



Dissertation

“A study of material differences since the introduction of the High-Tech Hub order website - the acceptance and effectiveness of online technology in the healthcare product reimbursement process.”

A dissertation presented in partial fulfilment of the requirements for the degree of
MSc in Pharmaceutical Business and Technology (QQI)

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August 2024

Candidate Declaration

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I certify that the dissertation entitled:

“A study of material differences since the introduction of the High-Tech Hub order website - the acceptance and effectiveness of online technology in the healthcare product reimbursement process.” submitted in partial fulfilment of the MSc in Pharmaceutical Business and Technology, to the department of Pharmaceutical Business and Technology, Griffith College Dublin, is the result of my own work and that where reference is made to the work of others, due acknowledgement is given.

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Acknowledgements

I would like to express my sincere thanks to my supervisor Kathy Clarke, for her support, patience and the encouragement she has given me during this dissertation journey. It is said the right teacher comes along at the right time, and this is true of Kathy. To both faculties of Innopharma and Griffith College, thank you for allowing me the opportunity to undertake this Masters' degree.

This research study would not have been possible without the participants who generously agreed to take part in interviews and complete surveys. Thank-you for your time and your knowledge.

Dedication

I would like to dedicate my Masters' Dissertation to my family, Raymond, Caoimhe and Saoirse, without their support it would not have been possible. To my parents Patrick and Kathleen Griffiths, who gave me the gift of learning and to always be experiencing learning to its fullest.

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List of Abbreviations

BVB	-	Best Value Biosimilar
CPD	-	Continued Professional Development
DOH	-	Department of Health
DM	-	DeLone and McLean
EC	-	European Commission
EDI	-	Electronic Data Interface
EIM	-	Essential Innovative Medicine
EU	-	European Union
GOV	-	Government of Ireland
GMS	-	General Medical Scheme
GP	-	General Practitioner
HCP	-	Healthcare Professional
HIQA	-	Health Information and Quality Association
HSE	-	Health Service Executive
HTA	-	Health Technology Assessment
HT	-	High Tech
HTH	-	High Tech Hub
IPHA	-	Irish Pharmaceutical and Healthcare Association
IPU	-	Irish Pharmaceutical Union
PSI	-	Pharmaceutical Society of Ireland
MMP	-	Medicines Management Programme
NAS	-	Novel Active Substance
PCRS	-	Primary Care Reimbursement Service
TAM	-	Technology Acceptance Model
UX	-	User Experience
WHO	-	World Health Organisation
WSP	-	Work System Principles

Abstract

“A study of material differences following the introduction of the HSE’s High-Tech Hub order website - the acceptance and effectiveness of online technology in the healthcare product reimbursement process.”

Fiona Griffiths Kelly

Objective: In this study it was shown that the introduction of the Health Service Executive High-Tech Hub (HTH) website, had a positive effect on the high-tech product procurement process. The research intention was to determine if users found the website easier to use than the alternate procurement system, and if the High-Tech website supported the end-to-end reimbursement and payment process more effectively. By identifying and understanding the critical success factors that impact user’s satisfaction of online systems. The significance of this study was, no comparative data had been recorded since HT Hub launch, to allow comparative analysis with the alternate procurement system.

Methodology: The study adopted a mixed method approach, and was conducted through surveys with Irish community pharmacy, and interviews with pharmaceutical distribution companies. A combined total of 30 participants responded to the interviews and surveys. The data was collected and processed through Google Forms and Microsoft Office suite.

Results: The data analysis identified acceptance by users of the High-Tech Hub online implementation, and the effective integration of the HSE HT website with pharmacies and product supplier systems. The challenge identified was the operation of two procurement systems for High Tech products. The data also identified the need to provide additional support for community pharmacies, with the growing need for pharmacy care.

Conclusions: Based on this research, there is an opportunity for the HSE to fully integrate all High-Tech products on one online system, to bring greater efficiency and transparency to this €1Billion healthcare process.

Key words: High-Tech, reimbursement, technology acceptance, user experience, system dynamics.

1. Introduction

1.1 Topic

Pharma 4.0 - technology and connectivity, relates to the module 'Processes, Production and Pharmaceutical Quality Systems' (PPPQS). It enables transparency and efficient data sharing across multiple companies, locations, and stakeholder groups. The aim being to improve process quality, enable real time operations control, and support faster decision-making, traceability and accountability. (ISPE, 2022). The focus of this research study is the Health Service Executive (HSE) High-Tech Hub website and process. Launched in 2018, the hub website required all companies involved in the supply of high-tech (HT) medicinal products in Ireland, to integrate their systems with the HSE Hub, (Health Service Executive PCRS, 2017). The intention being to provide real time order supply status' between the HSE, community pharmacies and national product suppliers (ISPE, 2022). Enabling strategic oversight of product, patient and pharmacy data across the HT prescription fulfilment process, (Lynch, 2006). The HSE target at launch, was to transition all HT products from the alternate national pharmacy system PIMS (Pharmacy Internet Messaging System) to the HSE online system within two years. Six years later, the HSE are still using two separate systems, their online Hub system and the PIMS system, for HT product procurement to reimbursement of fees.

1.2 Purpose

The purpose of this research study is to determine the effectiveness of the HSE High Tech Hub process across industry users and understand how efficient it is from procurement to reimbursement compared to the alternate system. The HT hub process currently engages with twenty-eight companies (Table 1), who provide HT products to community pharmacies across Ireland. The aim is to understand if the introduction of the HSE website, to the HT process and has achieved the success factors set out below – identifying from research interviews and survey responses, if pharmacies and national supply companies find the hub system and process, more or less accurate, does it take more or less time to use than the older system, and overall do research participants consider the hub more, or less effective.

The research is being done to provide recommendations for the HSE and stakeholder companies, to expand the provision of services on the HSE website – by adding all remaining HT product therapies to this online platform and expand the platform further by adding all products involved in the General Medical Scheme (GMS) procurement process. If adopted, this would provide a full end to end ‘Prescriber to Patient to Product’ system, enabling full transparency and traceability, removing the ambiguity of a dual system process. In addition, this research will assess if this platform has improved the HT administrative process in Irish community pharmacies and if a reduction in HT product wastage has been achieved, as directed by the HSE in its Strategic Action Plan 2019–2021 (PCRS, 2019).

High Tech Wholesaler and Manufacturer Payments	Year
	JAN23-DEC23
Company	Amount Paid (€)
Allphar Service	€ 26,909
Astellas Pharma Co. Ltd.	€ 28,060,571
Beigene Switzerland Gmbh (Dutch Branch)	€ 1,728,641
Clonmel Healthcare Ltd	€ 2,666,484
Galway Drug Co.Ltd.	€ 14,298
Gilead Sciences Ltd.	€ 1,859,343
Glaxosmithkline Pharmaceuticals	€ 3,158,172
Incyte Uk	€ 819,315
Immedica	€ -
Imed Healthcare	€ 3,480,920
Kbfl Sciences Ltd	€ 3,957,690
Novo Nordisk	€ 1,695,875
Otsuka Pharmaceuticals	€ 360,182
Orphalan	€ 773,597
P.C.O. Manufacturing Ltd.	€ 5,613,001
Ptc Therapeutics International Ltd.	€ 2,501,209
Pfizer Healthcare	€ 60,600,404
Recordati Netherlands B.V.	€ 81,648
Rx Source Ltd	€ 7,705,332
Sciensus International B.V.	€ 4,551,765
Theravia	€ 132,496
Temperature Controlled Pharmaceuticals Ltd	€ 14,436,750
United Drug (Ballina)	€ 72,242,004
Uniphar Ltd.	€ 466,574,999
United Drug (Dublin)	€ 259,476,908
United Drug (Limerick)	€ 131,678,218
Vertex Pharmaceuticals	€ 77,726,258
Xentra Pharm Ltd	€ 2,218,032
Grand Total	€ 1,154,141,021

Table 1 - HSE High Tech Wholesaler and Manufacturer Payments 2023, (PCRS, 2024).

1.3 Significance

To give context to the significance of the research – the cost of high-tech (HT) medications purchased by the HSE exceeded €1 Billion in both 2021 and 2023. High-Tech purchases are forecast to exceed €1.3 Billion in 2024 (Figure 1), based on purchases from January to June 2024. Growth in the HT product category is set to continue, (IQVIA, 2022).

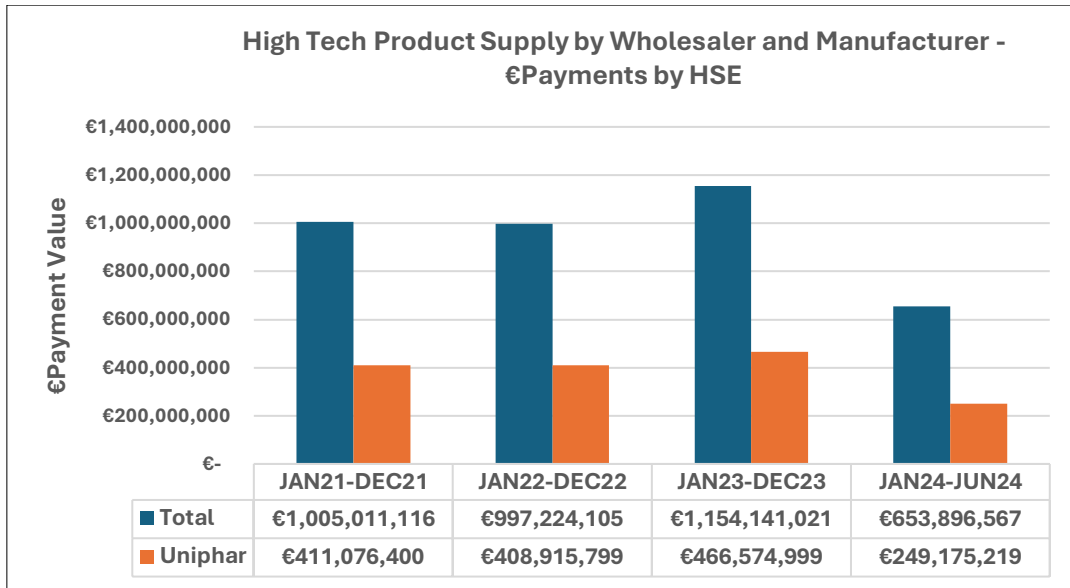


Figure 1 - HT Product Supply by Wholesaler, Manufacturer €Payments by the HSE, (PCRS, 2024).

High-tech products are specialised therapies, prescribed by medical consultants only. Product types include transplant therapies, fertility treatments, and chemo medications. HT products are clinically assessed by the Medicines Management Programme in Ireland (MMP, 2024), their aim being to introduce new therapies to Irish patients, as they become available on a global scale (IPHA, 2022), (IQVIA, 2022), (efpia, 2020). These products are ultimately purchased by the HSE and supplied to patients via community pharmacies. Pharmacies receive a reimbursement fee from the HSE for services provided to HT patients (PCRS, 2021). The HSE Primary Care Reimbursement Service (PCRS) are responsible for hosting and support of the HT Hub website, and for the payment of the HSE's Drug Payment Schemes, to include the HT reimbursement process, (IPHA, 2022).

In terms of uniqueness and relevance to the research – the HSE are both the Purchaser and Payer of High-Tech medications on behalf of the Irish Government. The introduction of the hub in January 2018 (Health Service Executive PCRS, 2017), and the slow transition of all HT products to the hub – means pharmacies must order certain HT products from the hub only, to receive the reimbursement fee. Failure to order these products from the hub means, those orders are treated as ‘private prescriptions’, and the pharmacy must pay for the product, not the HSE. If the pharmacy makes a mistake, and orders a HT Hub product on the alternate system, this is no longer accepted by the Hub, and the pharmacy must pay for the medication directly with the supplier and this means a loss of HSE reimbursement fee for the pharmacy. This strict process change has given the HSE tighter control over pharmacy high tech orders, and order data from pharmacies and product suppliers, which should result in a more timely, precise reimbursement and reconciliation process.

The alternate process (non-Hub) is administered through a manual reimbursement claims process, with pharmacies submitting a monthly claim file to the HSE, which may take weeks for the HSE to analyse and approve. The use of two parallel HT order systems, makes HT prescription fulfilment very complex for community pharmacy teams and raises the question – Why are the HSE using two systems for HT product procurement to the same pharmacies from the same supplier companies daily?

The research opportunity identified is – there is currently no information or data available to determine if the hub has been more successful in providing a more efficient and effective process for HT product procurement for the last six years, compared to the alternate system. This data is critical to demonstrate the value and gaps that might exist, between each system. This data could be used to recommend the implementation and full transition of all HT products to the hub platform. By analysing the primary research data and comparing the findings to the critical success factors considered most important to website users in healthcare settings, (Kucheriavy, 2024), (Intechnic, 2024b), identifying if the hub is the preferred and most effective system for the purchase, administration and reimbursement of HT products in Ireland.

1.4 Research - Question

“Has the introduction of the HSE High Tech Hub online order model, resulted in a more effective supply of High-Tech medications to community pharmacy – improving the pharmacy reimbursement process and reduced product wastage?”

1.5 Research - Hypothesis

The researcher hypothesizes that the introduction of the High-Tech Hub has delivered efficiencies in reduced time spent on administrative processes at community pharmacy level, increased awareness and traceability in the product to prescription dispensed relationship, and as a result a reduction in high tech product wastage (undispensed products). Using the critical success factors, detailed below, the research participants will be asked to rate the effectiveness of each.

1.6 Research - Objectives

1. To determine what material differences have been achieved with the introduction of the High-Tech (HT) Hub online model,
2. To assess the effectiveness of this Hub online technology in HT product fulfilment.
3. To assess the acceptance by users of this technology in HT prescription fulfilment.
4. The effect of the HT Hub on product costs and wastage.
5. To assess the administrative effect on healthcare professionals with this process change.
6. To recommend the implementation and full transition of all high-tech products to the hub platform, for all supplier companies and community pharmacies in Ireland.

1.7 HSE High Tech Hub - Critical Success Factors

Aligned with the research objectives, the below High-Tech website success factors will be considered important in surveying the effectiveness of the High-Tech Hub online model, and its continued use by healthcare professionals as a key information system, (Intechnic, 2024a), (DeLone and McLean, 2003), (Alter, 2017).

1. To determine what material differences have been achieved with the introduction of the HTH model,
 - Ease of use
 - Improved Support
 - Order Fulfilment

2. To assess the effectiveness of this Hub online technology in HT product fulfilment.
 - Process Quality
 - Interoperability
 - Improved data

3. To assess the acceptance by users of this technology in HT prescription fulfilment.
 - Better patient care
 - Improved Security

4. The effect of the HT Hub on product costs and wastage.
 - Reduced Cost
 - Reduced Rejections
 - Reduced Stock level

5. To assess the administrative effect on healthcare professionals with this process change.
 - Reduced administration
 - Time saved

1.8 Dissertation Outline

This dissertation has five chapters. Chapter one introduces the research topic - the survey and analysis of critical success factors following the launch of the Health Service Executive (HSE) High-Tech Hub process. This chapter explores the significance of the topic, recognising the 1€Billion spent annually by the Irish Government on high-tech medications (PCRS, 2024), using two parallel purchase systems. Chapter one details the research question, the hypothesis and introduces the research objectives and critical success factors to the HSE high-tech hub.

Chapter two discusses the literature review against the research objectives, beginning with web user experiences and critical success factors. The theme of cost and product waste, in terms of national and international spend on innovative medicines is reviewed (IQVIA, 2022), in the context of medicine shortages (HPRA, 2024). The theme of operational excellence and technology effectiveness is then considered, how it can support healthcare professionals to improve administrative tasks, allowing more time for patient care, aligned with the acceptance and trust of new technology, (Siemens, 2023). The last objective under the theme of care – both patient and pharmacy team care is analysed, to support forecasted growth in healthcare requirements needed (IPU, 2024a), (PSI, 2023). Chapter two concludes with a summary of findings, and gaps in secondary research that will be addressed with primary research, and the Conceptual Framework with timeframe for study completion.

Chapter three explores the research methodology, using the structure of Saunders research onion, (Saunders *et al.*, 2019). The justification for choosing an online survey for pharmacy, and in-depth interviews for supply chain companies, to gain deeper insights on the HT supply process. This chapter explains the philosophy applied to the research study, how it will be developed in theory, and justification for the methodological choice. It explains the sampling methods and why they were chosen for each research participant profile, and possible limitations and implications for the study. This chapter discusses the importance of validity and reliability, and the overarching importance of ethics in research.

Chapter four assesses and analyses the research findings, against the research objectives and themes. The data collected will be presented and explained with supporting graphs and tables, to demonstrate whether, or not, the hypothesis can be proved. Qualitative data will be presented identifying if common views or themes have been identified across the study participant group. The research study conclusions will be detailed in Chapter five, together with recommendations from the study and how the findings may be explored in the future.

2. Literature review

2.1 Background

In 2013, Ireland's 'eHealth strategy' was launched by the Department of Health (eHealth Ireland, 2013). The same year, Irish community pharmacies collaborating with pharmaceutical supply companies, launched a new national broadband procurement system - PIMS (Pharmacy Internet Messaging System), enabling real time digital order entry, with immediate order confirmation from product supply company, via electronic interfaces. It became the industry standard, and all pharmacies have diverted from the antiquated Direct Order Entry system (dial-up modems). With multiple vendors for PIMS in the Irish market, all systems work from one product file, ensuring product data is current and referenced with one IPU Code (Irish Pharmaceutical Union) (IPU, 2024b). Since launch, pharmacy orders have flowed to and from product supply companies 24/7, with the highest degree of accuracy and efficiency required in a GDP environment, (EMA, 2024), (EUR-Lex, 2001). The PIMS system demonstrates how full integration, with data centrality can be achieved, creating lasting transformation in medicinal product supply chains. This was possible with collaboration from all stakeholders - community pharmacy, wholesalers and system vendors, being open to improve the process for everyone (Stulp, 2022).

Also in 2013, the Department of Health (DOH) HSE's 'eHealth strategy' was launched (eHealth Ireland, 2013). Despite its promises and the eHealth strategy being included in other strategy publications since, (to be discussed, Figure 4). Compared to the PIMS system, eHealth has not delivered on - easier access to health records, greater transparency, system reorganisation and community focus of health services, (Figure 2). This strategy, and others by the Department of Health will be central to this literature review, following the research objectives - technology effectiveness, acceptance, and critical success factors of connectivity, efficiency and collaboration. There is however one exception – the launch of the HSE High Tech Hub website in January 2018 (Health Service Executive PCRS, 2017). Developed by the HSE's Primary Care Reimbursement Service team (PCRS), in partnership with suppliers of HT medicinal products. The HSE's intention at launch, was to transition all HT products from the alternate pharmacy system over to the HSE website model within two years. It has been six years and despite the web's daily use, the HT process remains unchanged. With pharmacies, product suppliers and the HSE operating within two different procurement processes – which is the focus of this study.

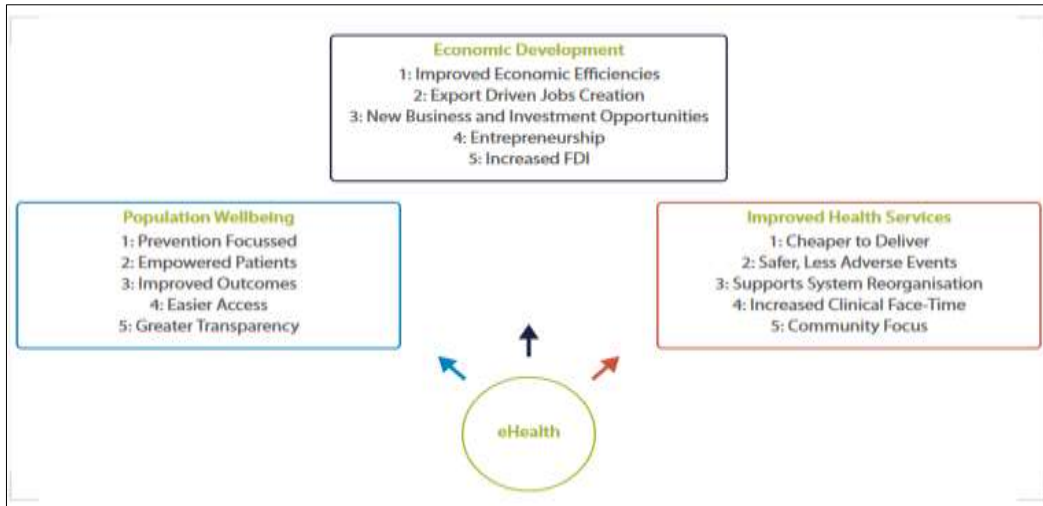


Figure 2 - eHealth will deliver benefits across three broad areas (eHealth Ireland, 2013).

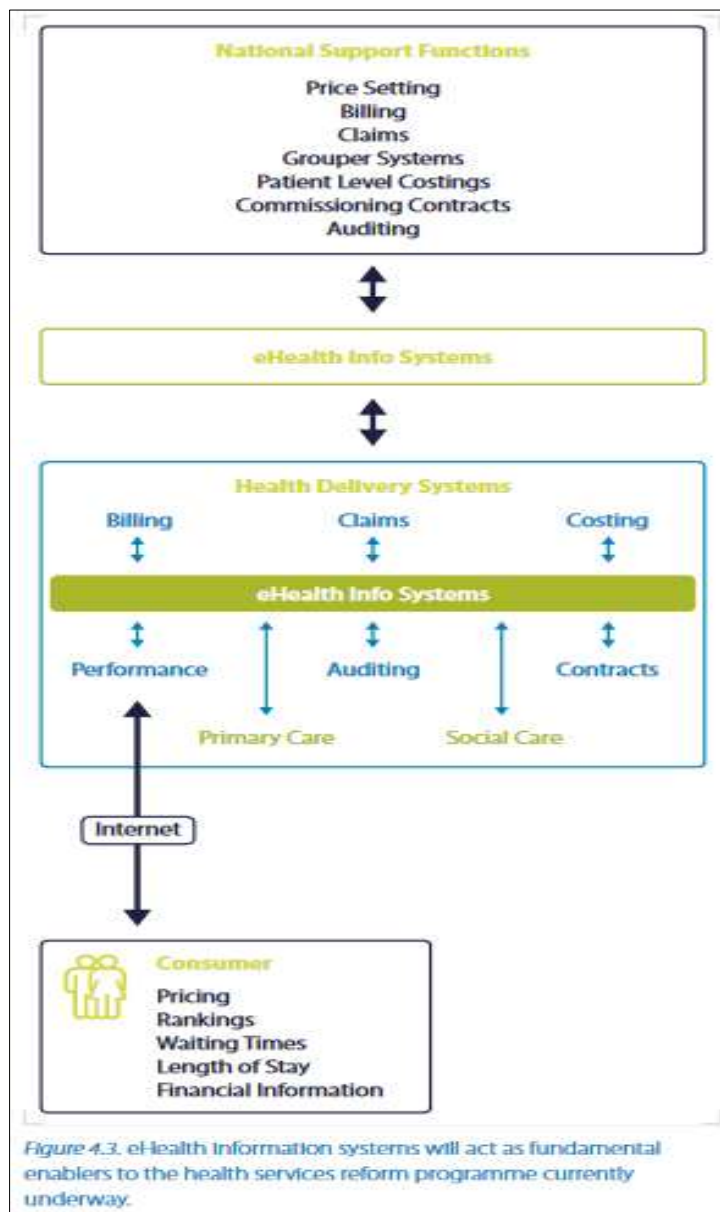


Figure 3 - eHealth Ireland 2015 - 2020.

The main observation of the 2013 ‘eHealth for Ireland’ strategy is the failure to launch. Its vision and content have been incorporated into multiple Irish Health Strategies, (Figure 4). Most recently included in the European Commission’s Digital Decade 2020 – 2030 document, (Government of Ireland, 2023) (European Commission, 2023). This literature review will refer to strategies in Irish Healthcare documents listed below, with international healthcare strategies and industry research. What will become apparent is the lack of data available on the new HSE HT Hub procurement system, despite HT product purchases increasing year on year. There is no data available to differentiate it from the current (alternate) HT procurement system. This leads to the research question and aims to prove the hypothesis - that ‘the introduction of the High-Tech Hub has delivered efficiencies in reduced time spent on administrative processes at community pharmacy level, increased awareness and traceability in the product to prescription dispensed relationship, and as a result, achieved a reduction in high tech product wastage’ (undispensed products).

The research timeline for healthcare publications is set out below in Figure 4. Divided into 3 Sections. the first being European publications and ongoing HPRA / product data sources. The second section (in blue) shows the extensive range of Irish government healthcare publications beginning with 2013 ‘eHealth Ireland Strategy’ and the third listing from the Pharmacy Union (IPU) and the Pharmacy Regulator (PSI). This reference list forms the backbone against which the research objectives and themes have been reviewed, and whilst this list of Irish Healthcare documents appears lengthy (HSE, DOH), there is a great deal of ‘carry forward’ of strategies and information contained therein. That is why the listing begins in 2013 and continues to the current year. This could indicate a weakness in the strategies, and support systems or that the visions are too big to introduce in significant launches. The research observation is that they do not lack purpose, clarity or motivation. They are well thought out, with defined pathways and targets. Commitment, collaboration and follow-through appear to be the barriers, (Price, 2022).

