendix 2.2: Concourse Generation and Q-Set Process, Table 40).

A pilot study was then performed with five volunteers (PhD students) at the School of Health Sciences, UoN, to ensure and enhance the content and face validity of the Q-statements. The criteria for the selection of the five PhD students was based on their academic standing within the UoN School of Health Sciences, understanding of the research practises, and enthusiasm to take a part in the pilot study. Thus, the PhD students' advanced level of research could provide an important perspective on the Q-statements, which could improve the statements' content, readability, and simplicity. This helped the researcher to practise the Q-sort activity. The volunteers' feedback and criticism regarding the readability and clarity of the statements were considered. Furthermore, the researcher conducted a post-sorting interview to know how the participants interpreted the Q-statements in order to enhance the Q-statements' clarity. The outcomes from the pilot exercise were considered to make changes on the final stage of the statements alongside the experts. Only one person suggested changing two statements' wordings in order for the statement to be correctly understand. The participants prompted statements 14 and 15 for greater clarity:

Statements 14: "*The legal consequences to me if a data breach is seen to occur*" changed to [The consequences to me legally by authorities if a data breach is seen to occur].

Statement 15: "*The sense of satisfaction I get from undertaking these tasks"* changed to [The sense of satisfaction I get when following the policies].

After these considerations and statement modifications under the supervision of the two experts from the School of Health Sciences, UoN, this resulted in 40 statements in the Q-Set. After the above Q-Set development processes, the Q-Set was ready for Q-sorting activity (see Appendix 2.2: Concourse Generation and Q-Set Process, Table 41). The following chart shows the Q-Set development (see Figure 13).

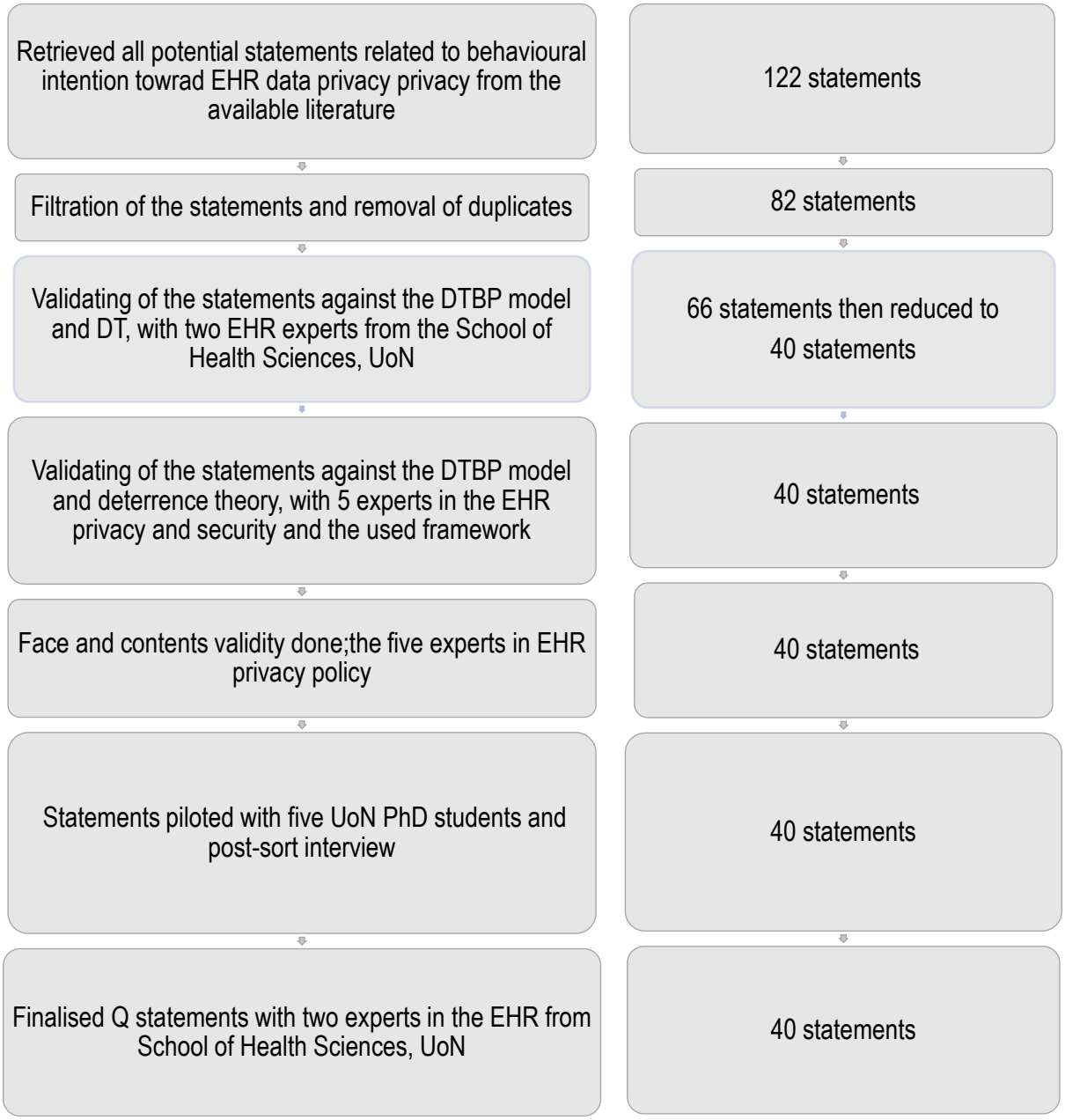


Figure 13: Q-statements validation process

4.3.4.3. Participants/ P-set

The next step in the Q study methodology is the selection of participants, known as the "P-Set." The Q-Methodology does not mandate a large sample size; instead, it highlights the various numbers of possible viewpoints across the targeted population (Mckeown and Thomas, 1988). The aim of the population's diversion of viewpoints it to create a comparison among the emerged factors. Brown (1980) recommends 40 to 60 participants for a Q-study or smaller numbers of participants are required in other studies. Also, Webler et al. (2009b) stated that

usually a Q-study recruits 12 to 20 participants to sort 40 to 60 Q-statements. Watts and Stenner (2012a) suggested using the ratio to determine the number, which means two or three statements for one participant. However, it is necessary for the study to have enough subjects in the P-Set that the researcher is able to establish the comparison between the factors (Van Exel and De Graaf, 2005, Watts and Stenner, 2012a). The P-Set selection is a challenge for researchers because the participants and number of the Q-Set statements are dependent on the study's context. The number of statements is debated in certain research contexts due to their narrowness and the limited number of statements in the field, which limit participants' subjectivities. Some of these hindrances to subjectivities include social and cultural rhetoric (Brown, 1980, Webler et al., 2009b, Watts and Stenner, 2012a).

Brown (2010) argued that the use of the R-Methodology rule for selecting the number of participants is not pertinent for the Q-Methodology, and recommended using the P-matrix to guide the selection numbers of the participants in the Q-Methodology, to guarantee the diversity of the participants which reflect on the Q sample. The P-matrix offers a guideline for scholars who adopt the Q-Methodology to select an appropriate sample size for the project, and (Brown, 2012) recommended it for studies of participants with diverse characteristics. Also, the author claimed that the Q-Methodology participants' selection process is like a quantitative method, in which the researcher identifies the study's sample in advance based on the participants' characteristics.

The P-matrix uses this equation to calculate the sample size of the study:

> "P-matrix = ([N_1 controlled variable 1] * [N_2 controlled variable 2] * [N_x controlled variable x]…)."

Where N refers to the number of groups in one singular controlled variable multiply with other number of controlled variables. Controlled variables known as stable variables, are the variables or aspects that investigators endeavour to maintain at a consistent level throughout their study in order to minimise their potential effect on the findings. The following subsection lists and explains why the controlling factors in this study was selected.

4.3.4.3.1. **Selection of the study's P-Set**

Four controllable factors were set for the participants (nurses) to prevent any demographic influence when analysing the findings. The characteristics are age, education level, work position, and experience, which were selected because they were found in the scoping review

to be the significant controlling factors used by researchers (see Table 17). Age was found to be significant in IS misuse intentions (Hovav and D'Arcy, 2012). Education level and work experience might influence nurses' knowledge and, thus, their tendency to comply with the policy (Herath and Rao, 2017, Li et al., 2010). Furthermore, work position was found to be a controlling factor in the prior literature to eradicate the unknowing effect (Hovav and D'Arcy, 2012, Ifinedo, 2014).

According Kuo et al. (2017), who explored the behavioural factors that inhibit nurses from complying with the EHR privacy policy, the author found that gender has no significant effect on the outcomes because the majority of nurses are female. Thus, gender was excluded from the participants' characteristics even though it was found to be significant in a study done by Foth (2017) on all hospital workers regarding the compliance intention toward the EHR data privacy policy. In contrast, it has been used as a control variable by other researchers (Sher et al., 2017a, Foth, 2017, Ma et al., 2016, Kuo et al., 2019, Foth et al., 2012, Sher et al., 2017b, Kuo et al., 2018, Altamimi et al., 2018, Kuo et al., 2017). Moreover, the researcher established inclusion and exclusion criteria to recruit the participants (nurses), to ensure that only those with pertinent knowledge and experience to achieve the research aim were included (see Table 19).

Thus, using the four controlling factors (see Table 17) to fill the P-matrix's equation to calculate the sample size of the study:

> "P-matrix = ([N_1 controlled variable 1] * [N_2controlled variable 2] * [N_x controlled variable x]…)."

The P-matrix combination yielded 54 possibilities according to the participants' characteristics (see Table 18):

> (3 [3Age] x 3 [3Education level] x 2 [2Working position] x 3 [3Experience]=54).

Therefore, the number of participants in this study was 54 nurses, selected purposively based on age, education, working position, and experience.

Table 17: The controlling Factors

Controlling Factors	Citations
Age	(Sher et al., 2017a, Ma et al., 2016, Sher et al., 2017b, Kuo et al., 2017, Kuo et al., 2019, Foth et al., 2012, Kuo et al., 2018, Foth, 2017)
Gender	(Foth et al., 2012) Foth, 2017, (Kuo et al., 2019, Sher et al., 2017b)
Education	(Ma et al., 2016) (Kuo et al., 2017) (Sher et al., 2017a)
Working position	(Ma et al., 2016) (Kuo et al., 2017) (Sher et al., 2017b)
Experience	(Foth, 2017) (Kuo et al., 2017) (Sher et al., 2017a)

Table 18: P-set matrix of the sample

Controlling Factors	Group 1	Group 2	Group 3	Total
Age	20-29	30-39	40- 49, 50-59, 60-69	3 groups
Education level	Diploma	Bachelor	Gradate (Master and PhD)	3 groups
Working position	Staff member	Supervisors		2 groups
Experience (years)	1-4	5-9	10 -14, 15- 20, 21-25	3 groups
P-matrix=				54 participants

Table 19: Participant Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Full-time nurse staff at hospitals Has access and worked on EHR or EMR Has access to the internet Proficient in English	Nurse not proficient in English (requiring help in speaking, writing, and interpreting) Nurses are dependent on someone else for use of the Internet Nurses without access to EHR or EMR, or who have never worked with them

The nurses in Saudi Arabia in this study actually obtained their bachelor's degrees and communicated at work in the English language, so this was considered commensurate with conducting the data collection in English. While some studies have cautioned that HCPs having different native languages might comprise a barrier that might affect communication at work, a direct relationship between the nurses' English proficiency and compliance with the EHR privacy policy has not been demonstrated in the literature (Mitchell, 2023). Thus, the potential

for an interaction between English proficiency and compliance should be noted as a potential limitation of the study.

4.3.4.4. Identification of the Q-Sort and Q-Sorting

The quantitative data that is gathered in the Q-Methodology is accomplished by sorting the Q statement on the Q grid. In the initial of the Q-Sorting activity, participants are instructed to carefully review all card statements and categorise it into three distinct piles: “strong disagreement”, “neutral,” or “strong agreement.” Subsequently, the participants can sort and arranged the cards inside the Q grid, wherein the participants ascertain the extent of their concurrence or discordance with the provided assertions. This kind of distribution has two poles: strong agreement and strong disagreement. The Q-Methodology’s grid feature prevents the participants from duplicating or sorting the statement into only three categories: “strong disagreement,” “neutral” or “strong agreement.” The grid shape, which commonly looks like a downside curve funnel, ranges from -4 or -5, to +4 or +5. The restricted grid shape has a tendency to be judgmental, even though there is an existing debate regarding the outcomes that may be affected by the distribution (Dariel, 2011).

Brown (1980) said that the forced Q grid strongly guides the participants to put the statements in the right order based on the shape shown, with less effect on the pattern of the outcome factors. Brown (1980) used this Q grid shape to sort 33 statements on 14 distributions to prove that it has a minor impact later on the emerging factors. Moreover, it is worth noting that the statements may be understood differently from one participant to another. Thus, Brown (1980) indicated that the statement ambiguity is not an issue, because the methodology incorporates the notion that participants construct their own interpretations of the statements. This feature in the Q-Methodology allows exploring the investigated issue by focusing on the participants’ viewpoints, which are vital in the analytical process (Herrington and Coogan, 2011, Zabala et al., 2018). However, in this study an online tool was used to collect the quantitative data from the participants, whereas the Zoom application was used to collect the qualitative data, as explained in the following subsections.

4.3.4.4.1. **Remote Study**

Due to the COVID-19 restrictions during the study fieldwork period (2021-2022), traditional approaches to conducting data, such as distributing questionnaires or conducting face-to-face

interviews, were not feasible (DeMers, 2020). Conducting quantitative and qualitative data remotely via computer using communication tools is reasonable under these conditions (Clay, 2020). An electronic survey, plus telephone and video interviewing, is considered a suitable means of generating research data (Harris, 2001). Thus, an online tool was used to collect the Q-sort data and the qualitative data in this study, as explained below.

4.3.4.4.2. **Online Q-Platform**

The online tools allow researchers to reach participants through e-surveys and to collect actual data from participants. There are many Q-Methodology online tools that have been developed to assist researchers in conducting their studies remotely. Table 20 compares existing online tools to justify the selection of the one that suits this study's context.

Table 20: Comparison of the Q-online tools

Online Tool	**Platform Navigation (Easy/ Moderate/ Hard)**	**Set-Up**	**Participant Management**	**Email Notification and Reminders**	**Interactive**	**Online Data Analysis**	**Report Generation**	**Support Other Language**	**Data Privacy Policy**	**Price Per Month (GBP)**
Q-assessor	Easy	Easy	Yes/Easy	Yes	Easy	Easy	Easy	Easy	Yes	390
FlashQ	Hard	Moderate	Not applicable	Not applicable	Moderate	Not applicable	Not applicable	Easy	Not applicable	Free
Q-sortouch	Moderate	Easy	Yes/Easy	Not applicable	Moderate	Easy	Not applicable	Not applicable	Yes	150
Esay HtmlQ	Easy	Easy	Not applicable	Not applicable	Easy	Not applicable	Not applicable	Applicable	Yes	Free
Q-method software (Lutfallah, 2019)	Easy	Easy	Yes/Easy	Easy	Easy	Easy	Easy	Easy	Yes	155

4.3.4.4.3. **Selected Online Q-tool**

The researchers reviewed the online tools and selected the "Easy-HtmlQ V1.1" tool for this study. This tool is an open-source software, which can be found freely on the GitHub repository. Anyone who knows Extensible Markup Language (XML) can edit and customise the files easily for any online Q-Methodology study. The tool is linked to Google Firebase, which is a secured database used by developers freely to store the collected data. The Google Firebase is protected by a strong password and can be easily accessed by the researcher. All submitted data can be simply downloaded as a JavaScript Object Notation (JSON) file. The JSON files are an open standard format file that stores quantitative data which can be easily analysed and generated into a report as an excel file using another open-source software called Ken-Q analysis. See, the actual Q-sorting online study at https://www.nottingham.ac.uk/helm/dev-test/ehr-nottingham-q-survey/.

This section only shows the online tools navigations rather than the recruitment processes. For further details on how participants were recruited and how the Q-sort process was undertaken, see section 4.5.2.

The online tool was made to have full online function site, which has several pages. To begin, the online tools pages have instructions of how this study could be executed was made clear. It informed the participants about the study's objective. It then explained to them how the Q-sort activity process could be done. Moreover, it showed them what they expect after finishing the sorting. The tool setup begins with a welcoming page, with a button to continue and start the study (see Figure 14).

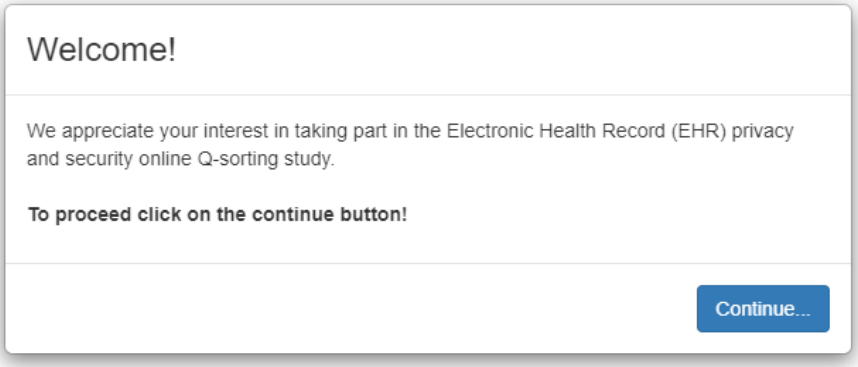


Figure 14: Online Tool Welcoming Page

Pressing the "continue" button takes the participants to the "Introduction" page that subsequently appears, which contains a brief explanation of what the study is about, and some technical instructions (see Figure 15).

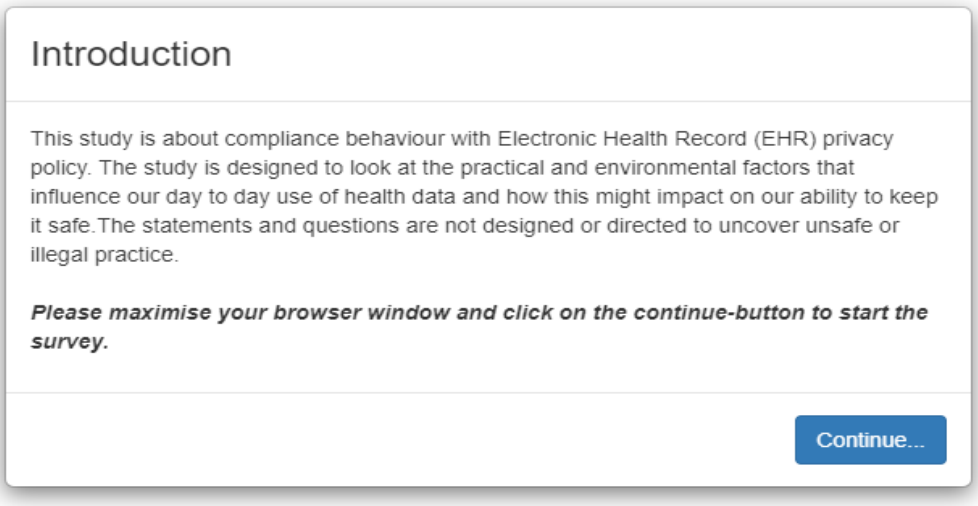


Figure 15: Online Tool Introduction Page

When the "Continue" button is pressed, it directs the participants to the first step of the study page, which contains a written instructions that explain to them what they need to do in order to start the study (see Figure 16). From this stage, the study started which the participants could classify these statements into three piles: "little or no influence," "some influence," or "strong influence" (see Figure 17). Once they finish, it automatically directs them to the next step.

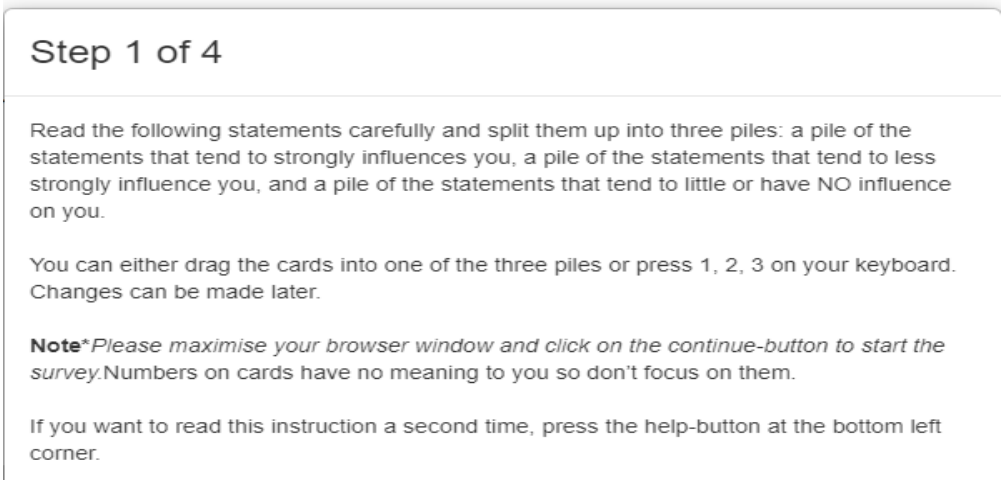


Figure 16: Online tool step 1 of 4

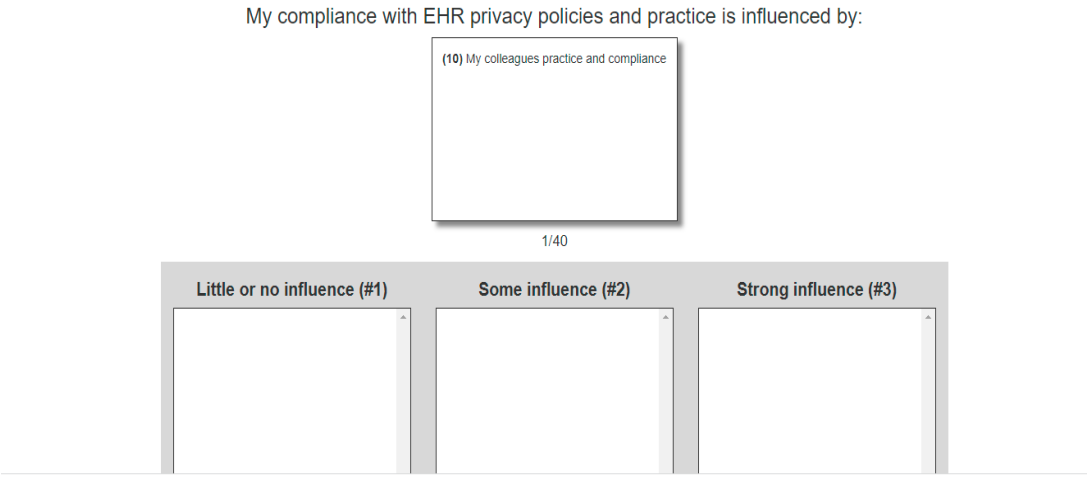


Figure 17: Online Tool Q Statements Piling Process

The second step of the Q-sorting activity is to place the Q-statements on the grid. An instruction popup page appeared, which showed and explained to the participant how and where to start placing the statements (see Figure 18). Then, the grid page appeared with the three piles that they had made in the first stage (see Figure 19). They could move any statement even after they placed it on the grid, as a reminder showed in step 3, which reminded them that they could move any statement from its place to another (see Figure 20).

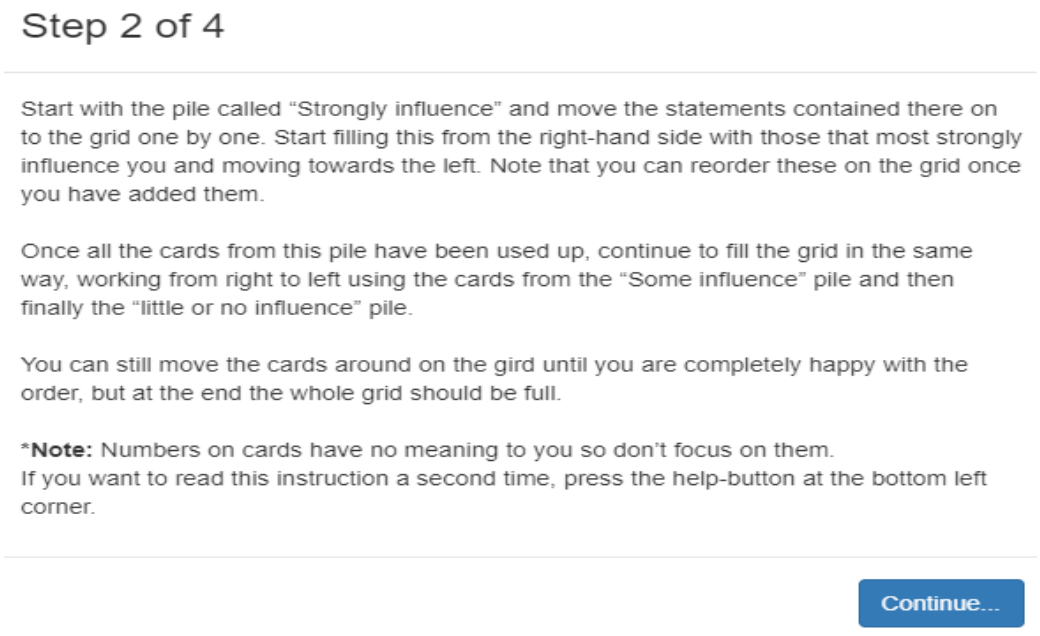


Figure 18: Online Tool Step 2 of 4

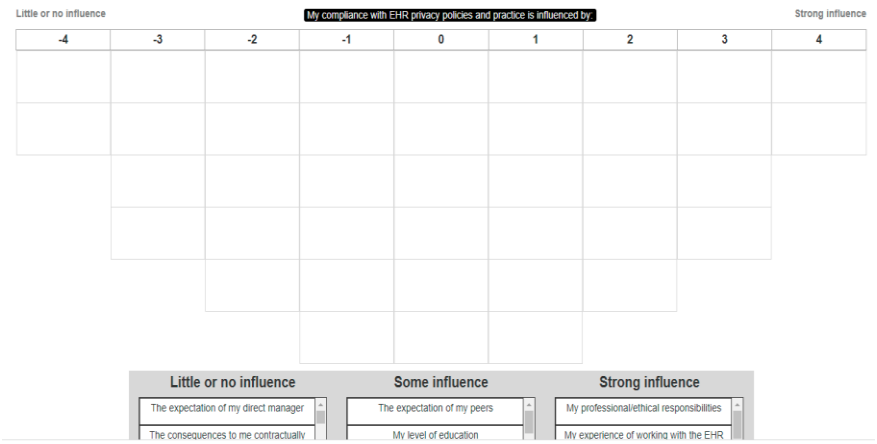


Figure 19: Online Tool Q Grid and Piles

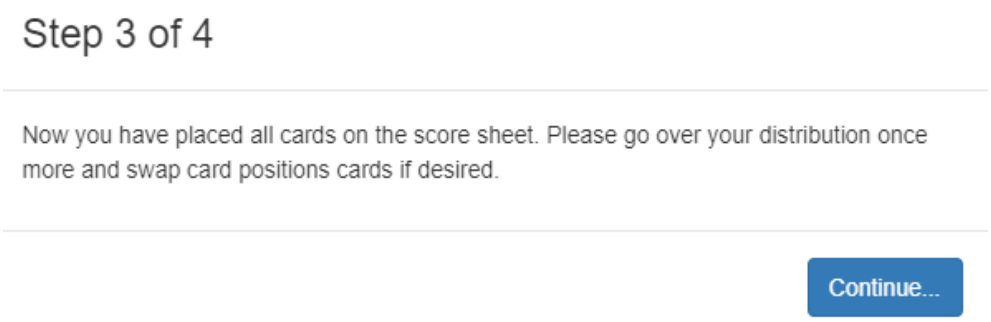


Figure 20: Online Tool Step 3 of 4

Once the participants were satisfied with their sorting, they clicked on "Continue," to get to the final step of entering sociodemographic information (see Figure 21 and Figure 22). Once their Q sort exercise and sociodemographic information is submitted, a final message appeared (see Figure 23 and Figure 24).

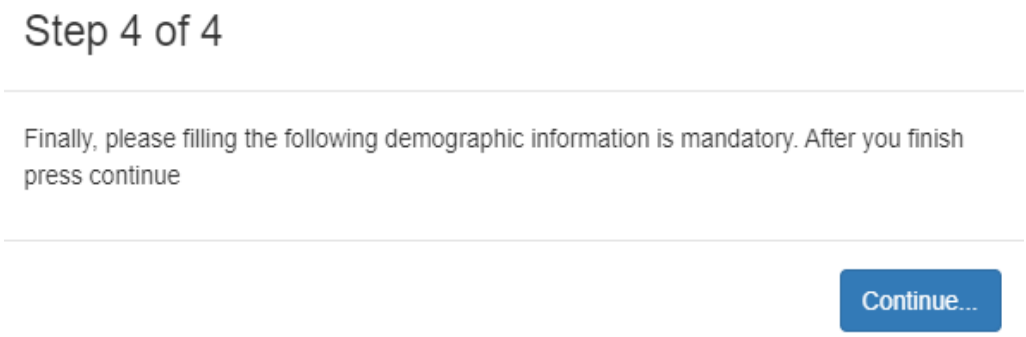


Figure 21: Online tool step 4 of 4

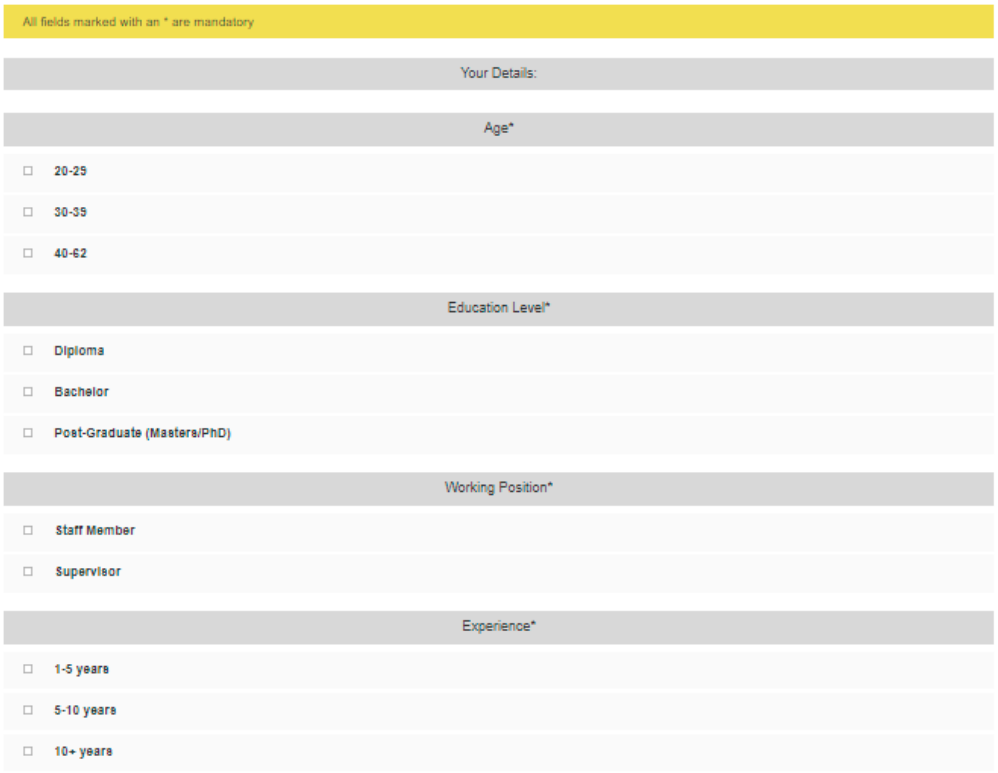


Figure 22: Online Tool Sociodemographic Information



Figure 23: Online Tool Submitting Data Page

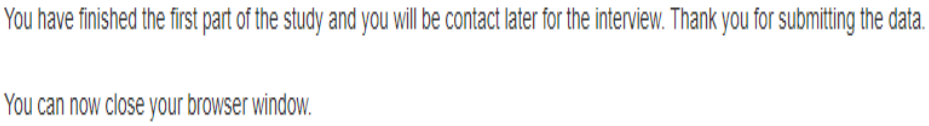


Figure 24: Online Tool Notification for Submitting the Data

4.3.4.5. Post-Sorting Interviews

Post-sorting interviews are usually performed with participants to explain their sorting. During the data analysis and interpretation phase, it was discovered that Q-sort information supported by interviews was beneficial. The post-sorting interview, which is a brief open-ended interview, is used as supportive information to help understand and interpret the Q-sorting process and is just a complement to the Q-sorting exercise (Watts, 2012, Paige and Morin, 2015). The purpose of post-Q sort interviews is to learn why participants position cards in the Q sort response grid

as they do. This simplifies the interpretative examination of factor arrays in respect to the viewpoints and attitudes of participants towards the issues being investigated. The interview attempts to discover respondents' opinions and values that form their own interpretations, rather than what participants think of the investigated issue – which is elaborated through a separate factor analysis procedure (Akhtar-Danesh et al., 2008, Watts and Stenner, 2005). Also, it ought to be noted that the collected data from the post-sorting interview is complementary to the Q-sort data analysis (Van Exel and De Graaf, 2005). However, some researchers often overlook the post-sorting interview after the Q sorts is collected online or by mail.

After the participants finished the Q-sort exercise, the participants were told how the interview would be conducted and what the interview was about, and the interview was being voice recorded. In this study, the interview guide was mainly comprised of four questions:

> "(a) Looking at the statement … can you explain the statements where you did? (b) What other statements in general is appealing to you? (c) What implication do those items have in the context of your overall viewpoint? (d) Do you have any general comments about the statement ranking exercise?"

All the participants' interviews were transcribed; however, the researcher only included the significantly loaded ones in the thesis itself (see Appendix 3: Post-Sorting Interview). The following subsection describes the online tool used to conduct the post-sorting interview.

4.3.4.5.1. **Selected Tool for the Post-Sorting Interview**

As it was planned for the study to be fully conducted online, the researcher had to choose one of the applications that are used in educational and working settings. Therefore, the researcher used the Zoom application (version 5.10.2) to conduct the interviews (see Figure 25). The Zoom application was commonly usually used for work meetings and communication among the participants in Saudi Arabia during COVID-19 lockdowns. This is a free application with audio, video, and sharing content features for up to 100 individuals, which allows the user to record the meeting and save it on the investigator computer device in the form of different output formats, such as MPEG 4 Audio (m4a) form "Moving Picture Experts Group," Audio form "Layer 3 Uniform Resource Locator (m3u)," and form "Moving Picture Experts Group-4 (MP4)." Zoom is compatible with multiple devices, including smart phones, computers, and tablets. The researcher used an encrypted laptop owned by the UoN to save the files, all of which were uploaded to the One Drive account that was provided to the student by the UoN.

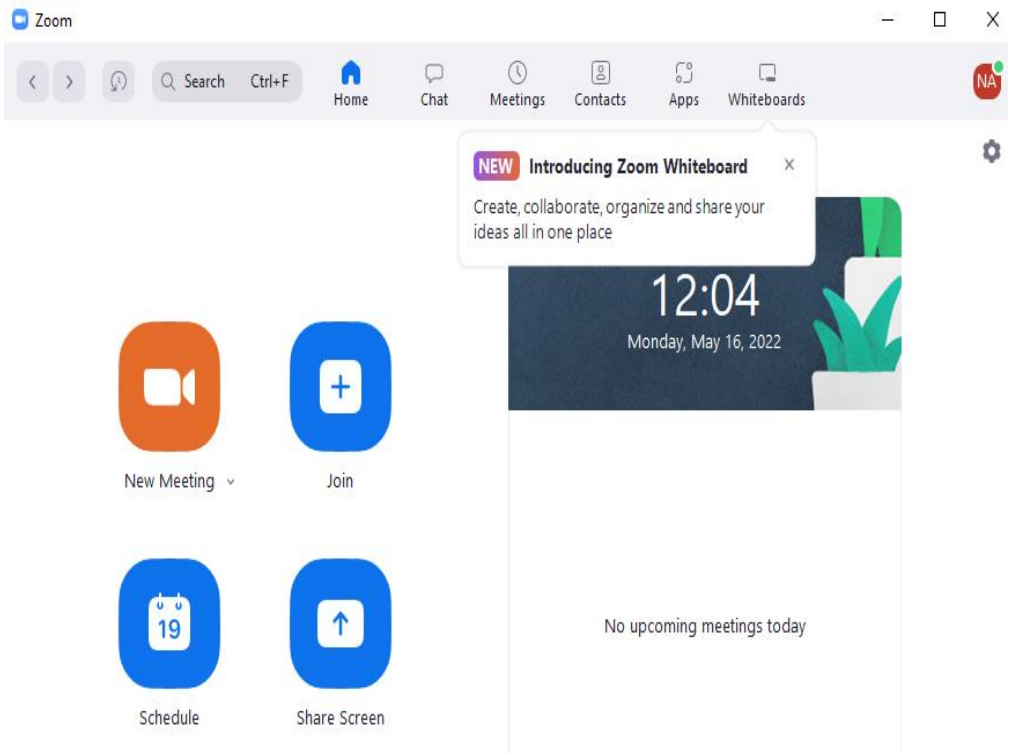


Figure 25: Zoom Meeting Room

4.4. Comparisons Between Traditional Paper and Online Q-Methodology Tools

4.4.1. Traditional Paper Tool

One of the advantages of using the paper method in Q-Methodology is that face-to-face interaction with participants helps researchers to comprehend participants' viewpoints (Brown, 1989, Previte et al., 2007), and may assist researchers to interpret the results (Scott et al., 2014). It also helps to interact one-on-one with the participants, which can assist in eliciting more commitment from them (Couper et al., 2001). The disadvantages of the face-to-face approach may include more operational and resource complications (Peter et al., 2008). Furthermore, the researcher's viewpoints on the participants may be reinforced (Scott et al., 2014), which may reflect on the findings that other researchers cannot produce similar results (Goodman et al., 2016, Guillemin and Gillam, 2004). Also, pertaining to sensitive topics, participants may not express their feelings and try to appear pleasing to researchers (Scott et al., 2014).

4.4.2. Online Tools

The positive side of the online Q-Methodology is that it utilizes less response time and reduces the resource waste of the traditional method (Nazariadli et al., 2019). Besides, it may increase

the reliability of the findings, and it provides a wide and easy online access for participants and researchers (Nazariadli et al., 2019). However, the downside of the online tool is that the tool may confuse participants during navigation the sorting activity because it is not commonly used in the research field (Peter et al., 2008). Besides, participants may have low commitment and engagement to the study, which may result in low data quality.

4.5. Recruitment

This section below shows the study's setting context, and the study's recruitment process.

4.5.1. Study Setting Context

Saudi Arabia is the largest country in the Arabian Peninsula, covering approximately 2,149 km^2 and sharing land borders with seven other Arab countries (Vincent, 2008). In 2020, according to the General Authority for Statistics Available in Saudi Arabia, the estimated population in Saudi Arabia was approximately 35 million. The MoH was established in 1954 (Almasabi, 2013). After 1970, the country increased its oil production and exports. That led to an increase in revenue, which has reflected on the country's development (Aarts and Nonneman, 2006). This also reflected on the healthcare system's expansion and development, aside from human resources development, with regard to educating and training the local population to work as HCPs. The MoH provides 60% of Saudi healthcare services, with the remaining 20% provided by the other governmental sectors and the private sector (Almasabi, 2013). The healthcare system in Saudi Arabia is classified into three levels: primary care, secondary care, and tertiary care.

4.5.2. Recruitment Process

The researcher obtained two ethical approvals from the UoN Faculty of Medicine and Health Sciences Research Ethics Committee (FMHS) and the Saudi MoH (Appendix 2.1). The researcher contacted the gatekeepers at the departments responsible for training and education at the targeted hospitals by email and phone calls, to inform them of the study and plan how and when the fieldwork would be performed. Advertising and recruiting for the study was done through the education and training department at the hospitals. Also, the researcher provided all information regarding the study to the gate keepers and what the participants' characteristics were needed. After sending the study information, participants reached out to the researcher by phone calls and WhatsApp messages asking about the study. It is normal in Saudi Arabia for employees and employers to use WhatsApp messages to communicate rather than using email.

Therefore, the WhatsApp application was used for commutation purposes between the researcher and the participants, but data was not collected through it. However, it was used to extensively explain the study to participants, in terms of its nature and how it would be conducted.

For those who agreed to take part in the study, the researcher scheduled an online meeting through the Zoom application. Both the Q-sort activities and the post-sorting interview were done while the participants were in the online meeting room. They were instructed to take a screenshot of the final grid sorting and send it back via the Zoom app so that they could refer to it when the online post-sorting interview started.

The study took place in Makkah city, among 54 registered nurses recruited from three hospitals in the city, all located within a 10-kilometer radius. The three selected hospitals were: King Abdul-Aziz General Hospital (300 beds, 500 nurses); King Faisal General Hospital (350 beds, 535 nurses); and Al Noor Hospital (500 beds, 1,048 nurses). Collectively, the hospitals have a total of 1,150 beds and 2,083 nurses, each equipped with EHR systems.

The participant recruitment process phase started from 20/12/2021 and lasted until 02/03/2022 (i.e., over two months). The researcher accepted everyone who wanted to participate in the study who met the study's requirements (see Table 18 and Table 19). No difficulties were encountered during recruitment. Initial interest was expressed by 71 nurses, of whom 10 signed the consent form and subsequently dropped out, while 7 completed the Q sort exercise and then dropped out; consequently, their Q sorts were removed. Ultimately, 54 participants who signed the consent form and completed Q sorting exercise and post-sorting interview were included in this study. The 54 nurses were distributed among the hospitals as follows:

- **King Abdul-Aziz Hospital:** 34 nurses
- **King Faisal Hospital:** 17 nurses
- **Al Noor Hospital:** 3 nurses (see, Figure 26 and Table 21)

Table 21: Count of Participants by Hospitals

Al Noor Hospital	**category**	**Count**	**category**	**Count**	**category**	**Count**
Age	*20-29 year*	0	*30-39 year*	2	*40- 49, 50-59, 60-69 year*	1
Education	*diploma*	0	*bachelor*	2	*Gradate (Master and PhD)*	1
position	*staff*	2	*manager*	1	-	-
experience	*1-5 year*		*5-1year*	1	*10 -14, 15- 20, 21-25 year*	2
King Abdul-Aziz Hospital	**category**	**Count**	**category**	**Count**	**category**	**Count**
Age	*20-29 year*	6	*30-39 year*	9	*40- 49, 50-59, 60-69 year*	2
Education	*diploma*	1	*bachelor*	11	*Gradate (Master and PhD)*	5
position	*staff*	10	*manager*	7	-	-
experience	*1-5 year*	4	*5-1year*	7	*10 -14, 15- 20, 21-25 year*	6
King Faisal Hospital	***category***	**Count**	**category**	**Count**	**category**	**Count**
Age	*20-29 year*	8	*30-39 year*	17	*40- 49, 50-59, 60-69 year*	9
Education	*diploma*	6	*bachelor*	7	*Gradate (Master and PhD)*	21
position	*staff*	25	*manager*	9	-	-
experience	*1-5 year*	6	*5-1year*	6	*10 -14, 15- 20, 21-25 year*	22

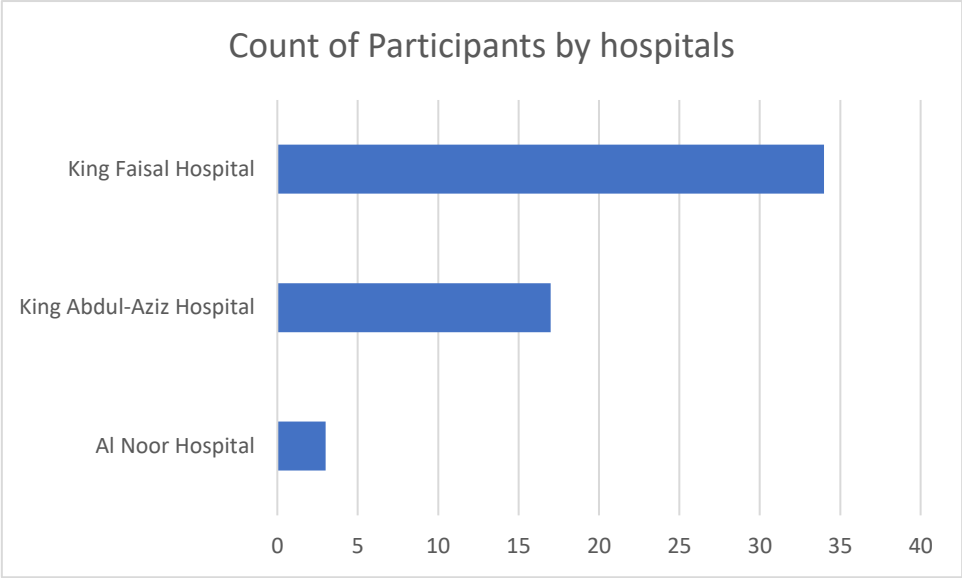


Figure 26: Count of Participants by hospitals

The response rate was calculated as follows:

Response rate = (Number of participants who completed the study/ Total number of the nurses) * 100

= (54/ 2,083) * 100

= 2.59%

Accordingly, in quantitative study, response rate is important as it affect the study's generalisability and validity. A higher response rate is associated with reducing the bias to increase the study's reliability. However, in qualitative study, the response rate is not required as the focus shift from generalisability to the depth understanding of the phenomena.

Prior to the sorting activities, an online consent form was sent to the participants and signed. Then, some additional demographic information was acquired to check for the participating eligibility criteria (Table 18 and Table 19). For the sorting exercise, the researcher instructed the participants that they had to read the instructions that were written for them and if there were any questions or did not understand the process they can ask (see section 4.3.4.4.1). Even though they asked many questions about the navigation, in general, the process went well.

After the sorting activities were completed, participants underwent the post-sorting interview (see section 4.3.4.5). Figure 27 shows the recruitment process steps that were undertaken in this study.



Figure 27: Recruitment Process Steps

4.6. Ethical Considerations

There are vital ethical considerations that researchers must consider when conducting research (Malone, 2003). Blee and Currier (2011) identified that ethical issues may surface anytime and anywhere during the research process. Researchers are obliged not to engage in any activities or release any information that may cause harm to the participants. In this study, the researcher found several points that are worth addressing, such as ethical approval, informed consent, asymmetrical power, anonymity, confidentiality, and data protection.

4.6.1. Ethical Approval

The researcher obtained ethical approval from both the UoN FMHS and the Saudi MoH before proceeding with the data collection phase (see Appendix 2.1: Ethical Approval Document).

4.6.2. Study Information Sheet and Informed Consent

The study took place in Saudi Arabia, and the study sites (all of which were operated by the MoH) were contacted and informed of when the study would take place, and to ask for their permission and cooperation. Two ethical approvals were required from both of the Faculty of Medicine and Health Sciences Ethics Committee of the UoN, and the MoH in Saudi Arabia.

The gatekeepers were contacted, and the study information was sent to them. The participants were provided with a study information sheet that had essential information regarding the study. Those who were willing to participate were sent two links via WhatsApp that directed them to the appropriate online consent forms for the UoN and MoH (via Microsoft Forms), where they could digitally sign the two forms and print or save them on their device. The participants were informed before and after they signed the consent form that participation in the study was voluntarily and they could withdraw at any time.

4.6.3. Asymmetric Power Relations

The asymmetric power relationship that occurs during the research experiment between researcher and participants due to the researcher's dominant perception also needs to be considered (D'Cruz, 2000). Conducting research online might have the benefit of reducing the effect of this relationship to a minimum, due to the physical absence of the researcher (the participants were not observed face-to-face). Moreover, the participants might feel more comfortable revealing information with the online tool. Interviewing participants can lead to revealing sensitive information. Thus, it was vital that the researcher and nurses be prepared to handle this situation. Also, the participants might feel threatened due to the subject sensitivity, which might impact their responses. Therefore, the participants were advised that they could pause or terminate sessions at any time, referring them to counselling services if necessary.

4.6.4. Anonymity, Confidentiality and Data Protection

Anonymity, confidentiality, and data protection are key ethical considerations in the online questionnaire. The online survey may violate participants' privacy more than the traditional paper survey (Cho and LaRose, 1999). Therefore, it is very important that data is not collected unnecessarily and not collected through websites that collect information and will be

maintained securely. The selected HtmlQ online tool was designed to keep the collected data secure, and the researcher team ensured that no personal data would be collected unless it was required for the study.

The researcher informed the participants that the collected data would be available only to the research team and protected under the data protection guidelines of the UoN. Moreover, the researcher kept the collected data from other means (such as audio recorded interviews) on a secured one drive that was provided by the UoN.

