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Foreword

As global challenges grow in complexity and the pace of innovation accelerates, the fusion of academic research and industry expertise has become indispensable—not simply to advance knowledge, but to transform it into tangible, lasting impact.

The IDEA Journal of Applied Research stands firmly at this intersection, presenting work that is both theoretically grounded and practically consequential. This June 2025 edition exemplifies the power of applied research to inform, innovate, and transform sectors critical to societal advancement, including healthcare, governance, manufacturing, marketing, and information systems.

The contributions in this volume are organised around three thematic pillars: **Innovation in Healthcare Delivery, Enhancing Public Services and Local Industry Resilience, and Marketing Dynamics** and **Information Systems in Contemporary Practice**. Collectively, these studies illuminate the profound value that applied research brings in driving systemic improvements, strengthening professional practice, and fostering sustainable development.

Innovation in Healthcare Delivery
Healthcare continues to be a fertile ground for applied research, where insights directly impact lives and resource management. Several papers in this edition address urgent challenges in healthcare with a view towards optimising service quality, safety, and efficiency.

The study by **Paul Bezzina** and **Dr Flavia Morone** on *Patient Safety Culture and Communication Practices in a Radiotherapy Department* offers a meticulous assessment of organisational culture dimensions within high-risk clinical environments. Their work highlights the critical role of leadership support, communication, and multidisciplinary collaboration in fostering a safety-oriented culture. Importantly, the research identifies actionable gaps, thus providing a roadmap for management-led quality improvement initiatives. It is a testament to how empirical findings can inform administrative practices to enhance patient outcomes.

Similarly, **Roderick Spiteri** and **Dr Flavia Morone**'s evaluation of Malta's *Home Antibiotic Therapy (HAT) Service* showcases a progressive model for outpatient care, revealing significant cost-savings and high patient satisfaction rates. Their work not only demonstrates the clinical and economic viability of home-based healthcare interventions but also underscores the importance of aligning patient-centred care models with national health policy objectives.

Emma Pisani's investigation into *Admission and Discharge Decisions in a Paediatric Emergency Department* further contributes to the healthcare discourse by dissecting the balance between clinical and non-clinical factors influencing frontline decision-making. Her findings advocate for enhanced training and systemic refinements to support objective triage processes, again bridging the gap between empirical inquiry and practice enhancement.

Finally, **Sarah Bartolo**'s study on *Electronic Health Records and Health Information Systems* within residential and community care settings provides critical insights into the role of technology in aged care. Identifying the technological and organisational factors influencing system adoption, Bartolo proposes pragmatic improvements, reinforcing the idea that effective technological implementation is as much a social endeavour as a technical one. Together, these contributions demonstrate that advancing healthcare requires a concerted effort to understand, evaluate, and improve the systems and practices that underpin service delivery. Through rigorous research, they extend the dialogue between academia and practice, driving healthcare innovation that is responsive to both clinical needs and systemic imperatives.

Enhancing Public Services and Local Industry Resilience
Beyond healthcare, applied research has significant potential to bolster public services and strengthen industry resilience—particularly in small and dynamic economies such as Malta's.

The paper by **Christopher Galea** and **Jerome Caruana Cilia** on *Remote Working in Local Councils* represents an important contribution to public administration studies. By evaluating the challenges and opportunities of remote work in municipal governance, the authors not only respond to shifts accelerated by the pandemic but also propose sustainable models for civic engagement and service delivery. Their recommendations serve as a practical guide for policymakers seeking to modernise governance structures without compromising public access and service quality.

In the manufacturing sector, **RoseMary Portelli** investigates the *Labour Shortage Crisis in Maltese Manufacturing Plants*, addressing a pressing socio-economic challenge exacerbated by demographic shifts and globalisation. Through a rich qualitative approach, Portelli captures the nuances of workforce attitudes, skill shortages, and the sector's evolving reputation. Her findings call for targeted educational reforms, strategic workforce planning, and cultural integration initiatives—insights that are invaluable to policymakers, educators, and industry leaders alike.

Moreover, **Marcelle Fenech** and **Dr Neville Schembri**'s study on *Market Dynamics Affecting Pharmaceutical Prices in the National Health Service* navigates the intersection of healthcare, economics, and policy. By elucidating the geopolitical and market factors driving pharmaceutical pricing, their work highlights systemic vulnerabilities and proposes integrative procurement and pricing strategies. This research illustrates the indispensable role of academic inquiry in informing evidence-based policy and operational resilience within public health systems.

These studies collectively underscore the imperative for research that does not merely analyse but actively informs the evolution of public services and industry practices. They exemplify the ethos of applied research: to serve as both a critical mirror and a practical tool for societal advancement.

Marketing Dynamics and Information Systems in Contemporary Practice

The evolving landscape of digital communication and information systems also features prominently in this edition, reflecting the critical need to understand consumer behaviour and technology integration.

Jessica Camilleri's work on *Social Media Marketing and Influencer Features in the Skincare Industry* captures the nuanced dynamics shaping modern consumer markets. By empirically measuring the influence of interactivity, informativeness, entertainment, and influencer credibility on purchasing intentions, Camilleri provides marketers with actionable insights into digital strategy optimisation. Her findings affirm that authenticity and relevance remain pivotal in an increasingly crowded digital marketplace.

Complementarily, **Sarah Bartolo**'s research, although primarily situated within healthcare, significantly touches upon information systems management. Her emphasis on user-centred design and feedback integration echoes broader principles relevant to digital transformation efforts across industries.

Both studies reflect the increasing confluence of technology, consumer expectations, and professional practice. They reinforce the need for continuous research-driven adaptation to maintain relevance and efficacy in an ever-evolving socio-economic context.

Conclusion

The articles featured in this edition of the *IDEA Journal of Applied Research* not only contribute to their respective fields but collectively reaffirm the necessity of bridging academic research with industry and public sector practice. They demonstrate that applied research is most impactful when it engages with real-world complexities, anticipates emerging needs, and provides grounded, implementable solutions.

As we navigate an increasingly interconnected and rapidly changing world, the complementarity of academia and practice will remain a cornerstone of meaningful innovation. It is through rigorous inquiry, critical reflection, and practical engagement that research can fulfil its highest purpose: to serve society by enhancing knowledge, informing policy, improving practice, and ultimately, enriching human lives.

At IDEA College, we recognise that meaningful research emerges through strong partnerships between academia and industry. Our strategic commitment is to cultivate research initiatives that directly inform professional fields, catalyse innovation, and contribute to sustainable societal development. Through this journal and our broader activities, we aim to lead and inspire applied research that makes a lasting difference.

Dr Nadia Vassallo
Principal IDEA College
Editor-in-Chief JAR

01 Optimising Service Delivery In Local Councils Through Remote Working: A Comprehensive Study on Implementation & Public Engagement

Christopher Galea & Jerome Caruana Cilia

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Abstract

This study explores the implementation of remote working in Malta's Local Councils, a shift accelerated by the Covid-19 pandemic. It examines how Councils can derive benefits from remote work while addressing challenges to ensure consistent, high-quality public services. By analysing existing resources, identifying gaps, and considering the perspectives of council members and staff, the research offers actionable recommendations for effective adoption. It also evaluates the feasibility of a fully remote model and provides strategies for maintaining public engagement, serving as a proactive framework to enhance sustainability and resilience in local governance.

Keywords: "Remote Working", "Local Governance", "Work-life Balance", "Human Resources Management", "Service Delivery to the Public".

Introduction

The sudden onset of the Covid-19 pandemic disrupted organizational norms globally, with Local Councils in Malta facing significant challenges in adapting to the abrupt shift from office-based operations to remote working. Without adequate preparation, training, or resources, Councils were compelled to continue providing essential public services under restrictive health measures, all while keeping administrative offices accessible to the public. The absence of a gradual transition highlighted their vulnerability to such unexpected disruptions.

This study investigates how Local Councils can effectively transition to remote working, drawing lessons from their forced shift during the pandemic. It assesses their current readiness, identifies challenges, and proposes strategies for mitigating obstacles while ensuring efficient service delivery. Particular attention is given to fostering collaboration and communication between remote teams and in-office staff to maintain organizational coherence.

The pandemic exposed critical gaps in Local Councils' infrastructure, such as reliance on equipment designed exclusively for on-site use, and difficulties in maintaining face-to-face services amidst social distancing, minimal staffing, and lockdown protocols. In some cases, administrative offices were forced to close due to staff testing positive for the virus, leaving employees to work full-time from home without proper guidelines or equipment. This unprecedented scenario in the 30-year history of Maltese Local Government shows the need for a more resilient and adaptable governance framework. While central authorities provided general teleworking guidelines, these were not tailored to the specific needs of Local Councils, leaving them to navigate the crisis with limited direction. This experience emphasized the importance of developing sustainable remote working policies to enhance preparedness for future disruptions.

1.1 Remote Working and the Management Perspective

Building on the challenges Local Councils faced during the Covid-19 pandemic and the need for a resilient approach to governance, the role of management emerges as a critical factor in the successful adoption of remote working. The effectiveness of remote work depends not only on infrastructure and policy but also on how managers perceive and adapt to this shift.