Timeline	Main Literature Sources	Citation	Research Objective (Theme)
2013	PIMS - Pharmacy Internet Messaging System (<i>launch broadband technology</i>)		3. Technology - Acceptance
2020	European Commission - Digital Decade Policy 2030 [DESI Index]	(European Commission, 2021)	3. Technology - Acceptance
2022	European Commission - Digital Decade Policy 2030 [DESI Index] - 1st 2 Year Review	(European Commission, 2024)	3. Technology - Acceptance
2022	Regional Digital Health Action Plan for WHO European Region 2023–2030 (RC72)	(WHO, 2022)	3. Technology - Acceptance
2022	European Commission - Digital Decade Policy 2030 [DESI Index] - 2nd 2 Year Review	(European Commission, 2024)	3. Technology - Acceptance
Ongoing	IPU - Product Information Files	(IPU, 2024c)	3. Technology - Acceptance
Ongoing	HPRA - Medicines Shortages	(HPRA, 2024)	3. Technology - Acceptance

Figure 4 - Ireland's Digital Health Strategy - Timeline (Source: Researchers own).

Section 2, and 3 of 3:

Timeline	Main Literature Sources	Citation	Research Objective (Theme)
2013	HSE - eHealth Ireland Strategy	(eHealth Ireland, 2013)	3. Technology - Acceptance
2014	ETP via Healthmail (<u>NON-Pharmacy</u>)	(eHealth Ireland, 2024)	3. Technology - Acceptance
2015	HSE - eHealth Ireland - Knowledge and Information Plan	(eHealth Ireland, 2013)	3. Technology - Acceptance
2016	HSE - Individual Health Identifier (IHI): HSE <u>PharmaVax</u> and GP (<u>NON-Pharmacy</u>)	(PCRS Primary Care Reimbursement Service, 2019)	3. Technology - Acceptance
2018	HSE - PCRS HIGH TECH HUB = Hard launch (2 Process System)	(Health Service Executive PCRS, 2017)	1. HTH Critical Success Factors
2019	HSE - PCRS STRATEGIC PLAN 2019 - 2021	(PCRS, 2019)	2. Technology - Effectiveness
2019	SLAINTE CARE - ACTION PLAN 2019 (MID YEAR DELIVERABLES REPORT)	(GOV.IE, 2019)	2. Technology - Effectiveness
2020	<u>HSE - HIGH TECH HUB (Contingency Backup System)</u>	(HSE, 2020)	1. HTH Critical Success Factors
2020	Stephen Donnelly - Minister for Health, June 2020.		Pharmacy Care - Appointment
2020	ETP via Healthmail - <u>Pharmacy (2 Process System)</u>	(eHealth Ireland, 2024)	3. Technology - Acceptance
2021	DOH - Spending Review (2021), Healthcare Capital Investment Ireland	(Department of Health, 2021)	4. Cost, Wastage.
2021	<u>Sláintecare</u> Implementation Strategy and Action Plan 2021-2023	(GOV.IE, 2021a)	3. Technology - Acceptance
2021	<u>Sláintecare</u> Programme Board established 2021	(GOV.IE, 2021b)	Pharmacy Care - Appointment
2022	Architect of Health: HSE Director of Digital Transformation - <u>Martin Curley (starts)</u>	(Curley, 2022)	Pharmacy Care - Appointment
2023	Architect of Health: HSE Director of Digital Transformation - <u>Martin Curley (leaves)</u>		Pharmacy Care - Resignation
2024	HSE - Capital Plan 2024		2. Technology - Effectiveness
2021	PSI - Corporate Strategy (2021-2024)		5. Pharmacy Care
2023	PSI - Workforce Intelligence Report	(PSI, 2023)	5. Pharmacy Care
2023	HIQA National Engagement on Digital Health and Social Care - Professional Survey	(HIQA, 2023)	5. Pharmacy Care
2023	IPU - Fitzgerald Power Pharmacy Pulse Report (<u>PCRS Reimbursement Fees</u>)	(Fitzgerald, 2024)	4. Cost, Wastage.
2024	IPU - Public Attitudes towards Pharmacy Survey (2024)	(IPU, 2024a)	5. Pharmacy Care
2024	IPU - Annual Review of Community Pharmacy Sector	(Fitzgerald, 2024)	5. Pharmacy Care
2024	IPU - <u>Pre Budget Submission 2025</u>	(IPU, 2024b)	5. Pharmacy Care

2.2 Theme 1 – Web Material Differences – Critical Success Factors

Web platforms provide effective communication tools between organisations and customers, with user experience critical to ensuring the adoption and continued use of the site, (Intechnic, 2024a). In the context of the HSE Hub, this means the HSE, prescribers, pharmacists and product supply companies. A wide group of business users, requires careful consideration of the elements needed to provide an effective user experience, combined with systems integration to meet the operational needs of all users. As the Hub website is used by all pharmacies in Ireland and integrated with 28 supply companies, both web pages and system-to-system interfaces need to be seamless, and able to adapt to the changing needs of the healthcare industry. In determining the success factors for the HT Hub, two models were used. Firstly, Alter’s Work System of Principles, Figure 5. Beginning with pleasing customers and balancing priorities of different customer types. It highlights the importance of performing work efficiently and monitoring quality and timing of data, which is critical to the hub website with time critical ordering and provision of medications. It alludes to security, within information, giving sufficient information to prompt action. And use of cost-effective technology to reduce efforts. The importance of maintaining compatibility with other work systems, and ability to adapt and grow is highlighted. While these principles and features are important, currently we cannot review the Hub against same, but can include these elements in future analysis.

Customers		Product/Services	
#1: Please the customers. #2: Balance priorities of different customers.			
Processes and Activities			
#3: Match process flexibility with product variability #4: Perform the work efficiently. #5: Encourage appropriate use of judgment. #6: Control problems at their source. #7: Monitor the quality and timing of both inputs and outputs. #8: Boundaries between steps should facilitate control. #9: Match the work practices with the participants.			
Participants		Information	Technologies
#10: Serve the participants. #11: Align participant incentives with system goals. #12: Operate with clear roles and responsibilities.		#13: Provide information where it will affect action. #14: Protect information from inappropriate use.	#15. Use cost/effective technology. #16: Minimize effort consumed by technology.
Infrastructure	#17: Take full advantage of infrastructure.		
Environment	#18: Minimize unnecessary conflict with the external environment		
Strategies	#19: Support the firm’s strategy		
Work System as a Whole	#20: Maintain compatibility and coordination with other work systems. #21: Incorporate goals, measurement, evaluation, and feedback. #22: Minimize unnecessary risks. #23: Maintain balance between work system elements. #24: Maintain the ability to adapt, change, and grow.		

Figure 5 - Work System Principles (Alter, 2017).

The second analysis model used more closely with information systems is the ‘DeLone and McLean model of information systems success’ (DeLone and McLean, 2003), Figure 6. It breaks down review criteria into 6 elements, focussing on quality, satisfaction and benefits. This model would work well with web design and service delivery measurement and like Alter’s model, could be used in the future to determine the success of the Hub against these key elements.

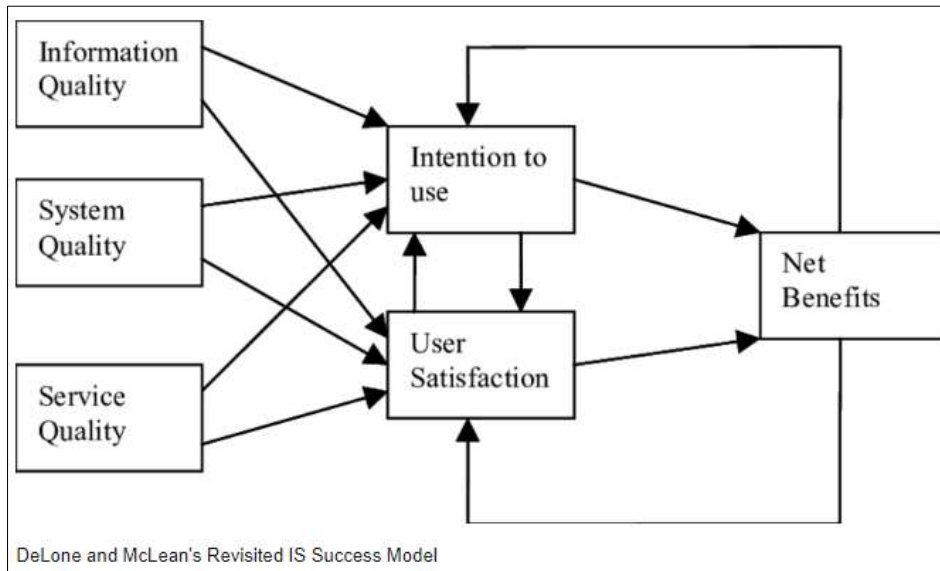


Figure 6 - DeLone and McLean model of information systems success (DeLone and McLean, 2003).

Taking ideas from both models and best practices from healthcare web design, the HT hub will be measured in the future against the objectives and critical success factors below.

1. To determine what material differences have been achieved with the introduction of the HTH model,
 - *Ease of use, Improved Support, Order Fulfilment.*
2. To assess the effectiveness of this Hub online technology in HT product fulfilment.
 - *Process Quality, Interoperability, Improved data.*
3. To assess the acceptance by users of this technology in HT prescription fulfilment.
 - *Better patient care, and Security.*
4. The effect of the HT Hub on product costs and wastage.
 - *Reduced Cost, Reduced Rejections, Reduced Stock level*
5. To assess the administrative effect on healthcare professionals with this process change.
 - *Reduced administration, Time saved.*

2.3 Theme 2 - Technology Effectiveness

The importance of innovation, digital transformation, and data oversight are an advantage to any organisation (Lynch, 2006). The positive impact on processes – ease of use, error reduction, more intuitive training processes and the promotion of sustainability, using digital technologies to positively impact community pharmacy, and by association the environment, (European Commission, 2023). In 2020, the HSE launched the Covid Tracker app. It was developed and launched nationally within a matter of months, available to mobile devices nationwide. The critical success factor here was investment and commitment to deliver, (HSE, 2020a). Also, during the pandemic, the HSE’s expansion of ‘Healthmail’ to include community pharmacies, allowed for the exchange of prescriptions and patient information between healthcare providers. This system is still in use today, however it still requires pharmacists to ‘print and sign’ the prescription as the official record, (eHealth Ireland, 2024), (HIQA, 2023). This Healthmail system includes a directory of registered users, providing a network of contacts between HCPs – doctors, dentists, pharmacies – both hospital and community as well as optometrists. Pharmaconnect CEO, Cormac McKenna, recently commented that community pharmacy has become a ‘primary care hub’, (McKenna, 2024), noting this expansion of care, pivots on the development and introduction of integrated technologies, that are central to pharmacies operational efficiency and improved communication channels, (Navi Group, 2024). Pharmacies need to adopt new technologies and key to this is investment both centrally, through the HSE, and locally with pharmacy system providers, providing maintenance and support.

With the cyber-attack to HSE systems in May 2021, (HSE, 2021) (RTE, 2021), the fragmented design and operation of hospital and primary care locations, meant it was more difficult to quantify the extent of the breach and bring systems and process back online in an organised efficient manner. The knock-on effect to patient records, continuity of care, and product supply, made it difficult for all stakeholders in the healthcare supply chain, to work with HSE teams as effectively and efficiently as possible. (HSE, 2020b). In 2020, the High Tech Hub enabled an ‘online contingency website’ with two factor security authentication, so that pharmacies could order patient specific prescriptions and ensure continued care of these extremely important medications. If the provision of the HSE High Tech (online) Hub in 2018 and the subsequent addition of the High Tech (online) Hub contingency system were done in a controlled systematic way (HSE, 2020b), why can that system not be further developed and optimised for use across all General Medical Schemes? The research study aims to identify the obstacles that are preventing the expansion of the high-tech Hub for other product prescription ‘order to cash’ activities in the community pharmacy setting. (European Commission, 2021).

Looking at the High-Tech Hub website, order system process flow, (Figure 7), it is a straightforward process, already using the HSE’s GMS (General Medical Scheme) Codes from Prescriber, to patient, to product to pharmacy, with the distributor/supplier as well as the manufacturer having unique GMS codes. In the eHealth Ireland Strategy, the HSE is looking to replace some of these GMS codes in favour of new codes? Why if the system is working well nationally, seven days a week over six years, would you look to change that. Would you not take the opportunity to optimise its use. The research intention is to explore the opportunities within the HT Hub website-process.

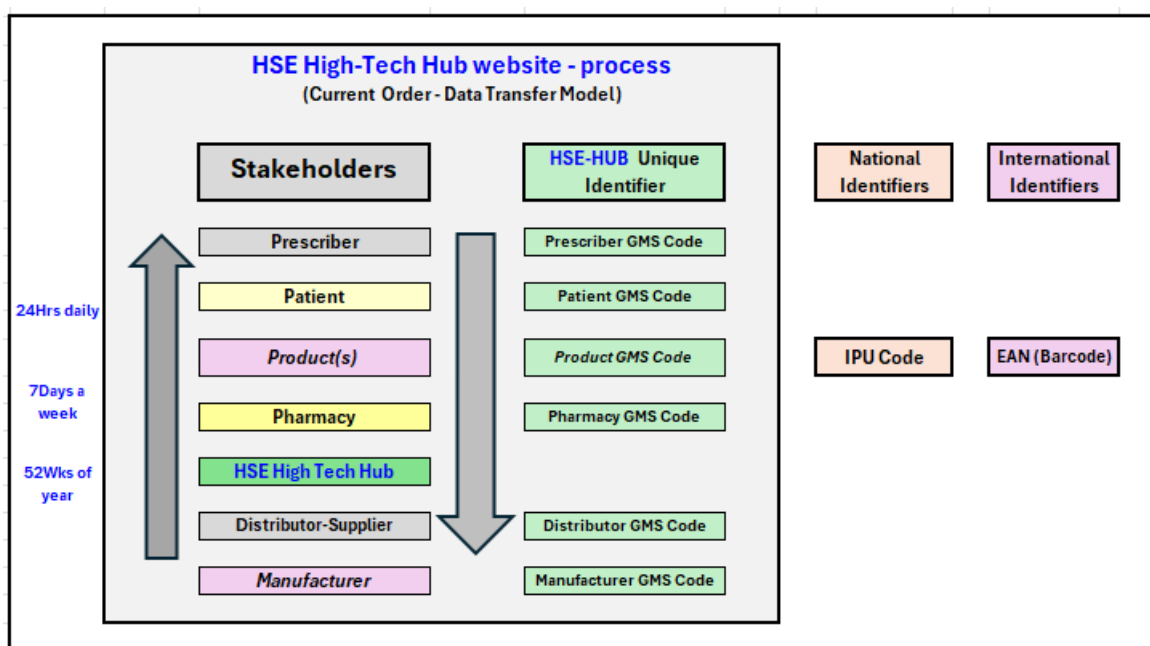


Figure 7 - HTH Process Flow - Order Fulfilment Model, GMS Codes. (Source: Researchers Own).

Continued HT Hub stakeholder engagement is needed, and essential to the continued success and development of the High-Tech support process. A cultural transformation will be needed at HSE level to meet this need, (Mesko, 2017), and to gauge the appetite of users for the transition to a one-system model, being the HT Hub, for all product procurement. Using the HT Hub as a quiet trailblazer, as it has worked successfully for the past six years. For the system to stay as it is, it has already regressed. The research suggests the desire on the part of the HSE PCRS team, to improve this integrated process at pharmacy level, and build from an established base.

2.4 Theme 3 – Technology Acceptance

The community pharmacy network in Ireland is central to the adoption of the HSE HT Hub website. Their support of the system and its correct use, ensures essential medications can be sourced and supplied for patient use. At the time of the hub launch, the pharmacist community positively supported the introduction of the Hub, promoting its use to provide better patient support, (Excellent Pharmacists Academy, 2020), despite its quick release by the HSE. To determine how effective the HT Hub has been since launch, at the time of review we are unable to gather data on its use. In general, Technology Acceptance can be measured by the Technology Acceptance Model (TAM) Model (Figure 8), used to gauge users' acceptance and attitudes to technology. Dependent upon levels of 'use', influenced by surrounding conditions, the TAM model is concerned with how seamlessly users can interact with the technology and what they hope to gain by using it, (Fiorini, 2018), (Nazari-Shirkouhi *et al.*, 2023).

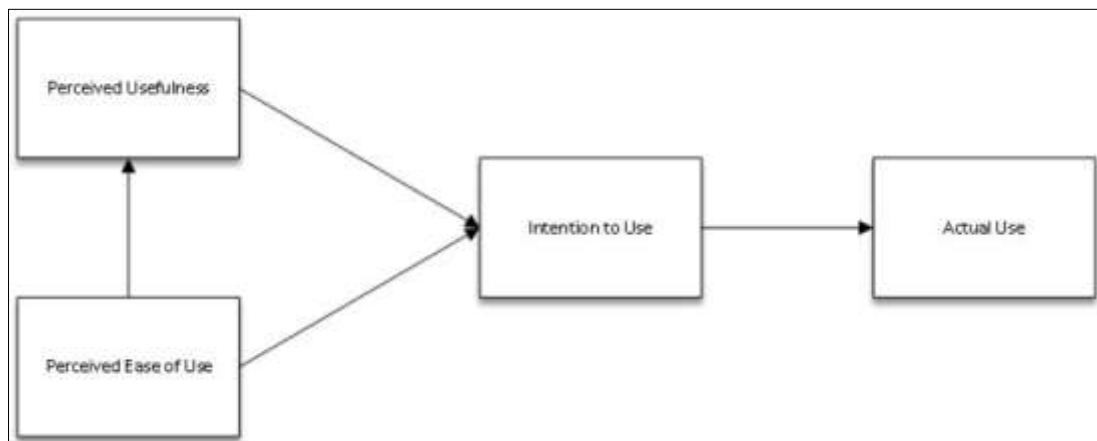


Figure 8 - Technology Acceptance Model (David 1985), (scherer, 2019).

Technology acceptance is very much to the fore of the European Health agenda, with the World Health Organisation, European Region 2023-2030 Digital Health Plan, promoting a digital environment that will deliver interoperability, trust and transparency in technology usage, (WHO, 2022). This is partnered by the European Commission, in their "EUR-Lex - European Declaration on Digital Rights and Principles for the Digital Decade 2023/C 23/01", (European Commission, 2023), adding solidarity, digital education and digital public services to the initiative. Ireland is already at odds with the European Commission's Directive, reporting they will aim for 80% by 2030, with the European target at 100%. Current European averages are already at 73%. It's a concerning statement, and unfortunately referencing most other Irish healthcare publications in the last decade – failure to commit is a trend. The secondary data findings are, there is never a perfect time to start or indeed launch, but there needs to be a starting point, with leadership and vision, (Government of Ireland, 2023).

In Deloitte's Digital Transformation Survey, Scottsdale Institute (Deloitte, 2021), organisational leaders were surveyed and respondents identified under the themes, 'digital all-rounders' and 'digitally developing', determined by their capacity to change. This was further qualified by the need to have a clear framework and communication language, to effectively guide those organisations along the transformation journey. This plan should be able to adapt and change as industries and organisations evolve, with key skills being leadership and the ability to effectively manage change, (Shudes, 2021). This idea is further supported by Hargadon, (Hargadon, 2005) who posits most successful organisations re-organise and re-focus old ideas and systems in newer ways, creating a continuous path of fresh ideas, building on their existing strong business base. So why doesn't every organisation adopt this approach? What makes it easier for some and difficult for others, as is the case with the prolonged HSE eHealth Strategy.

The Digital Transformation Survey (Deloitte, 2021) further explains that the top three barriers to overcome, to achieve digital success are talent, budget and data. This may explain the reason for the protracted rollout of the eHealth for Ireland plan (eHealth Ireland, 2013), having gained and lost some key business leaders in recent years, and not related to the Covid 19 pandemic. Professor Curley (formerly HSE Digital Director) would agree with the Deloitte observations, in his opinion the HSE was "not fit for purpose" and "clinicians are pushing for this (change), but the resistance is coming from administrators that do not have clinical backgrounds", also noting that "outmoded and outdated IT systems are a hallmark of the Irish health service", (Curley, 2022). A view also shared by Paul Reid, (former HSE Director General), who when resigning advised feeling "constrained in the HSE's ability to deliver change" (Bowers, 2023).

Figure 9 demonstrates at an international level, Ireland's lack of success in rolling out 5 key elements for a national digital healthcare system. Except for Scotland, who has a 'Unique Patient Identifier' and an 'Electronic Health Record', in terms of e-prescribing, vaccination registries and health information exchanges, Ireland is 'in the pipeline' for 4 of the 5 e-health system – yet to launch, (IPU, 2024a).

KEY ENABLERS FOR A SUSTAINABLE PHARMACY MODEL

The table below compares existing ICT systems in these countries with an impact to pharmaceutical care:

Table 2: International Evidence for eHealth Systems

	IRELAND 	SCOTLAND 	ENGLAND 	AUSTRALIA 	CANADA 	NETHERLANDS 
Unique Patient Identification	Yes (IHI – but not available to many systems)	Yes (NHS Number)	Yes (NHS Number)	Yes (Individual Health Identifier)	Yes (Each province issues their own)	Yes (Citizen Service Number)
Electronic Health Record	No	Yes	Yes (90% of trusts)	Yes (My Health Record)	Yes	Yes
ePrescribing	No (In the pipeline)	No (In the Pipeline)	Yes (95% of all prescriptions)	Yes (Since 2023)	Yes	Yes (Over 90% adoption)
National Vaccination Register	No	No (Paediatric register only by province)	Yes (National Immunisation and Vaccination System)	Yes (Australian Immunisation Register)	No (Canadian Immunization Registries & Coverage Network aggregates national data)	Yes (Part of its National Immunisation Programme (NIP))
Health Information Exchange	No (In the pipeline – NSCR)	Yes	Yes (Regional shared care records)	Yes (Varies by state)	No (Investing in infrastructure)	No

Figure 9 - IPU White Paper, Pre Budget-Submission 2025. (IPU, 2024a).

2.5 Theme 4 - Product Management – Cost and Waste

The healthcare budget is always high on the national agenda. Any cost savings or efficiencies should be thoroughly reviewed and implemented where possible. The research topic, HT specialised medications, and the introduction of the new HT online system, aimed to reduce product purchase costs, by removing the pharmacies ability to stockpile product, and give improved visibility of prescribing and dispensing data by the HSE. (PCRS, 2019). As the HSE pays for 80% of the medicinal products purchased nationally, there is a legal obligation on all stakeholders within supply chain to do so fairly and transparently. (Global Legal Insights, 2021). The most recent report available of 'Total HSE Payments and Reimbursements' is 2020, (PCRS, 2021), showing a total spend by the HSE of €3,334.03m, up 9.5% from €3,042.46m from 2019. Reviewing these costs, the 'High Tech' spend is significant at €944.49m or 28.3% of Total Payments in 2020, also including fees to Pharmacists, Dentists, Hospitals and GPs. In 2020, the total number of people receiving High-Tech medications was 92,691, up from 60,888 people in 2011 (52% increase in 9 years), and High-Tech items dispensed had dramatically increased from 361,419 in 2011 to 798,437 in 2020, a 121% increase, (PCRS, 2021).

There has been significant focus in recent years on product prescribing practices and cost effectiveness. This began over a decade ago with the shift from branded to generic medicines, which are now standard, (O'Leary, 2015). This shift has recently focused on higher priced specialised medications (high techs). Darragh O'Loughlin (IPU General Secretary) asked for legislative change to allow pharmacist control over HT product substitution. The debate for implementation was robust, with cost savings of €800 million proposed over a 5-year period, noting at that time, the annual HSE spend on high tech biologics alone was expected to reach €900 million in 2020 (Curran, 2018), this proposal has yet to be implemented by the HSE. The introduction of the HT Hub gives access to reimbursement data and payment reconciliation data, that would previously have been administered through manual reclaim submissions. In the past, submissions would have been by courier or post – which was subject to timing delays and errors. The relevance to the research topic, as the HSE is both purchaser and payer of HT Medicines, is to identify if data exists on administrative costs and time saved in High Tech claims from retail pharmacy. There is a significant volume of data, transparent to supplier level, showing €spend and trends. However, no data exists to identify if the HT Hub process specifically has improved, and product wastage reduced.

The main difference between the two HT procurement systems is, the alternate system allows pharmacies to purchase ‘multiple quantities’ of products at one time, for multiple patients. When bulk orders arrive to pharmacy, stock is then allocated to each patient. Using the hub system, there is a one-to-one relationship between the patient and product - with orders submitted by product code to specific patient codes, with a product to patient relationship from the prescriber, through to dispensing. The HSE will argue the latter is a more effective system, reducing product costs and order errors, keeping supply and payment queries to a minimum. (Health Service Executive PCRS, 2017). The pharmacy argument is increased time spent on daily administrative tasks – making the pharmacy budget more expensive, (IPU, 2024a). To find the balance between two systems is difficult, as pharmacists must remember which system hosts which HT product, and place orders accordingly. The HSE publish one monthly dataset (PCRS, 2024), which does not breakout fees per system type, so currently there is no way to determine the pros and cons to each process, which model is more effective.

When the Pharmacy Taskforce was launched in 2023 by the Department of Health, to support pharmacists in using their training and knowledge to best care for patients in home settings, (Medical Independent, 2023), it was highlighted that current fees paid to pharmacists were 24% lower than in 2009. The Minister for Health, Stephen Donnelly, gave his comments below and no changes have been made yet to pharmacist fees, despite the introduction of the new enhanced pharmacist services for minor ailments, as recently as August 2024, (Fitzgerald, 2024). Figure 10 highlights the growth in PCRS items dispensed growing significantly more, than PCRS Payments.