4.6.5. Website Functionality

Another consideration that must be taken when collecting data using online methods is to ensure that websites do not inadvertently collect identifiable participant information, such as unique IP addresses and so on. The online tool chosen for this study was made so that this kind of accidental data collection would not happen.

4.7. Summary

This chapter deliberated on the Q-Methodology theoretically, and how it was implemented online. It took approximately three months to administer the study to registered nurses at three hospitals in Makkah, Saudi Arabia. The Q-Methodology, as used in this study, is usually used to capture people's subjectivity (i.e., their subjective perceptions and thoughts concerning researched phenomena) in an objective way. It is grounded in the mixed-method approach, classified under the pragmatic paradigm. All of the method's steps were described and illustrated to show how it was applied. The method has five sequential steps, which include generating the concourse, developing the Q-Set, selecting participants (P-set), and analysing and interpreting factors.

The DPBT and DT frameworks were used to generate the concourse, which resulted in 120 statements that were downsized to 40 statements that were sorted by 54 participants, selected using a P-matrix. Post-sorting interviews were piloted as a complementary part of the Q-sorts activity. The data analysis used Kade software (version 1.2.1) to analyse Q-sorts data, and Microsoft Word software to organise the interview data. The extracted factors are presented in the following chapter.

Moreover, the justifications for using the Q-Methodology and the drawbacks and strengths of the methodology were discussed in detail in this chapter, and the online Q-Methodology tool's

evaluation and comparison between the traditional and online tools were presented and discussed. It showed the selection process of the online tool to collect the study's data.

CHAPTER 5
FACTOR ANALYSIS AND INTERPRETATION

This chapter presents the study's P-Set demographic characteristics. Moreover, it presents the factor analysis processes of the Q-Methodology and explains how it was performed in this study. Finally, it explains how the results are interpreted, as presented in the following chapter.

5.1. P-Set demographic characteristics

This study recruited 54 full-time nurses from three hospitals runs by the MoH in Makkah, Saudi Arabia, as described in Chapter 4. Table 22 below shows the 54 participants' demographic characteristics. It can be seen that the largest cohort were aged 30 to 39 years' old (48.1%). Most of the participants held bachelor's degrees (64.8%), and were employed as staff nurses (70.03%). Finally, participants with more than ten years of experience made up half of the experience sample.

Table 22: Sociodemographic Characteristics of P-Set (N=54)

	Frequency	Percent (%)
Age (years)		
20-29	15	27.8
30-39	26	48.1
40-62	13	24.1
Education		
Diploma	8	14.8
Bachelor's Degree	35	64.8
Master's Degree/Post Grad	11	20.4
Position		
Staff	38	70.03
Managers/ supervisors	16	29.6
Experience (years)		
1-4	12	22.2
5-9	15	27.8
10 +	27	50

5.2. Factor Analysis

The aim of the factor analysis stage in the Q study is to categorise the participants' viewpoints into a few different factors that were captured in the Q-sorts. This stage entails three phases, as shown in Figure 28; correlation, by-person factor analysis, and factor score calculation (Valenta and Wigger, 1997, Brown, 1980).

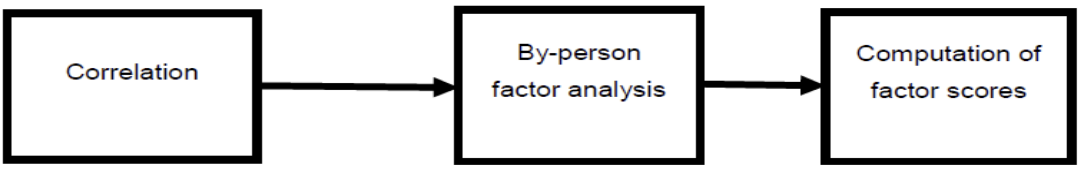


Figure 28: The Q-analysis stages

Analysing the Q-sorts' data requires a specific software to execute this phase. There are many Q software packages used by researchers, such as PQmethod, PCQ, and KADE software. This study used KADE software (version 1.2.1), due to its user-friendly interface (see Figure 29) (Banasick, 2019, Banasick, 2021). The complete Q-sorts were entered and analysed by the chosen software. After the analysis of the data were completed, the outcome result was

produced in the form of an Excel spreadsheet. The following section explains every step in the analysis.

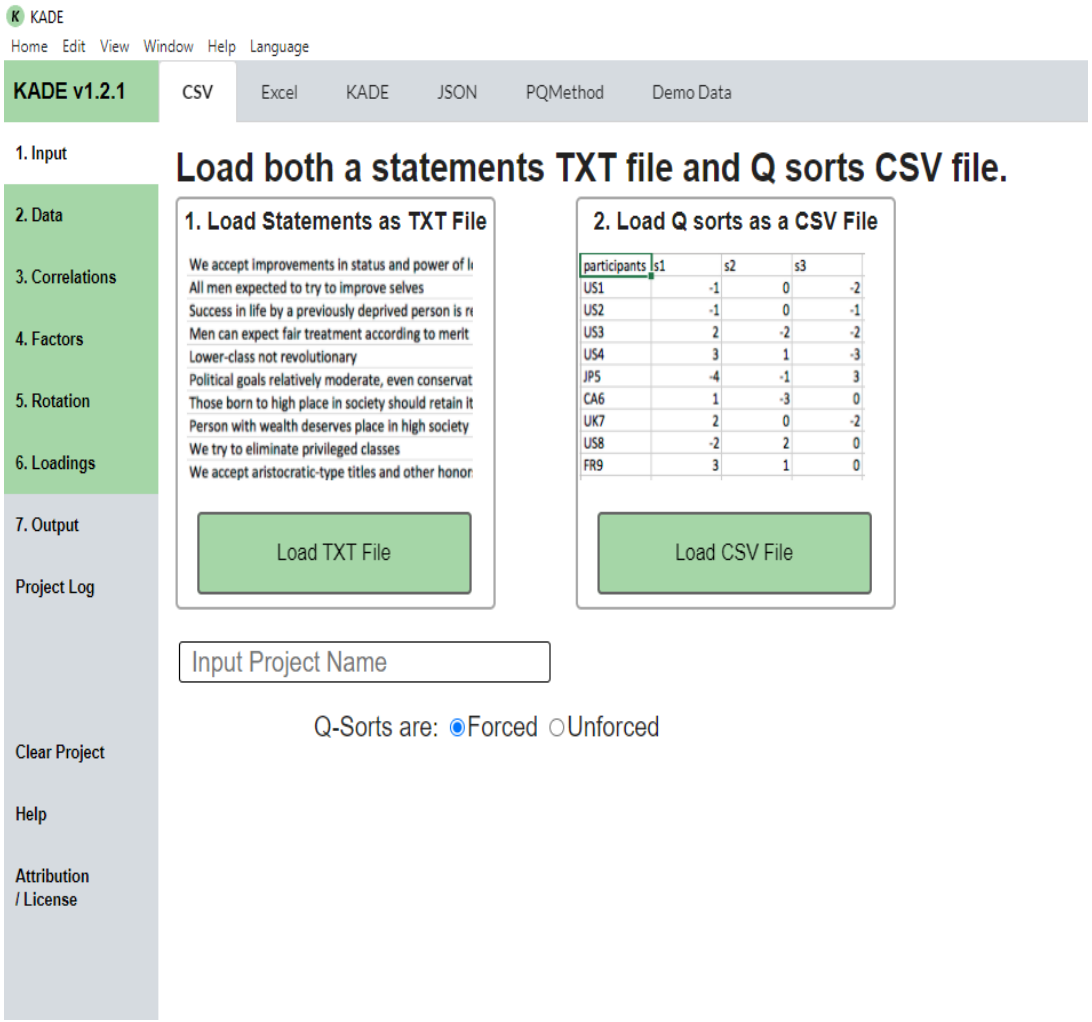


Figure 29: KADE Software Version 1.2.1

5.3. Correlation

The first step is to make the correlation matrix, which looks for patterns of similarity and difference in the Q-sorts in order to find out what factors are emerging. In order to generate a correlation matrix, an inter-correlation for each Q-sort that was performed by one participant with the others' Q-sorts was performed (Barker, 2008, Valenta and Wigger, 1997, Watts, 2012). The Q-sorts were then entered into the Kade-Q analysis software to execute the correlation step (see Appendix 2.4: Q-Sorts' Correlation Matrix).

5.4. By-Person Factor Analysis (Factor Extraction)

Factor analysis is a statistical technique utilised to elucidate the variation that is present among observable variables that are connected with each other. This technique aims to represent this variation in terms of a smaller set of unseen variables, known as factors (DeCoster, 1998). Hence, the analysis in the Q-Methodology clusters the participants' Q-Sorts' viewpoints into few factors so that each factor has similar shared opinions about a specific topic, which is called "by person factor analysis." It is used to analyse the Q-Sorting statements activities, which several scholars believe is a reversed version of factor analysis in R-Methodology. In fact, researchers have posited that "R-Methodology" is fundamentally different from "Q-Methodology," as the former concerns finding the correlation between variables (e.g., the weight and height of individuals), whilst Q-Methodology aims to find the correlation between individuals' sorting viewpoints (Mckeown and Thomas, 2013).

Before factor analysis the correlation between the Q-sorts will be done to identify the people viewpoints. Then, the outcomes from the correlation process goes to the factor extraction process. The extraction of factors and factors rotation are two elements in this step.

Starting with factor extraction, Watts (2012) described that Q studies frequently employ centroid factor analysis (CFA) extraction and principal component analysis (PCA). CFA offers an understanding of the extent that a person or combined joint factors are involved in clarifying the variation of the investigated factors, which allows identification of joint factors that have an important impact on the analysed model (Balu and Furtuna, 2006). However, PCA is more commonly employed for reducing the complexity of extensive datasets, which it does by converting a substantial number of variables into a more compact representation that retains the majority of the data included in the original dataset (Richardson, 2009).

Watts (2012) stated that CFA extraction is a traditional method to analyse and extract factors in the Q-Methodology. Stephenson (1953) and Ramlo (2016a) favour CFA in analysing Q-Methodology results due to its indeterminacy, which necessitates the study of various clarifications as opposed to jumping to the best mathematical answers, which might be quickly obtained by PCA. As Wright (2013) p. 156) explains, CFA can be used to search for elements that may align with a theoretical perspective that the investigator or literature may find. Using CFA may be preferred over PCA for theoretical reasons; it has been argued that PCA is not a

factor analysis technique, and its outcome results are thus not factors, but Webler et al. (2009a) argued that similar results can be obtained using either PCA or CFA.

CFA has been preferred in many Q studies' data analyses over PCA, because the latter has limited theoretical discovery potential in regard to the investigated issue (Brown, 1980, Watts and Stenner, 2012a). CFA provides flexibility to analyse data using various solutions to cluster similar patterns of a group Q-sorts, which can be used to discover in-depth participants' viewpoints. Therefore, the CFA was chosen to apply in this research because of its indeterminacy. Moreover, PCA is used to validate the factors extraction outcomes (i.e., scree test). The following subsection explains the factor extraction process and its application.

5.4.1. Factor Analysis Process and Outcomes

The Q-Methodology's fundamental aim is to capture people's subjectivity through an objective approach (Brown, 1980). The factor extraction process in the Q-Methodology depends on the researcher's experiences in the field (Watts, 2012), and it is the researcher's responsibility to review their data, and then defend these as the best possible analytical solution. Thus, the analysis process applied to the results of this study was adopted from the five steps developed by Watts (2012) and Watts and Stenner (2012a) from Brown (1980) that Q-methodologists set to extract objective factors after applying CFA, to achieve less subjective factor analysis and data extraction processes while attaining meaningful factors, as listed below and described in the following subsections:

- The magic number 7 criterion
- The Kaiser-Guttman criterion
- The two or more Q- sorts significant loading criterion
- The Humphrey's rule criterion
- The Scree test criterion

5.4.1.1. The Magic Number 7 Criterion

The Magic Number 7 Criterion is used to identify the initial extracted factors in Q analysis. This was originally defined by Brown (1980) as a starting point for Q analysis. The selection of the "magic 7" is only a starting point, and mainly should be applied with very large data sets. Other criteria must be applied in order to identify the truly substantive factors because the usage of the magic number 7 criterion only is arbitrary way to extract the factors at this stage (Brown,

1980, Watts and Stenner, 2012a). Thus, using other criteria can help in retaining objective factors.

5.4.1.1.1. **Application of the Magic Number 7 Criterion**

The criterion was applied to the data and seven factors were identified. The Table 23 shows all participants' Q-sorts loading significantly or non-significantly before factor rotation. In detail, Factor 1 had 23 Q-sorts that were significantly loaded and 4 confound Q-sorts. Factor 2 had 3 Q-sorts were significantly loaded and 2 confound Q-sorts. Factor 4 had 1 Q-sort that was significantly loaded and 1 confound Q-sort. Factor 5 had 1 Q-sort that was significantly loaded and 2 confound Q-sorts. Factor 7 had 1 Q-sort that was significantly loaded and 1 confound Q-sort. Factors 3 and 6 had zero Q-sorts significant loaded.

In addition, at the bottom of the Table 23, the factors' eigenvalue (EV) and factors' parentage explained variance were displayed. Also, it shows the participants' characteristics in the column named "Participants." For example, "**P1**G2E2O1X3" refers to participant number **(P1)**, G letter refers to the age groups, E letter refers to the level of education, O letter refers to the working position group, and X letter refers to working experience group. The numbers indicate the number of group's categories: the age group has three categories (1, 2, and 3), level of education has three categories (1, 2, and 3), working position has two categories (1 and 2), and working experience group has three categories (1, 2, and 3).

Table 23: Un-Rotated Factor Matrix of Q-sorts

Participants	**Factor**						
	1	**2**	**3**	**4**	**5**	**6**	**7**
1. **P1**G2E2O1X3	***0.4294**	-0.2887	0.0451	-0.0944	***0.426**	0.076	0.2652
2. **P2**G2E2O2X3	**0.5182**	-0.0728	0.0028	0.1696	0.061	0.0156	0.0998
3. **P3**G1E2O1X1	***0.4523**	0.0712	0.0027	0.1051	***-0.4013**	0.0827	-0.2974
*4. **P4**G1E2O1X1*	*0.3027*	*0.1518*	*0.0124*	*0.2317*	*0.1464*	*0.0338*	*-0.1586*
5. **P5**G2E1O1X3	**0.7315**	0.119	0.0077	-0.1372	0.1012	0.009	-0.1732
6. **P6**G3E1O1X3	0.3804	**-0.4396**	0.1085	0.2551	0.0504	0.0322	-0.2296
7. **P7**G2E2O1X2	**0.5349**	-0.2701	0.0394	0.283	0.1093	0.0425	0.3527
8. **P8**G2E3O2X2	**0.4794**	0.1068	0.0061	0.0649	-0.3439	0.0589	-0.1823
*9. **P9**G2E2O1X3*	*0.2543*	*0.177*	*0.0169*	*0.1698*	*0.2785*	*0.0447*	*0.1918*
10. **P10**G3E2O2X3	**0.5349**	0.1971	0.0209	0.0087	-0.2209	0.024	0.3171
11. **P11**G2E2O2X3	**0.5234**	0.1862	0.0187	0.2173	0.0347	0.0235	-0.1094

Table 23: Un-Rotated Factor Matrix of Q-sorts

Participants	Factor						
	1	**2**	**3**	**4**	**5**	**6**	**7**
*12. **P12**G3E2O2X3*	*0.1859*	*0.1995*	*0.0215*	*-0.3118*	*-0.1498*	*0.0491*	*-0.2183*
13. **P13**G3E3O2X3	**0.569**	0.1432	0.011	0.2192	0.2546	0.0487	-0.2982
14. p14G1E1O1X2	**0.4924**	0.1772	0.0169	-0.0415	0.1452	0.0071	-0.0899
*15. **P15**G2E3O2X3*	*0.2302*	*0.2147*	*0.0249*	*-0.3539*	*-0.3051*	*0.0952*	*-0.0901*
*16. **P16**G2E2O2X3*	*0.1471*	*-0.3166*	*0.0546*	*-0.2556*	*0.0643*	*0.0251*	*-0.2293*
17. **P17**G3E1O1X3	**0.6658**	-0.1634	0.0142	-0.1596	-0.3084	0.0541	-0.0969
18. **P18**G1E2O1X1	**0.6848**	-0.142	0.0107	-0.1722	0.194	0.0236	-0.2493
*19. **P19**G2E2O1X2*	*0.3877*	*-0.0863*	*0.0039*	*-0.1385*	*-0.3878*	*0.0775*	*-0.0822*
20. **P20**G2E3O1X3	0.1319	-0.3827	0.0809	**-0.588**	-0.3123	0.1999	0.2151
21. **P21**G2E3O2X3	**0.7741**	0.1362	0.01	0.1041	0.0579	0.0068	0.0287
*22. **P22**G2E3O2X3*	*0.2949*	*-0.1792*	*0.0171*	*0.1163*	*0.1264*	*0.0126*	*-0.0768*
23. **P23**G1E2O1X1	0.0269	-0.1416	0.0106	-0.2934	**0.4663**	0.1245	0.1488
24. **P24**G2E2O1X2	0.3748	**0.5011**	0.1443	-0.0994	0.0812	0.0046	-0.0048
25. **P25**G2E2O1X2	**0.4865**	-0.0791	0.0033	0.3984	0.053	0.0761	0.2613
26. **P26**G1E2O1X1	***0.4762**	-0.2043	0.0223	0.0872	-0.1816	0.0211	***-0.415**
*27. **P27**G3E1O1X3*	*0.2968*	*0.2841*	*0.044*	*0.1169*	*0.0009*	*0.0075*	*0.3066*
28. **P28**G3E3O2X3	**0.4213**	0.1086	0.0063	-0.0966	0.1234	0.0074	0.1712
*29. **P29**G2E2O1X3*	*0.1659*	*-0.2756*	*0.041*	*0.3305*	*-0.3518*	*0.1138*	*-0.0303*
30. **P30**G1E3O1X1	**0.5038**	0.3399	0.0636	0.2266	0.2211	0.0437	-0.1079
*31. **P31**G2E3O2X3*	*0.014*	*-0.4066*	*0.0919*	*-0.187*	*-0.3748*	*0.0792*	*0.1916*
32. **P32**G1E2O1X1	**0.5447**	-0.1538	0.0126	0.1847	0.1161	0.0216	-0.3369
33. **P33**G2E1O1X3	*0.2427*	*-0.1946*	*0.0202*	*-0.2302*	*0.161*	*0.0282*	*-0.0783*
34. **P34**G2E2O1X2	*0.2321*	*-0.3713*	*0.076*	*0.0531*	*0.0879*	*0.0041*	*0.0533*
35. **P35**G2E1O1X3	*0.1691*	*-0.0351*	*0.0006*	*0.1236*	*0.2339*	*0.0287*	*0.3081*
36. **P36**G3E2O1X3	*0.1725*	*0.0931*	*0.0047*	*-0.0604*	*-0.1707*	*0.0154*	*0.1246*
37. **P37**G3E3O2X3	*0.1366*	*0.0661*	*0.0024*	*0.1352*	*0.2398*	*0.0313*	*0.0826*
38. **P38**G2E2O1X3	**0.4289**	0.3629	0.0729	0.1431	-0.0788	0.0146	-0.1696
39. **P39**G3E2O1X3	***0.533**	***0.4881**	0.1364	-0.2125	0.0971	0.0189	0.1369
40. **P40**G1E2O1X1	***0.427**	0.0629	0.0021	***-0.435**	0.1347	0.0825	0.1021
41. **P41**G2E2O2X3	**0.4424**	-0.0339	0.0006	0.1475	-0.2354	0.0387	0.306
42. **P42**G2E2O2X3	0.2023	-0.2709	0.0396	-0.0323	0.2381	0.021	**-0.4418**
43. **P43**G3E2O1X3	**0.6943**	-0.0276	0.0004	0.0867	-0.1133	0.0115	0.0023

Table 23: Un-Rotated Factor Matrix of Q-sorts

Participants	Factor						
	1	**2**	**3**	**4**	**5**	**6**	**7**
*44. **P44**G1E2O1X3*	*0.226*	*0.0054*	*0*	*0.1608*	*0.1835*	*0.0254*	*-0.1011*
45. **P45**G3E2O1X3	***0.4735**	0.0766	0.0032	-0.3191	***0.4185**	0.1124	0.1792
*46. **P46**G2E1O1X2*	*0.0199*	*0.1226*	*0.0081*	*0.2251*	*-0.3689*	*0.0909*	*0.31*
*47. **P47**G1E2O1X1*	*0.1912*	*-0.2728*	*0.0402*	*-0.0977*	*-0.3462*	*0.0595*	*0.0788*
48. **P48**G2E3O2X1	0.1583	**-0.5245**	0.1587	-0.187	0.1361	0.0184	0.1086
*49. **P49**G2E2O1X2*	*0.2854*	*-0.242*	*0.0314*	*-0.1043*	*-0.254*	*0.0343*	*-0.1213*
50. **P50**G1E2O2X2	***0.477**	***0.5007**	0.1441	0.0132	-0.1505	0.0121	0.0749
51. **P51**G1E2O1X2	**0.5139**	0.1813	0.0177	0.1774	-0.1479	0.0275	-0.2465
52. **P52**G1E3O2X2	**0.4491**	0.2484	0.0335	-0.0308	-0.2379	0.0274	0.3314
53. **P53**G2E2O2X3	**0.6126**	0.4081	0.0932	-0.2457	0.0817	0.0239	-0.1566
54. **P54**G2E2O1X2	**0.4802**	-0.1562	0.0129	0.2943	0.3486	0.0914	0.0402
Eigenvalues	9.7361	3.3992	0.1568	2.435	2.9563	0.1807	2.3154
% explained variance	18	6	0	5	5	0	4

Italic text: refers to non-significant Q sorts loading
Bold number: shows the significant Q sorts loading
(*) refers to confound Q sorts

5.4.1.2. The Kaiser-Guttman Criterion

The Kaiser-Guttman criterion is suggested to apply a limit of greater than 1 EV to the data outcome factors (Brown, 1980). EVs are a distinct collection of scalar parameters that are linked to a set of linear formulas, often in the form of matrix formulas. According to Watts and Stenner (2012a) the EV is able to show the investigator the factor explanatory power, which points out the eligible factor for factor rotation. The rule is the researcher must have a cut-off point for extraction factors when the EV is equal to or greater than 1. Calculating the EV for the factors follows this equation:

$$\text{Factor X} = (\text{fist Q-sort loading on Factor X})^2 + (\text{second Q-sort loading on Factor X})^2 \text{ and } \ldots + (\text{N Q-sort loading on Factor X})^2$$

Watts (2012) stated that researchers need to be careful not to ignore possible factors at the retaining factors stage. However, the use of the EV rule for determining the number of the

extracted factors often results in a larger number of factors when studies have larger Q-sorts. Brown (1980) argued that the EV technique of extracting factors might result in the extraction of meaningless factors. The issue is that using only the EV creation to extract any factors that has larger than 1 value could lead to an issue of extracting meaningless factors when the study has a large number of participants or Q sample. Using only the Kaiser-Guttman criterion to extract factors might be subjective at this stage (Watts and Stenner, 2012a). Thus, there are other criteria that the Q researchers recommend applying to data sets to ensure the extracted factors are fully robust. These criteria are: the two or more Q-sorts significant loading criterion, Humphrey's rule criterion, and the scree plot criterion, which can be applied to verify the outcomes of the EV criterion (Watts and Stenner, 2012a).

5.4.1.2.1. **Application of the Kaiser-Guttman Criterion**

By following the Kaiser-Guttman criterion, the seven factors can be reduced to five factors, as can be seem in Table 24. The five-factor solution accounted 38% of variance of the study, which makes this a potential solution. This study had 54 participants sorting 40 statements, whereas Q-studies recruit usually between 12 and 20 participants to sort 40 to 60 Q-statements (Webler et al., 2009a). As explained previously, Q studies usually do not require a large number of participants (McKeown, 1988); the purpose of the Q research is to examine people's viewpoints on a specific issue and it does not prefer to have a large quantity of participants in the study (Brown, 1980, Watts and Stenner, 2012a). However, the current study did have a relatively large P-Set. Therefore using only the EV criterion to extract factors might be subjective at this stage (Watts and Stenner, 2012a). As this criterion resulted in five factors, the two or more Q-sorts significant loading criterion Humphrey's rule criterion and the scree plot criterion were applied to verify the outcomes of the EV criterion (Watts and Stenner, 2012a).

Table 24 shows the five criteria that the researcher used to retain the factors of this study. It shows all outcome factors from the data, and the steps that every factor underwent through the process of applying the criteria. Moreover, the EV and standard error (SE) of each factor is presented in the table.

Table 24: Factors' Extraction Criteria

No.	Criteria	Factor						
1	Magic number 7	1	2	3	4	5	6	7
	EV	9.7361	3.3992	0.1568	2.435	2.9563	0.1807	2.3154
2	Factors met Kaiser-Guttman	1	2	*	4	5	*	7
3	Two or more Q- sorts significant loading	1	2	*	Not passed	Not passed	*	Not passed
4	Factors that met the Humphrey's rule Standard error is 0.16 Double is 0.32	1	2	*	*	*	*	*
		0.56 pass	0.26 Pass with exception	*	0.25	0.19	*	0.15
5	Scree test	1	2	*	*	*	*	*
* refers to factors not meeting the criteria								

5.4.1.3. The Two or More Significant Q-Sorts Loading Criterion

The third criterion is called "two or more significant Q sorts loading," as outlined by (Brown (1980)p. 222). This is achieved by looking at the un-rotated factors table that resulted from applying the previous criteria then counting in any factors that has two or more significant Q sort loadings. Usually at this stage, the significance level of the study needs to be calculated. The following equation can calculate the significance level for Q studies:

$$\left(2.58 * \left(1 \div \sqrt{\text{number}} \text{ of the statements}\right)\right)$$

So, any Q-sort's loading scores equal or higher than the significance level of the study considers to be significant (Brown, 1980). Confound Q-sorts that loaded significantly on two different factors, cannot be count as significant Q-sort (Watts and Stenner, 2012a). After this, another criteria usually recommended to verify the extracted factors.

5.4.1.3.1. **Application of the two or more significant Q sorts loading criterion**

The third criterion was achieved by looking at Table 23, and counting any factors that have two or more significant Q-sorts loading. Before proceeding in this criterion, the significance level of this study needs to be calculated. The following equation can calculate the significance level for Q studies (Brown, 1980) p. 222):

$$2.58 * (1 \div \sqrt{\text{number}} \text{ of the statements})$$

$$2.58 * (1 \div \sqrt{40}$$

$$2.58 * (1 \div 6.3)$$

$$2.58 * (1 \div 6.3)$$

$$2.58 * (0.1587) = 0.4095\ to \pm 0.41.$$

Thus, the significance level of this study is (P=< +/-0.41)

The result was that only Factors 1 and 2 satisfy this criterion set (see Table 24). Factors 4, 5 and 7 did not meet the two or more significant loading criterion, because all of them have one significant loading Q-sort, and one or two confound Q-sorts. Thus, Factors 1 and 2 were carried out to be tested by the rest of criteria.

5.4.1.4. Humphrey's Rule Criterion

The fourth criterion is "Humphrey's Rule," which involves multiplying the highest two Q-sort scores in each factor. The cross product of each factor then determines whether the result exceeds the double of the study's SE (Brown, 1980)p. 223). If it exceeded the double of the study's SE then it can be count as factor, however, Watts and Stenner (2012a) said that the Humphry's rule could be applied less strictly by keeping the SE as it is. In this case, factors can be counted in the study if the two highest Q-sorts cross product exceeded the study's SE. The equation of the calculating the SE is $(1 \div \sqrt{\text{number}}$ of the statements) (Brown, 1980, p. 222).

5.4.1.4.1. **Application of the Humphrey's Rule Criterion**

Humphrey's rule involves multiplying the highest two Q-sort scores in each factor. Then, the cross product of each factors determines whether the result exceeds the double of the study's SE (Brown, 1980) p. 223). To calculate the study's SE is needed to be calculated. The equation of the calculating the SE is $(1 \div \sqrt{\text{number}}$ of the statements) (Brown, 1980)p. 223):

$$1 \div \sqrt{40}$$

$$1 \div 6.3 = 0.1587 \text{ Rounded up to } 0.16$$

The study's SE is (0.16), and the Double SE is 0.32.

The cross product of the highest two Q-sorts of the Factors 1 and 2 are 0.56 and 0.26. Factor 1 met the criterion and Factor 2 did not met criterion. As advised by Watts and Stenner (2012a), the Humphry's rule could be applied less strictly by keeping the SE as it is. In this case, the Humphry rule was applied less strictly to Factor 2 by keeping the SE in this study at 0.16. Thus, Factor 2 passed since the cross-product value equals 0.26 (see Table 24).

5.4.1.5. Scree Test Criterion

The final criterion is the "Scree Test," which is used to examine all extracted factors and verify the outcomes. It is a precise test for determining how many factors should be extracted during data analysis (Watts, 2012). This test is derived from the PCA context according to Cattell (1978), which is typically used in the factor analysis process. This test involves graphing each factor's EV as a point on a chart, and then connecting them with a sloping line. The count of points on the chart are then considered as factors before the line changed and becomes steady (Watts, 2012). As previously discussed, PCA and CFA often produce very similar outcomes (Harman, 1976, Watts, 2012). PCA is a more optimal mathematical solution, because it reduces itself into a single entity, which ought to be accepted. In fact, Watts (2012) stated that this test is more accurate than the Kaiser–Guttman criterion in the factor retention process. Therefore, these criteria were applied in this study and the result will be presented in the next chapter.

5.4.1.5.1. **Application of the Scree Test Criterion**

The Scree Test criterion was performed, which shows the biggest change seems to be between 1 and 2 (see Figure 30 and Table 25). This verifies that there were only two factors (Factors 1 and 2) that this data could present (see Table 24), and the rest could be spurious factors (i.e., Factors 4, 5, and 7). According to Watts (2012), this test is more careful than the Kaiser–Guttman criterion in the factor retention process.

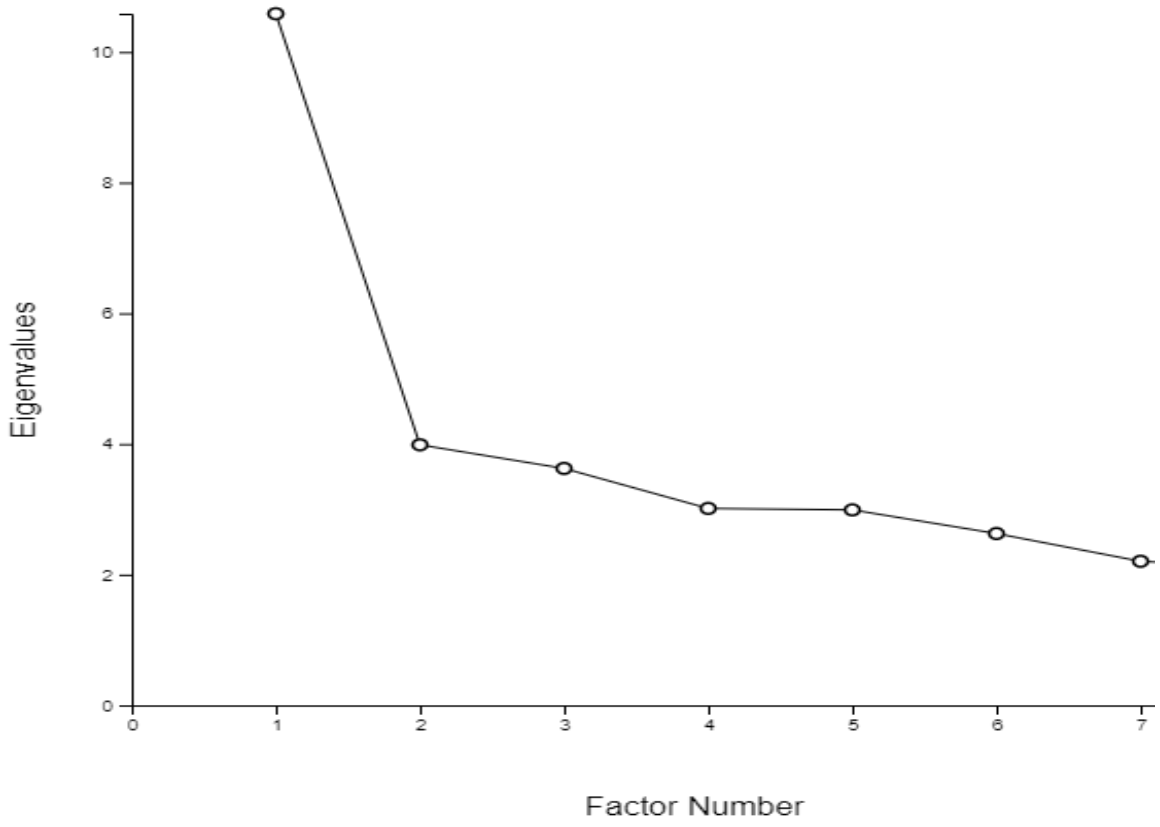


Figure 30: An initial PCA

Table 25: EV of an initial PCA

PCA	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Eigenvalue	10.5844	3.986	3.6244	3.0127	2.9904	2.6283	2.0878

5.4.2. The Decision of Selecting the Study Solution

The 2-factor solution was by far the most robust statistically speaking, since it met all of the aforementioned criteria. Studies returning 2 factors such as this as quite common in Q studies (Lundberg et al., 2020). A relaxing of some of the statistical constraints did also reveal a 5-factor solution. Whilst this was statistically inferior to the 2-factor solution, it was examined just to determine whether any further insights could be seen, or indeed whether more of the variance could be explained (see Figure 31). However, neither of these proved to be the case. No other solutions with differing numbers of factors were seen during differential rotations.

The two-factor solutions met all five criteria, whereas the five-factor solutions met only one criterion (Kaiser-Guttman), which only focuses on the EV of the factor (see Table 24). Researchers agreed that using this criterion could lead to "spurious factors" (Cattell, 1978, Brown, 1980, Watts and Stenner, 2012a). Moreover, Brown (1980) suggested that using only the EV and total variance in Q-Methodology studies is subjective. Besides, the use of this criterion can result in too many factors when the study has a large data set (Cattell, 1978, Wilson and Cooper, 2008).

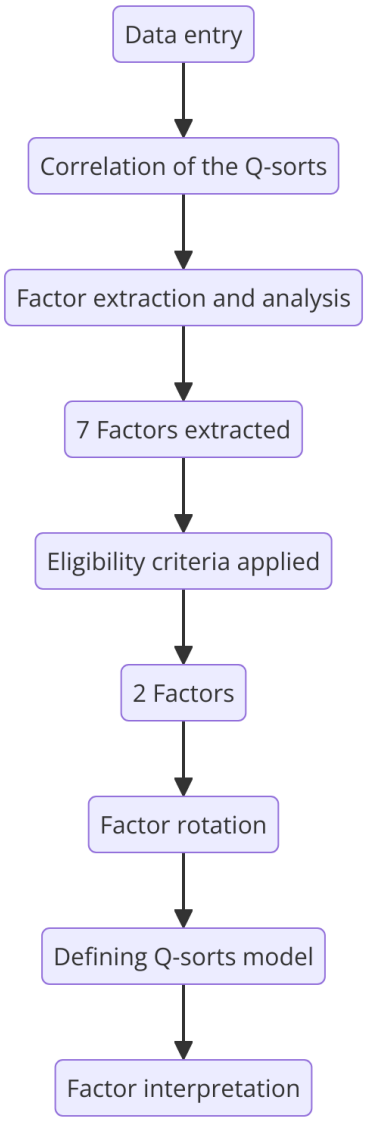


Figure 31: Q-Sorts analysis process

5.4.3. Factor Rotation

Once the factors have been identified and extracted, the next stage is factor rotation. According to Child (1970), p. 52), factor rotation "refers to the procedure of moving and manipulating the

axes," transferring the retained factors from the factor analysis process to an understandable structure that helps in interpreting the result. The goal of factor rotation is to find the ideal positioning of factors to improve understanding of the result.

The factor rotation process usually reduces the number of confound Q-sorts that loaded on the factors, as well as the number of non-significant Q-sorts that are below the significance level (Akhtar-Danesh, 2017). Excluding the confound and non-significant Q-sorts can enhance the result by cutting the noise that those Q-sorts makes during the result interpretation, as recommended by (Akhtar-Danesh, 2017). "Non-significant" Q-sorts are those that do not show a clear pattern in terms of whether they are similar to or different from other Q-sorts, whereas "confound Q-sorts" are those that significantly loaded onto two factors. The rotation process has two options, as described below.

First, Judgmental Rotation (also called Hand Rotation), relies on the investigator's prior understanding and knowledge about the study's problem or the participants (Ramlo, 2016a, Dariel, 2011, Watts and Stenner, 2012a). This allows the researcher to rotate the factors in different directions regardless of the factors' size. According to Watts and Stenner (2012a), by-Hand Rotation is subjective and could be a data-driven solution.

Second, Varimax Rotation is a mathematical structure that can produce and distinguish factors from each other. It is widely used among researchers to statistically analyse the data and produce factors with precise high loading variables on the factors. Q-Methodology software, such as PQmethod and Kade software, have this option as the default for factor rotation. This rotation has statistical power, which can offer an orthogonal factor solution by rotating them mathematically to accurate angles. The variance is calculated and distributed in each factor by following a sequence and iterative process that allows each Q-sort to be loaded on only one factor until saturation is reached (Watts and Stenner, 2012a). Thus, in this research, only varimax was used to analyse the results.

5.4.4. Factor Loading

After factor rotation, significant Q-sorts are classified and loaded onto a particular factor and then flagged, which is called Factor Loading (Dariel, 2011). Usually, all Q-sorts are loaded onto factors if counted as significant at the $P<0.01$ level. For calculating the significance level in the Q-Methodology, the following equation is followed (Brown, 1980)p. 222):

$$2.58 * (1 \div \sqrt{\text{number of the statements}})$$

The goal of the Q-sort loading process is to ensure that Q-sorts on a specific factor need to be strongly inter-correlated, with little or no association to other factors (Watts and Stenner, 2012a). Thus, factors need to be supplemented with coherence and interpretability by having basic structure in Q-sort loadings. Nonetheless, confound Q-sorts can be loaded on more than one factor at time. Thus, flagging Q-sorts is important to ensure there was no confound or non-significant Q-sorts were selected (Watts and Stenner, 2012a). There are two options for flagging Q-sorts: auto and manual flagging. Auto-flagging is provided by Q-Methodology software at the $P<0.01$ level, while manual flagging can be performed with the discretion of the researcher. Akhtar-Danesh (2017) and Watts and Stenner (2012a) recommend manual flagging, to ensure that only Q-sorts loaded is equal or larger than the significance level of the study. Akhtar-Danesh (2017) stated that the researchers must ensure not to include any confound Q-sorts or non-significant Q sorts, since they can make the factor challenging to interpret (Akhtar-Danesh, 2017).

5.4.4.1. Application of Factor Rotation and Loading on the Two-Factor Solution

5.4.4.1.1. **Overview**

Two factors were extracted from the data, after they were validated by the five criteria described above. These two factors were then varimax rotated, which explained 24% of the study variance (as described in Chapter 4). The factor rotation reduced the number of confound Q-sorts that loaded on the two factors (Factors 1 and 2) as well as the number of non-significant Q-sorts that are below the significance level. By excluding the confound and non-significant Q-sorts, the results can be enhanced by cutting the noise that those Q-sorts make during the interpretation of results.

The current study recruited 54 participants and generated 26 Q-sorts that were significant, 26 Q-sorts that were non-significant, and 2 Q-sorts were confound. Having a large number of non-significant Q-sorts does not necessarily disqualify the study results (see Table 26). According to Watts and Stenner (2012b), non-significant Q-sorts have a minimal degree of communality, and are not substantially linked with any of the extracted factors. Thus, the non-significant Q-sorts in a project are not necessarily instances of project failures, but suggest that the participants arranged statement items in dissimilar manners, resulting in weak correlations between different Q-sorts, which lead to an the absence of shared perspectives (Yang, 2016).

More directly, this is an indication that participants had different views regarding the investigated issues, which underscores how this field is complex, and needs further investigation.

Table 26: Two-Factor Solution Participant Loading

	No. Participants Loaded on Factor	**Percentage**
Factor 1	19	35.2%
Factor 2	7	12.96%
Confounding Q sorts	2	3.7%
Non-significant Q sorts	26	48.16%

However, the study's significance level is 0.409 (rounded to 0.41), as calculated using Brown's (1980) formula:

$$2.58 * (1 \div \sqrt{\text{number}} \text{ of the statements})$$

Thus, the non-significant and confound Q-sorts were excluded from the subsequent interpretation of the results.

5.4.4.1.2. Before and after rotating comparison of the Q-sort loadings on the two factors

Before varimax rotation, Factor 1 had 23 Q-sorts that were significantly loaded prior to rotation, while Factor 2 had 3 Q-sorts were significant loaded prior to rotation.

After varimax rotation, Factor 1 had 19 Q-sorts that were significantly loaded, 13 Q-sorts were non-significant, and 1 Q-sort was confound (Q-sort: **P18**G1E2O1X1); and Factor 2 had 7 Q-sorts were significantly loaded, 13 Q-sorts that were non-significant, and 1 Q-sort that was confound (Q-sort: **P17**G3E1O1X3).

Factor 1 had an EV of 9.7, elucidating 18% of the study variance, whereas Factor 2 had an EV of 3.4, elucidating 6% of the study variance (see Table 26 and Table 27).

Table 27 displays every Q-sort loaded on the two factors. All Q-sorts that defined the two factors were highlighted. The **Number in Bold** represents the 26 significant Q-sorts at level P< 0.41. The *Number in Italic* represents the 2 confound Q-sorts that were significantly loaded on two factors. The (*) sing represents the 26 non-significant Q-sorts that were below the significance level P<0.41. Table 27 also shows the participants' characteristics. For example,

"**P53**G2E2O2X3" refers to participant number 54 **(P53)**, "G" refers to the age group, "E" to the level of education, "O" to the working position group, and "X" to the working experience group. The numbers indicate the number of group's categories, as explained previously (age group categories 1, 2, and 3; level of education groups 1, 2, and 3; working position group categories 1 and 2; and working experience group categories 1, 2, and 3).

Table 27: Loadings table with defining sorts flagged

Part. No.	Q-sort	Factor 1	Factor 2
53	**P53**G2E2O2X3	**0.7359**	-0.0156
21	**P21**G2E3O2X3	**0.7262**	0.3006
39	**P39**G3E2O1X3	**0.7117**	-0.1259
5	**P5**G2E1O1X3	**0.6811**	0.2921
50	**P50**G1E2O2X2	**0.6712**	-0.1665
30	**P30**G1E3O1X1	**0.6075**	-0.0164
24	**P24**G2E2O1X2	**0.5852**	-0.2217
43	**P43**G3E2O1X3	**0.571**	0.3958
10	**P10**G3E2O2X3	**0.5571**	0.1207
13	**P13**G3E3O2X3	**0.557**	0.1845
38	**P38**G2E2O1X3	**0.5566**	-0.0761
11	**P11**G2E2O2X3	**0.5416**	0.1238
51	**P51**G1E2O1X2	**0.5309**	0.1228
52	**P52**G1E3O2X2	**0.5123**	0.0314
14	P14G1E1O1X2	**0.5106**	0.1147
18	**P18**G1E2O1X1	*0.5017	*0.4874
8	**P8**G2E3O2X2	**0.4619**	0.1672
45	**P45**G3E2O1X3	**0.4406**	0.1895
3	**P3**G1E2O1X1	**0.4199**	0.1827
28	**P28**G3E3O2X3	**0.4138**	0.1345
27	***P27****G3E1O1X3*	*0.4029*	*-0.0804*
2	***P2****G2E2O2X3*	*0.3983*	*0.3395*
40	***P40****G1E2O1X1*	*0.394*	*0.1761*
25	***P25****G2E2O1X2*	*0.3681*	*0.3278*
41	***P41****G2E2O2X3*	*0.3551*	*0.266*
4	***P4****G1E2O1X1*	*0.3368*	*0.0343*
9	***P9****G2E2O1X3*	*0.3096*	*-0.0128*
15	***P15****G2E3O2X3*	*0.3095*	*-0.0576*
12	***P12****G3E2O2X3*	*0.2639*	*-0.0685*

Table 27: Loadings table with defining sorts flagged

Part. No.	Q-sort	Factor 1	Factor 2
36	***P36****G3E2O1X3*	*0.1955*	*0.014*
44	***P44****G1E2O1X3*	*0.1936*	*0.1167*
37	***P37****G3E3O2X3*	*0.1507*	*0.0176*
35	***P35****G2E1O1X3*	*0.1239*	*0.1204*
6	**P6**G3E1O1X3	0.0851	**0.5751**
48	**P48**G2E3O2X1	-0.1479	**0.5275**
7	**P7**G2E2O1X2	0.3064	**0.5149**
17	**P17**G3E1O1X3	*0.4741	*0.4951
1	**P1**G2E2O2X3	0.2074	**0.474**
34	**P34**G2E2O2X2	-0.0034	**0.4378**
26	**P26**G1E2O1X1	0.2922	**0.4279**
32	**P32**G1E2O1X1	0.377	**0.4221**
20	***P20****G2E3O1X3*	*-0.0941*	*0.3937*
54	***P54****G2E2O1X2*	*0.3214*	*0.3895*
49	***P49****G2E2O1X2*	*0.1109*	*0.3573*
31	***P31****G2E3O2X3*	*-0.2064*	*0.3505*
16	***P16****G2E2O1X3*	*-0.0458*	*0.346*
42	***P42****G2E2O1X3*	*0.0253*	*0.3371*
47	***P47****G1E2O1X1*	*0.015*	*0.3328*
29	***P29****G2E2O1X3*	*-0.0079*	*0.3216*
22	***P22****G2E3O2X3*	*0.1527*	*0.3095*
33	***P33****G2E1O1X3*	*0.1003*	*0.2944*
19	***P19****G2E2O1X2*	*0.2808*	*0.2809*
23	***P23****G1E2O1X1*	*-0.0533*	*0.1339*
46	***P46****G2E1O1X2*	*0.0826*	*-0.0928*
Eigenvalues		9.7361	3.3992
% explained variance		18	6

Number in Bold: refers to significant Q-sorts
Number in Italic: refers to non-significant Q-sorts
(*) sign: refers to confound Q-sorts

5.4.4.2. Factor characteristics (the two factors)

In order to compare factors, the factors' characteristics needed to calculated and presented. Table 28 and Table 29 displays the study's factor score correlations, composite reliability, and SE for Factor Z-scores.

First, the factor correlation score refers to the correlation between the two factors' Q-sort model score. It is performed to generate a relationship between factors in which participants were assigned to a specific factor based on their inter-correlation of a single model item. It can measure the similarities and differences of the items within factors (Mckeown and Thomas, 2013).

Table 28 shows that the two factors have a correlation score of 0.38. According to Cohen (1988) correlation coefficient guidelines, a correlation coefficient value that is less than 0.3 is considered a small correlation, 0.3 to 0.5 is considered an average correlation, and above 0.5 is considered a higher correlation. The correlation score in this study is average, which means the items of one factor tend to endorse other factors' items to a medium degree. In practical terms, this correlation between the two factors can be represented in the consensus statements (see Section 6.2).

However, the explanation of the study correlation must be determined according to the research's goal and context (Cohen, 1988). In Q-Methodology, the factor correlation score between the Q-Sorts at each factor is important because it provides a clearer representation of each item in the factors (Mckeown and Thomas, 2013). One of the advantages of using Q-Methodology is to identify the commonalty between the different factors. Thus, the factor score correlation was only used to detect the degree of correlation of the two factors, which will be presented as the consensus statements later in this chapter.

Table 28: Factor Score Correlations

	Factor 1	Factor 2
Factor 1	1	0.3792
Factor 2	0.3792	1

Second, the composite reliability in Q-Methodology is used to measure the reliability of the selected factors solution (Mckeown and Thomas, 2013). It calculates the amount of the total variance of the statement in the factor. This provides an estimation of the factor score

correlation reliability (Mckeown and Thomas, 2013), measuring the inner reliability between the Q-sort model items. Normally, the factor correlation score of the items is used to compute the composite reliability, which ranges from 0 to 1 (Valenta and Wigger, 1997). A high composite reliability score means that the items are reliable, whereas a low composite reliability score means that the items are not reliable (Mckeown and Thomas, 2013). Thus, the study's composite reliability of the two factors is largely high, ranging from 0.96 to 0.98 (Table 29). The SE values for Factor Z-scores were used to reveal the amount of uncertainty in the factors' scores, calculated using the equation SEf=Sf * square 1-f, where "Sf" refers to a perpetual value (2.2), for enforced distribution (Brown, 1980).