Research by Kowalski and Slebarska (2022) highlights differing perspectives on remote working across management levels. Lower-level managers generally view it positively, appreciating the increased flexibility it offers workers.

In contrast, middle-level managers face challenges such as reduced control and concerns over productivity. However, across all management levels, those who maintain regular communication with their teams tend to recognize the benefits of remote work. This aligns with Musleh's (2022) findings, which suggest that remote working can enhance productivity compared to traditional in-office work.

Remote working, as defined by Karabulut Temel and Batmaz (2024), refers to a work arrangement outside a traditional office environment, where communication with colleagues is facilitated through digital technology. The Covid-19 pandemic highlighted the potential benefits of remote working, such as improving work-life balance, reducing commuting time, and increasing productivity. These advantages have led to a growing preference for remote work among employees, with both employees and managers viewing it as the future of work. Karabulut Temel and Batmaz (2024) also note that remote working is expected to become more prevalent across various contexts in the future. Similarly, research by Waworuntu et al. (2022) indicates that millennials and Gen Z value job flexibility, including the option to work from home, as an important factor in achieving work-life balance. Organizations must carefully manage the implementation of remote working to ensure work quality and efficiency are upheld, while also prioritizing employee well-being (Popovici and Lavinia Popovici, 2020). As remote working becomes an essential factor in boosting employee motivation, and with millennials and Generation Z increasingly seeking such incentives when job hunting, local government institutions in Malta must be prepared to offer these benefits. If they fail to do so, the sector risks falling behind and may face difficulties in attracting suitable candidates. Despite its challenges, remote working outside traditional office settings will be a scenario that many organizations will encounter in the coming years—one that must be embraced strategically. Local government must be fully equipped and prepared to adapt, ensuring it remains competitive and relevant in the future.

Methodology

This study was conducted using an inductive research approach, where conclusions were drawn from observed patterns and specific insights. This approach, often characterized as "bottom-up," begins with a research question and progresses toward broader conclusions by identifying patterns and consistencies (Woiceshyn & Daellenbach, 2018; Trochim, 2006). The inductive method was particularly suitable for this research, as it facilitated a deeper exploration of the unexplored topic of remote working in Local Government, ultimately leading to actionable recommendations.

An exploratory research design was employed to address the research question comprehensively. Both primary and secondary methods were utilized to gather data, which was analysed qualitatively. Data was collected through one-to-one interviews and focus groups to explore the participants' perspectives relating to the working environment in Local Government. This approach helped to uncover both positive and negative perceptions about remote working among employees and management, highlighting potential barriers to successful implementation. Consistency in the data collection process was maintained by using the same interview guide for both individual and group discussions, enabling effective comparison, coding, and analysis.

Participants were carefully selected using non-probability sampling, focusing on stakeholders with relevant expertise and experience in Local Government. These included representatives from the Local Government Division where its main role is to fund, monitor the functions of local authorities, as well as to promote and assist Local Government, the Local Councils' Association which protects and promotes the common interests of elected members of local authorities, Members of Parliament involved in Local Government due to their contribution from the political perspective, Executive Secretaries being the executive, administrative and financial head of the Council, Council employees who are the front liners and deal directly with the public together with the Executive Secretary, and Mayors who are the political heads of their respective Council. The rationale behind the sampling ensured that the study benefited from diverse, informed perspectives, thereby enhancing the validity and reliability of its findings.

Fig 1 - List of Stakeholders interviewed

Once all sessions and transcripts were completed, the data was organized according to the respective questions. It was then imported into a QDA Miner Lite software, allowing the researcher to categorize, code, and theme the data based on selected keywords and phrases extracted from the participants' opinions and recommendations and grouped together as themes. This process helped to identify and group related content areas, narrowing the data to capture key insights and overall results. Once this process was completed, coding, interviewees' names, including those holding public office—were removed to ensure anonymity. The data was further structured to align with the research questions, enabling the researcher to present the findings comprehensively. This approach ensured that the analysis was both valid and reliable, adhering to a clear and systematic framework.

Research Findings and Analysis

3.1. General Opinion on Remote Working

Initially, many participants expressed scepticism relating to implementing remote working in Local Councils. Their primary concern was the lack of adequate structures to manage and implement remote working without compromising the quality of service delivered to community members who would normally be residents of their locality. Discussions during interviews and focus groups revealed heightened reluctance among participants to propose strategies for implementing remote working, as they feared the challenges associated with maintaining service delivery and addressing management concerns.

3.2. Benefits of Remote Working

The participants believe that there are several benefits of remote working, including job satisfaction, flexible time management, increased motivation, work-life balance, and savings on travel time and expenses. Work-life balance is the most positively perceived benefit, encompassing flexibility, autonomy in organizing tasks, and an overall improvement in quality of life. Participants agreed that remote working contributes to life satisfaction and happiness, enhances productivity, and helps retain the current workforce while attracting new talent.

3.3. Environmental Impact of Remote Working

The findings demonstrated that remote working has positive environmental implications. A study by Moglia et al. (2021) highlighted the sustainability benefits of teleworking, a view echoed by the participants. Remote working can alleviate parking issues in several localities and reduce energy consumption and carbon footprints by encouraging paperless offices. Paperless practices also enhance document organization, streamline workflows, expedite processes, facilitate data backup and disaster recovery, and lower operational costs. Moreover, safeguarding the environment aligns with Local Councils' responsibilities under Article 33 of the Local Government Act. Thus, implementing remote working not only supports environmental sustainability but also optimises service delivery for residents.

3.4 Human Resources

Among the 333 administrative staff working in Local Councils, 68 (20%) are Executive Secretaries tasked with managing human resources, leaving an average of 3.87 employees per Council.

Local Councils employing 6–10 staff members (15 Councils) are better equipped to implement hybrid work models, allowing some employees to work remotely while others provide in-office, face-to-face services. Councils with 4–5 employees (18 Councils) may still adopt remote working but could face challenges during staff absences due to vacation or sick leave. However, Councils with three or fewer employees—representing 51% of all Local Councils—are likely to face significant difficulties maintaining face-to-face service delivery alongside remote working. Participants suggested establishing centralized or regional staff pools to support Councils in offering remote working arrangements on a case-by-case basis without necessitating additional recruitment. They also emphasized the importance of considering factors such as the locality's size, population, and available resources for recruiting sufficient workforce when determining the minimum administrative staffing levels required for successful remote working implementation.

3.5. The need for training

Even with the most advanced tools and modern equipment, employees remain the cornerstone of an organization's success. Providing training ensures that employees have the necessary skills to perform their tasks efficiently and effectively (Gumede et al., 2023). For Local Councils, training is critical for successfully implementing remote working while maintaining high standards of service delivery. This need emerged during interviews and focus groups, where managers expressed concerns about effectively managing employees remotely, and employees highlighted challenges in managing their time while working from home. Training for both management and employees is essential to facilitate a smooth transition to remote working. A well-trained workforce is better equipped to deliver efficient and effective services to citizens. Training also boosts employees' confidence and well-being, supports work-life balance by enhancing time and task management skills, and equips staff to utilize digital tools effectively. Additionally, training can improve the performance of workers facing challenges in adapting to remote work (Bezzina et al., 2021). Participants also stressed the importance of training elected members. This would help them understand the benefits of remote working and how it can be implemented without compromising service quality. Ultimately, training ensures good governance and successful adoption of remote working practices.

3.6. Enabling Digital Tools

Remote working heavily depends on digital infrastructure. As Bezzina et al. (2021) argue, digital technology is critical for implementing remote work while maintaining and optimising service delivery, ensuring consistent communication between remote and in-office teams. Furthermore, digital tools can foster a data-driven culture, enabling management to make informed decisions to enhance, refine, or create new policies and services based on real-time data (Eduard et al., 2023).

Digital technology emerged as a central theme in all interviews and focus groups. Participants identified several tasks suitable for remote working that rely on digital tools, including online permit applications, accounting, customer care, email correspondence, bulky refuse bookings, and social media management. They emphasized the necessity of robust digital systems to support these functions, allowing Local Councils to sustain high-quality public services while implementing remote work. Participants also highlighted the need to digitize and automate internal workflows within Local Councils to improve efficiency.

The COVID-19 pandemic exposed the lack of preparedness and digital infrastructure in Local Councils, thereby showing the need for modernization to handle similar emergencies effectively. Participants noted that digital tools could improve performance, foster communication between remote and in-office teams, strengthen community engagement, reduce paper use, enhance data security, and provide management with monitoring tools to ensure accountability. Bezzina et al. (2021) further emphasize that modernized digital platforms and expanded online services can attract a broader audience and gradually transition from traditional face-to-face service delivery. This shift represents a valuable opportunity for Local Councils to innovate and expand their reach.

An ICT audit conducted by the National Audit Office (NAO) in 2020 assessed the state of ICT hardware and software in Local Councils. The audit identified risks related to data confidentiality, integrity, and reliability, offering recommendations for improvement. A follow-up audit in 2023 revealed that, of 28 recommendations, only 7% were fully implemented, 50% partially implemented, and 43% had not yet been addressed. While some progress has been made, the NAO stressed that further action is necessary (National Audit Office, 2023).