“Pharmacists are highly trained, valued healthcare professionals who already use their extensive training and expertise in medicines to help people every day. They were tremendous partners during the recent Covid pandemic and made a hugely positive contribution to our vaccination programme.”
 (Medical Independent, 2023).

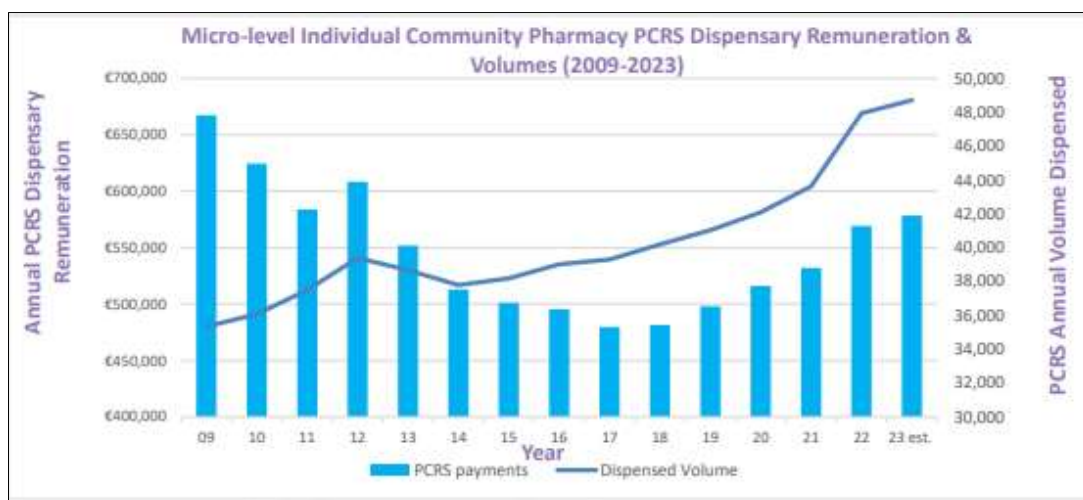


Figure 10 - Community Pharmacy PCRS Remuneration & Volumes 2009-2023, (Fitzgerald, 2024).

People may think it is given that the HSE want to make the product to patient process more efficient. This is a view strongly held by the Pharmacy Union, (IPU, 2024a) and the Pharmacy Regulator (PSI, 2023). However, there is no evidence from the DOH or the HSE to support this, as no process or technological system improvements have been made in recent years. Again, we might ask why?

To give a balanced account of the literature review, it should be noted that Ireland, when it comes to paying for High-Tech medications is outperforming the European average in several drug therapies. Of 26 countries, Ireland ranks fifth for reimbursing 20 of the top Essential Innovative Medicines (EIM), Figure 11, (IQVIA, 2022). Also reported in the average utilisation of EIMs in Europe being 100, Ireland ranks slightly higher than the European average, (IQVIA, 2022). Of 7 key therapeutic areas for essential medicines, Ireland ranks higher than the European average for Oncology (115), (Figure 12), with Immunology ranking 7 of 36 countries, at 183, (Figure 13). It is clear there has been significant investment by the Medicines Management Programme in products and in turn patient care, (MMP, 2024). What is now needed, is a more effective High-Tech procurement to payment process, that will support Irish patients and the healthcare system, well into the future.

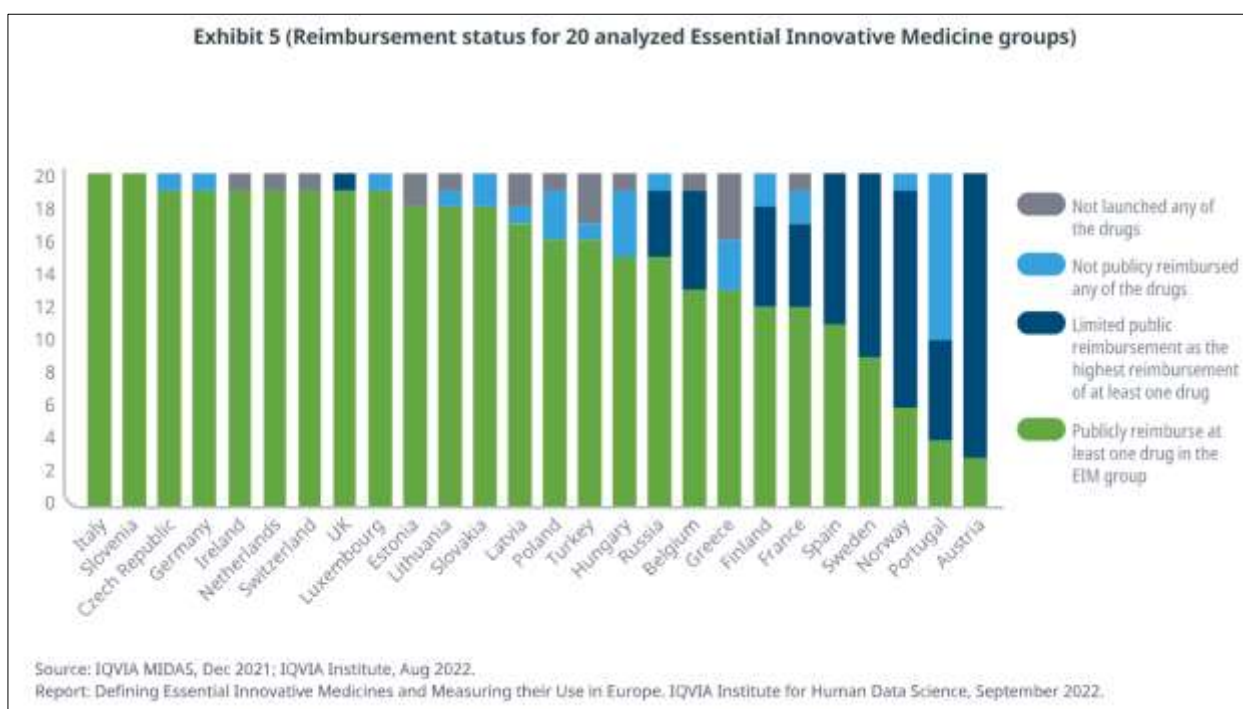


Figure 11 - Reimbursement status for 20 Essential Innovative Medicine Groups (IQVIA, 2022).



Figure 12 - Ireland - Average per capita Essential Innovative Medicines by therapy, (IQVIA, 2022a).



Figure 13 - Immunology- Avg. per capita Essential Innovative Medicines by therapy (IQVIA, 2022a).

Theme 4 - Product Management – Waste

The expectation for better stock management (PCRS, 2021) has been highlighted again this year by the HSE and the Medicines Management Programme (HSE, 2024). Requesting all new patients listed for certain cancer treatments, be prescribed the Best Value Biosimilar (BVB) – encouraging greater use of the High-Tech Hub online order model, allowing the HSE greater visibility of the causal relationships from prescriber to pharmacy to product dispensed, (IQVIA, 2022), Figure 14. This addresses the historical concern of product wastage (undispensed product in community pharmacy). With the launch of the HT hub in 2018, there was commercial concern with product stockpiling, and with the introduction HT Hub this would reduce (Health Service Executive PCRS, 2017). The concern was mainly pharmaceutical companies expecting a sales reduction until prescribing found its new level, with product demand eventually increasing once adoption of new medications was utilized.

There are obligations on all stakeholders with medicine shortages, (HPRA, 2024) to mitigate against out of stocks and source best products at the best price for patients. Global Pharmaceutical companies are reducing product listings in Ireland for commercial reasons, putting pressure on pharmacy, hospitals and the HSE to maintain supply and patient care.

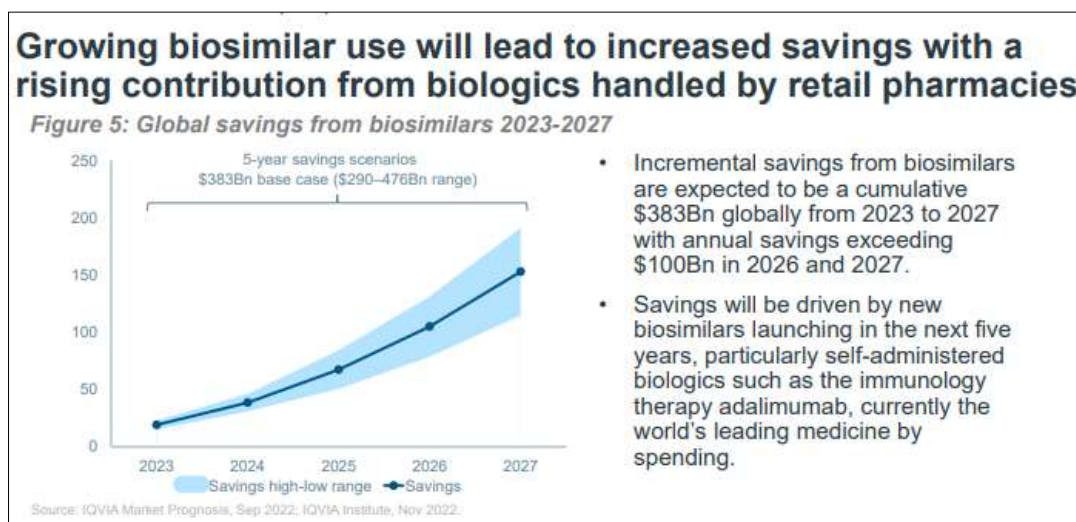


Figure 14 - Global savings from Biosimilar use 2023-2027, (IQVIA, 2022a).

2.6 Theme 5 – Care - Administrative Effect and Pharmacy Growth

Dependence on community pharmacies has never been higher, with pharmacy visits at 51% of people visiting their pharmacy weekly (IPU, 2024a), to avail of services now offered. In the IPU IPSOS Survey 2024, pharmacy visits are quoted at 78 million annually, compared to 29 million attending their GP and 3.4 million attending outpatient hospital services, (IPU, 2024a). This is a staggering requirement on pharmacy support. In the IPU's 'Pre Budget-Submission 2025', there is growing concern noted amongst pharmacists that the needs of pharmacies are not being taken seriously by the Department of Health. With worrying trends from pharmacists suggesting leaving the pharmacy profession in the near future, which would have serious implications for patients and the HSE, referring to the numbers above. Pharmacists are time tight, routine tasks should be made easier and where possible automated, to make prescription dispensing easier and errors eliminated (Aldhwaihi, 2016). Easing the administrative burden on pharmacies, (Beaton, 2022) and focusing on opportunities for interoperability between healthcare providers is critical for patient and pharmacy teams care.

“Healthcare demands and costs are outpacing clinician availability and system capacity. Radical innovation is required”, (Diamandis, 2016). Diamandis goes on to say that health should be viewed as an investment in the future and not as a cost. This requires collaboration to support the national health strategy with true leadership, (Curley, 2022). Dr. Michael Curley was thought to be the ‘best person for the job’ when he joined the HSE in 2022 but left the following year citing a resistance to change within the organisation and “that the problem is bigger than the HSE”. There needs to be a rapid review of pharmacy services, (Medical Independent, 2023) in conjunction with a review of technology infrastructure to update the current solutions which are outdated and siloed, (Health Service Executive PCRS, 2017) (Navi Group, 2024).

This in turn should address the administrative support needed in pharmacy, and the removal of outdated systems and processes through digital transformation, showing a genuine commitment to the profession and pharmacy community.

2.7 Literature gaps and research opportunity

Using secondary data alone, it cannot be determined if the high-tech product procurement and support process has improved. No research evidence exists within HSE reports, Department of Health data, or industry reviews, related to the HSE Hub model and its effectiveness in product supply, (PCRS, 2021). This lack of data presents the opportunity to conduct research with the High-Tech industry and gather feedback on the use of HSE High-Tech online model.

The literature review highlights there is no data on the High-Tech Hub currently to answer the below:

- What material differences have been achieved since the introduction of the High-Tech Hub?
- Is the Hub an effective online system for HT product fulfilment?
- Is the Hub accepted by users as the technology of choice in HT prescription fulfilment?
- Has the Hub had a positive effect on product wastage, and reduced costs?
- Has the Hub reduced the administrative burden on pharmacy and supply chain teams?

2.8 Conceptual Framework

Figure 15 highlights the phases of the dissertation, from initial idea, through to stages of the research study. The table that follows gives background and structure to the research process steps.

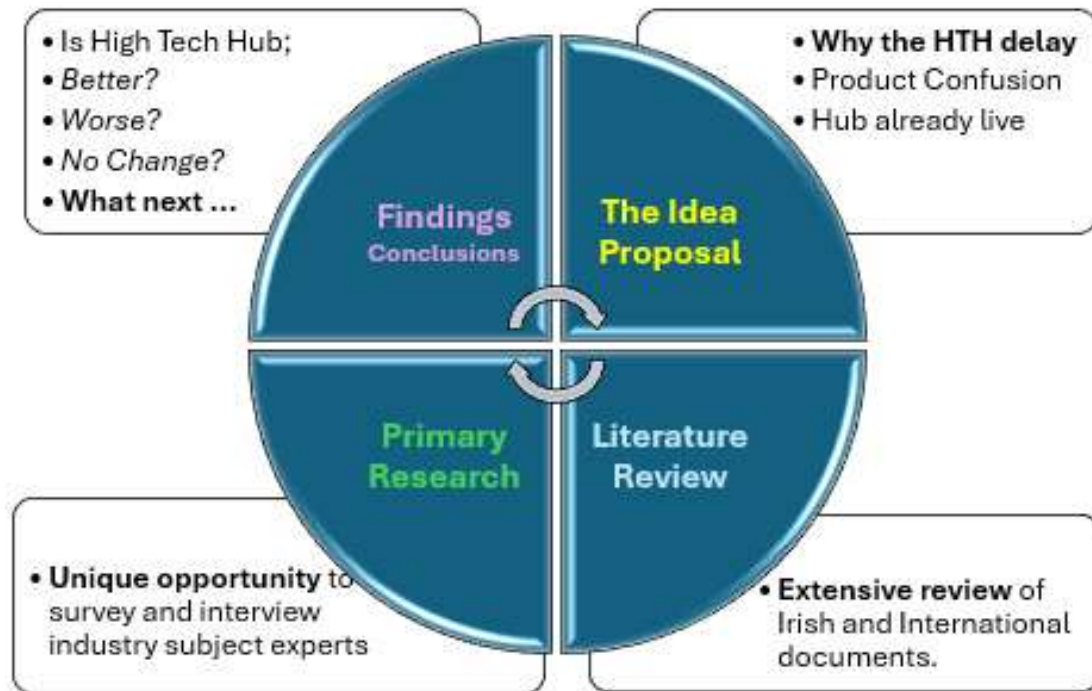


Figure 15 - The Conceptual Framework - Dissertation Idea to Delivery, (Source Researchers Own).

Research Topic
"A study of material difference(s) since the introduction of the High-Tech Hub order website - the acceptance and effectiveness of online technology in the healthcare product reimbursement process."
Aim
To answer the research question - "Has the launch of the HSE Hub website resulted in more effective supply of High-Tech medications to retail pharmacies and patients, in turn improving the pharmacy reimbursement process and reduced product wastage?"
Hypothesis
<p>The research hypothesis is that the introduction of the High-Tech Hub has:</p> <ul style="list-style-type: none"> - delivered efficiencies in, reduced time spent on administrative processes at community pharmacy level - increased awareness and traceability in the product to prescription dispensed relationship, resulting in <ul style="list-style-type: none"> - a reduction in high tech product wastage (undispensed products).

Figure 16 - Details the Conceptual Framework from Topic to Analysis.

Key themes influencing the research
<ol style="list-style-type: none"> 1. High-Tech Hub material differences - Web Critical Success Factors 2. Cost effectiveness – product shortages, investment requirements 3. Product management, Waste - product ordered to dispensed. <ol style="list-style-type: none"> 4. Technology Optimisation – Effectiveness 5. Technology Optimisation – Acceptance 6. Administrative Effect (Care and wellbeing of patients and pharmacy/supply chain teams)
Main conceptual sources and Theoretical Framework
<ul style="list-style-type: none"> - The High-Tech Hub website is relatively new having launched in 2018. Despite the annual HSE data being reported, there is no data on the use and impact on high-tech product patterns from 2021 to 2024, against the backdrop of increasing €spend on high-tech medications. - The research aims to determine the levels of engagement by research participants, on the use of the High-Tech Hub process-website model, compared to the alternate system (currently a parallel process). - Understand the motivations and actions needed, to improve technology integration between the HSE and high-tech medicinal product stakeholders.
Conceptual sources
<p>HSE - Health Service Executive - purchaser payer of HT products in Ireland, responsibility for governance and delivery of patient care. (Health Service Executive PCRS, 2017)</p> <p>PCRS - Primary Care Reimbursement Service - overall responsibility for web hosting and support of the HTH Order process-website (PCRS, 2022)</p> <p>PSI - Pharmaceutical Society of Ireland, for pharmacy listings, industry research, journals, in addition to the role as pharmacy regulator. (PSI, 2023)</p> <p>IPU - Irish Pharmaceutical Union for industry research and journals. (IPU, 2024a)</p> <p>HPRA - Health Products Regulatory Authority, for high-tech product reference lists and guidance on pharmaceutical suppliers. (HPRA, 2024)</p> <p><i>Main historical sources and key debates = spend on healthcare in Ireland, health technology assessments. Prolonged / <u>failure</u> to launch of 'most' Irish healthcare technology projects.</i></p> <p><i>Literature review – Use of Boolean word searches to identify key literature, concepts and theories.</i></p>
Main empirical sources
<p>PCRS - Primary Care Reimbursement Service, for monthly and annual spend on high-tech medications and reimbursement fees.</p> <p>IPU - Irish Pharmaceutical Union for industry research and surveys.</p> <p>PSI – Pharmaceutical Society of Ireland for industry sponsored research.</p> <p>DOH - Department of Health, for national spending review data and healthcare capital investment in Ireland.</p> <p>IQVIA – for European and global healthcare data and insight. (IQVIA, 2022)</p> <p>DELOITTE – for global healthcare data, trends and outlooks. (Deloitte, 2022)</p>
Methodological Framework
<p>Data collection and collation</p> <p>(1) <u>Digital Survey</u> via Google Forms</p> <p>* A structured survey for community pharmacy participants. Chosen as most efficient for pharmacy teams.</p> <p>(2) <u>In-depth Interviews</u> –</p> <p>* A semi-structured questionnaire style interview for all other participant types.</p> <p>* 50 questions in total - 80% open/closed, with 20% free text responses, encouraging thought for the Q&A.</p>

Timeframe
July - August 2024.
Analytical Framework
Data Collection
(1) Digital Survey = data collection automated in Google Forms, download by csv file, saved to excel file. (2) In-depth semi structured Interviews - using excel form questionnaires for all questions, response types.
Data Analysis
Response data from groups (1) and (2) will be collated in one master excel file for review and analysis.
Theory Testing
Data will be tested to determine the research design and chosen methods were appropriate?
Findings - Conclusions - Recommendations
To be confirmed.
Finalise Dissertation Data
Communicate findings of the Research in report format and submit for Dissertation review and assessment.

2.9 Dissertation Research Timeline

Student: 2224027 - Fiona Kelly	Week No.	1	2	3	4	5	6	7	8	9	10	11
Dissertation Research - Timeline	Date / Week Beginning	25/03/2024	24/06/2024	01/07/2024	08/07/2024	15/07/2024	22/07/2024	29/07/2024	05/08/2024	12/08/2024	19/08/2024	26/08/2024
Draft Research Proposal submission	20/03/2024											
Research Proposal Submission	24/06/2024											
Ethics Form Submission	07/07/2024											
Ethics Approval Granted	12/07/2024											
Participant Selection	15/07/2024											
Questionnaire interview(s) - invitation	22/07/2024											
Questionnaire survey(s) - invitation	22/07/2024											
Participant Consent	22/07/2024											
Primary Research Data Collection	22/07/2024											
Submit Chapters 1, 2, 3	22/07/2024											
Mini Viva	26/07/2024											
Findings and Analysis	06/08/2024											
Conclusions and Recommendations	11/08/2024											
Submit Chapters 4, 5	14/08/2024											
Dissertation Submission	25/08/2024											
Dissertation Viva	tbc											

Figure 17 - Research Timeline (Researchers Own).

3 Research Methodology

Section	Research Layer	Chosen Action	
3.1	Overview	Research Onion, (Saunders <i>et al.</i> , 2019).	
3.2	Philosophy	(a) Positivism	(b) Interpretivism
3.3	Approach	(a) Deductive	(b) Inductive
3.4	Strategy	(a) Surveys	(b) Questionnaires
3.5	Choice	Mixed Method	
3.6	Time Horizon	Cross Sectional	
3.7	Sampling (Participants)	<i>(Qualtrics, 2024), (Fitzgerald, 2024)</i>	
3.8	Ethics		
3.9	Validity and Reliability		
3.10	Data Collection and Analysis		

3.1 Overview

The literature review showed there is one measurable process in place for the purchase of high-tech products, and reimbursement fees paid by the HSE to pharmacy (PCRS, 2022). However, there is a lack of data to identify the one-to-one relationship (from purchase to payment), to demonstrate a reduction in product stockpiling and medicinal product wastage that has been enabled at community pharmacy level, since the introduction of the high-tech hub model. The research study will explore if the introduction of the hub has delivered improvements in administration of high-tech medications and a reduction in un-dispensed products (wastage). Primary research of this detail, specifically related to this HSE system, has not been done before. The research aims to prove the hypothesis that the Hub has delivered the improvements, and in doing so could be an answer to providing the additional support needed for expansion of pharmacy services (IPU, 2024a) - providing one procurement interface for reimbursable products with the HSE, removing all ambiguity over which system pharmacies should use. This benefits the HSE, and potentially product suppliers and pharma companies, giving full end to end transparency of the high-tech procurement process. The primary research interviews will also allow for feedback on how the hub, the system itself and all support processes, could be improved and expanded beyond current use - to deliver better integration of services between the HSE, pharmacy and supply companies.

The research strategy chosen for community pharmacy is an online survey, which is thought to be the most effective use of pharmacy time and access. For all product suppliers and pharmaceutical companies, an in-depth interview is proposed, to gather quantitative data on the hub critical success factors, with additional open-ended questions allowing participants to talk freely about the high-tech process. Research participants will be given the opportunity, within the interview, to comment on how the hub has affected their role and respective businesses, and how they see the HT procurement and reimbursement process developing in the future.

The following sections detail the research methodology for this study using the logic of Saunders research Onion, Figure 18, (Saunders *et al.*, 2019).

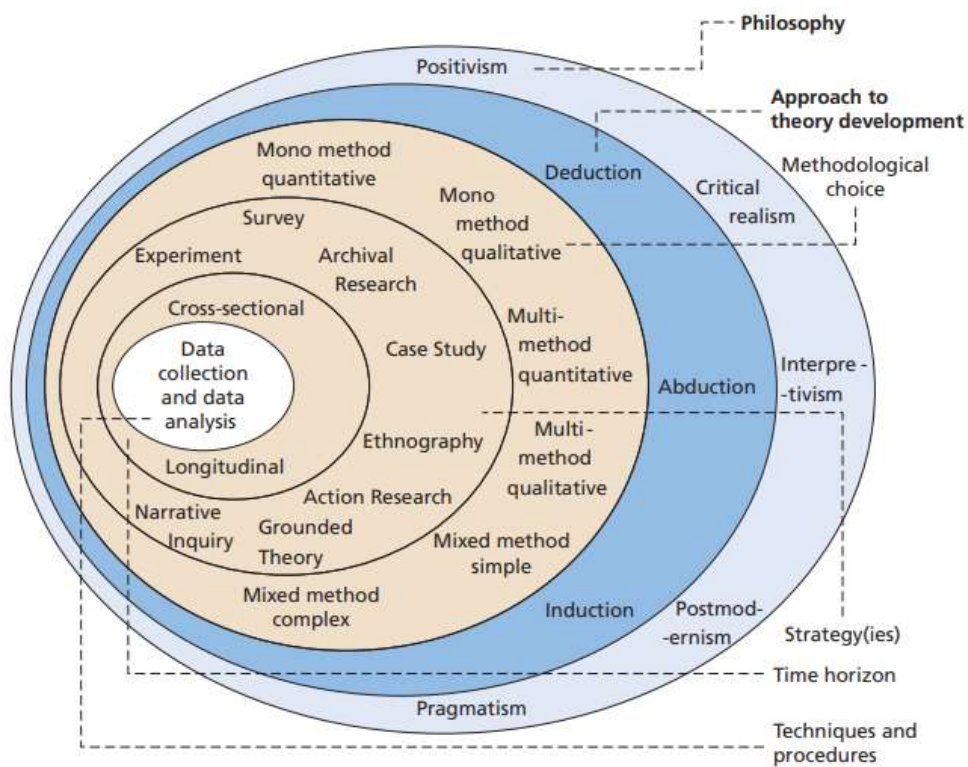


Figure 18 - Saunders Research Onion – Plan, (Saunders *et al.*, 2019).