Table 29: Factor Characteristics of the Two Factors

	Factor 1	Factor 2
No. of participants	19	7
Composite reliability	0.987	0.966
Factor Z-scores SE	0.114	0.184

5.4.5. Factor Arrays

The idea of using Q-Methodology in research is to look into a group of people's views and to polarise their views into major themes based on their viewpoint similarities and differences (Tiernon et al., 2017). In terms of statistics, the Q-Methodology analysis generates a small number of factors in order to explain the variations that are seen in those factors. After the scores for each factor have been calculated, each factor is shown in a gestaltism diagram, which shows all of the general emergent perspectives (Watts and Stenner, 2012a), with no reduction in the analysed data. Hence, the factor array provides a value that reflects the relationship between each Q-sorted item and the emerged factor, which specifies where each item was positioned on the Q-sort grid, also known as the Q-Diagram or Q-Model. The factor array consists of nothing other than a single Q-sort that has been organised to reflect the perspective of a singular factor (Watts and Stenner, 2012a).

The factor arrays are created based on the statements' Z scores, which are calculated based on the average of the statements' scores that are associated within the Q-sort model (Zabala et al., 2018). The Z-score is necessary for analysing and interpreting the data, which helps in the factor loading process to identify where each Q-sort belongs to which factors (Ramlo, 2018). The Z-score provides a better understanding of the investigated issue in Q analysis, than factor loading

alone in R-analysis. It indicates the theoretical sort of each participant in all factors (Zabala et al., 2018). Q-analysis emphasises on the nature of the relations between Q-sorts' items that comes from a factor score, whereas R-analysis's focus shifted to the nature of the researched problem (Brown, 1980).

The factor arrays used to illustrate the factors, by using each factor's model, which include consensus statements and distinguishes statements. The distinguishing statements refer to statements shows dissimilar views from factor to another. The distinguishing statements usually located at the end of the Q-sort grid of both negative and positive sides in each factor (+4 and -4). The distinguishing statements are valuable to the participants in each factor regarding the issue, which were considered significant. Thus, the statements in the Q-grid must be addressed to make sure nothing is left out (Watts and Stenner, 2012a). The distinguishing statements are the ones that count in a specific factor which ranked significantly at level $P<0.01$ or 0.05, while these statements have diverse scores on other factors. The consensus statements refer to any statements that cannot be easily distinguished between the extracted factors. Thus, it can be said to represent agreement amongst participants – regardless of the factor the statements were loaded into. The consensus statements are placed on all factors in the same sort's grid position (Dariel, 2011). Thus, the factor array was used to create the Crib Sheet, which is used to easily interpret the factors.

5.4.5.1. The Factor Array of the Two Factors

Table 30 shows the factor array of the two factors and each factors' items ranking and Z-score. This will be used to profoundly interpret the two factors as expounded in Chapter 6.

Table 30: Factor Arrays for Two Factors

No.	The Actual Statements	F1		F2	
		Score ranking	Z-score	Score ranking	Z-score
9	[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]	4	1.73	2	0.823
30	[My professional/ethical responsibilities]	3	1.45	2	0.993
34	[My confidence in my understanding of EHR policy and practice]	3	1.25	1	0.48
16	[The importance I place on EHR privacy policy of my practice]	3	1.22	0	0.261
14	[The consequences to me legally by authorities if a data breach is seen to occur]	3	1.21	0	-0.062
3	[The ease of using the EHR system]	2	1.07	-2	-0.978
12	[The availability of guidelines on the subject]	2	0.89	-3	-1.253
6	[The benefit it brings to my patients]	2	0.85	3	1.531
22	[The amount of time needed to complete the EHR record]	2	0.81	-4	-2.003
33	[The benefit it brings to my hospital]	1	0.56	4	1.813
20	[The usefulness of the guidelines]	1	0.51	0	-0.115
5	[My level of education]	1	0.37	-1	-0.539
29	[The consequences to me contractually from my organisation if a data breach occurs]	1	0.35	0	-0.117
1	[My experience of working with the EHR]	1	0.34	-1	-0.594
32	[The amount and level of support that is available to me]	1	0.23	-3	-1.201
28	[The sense of satisfaction I get when following the policies]	0	0.2	2	0.842
35	[The expectation of my patients]	0	0.01	2	1.051
39	[The extent to which I am able to comply with EHR privacy policy without help]	0	0	-2	-1.068
36	[The extent of clinical experience I have]	-1	-0.25	2	0.925
37	[My personal preference about following the EHR privacy policy]	-1	-0.27	1	0.366

31	[The expectation of the top management of my hospital]	-1	-0.28	3	1.141
26	[The expectation of my direct manager]	-1	-0.3	1	0.509
8	[The position I hold in the hospital]	-1	-0.42	4	1.638
17	[The extent to which this aspect of my role is open to investigation by the press or other organisations]	-2	-0.5	3	1.175
4	[The priority I give these tasks compared to other clinical and administrative tasks]	-2	-0.51	0	0.24
21	[The number of the steps required to access an EHR]	-2	-0.56	-2	-1.036
10	[My colleagues' practice and compliance]	-2	-0.91	-1	-0.332
11	[The extent to which this aspect of my work may be open to criticism by patients and their families]	-2	-0.95	-1	-0.474
13	[The benefit it brings to my colleagues]	-3	-1.07	1	0.681
38	[The expectation of the public]	-3	-1.74	-2	-0.947
18	[The expectation of my friends and family]	-4	-2.23	-3	-1.105
23	[My age]	-4	-2.34	-4	-1.739

5.5. Crib Sheet

A Crib Sheet, according to the *Cambridge English Dictionary*, is a piece of paper that contains notes to help someone interpret a complex issue. It offers a systematic and rigors process to interpret the factor items. For example, Watts and Stenner (2012a) presented a Crib Sheet in their Q-Methodology research in order to simplify the factors' complexity during the interpretation process. A Crib Sheet helps the researcher engage with every item in the factors, which usually has the necessary information about some of the important items that were ranked at zero or in the middle of the distribution (Watts and Stenner, 2012a). It has four basic sequence elements that the researcher classifies; first, items that were the highest ranked in the factor; second, items that were ranked higher in one particular factor other than the rest of the factor array; and third, items that were ranked lower in the factor than the rest of the factor array Fourth, items that were the lowest ranked in the factor.

5.6. Qualitative Analysis

Post-sorting interviews greatly contribute to a comprehensive understanding of participants' sorting processes. They provide supportive information to understand and interpret the Q-sorting process, complementing the Q-sorting exercise (Jeffares and Skelcher, 2011, Watts, 2012, Paige and Morin, 2015). The purpose of these interviews is to understand why participants position cards in the Q-sort response grid, simplifying the interpretative examination of factor arrays. This approach helps to understand the viewpoints and attitudes of participants towards the issues being investigated (Watts and Stenner, 2005), enhancing the overall understanding of the Q-sorting process (Akhtar-Danesh et al., 2008, Watts and Stenner, 2005). However, the post-sorting interview data is complementary to the Q-sort data analysis, but some researchers overlook it after collecting Q-sorts online or by mail. Thus, the post-sorting interview data in this study was transcribed and used to interpret the factors (see Appendix 3). This coding approach aids in the organisation and correlation of participant comments with each Q-sort.

5.7. Factor Interpretation

The factor array, distinguishing statement, consensus statements, and post-sorting interview is an important step used to interpret data. The Q-sort compost to visualise the opinions of the participants, which arranges the items depending on their average score, as determined by all

participants in a particular factors (Watts and Stenner, 2012a). The consensus statements are used to explain what the participants agreed upon. The distinguishing statements help in understanding each factors' main characteristics, which can be used to assess the constancy of the result (Mckeown and Thomas, 2013). Whilst the Crib Sheet was used to interpret and summarise the factors (Watts and Stenner, 2012a), the interview data were used to support the factor interpretation. The participants' responses were placed under each statement, which indicated how the statements were sorted. The following chapter presents the study's findings, including factor analysis and interpretation.

5.8. Summary

This chapter described the data analysis and interpretation processes were described for both of the Q-sorting activities and the post-sorting interview, showing the application of the data analysis; two-factor solution. The factors passed the five objective criteria that were set by Q-Methodology researchers (the "magic number 7", Kaiser-Guttman, two or more significant loading, Humphrey's rule, and Scree test criteria). The main results are presented in the following chapter.

CHAPTER 6
FINDINGS

This chapter presents the Q analysis process that was conducted on 54 Q-sorts in this research. It reveals all outcomes from the factors extraction process and provides a comparison between the extracted factors. Finally, the two outcomes possibilities that were shown in the analysis are comparatively analysed.

6.1. The Two Factors Narrative

In the previous chapter, the data analysis revealed the initial five factors being reduced to two. Thus, the two resultant factors are defined and detailed in this narrative analysis of the findings by using each factor's model, which includes the ranked statements on a grid. The post-sorting interview, wherein participants vocally explained why they sorted the statements in the way that they did, is used to back the factors' interpretation. The reason for this is to help with understanding the reasons why participants ranked the statements in this way – it reveals more about their motivations for adhering with the EHR privacy policy.

An initial description is given of the consensus statements in the following section. These are the statements that were ranked equally in both factors (i.e., where there is consensus between the different groups). These factors can therefore be seen to represent aspects that have commonality across the whole sample.

6.2. Consensus Statements

6.2.1. Overview

After completing the by-person analysis of the participants' Q-sorts, factors were selected and extracted. The consensus statements are an important aspect of the resultant outcomes that need to be presented in Q-Methodology; they comprise any statements that cannot be easily distinguished between the "factors" (in the sense of Q). Thus, they can be said to represent agreement amongst participants regardless of the factor they load to (Herrington and Coogan, 2011, Brown, 1980).

Table 31 shows the statements that represented consensus between the participants regardless of the factor. They agreed upon these statements when they were asked to sort the items in

relation to the question: “What are the behavioural factors that influence nurses to comply with the EHR privacy policy?” The table shows each consensus statement’s ranking in both Factors 1 and 2, and shows its level of significance. The significance level (p value) refers to the level of confidence in the outcome of the analysis, with statistical significance being commonly determined by “P<0.05 and P<0.01”. Moreover, the table shows the Z-score of the censuses statements for two factors and show the Z-score differences between them. The Z-score refers to how many standard deviations that the factor censuses items’ score located from the mean average of the factors composite (Watts, 2012). The censuses statements were drawn based on the Z-score of the statements in each factor, regardless of some of the differences in the statements’ ranking score. A total of 13 statements represent consensus within the participants tested, regardless of the factors. There were nine significant statements at p<0.01, and four significant statements at p<0.05.

Table 31: Consensus Statements

No.	Significance	The Actual Statements	F1		F2		Z-score differences
			Score ranking	Z-score	Score ranking	Z-score	
23	*	[My age]	-4	-2.34	-4	-1.739	0.61
2	*	[The possible reaction of my colleagues towards me if a data breach occurs]	-3	-1.055	-2	-0.699	0.36
15	*	[The expectation of my peers]	-3	-1.746	-3	-1.727	0.02
11		[The extent to which this aspect of my work may be open to criticism by patients and their families]	-2	-0.95	-1	-0.47	0.48
21		[The number of the steps required to access an EHR]	-2	-0.56	-2	-1.04	0.48
19	*	[The extent to which I feel a particular task is necessary]	-1	-0.32	-1	-0.24	0.08
24	*	[The nature and amount of training I received on the subject]	0	-0.20	-1	-0.34	0.14
25	*	[The extent to which this is monitored by my hospital]	0	0.17	0	-0.20	0.37
27	*	[The expectations of those who manage data protection within my hospital]	0	0.13	1	0.35	0.22
29		[The consequences to me contractually from my organisation if a data breach occurs]	1	0.35	0	-0.12	0.47
7	*	[The level to which I agree with the data privacy policies I am asked to follow]	2	0.69	1	0.54	0.15
30		[My professional/ethical responsibilities]	3	1.45	2	0.99	0.46
40	*	[My hospital's rules and policy]	4	1.60	3	1.41	0.19
* indicates significance at p<0.01)							

6.2.2. Age Was Not Important

From Table 31, it can be seen that there were a number of statements that both groups equally disagreed with. Most clearly, both groups strongly and equally disagreed that their age was a factor in influencing them in relation to adherence privacy policy (23-24). This statement was ranked at the lower position by both groups. It was further demonstrated by the 13 post-sorting interview participants, 10 of whom were from factor 1 (**P8**, **P10**, **P11**, **P13**, **P30**, **P38**, **P39**, **P43**, **P51**, and **P52**) and 3 from factor 2 (**P6**, **P7**, and **P32**). The most common themes they mentioned in their comments on this are discussed below.

The nurses agreed that age was not an important factor, and many suggested that the more important thing is knowledge:

> "For me, my age does not make a big deal. No matter how old you are, you can handle it, and it is not going to affect you, as long as you have the knowledge." **(P7)**

Some did not think that age was a factor compared to the ability to learn and remain in compliance with the policy:

> "… no age limit is required to learn using the EHR or to follow its policy. Anyone, no matter what his or her age is, can learn and do whatever they want to do. And the age aspect does not influence anyone." **(P38)**

Some highlighted the relationship of age and experience that could play a role in their compliance:

> "When it comes to age, in regard to this concept, we are dealing with experience. When we talk about age, we also focus on experience, and what clinical experience you have. For me, it could not be an excuse to just not follow the policy in practice." **(P6)**

Moreover, others suggested that awareness regardless of age was an important aspect:

> "This statement for me is less important, because age does not make a big difference when we are working in the healthcare sector. Of course, all age groups need to be aware of the system and update their knowledge of everything…." **(P8)**

6.2.3. Peers and Colleagues Were Not Influential

The influence of peers and colleagues in relation to a person's compliance was also largely disregarded by both factors with both factors touching on this issue (2 and 15) ranking at either -2 or -3 in both factors (see Table 31). The related statement (15) was further illustrated by five participants from factor 1 in the post-sorting interview (**P5**, **P38**, **P43**, **P51**, and **P53**).

Analysis of the quotes collated from the post-sort interviews suggested that other elements, such as self-motivation, were more important than peers' expectations for compliance with EHR privacy policy:

> "I put it under little or no influence, because anything I do, I do it for myself …." **(P43)**

6.2.4. The Hospital Guidelines were Influential

Similarly, the hospital guidelines were more vital than peers' expectations for compliance with EHR privacy policy:

> "I put it under little or no influence, because … I do not care what my peers feel or what they think about me. And as long as I am following the hospital's guidelines to maintain patients' privacy, my peers' expectations do not affect me." **(P43)**

Some think that benefiting patients were more important in terms of setting expectations for compliance with EHR privacy policy than peer influence:

> "It has no effect on me... because my focus while I am working is to follow and comply with hospital policy. At the same time, I will do whatever it takes to benefit my patients. Not what my peers expect from me." **(P5)**

6.2.5. Criticism by Patients' Families Were Not Influential

Moreover, nurses did not seem to be affected by any [aspect of work that may be open to criticism by patients and their families] (11). The nurses' adherence with the EHR privacy policy was ranked at either -1 or -2 in both factors. This might seem to contradict with some of the comments made above, as just described, but the key to understanding the ranking of this statement might be the fact that it mentions patient's families, and it could be that nurses do not feel that this consideration influences (or ought to influence) their compliance, as the quote below illustrates:

> "My work should not be influenced by others, especially the family of the patient. At least what I do in my work at the hospital benefits the patients by keeping the patient data private. I am not doing it for the family." **(P24)**

> "So it is not important to me. and I do my work based on my job description." **(P24)**

6.2.6. The Number of Steps Required to Access an EHR was Not Influential

Similarly, nurses in both factors disagreed that [the number of steps required to access an EHR] (21, -2) had an impact on their compliance with the EHR privacy policy, see Table 31. As one of the participants commented:

> "We don't have so many steps to access the EHR, but this does not affect our compliance at all." **(P26)**

6.2.7. Training on Privacy Was Not Influential

Also, the nurses disagreed that the amount of training they received on the subject (24), had on an influence on their compliance with the EHR privacy policy (see Table 31). Analysis of the quotes from the interviews suggested that nurses rely on their familiarity and experience with the system to comply with the policy:

> "I chose this statement because we are not getting full training with any EHR system. We will be trained when we have experience … the overuse." **(P28)**

6.2.8. EHR Monitoring Was Influential

However, the nurses agreed in both factors that the statement: [The extent to which this is monitored by my hospital] (25, 0) has some effect on their adhering behaviour with the EHR policy. It was placed in the middle of the composite in both factors. Participants in both factors had strong opinions concerning the impact of monitoring on their compliance with the policy. Some thought that their hospital could track their activities, making it impossible to hide any suspicious actions:

> "I chose 'strongly influence me' for this statement, because the EHR is monitored by my hospital; all activity is documented, and everybody can see it. So, if there is any problem, you cannot hide it from the co-workers and the management." **(P45)**

Similarly, others thought that computer monitoring could lead to more compliance among nurses*:*

> "Because if the EHR and the compliance with its policy are monitored by the hospital, it will influence us more to follow the policy. If we do not follow the policy, we may get a notification from the management." **(P53)**

In contrast, some of the participants thought that there is no system observation at the hospital:

> "I put 'no influence' for this statement, because there is no observation at my hospital." **(P34)**

Opinions in both groups pertaining to the statements: [The expectations of those who manage data protection within my hospital] (27) and [The consequences to me contractually from my organisation if a data breach occurs] (29) were neutral, as both statements ranked either 0 or +1.

Some of the nurses also agreed that the level to which they agree with the data privacy policies they are asked to follow (7) had an influence on them to comply with the EHR policy. However, from the interview, one of the participants thought that there are some unnecessary policies that the participant was asked to follow:

> "Sometimes they asked me to follow unnecessary policies, which I usually don't agree with." **(P52)**

6.2.9. The Hospital's Rules were Influential

The participants in the two factors agreed that they were relying on the existence of the hospital's rules and policies and their professional and ethical responsibilities to comply with the EHR privacy policy. Participants in both factors identified [My professional/ethical responsibilities] (30) as important, with emphasis given to protection of patients' information. From analysing the participants' comments, they suggested that being ethically responsible was important with regard to protecting patients' information:

> "As professionals, we should protect patients' data, rather than divulge it to others. It is unethical to talk about it to other people, even if not concerned, or even among medical staff. The ones who should know about a patient's condition are the ones who are giving direct care to the patient, like primary physicians and nurses. Because if we divulge it to other staff who are not in the care process of the patient, it makes us less professional." **(P39)**

They consider patient confidentiality to be within their scope of professional responsibility:

> "… Because all things you do to patients must be kept confidential, and I must comply with the privacy policy. It is my professional responsibility to follow the hospital guidelines." **(P43)**

In addition, they think that the workload may affect their compliance with the EHR policy, so they rely on their ethical side to motivate them to comply with the related privacy provisions of the policy:

> "… At work, we are under stress, and that does not lead to perfection in our profession. So, we need our ethical side when we are dealing with co-workers or dealing with patients and their data. It has a strong influence on me… If you don't have an ethical code and professional responsibilities, you cannot work at this place." **(P3)**

However, whilst peers' expectations had little influence on them, interestingly they feel that their compliance might have had a positive influence on others:

> "With complying with the EHR privacy policy, my colleagues will see how professional and ethical I am at work, and this will reflect on their personality and work." **(P45)**

Consequently, HCPs are ethically and professional influenced to comply with the policy. Moreover, both factors agreed that the statement: "the rules and policies of the hospital" (40) has a huge influence their compliance with the EHR privacy policy (see Table 31). In the post-sorting interview, the participants suggested that they value the hospital rules and policy for different reasons. Some are motivated to protect patients' privacy:

> "We have to follow the hospital rules and policies, so we cannot breach any rules or policies. We have to abide by the policy to protect patient confidentiality and data privacy." **(P10)**

Some are particularly inclined to protect the institution:

> "If the hospital has strict rules and policies to monitor regularly the compliance of the EHR, actually all staff will comply with it and use the EHR properly." **(P26)**

Some are extrinsically motivated by the consequences of not following the policy, and felt the need to protect themselves:

> "It is important because it helps me to understand the rights and duties which are being asked and written down in the policy. Also, it protects me from any consequences that may happen in the future." **(P49)**

Finally, some are simply just following the established guidelines at work:

> "Of course we need to comply with this, because it will give us guidelines to follow while doing our job." **(P32)**

In conclusion, the participants in both factors totally agreed on 13 statements; 9 out of 13 statements were significant at $p<0.01$, and 4 out of 13 statements were significant at $p<0.05$. The nurses in both factors agreed that other expectations, reaction, and criticism were less influential on them to comply with the EHR privacy policy. In contrast, they all agreed that the hospital' rules and their professional ethics and responsibilities had a bigger influence on whether they complied with the EHR privacy policy.

Having looked at the consensus statements, which seemed to characterise the participants regardless of the two groups, it was also possible to notice the differences between the two groups from the results of the Q-sorts and the post-sort interview responses. The characteristics of both factors will be explored in the following section.

6.3. Interpreting the Two Factors

This section describes the two factors, beginning with each factor's population demographic information and related labelling. Next, the factor's description and the composite of the factor are presented, followed by the Crib Sheet used to interpret factors 1 and 2, then the distinguishing statements of the two factors will be shown to compare and discuss the factors. The methodological basis for these steps is explained in detail in Chapter 5.

As previously explained, the factor explanation process is inherently challenging, because the Q-Methodology's goal is to produce inclusive common perspectives of Q sorts and display a comprehensive "whole viewpoint" (Watts, 2012). Thus, the researcher used combination of the Crib Sheet and the distinguishing statements tools to interpret the factors, since the Crib Sheet is used to organise the factors' narration and interpretation, which gives a holistic overview of the factors (Watts, 2012). It allows the researcher to restructure the statements based on the highest and lowest on one factor comparing to other factors. It facilitates the researcher's engagement with each item in the factors, which often contains information on some of the significant things that were placed at zero or the centre of the distribution.

On the other hand, the distinguishing statements are those items that differentiate one factor from another (VanExel and Graaf, 2005). These items identified by comparing the score of each

statement that loaded on one factor to other multiple factors. This helps in indicating that a specific item is more associated with one factor than other factors, and aids in understanding each factors' main characteristics, which can be used to reflect the reliability of the result (Mckeown and Thomas, 2013). Whilst the Crib Sheet was used to summarise the factors, the distinguishing statements concentrate on the distinguish item between the extracted factors. The using of these two tools is common in Q-methodological analysis and interpretation – bringing strength to the result by ensuring a concise representation of the essential structure of the data. It also helps in summarising and presenting the participants' viewpoints objectively, which will reduce the researcher's bias during the interpretation by promoting the result transparency.

Watts (2012) stated that it is important for researchers to investigate the interrelationship between the factor's items, in order to understand and explain why some items are placed in a certain position in contrast to other factors. Thus, the interrelationships of factors serve as a guide for researchers to interpret and explain each factor. The purpose of this is to identify the extracted factor clearly by having a fully understanding of the factors' items, showing the differences and similarity between the participants' viewpoints for the factor, which helps the researcher to describe the study's data.

All statements in the following subsections interpreting the factors are given with their factor ranking in brackets. For example, statement number 9 is ranked +4 for factor 1; this is rendered as "(9, +4)."

6.3.1. Factor 1: Professionally Pragmatic

The first factor can be described as containing the views of those individuals who appeared to be what we have termed as "Professionally Pragmatic." They are nurses who are clearly willing to comply with EHR privacy policies, in line with their professional responsibilities. However, they appeared to condition their compliance based on the environment in which they worked and the benefit they perceived for their patients.

Factor 1 explained (EV=9.7) of the variability in the data, which account 18% of the total variability of the study.

A total of 19 participants loaded significantly onto this factor. The population in this factor includes almost equally representative numbers of nurses from all age groups. Furthermore,

more than half of the participants have a bachelor's degree and had 10 years or more of work experience (see Table 32).

Table 32: Contextual information for participants in Factor 1

Age			
Groups:	20-29 years	30-39 years	40-49, 50-59, 60-69 years
Participants N (%):	6 (31.6%)	7 (36.8%)	6 (31.6%)
Education level			
Groups:	Diploma degree	Bachelor's degree	Graduate degree (Master and PhD)
Participants N (%):	2 (10.5%)	11 (57.9%)	6 (31.6%)
Working position			
Groups:	Staff	Manager	
Participants N (%):	10 (52.6%)	9 (47.4%)	
Experience			
Groups:	1-4 years	5-9 years	10-14, 15-20, 21-25 years
Participants N (%):	2 (10.5%)	6 (31.6%)	11 (57.9%)

Table 33 outlines the characteristics of the "Professionally Pragmatic Factor (1) Persona" with regard to participants' compliance with the EHR privacy policies.

Table 33: Professionally Pragmatic Factor (1) Persona

Characteristic	Description
Factor 1's Persona	The nurses who identify as a professional pragmatic, as outlined in group 1 might typically be: a young male or female nurse, within 10 or more numbers of years of practising, working as staff more frontline supervisors. These nurses were keen to do the best for their patients and this was the driving force for their behaviour, the nurses might typically be slightly more sceptical about the value of data privacy policy, although unlikely to mention this to other. The nurses may have a sense that the time they spend on data privacy detracts from her patient care. Having said that, they were aware of their professional responsibilities and the importance of data privacy and will comply with this to the best of her abilities.
Compliance drivers	- Access to the needed resources (computers, software, etc.) - Ease of using the EHR system - Availability and usefulness of guidelines - Confidence in understanding EHR policy and security practice - Importance placed on EHR privacy policy
Dominated Frameworks' constructs	-Attitude, -PBC, -Punishment severity, and -Educational level
Compliance approach	Nurses were motivated to comply with EHR privacy policy; however, it was coupled with the work environment.

6.3.1.1. Factor 1 Composite Sort

The composite sort of this factor (see Figure 32) is calculated during the factor analysis process, which uses a mathematical equation to identify the pattern in the factor by correlating between the factor items. It visualised the participants' viewpoints and shows the sorted items' position based on the average score of each item that was sorted by all participants in this factor. It is useful for the researcher to comprehend the dimensions of the participants' standpoint. The composite model shows the location of consensus statements that shaded in grey colour. It also shows the distinguishing statements at both significance level $P<0.01$ and $P<0.05$. It shows the items' Z-score direction of one factor compared to the other factor (see Figure 32). The Z-score refers to how many standard deviations that the factor items' score located from the mean average of the composite. It helps in drawing a first sight of the factor's whole viewpoint by showing the items' score and its direction (Watts, 2012). This aids in a thorough interpretation of the factor by visualising the placement of the items on two-dimensional poles.

Composite Q sort for Factor 1

-4	-3	-2	-1	0	1	2	3	4
** ◄ 18. The expectation of my friends and families	2. The possible reaction of my colleagues towards me if a data breach	** ◄ 17. The extent to which this aspect of my role is open to investigation	** ◄ 36. The extent of clinical experience I have	** ◄ 28. The sense of satisfaction I get when following the policies	** ◄ 33. The benefit it brings to my hospital	** ► 3. The ease of using the EHR system	* ► 30. My ssional/ethical esponsibilities	** ► 9. The access to the resources (computers, software, etc,)
** ◄ 23. my age	** ◄ 13. The benefit it brings to my colleagues	** ◄ 4. The priority I give these tasks compared to other clinical and	** ◄ 37. My personal preference about following the EHR privacy policy	25. The extent to which this is monitored by my hospital	** ► 20. The usefulness of the guidelines	** ► 12. The availability of guidelines on the subject	** ► 34. My confidence in my understanding of EHR policy	40. My hospital's rules and policy
	** ◄ 38. The expectation of the public	* ► 21. The number of the steps required to access an EHR	** ◄ 31. The expectation of the top management of my hospital	27. The expectations of those who manage data protection	** ► 5. My level of education	** ◄ 6. The benefit it brings to my patients	** ► 16. The importance I place on EHR privacy policy of my practice	
	15. The expectation of my peers	** ◄ 10. My colleagues practice and compliance	** ◄ 26. The expectation of my direct manager	** ◄ 35. The expectation of my patients	* ► 29. The consequences to me contractually from my	** ► 22. The Amount of time needed to complete the EHR record	** ► 14. The consequences to me legally by authorities if a data breach	
		* ◄ 11. The extent to which this aspect of my work may be open to	19. The extent to which I feel a particular task is necessary	** ► 39. The extent to which I am able to comply with EHR privacy policy	** ► 1. My experience of working with the EHR	7. The level to which I agree with the data privacy policies I am		
			** ◄ 8. The position I hold in the hospital	24. The nature and amount of training I received on the subject	** ► 32. The amount and level of support that is available to me.			

Legend

* Distinguishing statement at P< 0.05

** Distinguishing statement at P< 0.01

► z-Score for the statement is higher than in all other factors

◄ z-Score for the statement is lower than in all other factors

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Figure 32: Model Q-sort for "Professionally Pragmatic" Factor

6.3.1.2. Factor 1 Crib Sheet

As outlined previously, the Crib Sheet was introduced into Q-methodological analysis by Watts (2012) as a way of helping researchers to grasp or summarise the characteristics of a given factor. It allows researchers to reorganise the items based on the highest and lowest on one factor comparing to others. It helps the researcher to engage with every items in the factors, which usually has the necessary information about some of the important items that were ranked at zero or in the middle of the distribution (Watts and Stenner, 2012a). Table 34 is divided into four parts. The first part shows the items ranked at (+4), then, the statements that were positively ranked higher in this Factor 1 than Factor 2. It depicts the statements that were negatively ranked lower in Factor 1 than Factor 2. Moreover, it shows the items that ranked at (-4). Finally, it also shows the statements' numbers and scores on both factors. Therefore, Table 34 was used to interpret Factor 1.

Table 34: Crib Sheet for Factor 1

No.	Statements	F1 Rank	F2 Rank
Item ranked at (+4)			
9	[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]	4	2
Positive statements ranked higher in factor 1 array than in another factor array			
22	[The amount of time needed to complete the EHR record]	2	-4
12	[The availability of guidelines on the subject]	2	-3
3	[The ease of using the EHR system]	2	-2
32	[The amount and level of support that is available to me].	1	-3
16	[The importance I place on EHR privacy policy of my practice]	3	0
14	[The consequences to me legally by authorities if a data breach is seen to occur]	3	0
34	[My confidence in my understanding of EHR policy and practice]	3	1
5	[My level of education]	1	-1
1	[My experience of working with the EHR]	1	-1
39	[The extent to which I am able to comply with EHR privacy policy without help]	0	-2
20	[The usefulness of the guidelines]	1	0
Items ranked lower in factor 1 array than in another factor array			
10	[My colleagues' practice and compliance]	-2	-1
38	[The expectation of the public]	-3	-2
35	[The expectation of my patients]	0	2
28	[The sense of satisfaction I get when following the policies]	0	2
26	[The expectation of my direct manager]	-1	1
4	[The priority I give these tasks compared to other clinical and administrative tasks]	-2	0
37	[My personal preference about following the EHR privacy policy]	-1	1
36	[The extent of clinical experience I have]	-1	2
31	[The expectation of the top management of my hospital]	-1	3
13	[The benefit it brings to my colleagues]	-3	1
17	[The extent to which this aspect of my role is open to investigation by the press or other organisations]	-2	3
8	[The position I hold in the hospital]	-1	4
Item ranked at (-4)			
18	[The expectation of my friends and family]	-4	-3

6.3.1.3. Factor 1 Interpretation Using the Crib Sheet

6.3.1.3.1. **Resource Availability and Ease of Use**

As seen in the Crib Sheet (Table 34), the nurses in the Professionally Pragmatic Factor 1 identified that access to resources such as computers, software, etc. (9, +4) was most influential motivator for them to adhere to the EHR privacy policy. They believe that that having sufficient access to the computer leads to greater compliance with the policy:

> "Actually, the compliance with the EHR will be higher when you have access to more computers, because what happens nowadays is that the computers are not adequate to do the documentation on time." **(P11)**

They also thought that computer availability and shortages were to blame for non-compliance with the EHR privacy policy:

> "… Lack of computers will lead nurses to not comply with the EHR policy to get their work done." **(P53)**

As fewer computers meant more time consumed to document patient files, this led to delays in their work, and could affect their compliance with the EHR policy*:*

> "… One of the struggles that we are facing here is that we have fewer computers, which leads nurses to take more time to complete documentation of patients' data…" **(P8)**

> "… We have a lack of computers, so the nurses and physicians delay their documentation and that leads to impact on the patients' safety and privacy." **(P10)**

> "Even though we know the policy and procedures and we are confident in regard to the guidelines, I feel that without resources we cannot proceed. So, we should have sufficient resources like computers and internet connection. Without them, we cannot complete our tasks, including compliance." **(P38)**

Also, the nurses indicated that the ease of using the EHR had greatly impacted their adherence to the EHR privacy policy (3, +2) (see Table 34). One of the participants in the post-sorting interview expressed that one of the issues was faulty Internet connectivity when they wanted to use the system, which could affect their compliance:

> "Most of the time we have internet connection errors or poor connection. Because of this, we can't use the system or document anything. If the system is easy to use, we can comply with system policy." **(P51)**

The amount of time they spend to complete patient files (22, +2) was an important feature for participants' compliance with the EHR privacy policy (see Table 34). They thought that the less time they took to complete patients' files (i.e., documentation), the more they would have to comply with the EHR privacy policy. The nurses commented in the interview that taking care of patients was more important, and they needed more time to undertake such care than documenting data for the EHR. The documentation took more time, which led to less compliance with the policy:

> "In ICU we have many critical patients, and we have to deal with them first, before going to documentation on EHR. So, we have a specific time that the system will close. The amount of time to complete the documentation has a great influence on compliance." **(P11)**

> "The time of completing the EHR is very important, because in practice, each nurse has three beds to cover, so it takes a long time to complete the EHR, and I need to focus to do it correctly." **(P50)**

Conversely, some of the participants disagreed that the time they spent on EHR documenting had an effect on their compliance with the policy, as they believed that everyone nowadays knows how to deal with the technology, which had transformed their skills and enabled them to work fast when operating such systems:

> "I selected this one under 'little or no influence'… Because we are in the informatics wave, so we are using computers, it will not take much time for writing or whatsoever." **(P14)**

> "…Unless you are not focused and stressed by the organisation … It may take 30 minutes to complete any tasks… I feel to comply with EHR policy, the amount of time to complete the record is not going to affect [compliance] that much." **(P3)**

The time to complete patients' files had a positive and negative effect on the nurses' compliance with the policy. Thus, it can be clustered into two groups: first, those who were busy at work and found it hard to comply with the policy if they spend more time on completing the files; and secondly, those who believed that having more time at work and more skills to use the EHR system enabled compliance.

One issue that this research revealed is that some of the nurses could not comply with the EHR policy without assistance. This was affirmed by the ranking of the three following statements, which were ranked higher in Factor 1 than Factor 2: [The amount and level of support that is

available to me] (32, +1) (concerning the technical support that is available to nurses when it is needed while using the EHR), [My experience of working with the EHR] (1, +1), and [The extent to which I am able to comply with EHR privacy policy without help] (39, 0)(see Table 34).

6.3.1.3.2. **The Importance of Patient Data Confidentiality**

The nurses in this study believed compliance with EHR privacy policy was important, and also believed this would be a driver for their compliance (16, +3) (see Table 34). In the post-sorting interview, one of the nurses highlighted the EHR privacy policy because of a personal experience:

> "For me, it is important to maintain patient privacy policies. Some patients won't divulge their health conditions to other people. They may be hiding it from their family members, so they do not get worried about their condition. And also, I have experience. I had cancer before, and when I had it, I hid it from my mother, and only my sister knew. I was afraid to tell my mother because she was sick [ill], and I was worried she might get sicker because she would be worried about me, and we would be both sick. I think keeping the patient's condition confidential from some of the family members is important for their mental health…" **(P43)**

Some follow the policy because they want to protect patients from being socially stigmatised when they have conditions, such as sexually transmitted diseases (STDs), which they might not want others to be aware of:

> "Also, some people have STDs, and maybe the staff are talking about the patient's condition and other people may hear it. So, people will judge the patient because he or she has an STD, and this person will be judged for doing something bad. In reality, maybe this person who has the STD got it through a blood transfusion error. And this is the importance of keeping patient data privacy." **(P39)**

Some value the privacy policy because of their belief that this is a fundamental right of patients:

> "… because I believe that all patients have the right for their records to be kept safe, and not to be shared with anyone [without patients' permission]." **(P43)**

6.3.1.3.3. **Guidelines**

The participants found that their confidence in their understanding of EHR policy and practise (34, +3) had a positive influence on their compliance with the policy) (see Table 34). In the

post-sorting interview, some nurses indicated that they could not comply if they did not understand the policy:

> "Overall, I have opted My confidence in my understanding of EHR policy and practise definitely influences me. I feel that without confidence in my understanding of the EHR policy, I cannot proceed with EHR's documentation process. We must have confidence to proceed and complete this process and to apply this policy." **(P38)**

> "… If I fully understand the privacy policy, I could follow it better." **(P21)**

In addition, they agreed that the availability and usefulness of the EHR guidelines on how they can comply with the EHR privacy policy influences their compliance with the policy (12, +2, and 20, +1) (see Table 34). The post-interview indicated that for some, the availability of the guidelines was simply to enable them to follow what they needed to be doing*:*

> "Without a map that I follow, I cannot know the way that I should follow…" **(P13)**

Some thought that the presence of guidelines will ensure standardisation, that everyone is doing things the same way:

> "…With the present guidelines, everyone will know what they should do at the beginning to reach the end of this way. So, if the guidelines are available, everything will be systematically arranged. Everyone will follow the correct way of the policies and procedures of the hospital." **(P13)**

For others, the presence of guidelines gave them confidence that they would not make mistakes:

> "Of course, using the EHR's guidelines to guide you during using the system, It will prevent you from committing mistakes in the future related to work." **(P24)**

6.3.1.3.4. **Monitoring and Legal Consequences**

The nurses in this factor identified that the legal consequences imposed by authorities if a data breach occurs were a positive motivator to adhere to the policy (14, +3) (see Table 34). They indicated in the interview that the hospital could track their activities while using the system, which might cause them troubles and lead nurses to comply more:

> "EHR is more secure than paper records… and they can track my activities during documentation and may use them for legal issues later. And it is safe for nurses to comply with the EHR policy to protect themselves from future legal issues… because it will affect their careers." **(P8)**

> "This statement has a stronger influence on me to apply the EHR privacy policy. Because if there are any legal consequences when data is breached, it will be a stronger influence on nurses in general to comply with this privacy policy." **(P30)**

However, the nurses disagreed that being investigated by the others, such as media or other formal agencies, would influence them to follow the EHR policy (17, -2) (see Table 34)

6.3.1.3.5. **Clinical Tasks**

The nurses in this factor believed that putting patient privacy or administrative tasks ahead of clinical tasks had less of an impact on nurses' adherence to the EHR privacy policy (4, -2) (see Table 34). In the interview, one participant thought that whilst they adhere to EHR policy, they prioritise clinical tasks ahead of this, if there is a conflict of time or functions to be carried out.

> "… For example, we come first early in the morning, and we start admitting patients. Maybe the patient's case becomes critical, so we deal with it first, and later on we deal with the EHR record." **(P51)**

[The extent of clinical experience I have] (36, -1) plays little part in whether or not they are likely to comply with the EHR-policy (see Table 34).

6.3.1.3.6. **Self-Satisfaction and Preferences**

The participants indicated that feeling satisfied with following the EHR privacy policy had less influence on nurses' compliance with the EHR privacy policy (28, 0) (see Table 34). They also found that preferring to follow the policy had less influence on nurses' compliance with the policy (37, -1). Therefore, nurses focus on their basic clinical tasks instead of following the EHR privacy policy (see Table 34).

6.3.1.3.7. **Others' Expectations**

The nurses in this factor believed that others' expectations, such as those of their friends and family, the public, their hospital's top management, their direct manager, and their patients, had no or little influence on their complaint with the EHR privacy policy (18, -4; 38, -3; 31, -1; 26, 0; 35, 0) (see Table 34). As outlined above, participants in this factor believe that [The expectation of my friends and family] (18, -4) were not influencing them to follow the EHR policy) (see Table 34). They considered that benefiting patients and meeting their expectations was more important than the expectations of their own friends and families in terms of compliance with the EHR privacy policy:

> "Actually, I don't think this will influence my compliance. Because when I am working at the hospital, I only focus on following and complying with the hospital policy. At the same time, I will do whatever benefits my patient." **(P5)**

> "I don't think this is related to my job or working with patients. I care only about patients' expectations, so it does not matter what my family or friends expect from me. I don't think this is related to the EHR compliance with its policy. Because, at the end, this is my job, and they don't care what I am doing at my job because it is not related to them…" **(P8)**

Some considered this to be a factor external to their professional environment*:*

> "I put it in -4 because I don't think my family and friend have a relation with my job in the hospital. These things may be considered outside of the environment of my work field. So, I should not consider their opinion." **(P13)**

> "Not all my friends work at the hospital, and I considered them in the public category, so I don't know what the EHR privacy policy means." **(P45)**

> "It is not related to my work or compliance with the EHR policy at all." **(P21)**

> "… it does not matter what my friends expect from me at work." **(P10)**

Some thought that their friends' and families' expectations had no bearing on them; what matters was their ethics and job responsibility:

> "I am not doing documentation and compliance with EHR policy because my family is expecting me to do it. But rather, I am doing it because it is part of my job and responsibility, and by complaining, this privacy policy. This is not related to my family or friends." **(P11)**

> "Complying with the EHR privacy policy is going with my ethics consideration and the expectations of my family and friends have nothing to do with compliance with this policy." **(P30)**

Whilst the factor clearly showed that [The expectation of the top management of my hospital] (31, -1), (see Table 34) did not influence their compliance in Factor 1, one participant commented that management's satisfaction is important for them:

> "Well, as staff working at the hospital, I should do my job in adherence with the policies and procedures that hospital management set to gain the full satisfaction of my management. I have to do my best to adhere to the policies and procedures, so my top management will be happy that I stick with the rules." **(P13)**

The nurses thought that [The expectation of the public] (38, -3) was not an influential factor on their compliance with the EHR privacy policy) (see Table 34). In the interview, they indicated that the public's expectation was not important because the public did not expect this, or had "no idea' (i.e., no knowledge or expectations) concerning it:

> "The public does not know what we are doing at the hospital and does not know what the EHR privacy policy means. I don't think they expect anything." **(P45)**

> "It is not influential to me because the public has no idea about the policies and practises at the hospital." **(P52)**

Or the public was not aware of such a policy:

> "The public is unaware of what we do at the hospital, and we never give it much thought." **(P53)**

Some thought the expectations of a manager or colleagues were more important than public expectations:

> "I think that the public will not expect anything from me, whether I'm using paper or using EHR, or whether I comply with the privacy policy or not. Maybe the expectations of my manager or my colleagues will be more effective than the public." **(P14)**

Some were focusing on providing a good care service and protecting the patient, hospital, and themselves:

> "I am not worried about public expectations that much… I am focusing on my patients and my hospital and how to protect myself and my hospital. And how to provide service to patients very well." **(P28)**

6.3.1.3.8. **Controlling Factors**

The nurses in Factor 1 found that education level was an influential element in their compliance with the EHR privacy policy (5, +1) (see Table 34). From the post-sorting interview, one of the participants identified that a higher education degree is important for nurses to comply with the EHR policy. Because they become aware of the basic knowledge that prepares them to be more professional during work:

> "… I feel a bachelor's or master's degree should be mandatory for an employee to hold in such a profession. That makes him more intellectual and more professional at his work…… What you work on and how you work should be

> based on the fundamentals of your education. It gives the person more about what he will do at work, which will give him the basics that he got from the education side." **(P3)**

> "… For example, if I do not have a bachelor's degree and am not well educated about the subject, and even though I have practical knowledge and I am aware of technical things or any theoretical knowledge. How can I supervise myself during the work and how can I follow instructions at the same time? This won't improve myself at the professional side. When you are aware of your basic knowledge that you gained from college, you will also know about clinical knowledge, experience, and ethics, and this is how you can improve your profession." **(P3)**

However, the working position had less influence on nurses' compliance with the EHR privacy policy (8, -1) (see Table 34). This is particularly salient as most participants for this factor were nursing staff members.

6.3.1.4. Summary of Factor 1

Overall, it is apparent that this group's compliance with the EHR privacy policy is notably influenced by the availability of resources, the availability of hospital's rules and policies, and legal consequences for not following the policy. They prioritise clinical tasks and view the EHR as something to fill in later. Given this milieu of emergent findings, this factor was labelled "Professionally Pragmatic."

6.3.2. Factor 2: Professionally Obligated

Participants in Factor 2 acknowledged that it is among HCPs' obligations to keep patients' information private and secure. This group included individuals who were more likely to comply with the policy because it was mandated by the hospital. They relied on others to decide what was in the interests of the patients for them, rather than like in the other group (Factor 1), where HCPs made this decision for themselves, on a case-by-case basis. Thus, participants in Factor 2 feel "professionally obligated" to comply with the policy, therefore this group was named as such.

The Factor 2 explained (EV=3.4) of the variability in the data, which account 12.96% of the total variability of the study. A smaller number of seven participants loaded significantly onto this factor, of whom four nurses were in age group between 30 to 39 years old, and five held bachelor's degrees. Four nurses were working in staff positions, and three had 1 to 5 years of

experience (see Table 35). It is worth noting that the Factor 2 population was less diverse than the Factor 1 population.

Table 35: Contextual Information for Participants in Factor 2

Age			
Groups:	20 to 29 years	30 to 39 years	40- 49, 50-59, 60-69 years
Participants N (%):	2 (28.6%)	4 (57.1%)	1 (14.3%)
Education level			
Groups:	Diploma degree	Bachelor's degree	Graduate degree (Master and PhD)
Participants N (%):	1 (14.3%)	5 (71.4%)	1 (14.3%)
Working position			
Groups:	Staff	Manager	
Participants N (%):	4 (57.1%)	3 (42.9%)	
Experience			
Groups:	1-4 years	5-9 years	10 -14, 15- 20, 21-25 years
Participants N (%):	3 (42.90%)	2 (28.6%)	2 (28.6%)

Table 36 outlines the characteristics of the "Professionally Obligated Factor (2) Persona" with regard to participants' compliance with EHR privacy policies.

Table 36: Professionally Obligated Factor (2) Persona

Characteristic	**Description**
The factor' persona	The nurses who identify as a professionally obligated, as outlined in group 2 might typically be: the nurses in their middle age, who had 1 to10 years numbers of years of practising, working as staff more frontline supervisors. The nurses were preference to comply with the EHR policy to benefit their hospital, patients, direct mangers and upper management. This was the driving force for their behaviour, having said that, the nurses were aware of their professional responsibilities and the importance of data privacy and will comply with this to the best of her abilities.
Compliance drivers	- Benefit to the hospital and their patients - Expectation of top management - Clinical experience - Personal preference and Sense of satisfaction from following policies
Frameworks' constructs	-Subjective norm/ supervisors influence construct - Perceived usefulness -Working position.
Compliance approach	Nurses were motivated by a sense of their profession obligation to abide by with EHR privacy policy to benefit their patients.

6.3.2.1. Factor 2 Composite Sort

The composite sort of this factor (see Figure 33) will help with a complete analysis of the factor by visualising the item's positioning on two-dimensional poles.