Currently, the only fully implemented digital system across all Local Councils is the online permit system launched in 2022 (The Malta Independent, 2022). Analysis of permits issued in 2023 showed that 36% of the 170,742 permits were processed and paid online, eliminating the need for residents to visit Local Council offices. Encouragingly, 68% of surveyed users found the system very easy to use, 77.1% indicated they would use the service again, and 86.2% reported no issues accessing the portal.

3.7. Analysis

The literature review and interviews with participants revealed several key challenges and potential solutions concerning the implementation of remote working, particularly within the context of Local Councils. While these challenges may not be uniform across all organizations, it is crucial to recognize potential obstacles and implement appropriate measures to mitigate them. Employees working remotely often experience disruptions that can affect their concentration, increased costs associated with home office setups, and a lack of clear communication with their teams, which may hinder overall productivity. For management, the primary challenges include limited human resources, inadequate technological infrastructure, and difficulties in overseeing remote employees. These issues are often compounded by a common perception that employees working outside the physical office environment may not perform at the same level as those present in the workplace. Furthermore, there is concern that remote working could negatively impact the quality of services provided to the public, as the personal oversight of employees may diminish.

3.8. General Observations

In response to these challenges, the researcher proposes several strategies designed to support the successful integration of remote working in Local Councils. One effective solution is the creation of dedicated workspaces for employees, which can help minimize distractions and foster a more productive remote work environment. Additionally, management should consider compensating employees for the extra expenses incurred while working from home, such as utility costs or office equipment. Another critical recommendation is the establishment of clear, consistent working hours to provide structure and ensure accountability among remote employees. To address temporary staffing shortages, the development of a regional or central pool of employees who can step in as needed would be beneficial, as would the recruitment of highly skilled workers to compensate for the potential lack of staff. Investing in training programs that focus on digital tools and independent work skills is also essential to ensure that employees are fully equipped to succeed in a remote work setting. Furthermore, frequent online meetings and team-building activities can help combat feelings of isolation and siloed working, maintaining cohesion within teams. Implementing a hybrid remote working model—wherein some employees work from the office and others work remotely—could help maintain face-to-face interactions with citizens while still reaping the benefits of remote work. Tailoring remote work practices to meet the specific needs of each Council ensures that service delivery remains effective, while the creation of a robust data protection policy ensures that sensitive information is securely handled.

Beyond these strategies, several participants made notable observations during the interviews that offer additional insight into the challenges and opportunities of remote working. For example, one of the participants highlighted that Executive Secretaries already engage in remote work, as they often attend meetings outside the office and continue to work during meeting intervals by responding to emails, making calls, and issuing instructions digitally. This observation suggests that remote working may already be a common practice in certain roles, even if not formally recognized as such. The participant added that despite significant investments in online technologies, such as the online permit system, the implementation of remote working within Local Councils is a feasible option. However, the participant also cautioned that the full transition to remote working may take up to 20 years, particularly as older generations, who may be less familiar with technology, gradually retire and are replaced by a more tech-savvy workforce.

Another participant argued that for Local Councils to function as professional public sector organizations, they must adapt to the needs and preferences of their employees, providing the same rights and treatment that public servants receive. The participant also noted that a "one size fits all" approach to remote working would not be effective, suggesting that a centralized approach to implementing and managing remote work would be more successful.

Another participant emphasized the importance of respecting employees' work-life balance by ensuring that remote working does not lead to increased working hours and that employees retain the right to disconnect when their workday ends. Finally, the same participant also stressed the importance of remote workers carefully selecting a specific room or area in their home to work, thereby creating a clear boundary between work and personal life and minimizing the risk of burnout.

These observations highlight the complexity of remote working in Local Councils and the need for a thoughtful, approach that considers the unique challenges faced by both employees and management. By addressing these issues through comprehensive strategies and fostering a culture of flexibility and understanding, Local Councils can ensure the successful integration of remote work while maintaining high standards of service delivery and employee well-being.

3.9. Local Council Office Opening Hours

To facilitate remote working while maintaining face-to-face services, the study also focused on exploring the participants' perceptions about Local Councils' public opening hours. Given the limited human resources and the growing use of online services, the participants were invited to consider whether opening hours should be redesigned or reduced, and it resulted that they strongly argued that opening hours should remain unchanged to preserve the current level of in-person service delivery. They further suggested that remote workers should extend their hours beyond standard opening times to accommodate the public's needs. In light of current limitations in staffing and digital services, the analysis concluded that face-to-face service delivery cannot be reduced until Local Councils fully digitize their services and recruit sufficient personnel. The participants proposed the adoption of standardized opening hours across all Local Councils. This approach would benefit regional pool employees, who could easily adjust to common schedules when temporarily replacing Local Council staff. Standardized hours would also enhance service delivery for residents, particularly in Local Councils with offices in multiple locations.

Recommendations

After analysing the data gathered, several recommendations on how to effectively implement remote working arrangements while ensuring continuous and effective service delivery to the public can be made. These recommendations emphasize the need for a comprehensive approach to integrate remote work in Local Councils, taking into account the challenges faced by both employees and management. A key recommendation is the establishment of a centralized body, such as the Local Government Division (LGD), to oversee and facilitate the implementation of these remote working arrangements across Councils. This body ensures a coordinated and standardized approach, while still allowing each Council to maintain its autonomy.

Additionally, the researcher recommends creating a common set of remote working procedures that all Local Councils can adopt, ensuring consistency and clarity for employees and management alike. This is crucial in establishing expectations and workflows that support both remote and in-office workers. Training programs for employees and Council members are also highlighted as essential for fostering the skills needed for successful remote work, including proficiency in digital tools and effective communication in virtual environments.

To further support remote working, the researcher suggests adopting standardized opening hours across Local Councils, with consideration for regional variations such as Saturday openings or extended hours to accommodate the diverse needs of the public. The creation of Regional Call Centres is proposed to help manage the high volume of incoming calls and provide support to Local Councils that may face staff shortages or capacity issues.

The researcher also recommends offering incentives for Local Councils to invest in community-building initiatives, such as establishing Community Centres that can serve as hubs for both in-person and remote activities, helping bridge the gap between online and offline interactions. Moreover, the importance of human resources capacity building is emphasized, with a focus on incorporating remote working into collective agreements and developing a regional pool of workers to assist during peak times or staff shortages.

Modernizing Local Councils' office setups to become fully digitally enabled is also identified as a key step in supporting the transition to remote work. This involves updating technological tools and infrastructure to ensure that employees have access to the resources they need to work effectively from home. Alongside this, promoting remote working arrangements and the use of digital services is recommended to encourage greater flexibility and improve public service delivery.

Finally, the researcher suggests providing incentives for Local Councils to organise activities that enhance communication and collaboration among remote teams and in-office workers. Regular team-building activities, virtual meetings, and other forms of engagement help prevent feelings of isolation and foster a sense of community, ensuring that the transition to remote work does not lead to a decline in collaboration or productivity. By implementing these recommendations, Local Councils can successfully navigate the challenges of remote work, maintain high service standards, and support the well-being of their employees.

Limitations of the Study

The study acknowledges several limitations that should be considered when interpreting the findings. One key limitation is that the public was not consulted, meaning the study did not gauge the expectations of citizens regarding the services provided by Local Councils, nor did it explore whether they are ready to fully embrace a digital service setup. This absence of public input limits the understanding of how remote working could affect service delivery from the public's perspective. Additionally, discussions around the opening hours of Local Councils were only held with politicians, management, and administrative staff, without consulting the public, which may pose another limitation, as the perspectives of service users were not incorporated.

Another limitation stems from the scarcity of research directly focused on remote working in Local Councils, both in Malta and internationally. While numerous studies on remote working within government entities and the private sector exist, the specific context of Local Councils remains under-researched. This gap in the literature posed challenges for tailoring the literature review to the unique structure of the Local Government sector, potentially affecting the depth and relevance of the review.

Despite these limitations, the study presents significant opportunities for further research and practical application. The primary aim of the study was to assess the current readiness of Local Councils to implement remote working, identify gaps, and recommend improvements for effective service delivery. Given the lack of existing literature on remote working in Local Government, this research opens new avenues for future studies in this area. It also provides valuable insights that could help enhance the Local Government system in Malta. Moreover, the study raises important questions about the optimal timeline for fully implementing remote working arrangements in Local Councils, ensuring that service delivery standards are maintained or even improved.

Conclusions

The implementation of remote working arrangements in the public sector has proven to be highly beneficial for employees, organizations, and even the environment (Day and Burbach, 2011). As evidenced through this study and supported by other sources, when executed correctly, remote working can serve as a powerful tool to optimise service delivery while maintaining high standards of public service. However, achieving these benefits requires the right infrastructure, including adequate training, digital equipment, effective systems, and sufficient human resources. Remote working presents a range of potential benefits, such as improved employee retention, cost savings, increased flexibility, enhanced work-life balance, greater productivity, environmental sustainability, heightened employee satisfaction, and reduced disruptions to work. Additionally, a distributed workforce, facilitated by teleworking, can also promote better integration of policy functions within regional offices (Robbins, 2020, as cited in Council of Europe, 2020, p.11).