3.2 Philosophy

The philosophy used in research refers to the assumptions and beliefs used in the creation of new knowledge. These assumptions are categorised as ontology, epistemology and axiology. Ontology refers to the world around us and how we react to it – our reality. Epistemology is concerned with gathering knowledge, what we consider to be valid and how this knowledge is collected. Epistemology, dependent upon the research strategy chosen, may influence the research outcome. Axiology is concerned with the ethics and values of the research(er). It is critically important to the success of the research to remain impartial, unbiased, and not be swayed by research participants. (Scribbr, 2024).

There are five recognised types of research philosophies, depicted in the outer layer of the research onion, (Saunders *et al.*, 2019). In business, two main philosophies are used – the first is positivism, which is largely objective, using quantitative datasets, and typically not affected by people. The second is interpretivism, this is subjective, using smaller qualitative datasets, analysing the responses, views and opinions of research participants. For this research study a combination will be used – positivism in the analysis of both surveys and questionnaires, and interpretivism, to understand and interpret the participant responses to the open-ended questions.

3.3 Approach

Following Saunders' method, the next methodology selection is research approach – with three choices. Two of these approaches will be used for this research study, deductive and inductive. The deductive approach starts with the research theory and the need to test that theory. A hypothesis is prepared, and a set of questions designed to test the hypothesis. The research data gathered is analysed and tested, to either prove or disprove the hypothesis. The inductive research approach is used when new knowledge and insights are needed, as there is little to no data available on the topic. This inductive approach will be used to review and analyse the responses to the free text questions and answers, to recognise if themes and patterns are present in participant responses, (Saunders *et al.*, 2019).

3.4 Strategy

The research strategy will include both an online Google Form Survey, communicated to groups of non-random, registered community pharmacies (PSI, 2022), asking them to respond to a set of seventeen questions. Secondly, a semi-structured questionnaire will be used for in-depth interviews with participants across the pharmaceutical industry. The questionnaire will have a total of fifty questions, covering the five research themes, aligned with the five research objectives. The interview questionnaire will include the seventeen online survey questions, so the quantitative research data can be combined and analysed more effectively. Whilst a total of fifty questions may appear detailed, the structure of the questionnaire was designed to bring the participants through the high-tech hub journey – across the themes, rating the HT hubs' functional use, to encourage thought and feedback on their interactions with the hub, and to think outside of its existing functionality, how it could be further developed and adapted to meet the changing needs of the Irish healthcare landscape. This study has presented the researcher with the unique opportunity to meet with and interview business and subject matter experts across the high- tech product fulfilment process and gain valuable insights that could influence the future system.

3.4.1 Questionnaire Structure

Section one – Suitability and awareness, contains six questions, to determine the suitability of the participants, their awareness level of the research topic and relevance to the study. Section two – Hub material differences (Critical Success Factors) with ten questions, asking participants to rate the Hub website on success criteria. Section three focusses on Product management, wastage and cost, with a combination of twelve questions and statements. On the theme of product waste, participants will be asked if they agree with suggested statements that the hub has reduced high-tech product waste in their business and asks if they are concerned with product waste in general. The latter part of section three has nine questions, surveying participants on their understanding of HT claim rejections and if they believe the Hub has brought benefits to the HSE budget. Section three concludes with five questions – asking participants to rate whether they agree if the HSE hub has brought benefit to each of the five stakeholder groups. Section four discusses Technology Optimisation - effectiveness, with eleven questions and statements. The mix of questions and statements is to encourage the participant to think critically about how the hub process is performed and how, in their opinion, it might be better utilised in the future. Section five continues the theme of Technology Optimisation looking at acceptance, with seven questions relating to the adoption and perception of the Hub technology.

Section six explores the Administrative Effect, the care and wellbeing of healthcare professionals and users of the HT hub website and process. There are ten questions to identify if users believe the Hub had a positive, transformative effect on their tasks, roles and responsibilities. The questionnaire concludes with a section on Outlook – asking participants to summarise any challenges (if any) and opportunities (if any) they believe might improve the high-tech hub website-process.

3.4.2 Research Strategy - Pilot and Testing

Online surveys were designed on Google Forms and tested by sending to multiple email addresses. This communication method also tested the layout and content of the survey, on its ease of use and achieving a completion time of less than 10 minutes as proposed. To ensure the interview questionnaire – the questions, layout, timing and data collection method was appropriate to the study, the researcher conducted a pilot questionnaire with a senior member of a national pharmaceutical supply company. This choice of participant enabled the researcher to identify any inappropriate or ambiguous questions, and ensure the questions and content were appropriate across the proposed participant groups, various department functions and roles. It also sought to ensure no commercial confidentiality would be compromised and approval given at the highest level to conduct the research. The interview length and timing were confirmed acceptable, with a completion time of approximately 20 minutes, allowing time for thought and qualitative feedback.

3.5 Choice

A multi-method choice will be applied to this study, using quantitative and qualitative methods as described above, bringing both sets of findings together, to present a common understanding of the overall findings, (Creswell, 2021). The research data will be gathered using both online surveys and in-depth interviews, to provide as inclusive a research study as possible, in relation to the use of the High-Tech hub model.

3.6 Time Horizon

A cross-sectional timeline will be chosen, with a defined start and end date, for research data to be collected across all participants at a single point in time. This should also enable sufficient time for the research to be carried out, collected and analysed within the timeframe of the research study and dissertation.

3.7 Sample Size, Profile and Access

The researcher must ensure the sample size will be reliable and representative of the study population, minimising the probability of error. The researcher must also be aware of the participants, their organisation and the administration of the research study. The research intention is to survey participants across the High-Tech product fulfilment process, and for this study to be as inclusive as possible, collecting feedback from a broad range of business perspectives (Figure 29). Apart from the requirement of study participants to have knowledge and experience of high-tech products, for example the prescription fulfilment process, the logistics and handling of high-tech products, and associated commercial and financial activities - no other criteria for participation were required.

For the online survey with community pharmacies, a sample size of 320 is determined (Table 2). This is based on a pharmacy population of 1,910 pharmacies in the Republic of Ireland, (Fitzgerald, 2024), and using the Qualtrics sample size calculator, with a 95% confidence level and 5% margin of error, Table 2, (Qualtrics, 2024). Pharmacies will be selected across twelve different pharmacy groups (Table 2), from large commercial groups (37 to 59 pharmacies), medium groups (20 to 30 pharmacies) to smaller pharmacy groups (8-10 pharmacies). Also included are independently owned pharmacies, part of larger franchise groups (88 pharmacies), (Table 2). All pharmacies have a national geographical spread. Access to these pharmacies will be by email invitation, considered the most effective form of contact and best use of pharmacy participant's time. Pharmacy contact email addresses will be sourced from the Pharmaceutical Society of Ireland website, (PSI, 2024), and from community pharmacy online store locators (Allcare Pharmacy, 2024). The online survey form begins by asking participants to confirm their acceptance to participate in the research and for their data to be collected, analysed and stored as part of the study. Surveys will be issued, and responses collected during July and August 2024.

Pharmaceutical industry participants will be selected and invited for interview, to gain a deeper understanding of the research topic, and insights on the performance of the high-tech product category, working within the two HSE HT systems and processes. A total of 30 participants will be invited for interview, from nine different business functions (Figure 19, Table 3). Participants have been selected from one of the 28 companies supplying high-tech products in Ireland to the HSE (Figure 20, Table 4). This company represents 40% of the annual high-tech market €value for the last three years (Table 4). For this reason, a total of 30 cross functional interviews, were deemed a valid research population. Interviews will take place in person and by video call during July and August 2024.

Participant Sample Size Calculator	
IPU - Review of the Community Pharmacy Sector in Ireland 2023	1910
Pharmacy Groups	Count of Pharmacy Group Participants
Allcare	59
Bradleys	20
Cara	11
Chemco	9
Dunne	8
Hickeys	37
Independent	16
Life	88
McCabes	24
McCauley	30
Meaghers	10
Your Local	8
Grand Total	320

Sample size calculator

Confidence Level: 95%

Population Size: 1910

Margin of Error: 5%

Ideal Sample Size: 320

Table 2 - Pharmacy Survey Participant Sample Size Calculator, (Qualtrics, 2024), (Fitzgerald, 2024).



Figure 19 - Research Study Interview Participant Profiles (Source: Researchers Own).

Participant - Role	Participant Available	Participant Unavailable	Total
Commercial	2		2
Commercial - Pharma	6	2	8
Customer Care	6		6
Data Protection	1		1
Finance	3		3
IT	1	1	2
Operations - Logistics	2		2
Quality	2	1	3
Regulatory	1	2	3
Total	24	6	30

Table 3 - Research Study - Interview Participant Profiles (Source: Researchers own)

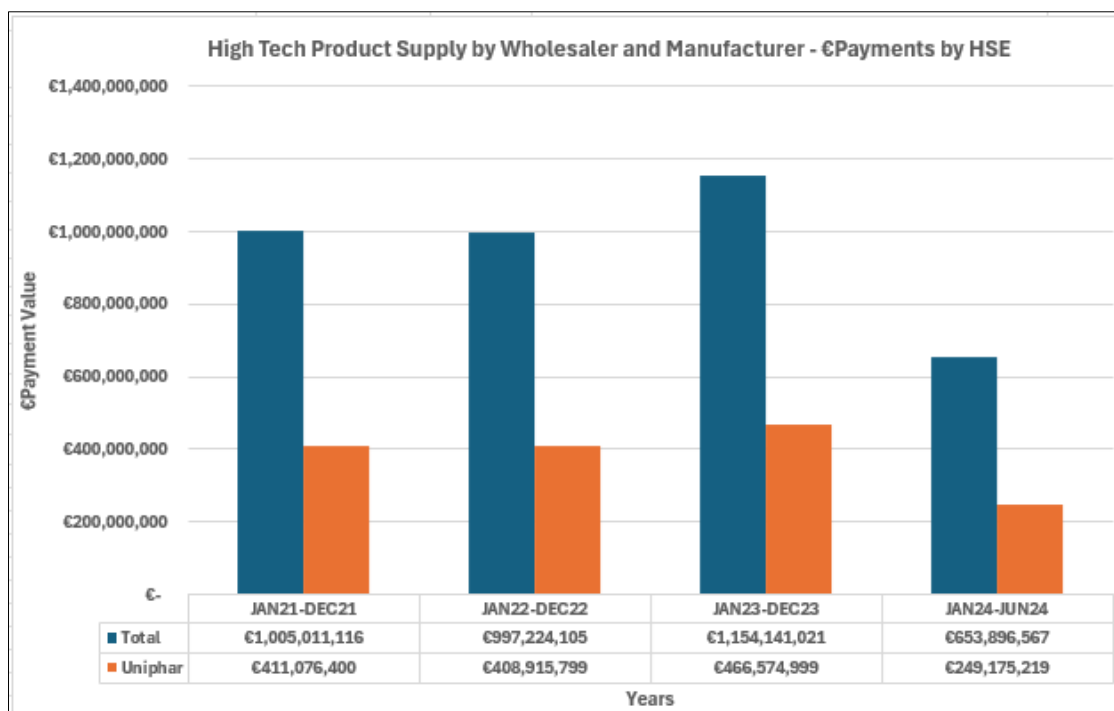


Figure 20 - HT Product Supply by Wholesaler, Manufacturer –2021 to JUNE 2024. (PCRS, 2024).

High Tech Wholesaler and Manufacturer Payments	Year	
	JAN23-DEC23	
Company	Amount Paid (€)	
Allphar Service	€	26,909
Astellas Pharma Co. Ltd.	€	28,060,571
Beigene Switzerland Gmbh (Dutch Branch)	€	1,728,641
Clonmel Healthcare Ltd	€	2,666,484
Galway Drug Co.Ltd.	€	14,298
Gilead Sciences Ltd.	€	1,859,343
Glaxosmithkline Pharmaceuticals	€	3,158,172
Incyte Uk	€	819,315
Immedica	€	-
Imed Healthcare	€	3,480,920
Kbfl Sciences Ltd	€	3,957,690
Novo Nordisk	€	1,695,875
Otsuka Pharmaceuticals	€	360,182
Orphalan	€	773,597
P.C.O. Manufacturing Ltd.	€	5,613,001
Ptc Therapeutics International Ltd.	€	2,501,209
Pfizer Healthcare	€	60,600,404
Recordati Netherlands B.V.	€	81,648
Rx Source Ltd	€	7,705,332
Sciensus International B.V.	€	4,551,765
Theravia	€	132,496
Temperature Controlled Pharmaceuticals Ltd	€	14,436,750
United Drug (Ballina)	€	72,242,004
Unipharm Ltd.	€	466,574,999 40%
United Drug (Dublin)	€	259,476,908
United Drug (Limerick)	€	131,678,218
Vertex Pharmaceuticals	€	77,726,258
Xentra Pharm Ltd	€	2,218,032
Grand Total	€	1,154,141,021

Table 4 - HT Product Supply €Payments by Wholesaler and Manufacturer - 2023. (PCRS, 2024)

3.8 Ethical Implications and Limitations

Before conducting any research, it is imperative the research process is free from bias, conflict of interest, and undertaken with integrity ensuring the highest moral and data quality standards. Privacy and confidentiality must be assured for all research participants and be central to all data collection and storage, adhering to GDPR guidelines, (Citizens Information, 2023). To ensure the above, for all research interviews a Participant Information Letter will be sent by email detailing why the participant was selected. The email will give details on the purpose of the requested interview (academic research), giving the participant time to read the detail of the research being conducted and give their consent (or not) to the interview. If agreeing to take part, they will be asked to sign a consent form, copies of which will be saved on the dissertation database, (Appendices A and B).

The researcher expects participants to answer truthfully and appreciates the addition of feedback to add depth to the research. It is acknowledged, the nature of the topic and questions may appear commercially sensitive, however the researcher will ensure the introduction to the questionnaire and online survey, will clearly state that all data collected will be used for dissertation purpose only. All interviews will be conducted in a conversational manner, with participants being able to view the research questions and their responses on screen throughout the interview. Responses will be captured in excel format at the time of interview and saved to a master responses file for later review and analysis. It will be clearly explained to all participants that by contacting the researcher by email, they can request a copy of their responses and/or request their data be excluded from the research dissertation, (WHO, 2023). It should be noted that ethical responsibility extends to the analysis and reporting of the research data. Careful consideration of the findings and presenting the complete dataset in an open-minded way, avoiding any data exclusion or exaggeration.

A possible limitation to the online survey may be access, in relation to digital security and caution by participants to open and click into email links that are not known to the invited online participant, considering the technology breaches to HSE systems in May 2021 (HSE, 2021), and global technology systems July 2024, (BBC News, 2024).

3.9 Validity and Reliability

In research it is important to demonstrate that your findings are accurate and consistent with the chosen research methods. The criteria used to test and evaluate research findings are reliability and validity, (Price, 2015). Validity is used to test if your research questions accurately measure what you intended them to. Using the example of the 'Material Differences' in website success (Theme 1 of this research study), it would not be correct to determine the overall success of the website using just one success factor. The choice of research strategy, being a questionnaire, and the construct of that questionnaire, for example the use of Likert Scales, needs to ensure that participants have the same understanding of the questions, as the researcher, and that your questionnaire is measuring what it is supposed to, (Janssen, 2023). Reliability is concerned with repeatability, the level to which the research methods can consistently produce the same or similar results, using the same parameters.

Using a data research test, such as Chi Squared, can help the researcher evaluate the research data in line with the above. In terms of the qualitative data that will be collected during interviews for this study, the researcher will rely on the professionalism, integrity and industry expertise of participants, to inform their opinions and responses, which will add dimension to the research data.

3.10 Data Collection and Analysis

Core to the research onion is the research data. How the data will be collected and analysed, to include the processes and techniques that will be used by the researcher to organise and review the data, drawing meaningful findings and conclusions. For this study, digital surveys will be sent to listed pharmacies, for online completion. This survey will be open from July until early August, across two months, to facilitate busier pharmacy times. In addition, interviews will be conducted with HT industry subject matter experts, using a semi structured questionnaire approach. As the online survey questions will also be included in the interview questionnaires, data from both will be collated into one excel Masterfile for analysis. The qualitative data from the interviews will be subject to thematic analysis, using groupings and word clouds. The research findings will be displayed in table and graph format, supported by an interpretation and discussion of findings in the dissertation document.

4 Findings and Analysis

4.1 Introduction

All research objectives were included in the primary research study, as no secondary data exists to answer the research question - “Has the introduction of the HSE High Tech Hub online order model, resulted in a more effective supply of High-Tech medications to community pharmacy – improving the pharmacy reimbursement process and reduced product wastage?”

The Research Objectives are:

- To determine what **material differences** have been achieved with the introduction of the High-Tech (HT) Hub online model,
- To assess the **effectiveness** of this Hub online technology in HT product fulfilment.
- To assess the **acceptance** by users of this technology in HT prescription fulfilment.
- The effect of the HT Hub on product **costs** and **wastage**.
- To assess the **administrative effect** on healthcare professionals with this process change.
- To recommend the implementation and **full transition** of all high-tech products to the hub platform, for all supplier companies and community pharmacies in Ireland.

Section	Question Numbers	Description
4.1		Introduction
4.2	S1 - S6	Suitability and Awareness
4.3	1 - 10	Hub Material Differences - Critical Success Factors
4.4	11 - 18	Product Management - Cost and Wastage
4.5	19 - 29	Technology Optimisation - Effectiveness
4.6	30 - 36	Technology Optimisation - Acceptance
4.7	37 - 46	Administrative Effect - Care and Wellbeing
4.8	47 - 50	Outlook - HSE Service Integration and HT Product Supply
4.9		Thematic Analysis
4.10		Summary

4.2 Suitability and Awareness

A total of 30 participants were invited for interview, of which 24 were available to participate. N=24 is considered a strong response rate and a meaningful representation of the business functions within the High-Tech population of supply chain companies in Ireland, (PCRS, 2024).

The online survey was distributed to 320 community pharmacies, with the research aim to achieve the desired response quota, however a low response rate of 5 online surveys were completed, representing 1.5% of email surveys sent [N=5]. This is considered a research limitation, possibly due to security concerns and caution accepting a link from an unknown sender, despite emails being sent from a Griffith College email address, and follow-up email invitations sent. In addition, as noted during the literature review, 3 pharmacy industry surveys have been completed in the last 12 months, (PSI, 2023), (Fitzgerald, 2024), (IPU, 2024a). For this reason, data from the online survey is considered an indication. Online Survey findings are detailed in the finding's sections below, with survey data shown separately to interview data, answering the 17 online questions, included in the overall 50 study questions.

To determine with certainty the suitability of participants and their awareness of the HSE high-tech hub, 6 qualifying questions were asked.

Question 1 asked interview participants to confirm they work in an appropriate setting for the research to be valid, and all participants confirmed yes (N=24, 100%), (Figure 21). Online survey participants (N=5) being aware of the high-tech process and the handling of high-tech products, were added to the participant number, totalling 29 participants for the full research study. To add business insight to the study data and allow for comparison and contrast of responses throughout the study, interview participants were asked in Question 2, to confirm their professional roles. Across N=24 participants 6 functions were identified, considered a favourable and varied representation (Figure 22). As the High Tech Hub was launched in 2018 (6 years ago), participants were asked in Question 3 to confirm the length of time in their current role, to ensure there was a balance of participants pre and post HTH launch, with N=13 of 24 participants having 6+ years in current role, N=3 participants with 3 to 6 years' experience and N=8 participants with less than 3 years. This balanced spread of years' experience is considered important in terms of pre and post launch opinion, in determining the effectiveness of the HT hub, (Figure 23).

Question 4 asked interview participants to confirm their ‘awareness level’ of HT medications. Of the interview participant group [N=24], N=12 participants confirmed they were ‘extremely aware’, with N=9 giving a ‘very aware’ response, and the lowest level response being ‘aware’ was confirmed by N=3. These combined responses represent 100% of the study participants and show a balanced spread of responses across business function roles, demonstrating a strong relationship and awareness level between functions, working within the HT supply chain process, (Table 5, Figure 24).

In a somewhat similar but different question, participants were asked to confirm their ‘familiarity with the HTH process’, as distinct from medication awareness in question 4. This question is to determine the interaction levels of participants with the HTH, rather than just their knowledge of it. In Question 5, N=8 participants advised they were extremely aware of the process-website, with N=11 being very aware and the lowest level of N=5 participants being aware. All participants [N=24], corroborating the responses in question 4, showing clear awareness and familiarity across the full participant group of HT medications and process, evidence of a strong sample for our research population. To close out our questionnaire suitability section - participants were asked how often they used the hub and/or interacted with the hub process, with N=10 participants (42%) using it daily, N=7 participants using it weekly, and the lowest level of use being monthly at N=3. In answering question 6, all interview participants [N=24] use the HTH at least monthly, with 42% [N=10] using it daily. Overall, the results from the Study Suitability questions are strong and suggest our study sample will be effective in evaluating the HT Hub website-process and addressing our research objectives and hypothesis.

Suitability and Awareness - Study Participant Profiles											
Measure	Response / Role	Commercial	Customer Care	Finance	Operations - Logistics	Quality - IT	Regulatory-Governance	[N] Interview Only	[N] Pharmacy (Survey)	[N] Interview plus Survey	[N] %
S2. - Role	[N]	8	6	3	3	3	1	24	5	29	
		28%	21%	10%	10%	10%	3%		17%	100%	
S3. - Length of Time in Current Role (Years)	<1	0	0	1	1	1	0	3		3	13%
	0 - 3	3	1	0	1	0	0	5		5	21%
	3 - 6	1	2	0	0	0	0	3		3	13%
	6 - 10	3	2	1	0	1	0	7		7	29%
	10+	1	1	1	1	1	1	6		6	25%
	[N]	8	6	3	3	3	1	24	0	24	100%
S4. - Awareness of High-Tech Medications, Processes	Extremely aware	4	3	1	1	2	1	12		12	50%
	Very aware	3	2	1	2	1	0	9		9	38%
	Aware	1	1	1	0	0	0	3		3	13%
	Somewhat aware	0	0	0	0	0	0	0		0	0%
	Not at all aware	0	0	0	0	0	0	0		0	0%
	[N]	8	6	3	3	3	1	24	0	24	100%
S5. - Familiarity with the 'High Tech Hub' PCRS process - website?	Extremely aware	3	2	1	1	1	0	8		8	33%
	Very aware	5	4	0	0	1	1	11		11	46%
	Aware	0	0	2	2	1	0	5		5	21%
	Somewhat aware	0	0	0	0	0	0	0		0	0%
	Not at all aware	0	0	0	0	0	0	0		0	0%
	[N]	8	6	3	3	3	1	24	0	24	100%
S6. - How often do you interact with the High Tech Hub process - website?	Never	0	0	0	0	0	0	0		0	0%
	Daily	1	5	2	1	1	0	10		10	42%
	Weekly	3	1	0	2	1	0	7		7	29%
	Monthly	2	0	1	0	0	0	3		3	13%
	Quarterly+	2	0	0	0	1	1	4		4	17%
	[N]	8	6	3	3	3	1	24	0	24	100%

Table 5 - Data 'Participant Suitability and Awareness'

Suitability and Awareness



Figure 21 - S.1 Do you work in Healthcare, Medical, Pharma related organisation

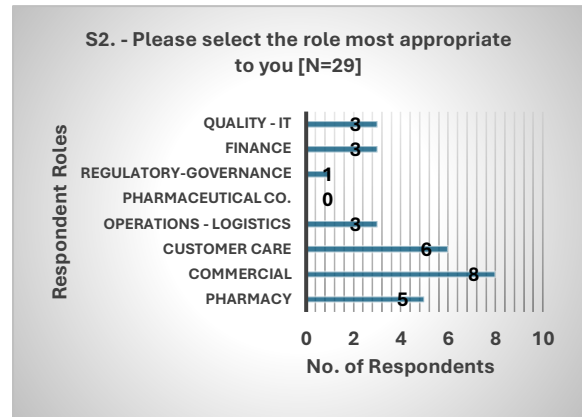


Figure 22 - S.2 Please select the role most appropriate to you

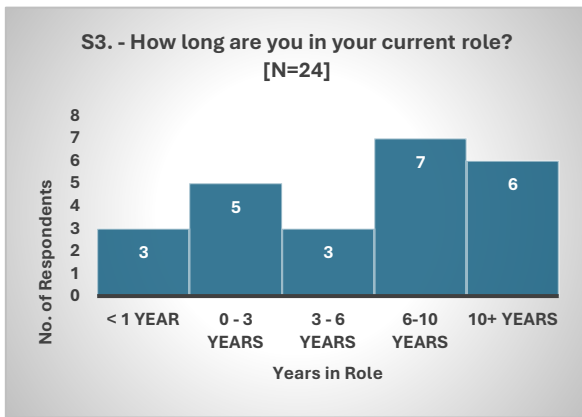


Figure 23 - S.3 How long are you in your current role

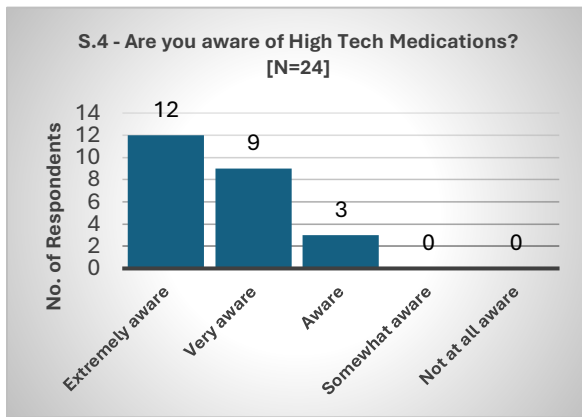


Figure 24 - S.4 Are you aware of High-Tech medications

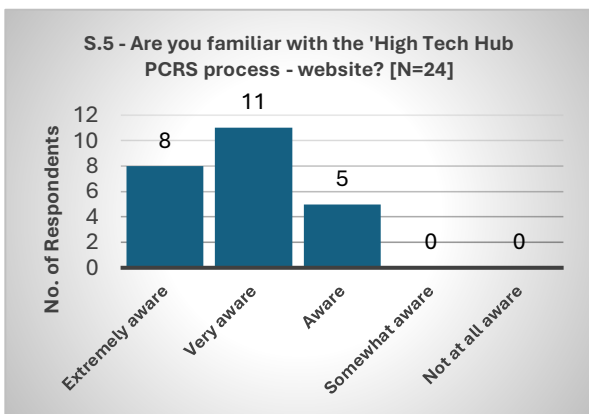


Figure 25 - S.5 Are you familiar with the 'High Tech Hub PCRS process - website

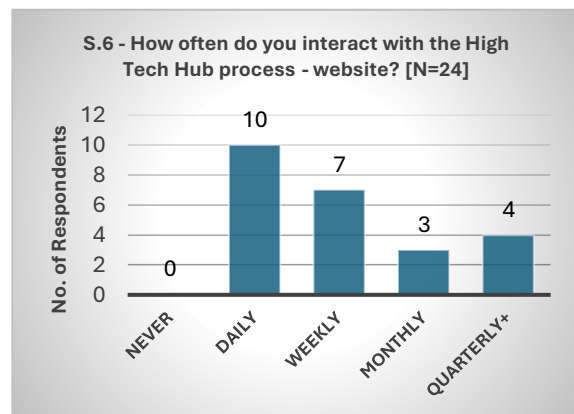


Figure 26 - S.6 How often do you interact with the HTH - website

4.3 Theme - Hub Material Differences - Critical Success Factors

For any website to be considered effective for its users, it must achieve a number of critical success factors, (Intechnic, 2024b), (DeLone and McLean, 2003). In this research study, participants are asked to rate 8 of the critical success factors below considered most relevant to the HSE High-Tech Hub (HTH) website, and to confirm if they agree or disagree with 2 statements on its use (questions 4 and 10). The graphs and tables overleaf (1-10) discuss participant responses and identify from findings, rating the 10 factors below, if Objective 1 has been achieved – “To determine what material differences have been achieved with the introduction of the High-Tech (HT) Hub online model”.