Composite Q sort for Factor 2

-4	-3	-2	-1	0	1	2	3	4
** ► 23. my age	** ► 18. The expectation of my friends and families	2. The possible reaction of my colleagues towards me if a data breach	19. The extent to which I feel a particular task is necessary	** ◄ 16. The importance I place on EHR privacy policy of my practice	** ► 13. The benefit it brings to my colleagues	** ► 35. The expectation of my patients	** ► 6. The benefit it brings to my patients	** ► 33. The benefit it brings to my hospital
** ◄ 22. The Amount of time needed to complete the EHR record	** ◄ 32. The amount and level of support that is available to me.	** ► 38. The expectation of the public	** ► 10. My colleagues practice and compliance	** ► 4. The priority I give these tasks compared to other clinical and	7. The level to which I agree with the data privacy policies I am	* ◄ 30. My ssional/ethical esponsibilities	40. My hospital's rules and policy	** ► 8. The position I hold in the hospital
	** ◄ 12. The availability of guidelines on the subject	** ◄ 3. The ease of using the EHR system	24. The nature and amount of training I received on the subject	** ◄ 14. The consequences to me legally by authorities if a data breach	** ► 26. The expectation of my direct manager	** ► 36. The extent of clinical experience I have	** ► 17. The extent to which this aspect of my role is open to investigation	
	15. The expectation of my peers	* ◄ 21. The number of the steps required to access an EHR	* ► 11. The extent to which this aspect of my work may be open to	** ◄ 20. The usefulness of the guidelines	** ◄ 34. My confidence in my understanding of EHR policy	** ► 28. The sense of satisfaction I get when following the policies	** ► 31. The expectation of the top management of my hospital	
		** ◄ 39. The extent to which I am able to comply with EHR privacy policy	** ◄ 5. My level of education	* ◄ 29. The consequences to me contractually from my	** ► 37. My personal preference about following the EHR privacy policy	** ◄ 9. The access to the resources (computers, software, etc,)		
			** ◄ 1. My experience of working with the EHR	25. The extent to which this is monitored by my hospital	27. The expectations of those who manage data protection			

Legend

* Distinguishing statement at P< 0.05

** Distinguishing statement at P< 0.01

► z-Score for the statement is higher than in all other factors

◄ z-Score for the statement is lower than in all other factors

Consensus Statements

Figure 33: Model Q-sort for "Professionally Obligated" Factor 2

6.3.2.2. Factor 2 Crib Sheet

Professionally Obligated Factor 2 was interpreted using Factor 2's crib sheet (see Table 37). This table is divided into four parts. The first part shows the items ranked at (+4), then it shows the statements that were positively ranked higher in this Factor 2 than Factor 1. It depicts the statements that were negatively ranked lower in Factor 2 than Factor 1 and shows the items that ranked at (-4). Finally, it also shows the statements' numbers and scores on both factors. It also shows the statements' numbers and scores on both factors.

Table 37: Crib Sheet for Factor 2

No.	Highest Ranked Statements	F2 Rank	F1 Rank
Items ranked at (+4)			
33	[The benefit it brings to my hospital]	4	1
8	[The position I hold in the hospital]	4	-1
Positive statements ranked higher in Factor 2 array than in another factor array			
17	[The extent to which this aspect of my role is open to investigation by the press or other organisations]	3	-2
31	[The expectation of the top management of my hospital]	3	-1
13	[The benefit it brings to my colleagues]	1	-3
36	[The extent of clinical experience I have]	2	-1
28	[The sense of satisfaction I get when following the policies]	2	0
4	[The priority I give these tasks compared to other clinical and administrative tasks]	0	-2
26	[The expectation of my direct manager]	1	-1
37	[My personal preference about following the EHR privacy policy]	1	-1
35	[The expectation of my patients]	2	0
6	[The benefit it brings to my patients]	3	2
Negative statements ranked lower in Factor 2 array than in another factor array			
20	[The usefulness of the guidelines]	0	1
39	[The extent to which I am able to comply with EHR privacy policy without help]	-2	0
5	[My level of education]	-1	1
1	[My experience of working with the EHR]	-1	1
16	[The importance I place on EHR privacy policy of my practice]	0	3
14	[The consequences to me legally by authorities if a data breach is seen to occur]	0	3
3	[The ease of using the EHR system]	-2	2
32	[The amount and level of support that is available to me].	-3	1
12	[The availability of guidelines on the subject]	-3	2
Lowest ranked statements			
22	[The amount of time needed to complete the EHR record]	-4	2

6.3.2.3. Factor 2 Interpretation Using the Crib Sheet

6.3.2.3.1. **Benefiting Others**

Benefiting others, such as the hospital, patients, and colleagues, etc. were motivators for the nurses to comply with the EHR privacy policy. From the crib sheet (see Table 37), it is clear that nurses identified the hospital benefits in term of resource management, reputation and

enhancement in the quality of service were a major influence element for them to comply with the EHR privacy policy (33, +4). From the post-sorting interview, one of the participants thinks following the policy could protect the hospital:

> "It will have a good impact on the hospital if I follow the policy. The benefits are… not much resource waste and protect the hospital's reputation. This will lead to a good quality service." **(P48)**

Moreover, they found that benefiting patients was the main driver for them to follow the EHR privacy policy (6, +3). In the interview, one of the nurses, places importance on protecting the hospital:

> "This is one of the most important things for me that makes me follow a data privacy policy…" **(P7)**

They though protecting EHR data could benefit the patients:

> "… I will do it just to benefit my patients." **(P7)**

Furthermore, benefiting their colleagues was a motivator for them to adhere to the EHR policy (13, +1) (see Table 37). One of the participants said that they followed the rules because they did not want to bring attention to themselves or their co-workers when data was breached:

> "By complying with EHR policy, it will decrease the number of problems, which leads to less investigation, so nurses will not feel under pressure." **(P34)**

The nurses in this segment are focusing on the bigger picture of the hospital. This is aligned with benefiting the internal and external customers by complying with the EHR privacy policy, compared to the nurses in factor 1 who were thought their peers had no influence on their compliance with the EHR privacy policy.

6.3.2.3.2. **Others' Expectations**

Some of the nurses were also influenced by the expectations of top management to comply with the EHR privacy policy (31, +3) (see Table 37), which was a marked difference from Professionally Pragmatic Factor 1. The following comment from the interview indicated this:

> "This is very important to me, because I believe that the management expects me to follow this policy." **(P32)**

The statement ranking score for "the expectation of direct managers" (26, +1) confirmed that nurses were influenced by management's expectations to follow the EHR privacy policy. Furthermore, patients' expectations influence nurses' compliance with the policy (6, +3) (see Table 37). From the post-sorting interview, some nurses thought that not following the policy might disappoint the patients:

> "For me, as a nurse, I want patients to expect me to follow the policy. I do not want them to be disappointed in me and how I handled their information." **(P7**)

> "Because it is very important that the patient expects me to regard how we give them medical care and how their information will be confidently stored." **(P32)**

6.3.2.3.3. **Prioritisation of Privacy**

The nurses in this factor are influenced by their feelings of satisfaction when they follow the EHR compliance with privacy policy (28, +2). They also prefer and prioritise compliance with the privacy policy over other tasks (4, 0 and 37, +1). At the same time, they think that their clinical experience influenced them to comply with the EHR privacy policy (37, +2) (see Table 37). Therefore, some nurses follow the EHR privacy policy more when they are clinically skilled and prefer compliance with the policy.

6.3.2.3.4. **Ease of Using the system, Support, and Availability of Guidelines**

Unlike those who loaded onto Professionally Pragmatic Factor 1, nurses in Factor 2 believed that the amount of time required to complete patient files (22, -4) had no influence on their decision to follow the EHR privacy policy (see Table 37). When the researcher asked the participant why they placed this statement under -4 in the post-sorting interview, she replied:

> "…because our department works 24 hours. We have three shifts, and we must complete our work before endorsement time." **(P48)**

In direct contrast to Professionally Pragmatic Factor 1, and again illustrating the nurses' professional commitment to privacy policy, nurses in Factor 2 showed that the ease of use of the system had little bearing on their decision to comply (3, -2) (see Table 34). One of the participants stated that it was easy to use the system:

> "…because if it is really easy to access and easy to use the system, then we can easily comply with policy." **(P48)**

However, other participants in this factor provided a contradictive response to the statement above, and stated that internet connectivity and service interruptions have an influence on their compliance with the EHR policy:

> "Ya, actually in our hospital system is always down… the system is not very good to use… The internet or the browser is not very good, always interrupted, so it has little influence on me." **(P1)**

Similarly, nurses in this factor were not influenced by the amount and level of support that is available to them (32, -3) (see Table 37). This may had been coupled with an already low expectation of the hospital's systems, which they had to work with. One of the interviewees stated that they almost felt helpless*:*

> "Just now our hospital started using this technology, and we still have little support from them This does not help me to follow the policy." **(P48)**

The nurses' prior experience with EHR had little bearing on their willingness to adhere to the policy (1, -1) in this factor, compared to Factor 1 (see Table 37). Moreover, the participants in this factor found the availability and usefulness of the EHR privacy guidelines had little influence on their compliance with the policy (12, -3, and 20, 0) (see Table 37). Moreover, the nurses were less motivated to comply with the EHR privacy policy in fear of being legally sued by authorities when a data breach happened (14, 0), compared to Professionally Pragmatic Factor 1 (see Table 37).

6.3.2.3.5. **Controlling Factors**

The participants in this factor identified the working position was a largely influence them to comply with the system policy (8, +4) (see Table 37). The comment from the interview indicated that the nurses who are in administrative or instructive position think of themselves as an example for others therefore they comply with the EHR privacy policy:

> "I feel this is a very strong influence because to follow this EHR policy is because, as I am a clinical instructor, I should be the first one who complies before telling staff to comply with this policy. So this is most influential for me." **(P1)**

> "Because if I want to teach nurses about the policy, I want them to listen to me and see me as an example because I am a head nurse." **(P34)**

The nurses disagreed that their level of education had influenced them to follow the EHR privacy policy (5, -1) (see Table 37). The following comment from the interview indicated that training is more important than education:

> "I feel that it is not relevant here, because this is for policy and procedures, and when I work in an institution, I have to abide by policy regardless of my level of education. My background education is not necessary; I will be further trained on policy and procedure here. So I am supposed to follow what is being said here. I think my level of education is not coming into the picture." **(P6)**

6.3.2.4. Summary of Factor 2

In conclusion, it is clear that the benefiting and expectations of others and the nurses' preferences for privacy influenced the Professionally Obligated Factor 2 to comply more with the EHR privacy policy compared to Professionally Pragmatic Factor 1. Employment position is an important element in this factor, as nearly half of the participants are in some capacity of management. However, the legal consequences, system usage, and support availability have a less influential effect on the compliance of nurses in this factor with the policy.

6.4. Comparing Factors 1 and 2

6.4.1. Population Comparison

More than double the number of participants (n = 19) loaded significantly onto the Professionally Pragmatic Factor 1, compared to seven participants who loaded significantly onto Professionally Obligated Factor 2. The population in actor 1 had almost equally representative numbers of nurses from all age groups, while in Factor 2, 4 of the seven nurses were aged between 30 and 39 years old. Furthermore, 11 out of 19 of the participants in Factor 1 had 10 years or more of work experience, while three of seven participants in Factor 2 had less than five years' experience Commonalities between the factors' populations included that over half of the population held bachelor's degrees and were working in staff nurse positions (see Table 32and Table 35).

6.4.2. Comparison of the Professionally Pragmatic Factor 1 and Professionally Obligated Factor 2 Using Distinguishing Statements

The Distinguishing Statements instrument used in Q-Methodology helps conceptualise and understand results by referring to the items that shape each factor using the items' score that generated by participants' sorting (Mckeown and Thomas, 2013). The statements help in

understanding each factor's main characteristics, which can be used to assess the constancy of the results (Mckeown and Thomas, 2013). Whilst the Crib Sheet was used to summarise the factors, the Distinguishing Statements centre on the distinguished items between the extracted factors. Using the Distinguishing Statements allowed the researcher to focus on the statements that were associated with one factor compared to another factor.

Table 38 shows the Distinguishing Statements' ranking score and Z-score for both Professionally Pragmatic Factor 1 and Professionally Obligated Factor 2. In comparing Factor 1 to Factor 2, as shown in (Table 38), 27 statements differentiate at a significance level $P<0.01$ for both factors. Seven items were agreed upon to be influential for both factors, with differences in their ranking scores. 20 items were differentiated from Factor 1 to Factor 2. In the following section, a comparison between Factor 1 and Factor 2 is presented using the distinguishing statements tables (see Table 38).

The Crib Sheet for Factor 1 exhibits 92.5% alignment with the distinguishing statements of Factor 1, of which only two statements were not presented in the crib sheet. However, the Crib Sheet for Factor 2 shows 81.5% alignment with the distinguishing statements of Factor 2. There were only five statements that were not presented in the Crib Sheet of Factor 2, which were marked by a (*) sign in Table 38.

Table 38: Distinguishing Statements for Factors 1 and 2

No.	The actual Statements	F1		F2	
		Q-rank	Z-score	Q-rank	Z-score
9	[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]	4	1.73	*2	0.823
34	[My confidence in my understanding of EHR policy and practice]	3	1.25	*1	0.48
16	[The importance I place on EHR privacy policy of my practice]	3	1.22	0	0.261
14	[The consequences to me legally by authorities if a data breach is seen to occur]	3	1.21	0	-0.062
3	[The ease of using the EHR system]	2	1.07	-2	-0.978
12	[The availability of guidelines on the subject]	2	0.89	-3	-1.253
6	[The benefit it brings to my patients]	*2	0.85	3	1.531
22	[The amount of time needed to complete the EHR record]	2	0.81	-4	-2.003
33	[The benefit it brings to my hospital]	*1	0.56	4	1.813
20	[The usefulness of the guidelines]	1	0.51	0	-0.115
5	[My level of education]	1	0.37	-1	-0.539
1	[My experience of working with the EHR]	1	0.34	-1	-0.594
32	[The amount and level of support that is available to me].	1	0.23	-3	-1.201
28	[The sense of satisfaction I get when following the policies]	0	0.2	2	0.842
35	[The expectation of my patients]	0	0.01	2	1.051
39	[The extent to which I am able to comply with EHR privacy policy without help]	0	0	-2	-1.068
36	[The extent of clinical experience I have]	-1	-0.25	2	0.925
37	[My personal preference about following the EHR privacy policy]	-1	-0.27	1	0.366
31	[The expectation of the top management of my hospital]	-1	-0.28	3	1.141
26	[The expectation of my direct manager]	-1	-0.3	1	0.509
8	[The position I hold in the hospital]	-1	-0.42	4	1.638

Table 38: Distinguishing Statements for Factors 1 and 2

No.	The actual Statements	F1		F2	
		Q-rank	Z-score	Q-rank	Z-score
17	[The extent to which this aspect of my role is open to investigation by the press or other organisations]	-2	-0.5	3	1.175
4	[The priority I give these tasks compared to other clinical and administrative tasks]	-2	-0.51	0	0.24
10	[My colleagues' practice and compliance]	-2	-0.91	*-1	-0.332
13	[The benefit it brings to my colleagues]	-3	-1.07	1	0.681
38	[The expectation of the public]	-3	-1.74	*-2	-0.947
18	[The expectation of my friends and family]	-4	-2.23	*-3	-1.105
(* sign) refers to missing statements from the crib sheet of factors.					

6.4.2.1. Resource Availability and System Ease of Use

Nurses in both factors identified the statement: [Access to resources (computers, software, etc.) were needed to comply with EHR privacy policy] was an influencing element in following the EHR privacy policy] (9), but the item was ranked higher (+4) in Factor 1 than in Factor 2 (+2) (see Table 38). This item in the distinguishing table was aligned only with the Crib Sheet of Professionally Pragmatic Factor 1, while Professionally Obligated Factor 2's crib sheet that did not include this statement. This showed that both factors were driven by the available resources. As one of the nurses in Factor 1 stated in the interview, they experienced a lack of computers available to use for their file documentation:

> "… One of the struggles that we are facing here is that we have fewer computers, which leads nurses to take more time to complete documentation of patients' data…" **(P8)**

Similarly, the nurses in Factor 1 found the statement [The ease of using the EHR system] (3) to be more influential for their compliance with the EHR privacy policy, which was ranked (+2) compared to Factor 2, which ranked it at (-2) (see Table 38). Both factors' Crib Sheets and distinguishing items tables included this statement. This means that the participants in Factor 1 highlight the system usage than those in the Factor 2. In the interview, one of the nurses in Factor 1 identified Internet connectivity is an issue for them affecting compliance with the policy:

> "Most of the time we have Internet connection errors or poor connection. Because of this, we can't use the system or document anything. If the system is easy to use, we can comply with system policy." **(P51)**

The participants in Professionally Pragmatic Factor 1 found the statement: [The amount of time needed to complete the EHR record] (22) more influential for their compliance with the EHR privacy policy, ranking it (+2), compared to Professionally Obligated Factor 2, which ranked it at (-2) (see Table 38). Both factors' Crib Sheets included this statement. Participants in Factor 1 found the time they spent on the system more obstructing to their compliance than those in factor 2. This means that the participants in Factor 1 were driven by [the amount of time needed to complete the EHR record] than those in Factor 2. In the post-sorting interview, one nurse in Factor 1 identified that compliance with the EHR policy came into conflict with their clinical responsibilities, which shows their pragmatic stance:

> "In ICU we have many critical patients, and we have to deal with them first, before going to documentation on EHR. So, we have a specific time that the system will close. The amount of time to complete the documentation has a great influence on compliance." **(P11)**

Factor 1 participants also identified the statement: [The amount and level of support that is available to me] (32) as affecting their EHR policy adherence (+1), while for Factor 2 it was ranked negatively (-3) (see Table 38). Both factors' Crib Sheets included this statement. Participants in Factor 1 believed technical support could help them to comply more strongly than in Factor 2.

The nurses in Factor 2 found the statement: [My experience of working with the EHR] (1) has more influence on their compliance with the EHR privacy policy, which was ranked +1, while those in Factor 1 ranked it at (-1) (see Table 38). Both factors' crib sheets included this statement. This indicated that the participants in Factor 2 believed that experience in using the system is more important to their compliance than ease of using the system or supporting services.

The differences between the two factors in term of compliance are that Factor 1 believed adequate resources and support services were needed to be available to them in order to easily use the system, which helps with compliance. While Factor 2 believed that if nurses became more experienced with the system, this may reduce the need for support being required (e.g., training or technical assistance) when using the system.

6.4.2.2. Personal Abilities and Preferences

The nurses in both factors identified the statement: [My confidence in my understanding of EHR policy and practice] (34) as having a positive impact on their compliance with the EHR policy. However, it was more influencing for those who loaded on Professionally Pragmatic Factor 1 (+3) than Professionally Obligated Factor 2 (1+) (see Table 38). This is aligned only with the Crib Sheet of Factor 1, where this statement was found to have a huge influence on nurses' compliance. Factor 2's Crib Sheet did include this statement. This means that the participants in Factor 1 were more driven by the confidence of their understanding the policy than the Factor 2 group. One of the participants in Factor 1 identified that understanding the policy is an important precondition to apply it correctly:

> "… If I fully understand the privacy policy, I could follow it better." **(P21)**

The nurses in Professionally Pragmatic Factor 1 identified the statement: [The importance I place on EHR privacy policy of my practice] (16) was more influential for them to comply with the EHR privacy policy, which was ranked (+3), while those in Professionally Obligated Factor 2 ranked it at (0) (see Table 38). Both factors' Crib Sheets included this statement, however, it was more aligned in Factor 1 than Factor 2. The participants in Factor 1 found this item was influential to their compliance, while those in Factor 2 found this item less influential to their compliance. This means that the participants in Factor 1 were more driven by placing importance on the policy than those in the Factor 2. One of the participants in Factor 1 articulated that following the EHR privacy policy would be particularly beneficial for patients.

> "For me, it is important to maintain patient privacy policies. Some patients won't divulge their health conditions to other people. They may be hiding it from their family members, so they do not get worried about their condition…." **(P39)**

Participants in Professionally Obligated Factor 2 found the statement: [The sense of satisfaction I get when following the policies] (28) was influencing their compliance with the EHR privacy policy, which was ranked (+2), while those in Professionally Pragmatic Factor 1 ranked it at (0) (see Table 38). Both factors' Crib Sheets included this statement. The participants in Factor 2 found this item was influencing their compliance, while participants in Factor 1 found this item less influential to their compliance. This means that the participants in Factor 2 were more driven by satisfaction they get from complying with the policy than those in Factor 1.

Factor 2 participants found the statement [The priority I give these tasks, while those in other clinical and administrative tasks] (4) had some negligible influence on their compliance with the EHR privacy policy, which was ranked (0), while those in Factor 1 ranked it at (-2) (see Table 38). Both factors' crib sheets included this statement. Participants in Factor 2 found this item was influencing their compliance, while those in Factor 1 who found this item less influential to their compliance. This means that the participants in Factor 2 were more driven by prioritising the compliance with the policy than those in Factor 1.

The nurses in Factor 2 found the statements [My personal preference about following the EHR privacy policy] (37, +1) and [The extent of clinical experience I have] (36, +2) were more influencing for nurses' compliance with the privacy policy, while those in Factor 1 ranked these items at (-1) (see Table 38). Both factors' crib sheets included this statement. Participants in Factor 2 found that this item was influencing their compliance, while those in participants in

Factor 1 found this item less influential to their compliance. This means that the participants in Factor 2 were driven by their preferences to comply with the policy than those in Factor 1.

Participants in the Professionally Obligated Factor 2 found the statement: [The extent to which I am able to comply with EHR privacy policy without help] (39) had little influence on their compliance with the EHR privacy policy, which was ranked -2, while those in Professionally Pragmatic Factor 1 ranked it at (0) (see Table 38). Both factors' Crib Sheets included this statement. Participants in Factor 2 found this item less influencing their compliance, while those in Factor 1 found this item influential to their compliance. This means that the participants in Factor 2 could comply with the policy without help than those in Factor 1.

The difference between the two factors is that Factor 1 participants placed more importance on the privacy policy; therefore, they needed to be confident in their understanding of the policy so that they could comply without external help. Those in Factor 2 exhibited greater personal preference to comply with the privacy policy, and clinical experience led them to prioritise privacy over other tasks.

6.4.2.3. Benefiting Others

The nurses in both factors have identified the statements: [The benefit it brings to my hospital] (33) and [The benefit it brings to my patients] (6) as positive influences on their adherence with the EHR privacy policy. However, these two statements were more highly ranked in Factor 2 (+4, +3) than in Factor 1 (+1, +2) (respectively) (see Table 38). This is aligned only with the crib sheet of Factor 2, where this statement can be seen to exert a major influence on nurses' compliance. Nevertheless, Factor 1's Crib Sheet also included this statement. This means that the participants were driven by benefiting others to comply with the policy. One of the participants in Factor 2 expressed that following the EHR policy is beneficial to the hospital and patients:

> "It will have a good impact on the hospital if I follow the policy… the benefit is protecting the hospital's reputation. This will lead to a good quality service." **(P48)**

The participants in Professionally Obligated Factor 2 find the statement [The benefit it brings to my colleagues] (13, +3) is more influencing for nurses' compliance with the privacy policy, while those in Professionally Pragmatic Factor 1 ranked this at (-1) (see Table 38). Both factors' crib sheets included this statement. Participants in Factor 2 found this item was influencing their

compliance, whereas participants in Factor 1 found it less influencing. This means that the participants in Factor 2 were more driven by benefiting their colleagues to comply with the policy more than those in Factor 1. In the interview, nurses expressed that they thought investigations may cause stress for other nurses, and seeking to avoid this would induce them to comply with the policy:

> "By complying with EHR policy, it will decrease the number of problems, which leads to less investigation, so nurses will not feel under pressure." **(P34)**

The difference between the two factors is that the nurses in Factor 2 believed that benefiting others, such as hospitals, patients, and subordinates, was a major drive for them to comply with the policy. Those in Factor 1 thought that benefiting others was important to the nurses; however, it was a minor driver for them to comply with the policy compared to other elements.

6.4.2.4. Others' Expectations

The nurses in both factors have identified that the statements: [The expectation of the public] (38) and [The expectation of my friends and family] (18) have no or little influence on their adherence with the EHR privacy policy. The two statements were ranked lower (-3 and -4) in Professionally Pragmatic Factor 1 compared to Professionally Obligated Factor 2 (-2 and -3) (respectively) (see Table 38). This is aligned only with the crib sheet of Factor 1, where this statement had less influence on nurses' compliance. The Factor 2's Crib Sheet did include this statement. The participants in both factors think that the public and their friends and families do not expect anything from them at work:

> "The public does not know what we are doing at the hospital and does not know what the EHR privacy policy means. I don't think they expect anything." **(P45)**

> "… it does not matter what my friends expect from me at work." **(P10)**

The participants in Factor 2 found the statement [The expectation of my patients] (35) to be influential for their compliance with the EHR privacy policy, which was ranked +3, while those in Factor 1 ranked it at (0) (see Table 38). Both factors' crib sheets included this statement. Participants in Factor 2 found this item was influencing their compliance whereas participants in factor 1 found it less influencing. This means that the participants in Factor 2 were driven by patients' expectations to comply with the policy than those in Factor 1. The participant in Factor 2 thought that patients may get disappointed if they do not follow the policy:

> "For me, as a nurse, I want patients to expect me to follow the policy. I do not want them to be disappointed in me and how I handled their information." **(P7)**

However, the participants in both factors disagree that their colleagues' practises and compliance (10) had an impact on their compliance with the EHR policy. It was ranked lower by Factor 1 than Factor 2, at (-2) and (-1) (respectively) (see Table 38). This is aligned only with the Crib Sheet of Factor 1 that this statement had less influence on nurses' compliance. The Factor 2's Crib Sheet did include this statement. This means that the participants in both factors were not influenced by their colleagues' practises to comply with the policy

The nurses in Factor 2 found the statements [The expectation of the top management of my hospital] (31, +3) and [The expectation of my direct manager] (26, +1) had more effect on their compliance with the EHR privacy policy, while those in Factor 1 ranked it at (-1) (see Table 38). Both factors' crib sheets included this statement. Participants in Factor 2 found this item was influencing their compliance whereas participants in Factor 1 find it less influencing. This means that the participants in Factor 2 were driven by managements' expectations to comply with the policy than those in Factor 1. The nurses in the interview think the management requires compliance with the EHR policy:

> "This is very important to me, because I believe that the management expects me to follow this policy." **(P32)**

Both factors believed that external expectations, such as public and family expectations, etc., were not important to their compliance. However, the two factors differ in their internal expectations; Factor 2 highlighted the internal expectations more than Factor 1.

6.4.2.5. Consequences and monitoring

The participant in Professionally Pragmatic Factor 1 found the statement: [The consequences to me legally by authorities if a data breach is seen to occur] (14) was influencing for their compliance with the EHR privacy policy, which was ranked +3, while those in Professionally Obligated Factor 2 ranked it at (0) (see Table 38). Both factors' crib sheets included this statement. This means Factor 1 were more influenced to comply by the consequences than those in the Factor 2. One of the interviewees indicated that their activities on the system are tracked and can lead to legal consequences:

> "… they can track my activities during documentation and may use them for legal issues later. And it is safe for nurses to comply with the EHR policy to

> protect themselves from future legal issues… because it will affect their careers." **(P8)**

Moreover, the participants in Factor 2 found the statement: [The extent to which this aspect of my role is open to investigation by the press or other organisations] (17, +3) had more influence on their compliance with the EHR privacy policy, which was ranked +3, while those in Factor 1 ranked it at (-2) (see Table 38). Both factors' crib sheets included this statement. This means Factor 2 were driven by open investigation by the press or other organisations to comply with the policy than those in Factor 1. One of the participants in the post-sorting interview identified their reputation at the hospital was important for them and they therefore must protect it:

> "Because of this point, and since I am a head nurse, I am reflecting on the hospital, and I am afraid this might affect the hospital's reputation if this investigation opened when data beach happens." **(P48)**

The differences between the two factors were that Factor 1 participants believed legal consequences were more important drivers for them, while those in Factor 2 participants thought that external investigation was more influential for them.

6.4.2.6. The Hospital Guidelines

The participants in Professionally Pragmatic Factor 1 found the statement [The usefulness of the guidelines] (20) to be influential for their compliance with the EHR privacy policy, which was ranked at (+2), while those in Professionally Obligated Factor 2 ranked it at (0) (see Table 38). Both factors' Crib Sheets included this statement. Participants in Factor 1 found this item was influencing their compliance whereas participants in Factor 2 found it less influencing. This showed that nurses in Factor 1 were driven by [the usefulness of the guidelines] to comply with the policy more than second group. One of the participants in Factor 1 thought that using EHR guidelines can prevent them from making mistakes:

> "Of course, using the EHR's guidelines to guide you during using the system; it will prevent you from committing mistakes in the future at work." **(P24)**

The nurses in Professionally Pragmatic Factor 1 found the statement: [The availability of guidelines on the subject] (12) was more influential for their compliance with the EHR privacy policy ranked it at (+2), while those in Professionally Obligated Factor 2 ranked it at (-3) (see Table 38). Both factors' Crib Sheets included this statement. Participants in Factor 1 found this item was influencing their compliance whereas participants in Factor 2 found it less influencing.

This showed that nurses in Factor 1 were driven by the availability of the guidelines to comply with the policy more than second group. One of the interviewees stated that guidelines available were like a map that showed nurses the correct ways to comply with the policy:

> "Without a map that I follow, I cannot know the way that I should follow. With the present guidelines, everyone will know what they should do at the beginning to reach the end of this way. So, if the guidelines are available, everything will be systematically arranged. Everyone will follow the correct way of the policies and procedures of the hospital." **(P13)**

The main basic difference between the two factors is that the participants in Factor 1 believed the guidelines are important for their compliance, while those in Factor 2 did not.

6.4.2.7. Controlling Factors

The nurses in Professionally Pragmatic Factor 1 found the statement [My level of education] (5) had more impact on their compliance with the EHR privacy policy, which was ranked +1, while those in Professionally Obligated Factor 2 ranked it at (-1) (see Table 38). Both factors' crib sheets included this statement. Participants in Factor 1 found this item was more influencing their compliance whereas participants in Factor 1 found it is less influential. This showed that nurses in Factor 1 were driven by formal education to comply with the policy more than second group. In the interview, one nurse stated that education was a key to gain the basic knowledge that helped nurses to comply with the policy:

> "… For example, if I do not have a bachelor's degree and am not well educated about the subject, and even though I have practical knowledge and I am aware of technical things or any theoretical knowledge, how can I supervise myself during the work and how can I follow instructions at the same time? This won't improve myself at the professional side…." **(P3)**

However, in Factor 2 participants tended to value training over education:

> "I feel that it is not relevant here, because this is for policy and procedures, and when I work in an institution, I have to abide by policy regardless of my level of education. My background education is not necessary; I will be further trained on policy and procedure here. So, I am supposed to follow what is being said here. I think my level of education is not coming into the picture." **(P6)**

The participants in Professionally Obligated Factor 2 recognised that their work position influences their adherence to the EHR privacy policy. They ranked the statement: [The position I hold in the hospital] (8, +4) as the most influential factor in complying with the EHR privacy

rules, while those in Professionally Pragmatic Factor 1 ranked this lower, at (-1) (see Table 38). Both factors' Crib Sheets included this statement. Participants in Factor 2 found this item was more influencing their compliance, whereas participants in Factor 1 found it less influencing. In the post-sorting interview, the participants complied with the policy because they identified themselves as role models for nurses who worked under their supervision:

> "Because if I want to teach nurses about the policy, I want them to listen to me and see me as an example because I am a head nurse." **(P34)**

Overall, the participants in Factor 1 relied on their education to comply with EHR privacy policy whereas Factor 2 value their working position to comply with the policy.

6.5. Summary

This chapter expounded the results of the Q-study that explored the factors that influence nurses to comply with the EHR privacy policy. The study's main goal is to understand the drivers and barriers that influence nurses' compliance with the EHR privacy policy in three hospitals in Makkah, Saudi Arabia. Two factors were narrated, dubbed "Professionally Pragmatic" (Factor 1) and "Professionally Obligated" (Factor 2). Both factors had 13 consensus statements and 27 distinguishing statements, at a significance level of $P<0.01$. Factor 1 posited that HCPs believe in the readiness of the hospitals' environment for those who want to comply with the EHR privacy policy, therefore they must be "professionally pragmatic" in their compliance with the policy. Factor 2 represents the idea that nurses have work obligations to the hospital and patients because of their jobs, which makes nurses more likely to follow the EHR privacy policy.

CHAPTER 7
DISCUSSION

This research was undertaken to explore the behavioural factors that influence nurses' compliance with EHR privacy policy from nurses' perspective in Saudi Arabia, using Q-Methodology. It identified where these viewpoints might group together in a holistic sense. This chapter discusses the study findings that utilised Q-Methodology as the methodological means to investigate the nurses' compliance behaviour with the EHR privacy policy. This provided a unique solution that combined quantitative method (Q-sort activity) and complementary qualitative approaches (post-sorting interview) to understanding the influential factors for nurses to comply with the EHR privacy policy, unlike the pure quantitative or qualitative approaches that have been previously publicised in the literature (see Chapter 2). The Q-Methodology approach shows a holistic view of the investigated issue, which can be categorised by participants views about a subject into few distinct viewpoints (Simons, 2013, Brown, 1980). It enhances the complexity and comprehensiveness of qualitative research by offering a systematic method for examining subjective perspectives while integrating quantitative aspects.

Moreover, this study was underpinned by two theories, the DTPB and the DT. The DTPB model is an expansion of the TPB theory proposed by Taylor and Todd (1995b), which helps to understand an individual's behaviour. The DT pertains to the intrinsic fears experienced by individuals as a result of external factors, such as legal frameworks and rules, which serve as deterrents to engaging in illicit behaviours (Hupert et al., 1996). The integration of DTPB and DT enables investigators to take into account the impacts of both intrinsic and extrinsic psychological factors when analysing, forecasting, or influencing behaviours of participants. This approach enhances comprehension of decision-making processes and mechanisms of behaviour modification. This chapter discusses the outcomes of this research in relation to the combined model's constructs, to facilitate understanding in the broader context of this research.

The following section situates this Q study in relation to existing research concerned with HCPs' compliance with EHR policy, considering its outcomes and theoretical underpinnings. Subsequently, Section 7.2 adumbrates the main outcomes of this research in terms of the research model described in Section 3.3 (see Figure 10). Thus, the main findings are explained in relation to the model's constructs: "attitude," "subjective norm," "perceived behavioural

control," "detection certainty and punishment severity," and "controlling factors"). Section 7.3 highlights the contributions of Factor 1 and Factor 2 outcomes to the theoretical frameworks' constructs. Section 7.4 indicates the importance of health data privacy and security regulations, while section 7.5 describes nursing practice implications. Section 7.6 summarises the chapter.

7.1. Implications Relating to Existing Research

As outlined in the results explained in Chapter 5, the analysis of the Q-sort revealed two statistically robust groupings (factors) of participating nurses in relation to their attitudes and perspectives in relation to EHR privacy policy. A review of the main characteristics of each grouping led to them being named as "Professionally Pragmatic" and "Professionally Obligated," and together they helped to uncover a number of important aspects about the nurses' perspectives on adherence with information safety.

This study showed that all participants in both factors were willing to comply with the EHR privacy policy. The participants in Professionally Obligated Factor 2 relied on their professional standards to do what was in the patients' best interests. For instance, the nurses focused on how to benefit all parties by complying with the EHR policy, and they highly ranked the following statements: [The benefit it brings to my hospital] (33), [The expectation of the top management of my hospital] (13), and [The position I hold in the hospital] (8).

On the other hand, the participants in Professionally Pragmatic Factor 1 depended on their judgement ability to do what was right for their patients in a holistic sense. For example, the nurses focused on more on technical difficulties and understanding the guidelines to perform their tasks, including compliance with the EHR privacy policy. They highly ranked the following statements: [Access to resources (computers, software, etc.) needed to comply with EHR privacy policy] (9), [The amount of time needed to complete the EHR record] (22), and [The availability of guidelines on the subject] (12).

The Q-Methodology as deployed in this study was able to uncover this dichotomy of nursing compliance practice in the field (i.e., Professionally Obligated Factor 2 verses Professionally Pragmatic Factor 1); whereas other methods could explore individual characteristics, they would lack a holistic grouping of the characteristics into an overall behaviour picture of ingrained philosophical behavioural positioning (Kuo et al., 2017, Ma et al., 2016). This displays the uniqueness of the Q-Methodology.

The findings of the current study (i.e., with regard to the two factors) confirm previous non-Q studies in terms of the individual barriers and drivers that were identified (Kuo et al., 2017, Ma et al., 2016). The Q-study allowed the strategic grouping nurses' viewpoints to form these factors in order to uncover the underlying ingrained holistic behavioural philosophical positions expressed by nurses, which are manifested through these barriers and drivers. Ma et al. (2016) conducted a quantitative survey to examine the factors that motivate nurses to protect EHR data in a hospital in Taiwan, testing the DTPB model as theoretical framework. They found that the social influence of managers and colleagues have significant influences the nurses' compliance. This is quite similar to our result, especially for the Professionally Obligated Factor 2.

Moreover, Ma et al. (2016) found that nurses who perceived usefulness and ease of used the EHR have significantly influences on their attitude toward the compliance with the policy. This is similar to our findings concerning the Professionally Pragmatic Factor1. These findings align more with the current study's DTPB model outcomes, which showed that nurses' attitudes, social influences, and perceived controlled behaviours were significant influencers on their compliance with the EHR privacy policy. This occurred because the Q-Methodology groups nurses in factors based on the similarities of their viewpoints, unlike the previous studies, which only indicate the general characteristics of the studied nursing populations.

The current study also used the DT to exam nurses' compliance, which to some extent aligned with Kuo et al. (2017) survey study, exploring factors that inhibit nurses' intention to violate EHR privacy policy in Taiwan. They used the DT model to examine the nurses' violation behaviour toward the EHR privacy policy. They found that punishment severity did not significantly predict nurses' violations of EHR policy, which is affirmed by The current study's finding that the participants in the Professionally Obligated Factor 2 were not greatly influenced by punishment severity, as shown by the fact that statements in fear of legal consequences such as [the consequences to me legally by authorities if a data breach is seen to occur] (14) were placed at the low end of the agreement grid. Moreover, Kuo et al. (2017) found that the detection certainty was, in contrast, to be a significant predictor for the nurses' violation of the EHR policy. These findings aligned with our findings concerning participants' viewpoints in Professionally Pragmatic and Professionally Obligated factors, who believed that detection certainty was a significant driver for the nurses to comply with the EHR privacy policy. Using the Q-Methodology was able to illuminate the differences between the two groups and showed variances in the extent to which participants in the factor groupings were influenced by

detection certainty and punishment severity. Previous studies only considered the overall nursing population, with no further classification precision.

In terms of the theoretical frameworks (DTPB and DT), the combination of the outcomes of Kuo et al. (2017) and Ma et al. (2016) could produce somewhat comparable outcomes to the current study outcomes, as the former used DT while the latter used DTPB. However, the two studies had different goals: Kuo et al. (2017) study was intended to explore the inhibitor factors for nurses to not to comply with the EHR privacy policy, whereas Ma et al. (2016) explored the motivator factors for nurses to protect EHR data. These two studies were only able to highlight some of the important factors, whereas the current study, by integrating the two theoretical frameworks, was able to discover a lot more. For example, some nurses in Professionally Pragmatic Factor 1 did not value social influence, but when it tipped toward penalty, their responses positively changed toward it. By using a qualitative approach in the Q-Methodology, this research was able to discover that there were subtler indications in terms of who was influenced and who was not influenced. Using a qualitative approach was able to discern more of the meaning behind this result, producing two holistic standing viewpoints about the nurses' compliance with the EHR policy, which explained the reasons why some nurses comply with the EHR policy in this study.

The abovementioned studies (Kuo et al., 2017, Ma et al., 2016) could not provide such a view of each group. The current Q study was able to discern that participants in Professionally Pragmatic Factor 1 were influenced by rules, regulations, and consequences, which were instrumental in their compliance with EHR policy. Conversely, participants in Professionally Obligated Factor 2 conceptualised how they were following rules and regulations based on their understanding of the overarching importance of and their confidence in the guidelines. Thus, the DTPB and DT in the current study helped uncovered the inter-correlation of the two factors' viewpoints, which showed connections between the personal behavioural factors and the law and regulation influences. The current study can show the connection of between the constructs of the model and explain it, but it cannot show to which degree these constructs were strongly linked to the nurses' compliance behaviour. Kuo et al. (2017) and Ma et al. (2016) only considered (if interpreted in light of this study) whether model constructs can measure the nurses' compliance with policy or not.

Another important difference was the fact that the two studies Kuo et al. (2017) and Ma et al. (2016) were performed in Taiwan in different locations. Kuo et al. (2017) focused on the non-

managerial nurses, while Ma et al. (2016) focused on all nurses who had access to the system. On the other hand, the current study was performed across three sites in Saudi Arabia, and one of the recruitment parameters was selecting the nurses based on their employment position, educational level, experience, and age group. Our results showed two factors: Professionally Pragmatic Factor 1 and the Professionally Obligated Factor 2. The Professionally Pragmatic participants preferred to be independent to comply with the EHR privacy policy, whereas the Professionally Obligated participants preferred to be dependent on others to guide them to comply with the EHR policy.

A comparison between the studies of Kuo et al. (2017) and Ma et al. (2016) and The current study's outcomes was undertaken because these studies used similar theoretical frameworks to examine nurses' compliance behaviour toward EHR privacy policy. The previous studies looked only at the nurses' compliance area previously. Existing studies that used similar or different theoretical frameworks to quantitatively examine the compliance behaviour of HCPs (i.e., physicians, nurses, HIM staff, etc.) with EHR privacy policy used methods focused on individual characteristics, which could not offer a comprehensive grouping of these characteristics to create an overall behavioural profile reflecting ingrained philosophical behavioural stances (Foth et al., 2012, Kuo et al., 2018, Holen et al., 2018, Sher et al., 2017b, Foth, 2017, Sher et al., 2017a).

Conversely, our Q-study was able to group the participants into two factors that can be distinguished: Professionally Pragmatic Factor 1 and Professionally Obligated Factor 2. The following sections adumbrate the main outcomes of this research in terms of the research model described in Section 3.3 (see Figure 10). Thus, the main findings are explained in relation to the model's constructs: "attitude," "subjective norm," "perceived behavioural control," "detection certainty and punishment severity," and "controlling factors."

7.2. Main Findings

7.2.1. Attitude

The "attitude" construct pertains to an employee's judgement of their behaviour (Taylor and Todd, 1995b). In the current study, it refers to the degree to which a nurse has a positive or negative opinion toward complying with the EHR privacy policy. Attitude is one of the main constructs in the DTPB model, which can be predicted by two sub-constructs: "perceived ease of use" and "perceived usefulness." In this study, the former concept pertains to how nurses

perceived the ease of using the EHR and its privacy policy to help them to comply with the policy; the latter refers to nurses' belief that the EHR privacy policy is useful to help them comply with the policy. The results of this study indicate that the "attitude" construct was generally found to be a significant influencer for both groups' compliance behaviour toward the EHR privacy policy.

Perceived ease of use of the system was a big driver in nurses' willingness to comply with EHR for all nurses, in line with previous work looking at the role of this factor in EHR acceptance and use (Foth et al., 2012, Ma et al., 2016, Foth, 2017). However, there were manifest differences expressed between the two groups to clarify and give detail to this. Unlike other studies, the current study uncovered which one of the two groups selected one construct with relatively more emphasis than the other. For those who belonged to the Professionally Obligated Factor 2, ease of use the EHR could be enhanced by training programmes to overcome their non-compliance with the privacy policy. Whereas subtle differences were seen in others in the Professionally Pragmatic Factor 1, where ease of use was important, and tempered with the provided support from the hospital. The reasons for this appeared to be a clear focus on patient care, meaning that anything that took away from this frontline care, as they saw it, must be carefully considered.

Such nuances have not been seen in this field before but could be aligned to observations in other areas where nurses have acted based on their professional and ethical responsibilities. The implications for this are that development must ensure that any system and processes are very closely aligned to patient care. The language within the system needs to be very patient-care focused and training must focus on the contribution of the EHR privacy to the maintenance of patient care in its language, tone, delivery, and so on. Thus, it is worthy to discuss the standing points about the attitude and its sub-constructs from the findings chapter in the following subsections.

7.2.1.1. Professional and Ethical responsibilities & Compliance

According to Nouhi et al. (2016) who examined nurses' attitudes toward professional and ethical responsibilities, there is a positive association between the nurses' attitudes and their ethical, professional, and clinical practise. Their findings underscore the significance of ethical conduct within the nursing profession. In this study, the relationship between nurses' attitudes and ethical responsibilities of was found to be significant. From the results obtained, and outlined in Chapter 5, the current study found that the nurses in both factors found that their

professionals and ethical responsibility had a huge influence on their compliance with the EHR privacy policy. This, of course, could be expected in the Professionally Obligated group, and indeed they clearly affirmed statements such as [My professional/ethical responsibilities] (30), ranked at (+2). However, what was perhaps a little surprising was that the Professionally Pragmatic Factor 1 actually ranked this statement slightly higher at (+3).

This affirms the findings of Bani Issa et al. (2020), who examined nurses' concerns regarding patient privacy and confidentiality when using the EHR system in the United Arab Emirates. They examined nurses in five healthcare settings using a mixed-method approach, and found that nurses were committed to their professional and ethical codes at the workplace, whereby they were more ethically compliant with the system privacy policy. Such codes are usually built upon laws and regulations that translate into coherent national standards and policies (Bani Issa et al., 2020).

However, the complementary qualitative data part provided a better insight and more details on participants' views in the current study. The nurses had different prospective on how they perceived the effect of professionals and ethical responsibilities on compliance with the EHR policy. They suggested that being ethically responsible was important with regard to protecting patients' information:

> "As professionals, we should protect patients' data, rather than divulge it to others. It is unethical to talk about it to other people, even if not concerned, or even among medical staff." **(P39)**

For example, both groups strongly agreed that their ethical and professional responsibilities drive them to comply with EHR privacy policy, but this was tempered by the extent to which they agreed with the policy. The nurses in both groups positively ranked the statement: [The level to which I agree with the data privacy policies I am asked to follow] (7), ranked at (+2) and (+1) by Factors 1 and 2 (respectively). Their individual drivers might differ between the groups – in the Professionally Obligated group, the way in which the policy fits with their existing work was more important, whereas the Professionally Pragmatic Factor 1 group was more motivated by a strong conviction that compliance supports patients. The post-sorting interview data provided a better insight and more details on participants' views in the current study. One of the nurses stated:

> "Sometimes they asked me to follow unnecessary policies, which I usually don't agree with." **(P52)**

This claim was affirmed by Elgujja and Arimoro (2019) who conducted a review about the patients' privacy right under the information law in Saudi Arabia. They stated that in Saudi "the currently adopted electronic patient records policies appear to be generic, inconsistent and potentially insecure." This is a serious issue that may lead some nurses to violate the privacy policy just because the policy does not fit the situation, which can cause a costly damage to hospitals and patients' reputation.

Overall, the nurses in both factors believed that their professional and ethical responsibilities were important and it drove them to comply with EHR privacy policy. Bani Issa et al. (2020) advised that the nurses' ethical code must be kept updated especially about their role in regard the data security and privacy when a new technology or adopted system. However, the difference between the two groups was that how they addressed this practically. Thus, understanding what influence nurses toward compliance with the EHR policy will help to promote ethical conduct and ethical reasoning in nursing practise while using the EHR. The management and nursing leaders are bearing the responsibility for integrating this into the policy(Bani Issa et al., 2020), in order to increase nurses' compliance with the policy (Qtait, 2023).

7.2.1.2. Ease of Use & Compliance

According to Tubaishat (2018), nurses often have a positive views regard the EHRs, considering them to be user-friendly. This perspective is found to be affected by several aspects, including profession positions, experience with EHRs, and level of their computer skills. Those in the current study whom we have identified as Professionally Pragmatic found that [the ease of using the EHR system] (3) clearly played an important part in their willingness or ability to comply with EHR policy. This viewpoint was confirmed by Foth et al. (2012), who found that the HCPs were influenced by the ease of using the system to adhere with the data privacy regulations. The complementary qualitative data provided a better insight and more details on participants' views in the current study. The nurses in Professionally Pragmatic Factor 1 thought that ease of using the system can improve their compliance with the policy:

> "… If the system is easy to use, we can comply with system policy." **(P51)**

They thought that technical issues were major obstructing to their work:

> "Most of the time we have internet connection errors or poor connection… Because of this, we can't use the system or document anything…" **(P51)**

Conversely, the participants in Professionally Obligated Factor 2 believed that the ease of use of the system was not influencing their compliance and by looking at the model Q-sort it was ranked (-2). The Factor 2 viewpoint reaffirms the finding of Ma et al. (2016) that the ease of using the system did not influence nurses to comply with the privacy policy, which they attributed to nurses knowing the privacy policy before implementing the EHR.

Whilst ease of use is such a major driver in massive areas of technological application and for nurses' compliance, the nurses in both factors negatively ranked the statement: [The number of steps required to access an EHR] (21, -2) and it was seen as less influential for their compliance. According to Faxvaag et al. (2011), who examined nurses' behaviours responding to an access control mechanism in Norwegian hospitals, accessing the system usually takes a long time, therefore nurses postponed their documentation and used other usernames that were already logged into the system in order to complete their tasks. As they explained that the EHR systems' access control measures usually compliant with information security standards; thus, the participants might find the accessing steps to the system is obstructing their work therefore they try to find a short cut for this process.