The COVID-19 pandemic has highlighted key lessons for public sector entities, including Local Councils. Unlike the private sector, the public sector cannot simply shut its doors due to its critical responsibilities and obligations to ensure business continuity. During the pandemic, Local Councils successfully adapted to remote work, providing employees with the opportunity to continue their roles and ensuring public services remained available through online platforms. This adaptability has proven effective and offers a model for managing crises in the future. Remote working could also serve as an emergency response strategy, ensuring that Local Councils continue to function efficiently during times of extreme urgency, as was experienced during the pandemic (Council of Europe, 2020).

By implementing the recommendations identified in this study, Local Councils can ensure that remote working arrangements are successfully integrated into their operations. Not only will this maintain high-quality service delivery to the public, but it will also enrich the overall public experience. Offering citizens alternative methods to access services—whether online or in person—along with full digitization, will enable Local Councils to make data-driven decisions that further enhance service delivery.

This study shows the need for the Local Government Department (LGD) to play a central role in drafting a comprehensive strategy for implementing remote working across Local Councils. By developing this strategy based on the recommendations provided, the LGD can help Local Councils create a future-proof workforce that is better equipped to meet both current and emerging challenges. This strategy will benefit Local Council employees, members, and the community, paving the way for future generations and fostering resilience in the face of potential challenges. By embracing the recommendations from this study, Local Councils can position themselves as forward-thinking, adaptable institutions that continue to meet the evolving needs of the public.

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02 Factors that Influence Admission and Discharge Decisions in a Paediatric Emergency Department in Malta

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Abstract

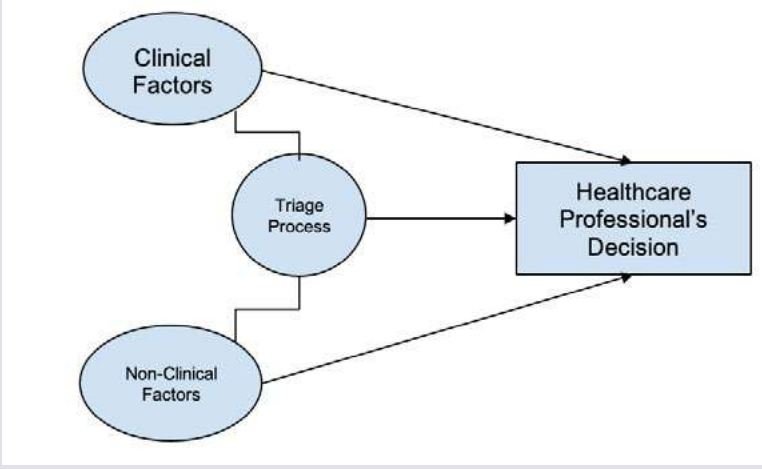
The Paediatric Emergency Department (PED) is a fast-paced environment with constant changes in its needs and care provision. Making a decision that results in a child receiving the appropriate level of care is heavily dependent on whether a decision is taken to either admit or discharge the patient from the PED. This study aimed to identify whether clinical and non-clinical factors impact the decision-making process when a healthcare professional decides whether a child is admitted or discharged from the PED.

A deductive approach, with a descriptive and correlational strategy was chosen. A quantitative, cross-sectional, observational design was deemed suitable for this study. Factors that are related to the triage process, and clinical or non-clinical factors were studied. For data collection, an online questionnaire was distributed to healthcare professionals of various grades, that had experience in the PED and with paediatric patients. Descriptive Frequencies were used to develop positive or negative trends in results, and Bivariate Spearman's Rho Analysis tests were performed to extract any correlation between the factors studied.

The findings of this study showed that the triage process implements both objective and subjective views. and clinical factors have a heavier impact than non-clinical factors when making an admission/discharge decision. There was a positive correlation between the years of experience of healthcare professionals and the subjectiveness of the triage process. No significant correlation was found between clinical/non-clinical factors and the assignment of severity level during triage.

Keywords: "Pediatric Emergency"; "Clinical Factors"; "Non-Clinical Factors"; "Emergency Triage"; "Triage System Performance"

Graphical Abstract



Highlights:

- Clinical factors highly impact the decision-making process in the Paediatric Emergency Department, while non-clinical factors are still considered but in a lesser capacity.
- The triage process is deemed to be subjective to the healthcare professional's level of experience and personal and professional judgement and does not solely rely on objective factors.
- The decision-making process can be improved by streamlining what factors are taken into consideration when admitting or discharging patients from the Paediatric Emergency Department.

Introduction

When referring to an annual report for the Paediatric Emergency Department in Mater Dei Hospital, Malta, which addressed attendances for the year 2023, there were a total of 16,970 attendances throughout the year, with December 2023 alone recording 1,110 attendances (Debono, 2023). These statistics show the sheer volume of patients that healthcare professionals must treat and make decisions about on daily basis.

Making a decision that results in a child receiving the appropriate level of care is heavily dependent on whether a decision is taken to either admit or discharge the patient from the Paediatric Emergency department (PED). A multitude of intricate factors influence these choices. Clinical factors such as severity of illness, triage level, and the mode of arrival to the emergency department, are highly influential factors when it comes to making this kind of decision (Pope et al., 2017; Marcin et al., 2017; Crilly et al., 2024). However, non-clinical factors, such as the time of day when a patient arrives at the emergency department and repeat presentations, also have an impact on the decision-making process (Greenfield et al., 2021; Guo et al., 2023).

There is currently a pressure on physicians, administrators, and legislators to reduce the overall rise in hospital admissions, especially when it comes to acute hospitalisations, that are thought to be avoidable or unneeded (Pope et al, 2017). Finding variables that anticipate hospital admissions can help with bed management and patient flow planning in the future, which will help reduce ED overcrowding (Crilly et al, 2024). In addition to rising demand, hospitalised or admitted patients remaining in the ED while they wait for a bed is one of the main causes of ED overcrowding (Barak-Corren et al, 2017).

This study aimed to identify whether clinical and non-clinical factors impact the decision-making process when a healthcare professional decides whether a child is admitted or discharged from the PED. The primary goal was to identify measures that can improve the quality of care given in this department. To do this, research on what goes into the process of taking the decision to admit or discharge, especially with regards to triage classification and patient outcomes, was carried out. Possible recommendations for improving the quality of care provided in these settings and ensuring that patients receive appropriate care in a timely and efficient manner were also explored.

Methodology

A deductive approach was chosen for this study, employing a correlational strategy. The research design was quantitative, and a cross-sectional approach was deemed most appropriate.

A questionnaire tool was developed and used to collect primary data from staff that have experience in the paediatric emergency department of the state-run, acute general teaching hospital in Malta (see Appendix 1). This questionnaire was distributed through an intermediary to avoid conflict of interest between the researcher and the participants. The questionnaire was disseminated to several healthcare professionals (n=120) that have a suitable period of experience working in the Paediatric Department of the study site.

The validation technique used for this data collection tool was face-to-face validity strategy. A Reliability test was also performed in order to ensure that the data collected gave accurate and conformable results. The test also portrays how consistent the items being measured were in comparison to each other. Cronbach's Alpha was used to determine internal consistency. According to Dalyanto et al. (2021), Cronbach's Alpha is a tool that is used to measure reliability, containing values that range from zero to one. Cronbach's Alpha was calculated on 15 items from the questionnaire tool, eliminating questions that were targeted to collect demographic data. Cronbach's Alpha coefficient of over 15 items resulted in 0.55. This result indicates that the tool was reliable enough to use in research (see Table 1). However, this coefficient result indicates that there were some items that did not correlate consistently with others in the tool that was used.

Cronbach's Alpha Value	Reliability Level
0.0-0.2	Less Reliable
>0.20-0.40	Somewhat Reliable
>0.40-0.60	**Reliable Enough**
>0.60-0.80	Reliable
>0.80-1.00	Very Reliable

Table 1: Cronbach's Alpha Reliability Level (Dalyanto et al., 2021)

The triage system used in this Emergency Department at the time of the study was the Emergency Severity Index (ESI) system. Pope et al. (2017) included a mixture of nurses and medical officers when collecting data for their study which explored factors that play a role in the decision to admit or discharge patients from the Emergency Department, as these were viewed as potential informants.

Several variables were identified when creating the data collection tool for this study. Demographic variables included the different levels of healthcare professions, age groups and level of experience in the PED in years, which were also grouped. A research model depicted in figure 1 explains the research method used for the study.