Questions 1 to 10. In your professional opinion - please rate the High-Tech HUB process - website on:

1. Ease of use
2. Customer support
3. Training Guides and Information
4. Security - your pharmacy and patient data is secure
5. Website quality
6. Order fulfilment experience
7. Reimbursement Timeline
8. Traceability - Order Matching 'from Prescriber to Pharmacy to Product to Patient'
9. Flexibility - opportunities for future use
10. The hub has improved the turnaround time from Order to Delivery

In Questions 1, 2 and 3, participants are asked to rate the HTH website-process on a 5-point scale from Poor to Excellent. In **Question 1**, 'Ease of Use', a response rate of N=26 is achieved, with 22 participants rating the HTH process from good [N=9], to very good [N=19] to excellent [N=3]. This represents 85%, N=22 participants giving the HT Hub a very high rating in terms of ease of use. Interestingly, of the 4 participants giving the HTH website a low rating, 2 pharmacy participants rate the HTH as fair and 1 as poor, which would be considered at odds with the ratings from other business functions, but nonetheless significant being the pharmacy function response (Figure 27).

Question 2 examines the customer support provided by the HSE PCRS team to users of the HTH website. In Figure 38, the data is quite symmetric, showing very little skew, demonstrating on average a positive support response rate, ranging from fair N=6, to good =N7, to very good at N=7, with 80% [N=22] of participants giving the HTH support team a positive rating. **Question 3**, also on the theme of support, relating to training guides and information, receives a less positive overall rating, with N=5 participants giving a poor rating and N=4 at fair, (Figure 29). On balance N=7 participants [of N=21], give written training information a good rating, so overall the responses would not indicate a strong positive or negative rating, as it is mixed across the response range and across the response functions.

Question 4 explores participants attitudes to the 'Security of Pharmacy and Patient Data' on the HT Hub, with a total response rate of N=20. It should be noted that the lack of response for some participants, indicates the request to withdraw from the question, having insufficient knowledge of that question and not wanting to skew or invalidate the data. Participants are asked to confirm if they agree, or not, with the statement that pharmacy and patient data on the HT Hub is secure. A total of N=19, of the N=20 responses, confirmed they agreed with the statement, within the range N=8 agreed, N=6 strongly agreed and N=5 agreed totally. Overall, participants had a very positive response to the security of pharmacy and patient data on the HT Hub, with a negative skewed graph (Figure 30).

Question 5 asks participants who use the HT website specifically, and not the HT process in general, to rate the websites quality. A response rate of N=10 was received, and presents a very balanced response rate, with no skew (Figure 31).

In terms of the overall end-to-end Order Fulfilment Experience using the HT Hub, participants are asked to rate the experience on the 5-point scale in **Question 6**, from poor to excellent, (Figure 32). Again, there is very little skew in this data, from total participant responses of N=28. Across four of the five business functions to respond (Table 6), they too present a very balanced response rate, no skew. No one rates the service as poor [N=0], with N=6 rating it as fair, N=9 at good, and again N=9 at very good, with N=4 giving an excellent rating. These ratings would be considered very favourable in the assessment of the HT Hubs performance. Important to the HT Hub process is the payment of pharmacist fees and the cost of product to supply chain companies – under the heading of reimbursement. There is a total of N=16 responses to **Question 7**, asking participants to rate the HT Hub on the timeline for reimbursement. This too attracts a balanced response, however the poor to fair rating is weighted towards the financial [N=2] and commercial [N=3] functions. It should be observed however that within the commercial function, from a total response rate on this question of N=6, this function also rated the reimbursement timeline as good, N=3. So quite a mixed response rate across the range and the business functions. The theme of cost/reimbursement is discussed further in the study, which may be more insightful looking at this element in greater detail.

Question 8 focuses on a key point of the HT Hub – Traceability. Tracking of prescriber to patient to product – prescription order and fulfilment data. Figure 44 demonstrates a strong response in favour of the HT Hub and the order matching process, with N=22 participants of total N=27, rating the Hub at good and above. N=12 at good to N=10 at the highest rating of excellent.

In terms of the Hub’s expansion of services, **Question 9** asks participants to rate the HTH on opportunities for future use? Of total participants, N=27, Figure 35 shows a somewhat symmetric graph. The Mode of ‘Good’, N=10 responses, spread over 4 functional roles, indicates there is optimism amongst participants the Hub has scope for expansion and improvement. Higher valued levels of very good and excellent, both attract ratings of N=6, so that overall, good to excellent response rates were N=16. Conversely, 11 participants gave a rating of N=5 being poor, and fair at N=6. Pharmacy participants, notably gave responses of poor N=4 and fair being N=1, revealing concerns at pharmacy group level, albeit a small representation, that more needs to be done with Hub system. Theme 1 – Critical Success Factors concludes with **Question 10** and the statement “The Hub has improved the turnaround time from order to delivery”, asking if participants agree or disagree with the statement. Figure 36 shows ratings of ‘Do not agree’ N=9, and ‘Do not know’ N=6, a total of N=15, (52%), and in contrast, 12 participants showing that turnaround time has improved (14, 48%). All ratings were shared across functions, indicating time to fill orders has not been negatively impacted either way by the HTH.

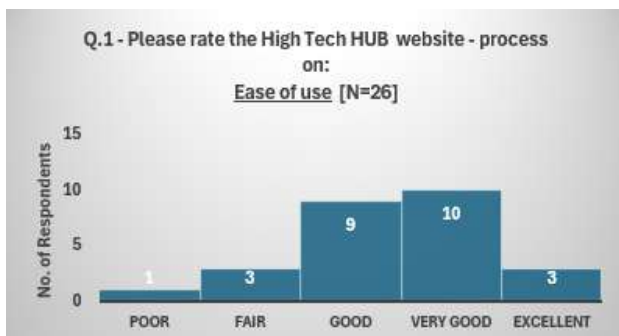


Figure 27 - Q.1 Rate the HTH on "Ease of Use"

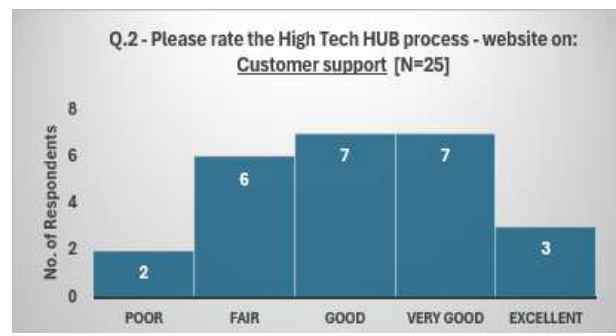


Figure 28 - Q.2 Rate the HTH on "Customer Support"

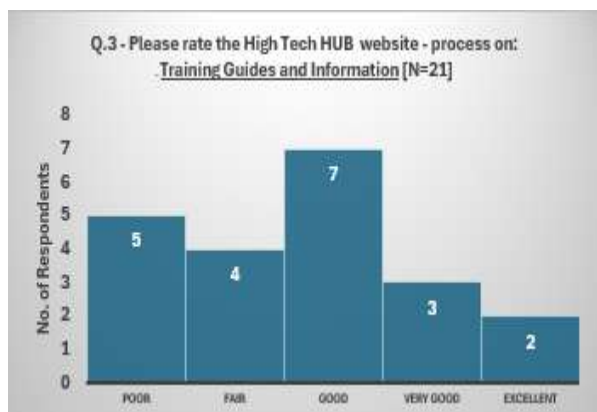


Figure 29 - Q.3 Rate the HTH on Training Guides and Information

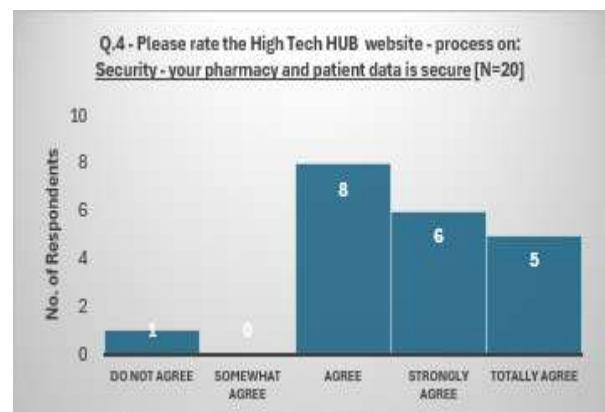


Figure 30 - Q.4 Security – pharmacy, patient data is secure

Theme - Hub Material Differences - Critical Success Factors



Figure 31 - Q.5 Rate the HTH on "Website Quality"



Figure 32 - Q.6 Rate the HTH on the "Order Fulfillment Experience"

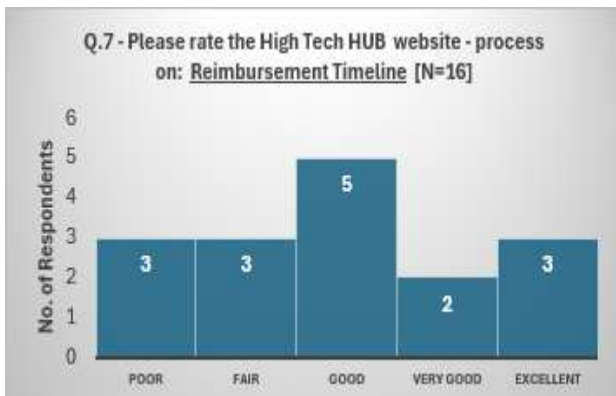


Figure 33 - Q.7 Rate the HTH on Reimbursement Timeline



Figure 34 - Q.8 Rate the HTH on Traceability of Order to Patient



Figure 35 - Q.9 Rate the HTH on Flexibility - Future Opportunities

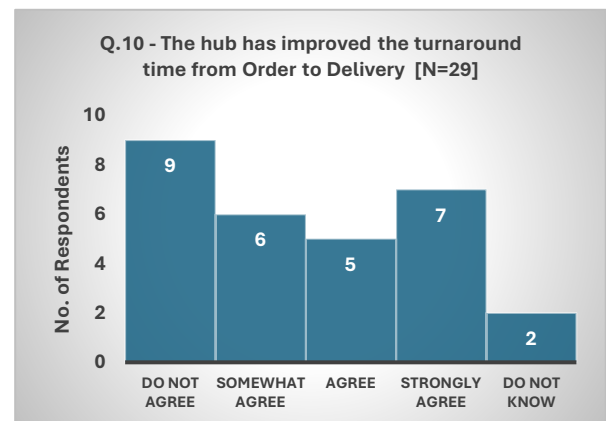


Figure 36 - Q.10 The Hub has improved the turnaround time from Order to Delivery

Theme - Hub Material Differences - Critical Success Factors

Theme - Hub Material Difference? (Critical Success Factor)											
Measure - In your professional opinion - please rate the High Tech HUB process - website etc	Response / Role	Commercial	Customer Care	Finance	Operations - Logistics	Quality - IT	Regulatory - Governance	[N] Interview Only	[N] Pharmacy (Survey)	[N] Interview plus Survey	[N] %
Q1. Ease of use	Poor	0	0	0	0	0	0	0	1	1	4%
	Fair	0	0	0	1	0	0	1	2	3	12%
	Good	4	2	2	0	1	0	9	0	9	35%
	Very Good	2	2	1	0	2	1	8	2	10	39%
	Excellent	1	2	0	0	0	0	3	0	3	12%
	[N]	7	6	3	1	3	1	21	5	26	100%
Q2. Customer support	Poor	0	0	0	1	0	0	1	1	2	8%
	Fair	1	0	2	1	1	0	5	1	6	24%
	Good	4	0	1	0	0	1	6	1	7	28%
	Very Good	2	4	0	0	0	0	6	1	7	28%
	Excellent	0	2	0	0	0	0	2	1	3	12%
	[N]	7	6	3	2	1	1	20	5	25	100%
Q3. Training Guides and Information	Poor	0	1	1	0	1	0	3	2	5	24%
	Fair	1	1	0	0	0	0	2	2	4	19%
	Good	3	2	1	0	0	1	7	0	7	33%
	Very Good	1	0	1	0	0	0	2	1	3	14%
	Excellent	1	1	0	0	0	0	2	0	2	10%
	[N]	6	5	3	0	1	1	16	5	21	100%
Q4. Security - your pharmacy and patient data is secure	Do not agree	0	0	0	1	0	0	1	0	1	5%
	Somewhat agree	0	0	0	0	0	0	0	0	0	0%
	Agree	3	1	1	0	0	0	5	3	8	40%
	Strongly agree	2	1	1	0	1	1	6	0	6	30%
	Totally Agree	1	2	0	0	0	0	3	2	5	25%
	[N]	6	4	2	1	1	1	15	5	20	100%
Q5. Website quality	Poor	0	0	0	1	0	0	1		1	10%
	Fair	1	1	0	0	0	0	2		2	20%
	Good	1	1	0	0	1	1	4		4	40%
	Very Good	1	0	1	0	0	0	2		2	20%
	Excellent	0	0	1	0	0	0	1		1	10%
	[N]	3	2	2	1	1	1	10	0	10	100%
Q6. Order fulfillment experience	Poor	0	0	0	0	0	0	0	0	0	0%
	Fair	1	1	0	1	0	0	3	3	6	21%
	Good	2	3	1	2	1	0	9	0	9	32%
	Very Good	3	1	1	0	2	1	8	1	9	32%
	Excellent	1	1	1	0	0	0	3	1	4	14%
	[N]	7	6	3	3	3	1	23	5	28	100%
Q7. Reimbursement Timeline	Poor	1	0	1	0	1	0	3	0	3	19%
	Fair	2	0	1	0	0	0	3	0	3	19%
	Good	3	1	0	0	0	0	4	1	5	31%
	Very Good	0	0	0	0	0	0	0	2	2	13%
	Excellent	0	0	1	0	0	1	2	1	3	19%
	[N]	6	1	3	0	1	1	12	4	16	100%
Q8. Traceability - Order Matching 'from Prescriber to Pharmacy to Product to Patient'	Poor	0	0	1	0	0	0	1	1	2	7%
	Fair	0	1	0	0	0	0	1	2	3	11%
	Good	3	3	1	2	1	1	11	1	12	44%
	Very Good	3	0	1	0	1	0	5	0	5	19%
	Excellent	1	2	0	0	1	0	4	1	5	19%
	[N]	7	6	3	2	3	1	22	5	27	100%
Q9. Flexibility - opportunities for future use	Poor	0	0	0	0	1	0	1	4	5	19%
	Fair	2	1	0	1	1	0	5	1	6	22%
	Good	2	4	3	0	0	1	10	0	10	37%
	Very Good	1	1	0	1	0	0	3	0	3	11%
	Excellent	2	0	0	0	1	0	3	0	3	11%
	[N]	7	6	3	2	3	1	22	5	27	100%
Q10. The hub has improved the turnaround time from Order to Delivery	Do not agree	0	2	0	2	2	1	7	2	9	31%
	Somewhat agree	2	0	2	0	0	0	4	2	6	21%
	Agree	1	1	1	0	1	0	4	1	5	17%
	Strongly agree	4	3	0	0	0	0	7	0	7	24%
	Do not know	1	0	0	1	0	0	2	0	2	7%
	[N]	8	6	3	3	3	1	24	5	29	100%

Table 6 - Data Theme 1 'Hub Material Differences - Critical Success Factors'

4.4 Theme - Product Management – Waste and Cost

Objective 4 is concerned with effective product management, and the importance of cost control, keeping waste product to a minimum. Product 'waste' in the context of the HT hub, may mean product ordered for a particular patient and subsequently not dispensed. If this product is ambient, (not a fridge product that requires a temperature-controlled supply chain), it can be returned to the supplier for full credit. If, however, the product is temperature controlled (fridge), as many High-Tech products are, the product cannot be returned and may have to be destroyed, at the expense of the HSE. To gauge what level of HT product 'waste' may exist within the HT supply chain, 3 questions are asked of the research participants, 2 of which are included in the online survey, Table 7.

Question 11, "The introduction of the hub resulted in less product wastage", asking participants if they agree with the statement. A response rate of N=29 was received, with N=21 participants stating they agreed with the statement and a further N=3 somewhat agreed. A total of N=5 participants were not in agreement / undecided. Overall, we can observe that 72% of responses view the HT hub favourable in terms of its impact on reducing product waste. To further understand the viewpoints of participants in relation to product management, **Question 12** asked all participants if they were concerned in general with HT product wastage? (undispensed products), and Figure 48 shows a balanced response rate. One third [N=9] showed no concern at all, while two thirds were slightly [N=8] to very concerned. From a research perspective, there is 'general concern' but nothing too significant from the findings.

The theme of waste wraps up with a third **Question no. 13**, specifically asking participants about product waste in their businesses. Surprisingly, 64% of participants across 5 business functions gave a Yes response, N=14, from a total response rate of N=22, with N=2 preferring not to answer. N=6 responses across 4 functions indicated No waste challenge. Overall, this would indicate an awareness of waste product management is a challenge within the HT supply chain, Figure 49.

In terms of product waste, the overall responses would suggest that participants see the Hub having a positive effect in controlling product waste and that all participant groups, although not overly concerned, are conscious that is a challenge that needs to be addressed within HT product supply.

Theme - Product Management - Waste

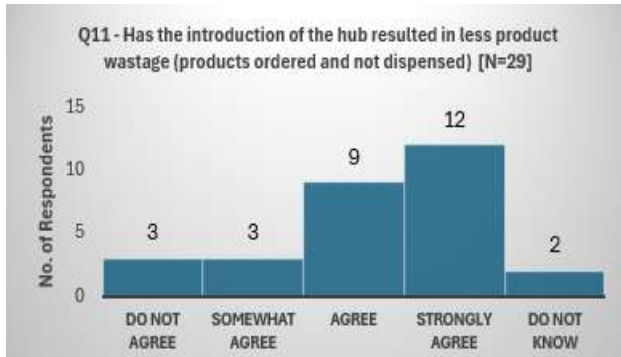


Figure 37 - Q.11 Has the HTH resulted in less product wastage



Figure 38 - Q.12 How concerned are you with HT product wastage?



Figure 39 - Q.13 Is there a challenge with product wastage in your business?

Theme - Product Management - Wastage											
Measure	Response / Role	Commercial	Customer Care	Finance	Operations - Logistics	Quality - IT	Regulatory - Governance	[N] Interview Only	[N] Pharmacy (Surveys)	[N] Interview plus Survey	[N] %
Q11. Has the introduction of the hub resulted in less product waste (products ordered and not dispensed)	Do not agree	0	0	0	2	0	0	2	1	3	10%
	Somewhat agree	3	0	0	0	0	0	3	0	3	10%
	Agree	2	2	2	0	2	0	8	1	9	31%
	Strongly agree	3	3	1	0	1	1	9	3	12	41%
	Do not know	0	1	0	1	0	0	2	0	2	7%
	[N]	8	6	3	3	3	1	24	5	29	100%
Q12. How concerned are you with High Tech product waste? (undispensed products)	Not at all concerned	4	1	2	1	0	0	8	1	9	31%
	Slightly concerned	1	2	1	1	1	1	7	1	8	28%
	Concerned	2	2	0	1	2	0	7	3	10	34%
	Very concerned	1	1	0	0	0	0	2	0	2	7%
	[N]	8	6	3	3	3	1	24	5	29	100%
Q13. Is there a challenge with product waste (undispensed products) in your business?	Yes	4	6	1	2	1	0	14		14	64%
	No	3	0	1	0	1	1	6		6	27%
	Unsure	0	0	0	0	0	0	0		0	0%
	Prefer not to answer	1	0	1	0	0	0	2		2	9%
	[N]	8	6	3	2	2	1	22	9	22	100%

Table 7 - Data Theme 4 'Product Management - Wastage'

Theme - Product Management - Cost

A key aim of the HT Hub is to provide a structured and streamlined system for management of the reimbursement process. Whether that is calculating the reimbursement fees due to pharmacists for orders placed on behalf of patients, dispensing of that product, or the payment for products by the HSE to the product supply company, (PCRS, 2024). Participants were asked to share their experiences of the HT Hub and the above processes, comparing the Hub to the alternate system. **Question 14** asks “On average, what percentage of your High-Tech claims are queried?”. Responses were received from all participants [N=29], however were very diverse. This indicates only some respondents are involved in the reimbursement process [N=16], and from that sub-group, across 5 functions, N=11 confirmed queries were typically less than 5% of all reimbursement reclaims, (Figure 40). **Question 15** delved deeper, asking if participants ‘believed ordering ALL High-Tech medications on the HUB has benefits for the HSE Budget?’. Overwhelmingly, from a total of N=24 participants, N=23 participants agreed [N=5], strongly agreed [N=18] that the HSE benefit greatly from use of the HT Hub, (Figure 41).

Question 17 asked the comparative question, “Is the High Tech HUB more cost effective compared to other forms of product ordering” Yes, or No? A total of N=20 responses were received, with 70% [N=14] believing the HT Hub is better. These responses were shared across 5 business functions, weighted towards Commercial [N=7] and Customer Care [N=5] participants, with Finance [N=2], Logistics [N=3] and Quality-IT [N=2] represented, (Figure 42). Taking the opportunity to discover the perceptions of all participants, for all stakeholder groups in the HT supply process, **Question 18** was asked as below:

- *18a - in your professional opinion, does the High Tech HUB benefit the – Patient* (Figure 53)
No significant findings highlighted, with an almost flat bar chart across 4 rating levels (Figure 53).
- *18b - in your professional opinion, does the High Tech HUB benefit the – Pharmacy* (Figure 54)
63% of participants [N=15 of 24] agreed with a further 21% [N=5] Strongly agreeing it benefits the pharmacy.
- *18c - in your professional opinion, does the High Tech HUB benefit the – HSE* (Figure 55)
75% [N=18 of 24] strongly agreed it benefits the HSE, with an additional 21% [N=5] agreeing.
- *18d - in your professional opinion, does the High Tech HUB benefit the – Wholesaler* (Figure 56)
A diverse mix of responses, 29% [N=7] disagreeing, 25% [6] agreeing and 25% [6] strongly agreeing.
- *18e - in your professional opinion, does the High Tech HUB benefit the – Pharma Co.* (Figure 57)
Again, a broad range of responses across the 5 ratings levels, with a total of N=24 responses.

In summary, it is acknowledged that participants believe the HT Hub benefits the pharmacy and the HSE mostly, of all five stakeholder groups.

Theme - Product Management - Cost

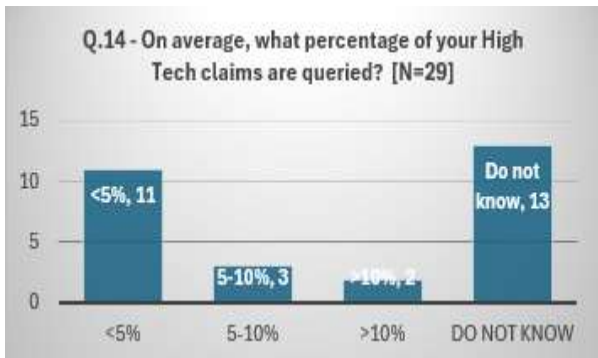


Figure 40 - Q.14 On average, what percentage of your HT claims are queried?