As several studies pointed out, the username and password are the most important process to access the EHR, which is a standard mechanism to limit nurses' access to the system (Samadbeik et al., 2015, Mtsha, 2009, Pourasghar, 2009). Moreover, Holen et al. (2018) conducted study to identify the communication's characteristics of sharing information at a hospital setting. They found that nurses sometimes used their colleagues' username and password to access the EHR under certain circumstances to complete their documentation assignment quickly. These circumstances happen when nurses have an issue of accessing the system by their account, or when they have limited numbers of computers devices.

The post-sorting interview data provided a better insight and more details on participants' views in the current study. It was found that one of the participants in Professionally Pragmatic Factor 1 directly stated that [the number of steps required to access an EHR] it does not affect compliance:

> "[It does] not affect our [nurses'] compliance." **(P26)**

In Germany, Foth et al. (2012) examined HCPs' compliance with the data protection regulation, including nurses. They reported a varying range of responses regard the accessing steps to the system and how it influences their compliance with the policy. They found that some of the

responses believed that this was helpful, and others thought this was obstructive to their compliance. Some nurses in the current study may have thought that the process of accessing the EHR system had no affect on them.

"Ease of Use" is often considered to be a foundational factor that influences the willingness of individuals to comply with a particular process or system. It makes logical sense that the harder to use something is, the more likely we are to not comply with its use, be it a process or a technical system. However, it must be pointed out that Ease of Use is actually a composite term that covers a whole range of things including technical difficult, clarity of explanation, familiarity, effort expenditure and so on. This makes a clear impact of this factor harder to interpret. In this study, Ease of Use was clearly rated as important in the Professionally Pragmatic group, as might be expected, the easier to do, the more willing the pragmatists were to do this. However, this contrasted notably to the Professionally Obligated group where the Ease of Use did not feature so highly in their willingness to comply. In other words, they felt it was their duty to comply regardless of how hard this might be to do. Overall, while the ease of use of the EHR system encouraged nurses to comply with the policy in the Professionally Pragmatic Factor (1), it was not collectively influential for nurses in the Professionally Obligated Factor (2). According to Foth et al. (2012), the ease of using the system is commonly ignored by researchers and policymakers, despite it being an important factor in HCPs' compliance with EHR privacy policy, and other changes and technology adoptions. The ease of using the system is one of the main factors affecting the front-line nurses' compliance with EHR policy, and hospital management should bear this in mind. IT departments should strive to continuously improving the system's usage and make it easy for intended end-users (i.e., HCPs) with limited time. This will consequently help nurses to perform their work on a system that is effectively integrated into their working environment circumstances and sensitive to their clinical professional needs (Foth et al., 2012).

7.2.1.3. Training, Formal Education, and Technical Support

Despite whether nurses identified as Professionally Pragmatic or Professionally Obligated, all agreed that the amount of training that provided to them on the EHR privacy policy had little influence on the perceived ease of use in relation to compliance. The Professionally Pragmatic factor participants ranked the statement [The nature and amount of training I received on the subject] (24, 0) higher than those in the Professionally Obligated factor (-1). This finding echoes

Ma et al. (2016), who examined the nurses' motivational factors to protect the EHR data privacy in one hospital in Taiwan and found that nurses are familiar with privacy policy as the legacy paper medical record system honoured the same policy, and most nurses had an adequate knowledge from their schooling on how to protect patients' privacy. Thus, the absence of training on the EHR privacy policy had no influence on nurses' compliance (Ma et al., 2016).

Even when nurses did not think they had received enough training, they still believed that this made no difference with their compliance. The qualitative data provided a better insight and more details on participants' views. One of the nurses in the pragmatic factor noted not receiving any training, and consequently relying on ad hoc training arising from experience:

> "We are not getting full training with any EHR system… We will be trained when we have experience … the overuse." **(P28)**

Thus, they believed that active, formal training might not contribute to their compliance with the EHR privacy policy, but actually using the system would comprise training in itself.

The nurses in the two factors appeared to receive instruction about data privacy through formal education and through training programmes. Nurses in the Professionally Pragmatic Factor 1 found formal education more important than training in terms of compliance with the EHR privacy policy and they ranked the statement: [My level of education] (5, +1) more positively than the statement: [The nature and amount of training I received on the subject] (24, 0). According to Foth (2017), who conducted a study in Germany to investigate the variables that predispose HCPs' compliance with data privacy policy at hospitals using a questionnaire, receiving a formal education assists the HCPs in adhering to the privacy regulations inside the hospital. In the current study, the Professionally Pragmatic Factor 1 did not prefer training in the hospital compared to the Professionally Obligated factor, who thought training was more favourable than formal education in terms of compliance with the EHR privacy policy.

This may be due to the discrepancy of the two factors' main characteristics. The Professionally Pragmatic Factor 1 preferred to be independent in their performing their job, whilst the Professionally Obligated Factor 2 were more likely to want support, structure, and guidelines, in some ways reflecting dependence. This can be inferred from the Professionally Pragmatic factor Q-sorts composite, whereby nurses in this factor ranked the statements: [The availability of guidelines on the subject] (12, +2) and [My confidence in my understanding of EHR policy and practice] (34, +3) more positively than those in the Professionally Obligated Factor 2 (12,

-3; 34, +1) (respectively). Hence, gaining insight into the subtle preferences of nurses about EHR information privacy education and training may provide valuable information for developing more focused and efficient approaches to encourage compliance in healthcare environments. The emphasis on formal education by nurses in pragmatic group indicates that a solid educational base is essential for guaranteeing adherence to data protection regulations.

By looking at the complementary qualitative part of the study, one of the participants in Factor 1 thought that nurse education degree programs could provide them with the basic knowledge that prepared them to be more professional during work:

> "… I feel a bachelor's or master's degree should be mandatory for an employee to hold in such a profession… When you are aware of your basic knowledge that you gained from colleague, you will also know about clinical knowledge, experience, and ethics, and this is how you can improve your profession." **(P3)**

Sher et al. (2017a) and Saito et al. (2017) indicated that the education level of HCPs can influence their comprehension of EHR privacy. Conversely, education level was not found to be an influential element for the Professionally Obligated Factor 2, who ranked it (-1). One of the nurses in Factor 2 reconsidered hospital training over formal education, and stated that:

> "…My background education is not necessary; I will be further trained on policy and procedure here… I think my level of education is not coming into the picture." **(P6)**

Exploring the inhibitory factors that influence nurses to not violate the EHR privacy policy, using a questionnaire in Taiwan, (Ma et al., 2016) found that educational level had less influence on nurses' compliance behaviour with the EHR privacy policy.

Alongside formal education, the level of support for the use of the system that the nurses received was an important factor for the Professionally Pragmatic Factor 1 nurses' compliance compared to their counterparts in the Professionally Obligated Factor 2; they ranked the statement: [The amount and level of support that is available to me] (32) at (+1) and (-3) (respectively). According to McCrorie et al. (2019), who examined staff members' anticipations about change and the consequences after the acquisition of a commercial EHR system by a prominent academic acute NHS hospital in the UK, nurses were reacting to the system to do their basic job, and needed immediate support when they faced technical issues. However, according to a questionnaire study done by Almuwail et al. (2023) to examine the obstacles associated with adhering to security compliance requirements in hospitals for

safeguarding patient data security and privacy within the healthcare sector in Saudi Arabia, HCPs had easy access to technical support.

Thus, the study highlights the need for all three aspects (training, education, and support) to meet the different learning styles of nurses and their practical responsibilities, but that there might need to be some element of choice. The insufficient knowledge among nurses about the privacy policy may lead to accidentally harm or illegal disclosed data, since they might not understand how they should manage such sensitive data (Von Solms and Von Solms, 2005, Imam, 2014). Therefore, the hospitals' management needs to assess their workers' knowledge and provide them with a tailored training programme that allows them time to train on the programmes and reflect on the importance of compliance with the hospital policy. Also, requiring training in privacy and security, and associated certification, may be useful screening tools *before* nurses are hired. Nurses must also be provided with continuous support, in order to enhance their compliance with the system security policy; as (Bani Issa et al., 2020) suggested, hospitals must equip the nurses with the essential skills set to improve their adherence with the EHR privacy policy.

7.2.2. Subjective Norm

A subjective norm is defined as an individual's perception of the social norms and expectations regarding a specific behaviour, as influenced by the opinions of significant others in their life (Fishbein and Ajzen, 1977). In the current study context, it refers to the extent to which nurses were aware of and were influenced by their perceptions of the values and views of others regarding their use of the EHR system besides the rules that they perceive they should adhere to. "Subjective norm" is a one of the main constructs in the DTPB model used to predict a person's BI. It has two sub-constructs: peer and supervisor influences. This study found that peer influence did not significantly affect nurses' compliance with the EHR privacy policy in both groups. However, supervisor influence did have a positive impact on the Professionally Obligated factor's compliance with the EHR privacy policy. This reflects that subjective norm is a form of social leverage that has an influence on a person's BI (Ajzen, 1991). Other studies that examined the compliance of HCPs (including nurses) with EHR policy found that subjective norm and its sub-constructs (peer and supervisor influence) were significant influencers of nurses' compliance with EHR privacy policy(Foth et al., 2012, Ma et al., 2016, Foth, 2017, Sher et al., 2017b).

7.2.2.1. Nurses thought the Hospital Rules and Policies were Important, but they Need to be Understood

Nurses' subjective norms are shaped by the workers' perceptions of working environment, as well as their compliance with established regulations and procedures(McDonald et al., 2005, Hsieh et al., 2016). In the current study, the Professionally Pragmatic Factor 1 ranked the statement [My hospital's rules and policy] (40) high (+4), but it cannot be seen as something that was specific to this group, as the Professionally Obligated Factor 2 also outlined the importance of this to their compliance, and ranked it (+3). Tung et al. (2008) examined nurses' acceptance toward the e-logistics IS in the health field. They found that nurses usually value the hospital's privacy rules; therefore, their beliefs, values, and experiences with the IS at the hospital played an important role in compelling them to use the EHR system properly. Other studies confirmed that the hospital rules and regulations are strongly important influencing to the nurses' compliance attitude (Ma et al., 2016, Kuo et al., 2018, Foth et al., 2012, Tung et al., 2008, Bani Issa et al., 2020). By looking at the complementary qualitative part, the participants had different viewpoints on how they explained it. The Professionally Obligated Factor (2) was more influenced by how the policy can regulate their work:

> "Of course we need to comply with this, because it will give us guidelines to follow while doing our job." **(P32)**

Whereas the Professionally Pragmatic Factor (1) was more into protecting patients and themselves:

> "…, it protects me from any consequences that may happen in the future." **(P49)**

Despite nurses in both factors valuing the hospital rules and policies, the nurses in the Professionally Pragmatic Factor 1 needed to be more confident in their understanding of the EHR privacy policy in order to comply compared to Factor 2. The statement: [My confidence in my understanding of EHR policy and practice] (34) was ranked (+3) in Factor 1 compared to (+1) in Factor 2. This finding confirms the finding of Ma et al. (2016) that nurses are more likely to comply with the privacy policy when they were self-confident in their skills and knowledge. This finding was also mirrored in other studies among different HCP groups (Sher et al., 2017a, Kuo et al., 2018, Boss et al., 2015, Warkentin et al., 2016). Collectively, the emerging research suggests that health workers tend to use the EHR effectively if they believe in their ability and understanding of the policy (Kuo et al., 2018, Boss et al., 2015, Warkentin

et al., 2016). Some nurses in the Professionally Pragmatic Factor 1 stated that they could not comply if they did not understand the policy:

> "… I feel that without confidence in my understanding of the EHR policy, I cannot proceed with EHR's documentation process. We must have confidence to proceed and complete this process and to apply this policy." **(P38)**

This is because nurses wanted to be self-reliant and make their own well considered opinions relating to protecting their patients' information. On the other hand, the nurses in Factor 2 did not highly rank the statement [My confidence in my understanding of EHR policy and practice] (34, +1). The Professionally Obligated Factor (2) core idea was to follow what has been told to them. A study conducted by Storaker et al. (2019) to explore how nurses partake in the ethical decision for their patients found that the nurses expressed a sense of ambiguity regarding the distinct professional and functional expectations associated with their roles. Their actions seemed to align more with established routines instead of ethical principles. Consequently, it was observed that the senior nurses appeared to prioritise their responsibility of remaining in close proximity to the patients, while the newest nurses displayed a greater emphasis on documentation and computer-based tasks. Furthermore, it was found that all nurses appeared to conform to established patterns with no engaging in deliberate and analytical contemplation.

The ethical challenges faced by nurses are closely associated with the demanding nature of their job conditions. As a consequence, the nurses frequently accept and adhere to the decisions made by external parties, potentially leading to a decrease in personal attention (Goethals et al., 2010). Therefore, hospital management should consider the impact of nurses' low confidence in understanding the policy, which might affect their motivation to comply with data privacy compliance and the ultimate safety of the EHR system.

Overall, the present study highlights the importance of the hospital rules and policy for nurses' compliance. The nurses' desire for confidence indicated that they wanted a sense of ownership of the EHR privacy policy, thinking that this could be a dimension of their profession requirements. Including nurses in the process of implementing the EHR and writing the usage policy can help in increasing compliance with the policy. Biddle and Milstead (2016) discussed EHR- and telehealth-related policies, and stated that nurses are the cornerstone of patient care as they constantly use ISs. If the system and its policy do not provide meaningful use for their intended purposes, a small group of HCPs, including nurses, need to be involved in the policy change process. These policies and guidelines need to set standards for everyone, and can

reduce disciplinary actions and help the staff retention and protect the data. Moreover, this message needs to be delivered and communicated clearly to HCPs; Burkett (2010) noted that communicating the policy effectively is critically important, and hospitals need to use different means to deliver it, which will help the staff of varying specialties and personal characteristics to comply with the policy.

7.2.2.2. Benefiting Others is Linked to the Nurses' Position

Both factors believed that benefiting patients was a driver for their compliance with the EHR privacy policy. However, the Professionally Obligated Factor 2's compliance was more driven by benefiting others than Professionally Pragmatic Factor 1. In detail, Factor 2 participants thought that following the EHR privacy policy would benefit their hospital, patients, and colleagues, which were positively reflected on the nurses' compliance with the EHR policy. The Professionally Obligated Factor 1 positively ranked the statements [The benefit it brings to my hospital] (33, +4), [The benefit it brings to my patients] (6, +3), and [The benefit it brings to my colleagues] (13, +1). These findings affirm previous studies on HCPs' adherence with the data protection regulation; HCPs value the compliance with the data privacy rules that reflect on their personal contribution to comply with the privacy policy, which aid in the overall hospital's compliance with law and regulations (Kuo et al., 2018, Ma et al., 2016, Sher et al., 2017b).

The plausible reason that nurses in Professionally Obligated Factor 2 believed that benefiting others was a driver for them to comply with the policy is because nurses in this factor take responsibility in their working position to protect the patients' information and protect the hospital as well. The Professionally Obligated Factor 2 positively ranked the statement [The position I hold in the hospital] (8, +4). This finding supports other studies that found that those in working positions such as managers have a huge influence on HCPs in general (Foth et al., 2012, Foth, 2017, Ma et al., 2016). Thus, the current study shows that nurses who believed that working position was important to their compliance were influenced by benefiting others to comply with the EHR privacy policy more the Professionally Pragmatic Factor 1. This was supported by the post-sorting interview data, which provided a better insight and more details on participants' views in the current study. One of the participants in Professionally Obligated Factor 2 thought that following the policy would positively affect the hospital image and improve service quality:

> "It will have a good impact on the hospital if I follow the policy. The benefits are… not much resource waste, and protecting the hospital's reputation… This will lead to a good quality service." **(P48)**

One of the head nurses in Professionally Obligated Factor 2 found that benefiting their staff was necessary, and pointed out in the interview that they would follow the privacy policy to prevent a further investigation that may influence other staff members, which may put them under pressure:

> "By complying with EHR policy, it will decrease the number of problems, which leads to less investigation, so nurses will not feel under pressure." **(P34)**

Thus, it can be concluded that benefiting patients and other staff were drivers for nurses to comply with EHR policy that can contribute to the bigger picture of the benefiting the hospital. By looking at the main characteristics of the two factors, it can be said that the Professionally Obligated factor's participants were looking into benefiting other from an idealistic lens, as they thought that patients and its confidentiality were the main character in the hospital. The Professionally Pragmatic Factor 1 participants felt that benefiting patients by protecting their data could come as result of having an appropriate working environment, available guidelines, available resources and supports, etc. A recent systematic review by Qtait (2023) studied how head nurses' leadership affects nurses, and also found that nurses who were in supervisory positions influenced subordinates with their own behaviour, which directly benefits the patient if it is aligned with the organisation's goal. Similar findings aligning with the Pragmatic factor's view regard the working environment were reported by Barzegar Safari et al. (2020), who examined factors influencing nurses to participate in the writing policy. They found that "disappointment in work procedures, lack of external support, and lack of time" were the major barriers for nurses to comply with the policy. Thus, promoting the idea of protecting the system among nurses can benefit the patients, hospital and themselves may create a practical security culture that help to secure the system.

The current study highlighted benefiting others, including patients, hospitals, and colleagues, can be a driver for nurses to comply with the EHR privacy policy, and can positively influenced by the nurses' working position. Thus, those who are in managerial position can play an important role in other nurses to comply with the policy; hence, Qtait (2023) stated that the head nurses must be well trained to supervise other staffs to influence their compliance with the EHR privacy policy.

7.2.2.3. Hospital Management Expectations & Compliance

Supervisor influence is considered to have a direct influence on the subjective norm (Taylor and Todd, 1995b). According to Venkatesh et al. (2003), when people perceive that others (such as supervisors) possess the capability to either give praise to the desired behaviour, or penalise the absence of such behaviour, they are prone to make their BI conform with the expectations of such "others." In The current study, supervisor influence was found to be a driver for the Professionally Obligated Factor 2, who highly ranked the statement [The expectation of the top management of my hospital] (31, +3), compared to nurses in Professionally Pragmatic Factor 1 who ranked it at (-1). This finding was echoed by Foth et al. (2012), examined HCPs' compliance with data protection regulation in Germany and found that when the staff thought the management (e.g., managers and supervisors) expected them to comply with regulations, the staff were more encouraged to comply with the hospital's regulations.

Numerous studies reported that supervisor influence is a significant predictor for the subjective norm (Kuo et al., 2017, Foth et al., 2012, Ma et al., 2016, Sher et al., 2017b), and this was supported and explained by the qualitative data in this study, which provided insights with some details. One of the participants in Professionally Obligated Factor 2 stated the importance of management expectation in compliance BI:

> "This is very important to me, because I believe that the management expects me to follow this policy." **(P32)**

This indicated that hospital management expectations are important to nurses, and the management need to encourage related beliefs among nurses. This point was linked to the DT, which mainly focused to predict the influence of the mentoring and punishment on the nurses' compliance. Therefore, once it tended toward punishment and legal action, the nurses in the Professionally Pragmatic Factor 1 were positively influenced by the manager expectations to comply with the EHR privacy policy.

> "Well, as a staff member working at the hospital, I should do my job in adherence with the policies and procedures that hospital management set to gain the full satisfaction of my management. I have to do my best to adhere to the policies and procedures, so my top management will be happy that I stick with the rules." **(P13)**

Another point was that peers' expectations were found to be less influencing to nurses' compliance with the EHR privacy policy than supervisors' expectation in both factors. The

statement: [The expectation of my peers] (15) was ranked (-3) in both factors. A plausible explanation for this finding is that the nurses might not want others to interfere in their work, and they might perceive such "expectations" to imply a threat to their professional autonomy. Saito et al. (2017) conducted a survey of HCPs' perceptions of EHR privacy and found that when nurses were asked to monitor their peers' compliance with the privacy rules, they typically find this to be intrusive and a threat to their autonomy. In this regard, the qualitative data from participants' views in the current study suggested more solipsistic perspectives on this, as indicated in the following excerpts from nurses in the Professionally Pragmatic factor 1:

> "I will do whatever it takes to benefit my patients. Not what my peers expect from me." **(P5)**

While peer influence had no influence on nurses' compliance with the policy, participants conversely expected their own influence to affect the compliance of others. One of nurse's supervisors in the Professionally Pragmatic group stated that:

> "With complying with the EHR privacy policy, my colleagues will see how professional and ethical I am at work, and this will reflect on their personality and work." **(P45)**

This links to the findings of Perry (2009)**,** who explored "role model" phenomena in nursing practice using interviews. The interviews revealed that nurses can learn from observing other nurses who are considered role models in practice, and translate observation knowledge into action. According to Bandura and Walters (1977) social learning theory, people can acquire behaviour from the observation of others. More recently, Hammerschmidt and Manser (2019) explored factors that influence nurses' compliance with the hand hygiene policy, focusing on role modelling by nursing supervisors, using surveys and interviews. They found that nursing supervisors who think that they are role models have a positive influence on other nurses to comply with the hand hygiene policy. However, they also found that supervisors who failed to adequately contemplate their role modelling conduct had various discrepancies in their behaviour and adherence to hand hygiene protocols, and sometimes they were influenced by personal preferences that were occasionally associated with outdated knowledge. The upshot is that nurses' sense of being role models (i.e., "influencing others") can enhance their own compliance with the EHR privacy policy.

Thus, nurses can be influenced by their supervisors to comply with the EHR privacy policy. It is recommended that supervisors use this bond between them and their employees to enhance their compliance with privacy rules and regulations. In addition, supervisors need to involve nurses in the process of writing and implementing the EHR privacy policy, which can foster a culture of ownership and compliance among nursing staff members. Moreover, the nurses believed that by following the EHR privacy policy, they can influence their peers to comply, but do not believe that the converse effect occurs.

7.2.3. Perceived Behavioural Control (PBC)

The concept of PBC refers to an individual's view of the resources necessary to engage in a certain activity(Ajzen, 1991, Taylor and Todd, 1995b). This perception may be influenced by controlling beliefs, self-efficacy, and enabling conditions(Ajzen, 1991, Taylor and Todd, 1995b). PBC is a one of the main constructs in the DTPB model used to predict nurses' compliance intention in this study. In this context, the PBC encompasses both inner and outer restraints on nurses' compliance with the EHR the privacy policy, encompassing self-efficacy and facilitating conditions. Self-efficacy pertains to the nurses' belief in their own competence to safeguard the privacy of EMRs. On the other hand, facilitating conditions encompass the resources, such as EHR software, equipment, and functionality, that aid in promoting privacy protection behaviours that are harmonious with the existing infrastructure in hospitals.

In this study, PBC's sub-constructs "self-efficacy" and "facilitating conditions" were found to significantly influence only the Professionally Pragmatic Factor 1 participants' compliance with the EHR privacy policy. Some aforementioned previous studies in relation to compliance with EHR privacy have shown the self-efficacy and facilitating conditions to be important influential factors in nurses' compliance (Foth et al., 2012, Ma et al., 2016, Kuo et al., 2018). In the following subsections, the findings concerning facilitating conditions and self-efficacy are discussed in detail.

7.2.3.1. Nurses Spend More Time on EHR Documentation Due to Computer Shortages

There is an existent correlation between self-efficacy and the utilisation of integrated documentation tools at the EMR among nurses, resulting in reduced documentation time (Philipsen et al., 2014). In The current study the statement: [The amount of time needed to complete the EHR record] (22) was set to predict the relation of the self-efficacy construct toward PBC. This can also be linked to the "ease of use" construct, however, we sought to

discuss it under its main construct, PBC. It was found that the participants in Professionally Pragmatic Factor 1 thought that the amount of time documenting was more influential on their compliance with the policy, and they ranked the statement with (+2), compared to Professionally Obligated Factor 2, who ranked it (-4).

This finding confirms the survey findings of Moody et al. (2004), who conducted a study about nurses' perception and preferences during documenting on the EHR at one hospital in the USA. They found that nurses have a harder and longer time during filling the EHR record, which jeopardises patients' safety and confidentially. The literature has thus long confirmed that there is a correlation between increased EHR use and decreased time spent in delivering bedside clinical care (Yen et al., 2019, Chan et al., 2010). More recently, Alzghaibi (2023), who examined the obstacles encountered during establish the EHR systems in Saudi Arabia using semi-structured interviews and focus groups and found that HCPs took longer to use the system whether entering or retrieving data.

In the complementary qualitative data, the nurses in Professionally Pragmatic Factor 1 identified that the documentation process took more time, which led to less compliance with the policy. They believed that spending more time taking care of patients was much more important:

> "In ICU we have many critical patients, and we have to deal with them first, before going to documentation on EHR. So we have a specific time that the system will close. The amount of time to complete the documentation has a great influence on compliance." **(P11)**

This finding adds support to Bjerkan et al. (2021), who conducted a study on the challenges that faces nurses during the electronic patients' file documentation. The first obstacles were that the documentation process varies from unit to another, and it depends on how busy the units are. When the system was adopted, some units did not change their documentation process, therefore the nurses work routines were interrupted and they continued with their legacy paper record documenting habits. The second challenge was that the EHR system had an issue when nurses tried to access data, which caused nurses to leave the computer logged on, and to ask their colleagues to document their patients' files rather, than doing it by themselves. The third challenge was that when system downtime occurred, they shifted to paper medical records, and then left the paper medical records unguarded, after resuming online data access when the

system came online again. This posed a confidentiality breach incident for patient data. Such obstacles were mentioned by the participants, as well such as the poor system quality:

> "Yah, actually in our hospital system is always down… the system is not very good to use… The internet or the browser is not very good, always interrupted." **(P1)**

A possible reason that the nurses in Professionally Obligated Factor 2 did not think the amount of time to complete the EHR files influenced their compliance with the policy was that they were looking at compliance from a supervisor's viewpoint. By looking at the interview part, a head nurse in Factor 2 believed they had adequate time to document at the EHR file:

> "…because our department works 24 hours. We have three shifts, and we must complete our work before endorsement time." **(P48)**

Similar results were found by Cherry et al. (2011), who examined the nurses' early EHR adoption practice in the USA using semi-structured interviews. They found that nursing supervisors had more time to work at computer and finished their tasks faster than nursing staff. Many managers mentioned that there was a decline in overtime among nurses, which they attributed to reduced time taken up on completing patient file tasks.

Availability of resources also affects nurses' compliance and attitudes toward following privacy policies. The nurses in Professionally Pragmatic Factor 1 believed that one of the causes that they had longer of time to document at the EHR is correlated with the available resources such as computers, and WiFi, etc. They ranked the statement: [Access to resources (computers, software, etc.) and [needed to comply with EHR privacy policy] (9) at (+4), compared to the Professionally Obligated Factor 2 ranking at (+2). This finding adds support to Kuo et al. (2018), who found that in order for nurses to formulate a habitual compliance with EHR privacy policy, hospitals need to facilitate all prerequisite resources necessary to achieve the task. Also, Limayem et al. (2007) and Ma et al. (2016) agreed that having proper conditions and resources at work are likely be one of the reason for the employees' actions to follow the privacy policy. This demonstrates that essential and adequate hospital resources, such as computer sets, are required for nurses to abide by the EHR privacy policy, even if the nurses routinely follow the privacy guidelines.

Resource shortages can happen to any new EHR system adopters (Moody et al., 2004). Participants in this study stated clearly that "we started EHR last year" **(P8)**, and some start-up

problems might reasonably be expected, therefore hospitals must ensure that all departments are equipped with sufficient resources to help nurses not to violate the privacy policy, and to maintain effective system operation in general(Fernández-Alemán et al., 2013). However, during interviews, Professionally Pragmatic Factor 1 nurses stated that they delayed documentation tasks due to a shortage of computers, and sharing them with other HCPs:

> "We should have sufficient resources like computers and internet connection. Without them, we cannot complete our tasks, including compliance." **(P38)**

Thus, resources shortages can be negatively influence nurses' compliance, causing more time to be consumed (i.e., wasted) when using the EHR. According Ma et al. (2016), the presence of appropriate conditions and resources in the workplace is likely to influence workers' adherence to the privacy policy. Hence, hospitals must have a sufficient number of computers and commensurate technological support (e.g., Wi-Fi etc.) to enable and enhance nurses' time of documentation, which would encourage more compliance with the policy.

7.2.4. Detection Certainty and Punishment Severity

Detection Certainty pertains to the procedure or action of identifying instances of data breaches (Li et al., 2010). Punishment Severity pertains to the deterrence of illegal activity by ensuring that individuals comprehend the repercussions of their actions (Williams and Hawkins, 1986, Straub and Welke, 1998, D'Arcy et al., 2009). In the current study, Detection Certainty refers to the nurses' opinion of the likelihood of being detected if they chose not to comply with the EHR privacy policy; and Punishment Certainty refers to the estimated likelihood of a nurses being penalised for not complying with the EHR privacy policy (as derived from DT).

Our results revealed that Detection Certainty was found to significantly influence nurses in both factors to comply with the EHR privacy policy, while Punishment Severity was found to significantly influence nurses in Professionally Pragmatic Factor 1. This affirms other studies that examined the influence of monitoring on the HCPs' compliance with EHR policy in Taiwan, using the DT, which found that both Detection Certainty and Punishment Severity have a significant influence on the HCPs' compliance (Kuo et al., 2017, Kuo et al., 2019).

7.2.4.1. System Monitoring & Consequences

It is widely acknowledged that operational personnel are generally regarded as the most vulnerable aspect in the realm of security management (Li et al., 2010). In healthcare organisations, nurses constitute the most substantial segment of HCPs who are primarily

responsible for engaging with EHRs, given the inherent demands of their profession. The likelihood of an EHR breach can be mitigated through effective regulation and adherence to the designated privacy policy by nurses (Kuo et al., 2017). Moreover, computer monitoring may have a positive effect in preventing the workers' suspicion behaviour, or an adverse effect of monitoring can affect nurses with the sense of low trust at their hospital.

The current study found that participants in both factors agreed that the hospital monitoring had some positive effect on nurses' compliance with the EHR privacy rules. The statement: [The extent to which this is monitored by my hospital] (25) was placed in the middle of the Q-sort composite. This finding echoes previous studies (Kuo et al., 2017, Kuo et al., 2019). Kuo et al. (2019) found that computer monitoring has a significant influencing on the HCPs' compliance. Longstanding literature asserted the effectiveness of monitoring to control suspicions behaviour activities while working with an IS (D'Arcy et al., 2009). By looking at the post-sorting interview in the current study, one of the participants thought that their activities were recorded and that violation activities were detected:

> "Because the EHR is monitored by my hospital; all activity is documented, and everybody can see it. So if there is any problem, you cannot hide it from the co-workers and the management." **(P45)**

This view was confirmed by Cherry et al. (2011), who conducted semi-structured interviews to describe the nurses' early adoption of the EHR system in several healthcare facilities in Texas (USA), and found increased compliance when nursing staff knew that their activities in the system were recorded.

Nurses in Professionally Pragmatic Factor 1 believed that legal consequences were another driver for their compliance with the EHR privacy policy. They ranked the statement: [The consequences to me legally by authorities if a data breach is seen to occur] (14) at (+3), compared to its position in the middle of the Q-sort composite for nurses in Professionally Obligated Factor 2. Kuo et al. (2017) explored barriers to nurses' violations of EHR privacy and security policy and found that nurses would not violate the EHR privacy policy if they believed that there were serious consequences. However, if HCPs feel there is a lesser degree of computer monitoring, they may believe that the likelihood of getting detected for breaching policy is lower, since they are less computer scrutinised (Kuo et al., 2019). The post-sorting interview provided more details on participants' views in the current study. One of the participants thought there was no system monitoring at the hospital:

> "I put 'no influence' for this statement, because there is no observation at my hospital." **(P34)**

A lack of monitoring might lead to increase negligence or suspicious behaviour among nurses while they are using the system (Kuo et al., 2019). This might be the reason the nurses in Professionally Obligated Factor 2 believed punishment severity had moderate to less influence on their compliance with the EHR privacy policy. (Sher et al., 2017a) examined factors influence the HCPs privacy protection of the EMR system at nine hospitals in Taiwan and found that the HCPs were not significantly influenced by the negative consequences when the EMR beached; however, the researchers indicated that there were more concerns shown from the participants when breaches happen. This also mirrored by Foth (2017) study, examining the behavioural factors that influence the HCPs to comply with German data protection regulations. It found that legal consequences did not necessarily influence HCPs to adhere with data privacy regulations,

Overall, the nurses were driven by the computer monitoring and breach consequences to comply with the EHR privacy. Thus, nurses should be aware that there is a system monitoring EMR compliance in hospitals (and such a system should actually be in operation). The impact of believing that the EHR system is monitored, and that violating the policy can lead to severe punishment, is likely to improve nurses' compliance with the EHR privacy policy.

7.2.5. Controlling Factors

7.2.5.1. Age & Compliance

Researchers have considered social factors such as age and education as influences in the use of EHR systems (Sher et al., 2017a, Ma et al., 2016, Sher et al., 2017b, Kuo et al., 2017, Kuo et al., 2019, Foth et al., 2012, Kuo et al., 2018, Foth, 2017). This was the reason why the age factor was probed in the current study. From the results obtained, and outlined in Chapter 6, it is very clear that age was not considered to be an important factor in nurses' willingness to comply with data privacy guidelines. This point came across strongly and equally from both factors, which ranked this at (-4). This was echoed by Altamimi et al. (2018), who examined whether the neutralisation theory help to foresee rationalisations for violating the EHR security policy on medical interns in Saudi and surveyed by questionnaire. They found that age was not significant for the intern to violate the EHR privacy policy. Hence, the evidence derived from our research, in conjunction with the discoveries made by Altamimi et al. (2018), emphasises

the agreement that age does not play a definitive role in impacting the dedication of nurses' behaviour to safeguarding data privacy.

The consensus in the current study undermines the belief that age has a detrimental effect on adherence with privacy policy, and other factors have a greater influence on forming attitudes and behaviours towards data privacy in the healthcare industry. The majority of the participants held the notion that age did not hinder their capacity to understand and adhere to EHR privacy policy. They displayed belief in their ability to adjust and remain up to date with changing compliance demands, regardless of their age. The post-sorting interview data provided a better insight and more details on participants' views in the current study. One of the participants stated that:

> "Learning is a lifelong process. And no age limit is required to learn using the EHR or to follow its policy. Anyone, no matter what his or her age is, can learn and do whatever they want to do. And the age aspect does not influence anyone." **(P38)**

Looking at the literature, some of those points were affirmed by Arunothong and Nazareth (2017) quantitative study, which examined 176 HCPs, including nurses (20.5%), nurse students (33.5%) and medical students (5.7%), and physicians (40.3%) in the USA. The participants were aged from 18 to 64 years old, and the EHR experience range was less than one year to more than 10 years. This study measured the misuse tendency of the electronic health data among the HCPs, using the awareness of the procedural and technological countermeasures. The procedural countermeasures elements were security policy, EHR data policy, training and HIPAA knowledge (as discussed previously, HIPAA is a US regulation used for legal releasing health data). The technological countermeasures elements were EHR monitoring, auditing, pattern detection and flagging misuse. Arunothong and Nazareth (2017) found that age was less significant in regard misuse the EHR. However, they found that HCPs were more likely to value experience than age in term of protecting the HIS. Thus, to enhance nurses' compliance with the EHR privacy policy, the focus should be shifted from age to experience and knowledge.

Age is a broad concept and has many co-dependent facets that could influence a nurses' ability to comply with data privacy. One of these related concepts is knowledge and experience. Whereas age was not considered to be a contributory factor, knowledge and experience were:

> "When we talk about age, we also focus on experience, and what clinical experience you have." **(P6)**

The nurses believed that knowledge and experience were more important attributes than age when it comes to compliance. These items were clearly factors that were seen as far more important or over- ridding any age-related effect. Maybe terms such as "knowledge-age" and "experience-age" could be hypothesised to determine how long nurses had been aware of this area of activity, as posited by Kang et al. (2023), who examined the correlations among nurses' adherence to information security policies, their level of information competence, and their attitudes towards information security. They found that previous security-related education and experience had a highly significant effect on the nurses' compliance. They also found nurses have identified a deficiency in information security education as a significant issue that compromises the privacy of patients. As our research found that both Professionally Pragmatic Factor 1 and Professionally Obligated Factor 2 participants valued their experience of working with the EHR more than their age.

Thus, age is not influential factor for nurses to comply with the policy. However, given that knowledge and experience were important and greater levels of mentoring of junior by senior colleagues could be important too. Possibly, there is a need to look at nursing education to ensure greater knowledge and to provide safe opportunities to practice with EHR. Ting et al. (2021) preformed an evidence-based synthesis integrative review about the interventions utilised for nursing education and training on the EHR system. The researchers claimed that nurses had inadequate training and education regard using the EHR system, which has adversely effect on the EHR data quality. As they recommended for interactive education that suit nurses' workflow.

7.3. Contributions of Two Factors' Outcomes to Theoretical Frameworks' Constructs

This study combined the DTPB and DT models to explore the behavioural factors that influence nurses to comply with EHR privacy policies. The DTPB is an extended theory of the TPB introduced by Taylor and Todd (1995b), which focuses on an individual's acceptance and usage behaviour regarding technology. The DT refers to the internal forces of fear in individuals that are created by external forces (i.e., law and regulations), and which deter them from performing unlawful activities (Hupert et al., 1996). TPB and DT are used widely in examining employees' compliance behaviour toward the IS security policy, and to hinder employees' suspicious activities (Lebek et al., 2013).

Combining the two models covered four aspects that were seen in other studies, including "behavioural beliefs," "normative beliefs," "controlling beliefs," and the "influence of the law and regulation" on nurses' behavioural compliance with the EHR privacy policy. All four aspects were seen as facilitators and inhibitors for both factors of the current study. Clearly, each factor in this research has shown a unique interaction with both the DTPB and DT model. For example, the Professionally Pragmatic Factor 1 selected more of behavioural beliefs (ease of use), controlling beliefs (facilitating conditions), and detection and punishment certainty as drivers for them, whereas the Professionally Obligated Factor 2 saw normative beliefs (superior influence), behavioural beliefs, and detection certainty as key drivers for their compliance. The controlling variables involved working position and education level, which had a positive influence on nurses in both factors, whereas age was not found to be influential.

By incorporating the DTPB and DT theoretical frameworks, a more comprehensive understanding of the HCPs' compliance behaviour can be achieved (Foth, 2017). However, when analysing findings derived from the Q study, it is essential to acknowledge the distinctiveness of subjective viewpoints and perspectives collected through this approach, rather than exclusively depending on behavioural or criminological theories (Ladan, 2018, Dariel, 2011, Rogers, 1991). Although the insights derived from the theoretical framework may provide some knowledge of the subjective perspectives inside a group. This is confirmed by recent empirical applications of the DTPB and DT in examining the HCPs' compliance intention with EHR privacy policy, which showed statistically moderated to high explanatory power (Ma et al., 2016, Foth, 2017, Kuo et al., 2019, Kuo et al., 2017). However, it should be kept in mind that using theoretical frameworks to clarify the findings gained by a Q-study may not provide a comprehensive explanation of the results, as the Q-Methodology was not designed to statistically validate theoretical frameworks (Dariel, 2011, Rogers, 1991). The purpose of the methodology is only to focus on the participants' Q-sorts and their reflection subjectively, to create a new theme in a holistic sense.

7.3.1. Reconstructing the Study Model

The research model (i.e., combined DTPB and DT) was constructed and built upon the outcomes for the scoping review. After testing the model, it might need to be reconstructed and re-tested informed by the outcomes of this research (i.e., the two factors). The results show that the majority of the model's constructs displayed a positive significant influence regarding the nurses' compliance with the EHR security policy in both factors, while only two constructs

showed less significance in this study (peer influence/subjective norm, and age as a controlling factor). However, the nurses in both factors were not equally influenced by the model's constructs, but they differed in a holistic sense. The nurses in Professionally Pragmatic Factor 1 were mainly influenced by the attitude, PBC, punishment severity, and educational level constructs compared to the nurses in Professionally Obligated Factor 2, were more influenced by the subjective norm/supervisors influence construct, working position. Overall, the DTPB and DT models were successfully combined to capture the viewpoints of the nurses in both factors (see Figure 34).

7.3.2. New Behavioural Constructs

The current study's findings discovered three overarching behavioural constructs that influence nurses' compliance with the EHR privacy policy, including "perceived independency," "role modelling" (instead of peer influence), and "knowledge" (instead of age). Starting with the perceived independency that was shown in the Professionally Pragmatic Factor 1's characteristics, the nurses wanted to be independent in their performing their basic tasks, including compliance with the EHR privacy policy. Hammerschmidt and Manser (2019) surveyed primary care nurses' obstacles to practice independence in the USA, and found that nurses who follow others' instructions, particularly physicians, found this to be a major obstruction to their professional autonomy. Therefore, the nurses believed that independency in their work helped them to generally comply with the policy in the medical field.

This aligns with our findings, as nurses in the Professionally Pragmatic Factor 1 preferred formal education and technical support over that hospital's training to enhance their compliance with the policy. This was because nurses wanted to be independent at work without people telling them what to do. This can be indicated from the statement selection of nurses in Factor 1 wanted to comply with the EHR privacy policy with certain degree of freedom based on their understanding and current situation. Thus, it worth to test nurses' perceived independency relationship toward behaviour compliance intention with the EHR privacy policy.

Moreover, the current study showed that participants in both factors were not influenced by their peers, but paradoxically believed that being a role model for other nurses could drove them to comply with the compliance with the EHR privacy policy. According to Hammerschmidt and Manser (2019), role modelling generally helps nurses to comply with healthcare policies. Thus, role modelling could be tested in future in regard to behavioural compliance with the EHR policy.

Another point was that the two factors agreed that the age was not influential for their compliance with the EHR privacy policy. A new concept such as knowledge was emerged, which the nurses believed age was not an issue if they have the knowledge on how they comply with EHR policy. Kang et al. (2023) investigated the associations between nurses' compliance with information security rules, their degree of information competence, and their attitudes towards information security. They discovered that prior education and expertise in security matters had a very substantial impact on the nurses' adherence. Thus, these new emergent terms could be added to the research model and be used to examine the nurses' compliance with the EHR privacy policy in different settings (see Figure 34).

The outcomes of the study can be distinct based on the two factors viewpoints (Professionally Pragmatic Factor 1 and Professionally Obligated Factor 2), even though there is a consensus between them (up to 38 percent). The two factors' consensus and distinguishing views presented in Chapter 6 enable adjustment of the research model, to help in showing more distinct views if it would be used a second time in a research (see Figure 34). Therefore, we recommend that the suggested model be further examined on a larger scale in different settings and with different populations – to provide a more in-depth understanding of whether this model fits to study compliance with the HIS security policy or not (see Figure 34). This model may need to be empirically tested and validated.

Researchers may use the partial least square (PLS) regression analysis approach to validate the model. The PLS is a form of statistics that is employed in structural equation modelling (SEM) for the purpose of analysing multivariate data in a variety of sectors, including the social sciences. This is a developing methodology for SEM that provides benefits such as the ability to accommodate odd data, small numbers of samples, and constructive indications. It is especially helpful for complicated correlational modelling, since it allows for the inclusion of latent variables in addition to constructive factors and chains of effects (Dehghani et al., 2016). Figure 34 shows the research model after incorporating the suggestions described above.

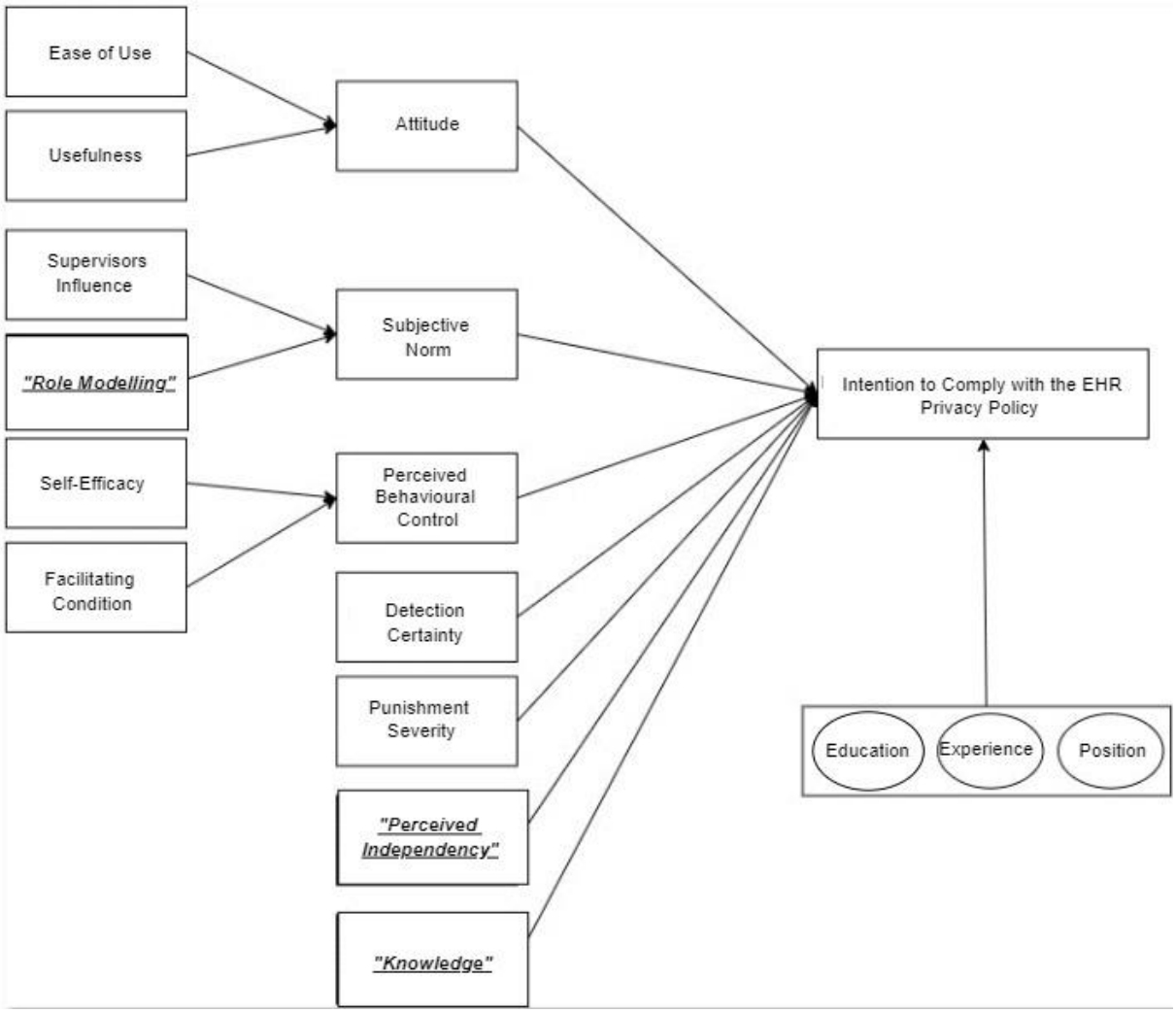


Figure 34: The Suggested Research Model

7.4. The Importance of the Health Data Privacy and Security Regulations

Privacy and security regulations are essential for ensuring that the EHR is safeguarded (and thus patients, HCPs, and health systems). For example, the US government has established the HIPPA and HITECH Acts, delineating the privacy and security requirements to protect patient's data when the healthcare providers provide healthcare services(Walid et al., 2024, Joshi et al., 2021). These acts and regulations address how healthcare providers must deal with EHR data, as well as the associated privacy and security challenges in healthcare settings.

7.5. Nurses' Best Security and Privacy Practices with the EHR System

While EHR systems have fundamentally enhanced healthcare service quality, HCPs' security and privacy practices needed to be acknowledged to ensure that professionals, especially nurses,

comply easily with the legal and regulatory standards to protect patients' data. Kamerer and McDermott (2020) conducted a literature study to explore nurses' role in cybersecurity areas that are related to their roles and provide best practice recommendations for them, and suggested several best practice areas for nurses to safeguard the EHR data, as described below.

7.5.1. Physical Threats

Physical threats happen when accidental action such as incorrect of paper document disposal, leaving workstation unintended and reacting to phishing call. Thus, the best security and privacy practices for nurses in the above situation include shredding all hard copies with appropriate disposal or locking documents in allocated filing cabinets. Moreover, signing off from computers before moving out from the working station is an important issue for the EHR in practice, as noted previously. In addition, nurses must not share their passwords with co-workers (or indeed anyone else, except where authorised by law or institutional policies). With regard to phishing requests, nurses must not click on unsecure or unknown links from working computers, and may require security training on how to spot such threats (Kamerer and McDermott, 2020).

7.5.2. Portable Device Threats

Using portable devices such as smart phones or laptops for work was found to be the most frequently reported cyberattack threat. Lost or stolen devices contribute to this type of threat. Thus, the best practice with regard to this threat is to ensure that such devices are locked in a secure locker and are maintained with GPS tracking enabled. Users must follow the hospital security guidelines in regard to using these devices at work, and must also ensure that these devices are encrypted and are not shared with others (Kamerer and McDermott, 2020).