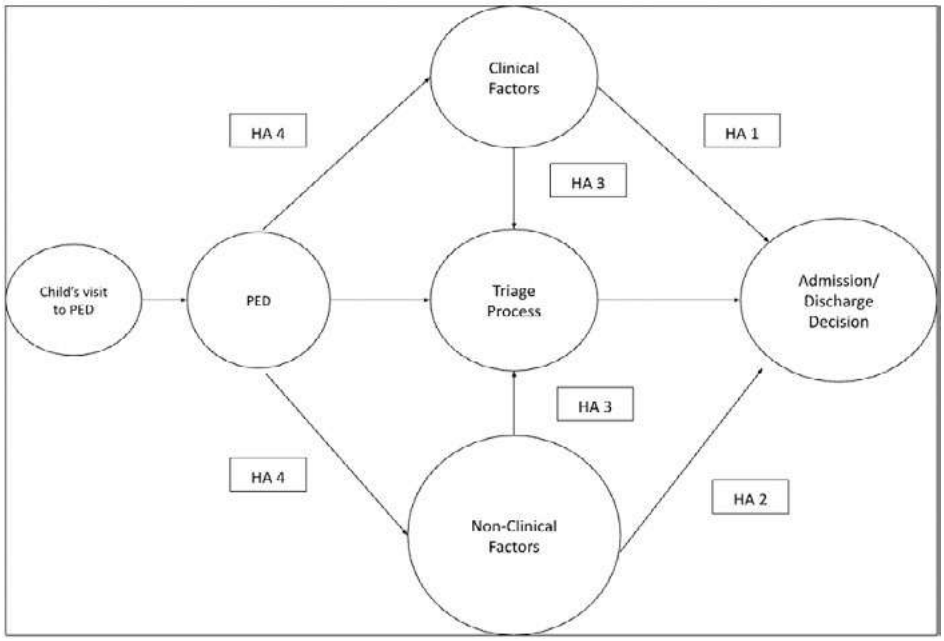


Figure 1: Research Model used for study

Four hypotheses in total were developed, as follows:

HA1: There is a high rate (≥50%) of positive responses ("often" and "always") related to clinical factors that affect the admission/discharge decision.

HA2: There is a high rate (≥50%) of positive responses ("often" and "always") related to non-clinical factors that affect the admission/discharge decision.

HA3: There is a significant correlation between the level of professional experience and the triage process.

HA4: There is a significant correlation between the level of reliability in the ESI system and clinical and non-clinical factors.

Healthcare professionals included Staff Nurses, Senior Staff Nurses, Charge Nurses and Practice Nurses, as well as Basic Specialist Trainees, Higher Specialist Trainees, Resident Specialists and Medical Consultants from the medical officer field. The age groups were split into 21-25 years of age, 26-30 years of age, 30-40 years of age, and 40+ years of age. A question asking if the respondent had experience in the PED was included, as well as a question asking if the respondent was licensed to perform triage.

Variables in the Triage domain included level of experience in performing triage, ESI reliability, ESI level as a factor influencing admission or discharge decisions, and ESI level in comparison to the patient's actual condition. Variables in the Clinical Factors domain included severity of illness, the presence of chronic conditions, and multiple presentations within a short timeframe, the method of presentation to the PED (self-referred or referred by physician), and the method of arrival to the PED (own transport or arrival by ambulance). The non-clinical variables forming part of the Non-Clinical Factors Domain were the rate of reassessment, waiting time, the presence of a senior doctor in the area, the time of arrival at the PED, the season of assessment at the PED, the parents' or guardians' fluency in languages, and how often the parental sense of urgency matches the patient's actual clinical condition. The questionnaire data collection tool was created using Google Forms and then distributed to the identified Data Sample. This data was analysed using Microsoft Excel and IBM SPSS Statistics. Tables 2, 3, and 4 below present the variables selected for each domain.

Triage Process Domain Variables
• Length of Experience when assigning ESI Level • Reliability of ESI Level assigned • Whether ESI Level is a factor in admission/discharge decision • Whether ESI Level assigned matches patient condition

Table 2: Triage Process domain variables.
Note: ESI refers to Emergency Severity Index

Clinical Factors Domain Variables
• Severity of illness • Chronic conditions • Repeat Presentations in a short timeframe • Method of presentation (Self-referred vs referred by Physician) • Method of arrival to PED (Own transport Vs Ambulance)

Table 3: Clinical Factor Domain Variables. Note: PED refers to Paediatric Emergency Department

Non-Clinical Factors Domain Variables
• How often patients return for Reassessment • Waiting time • Presence of Senior Doctor in department • Time of arrival to the PED • Season of arrival to the PED • Parental/Guardian's level of fluency in Languages • How often Parental/Guardian's sense of Urgency matches patient's condition

Table 4: Non-Clinical Factors Domain Variables. Note: PED refers to Paediatric Emergency Department

Questions covering the three domains were designed with a Likert scale response ranging from 1 to 5, in order to show either a negative or positive trend from each response. An overall negative trend would be signified from a high rate of "number 1" and "number 2" responses, while an overall positive trend would emerge from a high rate of "number 4" and "number 5" responses. If a certain domain showed that the highest percentage of responses lied around "number 3" then that would be deemed a neutral trend.

An open-ended question was included at the end of this questionnaire, with the aim of identifying more factors that have an effect on the decision-making process. Respondents amounted to 58.4% of total participants for this study. Participants identified the following factors, which were not addressed in the questionnaire created for this study: Seniority of Nursing staff, Busyness in the ED, Response to treatment, Parental knowledge, previous medical history, social support, the child's age, ethnicity and hospital bed state. Parental knowledge (10.5%), Social support (10.5%) and Hospital Bed State (7.9%) had the highest percentage rates of response from the total number of respondents of the open-ended questions. Table 5 depicts the results of this open-ended question.

Factor identified by respondents	Percentage (%) response rate
Seniority of Nursing Staff	2.6%
Busyness in the ED	2.6%
Response to Treatment	2.6%
Parental Knowledge	10.5%
Medical History	2.6%
Social Support	10.5%
Child's age	2.6%
Child's ethnicity	2.6%
Hospital Bed State	7.9%

Table 5: Open-ended question results

Ethical considerations were implemented to ensure that no harm would be caused to participants or entities taking part in this study. Data gathered for this research study was kept confidential by making use of proper GDPR protocols which are abided by in the hospital from which the data was collected. Permission from the relevant Heads of Departments was obtained prior to accessing the data for this study. Questionnaires were distributed through an intermediary and completed online via a provided link. This process ensured that no physical contact occurred, thereby avoiding any conflict of interest between the researcher and the participants.

Results

The total number of healthcare professionals—including a mix of nurses and medical officers—with experience in the departments relevant to this study was approximately 120. As such, the questionnaire used to collect primary data was distributed to the entire population. This meant that 81 or more measurements (participants) were needed to have a confidence level of 95%, so that the real value is within ±5% of the measured value. This result was achieved by assuming that the percentage population proportion was 80%, given that the population being studied was homogeneous in nature and it could be assumed that the answers provided would be quite accurate. The questionnaire used to collect primary data was distributed via an intermediary through an email sent to the participants. Although multiple reminders were also sent at adequate intervals, only 65 responses were collected over the course of the data collection period, which spanned ten weeks in total. This increased the margin of error from ±5% to ±6.61%.

Descriptive statistics were included in order to highlight the distribution of the data collected, and identify any patterns present. These statistics also portray the strength of the data that was collected. Table 6 depicts the distribution of ages and professions of the participants for this study. The highest number of respondents fell between the 26-30yrs age group bracket (53.8%). The Healthcare profession that was chosen the most from all respondents was Basic Specialist Trainee (36.9%).

Healthcare Profession	Age groups by number and percentages of total respondents N =65 (%)				Healthcare profession Total number and percentages (%)
	21-25	26-30	30-40	40+	
Staff Nurse	4(6.2%)	6(9.2%)	3(4.6%)	3(4.6%)	16(24.7%)
Senior Staff Nurse	0(0.0%)	0(0.0%)	3(4.6%)	0(0.0%)	3(4.6%)
Charge Nurse	0(0.0%)	0(0.0%)	0(0.0%)	1(1.5%)	1(1.5%)
Practice Nurse	0(0.0%)	0(0.0%)	0(0.0%)	1(1.5%)	1(1.5%)
Basic Specialist Trainee	0(0.0%)	20(30.8%)	4(6.2%)	0(0.0%)	24(36.9%)
Higher Specialist Trainee	0(0.0%)	9(13.8%)	4(6.2%)	0(0.0%)	13(20%)
Resident Specialist	0(0.0%)	0(0.0%)	4(6.2%)	0(0.0%)	4(6.2%)
Medical Consultant	0(0.0%)	0(0.0%)	0(0.0%)	3(4.6%)	3(4.6%)
Total sum of age group respondents and percentage (%)	4(6.2%)	35(53.8%)	18(27.7%)	8(12.3%)	65(100%)

Table 6: Healthcare Profession vs Age Group

Table 7 shows the distribution of the number of years of experience against the professions taking part in the study. The range of years of experience with the highest number of responses was 6 months to 2 years of experience (36.9%), followed by 2-3yrs (26.1%) and 3yrs+ (30.8%). The range of years of experience with the highest number of responses was 6 months to 2 years of experience (36.9%), followed by 2-3yrs (26.1%) and 3yrs+ (30.8%).