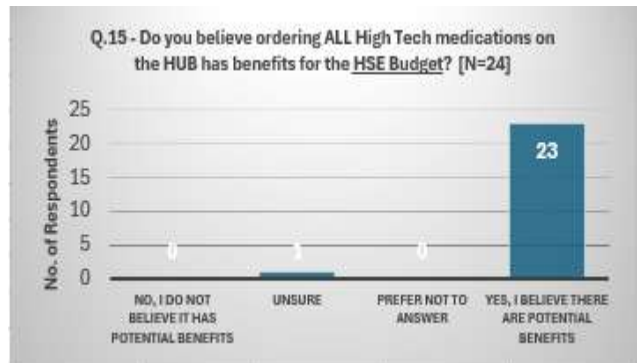


Figure 41 - Q.15 Do you believe ordering ALL High-Tech meds on the HTH benefits the HSE Budget?

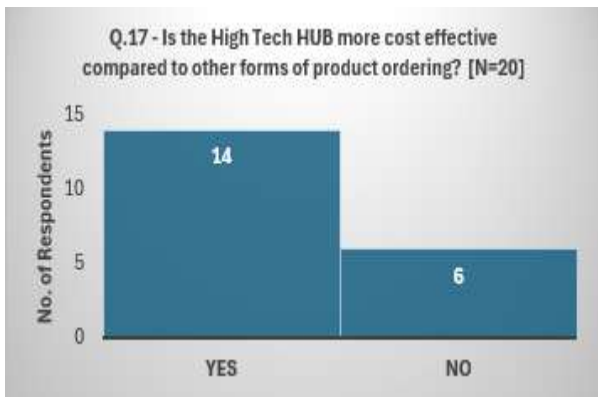


Figure 42 - Q.17 Is HTH more cost effective compared to other forms of product ordering?



Figure 43 - Q.18a In your professional opinion, does the HTH benefit the Patient?

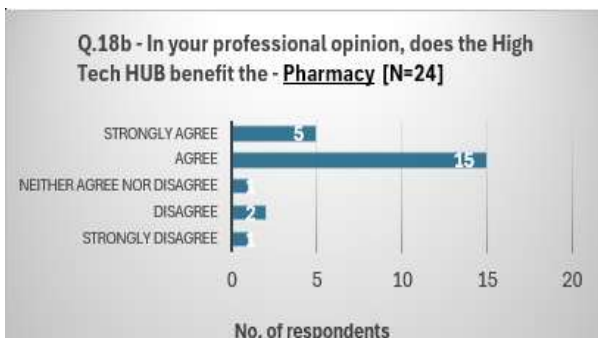


Figure 44 - Q.18b does the HTH benefit the - Pharmacy?

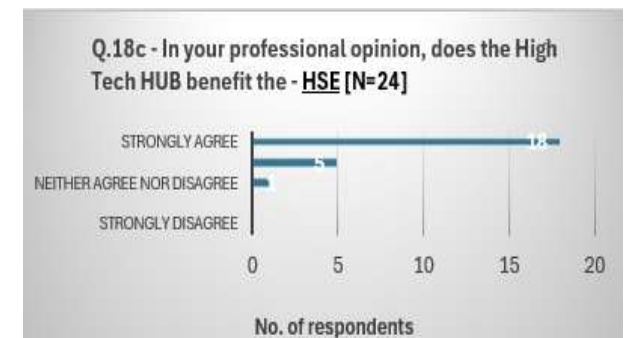


Figure 45 - Q.18c does the HTH benefit the - HSE?

Theme - Product Management - Cost

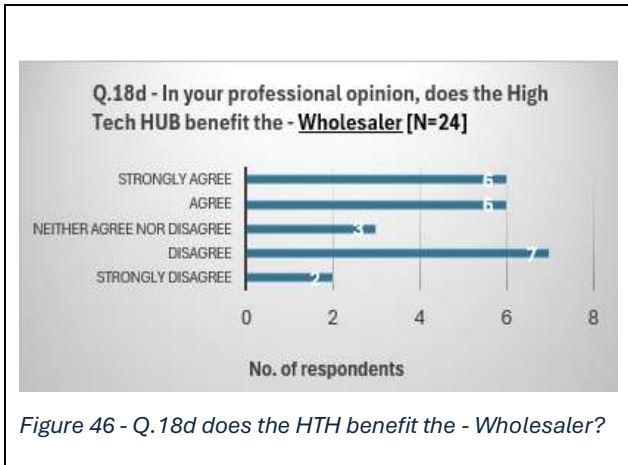


Figure 46 - Q.18d does the HTH benefit the - Wholesaler?

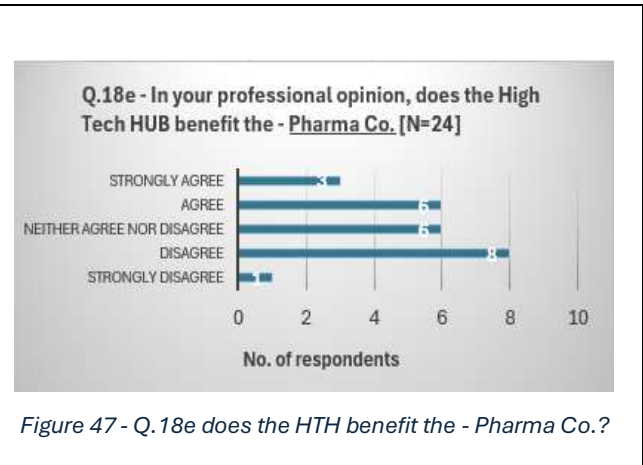


Figure 47 - Q.18e does the HTH benefit the - Pharma Co.?

Theme - Product Management - Cost											
Measure	Response / Role	Commercial	Customer Care	Finance	Operations - Logistics	Quality - IT	Regulatory - Governance	[N] Interview Only	[N] Pharmacy (Survey)	[N] Interview plus Survey	[N] %
Q14. On average, what percentage of your High Tech claims are queried?	<8%	2	3	2	0	0	1	8	3	11	38%
	5-10%	1	0	0	0	1	0	2	1	3	10%
	>10%	0	0	1	1	0	0	2	0	2	7%
	Do not know	5	3	0	2	2	0	12	1	13	45%
	[N]	8	6	3	3	3	1	24	5	29	100%
Q.15 Do you believe ordering ALL High Tech medications on the HUB has benefits for the HSE Budget?	No, I do not believe it has potential benefits	0	0	0	0	0	0	0			0%
	Unsure	0	1	0	0	0	0	1			4%
	Prefer not to answer	0	0	0	0	0	0	0			0%
	Yes, I believe there are potential benefits	8	5	3	3	3	1	23			96%
	[N]	8	6	3	3	3	1	24	0		100%
Q17. Is the High Tech HUB more cost effective compared to other forms of product	Yes	6	5	1	1	1	0	14			70%
	No	1	0	1	2	1	1	6			30%
	[N]	7	5	2	3	2	1	20	0		100%
Q.18a In your professional opinion, does the High Tech HUB benefit the - Patient	Strongly Disagree	0	0	0	0	0	0	0			0%
	Disagree	1	0	0	3	2	1	7			29%
	Neither agree nor disagree	3	2	0	0	0	0	5			21%
	Agree	3	1	2	0	1	0	7			29%
	Strongly Agree	1	3	1	0	0	0	5			21%
	[N]	8	6	3	3	3	1	24	0		100%
Q.18b In your professional opinion, does the High Tech HUB benefit the - Pharmacy	Strongly Disagree	0	0	0	0	0	1	1			4%
	Disagree	1	0	0	1	0	0	2			8%
	Neither agree nor disagree	0	1	0	0	0	0	1			4%
	Agree	6	3	1	2	3	0	15			63%
	Strongly Agree	1	2	2	0	0	0	5			21%
	[N]	8	6	3	3	3	1	24	0		100%
Q.18c In your professional opinion, does the High Tech HUB benefit the - HSE	Strongly Disagree	0	0	0	0	0	0	0			0%
	Disagree	0	0	0	0	0	0	0			0%
	Neither agree nor disagree	0	1	0	0	0	0	1			4%
	Agree	1	2	1	1	0	0	5			21%
	Strongly Agree	7	3	2	2	3	1	18			75%
	[N]	8	6	3	3	3	1	24	0		100%
Q.18d In your professional opinion, does the High Tech HUB benefit the - Wholesaler	Strongly Disagree	0	0	0	1	0	1	2			8%
	Disagree	3	1	2	0	1	0	7			29%
	Neither agree nor disagree	1	1	0	0	1	0	3			13%
	Agree	3	2	0	0	1	0	6			25%
	Strongly Agree	1	2	1	2	0	0	6			25%
	[N]	8	6	3	3	3	1	24	0		100%
Q.18e In your professional opinion, does the High Tech HUB benefit the - Pharma Co.	Strongly Disagree	0	0	0	0	0	1	1			4%
	Disagree	2	2	1	1	2	0	8			33%
	Neither agree nor disagree	3	1	0	1	1	0	6			25%
	Agree	3	1	2	0	0	0	6			25%
	Strongly Agree	0	2	0	1	0	0	3			13%
	[N]	8	6	3	3	3	1	24	0		100%

Table 8 - Data Theme 4 'Product Management - Cost'

4.5 Theme – Technology Effectiveness

Research Objective 2 – explores technology effectiveness, and if the launch of the hub has transformed the HT procurement process, in a systematic, structured and streamlined way. A total of 11 questions asked, 2 of which are free text responses, which will be discussed in the ‘Thematic Response’ section at the end of this chapter.

The topic of technology effectiveness begins with **Question 19**, asking interview participants “Is the HTH better suited to the end-to-end High-Tech order to reimbursement process?”. All responded [N=24], with two thirds of participants Agreeing [N=8] to Strongly agreeing [N=8] the HTH is a better system, with responses across 5 business functions. 5 participants somewhat agreed, giving an overall favourable response to the HT hub being better suited to the reimbursement process, than the alternative system, (Figure 48). **Question 20**, examines the idea there may be barriers to using online order systems for pharmaceutical products? This is a closed question with response choices of Yes or No, driving participants to think broadly about the question, in the context of pharmaceutical products. Two thirds respond with yes, N=15, one third, N=9, respond No (Figure 49). It is interesting that participants believe there are barriers, considering technology should provide better automation of services, improved access and better data analysis opportunities, if done well. If participants responded Yes, meaning they believed there to be barriers, they are asked in **Question 21**, to give reasons to support their answer. This will be further discussed in the ‘Thematic Analysis’, but for context of technology effectiveness, some reasons shared are,

- *“Pharmacists work within a patient medication record, we shouldn’t have to leave that record for anything, we should not have to go to a separate system – Participant 10”*
- *“If they (HSE) have system outages, orders cannot transfer which causes system issues, other channels may have been shut down and need to be re-opened and orders manually processed, as they are restricted (blocked) from other interfaces and website facilities, once listed on the HSE HUB – (Participant 12).”*
- *“As can be the problem here, system needs to be up to date, just in time for stock availability. If not creates administrative issues and patient service issues – (Participant 18).”*

For technology information systems to be effective, their integration must be seamless. **Question 22** asks “How well does this HSE technology integrate with other systems in your business?”. A total of N=23 responses received, with 57% [N=13] advising Moderate, and 30% [N=7] giving a Very Seamless, response.

There are some outliers, 1 response each from both Commercial and Regulatory participants, advising Not Seamless at all. **Question 23**, is similar and asks, “How well connected are the users of the High-Tech Hub website - how well does it connect to other systems?”, encompassing both users and systems, and the results corroborate with responses from Question 22, a total of N=24 responses, with 50% [N=12] giving Moderately response, 21% [N=5] advising Very Good, and 17% [N=4] giving a response of Fair. Overall, the interview responses indicate that the HTH system appears to work and integrate with systems across all business functions. Figures 48 and 51, show non skewed graphs.

Currently on the HT Hub, there is a one-to-one relationship between prescription to patient to product, and each order being filled by the product supply company, effectively one patient order per box, delivered to pharmacy. These HTH order types can take more time to prepare from order pick preparation to delivery and checking on receipt at pharmacy. **Question 24** explores the idea that “If pharmacy (patient) orders could be consolidated, would you be in favour of moving the order process for all reimbursable products to the HSE HUB?” meaning the HTH system would consolidate the orders being sent to the product supplier, identifiable by unique codes. When received and dispensed by the pharmacy, which would result in less physical boxes and deliveries to pharmacy. A closed question was asked, with Yes or No response options. A total of N=24 responses were received, with 58% [N=14] confirming Yes, they would be in favour of this change, and 42% advising No, [N=10], interestingly across 6 business functions, (Figure 52). Continuing the theme of technology effectiveness and process improvement, **Question 25** asked participants. “Could the HSE Total High Tech Reclaims Process, from Order Placement > Fulfilment > Reimbursement process be easier to administer?”. Interestingly, in the context of the HT Hub working alongside the alternate system, a total response rate of N=24 was achieved, the No responses were 37% [N=9] and yes at 63% [N=15], indicating there are still improvements that could be introduced.

Both **Question 26** and 27 asks participants to “Rate the Order to reimbursement process using the High Tech Hub compared to Standard High Tech reimbursement process for *“Order to Delivery”*, Figure 54 gives a non-skewed representation of responses, with slight lean towards the HTH being above standard. For **Question 27**, and *“Reimbursement Fees Payable”*, a strong response of 67% [N=10] of 15 responses, indicates the HT Hub rates higher than the alternative HT supply system. **Question 28**, an overarching question to Technology Effectiveness, asks “Do you agree that the High Tech HUB is better suited to the High-Tech claim reimbursement process - matching prescriber, to patient, to prescription, to product?”. A non-skewed graph is drawn, identifying 87% [N=21] of responses agree! (Figure 55).

Theme – Technology Effectiveness

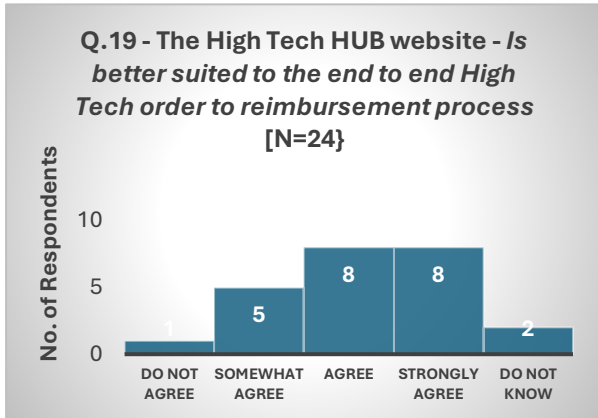


Figure 48 - Q.19 The HTH website better suited to the HT reimbursement process



Figure 49 - Q.20 Are there barriers to using online order systems for pharmaceutical products?

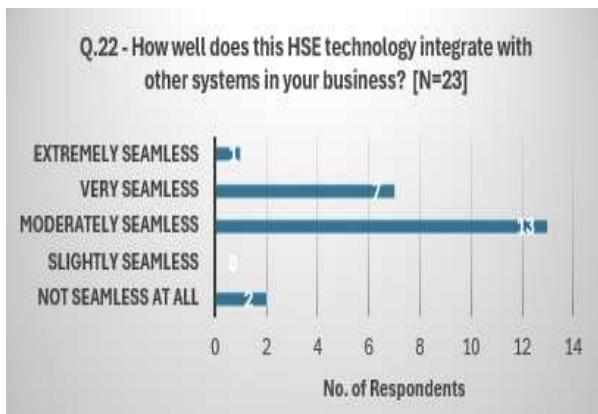


Figure 50 - Q.22 How well does this HSE technology integrate with other systems in your business?

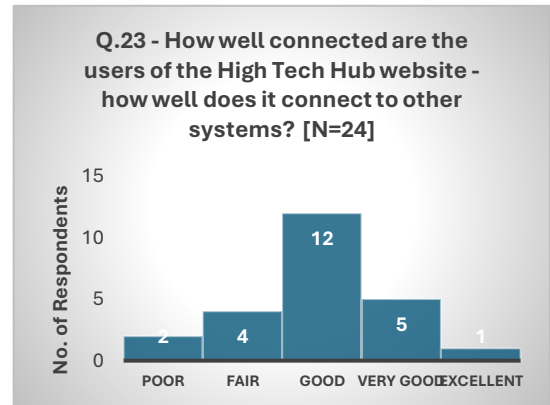


Figure 51 - Q.23 How well does the HTH website connect to other systems

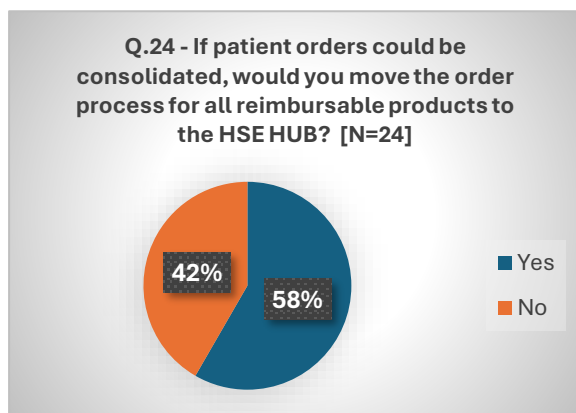


Figure 52 - Q.24 If orders were consolidated should all reimbursed products go to HTH

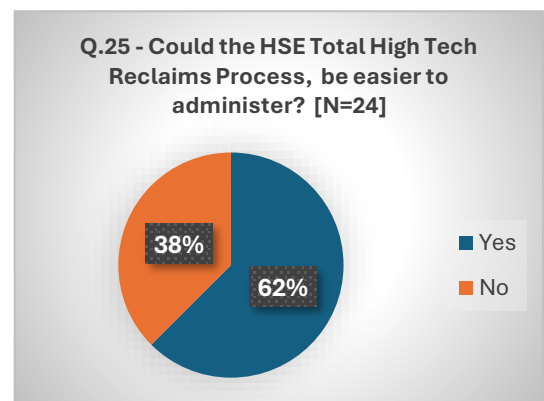


Figure 53 - Q.25 Could the HSE Total HT Reclaims be easier to administer

Theme – Technology Effectiveness

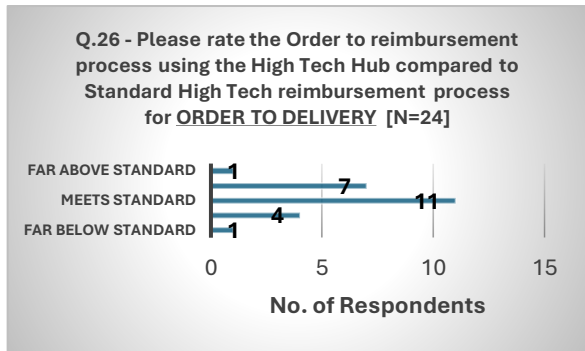


Figure 54 - Q.26 Please rate the HTH for Order to Delivery

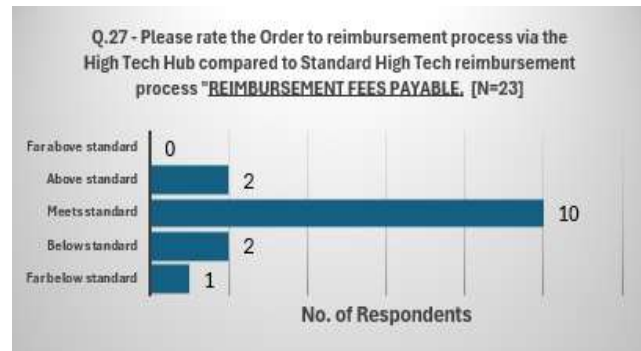


Figure 55 - Q.27 Please rate the HTH for Fees Payable

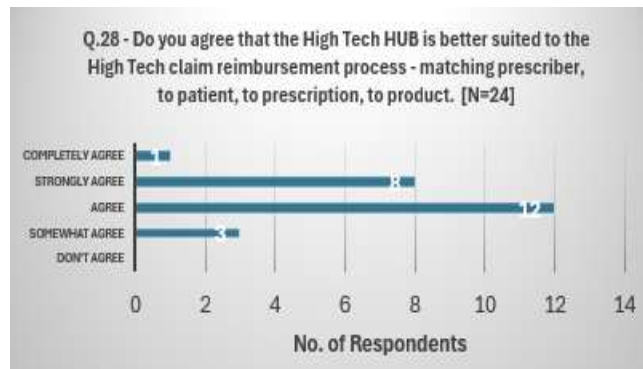


Figure 56 - Q.28 Do you agree the HTH is better suited to the HT claim reimbursement process?

Theme – Technology Effectiveness

Theme - Technology Optimisation - Effectiveness											
Measure	Response / Role	Commercial	Customer Care	Finance	Operations - Logistics	Quality - IT	Regulatory- Governance	[N] Interview Only	[N] Pharmacy (Survey)	[N] Interview plus Survey	[N] %
Q.19 Is the HTH better suited to the end to end High Tech order to reimbursement process?	Do not agree	0	0	0	0	0	1	1			4%
	Somewhat agree	0	1	2	1	1	0	5			21%
	Agree	4	2	1	1	0	0	8			33%
	Strongly agree	4	2	0	0	2	0	8			33%
	Do not know	0	1	0	1	0	0	2			8%
	[N]	8	6	3	3	3	1	24	0		100%
Q.20 In your professional opinion, are there barriers to using online order systems for	Yes	5	3	2	2	2	1	15			63%
	No	3	3	1	1	1	0	9			38%
	[N]	8	6	3	3	3	1	24	0		100%
Q.22 How well does this HSE technology integrate with other systems in your business?	Not seamless at all	1	0	0	0	0	1	2			9%
	Slightly seamless	0	0	0	0	0	0	0			0%
	Moderately seamless	3	2	3	3	2	0	13			57%
	Very seamless	4	2	0	0	1	0	7			30%
	Extremely seamless	0	1	0	0	0	0	1			4%
	[N]	8	5	3	3	3	1	23	0		100%
Q.23 How well connected are the users of the High Tech Hub website - how well does it connect to other systems?	Poor	1	0	0	1	0	0	2			8%
	Fair	1	0	0	1	1	1	4			17%
	Good	2	5	2	1	2	0	12			50%
	Very good	4	0	1	0	0	0	5			21%
	Excellent	0	1	0	0	0	0	1			4%
	[N]	8	6	3	3	3	1	24	0		100%
Q.24 If pharmacy (patient) orders could be consolidated, would you be in favour of	Yes	5	4	2	2	1	0	14			58%
	No	3	2	1	1	2	1	10			42%
	[N]	8	6	3	3	3	1	24	0		100%
Q.25 Could the HSE Total High Tech Reclaims Process, from Order Placement >	Yes	5	2	2	2	3	1	15			63%
	No	3	4	1	1	0	0	9			38%
	[N]	8	6	3	3	3	1	24	0		100%
Q.26 Please rate the Order to reimbursement process using the High Tech Hub compared to Standard High Tech reimbursement process for ORDER TO DELIVERY	Far below standard	0	0	0	1	0	0	1			4%
	Below standard	0	0	1	2	0	1	4			17%
	Meets standard	3	4	2	0	2	0	11			46%
	Above standard	4	2	0	0	1	0	7			29%
	Far above standard	1	0	0	0	0	0	1			4%
	[N]	8	6	3	3	3	1	24	0		100%
Q.27 Please rate the Order to reimbursement process via the High Tech Hub compared to Standard High Tech reimbursement process *REIMBURSEMENT FEES PAYABLE.	Far below standard	0	0	0	1	0	0	1			7%
	Below standard	0	0	1	0	1	0	2			13%
	Meets standard	5	0	2	0	2	1	10			67%
	Above standard	2	0	0	0	0	0	2			13%
	Far above standard	0	0	0	0	0	0	0			0%
	[N]	7	0	3	1	3	1	15	0		100%
Q.28 Do you agree that the High Tech HUB is better suited to the High Tech claim reimbursement process - matching prescriber, to patient, to prescription, to product.	Don't Agree	0	0	0	0	0	0	0			0%
	Somewhat Agree	1	1	0	0	1	0	3			13%
	Agree	2	3	2	3	1	1	12			50%
	Strongly Agree	5	2	1	0	0	0	8			33%
	Completely Agree	0	0	0	0	1	0	1			4%
	[N]	8	6	3	3	3	1	24	0		100%

Table 9 - Data Theme 2 'Technology Optimisation - Effectiveness'

4.6 Theme – Technology Acceptance

Your newly integrated system may be highly effective, but if it does not have the support and acceptance of the intended users who see the benefits in its use, it can never achieve its full potential, (DeLone and McLean, 2003). To understand participants attitudes to the current and future use of the HT hub, 6 questions were asked.

With an emphasis on the future, **Question 30** asks “Should all Reimbursable Medications be ordered on the HSE HUB?”. This question was also included in the online survey, giving a total response rate of N=29 responses received through interview and surveys. Responses indicated a caution across all 7 groups to transitioning all reimbursable products to the HTH online model. With 45% [N=13] confirming No, and N=6 responses Undecided, so overall 66% of participants showing a reluctance to the suggestion. (Figure 57). **Question 31**, also future based, asks “Do you think that ALL high-tech products will be ordered through the HSE HUB in the next” with a range of responses in years suggested. A total response rate of N=24 was received, with 15 responses (63%) suggesting it will be “3-5 Years” before all HT products have transition to the web. This would make a total transition of c.10 years since launch in 2018. This could indicate a lack of confidence in the HSE to deliver the HTH fully, (Figure 58).