7.5.3. Insider Use Threats

Internal users of the EHR system continue to be the weakest link in protecting system data privacy. Users' actions are hard to control unless hospitals take active measures to reduce internal threats. There are numerous potential measures that can be taken in this regard, the most common and effective of which include providing computer and safeguard training, providing legal and ethical advice on the implications of using EHR courses, ensuring a proper working environment, encouraging reporting of suspicious activities (i.e., a reporting culture), and software intervention (e.g., encryption, access restriction, and firewall safeguards) (Kamerer and McDermott, 2020).

7.5.4. Technical Threats

Technical threats chiefly concern those that may trick nurses into unknowingly revealing patients' information by sharing passwords or other EHR end-users' information. These threats include social engineering threats such as phishing, ransomware and identity theft, etc. To reduce the risk of such technical threats, nurses must be educated concerning identifying potential risks and working closely with IT professionals to reduce the occurrence and potential impacts of attacks. Nurses need to change their passwords on a regular basis and use complex passwords. Systems should be updated regularly, as required, with appropriate devices encryption and protection (Kamerer and McDermott, 2020).

7.5.5. Administrative Threats

Administrative threats include policies, procedures, and protocols that govern the EHR's daily operations. Non-compliant actions among EHR end-users could leave the healthcare facilities vulnerable to cyberattack (Kamerer and McDermott, 2020). Thus, compliance with the EHR privacy and security policies is necessary to protecting patients' information. Education and training regarding the proper access and usage of the data are also important, along with ensuing that access privileges are commensurate with nurses' roles and responsibilities (Kamerer and McDermott, 2020).

7.6. Summary

This chapter discussed the factors that influence nurses to comply with the EHR privacy policy. The study's main goal was to understand the drivers and barriers that influence nurses' compliance with the EHR privacy policy in three hospitals in Makkah, Saudi Arabia. The findings provide two distinct viewpoints of nurses with regard to their adherence with the EHR privacy policy, which can differ from setting to setting, and from country to country (Foth et al., 2012). Despite there being different viewpoints among nurses, there was consensus among the participants that the EHR privacy policy was valued *per se*, which is attributable to the fundamental importance of patients' privacy in nursing professional ethics (Bani Issa et al., 2020). However, the nurses thought that other resources and technical factors can lower their compliance with the policy, such as computer shortages and inflexible systems. The study's findings contribute to existing literature and the overall comprehending about the nurses' compliance with the EHR privacy policy practice in Saudi Arabia.

CHAPTER 8
CONCLUSION

This chapter concludes the thesis, linking the emergent findings back to the initial study objectives adumbrated in Chapter 2. Moreover, based on these outcomes, it presents recommendations, reflections, and implications arising from this research, acknowledging its limitations and identifying areas for future research to expand on the contributions of this study.

The study's aim was to explore the drivers and barriers that influence nurses' compliance with the EHR privacy policy in Saudi Arabia. Two objectives were set to achieve this aim.

1. To develop and apply the Q-Methodology using nurses in Saudi as participants to explore the behavioural factors that influence the nurses' compliance intention towards EHR data privacy policy in the real context.
2. To provide recommendations based on the findings of the study that can be used by management, stakeholders, and authorities when adopting new technology or writing a new EHR privacy policy.

Overall, the present study demonstrates that nurses in both groups exhibit an awareness of the significance of data privacy in nursing practice, despite their specific behavioural drivers for compliance with EHR policy. The study indicates that both the "Professionally Pragmatic" and "Professionally Obligated" factors need assistance in this regard.

The group described as "Professionally Pragmatic" strives to adhere to regulations while also taking into account the wider requirements to benefit the patients. This group needs empowerment to articulate concerns pertaining to their workload or system problems that have the potential to jeopardise patient care. Conversely, the group that is "Professionally Obligated" seems to prioritise adherence to data privacy regulations without taking into account the possible consequences for patients. Their strict devotion to rules – regardless of the potential legal consequences – may provide a concern that has to be addressed. Nevertheless, there are instances when nurses may to conform the policy without careful consideration.

8.1. Reviewing the Study's Aim and Objectives

First objective: *To develop and apply the Q-Methodology on nurses in Saudi to explore the barriers and drivers that influence the nurses' compliance intention towards EHR data privacy policy in the real context.*

The stated aim and objectives have been accomplished using Q-study, underpinned by the DTPB and DT combined model. This was the first step on the pathway to achieve the main aim of understanding the behaviour of nurses in response to data compliance, as fulfilled in Chapters 2 through 5, where a scoping review and Q-Methodology were explained and the results were presented.

The review identified six driver and barrier factors that influence HCPs' compliance with EHR privacy policy (social influence, lacking computer skills, resource availability, gaining benefits, system monitoring and consequences, and compliance with the policy increases workload). These subtle and detailed observations might serve as the foundation for future studies investigating the interaction between these parameters and real-life compliance behaviour.

Also, it was found that 17 theoretical frameworks were used to examine the HCPs' compliance with the EHR privacy policy. However, the outcomes from the scoping review led to the adoption of the combined DTPB and DT model to study nurses' compliance behaviour with the EHR privacy policy. This was echoed by Foth (2017), who examined HCPs' compliance with the Germany's privacy rules and regulations, using a survey. This research revealed that the amalgamation of the TPB and the DT offered a broad perspective to comprehend the intricate aspects of HCPs' behaviours related to data compliance.

The use of Q-Methodology to investigate nurses' compliance behaviour provided a holistic view of the issue. The Q-Methodology aims to generate a large number of statements, which can be refined later guided by the DPBT and DT model. The Q-Methodology facilitated the recognition of two primary perspectives among nurses: Professionally Pragmatic Factor 1 and Professionally Obligated Factor 2. The Q-sorts activity helped the nurses to vocalise their viewpoints in a broad form, which resulted in two factors that cannot be generalised on other nurses. This provides detailed and subtle insights into how nurses in the Saudi healthcare system interpret and comply with EHR privacy policy. Moreover, the consensus statements highlight the crucial need of a well-designed EHR privacy policy in hospitals to promote and guarantee adherence among nursing workers.

This study's findings highlight the need for healthcare facilities to create a setting that not only recognises the importance of EHR privacy rules, but also offer assistance and resources to overcome the obstacles that affect compliance. Moreover, the two resultant factors showed different viewpoints between nurses in term of complying with the EHR privacy policy. The recognition of the two factors' viewpoints among nurses might significantly help to create specific pathways to design and improve the nurses' adherence to EHR data privacy regulations.

Overall, this Q-study effectively accomplished its goal by revealing the complex nature of nurses' intents to adhere to EHR privacy policy at hospitals in Saudi Arabia. The acquired knowledge lays the foundation for future research efforts and highlights the significance of customised approaches to enhance adherence to EHR privacy rules among HCPs.

8.2. Reflexivity

Reflexivity is seen as a path to comprehending the researcher's perceptions through the use of a rigorous self-awareness evaluation (Marshall et al., 2010). Reflexivity is crucial because it allows the scholars to constantly evaluate their own role in the investigation process and the results (Marshall et al., 2010). Furthermore, reflexivity is important within interpretative paradigm upon which Q-Methodology is founded (Ramlo and Newman, 2011). The researcher might get personally biased, which will influence the study. Marshall et al. (2010) stated that personal opinions cannot be bracketed and that it is crucial that the researchers be honest about their biases and how they may have impacted the study. This self-reflection can improve the rigorousness and transparency of the study's reliability.

Thus, the researcher's positionality in the study needs to be clarified, demonstrating how the researcher's own social view and position are adopted for and affect a specific study (D'silva et al., 2016, Sultana, 2007), which pertains to broader personal, political, economic, and rational perspectives (Ozano and Khatri, 2018)p. 191). Positionality shows how researchers perceive themselves and how others perceive them, which can affect study outcomes, because of the way in which researchers see and interpret data. As noted by D'silva et al. (2016), this entails advantages and disadvantages. For instance, the researcher who is new to the study setting may perceive what somebody immersed in the setting may miss; however, researchers who are new to the study setting and do not acknowledge their positionality may unintentionally disrupt the study processes and the theoretical perspectives that were used to interpret the data (D'silva et al., 2016) p. 104). D'silva et al. (2016) additionally pointed out that this may result in the

researcher overlooking the complexity of the data collection that was not part of the research experience.

Given the importance of positionality, it is essential to acknowledge and account for the researcher's positionality in the current study. For example, this study was done through online means; therefore, there was no face-to-face interaction occurring because of the COVID-19 pandemic social distancing. The researcher has a mixture of health administration and informatics background that allows him to work closely with the participants through the online tools when they face any technical difficulties. Moreover, the participants might have perceived me to be an administrative or IT professional, working with them in the setting to resolve IT issues. This might have caused some nurses to not engage with the study (as they tend to avoid becoming embroiled with administrative or technical issues in the workplace).

Another point is that the researcher studied the health informatics extensively and previously worked on the EHR, and taught and trained students on how to use the EHR system for a short period of time. Moreover, I was aware that I was a PhD student whose background was not nursing, but I have a health administration and health informatics background, which intersects with EHR nursing workflows. Therefore, as a researcher, I did not feel that I had no practical experience when nurses mentioned any topics regarding the EHR during the data collection. However, my thoughts upon commencing this research were that there was already an existing EHR system and an updated privacy policy that would help address health data privacy and security issues encountered in clinical practise. This perspective stemmed from my time spent in the classroom at the university.

My background as a health informatics professional, with associated technical and administrative skills and a comprehensive understating of the EHR system, all influenced me in commencing and undertaking this study. However, I was surprised that nursing participants were influenced by the non-technical factors, such as subjective norms, which were found to critically influence their compliance with the EHR privacy policy. Initially, I presumed that updating the policy and technical solutions would be adequate to ensure that the nurses could easily comply, but their feedback showed how important the user experience and social norms are with regard to compliance. This awareness highlighted how human factors can greatly affect nurses' compliance with the EHR privacy policy.

Thus, this perspective might have altered the preparation of the research – perhaps causing preconceptions that were not completely aligned with reality. It implied that the investigator's pre-existing assumptions might have biased the researcher's understanding of the methodology process or data analysis in this study. By reflecting on these insights, my health informatics background formed my first assumption, and the findings of this study changed my perceptions and provided me with a broader perspective on nurses' compliance with EHR privacy policies.

8.3. Study Strengths and Limitations

Every study has its own strengths and limitations. In the following section, this study's strengths and limitations are discussed, considering the extent to which they may affect the study's results.

8.3.1. Q-Methodology

This research is the first (to the investigator's knowledge) that employed Q-Methodology to examine nurses' compliance with the EHR privacy policy in Saudi Arabia. The Q-Methodology was found to be the most germane methodology for investigating this issue. Q-Methodology enables the nurses to articulate their viewpoints on specific topics, which is especially beneficial in hierarchical systems where efficient interaction is often hindered among the researcher and participants at different levels of the hierarchy (Saiti and Stefou, 2020). Any individual at a lower position in the hierarchical structure may exhibit reluctance in voicing their ideas, maybe due to concerns of being unwelcome, not being taken seriously, or being disregarded by superiors in the organisational hierarchy. The dread of being disregarded may lead the person to withhold their ideas (Saiti and Stefou, 2020).

The Q technique may be quite beneficial in situations like these. Sorting the statements may uncover hidden perspectives that participants may not have shared in interviews, owing to operating inside a hierarchical structure (Zabala et al., 2018). The present research used Q technique to enable the nurses to articulate their viewpoints by responding to carefully constructed statements that capture their perspectives. These thoughts were further explained, as the interview was a complementary approach to the Q-sorting activity. Zabala et al. (2018) stated that Q technique allows for the comprehension of several views, and the process itself is characterised by a systematic and uncomplicated nature, but warned that the process of interpreting data and addressing participant inquiries may include a certain level of subjectivity.

Additional challenges that can occur when working with the Q approach include the potential for a lack of accuracy, due to the use of small samples, and the inherent complexity of comprehending participants' perspectives. It was vital for researchers to provide justifications for multiple decisions made during the process, and the time-intensive nature of carrying out the interviews. Using the methodology in the current study helped to extract two distinct factors regard complying with the EHR privacy policy. It also shows the similarity between the participants in the two factors. The Q-Studies' result cannot be generalised to other workers in this field, because this methodology aims to capture the participants' subjectivity, due to small sample size (Valenta and Wigger, 1997). However, this study's findings might be used by other researchers for further investigations of nurses' compliance behaviour, which showed several potential research aspects. However, it is necessary to mention that the outcome of this study does not preclude the possibility that there are other different viewpoints that may be equally valid that were not encompassed by the research net case in this research (Watts, 2001).

Moreover, the Q-Methodology allowed the nurses to reveal their inner viewpoints about compliance with the EHR privacy policy that may not have been captured by using different approaches such as a questionnaire or interview. In this Q study, the nurses might not have a deeper knowledge regarding the investigated topic. Therefore, the researcher prepared the Q-Set statements based upon pre-existing statements, allowing to capture the participants' perceptions during the Q-Sort activity. However, an enhancement on the Q-Set statements wording term could be added to some of the Q-Set's statements, by writing in much simpler word terms. This might have helped to reduce the number of non-significant Q-Sorts in this study, even though this is not considered to be a pertinent issue in Q-Study *per se*.

According to Webler et al. (2009b), a Q-study typically recruits 12 to 20 participants to sort 40 to 60 Q-Statements. Brown (1993) recommended 40 to 60 participants for a Q-Study, and smaller numbers of participants might be suitable in some contexts. The non-significant Q-Sorts in a project are not necessarily a failure of the project, but rather suggests that the participants arranged the statement items in a dissimilar manner, resulting in a weak correlation between different Q-Sorts, which lead to an the absence of shared perspectives (Yang, 2016). This shows that nurses have different views regarding the investigated issue, which reflects that this field is a complex one, which needs further investigation (for more justifications, see Appendix 4.1).

Moreover, scholars have suggested that despite the fact that the Q-Methodology might be used to investigate subjectivity or behaviour, it still presents difficulties during data reduction

(Barker, 2008, Ho, 2017). Therefore, the researcher joined the Q-Methodology community, and attended two short courses, workshops and online seminars and meetings to seek knowledge of this methodology. As a result, I was able to connect with other scholars who are interested in Q-Methodology and participate in stimulating discussions, both of which helped me get a better understanding of this approach. Moreover, this reflected on the groundwork of this Q study, including concourse generation and validation, P-Set selection and factor' findings' analysation and interpretation. In addition, this helped specifically in the factors selection process that showed two options during the analysis. This community is beneficial for new researchers, which provides essential short courses and materials about the Q-Methodology, and may be accessed at: https://qmethod.org/.

8.3.2. The Research Model

The study utilised the DTPB and DT as a theoretical framework, which covered personal beliefs and the effect of laws on these (Lebek et al., 2013). Both of the models were only examined the employees' compliance with the information security policy using the quantitative method. Moreover, other models emerged from behavioural studies (Ajzen, 1991, D'arcy and Herath, 2011), but they are not designed for the healthcare field. The models forecasted a diverse array of behaviours, including consumer and recreational decisions (Warshaw and Davis, 1984), as well as educational endeavours and accomplishments. However, this should not be seen as a constraint, since Q-Methodology offered the nurses in this research the chance to ascertain how both models can capture their compliance with the EHR privacy policy. The nurses were presented with a revised set of statements drawn based on both models and validated by experts, as detailed in the methodology chapter. This was achieved via the comprehensive Q-Statements creation process and pilot study (see Appendix 2.2: Concourse Generation and Q-Set Process). This enhanced the models' structures, while also customising the statements specifically for the healthcare industry, thereby pioneering investigation of this issue.

8.3.3. COVID-19 and Online Recruitment

This study's fieldwork was conducted during the period of public health social distancing due to the COVID-19 pandemic during December 2021 to March 2022. The precaution measures that were used to tackle the pandemic were relatively new, and posed great obstacles to researchers, placing pressure on the healthcare system and HCPs, which extended to the healthcare research field. Therefore, controlling the study setting's variables during conducting the study in the COVID-19 period was challenging, including practical challenges concerning

travel restrictions, recruiting participants, and social distancing, etc. (Upadhyay et al., 2021). In the research field, controlling the independent variables must be ensured to increase the study's internal validity; losing control over the essential resources that are needed for the research may jeopardise the validity of the study (Alsiri et al., 2021). This might affect the study data quality and outcomes, because adverse events might happen during the data collection, which might impact the data quality.

Performing a non-experimental study using online tools can overcome social distancing restrictions such as those applied in response to COVID-19. Researchers have been able to reach out to people through web-based polls and acquire meaningful data from those who take part. Online tools have certain advantages over conventional approaches, including a less wasteful use of resources and the potential to improve the results' accuracy (Nazariadli et al., 2019). However, they carry the risk of participants being confused, especially for tools with which the public have less familiarity (i.e., anything other than a conventional questionnaire), given the absence of anybody there to provide help and reassurance. This could cause the participants to not be fully invested in the research, which might impact the quality of the data.

However, many online tools already exist for online Q research; hence, this was a major advantage when the selected tool was used during Covid-19. The researcher selected an online tool that fit the requirement of this Q study, therefore, there was no need to create new tool. The study used email as the primary communication medium for participant recruitment, but it was found to be ineffective in engaging participants. To address this, WhatsApp was used instead. Moreover, the Microsoft Teams application faced technical difficulties during online meetings, causing a reassessment of the chosen platform. Participants were more comfortable with the Zoom application, which was widely used in Saudi universities for online education during the pandemic. These challenges highlight the importance of adaptability in research methodologies and aligning with participants' familiarity and technological preferences for efficient engagement. Despite these challenges, the study continued with adjustments, emphasising the need for adaptability when using various technological tools in diverse research settings.

Due to the COVID-19 pandemic, hospitals were understaffed, and nurses were under pressure, and were typically working overtime. In addition, recruiting participants to perform an online Q study is a challenging job even under the best of circumstances. Thus, recruiting nurses might be negatively influenced by the online tool that was used to acquire data in this study. In particular, with regard to the online tool used among nurses, the amount of time it took to

complete was an important factor that had to be considered. Throughout the course of this research, it was found that a few nurses voiced their opinions on the amount of time necessary to do a Q-Sort. The fact that all nurses who took part in this study were unfamiliar with this methodology before the start of the investigation poses a potential difficulty for this aspect of the research. Before they began the Q-Sorting process, it was essential to provide a concise explanation of the approach. Even though this was a new finding, it was not highlighted in any of the earlier studies; this might be due to the first time encountering this study approach. In spite of this, the advantages of this method for achieving the purpose of the study exceed its drawbacks.

Another point is that the findings in this study might be influenced by the nurses' attitudes toward using the EHR due to COVID-19 restrictions. According to Almulhem et al. (2021), who examined HCPs' satisfaction using the EHR system during COVID-19 in Saudi Arabia, the pandemic had a significant impact in exacerbating HCPs' burnout, and this was linked to the usage of EHR system. This could have been negatively reflected in the nurses' viewpoints toward the compliance with EHR privacy policy.

8.4. Study Contributions

This PhD study contributed to the body knowledge of literature regarding nurses' compliance behaviour with the EHR privacy policy. These contributions can be attributed to different sections of this study. First, the outcomes from the scoping review presented in Chapter 2 showed that researchers have tried to use different theories and theoretical frameworks to examine nurses' behavioural compliance with the EHR privacy policy, which showed that this research area was complicated and intersects with different disciplines. Thus, this study proposed a new model that built upon other researchers' contributions to examine nurses' behavioural adherence to privacy policies.

Moreover, this study was the first to use the Q-Methodology to examine nurses' compliance behaviour with the EHR privacy policy, based on the combined theoretical frameworks of DTPB and DT. Previous studies in Taiwan examined nurses' compliance with EHR policy using a quantitative approach, with each model examined separately (Ma et al., 2016, Kuo et al., 2017). By using the research model to build the concourse in this Q study, two novel factors pertaining to adherence to the EHR privacy policy were identified. The result was unique, and the nurses valued privacy regardless of their different viewpoints about the facilitators and

barriers. The first factor was called Professionally Pragmatic (Factor 1), whereby nurses were concerned with how they could perform their tasks easily and independently. The second factor was called Professionally Obligated (Factor 2), whereby nurses were influenced by the policy and what others told them to comply with the EHR privacy policy. Moreover, using Q-Methodology allowed the researcher to draw and generate theories. Therefore, this study contributes to discovering three underlying concepts that comprise key contributions:

- Nurses in the Professionally Pragmatic Factor 1 believed that being independent was a key in their compliance with the EHR privacy policy.
- Nurses in both factors indicated that being a role model drove them to comply with the policy.
- Nurses in both factors believed knowledge could be a driver factor for their compliance with the policy.

Overall, this study evidently showed how important the nurses' compliance behaviour with the privacy policy is in order to protect the EHR system. It moved our understanding from knowing the general description of the nurses' population regarding compliance with the EHR privacy policy to knowing their viewpoints and categorising them into two groups. Moreover, these two factors' viewpoints enriched the literature knowledge body regarding compliance with the EHR privacy policy.

8.5. Implications and Recommendations

Second Objective: *To provide recommendations based on the findings of the study that can be used by management, stakeholders and authority when adopting new technology or writing a new policy.*

The nurses in this study believed that compliance with the EHR privacy policy was important, however, they have two distinct viewpoints on how their behavioural compliance form toward compliance with the EHR privacy policy. Understanding this will help to assess the current practice, which will enable nurses to protect the EHR data. The main elements that impact the nurses to comply can by concluded into five elements:

- Implications for having a proper EHR privacy policy and auditing on nurses' compliance with EHR privacy policy

- Implications for having proper resources to facilitate compliance with the EHR privacy policy
- Implications for privacy training and education on nurses' compliance with EHR privacy policy
- Implications for social influence on nurses' compliance with EHR privacy policy
- Implications for the guidelines and monitoring on nurses' compliance with EHR privacy policy

While the findings of the study may only be applicable to the individuals who participated in it, they could be nonetheless used in other settings. Thus, the following subsection present the implications and recommendations pertaining to the two identified factors concerning compliance behaviour among HCPs, particularly nurses, with the EHR privacy policy.

8.5.1. Implications for Having a Proper EHR Privacy Policy and Auditing Nurses' Compliance with EHR privacy policy

As described in Chapter 7, the two factors recognise that the hospital rules and guidelines are crucial for nurses to comply with the EHR privacy policy, because they professionally and ethically value patients' privacy, which is built into the nursing profession (Bani Issa et al., 2020). In this regard, the health institutions are responsible for providing very detailed guidelines and policies for the employees in order for them to know their roles in protecting the data and accessing limit to the system. The policy must take into consideration the nurses' working environment and their personal behaviours, because they are key to compliance with EHR privacy and security policies. Otherwise, the hospital management may be setting themselves up for failure to secure the HER system (Imam, 2014).

Looking at the healthcare system situation in Saudi Arabia, the MoH has a strategic plan for implementing a unified EHR system and protecting data privacy, but comprehensive legislation has not been passed to protect health data privacy yet. If the data privacy and security guidelines are not considered from the beginning of the implementation process, it may lead to a failure to protect the data for the moment and even make it harder later (Chikhaoui et al., 2017). Data privacy and security standardisation should start in parallel with implementing the HIS. Having updated regulations and standards that mandate data privacy and security at healthcare institutions may enhance health data protection in general; moreover, it will specifically help the nurses in both factors to comply with the EHR privacy policy.

The hospital management needs to co-design a comprehensive EHR privacy and security policy with the nurses, so that they develop a sense of ownership over the processes. To achieve this, many stakeholders at the hospital, including top management, the IT team, and HCPs, should collaborate to write the internal rules and regulations. In this case, the nurse informaticists' role is necessary to bridge the gap between clinical practice and data protection regulation, as they will be able to understand both realms. The Healthcare Information and Management Systems Society (HIMSS) suggested that integrating nurses informaticists in the entire procedure of selecting, designing, and implementing the system might raise the degree of understanding and adherence with the EHR privacy policy (2007).

From the study's findings, nurses stated that the EHR privacy policy and some of the available guidelines did not coincide with their work circumstances. Thus, a periodical audit and update of the policy, standards, and rules is another strategy to enhance nurses' compliance with the EHR privacy policy. According to Bunting and de Klerk (2022), auditing helped nurses increase their compliance rate with the EHR documentation. The reason why auditing is effective is that the time consumed in the audit process itself may help in the effective use of the system. Thus, performing internal evaluations of the EHR system frequently to check for compliance problems. This includes checking the accuracy of data, analysing user activities, and making sure everyone is following the rules. This will reflect on the nurses' compliance in both factors.

8.5.2. Implications for Having Proper Resources to Facilitate Compliance with the EHR Privacy Policy

The nurses' viewpoints showed that a lack of resources and support is a universal barrier to their compliance behaviour with the EHR privacy policy (Kuo et al., 2018, Ma et al., 2016). A proper environment that includes adequate resources and support can encourage nurses to comply with the EHR privacy policy. The Professionally Pragmatic Factor 1 nurses believed that having more resources (computers, screens, etc.) could improve their compliance. They indicated in the interview that they have computer shortages. Hence, hospitals need to provide adequate resources before the system goes live to ensure the IS protection policy cannot be violated. The proper infrastructure must be integrated into the implementing process in order to determine out the resources necessary for the successful execution of a secure EHR system and the proper environment to run the system.

This involves distributing enough computers, an internet host, and standby devices. In addition, regular maintenance of the EHR system and related devices is required. This ought to

encompass updates, upgrades, or modifications to the EHR system, taking into account new expansion throughout the clinical settings. However, technical support is another key for nurses to comply with the EHR policy. The nurses in this study reported that they lack support and assistance when nurses face technical issues, as they also reported a lack of guidelines to follow. Therefore, supervisors, nurses, informaticists, and IT professionals need to develop a plan to provide appropriate support for nurses. This will encourage nurses to perform their job and properly comply with HER policies.

8.5.3. Implications for Privacy Training and Education on Nurses' Compliance with EHR Privacy Policies

The nurses in this study believed knowledge and experience were key to comply with any EHR privacy policy. Preparing nurses with the needed knowledge and skills can be a major influence on their behaviour and intention to comply with a EHR privacy policy. The training issues discussed in Chapter 7 must be stressed here. Both factors believed that training was not important to their compliance. This was also reflected in the interviews, wherein several nurses revealed that they had never received formal training and relied on their computer literacy. This should be avoided, and distinct training and education programmes on how to protect the system must be provided periodically to ensure adequate training to confidently and properly deal with the system. Nursing education programmes and training courses need to be updated regularly, so that nurses have sufficient knowledge to protect the EHR system. Elgujja and Arimoro (2019) stated that HCPs who have access to the EHR system pose a significant risk to the confidentiality of the data, therefore training courses should be introduced to improve the staff's knowledge and skills on how to use and protect the system.

However, participants aligned with Professionally Pragmatic Factor (1) believed that training was not helpful for their compliance with the EHR privacy policy. This might be due to the existing training programme's lack of practical application (as perceived by participants). To solve this issue, involving nurses in crafting and designing the programme based on the issues they face in the work environment may ensure the training is relevant and effective. As a result, nurses may positively change their opinion toward the training programme, because they thereby perceive that their voices are being heard.

While the nurses believed that education was important for them to comply with the EHR privacy policy, they believed that basic knowledge and skills regarding EHR privacy could be attained through college education (Saito et al., 2017, Sher et al., 2017a). This has implications

for the nurses' educational programme, as it was shown in the study that nurses' compliance behaviour with EHR privacy policies is influenced by formal education. Thus, it is recommended for nursing education programmes to update their course curriculum and start focusing on how they can equip their students with knowledge and skills to understand the logic and functionalities of EHR to deal with common issues in practise, including protecting the data and cybersecurity training.

8.5.4. Implications for Social Influence on Nurses' Compliance with EHR Privacy Policies

The nurses in this study believed the management expectations influence their compliance with the EHR privacy policy. This finding can be used to enhance nurses' adherence with the EHR policy in the practices. According to Cruz et al. (2022), nurses are committed to their job and task management. Therefore, this commitment relationship can be leveraged to enhance nurses' compliance with the EHR privacy policy. The nurses' positive beliefs toward their management expectations helps to achieve the management' goal of protecting the EHR system. Moreover, the nurses thought that by complying with the policy they set a positive example for other nurses. Thus, the nurses feel that they are role models for others, which may be used in practice as an encouragement for nurses to comply with the EHR policy. This can be used by the hospital to encourage nurses to comply with the EHR privacy policy. Our recommendation is that the hospital management need to enhance this expectation belief among nurses to help them to easily comply with the policy.

Involving nurses in designing and writing the privacy policy can enhance their compliance with the EHR privacy policy in general, because they perceive that their professionalism is valued, and their active participation is sought. To do this, hospital management should create a feedback loop, whereby some nurses and their supervisors meet with the hospital's policymakers to discuss the policy and how it can fit in with nurses' practice. If the policy already exists, nurses can be involved in intermittent review meetings to express their opinions and experiences, which can inform the review and development of existing policy.

8.5.5. Implications for Guidelines and Monitoring for Nurses' Compliance with EHR Privacy Policies

In this study, both factors thought that monitoring help them to comply with a policy. Computer monitoring is one of the countermeasures for violating EHR privacy, therefore hospitals need

to monitor the system and communicate this with the EHR end-users, including nurses. This should be an automatic and known practise in the hospitals. According to Taksler et al. (2021) and Kuo et al. (2019), computer monitoring to ensure the safety of EHR data ought to be required. The organisational policy for EHR privacy policy must outline the purpose, scope, and type of activities that will be monitored. Moreover, the legal and ethical implications of computer monitoring need to be considered during the writing of the policy, to make sure it aligns with hospital and governmental regulations. It is important for the nurses to possess an understanding that computer monitoring has the potential to occur at any given moment. Consequently, it is recommended that their contractual agreement include the introduction and signing of a permission form as a strategic safeguard tactic for the EHR system. Implementing a technological security solution may help reduce the nurses in the two factors violations of EHR security, such as intrusion detection systems and logging methods.

8.6. Recommendations for Future Research

Q-Methodology is a research technique that uses Q-Sorts to uncover subjective viewpoints and generate theories based on these perspectives that can be tested later. Thus, the following subsections identify possible research regarding the compliance behaviour with EHR privacy policies that was inferred from the findings, which may form hypotheses beyond this study's scope. These recommendations target the privacy of healthcare practises, nurses, and other HCPs in study settings.

8.6.1. Using Different Methodologies to Capture Nurses' Behaviour

Future research needs to consider new approaches and methodologies, such as observation of the nurses' actual compliance with the EHR policy. By doing this, it may obtain data that may provide a deeper understanding of how nurses follow the policy in practise. Scholars may help expand our understanding of nurses' compliance behaviour with EHR privacy policies by exploring the suggested lines of study. By shedding light on the nuances at play, these studies will pave the way for more efficient tactics, treatments, and policies to be created to increase nurses' security adherence. Moreover, this study did not investigate the nurses' level of compliance with the EHR privacy policy. Hence, triangulation studies or observational studies need to be conducted to uncover the levels of compliance and maybe then look at specific groups or issues where compliance is poorer

8.6.2. Using the Q-Methodology with other HCP Groups

Q-Methodology is a method largely for developing theory that can then be tested through other forms of research, quantitative or qualitative (Davis and Michelle, 2011). After data was collected, analysed, and discussed, it was noticed that the EHR privacy and security practises showed enormous opportunities for researchers to investigate other HCPs such as physicians and pharmacists et al. using the Q-Methodology. The outcomes may differ because of the different level of knowledge among the HCPs due to different access levels to the EHR system. Moreover, the culture of the organisation might be different than where this study was conducted. Each HCP group has definite needs and challenges; thus, understanding this can help those who are writing the policy and guidelines that address the HCPs job roles needs.

8.6.3. Universal Policy and Guidelines

It was noted in Chapter 7 that health information regulations and policies are inconsistent and generic in Saudi Arabia. Future research needs to focus on constructing universal privacy policies and guidelines that healthcare institutions can adopt to address the requirements and challenges of protecting the EHR system. This may promote compliance with health information privacy across healthcare institutes. Future studies need to explore (and enable) the co-designing of the privacy policy team in depth, including all HCPs. It was shown that nurses were not involved in the process of implementing the EHR and writing its policy. Therefore, researchers need to explore this aspect from all different angles, which can be tested contextually and empirically. Moreover, this study revealed the need for more future studies exploring in-depth health information security, privacy, and ethics concerning nurses and other HCPs. Haried et al. (2019) conducted a meta-analysis study about HIS from 2000 to 2015, and concluded that more studies are needed regarding the above issues pertaining to universal and standardised policies and guidelines.

Moreover, future studies should examine the compatibility of the leading countries' privacy and security regulations, such as HIPAA in the US, which can be applied in Saudi Arabia. This entails assessing and developing similar regulations to be applied in the Saudi healthcare context, which is increasingly aligned with US standards as per international accreditation requirements for healthcare institutions. In addition, investigating governmental regulations can inform the understanding of the competent authorities and researchers with regard to the effectiveness of regulations. Understanding the factors behind their deficiency of implementation can offer insights into how policy can be implemented and developed.

8.6.4. Studying Compliance at the Managerial Level

In this study, managers were found to be a crucial element for nurses' compliance with EHR privacy. Thus, the position and role of management at all levels, especially in the nursing profession, need to be further studied. It is critical to explain the managers' perceptions about EHR privacy contextually and empirically. Moreover, performing comparative research can help understand managers' privacy perceptions before and after implementing the EHR privacy policy. This may shed light on how managers' knowledge and behaviour on privacy changes with the adoption of EHRs, which can help to secure the sustainability and long-term effective use of EHR systems.

8.6.5. Formal Education and Training

This study found that nurses were highlighting the importance of knowledge and experience, and they linked acquiring knowledge to their schooling system, education programmes, and short training programmes. Moreover, other studies found that nursing programmes are commonly outdated in term of addressing the privacy issues of HIS (Ting et al., 2021). Therefore, a longitudinal studies and interventions are required to inspect how the technology materials and programmes in nursing school can affect nurses' compliance with the EHR policy later in practise. Understanding this can enlighten the nurses' curriculum development process, which may help nurses learn how to deal with sensitive information in practise.

Another area of research is developing training courses to provide the nurses with the basic skills to ensure adequate and safe use of the EHR system. It ought to cover aspects such as logging into the system, documenting the process, how they handle difficult situations, and self-reporting, etc. Examining this training intervention's effectiveness can contribute to enhancing nurses' compliance practises with the EHR privacy policy.

8.7. Closing Remarks

The outcomes of this study show that the nurses attach great importance to health information confidentiality, despite their varying perspectives on the factors that enable or hinder it. The first factor, labelled as "Professionally Pragmatic," focused on the ease and autonomy of performing tasks, while the second factor, labelled as "Professionally Obligated," was influenced by policy and external directives to adhere to the EHR privacy policy. This study clearly demonstrated the significance of nurses' adherence to the privacy policy in safeguarding the EHR system.

Finally, investigating nurses' adherence to the EHR security and privacy policy highlights the crucial overlap between the moral need to protect patient data and the difficulties encountered in maintaining strong security measures. During this study project, we have emphasised the crucial significance of strict compliance procedures in order to maintain patient privacy, reduce data breaches, and safeguard the reliability of EHR. The dynamic nature of technology, along with the growing intricacy of healthcare settings, necessitates constant awareness and adjustment to constantly new security risks. Nurses, being medical providers, have a crucial responsibility to maintain security and privacy standards through their involvement in secure procedure implementation, commitment to continuing education, and training.

However, despite notable progress, there are still enduring obstacles that need continuous focus and creativity. These factors include the need for extensive education, distribution of resources, and the creation of user-friendly technology that assist nurses in their everyday work while giving utmost importance to the confidentiality of patient data. It is crucial to cultivate a culture of consciousness, cooperation, and responsibility inside hospitals as we progress. This may enable nurses to efficiently negotiate the complex terrain of privacy compliance. Through a collaborative and proactive approach, we can work towards a HIS that places patient care as a top priority while simultaneously guaranteeing privacy and security of critical healthcare data.

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APPENDICES

Appendix 1: Scoping Review Database Search

# ▲	Searches	Results	Type	Actions	Annotations
1	ehr.mp.	6657	Advanced	Display Results | More	
2	Medical Records Systems, Computerized/ or Electronic Health Records/	37103	Advanced	Display Results | More	
3	("electronic medical record*" or "electronic health record*" or "computeri?ed medical record*" or "computeri?ed health record*" or "hospital information system*").mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	51021	Advanced	Display Results | More	
4	1 or 2 or 3	65024	Advanced	Display Results | More	
5	exp Privacy/	15083	Advanced	Display Results | More	
6	exp Computer Security/	7526	Advanced	Display Results | More	
7	("data privacy" or "data security" or "data breach" or "security breach" or "information breach" or "privacy concerns*").mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	2001	Advanced	Display Results | More	
8	exp Confidentiality/	52249	Advanced	Display Results | More	
9	5 or 6 or 7 or 8	67013	Advanced	Display Results | More	
10	4 and 9	5772	Advanced	Display Results | More	
11	(perception* or Attitude* or belief* or issues* or ethic* or behaviour* or behavior*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	2629297	Advanced	Display Results | More	
12	exp Perception/	422536	Advanced	Display Results | More	
13	exp Attitude/	559856	Advanced	Display Results | More	
14	exp Culture/	157829	Advanced	Display Results | More	
15	exp Behavior/	1762690	Advanced	Display Results | More	
16	11 or 12 or 13 or 14 or 15	3696765	Advanced	Display Results | More	
17	10 and 16	1851	Advanced	Display Results | More	
18	exp Health Personnel/	501523	Advanced	Display Results | More	
19	(nurs* or doctor* or hospital employee* or health personnel* or health information management staff*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	941602	Advanced	Display Results | More	
20	18 or 19	1169635	Advanced	Display Results | More	
21	17 and 20	461	Advanced	Display Results | More	

Figure 35: The Ovid (MEDLINE) Search Results from 29/1/2020.

Appendix 2: Methodological Documentation

Appendix 2.1: Ethical Approval Documents

University of Nottingham Ethical Approval

University of Nottingham
UK | CHINA | MALAYSIA

Faculty of Medicine & Health Sciences
Research Ethics Committee
Faculty Hub
Room E41, E Floor, Medical School
Queen's Medical Centre Campus
Nottingham University Hospitals
Nottingham, NG7 2UH
Email: FMHS-ResearchEthics@nottingham.ac.uk

27 May 2021

Nabil Alhassani
PhD Student, Health Sciences
School of Health Sciences
B Floor, Medical School
Queen's Medical Centre Campus
Nottingham University Hospitals
Nottingham
NG7 2UH

Dear Mr Alhassani

Ethics Reference No: FMHS 240-0421 **– please always quote**	
Study Title: Exploring the Drivers and Barriers Factors that influence the Nurse's behavioral intentions to comply with the Electronic Health Record (EHR) Data Privacy Policy in Saudi Arabia. Using Q-methodology.	
Location of Study: King Faisal General Hospital, King Abdul-Aziz General Hospital and Al Noor Specialist Hospital Makkah, Kingdom of Saudi Arabia - Online	
Chief Investigator/Supervisor: Richard Windle, Professor of Digital Learning, School of Health Sciences.	
Lead Investigators/student: Nabil Alhassani, PhD Student, School of Health Sciences.	
Other Key Investigators/Collaborators: Dr Stathis Konstantinidis, Associate Professor e-Learning and Health Informatics, School of Health Sciences	
Proposed Start Date: 01/07/2021	**Proposed End Date:** 31/10/2021

The Committee considered this application at its meeting on 23 April 2021 and the following documents were received:

- FMHS REC Application form and supporting documents version 1.0: 12.04.2021

These have been reviewed and the research project has been given a favourable ethics opinion.

Please submit copies of letters of approval from the Saudi Ministry of Health IRB/REC Committee and gatekeepers at the hospitals involved when these are available so they can be noted to file. This must be completed before recruitment of participants commences.

Please note that this favourable ethics opinion has been given on the understanding that:

1. All appropriate ethical requirements and regulatory permissions are respected and followed in accordance with all local laws of the country in which the study is being conducted and those required by the host organisation/s involved.
2. The research project will adhere to ICH E6 (R2) Good Clinical Practice (GCP) which is the international ethical, scientific, and practical standard to which all clinical research is conducted.
3. The protocol agreed is followed and the Committee is informed of any changes using a notice of amendment form (please request a form).
4. The Chair is informed of any serious or unexpected adverse event.
5. An End of Project Progress Report is completed and submitted to FMHS REC within six months after the study has finished (Please request a form).

Yours sincerely

Dr John Williams, Associate Professor
Chair, Faculty of Medicine & Health Sciences Research Ethics Committee

Saudi Ministry of Health Ethical Approval

وزارة الصحة
Ministry of Health

المملكة العربية السعودية
وزارة الصحة
المديرية العامة للشؤون الصحية
بصحة منطقة مكة المكرمة
اللجنة المحلية لأخلاقيات البحوث
بصحة منطقة مكة المكرمة
(H-02-K-076)
1439/4/28

Institutional Review Board Opinion Letter

Date of Issue	14.06.2021
Research Title	Factors influence nurses' Compliance intention with EHR privacy policy(Q-methodology study)
Primary Investigator	Nabil Dahkilallah alhassani
IRB Number:	H-02-K-076-0621-518
Category of Approval	Approved (Expedite)

Dear / Nabil alhassani. Pro /Richard windle , dr /stathis konstantinidis.

This is to inform you that the above-mentioned proposal has been reviewed and discussed by IRB Committee and was approved according to ICH GCP guidelines. Please note that this letter is from research perspective only. You will still need to get permission from the head of research department in the Directorate of health affairs, Makkah Region to commence data collection and start your project.

We wish you all the best in your project and request you to keep the IRB informed of the progress on a regular basis, using the IRB log number shown in this letter.

Please be advised that regulations require that you submit a progress report on your research every 6 months. You are also required to submit any manuscript resulting from this research for approval by IRB before submission to journals for publication.

As a researcher, you are required to have a valid certification on protecting human research subject.
If you have further questions, feel free to contact me:

(research-makkah@moh.gov.sa).

DR.Nadir Hamza M[illegible]
Chairman, Institutional Review Board (IRB),
Makkah

INSTITUTIONAL REVIEW BOARD
APPROVAL
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Extension for Data Collection Period

وزارة الصحة
Ministry of Health

المملكة العربية السعودية
وزارة الصحة
المديرية العامة للشؤون الصحية
بصحة منطقة مكة المكرمة
اللجنة المحلية لأخلاقيات البحوث
بصحة منطقة مكة المكرمة
(H-02-K-076)
1439/4/28

Institutional Review Board Opinion Letter

Date of Issue	03.01.2022
Research Title	Factors influence nurses' compliance intention with EHR privacy policy (Q-methodology study)
Primary Investigator	Nabil Dahkilallah Alhassani
IRB Number:	H-02-K-076-0521-518
Category of Approval	Extension (end of Dec 2022)

Dear / Nabil alhassani. Pro /Richard windle , dr /stathis konstantinidis.

This is to inform you that the previous submitted study titled (**Factors influence nurses' compliance intention with EHR privacy policy (Q-methodology study**) was reviewed and its approval was renewed for another year with effect from the date of this letter and it will last to the **end of Dec 2022**. Please note that this letter is from research perspective only.

This is to inform you that the above-mentioned proposal has been reviewed and discussed by IRB Committee and was approved according to ICH GCP guidelines. Please note that this letter is from research perspective only. You will still need to get permission from the head of research department in the Directorate of health affairs, Makkah Region to commence data collection and start your project.

We wish you all the best in your project and request you to keep the IRB informed of the progress on a regular basis, using the IRB log number shown in this letter.

Please be advised that regulations require that you submit a progress report on your research every 6 months. You are also required to submit any manuscript resulting from this research for approval by IRB before submission to journals for publication.

As a researcher, you are required to have a valid certification on protecting human research subject.
If you have further questions, feel free to contact me:

(research-makkah@moh.gov.sa).

DR.Nadir Hamza Motair
Chairman, Institutional Review Board (IRB),
Makkah

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Appendix 2.2: Concourse Generation and Q-Set Process

Table 39: Concourse dawn from the literature with first Q-Set edit with two experts from HELM

Constructs	Concourse statements after duplicated statements were removed	Extracted from the scoping review studies	Cited from	Modified after first discussion "My compliance with EHR privacy policy is influenced by":
Subjective norm	1. The upper level management of our hospital thinks I should follow organisational data protection policies 2. My boss thinks that I should follow EHR privacy policy 3. My colleagues think that I should follow EHR privacy policy 4. The data protection official of my hospital thinks that I should follow EHR privacy policy 5. Other computer technical specialists in the organisation think that I should follow EHR privacy policy. 6. My Patient think I should follow EHR privacy policy 7. People who influence my behavior would think that I should protect EHRs privacy 8. People who are important to me would think that I should protect EHRs privacy 9. My friends and family would think that I should protect EHRs privacy 10. I will protect EHRs privacy because my superior asks for	(Foth, 2017, Kuo et al., 2017, Sher et al., 2017b, Foth et al., 2012, Ma et al., 2016)	(Karahanna et al., 1999, Ifinedo, 2012, Venkatesh et al., 2003, Taylor and Todd, 1995b, Herath and Rao, 2009a)	1. The expectation of the top management of the hospital influences me to comply with EHR privacy policy 2. My organisation's rules and regulations influence me to comply with EHR privacy policy. 3. [The expectation of my direct manager] influences me to comply with EHR privacy policy 4. The expectation of my friends and family influences me to comply with EHR privacy policy 5. The expectation of the data protection official at my hospital influences me to comply with EHR privacy policy 6. The expectation of hospital IT specialists influences me to comply with EHR privacy policy 7. The expectation of my Patient influences me to comply with EHR privacy policy. 8. The expectation of the community influences me to comply with EHR privacy policy.
Perceived behavioural control	11. I would be able to protect EMRs privacy (Control) 12. The data protection policies hinder me in my daily work	(Kuo et al., 2017, Ma et al., 2016)	(Venkatesh et al., 2003)	9. If I wanted to, I could comply with EHR privacy policy (able)

Table 39: Concourse dawn from the literature with first Q-Set edit with two experts from HELM

Constructs	Concourse statements after duplicated statements were removed	Extracted from the scoping review studies	Cited from	Modified after first discussion "My compliance with EHR privacy policy is influenced by":
	13. I do not find it difficult to observe the data protection policies in the daily work () 14. I have the knowledge necessary to protect EMRs privacy 15. I have the resources necessary to protect EMRs privacy			10. Complying with EHR privacy policy is obstructing me in my daily work. 11. I comply with EHR privacy policy because I have the knowledge. 12. I comply with EHR privacy policy because I have the resources.
Self-efficacy (knowledge, confidence, ability)	16. I can comply with EHR privacy policy even if there is no one around to help me (ability 17. I can comply with EHR privacy policy if I have adequate time to complete my job 18. I can comply with EHR privacy policy using only manuals or documents for reference (ability) 19. I could easily be protect EHRs privacy if I wanted to (confidants) 20. I would feel comfortable in protecting EHRs privacy 21. I am confident that I can comply with the EHR privacy policy 22. I am confident that I can recognise the potential problems of violating EHR privacy 23. I am confident that I can comply with the EHR privacy policy even if there is no one around to help me 24. I would feel comfortable following most of the EHR privacy policy my own	(Johnston and Warkentin, 2008, Ma et al., 2016, Sher et al., 2017a, Sher et al., 2017b)	(Taylor and Todd, 1995b) (Herath and Rao, 2009a)	13. I can comply with EHR privacy policy even if there is no one around to help me. (ability) 14. I can comply with EHR privacy policy using only manuals or documents for reference (ability) 15. I could comply with EHR privacy policy if I wanted to (ability, confidant) 16. I don't comply with EHR privacy policy because I don't have time 17. I am confident in my knowledge of the EHR privacy policy. 18. I am confident in my ability to comply with EHR privacy policy 19. I understand the EHR privacy policy and how to apply it 20. I am confident about my understanding of the EHR privacy policy and how to apply it 21. I comply with the EHR privacy policy strictly throughout my working practices to the best of my understanding

Table 39: Concourse dawn from the literature with first Q-Set edit with two experts from HELM

Constructs	Concourse statements after duplicated statements were removed	Extracted from the scoping review studies	Cited from	Modified after first discussion "My compliance with EHR privacy policy is influenced by":
	25. If I wanted to, I could easily follow EHR privacy policy on my own			22. I mostly comply with EHR privacy policy to the best of my understanding 23. EHR privacy policy is a major consideration within my practice 24. EHR privacy policy in one consideration in my practice, but others have more importance
Facilitating conditions	26. I am confident in my ability to comply with EHR privacy policy 27. I have access to the resources needed to comply with EHR privacy policy 28. I can comply with EHR privacy policy whenever and however I want 29. I have full control over my compliance with EHR privacy policy 30. The equipment (computers, printers, etc.) for EHR systems is compatible with other hardware I use in hospital 31. The software for EHR systems is compatible with other software I use in hospital 32. I could use EHR systems to query patient's medical records	(Kuo et al., 2018, Ma et al., 2016)	(Taylor and Todd, 1995b)	25. I have access to the resources needed to comply with EHR privacy policy 26. The equipment (computers, printers, etc.) in relation to EHR systems is compatible with other hardware I use in hospital 27. The software for EHR systems is compatible with other software I use in hospital 28. I would comply with EHR privacy policy if the hospital provided me enough resources.
Attitude	33. Adopting security technologies and regulations for data protection is important	(Ma et al., 2016, Foth, 2017, Foth et al., 2012)	(Peace et al., 2003, Riemenschneider et al., 2003, Ifinedo, 2012, Venkatesh et al., 2003)	29. Adopting EHR privacy policy is important for me. 30. I find the EHR privacy policy at the hospital to be appropriate and sensible

Table 39: Concourse dawn from the literature with first Q-Set edit with two experts from HELM

Constructs	Concourse statements after duplicated statements were removed	Extracted from the scoping review studies	Cited from	Modified after first discussion "My compliance with EHR privacy policy is influenced by":
	34. Adopting security technologies and regulations for data protection is beneficial. 35. Adopting security technologies and regulations for data protection is helpful 36. I find the internal regulations for data security to be appropriate and sensible 37. I think protecting EHRs privacy is a wise idea 38. I like the idea of protecting EHRs privacy 39. Protecting EHRs privacy is fun			31. Complying with EHR privacy is part of my professional responsibility 32. I like the idea of complying EHRs privacy policy 33. I think complying with EHRs privacy policy is a wise idea
Perceived usefulness	40. Every employee can make a difference when it comes to helping to secure the EHR data of the hospital 41. There is not much that any individual can do to help secure the EHR data in our hospital 42. If I follow the organisational data-protection policies of my hospital, I can make a difference in helping to secure the EHR data privacy 43. Consideration of the data-protection policies in daily work is important for the hospital 44. Consideration of the data-protection policies in discussions with patients is important for the hospital 45. Consideration of data-protection policies in discussions with colleagues is important for the hospital	(Foth et al., 2012, Kuo et al., 2018, Ma et al., 2016)		34. I can make a difference when it comes to comply with the EHR privacy policy at the hospital 35. There is not much that I can do to comply with the EHR privacy policy in our hospital 36. If I comply with my hospital EHR privacy policy, I can make a difference in helping to secure the EHR data privacy. 37. If I comply with my hospital EHR privacy policy, I can make a significant benefit on my colleagues 38. If I comply with my hospital EHR privacy policy, I can make significant benefit to patent care 39. If I comply with my hospital EHR privacy policy, I can make significant benefit to my institution.