Years of Experience	Age groups by number and percentages of total respondents (%)				Total Sum of Years of Experience Respondents and Percentage (%)
	21-25	26-30	30-40	40+	
0-6mths	0(0%)	2(3.1%)	1(1.5%)	0(0.0%)	3(4.6%)
6mths-2yrs	2(3.1%)	18(27.7%)	3(4.6%)	1(1.5%)	24(36.9%)
2-3yrs	2(3.1%)	9(13.8%)	5(7.7%)	1(1.5%)	17(26.2%)
3yrs+	0(0.0%)	6(9.2%)	9(13.8%)	5(7.7%)	20(30.8%)
N/A	0(0.0%)	0(0.0%)	0(0.0%)	1(1.5%)	1(1.5%)
Total sum of age group respondents and percentage (%)	4(6.2%)	35(53.8%)	18(27.5%)	8(12.3%)	65(100%)

Note: N/A (not applicable) indicated that the respondent did not have any experience working in the Paediatric Emergency Department itself, and one participant chose this answer as their response

Table 7: Years of Experience vs Age Group

Respondents answered questions related to triage, and the ESI level that is assigned to a patient when arriving to the PED. Fifteen respondents answered the first question in this domain, as respondents who are not trained to do triage in the PED were instructed to skip this question. Here, participants were asked if they deem that experience plays a role when assigning an ESI level versus looking solely at clinical parameters. The highest percentage of responses was 5, or "Always", with 10.8% (46.7%) of the total responses. The median answer was 4, indicating a positive trend.

When respondents were asked how reliable they find the ESI level assigned to each patient to be in indicating their clinical condition (question 7), the highest percentage of the total responses was 67.7% for response 4, or "Often". This indicated that they often find that the level assigned is reliable, also shown by a median result of 4. However, when in question 8 respondents were directly asked if the ESI level plays a role in deciding whether to admit or discharge a patient, the majority of answers hovered between "Occasionally" (36.9%) and "Sometimes" (40%), also evidenced by the median result of 3, indicating a skew to the neutral section of the Likert scale. This shows that while it is considered as a factor it might not be as important as other factors in making this decision.

Respondents were also asked in question 9 how often they find that the ESI level assigned matches the patient's actual conditions, and the highest percentage lied with result number 4 (70.7%), as well as a median result of 4. This would indicate that most answers showed a positive trend, therefore implying that patients are often triaged and given the correct level of severity by trained professionals.

Overall, responses in this domain suggest that respondents consider the triage process reliable, as indicated by a low percentage of negative trend responses (1= 1.9%, 2= 12.9%) and a higher rate of positive trend responses (4= 50.9%, 5= 5.3%). When percentages were calculated for the corresponding trend, overall negative trend responses had a percentage of 14.8%, while overall positive trend responses had a percentage of 56.2%. Overall Neutral trend responses had a percentage of 29.5% of the total number of responses. The results are shown in table 8.

Question number/Factors	Likert Scale responses					Median
	1	2	3	4	5	
6-L.O.E when Assigning ESI Level	0(0.0%)	0(0.0%)	2(13.3%)	6(40%)	7(46.7%)	4
7- ESI Reliability	0(0.0%)	2(3.1%)	17(26.1%)	44(67.7%)	2(3.1%)	4
8-ESI vs Decision to Admit/Discharge	4(6.2%)	24(36.9%)	26(40%)	10(15.4%)	1(1.5%)	3
9-ESI Compared to Patient Condition	0(0.0%)	1(1.5%)	17(26.1%)	46(70.7%)	1(1.5%)	4
Overall Rates	4(1.9%)	27 (12.9%)	62(29.5%)	106(50.9%)	11(5.3%)	
Overall rates by trend	31(14.8%)		62(29.5%)	117(56.2%)		

Note: Likert Scale response template: 1 = Never, 2 = Occasionally, 3 = Sometimes, 4 = Often, 5= Always. L.O.E refers to Level of Experience. ESI refers to Emergency Severity Index.
NB : Percentages for Section 6 are out of 15 total responses, while for sections 7-9 percentages are out of 65 total responses.

Table 8: Triage domain

Results for the Clinical factors showed that Severity of illness (Question 10), was a highly influential factor, with the majority of respondents (45, 69.2%) indicating 5 or "Always", and 16 respondents (24.6%) indicating "Often" as their answer. The median result for this question was 5. Question 11 had 66.2% of the total respondents who chose response 4 as their answer, and 20% of total respondents opted for response 5. The median result for this question was 4. Responses to question 13 had a median result of 4, with the highest percentage lying around response 4 (60%). Both Question 11 and Question 13 show a positive trend in results. Question 18 shows a neutral trend in responses, with the highest percentages being that of response 2(36.9%) and response 3(32.3%), and median of 3. Question 19 shows a negative trend, with 49.2% of the total respondents choosing response 1, and a median result of 2.

When looking at the percentages for the overall rates by trend, this domain showed a higher amount of responses that lean towards a positive trend, with 54.8% of answers resulting in a Likert scale response of 4, indicating "Often" or 5 indicating "Always". The results are shown in table 9.

Question number/Factors	Likert Scale Responses					Median
	1	2	3	4	5	
10- Severity of Illness	1(1.5%)	1(1.5%)	2(3.1%)	16(24.6%)	45(69.2%)	5
11- Chronic Conditions	0(0.0%)	1(1.5%)	8(12.3%)	43(66.2%)	13(20.0%)	4
13- Repeat Presentations	0(0.0%)	5(7.7%)	18(27.7%)	39(60%)	3(4.6%)	4
18-Method of Presentation (Self-referred vs Physician)	5(7.7%)	24(36.9%)	21(32.3%)	14(21.5%)	1(1.5%)	3
19-Method of arrival (Ambulance vs Own Transport)	29(44.6%)	24(36.9%)	8(12.3%)	4(6.2%)	0(0.0%)	2
Overall Rates	35(10.8%)	55(16.9%)	57(17.5%)	116(35.7%)	62(19.1%)	
Overall rates by trend	90(27.7%)		57(17.5%)	178(54.8%)		

Note: Likert Scale response template: 1 = Never, 2 = Occasionally, 3 = Sometimes, 4 = Often, 5= Always

Table 9: Clinical Factors Domain

The next domain covered Non-Clinical Factors and their effect on the admission/discharge decision-making process. It is worth noting that the overall response distribution for Positive (response 4 and 5) and Negative (response 1 and 2) trends was nearly even, with 29.3% of responses reflecting a negative trend and 29% reflecting a positive trend. The Likert Scale response 3 had a 41.8% response rate overall, indicating a neutral overall trend of responses.

Question 12 asked how often respondents find that patients revisit the PED in a short timespan(72hrs). The responses for this question shifted towards the lower end of the Likert Scale, and although a median of 3 was obtained, one can see that the majority of responses lied between "Occasionally" (49.2%) and "Sometimes" (44.6%). Question 14 regarded waiting times of patients in the PED and whether this was considered a factor when deciding whether to admit or discharge a patient. The median result was also 3, with 56.9% of the total respondents choosing 3 as their answer. The median result for Question 15, which regarded the presence of a senior doctor in the area, was 4, with the highest total percentage of respondents choosing answer 4 (60%), meaning that responses showed a positive trend.

Question 16 sought to find out whether the time when a patient presented to the PED, for example during the day versus the nighttime, or a day of the week versus the weekend, affected admission/discharge decisions. 18.5% of respondents chose answer 1, and 32.3% of respondents answered 2, while the median answer was also 2, thus leaning towards the lower end of the Likert scale and showing a negative trend of responses. Question 17 asked whether respondents see a correlation or pattern between admissions/discharges, and seasons. The median result was 3, with a number of respondents choosing option 3(35.4%) and option 4(44.6%). The results for these questions are shown in table 10.

Question number/Factors	Likert Scale Responses					Median
	1	2	3	4	5	
12-Reassessment	0(0.0%)	32(49.2%)	29(44.6%)	4(6.2%)	0(0.0%)	3
14-Waiting time	3(4.6%)	20(30.8%)	37(56.9%)	5(7.7%)	0(0.0%)	3
15-Presence of Senior Doctor	0(0.0%)	0(0.0%)	16(24.6%)	39(60%)	10(15.4%)	4
16-Time of Arrival	12(18.5%)	21(32.3%)	24(36.9%)	8(12.3%)	0(0.0%)	2
17-Season of Presentation	4(6.2%)	9(13.8%)	23(35.4%)	29(44.6%)	0(0.0%)	3
20-Parental Fluency in Languages	1(1.5%)	15(23.1%)	19(29.2%)	24(36.9%)	6(9.2%)	3
21-Parental Sense of Urgency	0(0.0%)	16(24.6%)	42(64.6%)	6(9.2%)	1(1.5%)	3
Overall Rates	20(4.4%)	113(24.9%)	190(41.8%)	115(25.3%)	17(3.7%)	
Overall rates by trend	133(29.3%)		190(41.8%)	132(29%)		

Note: Likert Scale response template: 1 = Never, 2 = Occasionally, 3 = Sometimes, 4 = Often, 5= Always

Table 10: Non-Clinical Factors domain

According to the overall trends presented in Table 11, the Triage Process domain showed a higher proportion of positive responses (56.2%), while the Clinical Factors domain reflected an even greater positive trend at 67.6%. The Non-Clinical factors domain showed a more neutral response trend, with an overall percentage of 41.8% versus 29.3% overall for negative trend responses and 29% overall for positive trend responses.