Question 32, reiterated the focus on benefits to pharmacies and process improvement, asking participants, “Do you believe ordering ALL High-Tech medications on the HUB has potential benefits for Pharmacies?”. Of N=24 responses received, N=18 participants confirmed Yes, a strong response at 75%, representing all 5 functional groups who responded. On balance, N=6 participants were unsure how to answer, and N=3 did not believe the move for all HT products on the hub to be a good one. In terms of perceptions and attitudes, (Figure 59). **Question 34** asked participants if they thought the HTH process had improved since launch? N=18 responses were received, across 6 business functions, with 83% [N=15] participants saying Yes, they believed the order to reimbursement process has improved with the introduction of the Hub, (Figure 60).

Looking to the future, and improved patient support and care, participants were asked in **Questions 35** “Is the HUB a step towards centralisation of Patient Records and Product Ordering to Reimbursement?”. With N=22 responses, a very strong response rate of N=19 (91%) confirmed Yes, (Figure 61). In terms of overall acceptance, participants were asked (**Question 36**), “Has the perception of the HUB online system improved since its launch?”. From a total response rate of N=22, 91% [N=20] confirmed Yes, the perception of the HT Hub has improved since its launch, (Figure 62).

Theme – Technology Acceptance

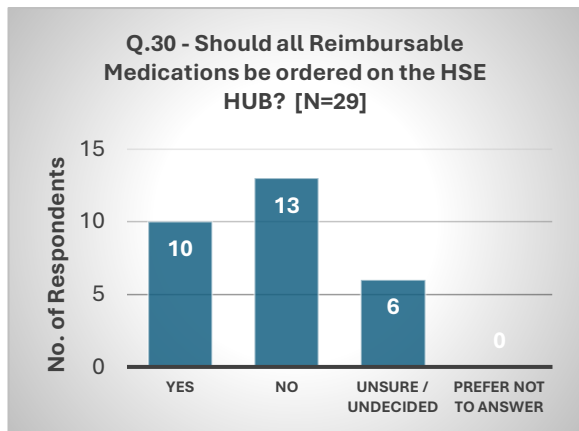


Figure 57 - Q.30 Should all Reimbursable Medications be ordered on the HTH?

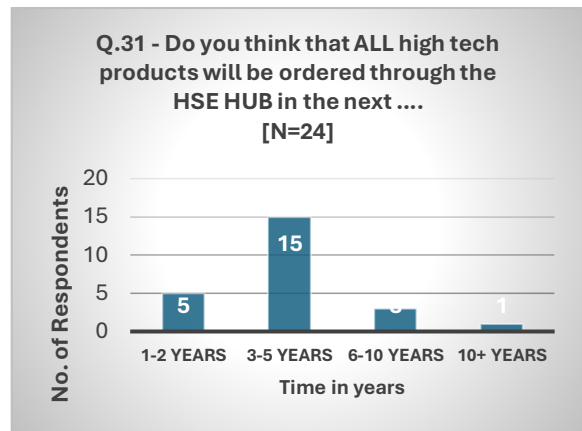


Figure 58 - Q.31 Do you think ALL HT tech products will be ordered through the HTH in the next

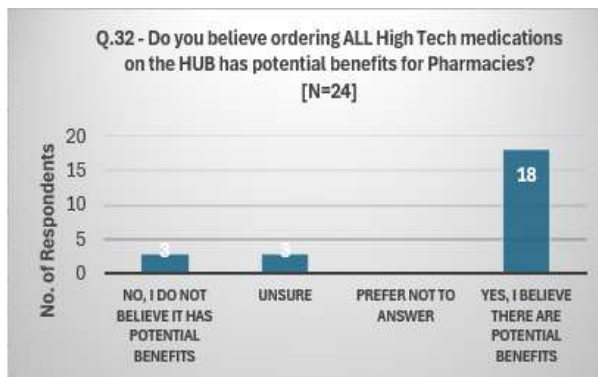


Figure 59 - Q.32 Do you believe ordering ALL HT Meds. on the HTH has benefits for Pharmacies?

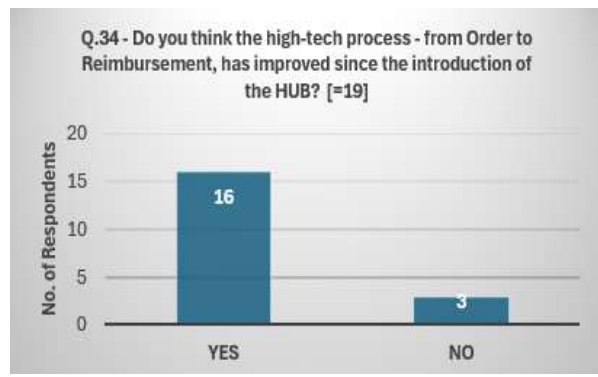


Figure 60 - Q.34 Do you think the HT process improved since introduction of the HUB?

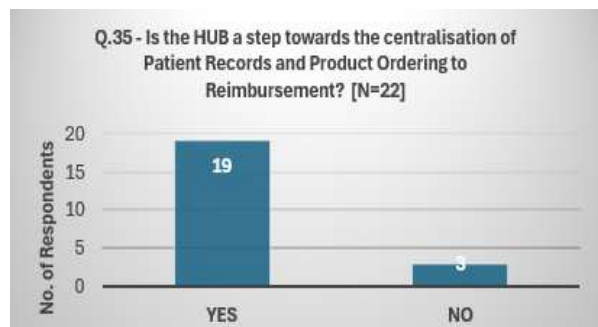


Figure 61 - Q.35 Is the HTH a step towards the centralisation of Patient Records

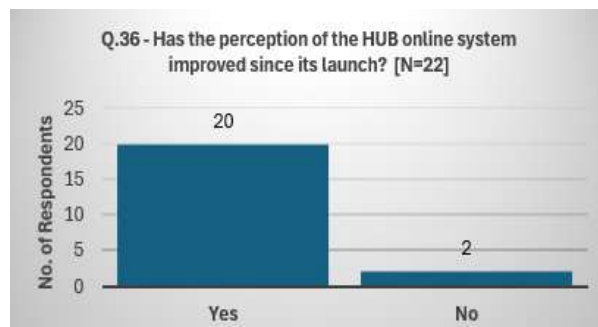


Figure 62 - Q.36 Has the perception of the HTH improved since launch?

Theme – Technology Acceptance

Theme - Technology Optimisation - Acceptance											
Measure	Response / Role	Commercial	Customer Care	Finance	Operations - Logistics	Quality -IT	Regulatory- Governance	[N] Interview Only	[N] Pharmacy (Survey)	[N] Interview plus Survey	[N] %
Q.30 Should all Reimbursable Medications be ordered on the HSE HUB?	Yes	1	5	2	1	0	0	9	1	10	34%
	No	2	1	0	2	3	1	9	4	13	45%
	Unsure / Undecided	5	0	1	0	0	0	6	0	6	21%
	Prefer not to answer	0	0	0	0	0	0	0	0	0	0%
	[N]	8	6	3	3	3	1	24	5	29	100%
Q.31 Do you think that ALL high tech products will be ordered through the HSE HUB in the next	1-2 years	1	2	0	1	0	1	5			21%
	3-5 years	6	3	3	0	3	0	15			63%
	6-10 years	0	1	0	2	0	0	3			13%
	10+ years	1	0	0	0	0	0	1			4%
	[N]	8	6	3	3	3	1	24	0		100%
Q.32 Do you believe ordering ALL High Tech medications on the HUB has potential benefits for Pharmacies?	No, I do not believe it has potential benefits	1	0	0	0	1	1	3			13%
	Unsure	2	0	0	1	0	0	3			13%
	Prefer not to answer	0	0	0	0	0	0	0			0%
	Yes, I believe there are potential benefits	5	6	3	2	2	0	18			75%
	[N]	8	6	3	3	3	1	24	0		100%
Q.34 Do you think the high-tech process - from Order to Reimbursement, has improved since the introduction of the HUB?	Yes	8	4	2	0	1	0	15			83%
	No	0	0	1	1	0	1	3			17%
	[N]	8	4	3	1	1	1	18	0		100%
Q.35 Is the HUB a step towards the centralisation of Patient Records and Product Ordering to Reimbursement?	Yes	8	6	3	0	1	1	19			86%
	No	0	0	0	2	1	0	3			14%
	[N]	8	6	3	2	2	1	22	0		100%
Q.36 Has the perception of the HUB online system improved since its launch?	Yes	8	5	3	2	2	0	20			91%
	No	0	0	0	1	0	1	2			9%
	[N]	8	5	3	3	2	1	22	0		100%

Table 10 - Data Theme 3 'Technology Optimisation - Acceptance'

4.7 Theme - Administrative Effect (Care and wellbeing)

With the introduction of any technology and information system, there is an expectation it will deliver benefits to the business and its users – through improved interactions, better physical and informational flows. These anticipated benefits look to address challenges that may exist in legacy systems and processes. Objective 5 looks at the administrative effect of the HT Hub, and what differences, if any, it has delivered to users and to determine if using the Hub provides improved support, having a positive effect on user roles and responsibilities. There are 7 questions to answer.

Mobility and Interoperability: **Question 37** asks participants if they agree with the statement “Using the High Tech Hub is more user friendly - it can be accessed from any location”, with responses given on a 5-point scale. All interview participants responded, N=24. Most participants agreed (84%), and found the Hub user friendly, compared to 2 participants who did not agree with the statement, which may be influenced by their roles and lower interaction level with the Hub, being Logistics and Regulatory, (Figure 63). **Question 38**, a statement, asks if “Steps in the high-tech order administrative process have reduced”, 12 participants (of N=19) agreed with the statement, however 6 participants did not agree, and their responses came from all functional groups, making this result inconclusive, (Figure 64).

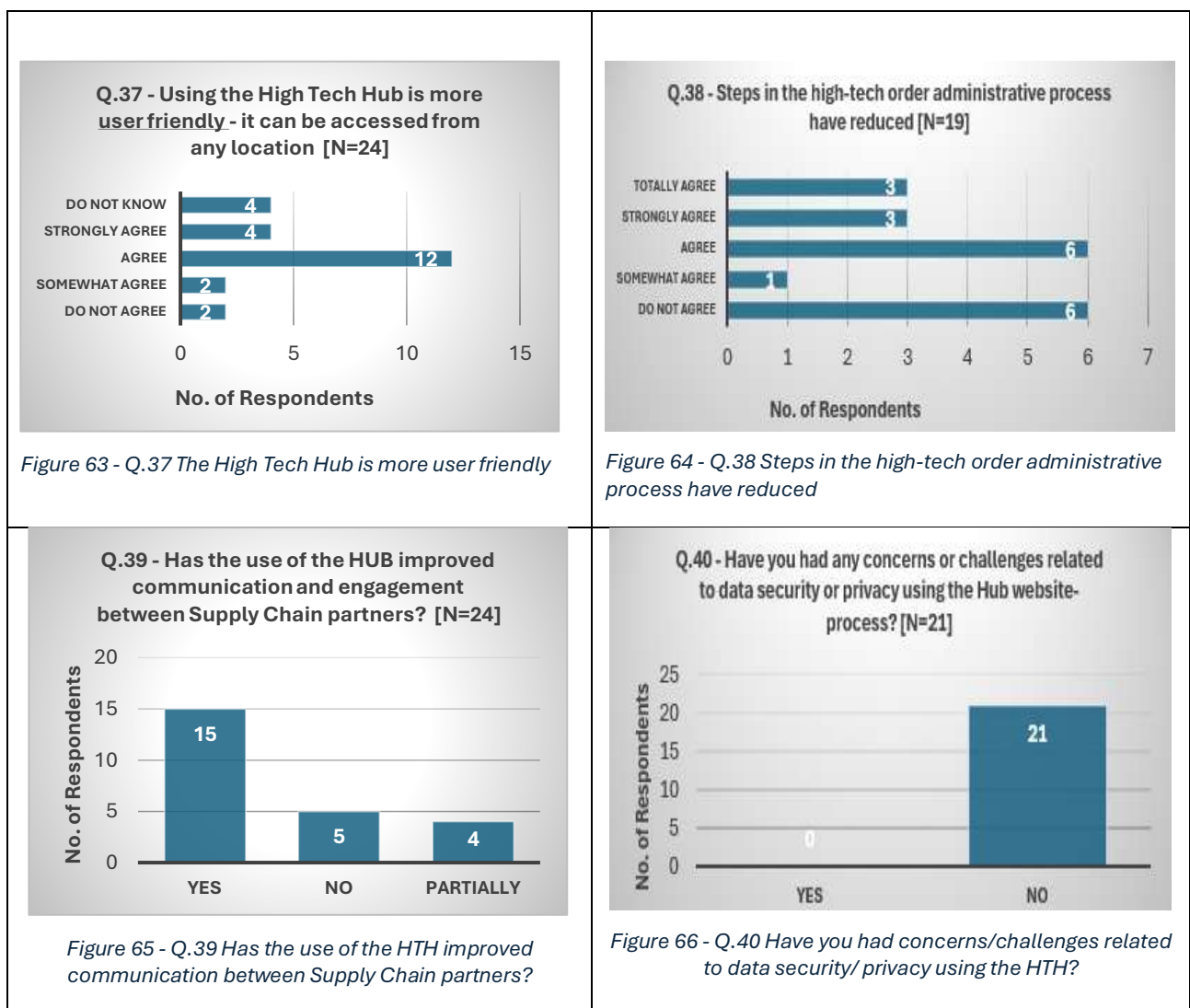
Communication and Engagement: **Question 39**, “Has the use of the HUB improved communication and engagement between Supply Chain partners?”, of total responses N=24, a high agreement rate of N=19 was given, from the Commercial, Financial and Customer Care functions, who tend to be front facing, so this indicates the Hub is having a positive effect, (Figure 65). Coupled with communication, **Question 40** asks, “Have you had any concerns or challenges related to data security or privacy using the Hub website-process?”, with 100% of participants [N=21] responding with no concerns at all.

Challenges, Workload and Overall Efficiency: Important to the adoption and use of the HT system, **Question 42** asks “Has the introduction of the HUB process, impacted your workload and responsibilities?” 59% of participants (17 of N=24) indicated their workloads have increased, with 9 participants advising No Change or a Decrease in workload. Overall, this result is important as the results throughout the study indicate the HT Hub is having a positive effect in most areas, which does not seem to be affected by the increase in users’ workloads, one is not affecting the other.

Theme - Administrative Effect (Care and wellbeing)

Linked to workload, the question regarding efficiency is asked, (**Question 43**) “Has the introduction of the HUB improved the efficiency of the order to reimbursement process compared to traditional methods?”. 16 (65% of N27) gave a Yes reponse, with 3 saying they were not sure of the affect on the overall process. 5 participants (22%) gave a No answer, that it had not improved the process compared to the alternate system. The Yes response received across all functional groups, representing more than a 65% average in most groups, indicates the Hub has a positive effect on the process.

In summary of the study, having taken participants through the steps in the HT process, they were asked “Overall, how would you rate the High Tech Hub process – website?”, on a scale of Poor to Excellent. No-one rated the Hub as poor, with 8 participants [of N=23] giving it Very Good to Excellent, with a Mode response of Good, by 11 participants (48%). Overall, participants gave the HT Hub a Good+ rating of 83%, which should be considered a success, (Question 44, Figure 69).



Theme - Administrative Effect (Care and wellbeing)

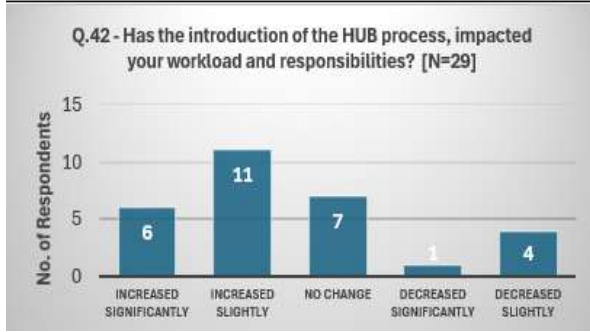


Figure 67 - Q.42 Has the introduction of the HTH impacted your workload and responsibilities?

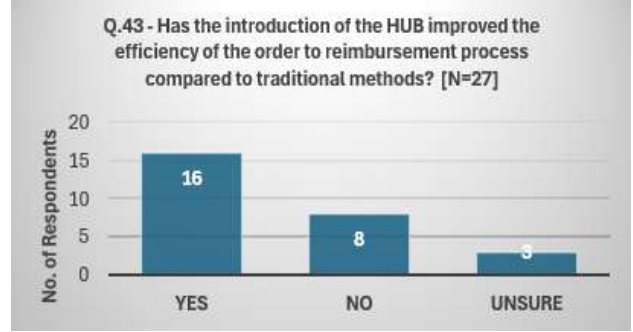


Figure 68 - Q.43 Has the introduction of the HTH improved the efficiency of reimbursement?

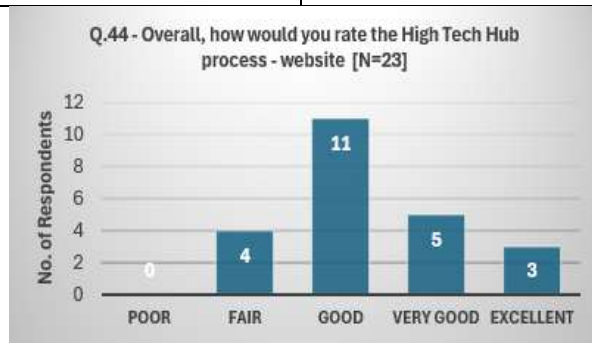


Figure 69 - Q.44 Overall, how would you rate the HTH process – website.

Theme - Administrative Effect (Care and wellbeing)											
Measure	Response / Role	Commercial	Customer Care	Finance	Operations - Logistics	Quality - IT	Regulatory - Governance	[N] Interview Only	[N] Pharmacy (Survey)	[N] Interview plus Survey	[N] %
Q.37 Using the High Tech Hub is more user friendly - it can be accessed from any location.	Do not agree	0	0	0	1	0	1	2			8%
	Somewhat agree	1	0	0	0	1	0	2			8%
	Agree	3	4	3	1	1	0	12			50%
	Strongly agree	2	1	0	0	1	0	4			17%
	Do not know	2	1	0	1	0	0	4			17%
	[N]	8	6	3	3	3	1	24	0		100%
Q.38 Steps in the high-tech order administrative process have reduced	Do not agree	1	1	1	1	1	1	6			32%
	Somewhat agree	1	0	0	0	0	0	1			5%
	Agree	2	1	2	1	0	0	6			32%
	Strongly agree	1	1	0	0	1	0	3			16%
	Totally Agree	1	2	0	0	0	0	3			16%
	[N]	6	5	3	2	2	1	19	0		100%
Q.39 Has the use of the HUB improved communication and engagement between Supply Chain partners?	Yes	8	5	2	0	0	0	15			63%
	No	0	0	0	2	2	1	5			21%
	Partially	0	1	1	1	1	0	4			17%
		[N]	8	6	3	3	3	1	24	0	
Q.40 Have you had any concerns or challenges related to data security or privacy using the Hub website-process?	Yes	0	0	0	0	0	0	0			0%
	No	7	5	3	2	3	1	21			100%
		[N]	7	5	3	2	3	1	21	0	
Q.42 Has the introduction of the HUB process, impacted your workload and responsibilities?	Increased significantly	1	1	1	1	0	0	4	2	6	21%
	Increased slightly	4	1	0	2	1	1	9	2	11	38%
	No change	1	3	1	0	2	0	7	0	7	24%
	Decreased significantly	0	0	1	0	0	0	1	0	1	3%
	Decreased slightly	2	1	0	0	0	0	3	1	4	14%
	[N]	8	6	3	3	3	1	24	5	29	100%
Q.43 Has the introduction of the HUB improved the efficiency of the order to reimbursement process compared to traditional methods?	Yes	8	1	2	2	2	0	15			65%
	No	0	1	1	1	1	1	5			22%
	Unsure	0	3	0	0	0	0	3			13%
		[N]	8	5	3	3	3	1	23	0	
Q.44 Overall, how would you rate the High Tech Hub process - website	Poor	0	0	0	0	0	0	0			0%
	Fair	0	1	1	2	0	0	4			17%
	Good	4	2	1	1	2	1	11			48%
	Very Good	2	1	1	0	1	0	5			22%
	Excellent	1	2	0	0	0	0	3			13%
	[N]	7	6	3	3	3	1	23	0		100%

Table 11 - Data Theme 5 ' Administrative Effect - Care and Wellbeing'

4.8 Thematic Analysis

During the interviews and surveys, participants were given the opportunity to provide feedback on the HT website and process. A total of 11 open ended questions were asked, linked to 4 research objectives (below), allowing participant feedback on the HT market, providing further contributions to the study.

The six step approach to thematic analysis was used, (Caulfield, 2023).

1. Familiarisation
2. Coding
3. Generating Themes
4. Reviewing Themes
5. Naming Themes
6. Reporting

In addition, 'Keywords' were used and linked to themes. Where 'unique participant responses' were identified, thought beneficial to findings, these have been highlighted. The data was collected in excel and the results matrix transposed, to allow filtering and analyses of words and phrases, allowing familiarisation with the data and terminology. Common words and phrases were highlighted to form themes and reported under objectives 2 to 5 below. The use of word clouds highlighted key words and helped cross check with themes identified.

Objective 2, Cost - Question 16. If yes, "the hub has benefits for the HSE Budget", please explain why in your opinion? Themes of *Control, Reduced Wastage, Reducing Risk and End-to-End* were used throughout. Figure 70.

Objective 3, Technology Effectiveness - Question 21. In your professional opinion, are there barriers to using online order systems for pharmaceutical products? If yes, please explain why in your opinion? Themes of *Restricted Products, Not Eligible, Blocked, Allocations and Stock* came through strongly.

Objective 4, Technology Acceptance - Question 33. Do you believe ordering ALL High-Tech medications on the HUB has potential benefits for Pharmacies? If yes, please explain why in your opinion? Participants cited *Ordering Everything, One Entry, Matching Process, No Overstocking*. Figure 72.

Objective 5 - Administrative Effect – Care - Question 41. What are the biggest user challenges faced in High-Tech Hub website use? Coincidentally the word cloud created a footprint, apt for highlighting the key themes that participants expect from the HT Hub website-process, being *Linked Order Data, Better Flexibility, More than One Order, Reconciliation (with) Suppliers, Product, Process, Products, Understanding, Challenges*. Figure 74.

Further examples can be identified in the word clouds overleaf.

As noted in the literature review, new HT product introductions are forecast to increase, (IQVIA, 2022), and combined with the growth in biosimilar products, will mean an increase in supports needed for storage, handling and dispensing of HT products. Participants were asked for their insights to the HT landscape in the next 1 to 5 years. In terms of their outlook, it is largely positive and focussed on opportunities, despite the challenges highlighted in payments and the HTH launch being led by the HSE. Question 47 asked participants, “What opportunities do you see, for online integration of services with the HSE and your pharmacy /department?”, the below examples represent the optimism of the research group.

1. *“There is opportunity for engaging with various digital providers in the marketplace with the HSE. In my view the HTH has been led by the HSE in the interest of saving on annual cost of High-Tech medications. The waste of high-tech medicines, very much a push approach with setting up the whole High-Tech HUB process. Taking the learnings of the rollout and start interacting with other providers, very much HSE push led, more benefits can be got by integrating with other providers in the marketplace. Patient support providers, for accurate ordering.” Participant 2.*
2. *“Without a doubt we would love to see hospital pharmacies with similar integrated systems, too many systems out there. Has negatives in terms of pricing, automation of systems, order errors, getting everything right first time. A system where we are all using the same codes, GMS (General Medical Scheme), EAN (Barcode), huge advantages to streamlining the orders.” Participant 11.*
3. *“Ordering consolidation and traceability should improve reimbursement, timing and reduce queries. Huge opportunity on minor ailments, basic health services, screening, blood tests, cholesterol, (pharmacies) to be paid for services, with patient traceability like the HUB. It’s coming but has been spoken about a lot for years with no progress. NHS has moved this way significantly. Patient MUR (Medical Usage Reviews) another key opportunity as a paid for service for pharmacies, to also benefit the HSE.” Participant 18.*
4. *“The digital transformation will yield huge opportunities. Its more about capabilities of the HSE (DOH) to action them. Streamlines processes and resources (between the HSE and the Wholesaler)” Participant 21.*

Aligned with the objectives and hypotheses, the thematic analysis, show research participants have a complete understanding and appreciation of HT hub system, and are concerned with using an effective system that supports efficient order management, payments and cost controls, supporting minimal product waste.