Table 39: Concourse dawn from the literature with first Q-Set edit with two experts from HELM

Constructs	Concourse statements after duplicated statements were removed	Extracted from the scoping review studies	Cited from	Modified after first discussion "My compliance with EHR privacy policy is influenced by":
	46. For the hospital, the combination of data protection and value do not play a major role 47. Compliance with EHR privacy policy is of benefit to me 48. The advantages of adherence to EHR privacy policy outweigh the disadvantages 49. Overall, compliance with EMR privacy policy is advantageous 50. The advantages of protecting EMRs privacy outweigh the disadvantages 51. Protecting EMRs privacy will improve patients' trust on hospitals			40. Consideration of the EHR privacy policy in daily work is important for the hospital 41. Consideration of the EHR privacy policy in discussions with patients is important for the hospital 42. Consideration of the EHR privacy policy in discussions with colleagues is important for the hospital. 43. I belief that EHR privacy policy does not have a major role impact for the hospital, 44. The advantages of complying with EHR privacy policy outweigh the disadvantages 45. Compliance with EHR privacy policy is of benefit to me
Perceived ease of use	52. I find regular training courses in data protection to be useful to protect EHR 53. The number of required passwords of the EHR hinders my productivity 54. The instructions for protecting EHRs privacy is easy to follow 55. It is easy to learn how to protect EHRs privacy 56. It is easy to protect EHRs privacy	(Foth et al., 2012, Ma et al., 2016)	(Foth et al., 2012, Taylor and Todd, 1995b)	46. Sufficient training has been provided for me to comply with EHR privacy policy. 47. The number of required passwords of the EHR hinders my productivity 48. The number of required passwords of the EHR hinders me to comply with the privacy policy 49. The instructions for complying with EHR privacy policy is easy. 50. It is easy to learn how to protect EHRs privacy

Table 39: Concourse dawn from the literature with first Q-Set edit with two experts from HELM

Constructs	Concourse statements after duplicated statements were removed	Extracted from the scoping review studies	Cited from	Modified after first discussion "My compliance with EHR privacy policy is influenced by":
Detection certainty	57. Employees are properly monitored for data protection policy violation 58. If I violate hospital data protection policies, I would probably be caught 59. If I don't follow EHR privacy policies, I will be penalised 60. I would be formally sanctioned if management learned that I had violated EMR privacy policy 61. I would be formally reprimanded if management learned that I had violated EHR privacy policy 62. EHR practices are properly monitored for policy violations in my hospital 63. If I violate EHR privacy policy, I would probably be caught	(Foth, 2017, Kuo et al., 2017)	(Peace et al., 2003, Knapp et al., 2005, Siponen et al., 2010, Siponen and Vance, 2010, Herath and Rao, 2009a, Li et al., 2010)	51. I am properly monitored for not complying with EHR privacy policy. 52. If I do not comply with EHR privacy policy at the hospital, I would probably be caught. 53. I would be formally sanctioned if management learned that I had not comply with EMR privacy policy. 54. My colleagues report me if I did not comply with EHR privacy policy.
Punishment severity or Perceived severity	64. The hospital carries out disciplinary action with employees who break EHR privacy rules 65. My hospital terminates employees who repeatedly break data protection rules 66. I believe that information stored on organisation computers is vulnerable to security incidents 67. My hospital terminates employees who repeatedly break EHR privacy rules 68. Having EHR privacy breaches is a severe problem for me	(Foth, 2017, Kuo et al., 2017, Foth et al., 2012, Sher et al., 2017a)	(Peace et al., 2003, Knapp et al., 2005, Anderson, 2005, Herath and Rao, 2009a)	55. The hospital penalizes me If I do not comply with EHR privacy policy. 56. If I repeatedly do not comply with EHR privacy policy, my hospital will terminate me. 57. I understand the penalties for not complying with EHR privacy policy 58. My productivity threatened by not complying incidents with EHR privacy policy

Table 39: Concourse dawn from the literature with first Q-Set edit with two experts from HELM

Constructs	Concourse statements after duplicated statements were removed	Extracted from the scoping review studies	Cited from	Modified after first discussion "My compliance with EHR privacy policy is influenced by":
	69. losing EHR data is a severe problem for me 70. I believe the productivity of my hospital and its employees is threatened by privacy-violation incidents 71. I believe the profitability of my hospitals is threatened by privacy-violation incidents 72. If I were caught violating EMR privacy policy, I would be severely punished			59. I am afraid my colleagues won't with me in future if I did not comply with EHR privacy policy.
Intention	73. I intend to continue complying with EHR privacy policy in the future. 74. I will always try to comply with EHR privacy policy in my daily life. 75. I plan to continue to adhere with EHR privacy policy frequently. 76. I tend to ignore EHR privacy policy that I think are not necessary 77. I tend to ignore EHR privacy policy in order to complete my work quickly 78. I tend to comply with EHR privacy policy only when it is convenient to do so 79. I predict I will protect EHR privacy I plan to protect EHR privacy 80. I am likely to follow hospital's privacy policies 81. It is possible that I will comply with hospital's privacy policy to protect EHR 82. I am certain that I will follow hospital's EHR privacy policy	**(Kuo et al., 2017, Kuo et al., 2018, Sher et al., 2017b, Foth, 2017, Sher et al., 2017a)**	(Venkatesh et al., 2012, Chan et al., 2005, Herath and Rao, 2009a)	60. I intend to comply with EHR privacy policy in the future. 61. I will always try to comply with EHR privacy policy in my daily life. 62. I tend to ignore EHR privacy policy that I think are not necessary 63. I tend to ignore EHR privacy policy in order to complete my work quickly 64. I tend to comply with EHR privacy policy only when it is convenient to do so 65. It is possible that I will comply with hospital's privacy policy to protect EHR 66. I am certain that I will comply with the hospital's EHR privacy policy

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
The two HELM experts statements before sent to other experts Starting statement: "My compliance with EHR privacy policies and practice is influenced by: "						
1. The experience I have of working with the her	Clear	Clear	Makes sense	[My experience of working with the EHR]	Makes sense	[My experience of working with the EHR]
2. The consequences to me by my colleagues if a data breach occurs	"… consequences to me by my colleagues" Sounds vague.	Clear	Makes sense	Please, be more specific what type or exmaples of consequences such as reporting or viewed as unskilled? Might be phrased as data breach consequences that might be imposed by my collegeaues on me? Such as ……	Need rephrase	[The possible reaction of my colleagues towards me if a data breach occurs]
3. The easy of using the EHR system.		If you can clarify the easy of use by giving example it would be better	Makes sense		Makes sense	[The ease of using the EHR system]
4. It's relative importance compared to other tasks I perform	Need rephrase	This sentience little bet complicated which kind of other task do you mean is it related to patients, other privacy policy related to	It sounds vague	(tasks I perform) You mean priority?	Need rephrase	[The priority I give these tasks compared to other clinical and administrative tasks]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
		another system or administration task because in each case the answer could be completely different.				
5. [My level of education]	Not clear	Clear	Makes sense	I think this could be identified from the correlation between the actual performance and the participants characteristics so I feel if you would like to add it you might use; my educational preparation in my study years?	Makes sense	[My level of education]
6. [The benefit it brings to my patients]		This question depend on the previous question. In the previous question if you mean the patients that means you don't need to repeat the question.	Makes sense	Such as …	Make sense	[The benefit it brings to my patients]
7. [The level to which I agree with the data privacy policies I am asked to follow]		Clear	Makes sense	My acceptance to……	Make sense	[The level to which I agree with the data privacy policies I am asked to follow]
8. [The position I hold in the hospital]	Be more specific "The position (e.g. Manager, staff	Clear	Makes sense	My position … and its related responsibilities?	Makes sense	[The position I hold in the hospital]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
	nurse) I hold in the hospital"					
9. My access to the resources (computers, software, etc.) that needed to comply with EHR privacy policy			Makes sense	The access to …		[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]
10. The example that my colleagues do it.	Need rephrase	This sentience does not make sense to me I could not understand what exactly you mean if you can clarify or change the world that you have used to clarify the meaning.	Makes sense	[My colleagues' practice and compliance] of ……	Need rephrase	[My colleagues' practice and compliance].
11. The extent to which this aspect of my work is open to scrutiny by my patients and their families	Need rephrase	Open to scrutiny is a complex world to be understand very will maybe by using another simpler world the meaning will be clearer	Advance language Need rephrase	The possibility of patients and their families/ service users' criticism and evaluation of my adherence to …	Need rephrase	[The extent to which this aspect of my work may be open to criticism by patients and their families]
12. clarity of the guidelines I need to	Need rephrase	Clear	Makes sense	Availability and clear of comprehensive guidelines that I can use for ……	Makes sense	[The availability of guidelines on the subject]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
comply with EHRs privacy policy						
13. [The benefit it brings to my colleagues]	Makes sense	If you can give example	Makes sense	([The benefit it brings to my colleagues] (Such as …)	Makes sense (need example)	[The benefit it brings to my colleagues]
14. The consequences to me legally if a data breach is seen to occur	Similar statements with "consequences to me by my colleagues if a data breach occurs"	You can put this question under the question that asked about the "consequences to me by my colleagues if a data breach occurs" so the difference between the two question would be clearer when they follow each other	Makes sense		Makes sense	[The consequences to me legally by authorities if a data breach is seen to occur]
15. The expectation of my peer		clear	Makes sense	Repetition	Makes sense	[The expectation of my peers]
16. The importance I place on this area of my practice		Does not make sense	Makes sense		Need rephrase	[The importance I place on EHR privacy policy of my practice]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
17. The extent to which this aspect of my role is open to scrutiny by the press or other organisations		Again use another word instead of open to scrutiny to simply the question and put this question under the other question that related to it in deferent way so the participant can see the deferent easily	Makes sense	Scrutiny by press? is it applicable in real world what about quality assurance?	Makes sense	[The extent to which this aspect of my role is open to investigation by the press or other organisations]
18. The expectation of my friends and family			Makes sense	What about societal expectation in following EHR privacy …	Makes sense	[The expectation of my friends and family]
19. [The extent to which I feel a particular task is necessary]			Makes sense	Does not make sense		[The extent to which I feel a particular task is necessary]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
20. usefulness of the written help available	Need rephrase (guidelines	Does not make sense to me I could not figure out what do you want from this question	Makes sense	Repetition (clear guidleines)	Need rephrase	[The usefulness of the guidelines]
21. The number of the required passwords to access an EHR.		Clear but again is this question to look into the ease of use or to rate their concern about the security issue	Makes sense	Is this an influence factor? Or you might say the easiness of applicability of the these EHR privacy procedures or something like that.. refere to the easeness of the procedures earlier	Makes sense	[The number of the steps required to access an EHR]
22. The time I have to complete the tasks needed.		clear	Makes sense	Amount of time needed to complete the EHR privacy … Tasks	Makes sense	[The amount of time needed to complete the EHR record]
23. [My age]		clear	Makes sense	Not written EHR it will be known from the correlation between applicability and the socio-demographic data Or if you want to include you migh say I think the compliance with EHR … is influence by the age of HCP	Makes sense	[My age]
24. The amount of training I have	Training in what? "The nature of training I have to	clear	Makes sense	The training I had in this area of practice?	Makes sense	[The nature and amount of training I received on the subject]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
	keep EHR data secured"					
25. [The extent to which this is monitored by my hospital]		Again add this question under the other question related to it so the participant idea and think will be more clear and organized.	Makes sense	is it applicable in real world what about quality assurance?	Makes sense	[The extent to which this is monitored by my hospital]
26. [The expectation of my direct manager]		clear	Makes sense		Makes sense	[The expectation of my direct manager]
27. [The expectations of those who manage data protection within my hospital]		Do you means external vendor or internal IT mangers and staff	Makes sense	The expectation held by hospital data protection management team	Makes sense	[The expectations of those who manage data protection within my hospital]
28. [The sense of satisfaction I get when following the policies]		Clear	Makes sense	The sense…… form complying with these policies and application of these tasks	Makes sense	[The sense of satisfaction I get when following the policies]
29. [The consequences to me contractually from my organisation if a data breach occurs]		Duplicated with The consequences to me legally if a data breach is seen to occur because the contract is a legal issue so it considers under legal no need re-ask the	Makes sense		Repeated	[The consequences to me contractually from my organisation if a data breach occurs]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
		question you can just add the word contract as an example for the legal issue				
30. My professional responsibility	Need to be more specific" My professional or ethical responsibilities"	Again if you clarify the previous question when I have mentioned if you means the patients or administrations or EHR system task you may not need to ask this question because it will appear as a duplicate question	Makes sense	My … towards the patients' data?	Makes sense	[My professional/ethical responsibilities]
31. The expectation of the top management of the hospital		Clear	Makes sense	I think this could be merged to the direct manager in to one statement such as The expectation held by … the hospital management otherwise you can leave it if you will investigate the effect of different management levels on that?	Makes sense	[The expectation of the top management of my hospital]
32. The amount of support I receive	Similar to [The extent to which I am able to comply with EHR privacy policy without help].	Which kind of support do you mean direct manager support, colleagues support or the system support and support to do what.	Makes sense	In what area of support (education, monitoring or …)	Makes sense	[The amount and level of support that is available to me]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
33. [The benefit it brings to my hospital]		Clear	Makes sense	What sort of benefits such as …(reputation Please, see the part of scrutiny it could be merged?	Makes sense	[The benefit it brings to my hospital]
34. [My confidence in my understanding of EHR policy and practice]		Clear	Makes sense		Makes sense	[My confidence in my understanding of EHR policy and practice]
35. [The expectation of my Patients]		Clear	Makes sense		Makes sense	[The expectation of my patients]
36. [The extent of clinical experience I have]		Does not make sense how does the clinical experience could affect my compliance with EHR privacy policies and practices.	Makes sense		Makes sense	[The extent of clinical experience I have]
37. The extent to which I am willing to do so		I am willing to do so refer level of education and training which already mentioned so it is kind of duplicated question	Makes sense	My personal preference / persuasion of adhering to the EHR…	Makes sense	[My personal preference about following the EHR privacy policy]
38. [The expectation of the public]		Does not make sense why I would consider the public as a nurse if I already considered my patients and managers.	Makes sense		Makes sense	[The expectation of the public]

Table 40: Five experts comments and the modified statements after the comments

	Assistant professor at Kind Saud University Medical City' comments	Health administration and health informatics lecturer at Jeddah University's comments	Professional nurse's comments	Professional nurse's comments	Medical physician at King Abdullah Medical City's comments	Modified Statements "My compliance with EHR privacy policies and practice is influenced by:"
39. [The extent to which I am able to comply with EHR privacy policy without help]		Clear	Looks duplicated		Repeated	[The extent to which I am able to comply with EHR privacy policy without help]
40. [My hospital's rules and policy]		Clear	Makes sense		Makes sense	[My hospital's rules and policy]

Table 41: The final statements categorised under the DTPB and DT theoretical framework constructs

Statement started with: My compliance with EHR privacy policy and practice is influenced by:	
Major Themes	**Sub-Themes**
Attitude: [The importance I place on EHR privacy policy of my practice] [My professional/ethical responsibilities] [The sense of satisfaction I get when following the policies] [The level to which I agree with the data privacy policies I am asked to follow]	**Perceived Ease of use** [The amount and level of support that is available to me]. [The nature and amount of training I received on the subject] [The availability of guidelines on the subject] [The number of the steps required to access an EHR] [The ease of using the EHR system] --------- **Perceived usefulness** [The benefit it brings to my hospital] [The benefit it brings to my patients] [The benefit it brings to my colleagues] [The priority I give these tasks compared to other clinical and administrative tasks]
Subjective norm: [My hospital's rules and policy] [The expectations of those who manage data protection within my hospital]. [The expectation of the public] [The expectation of my patients]	**Peer influence** [The expectation of my peers] [The expectation of my friends and family] [My colleagues' practice and compliance] ----- **Superior influence** [The expectation of the top management of my hospital] [The expectation of my direct manager]
Perceived behavioural control: [The extent to which I am able to comply with EHR privacy policy without help] [The extent to which I feel a particular task is necessary] [My personal preference about following the EHR privacy policy] [The extent of clinical experience I have]	**Self-efficacy** [The amount of time needed to complete the EHR record] [My confidence in my understanding of EHR policy and practice] ------- **Facilitating conditions** [Access to resources (computers, software, etc.) needed to comply with EHR privacy policy] [The usefulness of the guidelines]
Detection certainty: [The extent to which this is monitored by my hospital] [The extent to which this aspect of my work may be open to criticism by patients and their families] [The extent to which this aspect of my role is open to investigation by the press or other organisations]	

Table 41: The final statements categorised under the DTPB and DT theoretical framework constructs

Statement started with: My compliance with EHR privacy policy and practice is influenced by:	
Major Themes	**Sub-Themes**
Punishment severity [The consequences to me contractually from my organisation if a data breach occurs] [The consequences to me legally by authorities if a data breach is seen to occur] [The possible reaction of my colleagues towards me if a data breach occurs]	
Controlling factors **Age:** [My age] **Education level:** [My level of education] **Working position:** [The position I hold in the hospital] **Experience:** [My experience of working with the EHR]	

Table 42: The final statements

No.	**Statements**
1.	[My experience of working with the EHR]
2.	[The possible reaction of my colleagues towards me if a data breach occurs]
3.	[The ease of using the EHR system]
4.	[The priority I give these tasks compared to other clinical and administrative tasks]
5.	[My level of education]
6.	[The benefit it brings to my patients]
7.	[The level to which I agree with the data privacy policies I am asked to follow]
8.	[The position I hold in the hospital]
9.	[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]
10.	[My colleagues' practice and compliance]
11.	[The extent to which this aspect of my work may be open to criticism by patients and their families]
12.	[The availability of guidelines on the subject]
13.	[The benefit it brings to my colleagues]
14.	[The consequences to me legally by authorities if a data breach is seen to occur]
15.	[The expectation of my peers]
16.	[The importance I place on EHR privacy policy of my practice]

Table 42: The final statements

No.	Statements
17.	[The extent to which this aspect of my role is open to investigation by the press or other organisations]
18.	[The expectation of my friends and family]
19.	[The extent to which I feel a particular task is necessary]
20.	[The usefulness of the guidelines]
21.	[The number of the steps required to access an EHR]
22.	[The amount of time needed to complete the EHR record]
23.	[My age]
24.	[The nature and amount of training I received on the subject]
25.	[The extent to which this is monitored by my hospital]
26.	[The expectation of my direct manager]
27.	[The expectations of those who manage data protection within my hospital].
28.	[The sense of satisfaction I get when following the policies]
29.	[The consequences to me contractually from my organisation if a data breach occurs]
30.	[My professional/ethical responsibilities]
31.	[The expectation of the top management of my hospital]
32.	[The amount and level of support that is available to me].
33.	[The benefit it brings to my hospital]
34.	[My confidence in my understanding of EHR policy and practice]
35.	[The expectation of my patients]
36.	[The extent of clinical experience I have]
37.	[My personal preference about following the EHR privacy policy]
38.	[The expectation of the public]
39.	[The extent to which I am able to comply with EHR privacy policy without help]
40.	[My hospital's rules and policy]

Appendix 2.3: Participants' Q-Sorts ("Professionally Pragmatic" and "Professionally Obligated" Factors)

P	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32	S33	S34	S35	S36	S37	S38	S39	S40
P1	-3	-1	-4	-2	-2	3	4	4	-3	0	1	0	1	0	-1	3	2	-4	0	2	-3	-1	-3	-2	2	-2	1	2	0	1	1	-2	2	3	-1	1	3	-1	-1	0
P2	4	0	-1	2	2	2	0	3	-1	0	-2	-2	-4	-2	-2	1	-1	-3	0	-1	-4	3	-3	-2	1	1	1	3	2	3	0	-1	1	-1	2	4	-3	-3	0	1
P3	2	-3	3	3	4	-2	-3	-1	1	-4	-1	0	-2	1	-2	2	-2	-1	1	0	-1	-4	-2	3	1	0	0	0	1	4	0	3	-1	2	2	1	-1	-3	-3	2
P4	-1	-3	-1	-1	1	-2	1	1	-1	0	-1	-2	-4	1	-3	-2	-2	1	2	2	-2	4	-4	0	0	3	-3	2	4	3	3	0	-1	2	2	1	0	-3	3	0
P5	0	0	2	-2	2	4	1	-1	3	-1	-2	3	-3	0	-4	1	-1	-4	-1	1	0	2	-3	-2	1	3	-3	2	1	0	-1	-1	3	1	2	0	-2	-3	-2	4
P6	-1	0	0	0	-4	4	-1	2	4	0	-3	-1	1	-2	-2	-1	1	-2	-2	-3	-1	-3	-4	2	1	2	-2	3	0	2	2	-1	3	0	3	1	1	3	-3	1
P7	-3	-2	0	3	-1	4	2	1	-1	-1	1	-1	0	1	-4	-2	2	-2	2	1	-2	-3	-4	-3	0	-3	3	0	0	3	3	0	2	-1	4	1	-1	-2	1	2
P8	0	-3	2	3	1	0	-2	1	4	-3	0	2	-1	4	-1	-1	1	-4	3	0	2	3	-4	2	-2	0	-2	-1	-3	3	1	0	1	-1	-3	2	-1	-2	-2	1
P9	0	-2	2	2	-3	0	0	0	2	1	-3	0	1	1	3	-2	4	-4	-1	3	-3	1	-3	-1	1	-1	2	-1	-1	0	-2	-2	-1	2	3	-4	4	-2	3	1
P10	1	-3	2	0	-1	3	2	-1	4	-2	1	3	1	-2	-3	-1	0	-4	1	-1	0	2	-4	0	-3	0	3	-2	-2	1	-3	1	2	-1	0	-1	2	-2	3	4
P11	2	1	1	0	-3	3	-1	2	4	-1	-2	-2	0	1	-1	3	-3	-4	-2	-2	-3	4	-4	3	2	2	1	-1	-1	1	2	0	0	3	-2	0	-1	-3	0	1
P12	2	0	0	2	1	-2	0	1	4	-3	-3	2	1	-1	-2	3	-3	-4	-1	1	3	2	4	3	3	-4	0	1	-1	1	-2	-1	-1	-1	-2	2	0	-3	-2	0
P13	3	-2	0	0	-1	-1	1	-1	1	-2	-1	4	-2	3	-3	1	-3	-4	-3	1	0	-1	-4	-1	2	3	1	2	0	2	4	-2	1	3	2	0	-3	0	-2	2
P14	0	-1	3	-3	2	3	-2	0	4	-3	-1	1	-2	-1	1	1	-1	-3	-2	4	-3	-4	-2	2	2	0	0	3	3	1	-1	1	1	0	0	-2	-1	-4	2	2
P15	2	0	-1	-4	2	-2	2	-3	1	1	-2	2	-2	0	-1	3	0	-1	1	-1	4	3	0	1	-2	-3	-4	2	0	4	-2	0	-1	1	-1	3	3	-3	-3	1
P16	2	-2	-1	0	0	3	-1	3	-1	1	-1	2	4	2	-4	-3	1	-1	-2	3	2	-3	4	3	1	-2	-2	1	0	0	2	-4	0	-2	-1	0	1	-3	-3	1
P17	0	-1	2	1	2	2	1	3	2	-3	1	3	-4	1	-3	-1	0	-2	-2	-3	0	-1	-1	0	-3	1	-1	0	-2	3	0	-2	4	3	-1	2	1	-4	-2	4
P18	-2	-2	-2	-1	3	0	2	3	2	0	-4	-1	1	1	-3	0	1	-3	-1	-1	-2	1	-4	-1	2	0	0	4	0	3	3	-2	1	1	-3	2	2	-3	-1	4
P19	-3	-3	1	0	2	2	3	4	1	-1	1	0	-2	1	-4	-3	-2	-1	-3	-2	-1	-1	2	3	-1	2	0	0	-2	4	-4	3	-1	1	0	1	3	-2	0	2
P20	-3	-2	-1	0	3	3	1	1	-1	-1	4	0	1	-4	2	0	1	-1	-2	-3	2	2	3	1	0	-4	-2	-1	-1	2	-3	-2	4	0	1	3	0	-3	-2	2
P21	1	-2	-1	0	0	-1	3	0	1	1	-3	2	-2	3	-3	3	-1	-4	-2	2	-2	-2	-4	-1	-3	-1	0	1	-1	3	0	0	1	4	2	2	1	-3	2	4
P22	-3	0	-3	2	3	3	0	-1	1	0	-1	1	1	4	4	3	-2	-4	1	-1	-4	-2	-2	-2	-1	2	-3	3	-2	-1	2	-3	1	0	2	0	2	-1	1	0
P23	-3	2	-2	-1	-1	3	-1	0	-4	4	4	3	-3	-2	1	1	1	-2	-4	2	1	0	1	-1	2	0	0	1	3	-2	-2	-1	2	0	2	0	-3	-3	-1	3
P24	0	-3	1	-1	2	-1	3	1	3	-3	-4	1	-2	2	-1	2	-4	-2	-2	4	0	1	1	-2	0	-1	3	-1	1	0	-3	0	-1	2	3	-3	0	-2	2	4
P25	0	0	1	3	0	2	0	0	2	-1	3	-1	1	1	-2	4	3	-3	-2	-3	-3	-1	-4	-1	-2	2	1	-1	2	4	1	-3	-2	1	3	0	-1	-4	2	-2
P26	-1	-3	1	1	2	3	-1	0	4	-3	-1	-2	-2	0	-2	0	-2	0	-1	-3	-4	-4	1	1	2	3	-1	-1	1	1	3	0	0	2	2	3	2	-3	-2	4
P27	0	2	1	0	-1	1	3	-1	-1	1	-3	-1	-1	3	-3	1	-2	-4	2	2	0	-2	0	-2	-2	1	4	-1	3	2	-2	4	-3	1	0	3	-4	-3	2	0
P28	3	1	1	-2	1	4	0	3	-2	0	-2	2	-3	0	-1	2	-1	-3	2	3	-3	0	-3	-4	2	-2	-1	-1	3	-1	0	2	4	1	-1	1	1	-4	-2	0
P29	2	0	-2	4	-2	4	1	-3	-2	-1	-2	-1	-1	0	1	-1	1	-1	0	1	-4	-2	2	3	-3	2	-1	1	-4	3	0	2	-3	0	1	3	3	0	-3	2
P30	-3	-3	2	-2	-3	2	-1	-1	4	3	1	0	-2	4	-3	1	-1	-4	0	-1	0	1	-4	1	2	0	-2	0	2	3	2	0	-2	3	1	-1	-2	-1	3	1
P31	-2	0	-2	-4	2	3	0	1	-2	-1	0	2	3	-1	1	-3	-1	0	1	-3	-1	-3	3	2	-2	-1	2	-3	-4	4	2	1	3	1	1	4	0	0	-1	-2
P32	1	1	-3	-1	0	0	-1	1	3	-4	-2	-2	0	2	-3	1	0	-2	1	3	-1	-1	-4	2	0	1	0	3	-2	-1	4	-1	2	2	3	2	-2	-3	-3	4

P33	-4	-1	-1	-2	3	-1	-1	-4	0	-1	1	0	2	1	-3	1	3	0	-3	1	-2	-1	2	0	0	1	1	4	0	2	-2	-3	3	2	3	-2	-3	2	-2	4
P34	1	-2	-3	1	-2	-1	1	4	2	3	0	-3	4	2	-2	0	3	-4	2	0	1	-2	0	-1	-4	2	-1	-1	1	0	-1	-3	3	-2	2	0	3	-3	-1	1
P35	-2	3	4	3	-4	2	4	0	-2	2	-1	-2	1	-3	-1	0	3	-3	1	1	-1	-3	-4	1	1	0	2	3	-1	0	-1	-2	-3	2	-2	1	0	-1	2	0
P36	-2	0	3	-3	1	1	-1	-4	-3	-4	-1	-2	0	4	-1	-1	0	-2	0	-3	-1	1	3	2	2	-2	2	-3	2	3	-2	0	1	0	4	1	-1	1	2	3
P37	-1	-3	-2	2	0	1	4	-2	2	-1	1	3	1	0	-2	0	1	-3	-1	3	-4	3	2	-1	1	3	0	-4	-1	-1	2	-3	1	0	2	-2	-2	0	4	-3
P38	1	-1	2	1	3	0	2	-3	4	-1	0	-2	1	3	-4	1	-2	-3	-1	3	0	2	-4	0	-3	-2	-1	-1	2	2	1	0	-2	4	1	-2	3	0	-3	-1
P39	1	0	0	-2	0	1	3	-2	3	-3	-2	3	-2	1	-1	4	-1	-3	0	2	2	2	-4	0	1	-3	3	-1	1	4	-3	-4	0	2	-2	-1	-1	-1	1	2
P40	-2	-1	3	-3	1	1	0	-2	-1	3	-4	2	2	0	0	-2	2	-3	-3	0	-2	4	0	0	1	1	3	1	-1	2	-1	-2	3	4	-3	2	-1	-4	-1	1
P41	3	-2	-1	0	1	2	0	3	1	1	-2	3	2	1	-3	-1	0	-4	4	-2	-3	1	-4	2	-1	-2	0	-3	-1	2	-1	1	2	-3	3	4	-2	0	0	-1
P42	-4	0	-1	1	0	1	-3	3	1	2	-1	-1	1	0	0	-1	-2	-3	0	2	0	2	-2	2	3	4	-3	1	-3	2	1	-4	3	-2	-2	-1	-1	3	-2	4
P43	3	-2	0	0	2	2	0	1	1	-3	-2	-1	-3	-1	-4	4	3	-1	-2	1	-3	1	-4	2	-3	-1	0	2	0	4	-1	1	3	2	3	0	-1	-2	-2	1
P44	2	-3	-4	0	-2	4	3	-4	-1	2	-1	3	-1	2	-1	1	0	2	-2	4	-3	-1	-3	3	0	1	-2	1	0	3	2	1	1	-1	-2	-3	-2	1	0	0
P45	-1	1	1	-2	1	-1	1	0	-1	2	-2	0	3	2	-3	2	3	-4	-2	1	-1	0	-3	-2	4	-3	0	0	2	4	0	-3	2	-1	-2	-1	3	-4	3	1
P46	3	0	4	0	-3	1	-1	-4	-1	3	0	-1	0	-1	1	1	-3	-2	3	-2	-2	-4	-1	1	-3	-2	0	-1	-2	2	-3	4	2	1	0	2	2	2	3	1
P47	-2	-1	0	-1	4	4	0	1	1	-3	-1	0	3	-4	2	2	3	-2	2	-1	3	-1	-4	2	-2	3	-2	-3	-2	1	-3	1	1	0	0	2	-1	1	-3	0
P48	1	0	-1	0	3	0	1	3	-1	1	0	-3	2	-2	-2	2	4	3	-3	0	0	-4	-1	-2	-3	2	3	1	-1	2	-1	-4	4	1	-3	1	-2	-2	-1	2
P49	0	1	-1	3	4	0	2	-2	-3	3	-2	1	3	2	-3	0	-1	1	2	-2	-2	-4	0	2	-1	1	-4	-2	0	3	-1	-1	0	1	-1	1	2	-3	-3	4
P50	1	-2	3	-3	0	2	3	-4	1	-3	1	2	-4	3	0	2	-2	-3	-1	-1	-1	4	-2	-1	-1	0	2	1	0	0	-1	2	-2	1	1	3	-2	-3	0	4
P51	2	-2	4	4	1	1	0	0	3	-3	-2	-2	-2	2	-4	0	1	-1	0	-3	-2	3	-4	-1	0	1	-1	2	-1	2	1	2	3	1	-3	-3	0	-1	-1	3
P52	0	-1	3	0	2	2	4	1	0	-2	0	3	2	1	-3	-1	1	-2	4	-1	-3	2	-4	-1	-1	-3	-2	1	-1	1	-3	3	1	3	-2	0	0	-4	2	-2
P53	-3	-2	2	-2	0	1	-1	-1	4	1	-2	1	-1	3	-4	2	1	-3	1	0	0	2	-3	-1	4	-1	0	-1	2	3	0	3	2	1	-3	-2	0	-4	-2	3
P54	1	-2	-1	1	-3	4	-2	0	-2	-2	3	0	-2	2	-3	0	1	-3	-1	2	-1	-1	-4	0	2	0	2	2	3	3	1	-3	1	-1	4	0	-4	1	-1	3

*Note: S refers to statement (see Table 42: The final statements) and P refers to participant

Appendix 2.4: Q-Sorts' Correlation Matrix

(Overleaf)

"Professionally Pragmatic" and "Professionally Obligated" Factors

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30	P31	P32	P33	P34	P35	P36	P37	P38	P39	P40	P41	P42	P43	P44	P45	P46	P47	P48	P49	P50	P51	P52	P53	P54
P1	100	22	-19	11	15	24	45	-7	22	8	18	-7	18	10	2	15	18	53	10	19	40	33	27	4	22	3	6	45	5	15	14	26	11	29	37	-13	14	7	26	22	12	15	24	19	48	-13	7	25	4	2	-4	28	21	31
P2	22	100	28	46	45	21	34	15	-1	12	40	12	35	23	9	-9	31	44	10	8	36	14	15	13	37	28	30	48	13	11	-11	35	-4	7	12	1	2	3	19	18	43	10	56	3	17	-4	-1	21	2	32	36	18	13	45
P3	-19	28	100	22	25	9	19	40	-6	10	20	30	40	44	18	2	37	18	28	-4	36	2	-22	28	26	56	22	16	22	18	-1	38	12	-12	-10	23	-22	37	17	-6	20	-8	51	1	-2	18	16	0	34	27	40	16	32	24
P4	11	46	22	100	30	1	22	16	4	-2	19	-20	29	15	16	-15	13	39	17	-21	35	7	-7	19	19	22	19	19	-7	44	-22	28	-4	2	-4	2	14	28	6	6	10	9	29	19	14	-19	-21	-12	5	23	26	22	23	22
P5	15	45	25	30	100	34	21	32	6	41	37	16	57	50	29	7	56	43	20	11	47	24	31	40	20	36	18	50	-6	40	-19	46	30	4	-1	8	16	30	43	36	21	29	49	16	23	-12	22	3	11	54	45	30	55	37
P6	24	21	9	1	34	100	30	12	11	15	36	-7	31	21	-10	16	27	37	14	1	16	20	-5	-20	22	42	-19	3	22	29	12	41	16	26	23	-6	-11	5	-4	5	27	43	34	15	5	8	28	11	3	-14	28	-9	15	37
P7	45	34	19	22	21	30	100	19	25	35	2	-23	24	15	-27	12	28	34	16	9	39	18	9	10	43	27	30	26	13	29	17	34	14	26	33	19	19	14	11	2	38	2	32	13	30	5	1	18	11	12	24	30	25	60
P8	-7	15	40	16	32	12	19	100	8	43	35	32	29	10	26	11	52	34	19	8	25	14	-32	3	19	15	2	9	9	33	0	34	-13	18	-8	-2	3	34	30	14	45	32	29	3	6	-2	33	-10	10	29	55	38	45	15
P9	22	-1	-6	4	6	11	25	8	100	37	21	-7	6	26	-19	-2	-3	14	-2	-16	32	20	-4	36	27	-4	0	8	10	24	-28	3	-1	27	36	4	30	22	23	28	6	3	11	2	39	8	-10	-12	-14	4	15	18	18	12
P10	8	12	10	-2	41	15	35	43	37	100	31	11	16	26	9	-8	44	20	35	16	39	-2	-10	35	27	12	15	13	4	26	3	10	-2	22	14	11	25	26	46	21	43	0	32	5	19	30	28	1	-3	45	41	48	36	16
P11	18	40	20	19	37	36	2	35	21	31	100	27	41	30	-1	-8	29	39	13	-13	31	15	-12	18	38	35	16	26	6	49	-11	42	-19	1	18	1	11	28	36	31	24	28	35	11	19	4	5	-6	-9	36	49	18	44	19
P12	-7	12	30	-20	16	-7	-23	32	-7	11	27	100	14	18	43	34	16	20	14	23	12	-11	-12	35	-10	7	7	5	-2	-5	-7	16	-7	-2	-9	2	-1	17	41	11	13	6	12	-19	16	-14	1	-14	2	13	8	7	23	-13
P13	18	35	40	29	57	31	24	29	6	16	41	14	100	29	6	10	40	37	2	-27	58	21	7	36	27	29	19	22	0	43	-13	54	24	-4	-2	2	23	34	43	19	15	20	36	34	14	-13	-13	1	2	43	34	1	30	56
P14	10	23	44	15	50	21	15	10	26	26	30	18	29	100	-3	9	24	25	18	-3	31	19	19	43	20	39	16	39	-5	32	-13	32	19	-13	10	11	1	15	35	18	1	6	39	19	27	6	9	2	-11	30	21	18	40	30
P15	2	9	18	16	29	-10	-27	26	-19	9	-1	43	6	-3	100	5	26	27	12	27	34	-5	-5	11	-9	-5	6	13	9	9	1	7	1	3	-16	2	-30	32	41	20	9	-14	28	3	21	8	14	-6	28	35	4	22	28	-22
P16	15	-9	2	-15	7	16	12	11	-2	-8	-8	34	10	9	5	100	18	23	16	18	2	-4	12	-5	-10	12	-14	6	13	-6	18	20	10	37	-4	-7	2	1	-9	12	13	21	-2	17	24	-29	-8	18	31	-29	-12	-7	3	18
P17	18	31	37	13	56	27	28	52	-3	44	29	16	40	24	26	18	100	45	56	38	50	15	7	20	29	51	0	27	14	17	22	34	14	17	-3	5	-3	19	28	29	20	14	49	-5	11	-2	20	34	29	36	51	32	31	19
P18	53	44	18	39	43	37	34	34	14	20	39	20	37	25	27	23	45	100	28	9	52	32	-10	19	20	39	5	27	1	29	1	50	20	27	18	-7	-3	25	30	45	21	38	37	9	57	-28	8	34	28	16	46	28	52	15
P19	10	10	28	17	20	14	16	19	-2	35	13	14	2	18	12	16	56	28	100	30	29	-6	-5	29	9	44	16	-6	28	17	28	-3	9	9	1	19	-2	13	1	14	13	7	24	-2	0	5	12	7	27	21	23	28	20	-3
P20	19	8	-4	-21	11	1	9	8	-16	16	-13	23	-27	-3	27	18	38	9	30	100	-9	1	38	-9	3	12	-31	1	-1	-16	40	-12	21	9	-15	20	-4	-16	4	21	9	9	13	-23	6	-8	38	21	13	6	-11	11	-1	0
P21	40	36	36	35	47	16	39	25	32	39	31	12	58	31	34	2	50	52	29	-9	100	32	3	53	35	27	43	33	20	41	-5	46	17	26	17	3	12	43	49	27	29	-3	56	28	40	22	-6	18	29	45	28	33	35	26
P22	33	14	2	7	24	20	18	14	20	-2	15	-11	21	19	-5	-4	15	32	-6	1	32	100	2	5	31	28	-6	13	22	15	6	28	14	21	1	-8	23	11	1	1	11	28	4	14	13	0	12	-5	24	8	5	10	-1	7
P23	27	15	-22	-7	31	-5	9	-32	-4	-10	-12	-12	7	19	-5	12	7	-10	-5	38	3	2	100	-1	2	-11	4	27	-14	7	-10	-5	28	-5	7	1	3	-32	2	20	-19	12	-2	9	11	-19	-8	10	-6	12	-34	-21	6	38
P24	4	13	28	19	40	-20	10	3	36	35	18	35	36	43	11	-5	20	19	29	-9	53	5	-1	100	2	19	36	20	-14	19	-24	20	18	-2	-14	24	24	37	55	12	-3	-10	27	-1	16	-10	-14	-7	-9	46	16	13	30	8
P25	22	37	26	19	20	22	43	19	27	27	38	-10	27	20	-9	-10	29	20	9	3	35	31	2	2	100	29	22	3	6	41	-8	16	11	29	29	7	30	32	23	5	22	-13	43	3	33	-2	13	25	9	20	26	22	15	40
P26	3	28	56	22	36	42	27	15	-4	12	35	7	29	39	-5	12	51	39	44	12	27	28	-11	19	29	100	2	13	32	24	18	41	14	5	-9	22	2	16	-7	4	7	10	29	-3	-5	2	11	8	32	23	34	-4	27	18
P27	6	30	22	19	18	-19	30	2	0	15	16	7	19	16	6	-14	0	5	16	-31	43	-6	4	36	22	2	100	27	12	27	-2	9	-11	5	31	23	2	19	28	14	21	-31	11	3	14	26	-8	-2	12	41	0	26	24	15
P28	45	48	16	19	50	3	26	9	8	13	26	5	22	39	13	6	27	27	-6	1	33	13	27	20	3	13	27	100	-9	7	-4	22	-24	4	2	-7	-4	12	25	20	32	-6	36	10	34	8	4	2	6	24	21	42	41	20
P29	5	13	22	-7	-6	22	13	9	10	4	6	-2	0	-5	9	13	14	1	28	-1	20	22	-14	-14	6	32	12	-9	100	-18	23	16	-2	4	20	3	-3	4	-18	-3	10	0	23	32	-27	31	12	-5	38	10	6	-5	-23	7
P30	15	11	18	44	40	29	29	33	24	26	49	-5	43	32	9	-6	17	29	17	-16	41	15	7	19	41	24	27	7	-18	100	-20	18	7	3	15	20	17	37	34	18	17	20	16	23	31	10	-12	-29	-6	38	29	21	62	40
P31	14	-11	-1	-22	-19	12	17	0	-28	3	-11	-7	-13	-13	1	18	22	1	28	40	-5	6	-10	-24	-8	18	-2	-4	23	-20	100	-1	5	0	-18	26	-1	-23	-17	20	35	-3	-3	-5	-11	19	32	14	21	-12	-31	9	-18	-13
P32	26	35	38	28	46	41	34	34	3	10	42	16	54	32	7	20	34	50	-3	-12	46	28	-5	20	16	41	9	22	16	18	-1	100	26	23	2	-3	-2	27	19	5	22	28	51	12	6	-21	12	18	8	22	29	3	24	41
P33	11	-4	12	-4	30	16	14	-13	-1	-2	-19	-7	24	19	1	10	14	20	9	21	17	14	28	18	11	14	-11	-24	-2	7	5	26	100	2	-9	36	13	10	12	30	-19	22	30	13	16	-20	4	36	15	7	6	-13	14	35
P34	29	7	-12	2	4	26	26	18	27	22	1	-2	-4	-13	3	37	17	27	9	9	26	21	-5	-2	29	5	5	4	4	3	0	23	2	100	5	-18	10	11	-10	-3	31	17	11	-12	28	-3	13	34	25	-28	2	1	5	9
P35	37	12	-10	-4	-1	23	33	-8	36	14	18	-9	-2	10	-16	-4	-3	18	1	-15	17	1	7	-14	29	-9	31	2	20	15	-18	2	-9	5	100	-14	-4	0	14	21	-5	3	1	1	28	22	5	18	6	-2	6	26	-1	14

P36	-13	1	23	2	8	-6	19	-2	4	11	1	2	2	11	2	-7	5	-7	19	20	3	-8	1	24	7	22	23	-7	3	20	26	-3	36	-18	-14	100	2	4	18	20	12	-11	8	-16	18	20	-3	-21	8	36	4	2	18	26
P37	14	2	-22	14	16	-11	19	3	30	25	11	-1	23	1	-30	2	-3	-3	-2	-4	12	23	3	24	30	2	2	-4	-3	17	-1	-2	13	10	-4	2	100	12	14	12	16	5	1	30	10	-26	-8	-12	-13	7	-2	13	-1	12
P38	7	3	37	28	30	5	14	34	22	26	28	17	34	15	32	1	19	25	13	-16	43	11	-32	37	32	16	19	12	4	37	-23	27	10	11	0	4	12	100	39	5	8	-9	39	13	21	2	4	-12	18	28	39	31	36	9
P39	26	19	17	6	43	-4	11	30	23	46	36	41	43	35	41	-9	28	30	1	4	49	1	2	55	23	-7	28	25	-18	34	-17	19	12	-10	14	18	14	39	100	28	14	1	37	20	43	-2	11	5	-6	49	21	28	46	28
P40	22	18	-6	6	36	5	2	14	28	21	31	11	19	18	20	12	29	45	14	21	27	1	20	12	5	4	14	20	-3	18	20	5	30	-3	21	20	12	5	28	100	7	18	16	4	44	-3	5	24	11	29	18	28	41	-2
P41	12	43	20	10	21	27	38	45	6	43	24	13	15	1	9	13	20	21	13	9	29	11	-19	-3	22	7	21	32	10	17	35	22	-19	31	-5	12	16	8	14	7	100	8	35	9	13	24	31	-8	19	12	14	44	17	24
P42	15	10	-8	9	29	43	2	32	3	0	28	6	20	6	-14	21	14	38	7	9	-3	28	12	-10	-13	10	-31	-6	0	20	-3	28	22	17	3	-11	5	-9	1	18	8	100	-5	12	12	-20	21	7	11	-23	19	-23	21	23
P43	24	56	51	29	49	34	32	29	11	32	35	12	36	39	28	-2	49	37	24	13	56	4	-2	27	43	29	11	36	23	16	-3	51	30	11	1	8	1	39	37	16	35	-5	100	28	17	4	26	34	8	32	52	31	30	41
P44	19	3	1	19	16	15	13	3	2	5	11	-19	34	19	3	17	-5	9	-2	-23	28	14	9	-1	3	-3	3	10	32	23	-5	12	13	-12	1	-16	30	13	20	4	9	12	28	100	7	4	-9	1	19	9	12	5	15	32
P45	48	17	-2	14	23	5	30	6	39	19	19	16	14	27	21	24	11	57	0	6	40	13	11	16	33	-5	14	34	-27	31	-11	6	16	28	28	18	10	21	43	44	13	12	17	7	100	-6	-12	23	22	1	17	30	53	16
P46	-13	-4	18	-19	-12	8	5	-2	8	30	4	-14	-13	6	8	-29	-2	-28	5	-8	22	0	-19	-10	-2	2	26	8	31	10	19	-21	-20	-3	22	20	-26	2	-2	-3	24	-20	4	4	-6	100	3	-14	18	13	5	19	-4	-9
P47	7	-1	16	-21	22	28	1	33	-10	28	5	1	-13	9	14	-8	20	8	12	38	-6	12	-8	-14	13	11	-8	4	12	-12	32	12	4	13	5	-3	-8	4	11	5	31	21	26	-9	-12	3	100	22	15	-2	4	20	5	-6
P48	25	21	0	-12	3	11	18	-10	-12	1	-6	-14	1	2	-6	18	34	34	7	21	18	-5	10	-7	25	8	-2	2	-5	-29	14	18	36	34	18	-21	-12	-12	5	24	-8	7	34	1	23	-14	22	100	24	-23	11	-5	-7	8
P49	4	2	34	5	11	3	11	10	-14	-3	-9	2	2	-11	28	31	29	28	27	13	29	24	-6	-9	9	32	12	6	38	-6	21	8	15	25	6	8	-13	18	-6	11	19	11	8	19	22	18	15	24	100	-11	11	20	13	-11
P50	2	32	27	23	54	-14	12	29	4	45	36	13	43	30	35	-29	36	16	21	6	45	8	12	46	20	23	41	24	10	38	-12	22	7	-28	-2	36	7	28	49	29	12	-23	32	9	1	13	-2	-23	-11	100	30	31	36	26
P51	-4	36	40	26	45	28	24	55	15	41	49	8	34	21	4	-12	51	46	23	-11	28	5	-34	16	26	34	0	21	6	29	-31	29	6	2	6	4	-2	39	21	18	14	19	52	12	17	5	4	11	11	30	100	41	54	18
P52	28	18	16	22	30	-9	30	38	18	48	18	7	1	18	22	-7	32	28	28	11	33	10	-21	13	22	-4	26	42	-5	21	9	3	-13	1	26	2	13	31	28	28	44	-23	31	5	30	19	20	-5	20	31	41	100	37	-9
P53	21	13	32	23	55	15	25	45	18	36	44	23	30	40	28	3	31	52	20	-1	35	-1	6	30	15	27	24	41	-23	62	-18	24	14	5	-1	18	-1	36	46	41	17	21	30	15	53	-4	5	-7	13	36	54	37	100	18
P54	31	45	24	22	37	37	60	15	12	16	19	-13	56	30	-22	18	19	15	-3	0	26	7	38	8	40	18	15	20	7	40	-13	41	35	9	14	26	12	9	28	-2	24	23	41	32	16	-9	-6	8	-11	26	18	-9	18	100