Domains	Likert Scale Responses				
	1	2	3	4	5
Triage process	4(1.9%)	27 (12.9%)	62(29.5%)	106(50.9%)	11(5.3%)
Clinical Factors	35(10.8%)	55(16.9%)	57(17.5%)	116(35.7%)	62(19.1%)
Non-Clinical Factors	20 (4.4%)	113 (24.9%)	190 (41.8%)	115 (25.3%)	17 (3.7%)
Overall Rates	(59 (6.0%)	(195(19.7%)	309(31.2%)	337 (34.0%)	90 (9.1%)
Overall rates by trend	254(25.6%)		309(31.2%)	427 (43.1%)	

Note: Likert Scale response template: 1 = Never, 2 = Occasionally, 3 = Sometimes, 4 = Often, 5= Always.

Table 11: Overall Response Rates per Domain

The variables identified in the three domains were tested against each other to see if there was any correlation between particular variables, or if any pattern could be developed. For these tests, Bivariate Spearman's Rho analysis was used.

The relationship between the level of years of experience of healthcare professionals was tested against variables in the Triage domain, as shown in table 12. A Bivariate Spearman's rank correlation test was performed for the variable "Years of Experience" (YOE) against the items in the first domain of the questionnaire, where the variables were labelled "Triage Experience", "ESI Level Reliability", "ESI Level" and "ESI Compare to Patient Condition". When the test was run, incomplete pairs were excluded to account for the fact that only 15 respondents provided data for one of the variables, that of "Triage Experience". The finding that was most interesting from these results was that there was a highly positive correlation between the years of experience and how significant the respondents find triage experience to be (Spearman's $\rho = 0.764$, $p < 0.001$). This finding is statistically significant at the 0.01 level.

All other correlations in this domain had a weak or non-significant correlational result, which would imply that the remaining variables tested in this dataset had minimally correlational relationships between them. There was a weak negative correlation between YOE and ESI Level Reliability (Spearman's $\rho = -0.075$, $p = 0.553$), as well as between YOE and ESI Level as a decisive factor (Spearman's $\rho = -0.028$, $p = 0.825$). A weak positive correlation was found between YOE and ESI compared to patient's condition (Spearman's ρ 0.7, $p = 0.577$). These results are shown in table 12.

Variables Tested Against Years of Experience	Spearman's ρ/Significance	
Years of Experience	Correlation Coefficient	1
	Sig. (2-tailed)	.
	N	65
Triage Experience	Correlation Coefficient	.764**
	Sig. (2-tailed)	<.001
	N	15
ESI Level Reliability	Correlation Coefficient	-0.075
	Sig. (2-tailed)	0.553
	N	65
ESI Level	Correlation Coefficient	-0.028
	Sig. (2-tailed)	0.825
	N	65
ESI Compared to Patient Condition	Correlation Coefficient	0.07
	Sig. (2-tailed)	0.577
	N	65

Note : YOE refers to Years of Experience. ESI refers to Emergency Severity Index.
***Correlation is significant at the 0.01 level (2-tailed).*

Table 12: Spearman's ρ Analysis for Variables "Years of Experience", "Triage Experience", "ESI Level Reliability", "ESI Level" and "ESI Compared to Patient Condition"

ESI reliability was tested against both Clinical and Non-Clinical Factors. There was no significant correlation between these variables. In table 13, ESI Level Reliability showed a weak positive correlation with Severity of illness (Spearman's $\rho = 0.043$, $p = 0.734$), Repeat Presentations (Spearman's $\rho = 0.108$, $p = 0.394$), Method of Presentation (Spearman's $\rho = 0.153$, $p = 0.222$) and Method of Arrival (Spearman's $\rho = 0.143$, $p = 0.255$). Chronic conditions and ESI Level Reliability had a weak negative correlation (Spearman's $\rho = -0.015$, $p = 0.904$).

Variables tested against ESI Level Reliability	Spearman's ρ/Significance	
ESI Level Reliability	Correlation Coefficient	1
	Sig. (2-tailed)	.
	N	65
Severity of Illness	Correlation Coefficient	0.043
	Sig. (2-tailed)	0.734
	N	65
Chronic Conditions	Correlation Coefficient	-0.015
	Sig. (2-tailed)	0.904
	N	65
Repeat Presentations	Correlation Coefficient	0.108
	Sig. (2-tailed)	0.394
	N	65
Method of Presentation	Correlation Coefficient	0.153
	Sig. (2-tailed)	0.222
	N	65
Method of Arrival	Correlation Coefficient	0.143
	Sig. (2-tailed)	0.255
	N	65

Table 13: Spearman's ρ Analysis for Variables "ESI Level Reliability", "Severity of Illness", "Chronic Conditions", "Repeat Presentations", "Method of Presentation" and "Method of Arrival"

All non-clinical factor variables tested against ESI Reliability (shown in table 14) showed no correlation in either direction (positive or negative) that was statistically significant at the 0.01 level or 0.05 level. There was a weak positive correlation between the variables "ESI Level of Reliability", and "Presence of Senior Doctor" (Spearman's ρ = 0.084, p = 0.508) and "Sense of Urgency" (Spearman's ρ = 0.209, p = 0.095). A weak negative correlation was present between "ESI Level Reliability" and "Reassessment" (Spearman's ρ = -0.111, p = 0.379), "Waiting Time" (Spearman's ρ = -0.064, p = 0.615), "Time of Arrival" (Spearman's ρ = -0.051, p = 0.689), "Season" (Spearman's ρ = -0.149, p = 0.235), and "Fluency in Languages" (Spearman's ρ = -0.091, p = 0.473).

Variables tested against ESI Level Reliability	Spearman's ρ / Significance	
ESI Level Reliability	Correlation Coefficient	1
	Sig. (2-tailed)	.
	N	65
Reassessment	Correlation Coefficient	-0.111
	Sig. (2-tailed)	0.379
	N	65
Waiting Time	Correlation Coefficient	-0.064
	Sig. (2-tailed)	0.615
	N	65
Presence of Senior Doctor	Correlation Coefficient	0.084
	Sig. (2-tailed)	0.508
	N	65
Time of Arrival	Correlation Coefficient	-0.051
	Sig. (2-tailed)	0.689
	N	65
Season	Correlation Coefficient	-0.149
	Sig. (2-tailed)	0.235
	N	65
Fluency in Languages	Correlation Coefficient	-0.091
	Sig. (2-tailed)	0.473
	N	65
Sense of Urgency	Correlation Coefficient	0.209
	Sig. (2-tailed)	0.095
	N	65

Note: ESI refers to Emergency Severity IndexPresentation" and "Method of Arrival"

Table 14: Spearman's Analysis for Variables "ESI Level Reliability", "Reassessment", "Waiting time", "Presence of Senior Doctor", "Time of Arrival", "Season", "Fluency in Languages" and "Sense of Urgency"

Participants were invited at the end of the questionnaire to provide further factors that they think influence the decision-making process. There were 38 (58.4%) total respondents out of the 65 participants from the study sample that chose to answer this question. Many of the factors mentioned were already tested for, however some new factors emerged from these responses. These factors were: seniority of nursing staff, busyness in the ED, response to treatment, parental knowledge, previous medical history, social support, the child's age, ethnicity and hospital bed state. Factors such as the child's age and racial ethnicity were identified in literature, however according to Marcin et al. (2017), this was not found to be a factor predictive of admission. parental knowledge (10.5%), social support (10.5%) and hospital bed state (7.9%) had the highest percentage rates of response from the total number of respondents of the open-ended questions. Results are shown in table 15.

Factor identified by respondents	Percentage (%) response rate
Seniority of Nursing Staff	2.6%
Busyness in the ED	2.6%
Response to Treatment	2.6%
Parental Knowledge	10.5%
Medical History	2.6%
Social Support	10.5%
Child's age	2.6%
Child's ethnicity	2.6%
Hospital Bed State	7.9%

Table 15: Factors identified from open-ended question

Hypotheses 1 and 2 were tested by viewing the overall rates and trends of responses for each domain. In this sense, it is noted that there is a high rate (≥50%) of positive responses ("often" and "always") related to clinical factors that lead to the decision to either admit or discharge the patient from PED (HA1), but there is a low rate (≤50%) of positive responses ("often" and "always") related to non-clinical factors that lead to the decision to either admit or discharge the patient from PED (HO2). This seems to show that non-clinical factors do not have the same weight during triage and do not seem to have a relevant impact on decision-making regarding patient admission or discharge from the PED. Table 16 depicts the accepted and rejected hypotheses.