4.9 Summary of Findings

Research Process and Data Gathered:

- Research data was gathered through interview with 24 subject matter experts. This participant rate, coupled with detailed questionnaire (50 questions) provided in-depth feedback and opinion on the research topic, across 5 research objectives.
- Participants were favourable towards the research study, and depth of the research questions, pausing to give due consideration to their responses.
- The online survey was shared with 320 community pharmacies, attracting a poor response rate, which the researcher attributes to timing, security concerns or survey overload response.
- For this reason, careful consideration was given to the 24 interviewee responses, and pharmacy responses were noted separately in the findings (Chapter 4).
- Data was collected via excel spreadsheet throughout, shared on screen with participants to ensure accuracy, and collated into excel for analysis.
-

Information obtained:

- It was not possible with secondary research to determine if the HT Hub was effective, however with primary research, it was determined to be the better procurement system.
- Using an in-depth interview, with a detailed questionnaire provided great interview structure and prompted the participant to think in different ways about the high-tech supply process and all the factors that can affect website use and high-tech product supply. Asking direct questions in some cases, and providing Likert scales for others, really made participants think carefully about the responses, which added to the overall study.
- Most participants were very aware of the high-tech product landscape, and forecast growth. Particularly in biosimilar product (high tech generics), adding the need for improved support requirements on supply companies and pharmacies in the storage, distribution and handling of HT products. Investment is needed at HSE and pharmacy level to have proper supports.
- An interesting observation of the study - even though participants rated the HT Hub lower in terms of reimbursement and payment processes and indicated improvements could be made in some areas, they gave an overall high effectiveness rating.

- Another interesting observation was the contrast between HSE investment in HT product distribution versus the investment in new essential innovative medicines (EIMs), ranking Ireland above the European average for reimbursement of EIMS and in some cases putting Ireland at a top ranking of 7, of 36 countries. While it is easy to criticise the HSE on its eHealth Strategy, the investment made in essential medicines is admirable.
- The responses received through open ended questions were detailed, with the strong themes of control, data oversight and timely product supply highlighted.
- Another strong theme in the literature review was the need for collaboration and commitment within the HSE. Highlighting that culture and lack of leadership was having a negative effect of the ability to commit to and deliver on the digital transformation plans proposed.
- On the theme of people and care, the research findings from both the PSI Workforce Report 2023 and the IPU Pre Budget Submission 2025, presented concerning findings in relation to the future of community pharmacy, and immediate need for investment in technology to ease the administrative burdens on pharmacies.

Significant Findings – Secondary Research:

- The Value of the High-Tech Product spend annually at €1.3billion.
- The Volume of visits to community pharmacy annually at 78 million.
- The sentiment from community pharmacists, on the lack of awareness by the DOH, on the financial and administrative burdens being experienced, while delivering patient care.
- Lack of data available on the HT reimbursement process, for such a high-profile product category.
- The lack of commitment to further develop the national eHealth framework, benefitting all citizens, is at odds with significant investment in innovative medicines, 28% of health spend.
- Also, on the theme of cost, the reduction in pharmacists' fees over the ten-year period, compared to the increased level of services they are asked to provide, and that this has been sustained for such a long period of time. Both the IPU and PSI reports indicate they are now at a juncture, with decisions being forced, resulting in the introduction of the Pharmacy Taskforce in 2023.

Differences between the findings and the literature review:

- It is difficult to compare the findings on the success of the HT Hub against the literature review, as there was no empirical data available. However, against the Technology Acceptance Model and Alter's Working Principles – the Hub scored highly against the alternate systems in the areas of - Ease of use, order fulfilment, traceability of product from prescriber to patient and flexibility for future opportunities, in the research questions.
- On the question of stock management, cost and reduced product wastage, the hub received a strong positive response.
- In terms of benefits, overwhelmingly participants gave a 100% response that the Hub benefitted the HSE budget, and it was better suited to the HT product procurement process.
- Participants were undecided, when asked should all reimbursable products be made available via the Hub, as this would include the addition of GMS and LTI products.
- Overall, and asked in multiple different ways, the participants gave a strong response to the statement - the HT Hub has improved the HT product fulfilment process.

Research Objectives – results are identified in the 'Differences in findings' above.

- ✓ To determine what material differences have been achieved with the introduction of the High-Tech (HT) Hub online model,
- ✓ To assess the effectiveness of this Hub online technology in HT product fulfilment.
- ✓ To assess the acceptance by users of this technology in HT prescription fulfilment.
- ✓ The effect of the HT Hub on product costs and wastage.
- ✓ To assess the administrative effect on healthcare professionals with this process change.

Research - Hypothesis

The researcher hypothesized the introduction of the High-Tech Hub has delivered efficiencies in reduced time spent on administrative processes at community pharmacy level, increased awareness and traceability in the product to prescription dispensed relationship, and as a result a reduction in high tech product wastage (undispensed products). Using the critical success factors, and research objectives as detailed above – this research study would give a yes response.

5 Conclusions

5.1 Conclusions

Before conducting this research study, there was no data available on the use and effectiveness of the High-Tech Hub website. It was acknowledged and referenced in the literature review, some technological advances had been made by the HSE to Irish healthcare systems, and further research was needed to improve their use. Referring specifically to the Pharmacy Regulators Workforce Report, (PSI, 2023), it noted this research was not in the scope of their study, but left open for other studies. It is acknowledged, as the State control the price of reimbursable medicines, together with fees paid to pharmacies and product supply companies, HT reimbursement incomes have greatly reduced in recent years. To ensure the sustainability and cost effectiveness of the High-Tech process, continued product supply, and to support the ongoing care provided by community pharmacy to HT product patients, a more efficient and cost-effective High-Tech system is needed.

It has been confirmed through the primary research that the High-Tech Hub website-process is fit for purpose and acknowledged by the representative participant group that the Hub, under each of the research objectives, rates above the alternate High-Tech procurement system. Effective immediately, all High-Tech products could transition to the online model. Or, if it was decided to expand the Hubs services to include (1) consolidated patient orders (instead of the one-to-one product to patient relationship) as discussed in the in-depth interviews, providing operational efficiencies for pharmacies and product supply companies, and/or (2) reverse logistics allowing for undispensed products to be returned to the supplier, minimising product waste, with investment could be developed into a more robust, future proofed solution.

It is acknowledged across the research objectives, that the HT Hub provides the critical success factors outlined in the research objectives, to make a meaningful difference to the HT support process. It is also acknowledged that the PCRS Reimbursement Payment data (PCRS, 2024), needs to reflect the values of current systems separately, so transparent empirical data can be sourced, to fully examine the HT Hubs effectiveness, in delivering cost benefits to all interested parties.

Comparing the in-depth primary research findings to the secondary data - the primary research responses in the main are positive, action based and future forward. Acknowledging the improvements that have been realised in the last six years with the HT Hub, giving feedback and suggestions as to how the HT Hub model could be further improved. Conversely the secondary research from the HSE and Department of Health, in relation to Irish Healthcare Strategy, while it is centred on the vision to provide an effective, unified eHealth System (eHealth Ireland, 2013), aligned with the European Digital Decades Policy (Government of Ireland, 2023), its failure to launch and engage at the pace and levels required, is lacking. It is unknown currently, if the delays are due to lack of funding, leadership or bureaucracy. Industry expert reviews, from the Pharmaceutical Society of Ireland as the Pharmacy Regulator (PSI, 2023) and the Irish Pharmacy Union, as pharmacies representative body (IPU, 2024a) are calling for innovation, investment and development, citing urgent change is needed to sustain community pharmacy and patient care requirements into the future.

The significance of the study, based on the new research findings, presents the opportunity for one High-Tech procurement system, with minimal changes required to deliver a complete HT product system solution. Providing full traceability from procurement, to patient, to product dispensed, and in doing so provide transparency on effective stock management, undispensed products, and cost control and visibility relating to pharmacy reimbursement fees, and supplier product payments.

In conclusion and to answer the research question - “Has the introduction of the HSE High Tech Hub online order model, resulted in a more effective supply of High-Tech medications to community pharmacy – improving the pharmacy reimbursement process and reduced product wastage?”. Referring to the primary research data the answer is yes, improvements have been made.

5.2 Limitations and Implications

The research group is reflective mainly of product supply chain participants and their representative functions, with community pharmacy representing 20% of the total participant group. The in-depth interview questionnaires contained 50 questions, including the 17 online questions shared with community pharmacies. Despite the research limitation of not reaching the online survey quota, all research questions were answered through 24 interviews, across all business functions.

5.3 Recommendations

Request engagement from the HSE PCRS team, to discuss and understand the protracted launch of the full High-Tech Hub product portfolio transition to the online model, recommending that all High-Tech products could transition to the online model in the near future, with minimal support. In addition, an opportunity exists to expand the online model to include other reimbursable product schemes (General Medical Scheme, Long Term Illness) providing a one-system solution for community pharmacy, to easily identify the correct system to purchase HSE funded prescriptions, versus private purchases.

With collaboration and investment from all HT stakeholders, it could be possible to consolidate HT patient orders, providing necessary operational efficiencies for pharmacies and suppliers.

The addition of product shortage alerts on High-Tech Hub product pages, linked to the Medicines Shortages list on the HPRA website (HPRA, 2024), could give additional support, reducing query time for pharmacies and High-Tech PCRS teams, on national product shortages and back in stock dates.

The study data indicates further research could be conducted on the High-Tech online model, referring to the PSI research study (PSI, 2023). This additional research with community pharmacies and HT product suppliers, as new HT products are introduced, would be in line with technology developments to be delivered as part of the European Digital Decade initiative, and to what extent they are realised in the next 6 years, (European Commission, 2024).

5.4 Reflection

This research study has provided both opportunity and access, to talk with industry experts on the high-tech process and gain valuable insights and opinions into the High-Tech process. This opportunity would not have been possible without the

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Appendices

Appendix A - Online Survey (*Community Pharmacies*)



Pharmacy Survey - High Tech Hub Process

Innopharma - Griffith College

Pharmacy Survey - High Tech Hub Process
My name is
Fiona Kelly, and I would like to invite you to take part in a research study, as part of my Masters in Pharmaceutical Business and Technology with Innopharma - Griffith College.

The aim of
this study is to understand the effectiveness of the **HSE High-Tech "Hub"** order website, and what difference(s) it has made to your pharmacy role. The survey also aims to identify if there are challenges and opportunities that may help improve the High-Tech order to reimbursement service in the future.

Taking part
involves a brief survey that will take less than 10 minutes to complete. Thank-you for taking the time to participate in my research study.

I confirm that I understand the purpose of this research survey and consent to participating.

Yes
 No

I consent to my data being used for the sole purpose of this research study.

Yes
 No

Email *

Your answer _____

In your professional opinion - please rate the High Tech HUB website - process on:

	Poor	Fair	Good	Very Good	Excellent
Ease of use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Order fulfillment experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reimbursement Timeline (from order to completion)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training Guides and Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Traceability - Order Matching from the Prescriber to the Pharmacy, and from Product to Patient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility - the opportunities to expand the High Tech HUB for future use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In your professional opinion - please answer if you agree or disagree with the below statements:

	Do not agree	Somewhat agree	Agree	Strongly agree	Totally agree
Security of the HUB - your pharmacy and patient data is secure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The High-Tech HUB has improved the turnaround time from Order to Delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The introduction of the HUB has resulted in less product wastage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How concerned are you with High Tech product wastage?

- Not at all concerned
- Slightly concerned
- Concerned
- Very concerned

Should all Reimbursable Medications be ordered on the HSE HUB?

- Yes
- No
- Unsure / Undecided
- Prefer not to answer

On average, what percentage of your High Tech claims are queried by the HSE?

- <5%
- 5-10%
- >10%
- Do not know

Has the introduction of the High Tech HUB process, impacted your workload - responsibilities?

- Increased significantly
- Increased slightly
- No change
- Decreased slightly
- Decreased significantly

Has the introduction of the High Tech HUB improved the efficiency of the product 'order to reimbursement process' - compared to other methods?

- Yes
- No
- Unsure

What, if any, are the user challenges you face using the High Tech Hub website - process?

Your answer _____

Please share your feedback or ideas that might help improve the High-Tech website or process?

Your answer _____

Submit

Clear form

Appendix B - In depth Interview Questionnaire (*High-Tech Industry participants*)

Inopharma		Dissertation Research Study			GRIFFITH COLLEGE				
"A study of material differences since the introduction of the High-Tech Hub order (process) website - the acceptance and effectiveness of online technology in the healthcare reimbursement process."									
Section / Objectives:	Web	No.	Question	Response	Response	Response	Response	Response	Response
Suitability and Awareness		1	Do you work in a healthcare, medical or pharmaceutical related organisation?	Yes	No				
Suitability and Awareness		2a	Please select the role most appropriate to you	Pharmacy	Commercial	Customer Care	Operations - Logistics		
Suitability and Awareness		2b	Please select the role most appropriate to you	Pharmac Co.	Regulatory-Governance	Finance	Quality - IT		
Suitability and Awareness		3	How long are you in your current role? (relevance to HUB launch January 2018)	< 1 Year	0 - 3 Years	3 - 6 Years	6-10 Years	10+ Years	
Suitability and Awareness		4	Are you aware of High Tech Medications?	Extremely aware	Very aware	Aware	Somewhat aware	Not at all aware	
Suitability and Awareness		5	Are you familiar with the High Tech Hub PCRS process - website?	Extremely aware	Very aware	Aware	Somewhat aware	Not at all aware	
Suitability and Awareness		6	How often do you interact with the High Tech Hub process - website?	Never	Daily	Weekly	Monthly	Quarterly	
Opening Statement:-				Opening Statement	Opening Statement	Opening Statement	Opening Statement	Opening Statement	Opening Statement
Hub Material Difference? (Critical Success Factor)	Web	1	Ease of use	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	2	Customer support	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	3	Training Guides and Information	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	4	Security - your pharmacy and patient data is secure	Do not agree	Somewhat agree	Agree	Strongly agree	Totally Agree	
Hub Material Difference? (Critical Success Factor)	Web	5	Website quality	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	6	Order fulfillment experience	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	7	Reimbursement Timeline	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	8	Traceability - Order Matching 'from Prescriber to Pharmacy to Product to Patient'	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	9	Flexibility - opportunities for future use	Poor	Fair	Good	Very Good	Excellent	
Hub Material Difference? (Critical Success Factor)	Web	10	The hub has improved the turnaround time from Order to Delivery	Do not agree	Somewhat agree	Agree	Strongly agree	Do not know	
Product Management, Wastage	Web	11	Has the introduction of the hub resulted in less product wastage (products ordered and not dispensed)	Do not agree	Somewhat agree	Agree	Strongly agree	Do not know	
Product Management, Wastage	Web	12	How concerned are you with High Tech product wastage? (undispensed products)	Not at all concerned	Slightly concerned	Concerned	Very concerned		
Product Management, Wastage		13	Is there a challenge with product wastage (undispensed products) in your business?	Yes	No	Unsure	Prefer not to answer		
Cost	Web	14	On average, what percentage of your High Tech claims are queried	<5%	5-10%	>10%	Do not know		
Cost		15	Do you believe ordering ALL High Tech medications on the HUB has benefits for the HSE Budget?	No, I do not believe it has potential benefits	Unsure	Prefer not to answer	Yes, I believe there are potential benefits		
Cost		16	If yes (the hub has benefits for the HSE Budget?) please explain why in your opinion?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	
Cost		17	Is the High Tech HUB more cost effective compared to other forms of product ordering?	Yes	No				
Cost		18a	In your professional opinion, does the High Tech HUB benefit the - Patient	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	
Cost		18b	In your professional opinion, does the High Tech HUB benefit the - Pharmacy	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	
Cost		18c	In your professional opinion, does the High Tech HUB benefit the - HSE	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	
Cost		18d	In your professional opinion, does the High Tech HUB benefit the - Wholesaler	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	
Cost		18e	In your professional opinion, does the High Tech HUB benefit the - Pharma Co.	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	

Opening Statement-	*	In your professional opinion - compared to the standard high-tech order process (offline), the High Tech HUB website:	Opening Statement	Opening Statement	Opening Statement	Opening Statement	Opening Statement
Technology Optimisation - Effectiveness	19	Is better suited to the end to end High Tech order to reimbursement process	Do not agree	Somewhat agree	Agree	Strongly agree	Do not know
Technology Optimisation - Effectiveness	20	In your professional opinion, are there barriers to using online order systems for pharmaceutical products?	Yes	No			
Technology Optimisation - Effectiveness	21	<i>If yes, please explain why in your opinion?</i>	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Technology Optimisation - Effectiveness	22	How well does this HSE technology integrate with other systems in your business?	Not seamless at all	Slightly seamless	Moderately seamless	Very seamless	Extremely seamless
Technology Optimisation - Effectiveness	23	How well connected are the users of the High Tech Hub website - how well does it connect to other systems?	Poor	Fair	Good	Very good	Excellent
Technology Optimisation - Effectiveness	24	If pharmacy (patient) orders could be consolidated, would you be in favour of moving the order process for all reimbursable products to the HSE HUB?	Yes	No			
Technology Optimisation - Effectiveness	25	Could the HSE Total High Tech Reclaims Process, from Order Placement > Fulfillment > Reimbursement process be easier to administer?	Yes	No			
Technology Optimisation - Effectiveness	26	Please rate the Order to reimbursement process using the High Tech Hub compared to Standard High Tech reimbursement process for ORDER TO DELIVERY	Far below standard	Below standard	Meets standard	Above standard	Far above standard
Technology Optimisation - Effectiveness	27	Please rate the Order to reimbursement process via the High Tech Hub compared to Standard High Tech reimbursement process *REIMBURSEMENT FEES PAYABLE.	Far below standard	Below standard	Meets standard	Above standard	Far above standard
Technology Optimisation - Effectiveness	28	Do you agree that the High Tech HUB is better suited to the High Tech claim reimbursement process - matching prescriber, to patient, to prescription, to product.	Don't Agree	Somewhat Agree	Agree	Strongly Agree	Completely Agree
Technology Optimisation - Effectiveness	29	<i>If, in your opinion, there are other process steps not mentioned? please specify.</i>	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Technology Optimisation - Acceptance	Web 30	Should all Reimbursable Medications be ordered on the HSE HUB?	Yes	No	Unsure / Undecided	Prefer not to answer	
Technology Optimisation - Acceptance	31	Do you think that ALL high tech products will be ordered through the HSE HUB in the next	1-2 years	3-5 years	6-10 years	10+ years	
Technology Optimisation - Acceptance	32	Do you believe ordering ALL High Tech medications on the HUB has potential benefits for Pharmacies ?	No, I do not believe it has potential benefits	Unsure	Prefer not to answer	Yes, I believe there are potential benefits	
Technology Optimisation - Acceptance	33	<i>If yes, please explain why in your opinion?</i>	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Technology Optimisation - Acceptance	34	Do you think the high-tech process - from Order to Reimbursement, has improved since the introduction of the HUB?	Yes	No			
Technology Optimisation - Acceptance	35	Is the HUB a step towards the centralisation of Patient Records and Product Ordering to Reimbursement?	Yes	No			
Technology Optimisation - Acceptance	36	Has the perception of the HUB online system improved since its launch?	Yes	No			
Administrative Effect (Care and wellbeing)	37	Using the High Tech Hub is more user friendly - it can be accessed from any location.	Do not agree	Somewhat agree	Agree	Strongly agree	Do not know
Administrative Effect (Care and wellbeing)	38	Steps in the high-tech order administrative process have reduced	Do not agree	Somewhat agree	Agree	Strongly agree	Totally Agree
Administrative Effect (Care and wellbeing)	39	Has the use of the HUB improved communication and engagement between Supply Chain partners?	Yes	No	Partially		
Administrative Effect (Care and wellbeing)	40	Have you had any concerns or challenges related to data security or privacy using the Hub website process?	Yes	No			
Administrative Effect (Care and wellbeing)	Web 41	What are the biggest user challenges faced in High Tech Hub website use?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Administrative Effect (Care and wellbeing)	Web 42	Has the introduction of the HUB process, impacted your workload and responsibilities?	Increased significantly	Increased slightly	No change	Decreased significantly	Decreased slightly
Administrative Effect (Care and wellbeing)	Web 43	Has the introduction of the HUB improved the efficiency of the order to reimbursement process compared to traditional methods?	Yes	No	Unsure		
Administrative Effect (Care and wellbeing)	44	Overall, how would you rate the High Tech Hub process - website	Poor	Fair	Good	Very Good	Excellent
Administrative Effect (Care and wellbeing)	Web 45	Please share ideas in which stakeholders can improve the use of the HT Hub website?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Administrative Effect (Care and wellbeing)	46	Do you have any additional feedback or comments on the High Tech process?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Outlook	47	What opportunities do you see, for online integration of services with the HSE and your pharmacy /department?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Outlook	48	What challenges do you see in High Tech product supply in the next 1-5 years?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Outlook	49	What opportunities do you see in High Tech product supply in the next 1-5 years?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer
Outlook	50	Do you have any other feedback or comments on the High Tech process that would add depth to this research?	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer	Free Text Answer

Appendix C - Participant Information Letter



Participant Information Letter

A study of material difference(s) since the introduction of the High-Tech Hub order website - the acceptance and effectiveness of online technology in the healthcare product reimbursement process.

Dear _____,

I would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Ask questions if anything you read is not clear or if you would like more information. Take time to decide whether or not to take part.

WHO I AM AND WHAT THIS STUDY IS ABOUT

My name is Fiona Kelly, and I am conducting this academic research in pursuing my Masters in Pharmaceutical Business and Technology, Innopharma-Griffith College. The aim of this study is to understand what material difference(s) have occurred since the introduction of the High-Tech Hub order website. The acceptance and effectiveness of online technology in prescription fulfilment, and the administrative effect for healthcare professionals involved in the High-Tech product reimbursement process.

WHAT WOULD TAKING PART INVOLVE?

Taking part involves a questionnaire interview (less than 20 minutes), allowing time for you to contribute any further information you feel could add to this research.

WHY HAVE YOU BEEN INVITED TO TAKE PART?

Participants in this study have been identified as representatives in the supply of High-Tech products to pharmacies and patients in Ireland, based on their professional role and organisation.

DO YOU HAVE TO TAKE PART?

Your participation is completely voluntary, and you have the right to refuse to take part, refuse any question and withdraw at any time without any consequence whatsoever. If you need to withdraw, please contact Fiona.griffithskelly@student.griffith.ie



WHAT ARE THE POSSIBLE RISKS AND BENEFITS OF TAKING PART?

There are possibly no risks to take part in this survey apart from data confidentiality, which will be assured by anonymising all responses and keeping all survey data password protected and stored on a secure private laptop. Feedback from participants in this study could help the researcher identify what is working well with this relatively new process/system, and where there could be opportunities to improve the process.

WILL TAKING PART BE CONFIDENTIAL?

Confidentiality and anonymity for all participants will be maintained. Use of non-anonymised data (in the form of signed consent forms and audio recordings) will be collected and retained as part of this research process. All research data will be stored securely, password protected and only accessible to the researcher. Research questions will be asked, and it is the participants professional experience and opinion that will be accepted. Should company confidential data be shared by participants in error, the researcher will disregard and exclude this data from the research study.

HOW WILL INFORMATION YOU PROVIDE BE STORED AND PROTECTED?

Signed consent forms and original audio recordings will be retained in digital form, on a password protected private laptop, accessed only by myself, until after my qualification has been conferred. A transcript of interviews in which all identifying information has been removed will be retained for a further two years. Under freedom of information legalisation, you are entitled to access the information you have provided at any time.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY?

The final research document will be used and retained for dissertation purposes only. Please note it will be retained by Innopharma-Griffith College and that all dissertation research projects, and their content will be made accessible in the college library and could potentially be made available in online e-journals or repository.

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION?

Researcher Name	Fiona Kelly
Telephone	087-8038697
Email	Fiona.griffithskelly@student.griffith.ie

Thank you for taking the time to consider participating in my research study.

Appendix D - Informed Consent Form



Consent to take part in research

A study of material difference(s) since the introduction of the High-Tech Hub order website - the acceptance and effectiveness of online technology in the healthcare product reimbursement process.

The researcher retains one copy signed by both them and the participant. The participant should also receive a copy of consent form as a record of what they have signed up to.

- I _____ voluntarily agree to participate in this research study.
- I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind
- I understand that I can withdraw permission to use data from my interview within two weeks after the interview, in which case the material will be deleted.
- I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.
- I understand that participation involves a survey style one to one interview.
- I understand that I will not benefit directly from participating in this research.
- I understand that all information I provide for this study will be treated confidentially
- I understand that in any report on the results of this research my identity will remain anonymous. This will be done by changing my name and disguising any details of my interview which may reveal my identity or the identity of people I speak about.
- I understand that disguised extracts from my interview may be quoted in the researcher's dissertation and viva presentation.
- If data is coming from within one company or specifically pertaining to the one company, I understand that I will adhere to all the codes of conduct and employee confidentiality and there is no expectation to breach these by partaking in this research.
- I understand that if I inform the researcher that myself or someone else is at risk of harm, they may have to report this to the relevant authorities - they will discuss this with me first but may be required to report with or without my permission.
- I understand that signed consent forms and original audio recordings will be retained in digital form, on a password protected private laptop, accessed only by myself, until after my degree has been conferred.
- I understand that a transcript of my interview in which all identifying information has been removed will be retained for two years from the date of the exam board.



- I understand that under freedom of information legislation I am entitled to access the information I have provided at any time while it is in storage as specified above.
- I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Researcher Details

Name Fiona Kelly
Degree Programme MSc in Pharmaceutical Business and Technology
College Details Innopharma – Griffith College Dublin
Contact number 087-8038697
Contact mail Fiona.griffithskelly@student.griffith.ie

Signature of participant
[Full Name – Printed]

Signature of research participant

----- Date

Signature of researcher

I believe the participant is giving informed consent to participate in this study

----- Date

Signature of researcher