Appendix 2.5: Kade Software Outcomes

"Professionally Pragmatic" Factor 1

Factor 1	Sorts Correlations																		
Q-Sort	P53G2E2C	P21G2E3C	P39G3E2C	P5G2E1O1	P50G1E2C	P30G1E3C	P24G2E2C	P43G3E2C	P10G3E2C	P13G3E3C	P38G2E2C	P11G2E2C	P51G1E2C	P52G1E3C	p14G1E1C	P8G2E3O2	P45G3E2C	P3G1E2O1	P28G3E3O2X3
P53G2E2O2X3	100	35	46	55	36	62	30	30	36	30	36	44	54	37	40	45	53	32	41
P21G2E3O2X3	35	100	49	47	45	41	53	56	39	58	43	31	28	33	31	25	40	36	33
P39G3E2O1X3	46	49	100	43	49	34	55	37	46	43	39	36	21	28	35	30	43	17	25
P5G2E1O1X3	55	47	43	100	54	40	40	49	41	57	30	37	45	30	50	32	23	25	50
P50G1E2O2X2	36	45	49	54	100	38	46	32	45	43	28	36	30	31	30	29	1	27	24
P30G1E3O1X1	62	41	34	40	38	100	19	16	26	43	37	49	29	21	32	33	31	18	7
P24G2E2O1X2	30	53	55	40	46	19	100	27	35	36	37	18	16	13	43	3	16	28	20
P43G3E2O1X3	30	56	37	49	32	16	27	100	32	36	39	35	52	31	39	29	17	51	36
P10G3E2O2X3	36	39	46	41	45	26	35	32	100	16	26	31	41	48	26	43	19	10	13
P13G3E3O2X3	30	58	43	57	43	43	36	36	16	100	34	41	34	1	29	29	14	40	22
P38G2E2O1X3	36	43	39	30	28	37	37	39	26	34	100	28	39	31	15	34	21	37	12
P11G2E2O2X3	44	31	36	37	36	49	18	35	31	41	28	100	49	18	30	35	19	20	26
P51G1E2O1X2	54	28	21	45	30	29	16	52	41	34	39	49	100	41	21	55	17	40	21
P52G1E3O2X2	37	33	28	30	31	21	13	31	48	1	31	18	41	100	18	38	30	16	42
p14G1E1O1X2	40	31	35	50	30	32	43	39	26	29	15	30	21	18	100	10	27	44	39
P8G2E3O2X2	45	25	30	32	29	33	3	29	43	29	34	35	55	38	10	100	6	40	9
P45G3E2O1X3	53	40	43	23	1	31	16	17	19	14	21	19	17	30	27	6	100	-2	34
P3G1E2O1X1	32	36	17	25	27	18	28	51	10	40	37	20	40	16	44	40	-2	100	16
P28G3E3O2X3	41	33	25	50	24	7	20	36	13	22	12	26	21	42	39	9	34	16	100

Factor 1	Sorts Weight
Q-Sort	Weight
P53G2E2O2X3	10
P21G2E3O2X3	9.57214
P39G3E2O1X3	8.98467
P5G2E1O1X3	7.91476
P50G1E2O2X2	7.60969
P30G1E3O1X1	5.99836
P24G2E2O1X2	5.54439
P43G3E2O1X3	5.27807
P10G3E2O2X3	5.03249
P13G3E3O2X3	5.03081
P38G2E2O1X3	5.02389
P11G2E2O2X3	4.77457
P51G1E2O1X2	4.60544
P52G1E3O2X2	4.32721
p14G1E1O1X2	4.30267
P8G2E3O2X2	3.65795
P45G3E2O1X3	3.40608
P3G1E2O1X1	3.17589
P28G3E3O2X3	3.11047

	Relative Ranking of Statements in Factor 1			
			Consensus	
	Highest Ranked Statements	Factor 1	Distinguishing	Factor 2
9	The access to the resources (computers, software, etc,) that are needed to comply with EHR pri	4	D*	2
40	My hospital's rules and policy	4	C*	3
	Positive Statements Ranked Higher in Factor 1 Array than in Other Factor Arrays			
30	My professional/ethical responsibilities	3	D	2
34	My confidence in my understanding of EHR policy and practice	3	D*	1
16	The importance I place on EHR privacy policy of my practice	3	D*	0
14	The consequences to me legally by authorities if a data breach is seen to occur	3	D*	0
3	The ease of using the EHR system	2	D*	-2
12	The availability of guidelines on the subject	2	D*	-3
22	The Amount of time needed to complete the EHR record	2	D*	-4
7	The level to which I agree with the data privacy policies I am asked to follow	2	C*	1
20	The usefulness of the guidelines	1	D*	0
5	My level of education	1	D*	-1
29	The consequences to me contractually from my organisation if a data breach occurs	1	D	0
1	My experience of working with the EHR	1	D*	-1
32	The amount and level of support that is available to me.	1	D*	-3
25	The extent to which this is monitored by my hospital	0	C*	0
39	The extent to which I am able to comply with EHR privacy policy without help	0	D*	-2
24	The nature and amount of training I received on the subject	0	C*	-1

	Negative Statements Ranked Lower in Factor 1 Array than in Other Factor Arrays			
28	The sense of satisfaction I get from undertaking these tasks	0	D*	2
25	The extent to which this is monitored by my hospital	0	C*	0
27	The expectations of those who manage data protection within my hospital.	0	C*	1
35	The expectation of my patients	0	D*	2
36	The extent of clinical experience I have	-1	D*	2
37	My personal preference about following the EHR privacy policy	-1	D*	1
31	The expectation of the top management of my hospital	-1	D*	3
26	The expectation of my direct manager	-1	D*	1
19	The extent to which I feel a particular task is necessary	-1	C*	-1
8	The position I hold in the hospital	-1	D*	4
17	The extent to which this aspect of my role is open to investigation by the press or other organi	-2	D*	3
4	The priority I give these tasks compared to other clinical and administrative tasks	-2	D*	0
21	The number of the steps required to access an EHR	-2	D	-2
10	My colleagues practice and compliance	-2	D*	-1
11	The extent to which this aspect of my work may be open to criticism by patients and their fami	-2	D	-1
2	The possible reaction of my colleagues towards me if a data breach occurs	-3	C*	-2
13	The benefit it brings to my colleagues	-3	D*	1
38	The expectation of the public	-3	D*	-2
15	The expectation of my peers	-3	C*	-3
	Lowest Ranked Statements			
18	The expectation of my friends and families	-4	D*	-3
23	my age	-4	D*	-4

Appendix 2.6: Kade Software Outcomes

"Professionally Obligated" Factor 2

Factor 2	Sorts Correlations						
Q-Sort	P6G3E1O1	P48G2E3O	P7G2E2O1	P1G2E2O1	P34G2E2O	P26G1E2O	P32G1E2O1X1
P6G3E1O1X3	100	11	30	24	26	42	41
P48G2E3O2X1	11	100	18	25	34	8	18
P7G2E2O1X2	30	18	100	45	26	27	34
P1G2E2O2X3	24	25	45	100	29	3	26
P34G2E2O2X2	26	34	26	29	100	5	23
P26G1E2O1X1	42	8	27	3	5	100	41
P32G1E2O1X1	41	18	34	26	23	41	100

Factor 2	Sorts Weight
Q-Sort	Weight
P6G3E1O1X3	5.35332
P48G2E3O2X1	4.55317
P7G2E2O1X2	4.36497
P1G2E2O2X3	3.80865
P34G2E2O2X2	3.37412
P26G1E2O1X1	3.26323
P32G1E2O1X1	3.19968

	Relative Ranking of Statements in Factor 2			
			Consensus	
	Highest Ranked Statements	Factor 2	Distinguishing	Factor 1
33	The benefit it brings to my hospital	4	D*	1
8	The position I hold in the hospital	4	D*	-1
	Positive Statements Ranked Higher in Factor 2 Array than in Other Factor Arrays			
6	The benefit it brings to my patients	3	D*	2
17	The extent to which this aspect of my role is open to investigation by the press or other organisatio	3	D*	-2
31	The expectation of the top management of my hospital	3	D*	-1
35	The expectation of my patients	2	D*	0
36	The extent of clinical experience I have	2	D*	-1
28	The sense of satisfaction I get from undertaking these tasks	2	D*	0
13	The benefit it brings to my colleagues	1	D*	-3
26	The expectation of my direct manager	1	D*	-1
37	My personal preference about following the EHR privacy policy	1	D*	-1
27	The expectations of those who manage data protection within my hospital.	1	C*	0
4	The priority I give these tasks compared to other clinical and administrative tasks	0	D*	-2
25	The extent to which this is monitored by my hospital	0	C*	0

	Negative Statements Ranked Lower in Factor 2 Array than in Other Factor Arrays			
16	The importance I place on EHR privacy policy of my practice	0	D*	3
14	The consequences to me legally by authorities if a data breach is seen to occur	0	D*	3
20	The usefulness of the guidelines	0	D*	1
29	The consequences to me contractually from my organisation if a data breach occurs	0	D	1
25	The extent to which this is monitored by my hospital	0	C*	0
19	The extent to which I feel a particular task is necessary	-1	C*	-1
24	The nature and amount of training I received on the subject	-1	C*	0
5	My level of education	-1	D*	1
1	My experience of working with the EHR	-1	D*	1
3	The ease of using the EHR system	-2	D*	2
21	The number of the steps required to access an EHR	-2	D	-2
39	The extent to which I am able to comply with EHR privacy policy without help	-2	D*	0
32	The amount and level of support that is available to me.	-3	D*	1
12	The availability of guidelines on the subject	-3	D*	2
15	The expectation of my peers	-3	C*	-3
	Lowest Ranked Statements			
23	my age	-4	D*	-4
22	The Amount of time needed to complete the EHR record	-4	D*	2

Appendix 3: Post-Sorting Interview Analysis

Appendix 3.1: Post-Sorting Interview Question 1 (Factors 1 & 2, Only Significant Q Sort Loadings)

Table 43: Participants responses for question 1, organised based on the statements for Professionally Pragmatic Factor 1

#	Statements	Responses on Statements Ranked (4+)	Responses on Statements Ranked (4-)
Q1) Looking at the statement … can you explain the statements where you did? *The answers were organised based on the statements *P litter refers to participants			
1.	**[The level to which I agree with the data privacy policies I am asked to follow]** *Consensus statement*	**P52** "Sometimes they asked me to follow unnecessary policies which I usually don't agree with."	
2.	**[The position I hold in the hospital]**		**P50** "It is little influence on me because I am working as charging nurse and the position sometime has little influence on the compliance with EHR system policy"
3.	**[My professional/ethical responsibilities]** *Consensus statements*	**P3** "probably the data what you have collected from me, I should have the responsibility where is my profession what will make my work more stronger for me to stand and complete my data. I believe I have responsibility toward my profession I could not complete any tasks or anyone so far. The ethical like code that we handle the body language in the profession is mandatory for us I believe. Standing with ethics the code the take up… during the discipline, timing up, how you manage to complete your task from the basic being on time and the work how serious you put down yourself. However, how you handle your personate … from personal	

		put it aside, put intellectually and emotionally not coming on professional our is more important… now it is we have stress work and with personal things that does not bring perfection in profession side. So we need to know our ethical side dealing with collages or dealing with the patients. It have strong influence if see. If you don't balance ethical code and your professional responsibilities and not aware of them, you will not work at you work place." … **P19** As I said before, being a health worker. I am fully conscious and always have responsibility for my work, which makes it an all-time strong influence on me. … **P39** "As professionals, we should protect patients' data, rather than divulge it to others. It is unethical to talk about it to other people, even if not concerned, or even among medical staff. The ones who should know about a patient's condition are the ones who are giving direct care to the patient, like primary physicians and nurses. Because if we divulge it to other staff who are not in the care process of the patient, it makes us less professional." … **P43** "Because all things you do to patients must be kept confidential, and I must comply with the privacy policy. It is my professional responsibility to follow the hospital guidelines. … **P45** "With complying with the EHR privacy policy, my colleagues will see how professional and ethical I am at work, and this will reflect on their personality and work"	

4.	**[My level of education]**	**P3** "I do believe the level of education matter a lot to me so I keep it in strong influence. Unlike you have your knowledge about your profession, you cannot be 100 percent at you profession to be a topper at your profession. You cannot upgrade yourself without any knowledge of the subject what you ware or what you work. So, I feel a bachelor or master degrees should be mandatory and must for an employee to be holding such a profession. That makes him to be more intellectual and to be more professional at his work so the level of education is mandatory. For me It is strong influence when it is coming to your professional side. What you work and how you work it should be from the basic of the education side. It gives the person more about what he will do at work which will give him the basic that he get from education side. So It is strongly influences me. An example: If I am not a bachelor and not well educated about the subject and even tho I have practical knowledge and aware of technical things or any theoretical knowledge, I go head of supervising myself I will not upgraded my professional side. When you are aware of your basic knowledge that you gain from collage, you will know furthermore about clinical experience and upgraded your professional level." … **P19** "I put it at strong influence because for me, as a nurse, it is very important to have a high level of education, because how can I comply with policy if I am not educated and oriented at all."	
5.	**[The amount of time needed to complete the EHR record]**	**P11** "In ICU we have many critical patients, and we have to deal with them first, before going to documentation on EHR. So we have a specific time that the system will close. The amount of time to complete the documentation has a great influence on compliance." …	**P3** "I gave the least influence here [The amount of time needed to complete the EHR record]. Here I prefer it should be least important, because the time what you hold, it is the time that you put down. Unless you are not focused and stressed by the organisation, you will not come up even a person if you see his intellectual's spells to complete any tasks maybe take

		P50 "The time of completing the EHR is very important, because in practice, each nurse has three beds to cover, so it takes a long time to complete the EHR, and I need to focus to do it correctly."	30 min. But maybe other influences does not influence him. If he has a bounce ranking in it, he can't' come over that task. So, here the time management place a whiter rules. But at the same time, it must not be a given enough time for a person to complete the policy and procedures of EHR. I feel to comply with EHR policy, time management is not going to affect [compliance] that much." … **P14** "I select this one under the little or no influence, maybe it will have a little influence, because we are in the informatics wave so we are using computer it will not take much time for writing or whatsoever."
6.	**[My hospital rules and policy]** *Consensus statements*	**P5**: "Based on the question here, you were asking about my compliance with the EHR privacy policy, I chose this … As strongly influenced. This statement strongly influences my compliance because in our hospital we are complying with the policy and procedures and nursing care delivery is guided by our hospital policies and procedures." … **P10** "We have to follow the hospital rules and policies, so we cannot breach any rules or policies. We have to abide by the policy to protect patient confidentiality and data privacy." .. **P17** "Each hospital has a privacy policy and procedure. As health workers, we have to follow the hospital's standards and policy to protect data." … **P18** "Because I am satisfied with the policy and procedures" ..	

		P21 "it strongly influences me because the right steps to do the right thing." … **P24** "for hospital rules and policy, not all hospitals have the same policy. So in our hospital, based on the policy, we will follow it, and it will benefit us using EHR." … **P50** "Because each hospital has a privacy policy, we have to follow them to protect the EHR information.	
7.	**[The benefit it bring to my patient]**	**P5** "In our hospital we have what it is called hospital's goal, so the main goal of the hospital is to provide a quality nursing care in sense of patient care centre here. I put this 'The benefit it brings to my patient,' here it is really very important when you are doing things especially in our hospital, so why we are doing something if we are not mainly benefiting the patient, that is the reason why I put this under the 'strong influences' for me." … **P28** "once we have issue regarding the patient specially we need to document what we did and how we performed the procedure. We are documenting everything that either done by me. It influences me when I recorded that and It is protecting me legally me, patient and my hospital for now and for future"	**P2** "It does not affect much, based on my experience. I think the benefit of following the privacy policy will be for both of us, not only for them."
8.	**[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]**	**P8** "Here in our hospital, we started EHR last year. One of the struggles that we are facing here is that we have fewer computers, which leads nurses to take more time to complete documentation of patients' data. Nurses and physicians are	

		using the same computers. For example, each department has three to two computers, which, of course, has around five nurses per shift, making it hard for them to access the software for the documentation. This is important to protect patient data." .. **P10** "Because it should be all available, the computers and software to comply with the privacy policy of the EHR… We have a lack of computers, so the nurses and physicians delay their documentation, and that leads to impact on the patients' safety and privacy." … **P11** "Actually, the compliance with the EHR will be higher when you have access to more computers, because what happens nowadays is that the computers are not adequate to do documentation on time." … **P14** "I selected this statement because it matters to me. When we have good and enough resources, such as computers, and everything is working well, that will have a strong influence on the compliance with the EHR privacy policy." … **P30** "Access to the resources is an important point in influencing nurses to comply with the EHR privacy policy. It is a strong influence when we have available recourses to apply and to follow this policy because I will do my job faster." … **P38** "Even though we know the policy and procedures and we are confident in regard to the guidelines, I feel that without resources we cannot proceed. So, we should have sufficient	

		resources like computers and internet connection. Without them, we cannot complete our tasks, including compliance" … **P53** "I choose this statement because it is important to have access to enough computers to follow the EHR privacy policy. Lack of computers will lead nurses to not comply with the EHR policy to get their work done."	
9.	**[The consequences to me legally by authorities if a data breach is seen to occur]**	**P8** "*EHR is more secure than paper records… and they can track my activities during documentation and may use them for legal issues later. And it is safe for nurses to comply with the EHR policy to protect themselves from future legal issues… because it will affect their careers.*" … **P30** "This statement has a stronger influence on me to apply the EHR privacy policy. Because if there are any legal consequences when data is breached, it will be a stronger influence on nurses in general to comply with this privacy policy."	
10.	**[The extent to which this aspect of my role is open to investigation by the press or other organisations]>**		**P24** "For this aspect of my work, the investigation is open only in the hospital and not in the press or other organisations." …
11.	**[My age]>** *Consensus statements*		**P8** "This statement for me is less important, because age does not make a big difference when we are working in the healthcare sector. Of course, all age groups need to be aware of the system and update their knowledge of everything. So, it does not matter how old I am to document in the EHR and to follow the policy." **P10**

			"Age does not matter to comply with EHR privacy policy; age is not important." … **P11** "The age is not correlated with compliance. It does not matter if you are younger or older, if you know what you are doing and you know what the policy is, then you should commit to it. Age is not related at all." .. **P13** "I put it in -4. because I don't think age has a relationship with following the EHR policy and procedures. This will not be an influence. This is what I think." … **P18** "The age does not matter at all for work itself. There is no age limit for doing this." … **P21** "There is no relation between age and compliance." … **P30** "Age is not influencing the compliance with the privacy policy of the EHR. That's why I was thinking I should rank -4" … **P38** "Because learning is a lifelong process. And no age limit is required to learn using the EHR or to follow its policy. Anyone, no matter what his or her age is, can learn and do whatever they want to do. And the age aspect does not influence anyone." …

			P39 "I think age does not have an influence on keeping people's privacy if you are smart enough. Age is not a factor for keeping patient privacy. And age is not related." … **P43** "For me, I don't think it will have an influence on the compliance with the EHR privacy policy." … **P51** "I think my age is not related to anything that influences my compliance with the EHR privacy policy." … **P52** "My age doesn't influence me to follow the policy or learning any new policies"
12.	**[The expectation of the top management of my hospital]>**	**P13** Well, as staff working at the hospital, I should do my job in adherence with the policies and procedures that hospital management set to gain the full satisfaction of my management. I have to do my best to adhere to the policies and procedures, so my top management will be happy that I stick with the rules…"	
13.	**[The availability of guidelines on the subject]**	**P13** "Without a map that I follow, I cannot know the way that I should follow. With the present guidelines, everyone will know what they should do at the beginning to reach the end of this way. So, if the guidelines are available, everything will be systematically arranged. Everyone will follow the correct way of the policies and procedures of the hospital."…	
14.	**[The usefulness of the guidelines]**	**P14** "we have a guideline to follow it, why? If you are not following these things you have a strong influence of that in	

		bad way which is mean, If I have a guideline and I did not follow it maybe this will affect my work and affect the others" … **P24** "Of course, using EHR's guidelines to guide you during using the system, It will prevent you from committing mistakes in the future related to work."	
15.	**[The number of the steps to access the EHR]** *Consensus statements*		**P2** "It does not affect me much. I've already worked in EHR, and the software and computers are simple to grasp just by looking at them. If I need something, I can figure it out by myself somehow. The computer is easy to use"
16.	**[The benefit it brings to my colleagues]**		**P17** "even my colleagues, we are working in the hospital and we have to protect our data and it will not bring any benefit to my collages if I protect data or not. in our hospital we all have to protect patient data" … **P50** "It only affects me, not my colleagues, if I follow the policy"
17.	**[The benefit it brings to my hospital]**	**P17** "as we know we are in the time of technology and this and it may be bring more benefit to our hospital if these data protected and it will make it more easier for us to come back to the data if it on EHR not in paper. Mmm…It will save our patients' data and easy to access to the information." … **P28** "the EMR will be used as legal evidence and I chose this as strongly influence me because what I document in the EHR	

		for the patient it will affect my hospital and it will affect my patient and it will show how I provide the service on the right way and right matter. And Keeping patient information private will benefit my hospital"	
18.	**[The sense of satisfaction I get when I follow the policy]**	**P18** "because in our daily routine we should use the system and without the manual is difficult." "I am satisfied with the hospital policy that why I feel that way"	..
19.	**[The extent to which this aspect of my work may be open to criticism by patients and their families]** *Consensus statements*		**P18** "because patient criticism is only when I commit mistake but in our daily base we are trying to do the best for the patient. We will get less criticism by patient if we do our best" … **P24** "My work should not be influenced by others, especially the family of the patient. At least what I do in my work at the hospital benefits the patients by keeping the patient data private. I am not doing it for the family." "So it is not important to me. and I do my work based on my job description."
20.	**[My confidence in my understanding of EHR policy and practice]**	**P21** "If I fully understand the privacy policy, I could follow it better." … **P38** "Overall, I have opted My confidence in my understanding of EHR policy and practise definitely influences me. I feel that without confidence in my understanding of the EHR policy, I cannot proceed with EHR's documentation process. We must have confidence to proceed and complete this process and to apply this policy."	

21.	**[My colleagues' practice and compliance]**		**P3** "for me this EHR privacy policy in the hospital setting, I believe truly compliance for yourself. It never should be a compliance with your collages' practice and what they make. If you keep a justification that my collages have not done this or they have done the best, so … They don't make a lot of difference. This is a policy for you made by your organisation and EHR is a part of the organisation and it should be mandatory for you nevertheless you collages compliance or not."
22.	**[The importance I place on EHR privacy policy of my practice]**	**P39** "For me, it is important to maintain patient privacy policies. Some patients won't divulge their health conditions to other people. They may be hiding it from their family members, so they do not get worried about their condition. And also, I have experience. I had cancer before, and when I had it, I hid it from my mother, and only my sister knew. I was afraid to tell my mother because she was sick [ill], and I was worried she might get sicker because she would be worried about me, and we would be both sick. I think keeping the patient's condition confidential from some of the family members is important for their mental health. Also, some people have STDs, and maybe the staff are talking about the patient's condition and other people may hear it. So people will judge the patient because he or she has an STD, and this person will be judged for doing something bad. In reality, maybe this person who has the STD got it through a blood transfusion error. And this is the importance of keeping patient data privacy." … **P43** "I believe that all patients have the right to keep the patient's record safe and do not share it with anyone"	
23.	**[The amount and level of support that is available to me].**		**P39** "it does not affect at all to keep patient privacy"

24.	**[The expectations of those who manage data protection within my hospital]** *Consensus statements*	**P27** Because they are the ones who are keeping our EHR safe. They influenced us to keep the patient record confidential"…	
25.	**[The priority I give these tasks compared to other clinical and administrative tasks]**	**P51** For example, you come first early in the morning, and we start admitting patients. Maybe the patient's case becomes critical, so we deal with it first, and later on we deal with the EHR record."	
26.	**[The ease of using the EHR system]**	**P51** "Most of the time we have internet connection errors or poor connection. Because of this, we can't use the system or document anything. If the system is easy to use, we can comply with system policy."	
27.	**[The extent to which I feel a particular task is necessary]** *Consensus statements*	**P52** "because I follow the policy according to what I feel it is necessary or not. If it is necessary to provide privacy to patient I will do"	
28.	**[The extent to which this is monitored by my hospital]** *Consensus statements*	**P45** "I chose 'strongly influence me' for this statement, because the EHR is monitored by my hospital; all activity is documented and everybody can see it. So if there is any problem, you cannot hide it from the co-workers and the management." … **P53** "Because if the EHR and the compliance with its policy are monitored by the hospital, it will influence us more to follow the policy. If we don't follow the policy, we may get a notification from the management."	
29.	**[The expectation of my friends and family]**		**P5** Actually, I don't think this will influence my compliance. Because when I am working at the hospital, I only focus on

			following and complying with the hospital policy. At the same time, I will do whatever benefits my patient." … **P8** "I don't think this is related to my job or working with patients. I care only about patients' expectations, so it does not matter what my family or friends expect from me. I don't think this is related to the EHR compliance with its policy. Because, at the end, this is my job and they don't care what I am doing at my job because it is not related to them. In regard to how I am documenting or complying" … **P10** "it does not matter what my friends expect from me at work" .. **P11** "I am not doing documentation and compliance with EHR policy because my family is expecting me to do it. But rather, I am doing it because it is part of my job and responsibility, and by complaining, this privacy policy. This is not related to my family or friends." … **P13** "I put it in -4 because I don't think my family and friend hava a relation with my job in the hospital. These things may be considered outside of the environment of my work field. So, I should not consider their opinion." … **P21** "It is not related to my work or compliance with the EHR policy at all. … **P27**

			"my family and friends are not important to keep the EHR data confidential, and, as I said before, the most important thing to me is the hospital policy and procedures." .. **P30** "Complying with the EHR privacy policy is going with my ethics consideration and the expectations of my family and friends have nothing to do with compliance with this policy." … **P45** "Not all my friends work at the hospital, and I considered them in the public category, so I don't know what the EHR privacy policy means."
30.	**[The expectation of my peers]** *Consensus statements*		**P5** "It does not influence me also as the same reason and explanation of the above." *This participant refers to their response earlier "actually, I don't think this will influence my compliance. Because, When I am working at the hospital like this, only focus is to follow and comply with the hospital policy at the same time I will do whatever benefit my patient." … **P38** "I placed the expectations of my peers' statement at (-4), because they have no influence on me to follow the EHR policy. And they don't play any role in following the EHR privacy policy. I think it does not have any influence or if it does have influence, it will be a little." … **P43** "I put it under little or no influence, because anything I do, I do it for myself and for my patients. I do not care what my peers feel or what they think about me. And as long as I am

			following the hospital's guidelines to maintain patients' privacy, my peers' expectations do not affect me." … **P51** "It does not influence my compliance with the EHR policy, because it's just their expectations, so there is no influence of their expectations on my compliance with the EHR policy." … **P53** "My peers do not influence me because everyone does their job without any expectations regarding compliance with EHR policy. And this is the last thing I will think of."…
31.	**[The expectation of the public]**		**P14** I think that the public will not expect anything from me, whether I'm using paper or using EHR, or whether I comply with the privacy policy or not. Maybe the expectations of my manager or my colleagues will be more effective than the public." .. **P17** "it is very rare to happen. we are not sharing our data to public. we are keeping our data save and this is why I put it under -4" … **P28** "I am not worried about public expectations that much… I am focusing on my patients and my hospital and how to protect myself and my hospital. and how to provide service to patients very well." … **P45**

			The public does not know what we are doing at the hospital and does not know what the EHR privacy policy means. I don't think they expect anything" … **P52** "It is not influential to me because the public has no idea about the policies and practises at the hospital." … **P53** "The public is unaware of what we do at the hospital, and we never give it much thought."
32.	**[The nature and amount of training I received on the subject]** *Consensus statements*		**P28** "I chose this statement because we are not getting full training with any EHR system. We will be trained when we have experience and the overuse."

Table 44: Participants' responses on question 1 organised based on the statements for Professionally Obligated Factor 2

#	Statement	Responses to statements ranked (4+)	Responses to statements ranked (4-)
Q1) Looking at the statement … can you explain the statements where you did?			
1.	**[The level to which I agree with the data privacy policies I am asked to follow]** *Consensus statements*	***P1*** "I chose this because of the position I held in the hospital. because I am actually working as a clinical instructor. I am one of those people in the ER that should comply with this. And this is most influential for me."	
2.	**[The position I held in the hospital]**	**P1**	..

		"I feel this is a very strong influence because to follow this EHR policy is because, as I am a clinical instructor, I should be the first one who complies before telling staff to comply with this policy. So this is most influential for me." … **P34** "Because if I want to teach nurses about the policy, I want them to listen to me and see me as an example because I am a head nurse.	
3.	**[My level of education]**		**P6** "I feel that it is not relevant here, because this is for policy and procedures, and when I work in an institution, I have to abide by policy regardless of my level of education. My background education is not necessary; I will be further trained on policy and procedure here. So I am supposed to follow what is being said here. I think my level of education is not coming into the picture."
4.	**[The amount of time needed to complete the EHR record]**		**P26** "Sometimes, we have different forms for physicians and nurses and it will take a long time for them to repeat the same thing. They have to document a lot of information and the time for the duty is limited for us. That is why they are late for entering data or not document at all" … **P48** "because our department works 24 hours. We have three shifts, and we must complete our work before endorsement time."
5.	**[My hospital rules and policy]** <u>*Consensus statements*</u>	**P26** "If the hospital has strict rules and policies to monitor regularly the compliance of the EHR, actually all staff will comply with it and use the EHR properly." … **P32** "Of course we need to comply with this, because it will give us guidelines to follow while doing our job."	

6.	**[The benefit it bring to my patient]**	**P6** "EHR, the problem that we face is the eligible of the hand writing in paper record which is not legible or not clear and this problem could be sort out if using EHR. this is going to help benefiting the patient and also to the staff. I prefer that to be strongly influence to comply with privacy of EHR … **P7** "*This is one of the most important things for me that makes me following a data privacy policy; I will do it just to benefit my patients.*"	
7.	**[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]**	**P6** "In my opinion, the access to the resources is important because practically, let's say I am the staff at the bedside and I am dealing with EHR, if I don't have sufficient recourses like a computer or software that is advanced enough to protect the data, at any time the privacy of my data is at risk. Each time I need to log off or log in, it is not like a paper file that I can carry, but here, if there are no sufficient computers and software, this surely will affect the compliance." … **P26** "Access to the resources inside any organisation can affect our compliance with EHR policy. If we have enough computers and software, we will do it faster and it will be easy for us."	
8.	**[The expectation of my patient]**	**P7** "For me, as a nurse, I want patients to expect me to follow the policy. I do not want them to be disappointed in me and how I handled their information."	
9.	**[The extent to which this aspect of my role is open to investigation by the press or other organisations]>**	**P48**	

		Because of this point, and since I am a head nurse, I am reflecting on the hospital, and I am afraid this might affect the hospital's reputation if this investigation opened when data beach happens.	
10	**[My age]** *Consensus statements*		**P6** "When it comes to age, in regard to this concept, we are dealing with experience. When we talk about age, we also focus on experience, and what clinical experience you have. For me, it could not be an excuse to just not follow the policy in practice." … **P7** "For me, my age is not a big deal. No matter how old you are, you can handle it, and it is not going to affect you, as long as you have the knowledge." … **P32** "It does not matter how old you are, and age is not relevant when you want to comply with the EHR policy."
11	**[The expectation of the top management of my hospital]**	**P32** "This is very important to me, because I believe that the management expects me to follow this policy."	
12	**[The number of the steps to access the EHR]** *Consensus statements*		**P26** "we don't have so many steps to access the EHR, but this does not affect our compliance at all"
13	**[The benefit it brings to my colleagues]**	**P34** "By complying with EHR policy, it will decrease the number of problems, which leads to less investigation, so nurses will not feel under pressure."	
14	**[The benefit it brings to my hospital]**	**P48** "It will have a good impact on the hospital if I follow the policy. The benefits are less time-consuming, less paper work, not much	

		resource waste, and protecting the hospital's reputation. This will lead to a good quality service."	
15	**[My colleagues' practice and compliance]**		**P32** "I am not influenced by my colleagues I am influenced through the policy and guidelines which is aligned with my knowledge and study"
16	**[The amount and level of support that is available to me].**		**P48** "Just now our hospital started using this technology, and we still have little support from them This does not help me to follow the policy."
17	**[The ease of using the EHR system]**		**P1** "Yah, actually in our hospital system is always down… the system is not very good to use… The internet or the browser is not very good, always interrupted, so it has little influence on me."
18	**[The extent to which this is monitored by my hospital]** *Consensus statements*		**P34** "I put 'no influence' for this statement, because there is no observation at my hospital."
19	**[The expectation of my friends and family]**		**P1** "Because as an employee, this statement has little influence on me. what my family and friend think about it. So I don't really find this influential at all. Collages I consider them as collages it all about works, so being find and family is not influential for me" … **P34** "because I am not talking and bringing my work problems or routine to home"
20	**[The expectation of my peers]** *Consensus statements*		**P7** "For me as nurse, I don't mind what other people will tell about me as long as I am doing my work properly and I am handling my patient."

Appendix 3.2: Post-Sorting Interview Question 2

Table 45: Participants' Responses Coded under each Statement (Professionally Pragmatic Factor 1)

Statements	Participants responses
Q 2: What other statements in general is appealing to you?	
[My age]	**P3** "I feel my age is not related to this and I do not have any other statements." **P13** "I put it in -4 because I don't think age has a relationship with following or compliance with EHR policy and procedures. It will not be an influence. This is what I think."
[The benefit it bring to my patient.]	**P5** *The participant selected this statement and did provide further explanation
[the availability of guideline]	**P8** "Some are important, such as the availability of guidelines. The nurses here need more awareness about how to document in the right way. Also, there is a problem in the system itself that is affecting the documentation process and compliance with the policy among nurses."
[amount time needed to complete the EHR record]	**P8** "The other statement is [The amount of time needed to complete the EHR record]. As I told you before, it is because of the computer shortage that will waste nurses' time during the documenting process on the system."
[the expectation the top management]	**P8** "Also, the expectation of the top management. Becasue they wanted us to adopt the system not gradually and did not give nurses a time and chance to learn about it. They want to change all of a sudden from paperwork to an electronic system without training them. even without giving them the ability to give their feedback when we see something missing in the system that needs to be revised."
[The extent to which this is monitored by my hospital]	**P11** "Because if we have consistency in checking the activity of the staff, it will lead to better compliance. Also, If the staffs are being reminded on how to do it properly, I think the compliance will be high. [The extent to which this is monitored by my hospital] is really needed."
[The nature and amount of training I received on the subject]	**P14** I think I have many, but I will select one of them, which is [The nature and amount of training I received on the subject]. I think it will work nicely if I have it or receive it."
[The expectation of my patient]	**P21**

Table 45: Participants' Responses Coded under each Statement (Professionally Pragmatic Factor 1)

Statements	Participants responses
	"Because the patient is expecting from me that his information will be kept private and confidential."
[My personal preference about following the EHR privacy policy]	**P24** "This is more convenient for us nurses to prefer this one. because it saves more time for us and it will be easier for us to record all the work we do during our work time."
[The availability of guidelines on the subject]	**P28** "Because if there are clear guidelines for documentation and usage of the EHR for those who are working with me and for those who are coming after me, it will be a legal document for me to protect me as a nurse and other healthcare workers."
[My professional/ethical responsibilities]	**P30** "So the statement of [My professional/ethical responsibilities] is more appealing because if someone does not have ethical responsibilities or a sense of ethical responsibilities, it will be difficult to comply with this policy." **P53** "The statement is my professional/ethical responsibility. Because this is part of my professional to keep patients' information private and it is not ethical to reveal patients' information. This influences us nurses to follow the rules to keep information confidential."
[The usefulness of the guidelines]	**P38** "Because if we have the proper guidelines, it would be beneficial to follow them correctly. If the organisation has them in its policy of EHR, it would be awesome. And we can minimise the time we consume during work."
[My hospital's rules and policy]	**P39** "I think this one [My hospital's rules and policy]. Each hospital should have strict and clear rules for keeping patients' data private in the system. The policy should contain that I should not give my username account to anyone, and when I ever use it, after I am done, I should sign out. and it may be missed by someone. So the hospital should have strict rules and enforce this policy so that only you can access your account and nobody else can use it. And especially for physicians because they can prescribe narcotic drugs, it should not be open to everybody and used by anyone, except that person."
[The usefulness of the guidelines]	**P43** "The most appealing to me is [The usefulness of the guidelines] because if I follow them, it will protect patients, the hospital, and me from any legal action."
[The benefit it brings to my collages]	**P45**

Table 45: Participants' Responses Coded under each Statement (Professionally Pragmatic Factor 1)

Statements	Participants responses
	Q2: "I pick this statement. The benefit it brings to my colleague." By using and following the EHR privacy policy, everyone will get the benefit from this, especially health workers during the endorsement time."
[Access to resources (computers, software, etc.) needed to comply with EHR privacy policy]	**P51** "The statement is the access to the resources (computers, software, etc.) that are needed to comply with the EHR privacy policy. Because we don't have too many computers, that is why"

Table 46*: P*articipants' Responses Coded under each Statement (*Professionally Obligated F*actor 2)

Statements	Participants responses
Q 2: What other statements in general is appealing to you?	
[My age]	**P1** [My age] "all age groups can easily follow this EHR system policy, so the statement is not relevant to me."
[My personal preference for following the EHR privacy policy]	**P1** "For me, there is something that we base our actions on only using our consciousness or something like this… I think that for me, I really do agree with that. If I could put this in (4+) I would do it, because I have a personal choice. Even if there is nobody checking on me, people can still follow the policy because it is their preference. I really like this statement."
[The benefit it bring to my hospital]	**P6** "The statement is the benefit to the patient. It does not only benefit the patient; it also brings benefits to the hospital. If these patients are in safe hands, they will give feedback to other patients, which will result in a positive outcome for my hospital."
[The level of education]	**P7** "The more you know about something, the more you will influence others."
[My confidence in my understanding of EHR policy and practice]	**P26** "I choose [My confidence in my understanding of EHR policy and practice]. Because if anybody understands his rules properly, he can comply with policy easily and without delay." **P34** "I select [My confidence in my understanding of EHR policy and practice], because it gives me the confidence to work with no pressure. and I can avoid making a mistake."
[The expectation of my patients]	**P32** "The statement is [The expectation of my patients]. It is very important because the patient expects me to provide them with medical care and to protect their information."
[The ease of using the EHR system]	**P48** "The statement is [The ease of using the EHR system], because if it is really easy to access and easy to use the system, then we can easily comply with policy."

Appendix 4: Justifications

Appendix 4.1: Justifications for Selecting the Two-Factors Rather than Five-Factors Solution

Overview

In Q-Methodology, the term used to describe emergent characteristics is "Q Factors." Each Q factor corresponds to a distinct perspective or pattern of response, shown by a certain kind or set of participants that sorted statement items in a comparable manner. During data analysis in our project, a number of criteria was applied that resulted of two-factor solution. A systemic review by Lundberg et al. (2020) regarding applications of Q approach in compulsory education found that the majority of Q studies retained three factors, followed by those retaining four and two factors. Therefore, the researcher sought to compare the study's outcomes with those of others that had two-factor solution outcomes, to show that Q-Methodology can work very well when two-factor solutions are found. Literature was thus harvested to identify Q studies with two-factor solution, and the researcher selected three studies for comparison (Flurey et al. (2016) Tiernon et al. (2017) O'Shea (2019).

In brief, the current study was done in the Saudi context to explore 54 nurses' viewpoints regard the compliance with the EHR privacy policy, using 40 statements. This study used the CFA with varimax rotation to analyse the results, then PCA was used to verify the CFA's outcomes. The result was a two-factor solution with 24% total variance. The two-factor solution was a common dominator in the identified literature.

The PhD study of O'Shea (2019) in the UK used the Q-Methodology to explore 22 patients' viewpoints on the meanings of self-harm, using 46 statements. This study used CFA and PCA with varimax rotation for data analysis. The result was two-factor solution with 45% total variance. In the USA, Tiernon et al. (2017) used the Q-Methodology for healthcare quality improvement on 10 registered nurses, using 13 statements. This study used PCA with varimax rotation for data analysis. The result was two-factor solution with 72% total variance. Finally, in the UK, Flurey et al. (2016) used the Q-Methodology to detect diverse typologies of experiences and coping tactics in men with rheumatoid arthritis on 30 patients, using 64 statements. This study used CFA with varimax rotation for data analysis. The result was two-factor solution with 34% total variance (see Table 47).

This study is compared with these previous works below, based on three characteristics: two-factor solution, total explained variance, and large number of non-significant loading Q-Sorts.

Table 47: Comparison of a Range of Studies that Generated Two-Factor Solutions to Q-Sorts

Citations	Topic and Aim	Country	Population (P-set)	No. Statements	Type of Analysis	Explained Total Variance
(Tiernon et al., 2017)	**Topic:** Using Q-Methodology in quality improvement projects. **Aim:** To describe how Q-Methodology can be used in quality improvement projects to better understand local viewpoints that act as facilitators or barriers to the implementation of EBP.	USA	10 registered nurses	13	PCA with varimax rotation	Two-factor solution, 72% total variance
(Flurey et al., 2016)	**Topic:** Identifying different typologies of experiences and coping strategies in men with rheumatoid arthritis: A Q-Methodology study. **Aim:** To identify typologies of experiences and coping strategies of men with rheumatoid arthritis.	UK	30 patients	64	CFA with varimax rotation	Two-factor solution, 34% total variance
(O'Shea, 2019)	***Doctoral study**: The functions of self-harm: A Q-Methodology study. **Aim:** To explore participants' subjective viewpoints on the functions of self-harm that are outlined in the current existent academic literature.	UK	22 participants	46	CFA or PCA (yielding similar results), then varimax rotation	Two-factor solution, 45% total variance
This study's information	**Topic:** Exploring the drivers and barriers factors that influence nurses' behavioural intentions to comply with the EHR Data Privacy Policy in Saudi Arabia using Q-Methodology. **Aim:** To explore factors in nurses' compliance with EHR data privacy policy in Saudi Arabia.	Saudi Arabia	54 nurses	40	CFA with varimax rotation, using PCA to validate extracted factors	Two-factor solution, 24% total variance

Only Two Factors in the Solution and Total Variance

Extracting a two-factor solution can occur in any Q study, because it depends on how many participants have similar viewpoints, which is called a factor (Yang, 2016, Lundberg et al., 2020). According to Yang (2016), if all participants provide comparable answers to the subject and therefore arrange statement items similarly, all correlations are going to be strong and positive, resulting in the emergence of just one Q factor. In contrast, if each person responses to the subject and therefore arrange statement items in a distinct manner, there will be no strong correlation between the different categories and no shared perspectives would arise.

In the current study, the analysis process resulted of a five-factor solution, which was then reduced to a two-factor solution using the five criteria discussed in Chapter 6. The resultant two factors represent 24% of the explained total variance in the study. In a similar case, the PhD study conducted by O'Shea (2019) used both CFA and PCA methods and yielded similar results. The author had to reduce a five-factor solution to a two-factor solution, with 45% of the explained total variance. According to the researcher, some of the emerging factors in the five-factor solution had fewer Q-Sorts loaded on them, resulting in an unclear factor that cannot be further discussed. O'Shea (2019) stated that other factors might have a higher total variance, but would not be statistically robust; hence, the total variance has less effect on extracting or interpreting the factors (Brown, 1993). In line with this, the current study faced a similar situation. Thus, choosing between the two solutions (five factors or two factors) depends on which solution can most rigorously represent the data, which turned out to be the two-factor solution.

Another point is that the explained total variances of all studies had different explained total variances, ranging from 72% to 34%, while this study explained a total variance of 24%. According to Watts and Stenner (2012a), citing Brown (1993), the proportion of explained total variance is less important than the factor structure's significance and consistency. A distinct and significant factor model that explains a smaller proportion of total variance could be far more enlightening compared to a meaningless factor model that explains a greater proportion of total variance. Thus, being concerned about the small percentage of explained total variances in this study was not an issue.

Large Number of Q-Sorts Not Significantly Loading to a Factor

According to Webler et al. (2009b), a Q study typically recruits 12 to 20 participants to sort 40 to 60 Q statements. (Brown, 1993) recommended 40 to 60 participants for a Q study, but smaller numbers of participants might be required in other studies (as discussed in Chapter 4); smaller sample sizes may be sufficient for various types of investigations. In this study, 54 participants were recruited. 26 Q-sorts were significant, 26 Q-sorts were non-significant, and 2 Q-sorts were confound. Having a large number of non-significant Q-sorts does not disqualify the study results; according to Watts and Stenner (2012b), non-significant Q-sorts have a minimal degree of communality, and are not substantially linked with any of the extracted factors. Thus, the non-significant Q-sorts in a project are not necessarily a failure of the project, and rather suggest that the participants have arranged statement items in a dissimilar manner. Such arrangements result in weak correlations between different Q-sorts, which leads to an the absence of shared perspectives (Yang, 2016). This shows that nurses have different views regarding the investigated issue, which is indicative that this field is complex, and needs further investigation.

Overall, by using a particular analysis test, the use of Q-Methodology facilitated the researcher in recognising different patterns of nurses' compliance behaviour within the sample. Unaware of the existence of two different factors detected by Q, the researcher may blindly think that all nurses exhibit the same compliance behavioural pattern, and hence view them in an identical way. Moreover, the factor scores unveiled the distinct attributes as well as resemblances of the nurses' compliance behavioural patterns, which might be used to investigate alongside other outcomes.

Q is an influential approach for analysing nurses' views and behaviours. The two-factor solution in this study provided a satisfactory interpretation of the data, which showed specific reasons that were supported by the literature. Moreover, the researcher enrolled in a Q-Methodology weekly seminar held by the Q-Methodology community to exchange knowledge. The researcher had an opportunity to consult some of the Q-Methodologist on the study's outcome, and they confirmed that having two-factor solution can occur in any study.