	Hypothesis			
	H01: There is a low rate (≤50%) of positive responses ("often" and "always") related to clinical factors that affect the admission/discharge decision.	HA1: There is a high rate (≥50%) of positive responses ("often" and "always") related to clinical factors that affect the admission/discharge decision	H02: There is a low rate (≤50%) of positive responses ("often" and "always") related to non-clinical factors that affect the admission/discharge decision.	HA2: There is a high rate (≥50%) of positive responses ("often" and "always") related to non-clinical factors that affect the admission/discharge decision.
Overall Negative trend Rate	(27.7%)		(29.30%)	
Overall Neutral Trend rate	(17.5%)		(41.80%)	
Overall Positive trend rate	(54.8%)		(29%)	
Accepted/Rejected	Rejected	Accepted	Accepted	Rejected

Table 16: Testing of Null and Alternative hypotheses 1 and 2

Hypotheses 3 and 4 were tested by performing Bivariate Spearman's rank correlation analysis on the corresponding variables. When the level of experience was tested against the triage process, there was a significant positive correlation between years of experience and experience while performing triage (Spearman's $\rho = 0.764$, $p < 0.001$). When ESI level reliability was tested against Clinical and Non-Clinical factor domain variables, no significant correlation in any direction occurred. Therefore, HA3 and H04 are accepted while H03 and HA4 are rejected, as shown in table 17.

	Hypothesis			
	H03 : There is no correlation between the level of professional experience and the triage process.	HA3: There is significant correlation between the level of professional experience and the triage process.	H04 : There is no correlation between the level of reliability in the ESI system and clinical and non-clinical factors.	HA4 :There is a significant correlation between the level of reliability in the ESI system and clinical and non-clinical factors.
Correlation of variables is significant at the 0.01 level	Yes (0.764)	Yes (0.764)	No	No
Correlation of variables is significant at the 0.05 level	No	No	No	No
Accepted/Rejected	Rejected	Accepted	Accepted	Rejected

Table 17: Testing of Null and Alternative Hypotheses 3 and 4

Discussion

The results of this study showed that the triage process, severity of illness, presence of chronic conditions, multiple PED presentations within a short timeframe (72 hours), method of presentation, method of arrival, reassessment, waiting time, presence of a senior doctor in the area, time of arrival, season of presentation, guardians' fluency in native languages, and the level of parental sense of urgency compared to the child's actual condition were all factors that influenced the decision to admit or discharge a patient from the PED, to varying degrees. Crilly et al. (2024) had identified some of these factors as well when studying predictions of hospital admissions from the ED. The authors indicate in the results of their study that the triage category, mode of arrival to the ED and the referral source were strong predictors of admission. Marcin et al. (2017) concluded that the day and time of ED presentation made a difference in the probability of admission, along with several other factors, one of which was also the triage category assigned to patients. Greenfield et al. (2021) had linked the presence of chronic conditions with repeat or multiple presentations to the PED, indicating that frequent ED attenders were more likely to suffer from a chronic condition. They concluded that frequent attenders had a higher likelihood of at least one hospital admission or transfer to another department.

Participants indicated that the level of years of experience is a crucial factor that is relied on when undergoing the triage process, as indicated by 46.7% of participants who indicated that they always consider this factor, followed by 40% who indicated that they often consider this factor. Yoon et al. (2023) suggest that triage is aided by the nurses' practical understanding of paediatric patients' distinct responses to the emergency department, their external look, and the progressive change in their conditions. The majority of participants in Yoon et al.'s study offered an objective point of view, grounded in the physiological basis of triage and the unique characteristics of each paediatric patient. The reliability of the case severity assigned during triage was highly trusted by participants at this study site: 67.7% indicated that they often find the assigned severity to be reliable, while 70.7% reported that the level of severity determined by the triage system used at the site generally matches the patient's actual condition upon examination. Goto et al. (2019) discovered that when ED triage was conducted using machine learning techniques, the discriminative capacity to forecast clinical and disposition outcomes was enhanced in comparison to the traditional triage method. Furthermore, machine learning techniques had a higher specificity for predicting the hospitalisation outcome than conventional approaches. This is because the machine learning approaches could help clinicians better identify children who need to be hospitalised. Goto et al. (2019)'s study shows that clinicians can improve the outcomes of the triage system with technology that streamlines the process and reduces errors.

Factors which were deemed clinical in nature showed a positive trend of responses overall, although one factor (method of arrival by ambulance) had a high rate of negative trend responses when viewed singularly, meaning that professionals in this study site do not consider this as a factor that pushes them to admit patients from the PED. In contrast to this finding, Crilly et al. (2024) had suggested that patients who arrive to the PED by ambulance are usually more likely to be admitted versus patients that arrive using other methods of transportation. Out of all the clinical factors addressed in the questionnaire, Severity of Illness was the factor that was considered by the highest percentage of participants to be an influential factor, where 69.2% answered that they always consider this factor in the decision-making process. Chronic conditions and repeat presentations were the next two clinical factors, with 66.2% of participants selecting "often" for chronic conditions, and 60% doing so for repeat presentations, as factors influencing the admission/discharge decision. Findings from studies by Marcin et al. (2017) and Greenfield et al. (2021) corroborate these findings. Marcin et al. (2017) indicated that the clinical condition and illness ratings were two factors predictive of admission, while Greenfield et al. (2021) highlighted that patients with chronic conditions are more likely to be admitted from PEDs, and are also more likely to have repeat presentations to the PED. Goto et al. (2019) identified emergency visits within the past 72 hours as one of the predictors used in machine learning models designed to assist the triage process, based on data routinely available from ED triage.

On the other hand, factors that were deemed non-clinical showed a more neutral response overall, with a majority of responses hovering between the negative and the neutral end of the Likert scale when assessed separately.

Reassessment, waiting time and parental sense of urgency had the highest percentage of participants answering the middle part of the Likert scale, with reassessment showing a result of 44.6% of total participants, waiting time having a percentage of 56.9%, and parental sense of urgency showing 64.6% of total participants who chose response 3, or "sometimes". The presence of a senior doctor elicited a more positive response, with 60% of participants indicating that they often consider this factor when making decisions regarding admissions or discharges. The time of arrival, season of presentation, and level of fluency in native languages shown by parents were deemed to be less significant by the participants of this study, with a more even spread between all 5 responses. Guo et al. (2023) conducted a study which showed that waiting times varied according to different parts of the day or the week, where they were longer during the weekend than in weekday visits. The number of PED visits varied during different national or school holiday periods as opposed to school semesters. In Pope et al. (2017)'s study which aimed to understand the process that clinicians use to make a decision, a number of non-clinical factors where identified by the participants taking part in that study. These included senior support in the ED, and the 4-hour target employed in EDs across the UK where the study was based. The study by Pope et al. (2017) highlighted the fact that the ED culture plays a significant role in the decision-making process, even though these factors are not clinical in nature. The literature available shows that these factors are present in PEDs worldwide, and play a part in the decision-making process undertaken by clinicians and other healthcare professionals.

While not indicating that non-clinical factors are not taken into account when deciding whether to admit or discharge a patient from the PED, a majority of the respondents showed that these factors do not influence this decision as heavily as clinical factors.

There was a correlation between the level of experience and the assumption that the triage process is not solely objective but incorporates a level of subjective influence when being performed. There was a weak correlation that was not of statistical significance between ESI reliability and clinical and non-clinical factors, further strengthening the view that the triage process employs a mixture of objective or clinical measures, and subjective ones, such as the experience of the nurse that is assigning a severity level.

Most of the results obtained were in congruence with the findings of available literature. One finding that did not match the sentiment of available literature was the effect of arrival by ambulance versus own transport on the decision-making process. A majority of respondents indicated that this is not a factor that they take into consideration when deciding if they need to admit or discharge a patient. Literature on the other hand shows that arrival by ambulance is a strong predictor of admission (Crilly et al., 2024; Goto et al., 2019; Greenfield et al., 2021).

The quality of the results was deemed suitable as it addressed the research objectives and answered research questions as well as proving hypotheses developed, however some limitations to the study itself may have reduced the level of quality of the results. These limitations were the reliability test result, low response rate, timeframe allocated to the research study, and the limited study sites.

Conclusion

The findings from this research study show that respondents highly value the triage process and think that clinical factors do have an effect on the admission/discharge decision. Non-Clinical factors are also considered when making this decision, but not as strongly as clinical factors. There was a positive correlation between the level of experience of nursing professionals and their recognition that the triage process includes both objective and subjective elements, rather than being purely objective. In line with this theory, there was no significant correlation between ESI reliability and variables in either the clinical or non-clinical domains, suggesting that no specific factor directly influences the assignment of a triage category. Instead, this decision, while being guided by a certain structure or regimen, remains a highly individualized process. These findings were largely consistent with the existing literature.

This study was performed with the hope that care in the PEDs in Malta is better understood, and perhaps improved or facilitated. Insight into the perceptions of healthcare professionals who staff this department daily without fail was invaluable in understanding the challenges they face in their work, as well as how they manage and resolve the issues that arise on a regular basis. The findings of this study offer a clearer view as to what impacts the decision-makers the most. It is hoped that these findings will better guide policy-makers in implementing new strategies aimed at improving the quality of care provided to Maltese paediatric patients.

Recommendations for future research include reviewing secondary data, incorporating more study sites, exploring additional factors to be analyzed and included in the data collection tool, and conducting qualitative studies that investigate the same objectives. Researchers are also invited to look into the development of predictive or other tools that may facilitate the admission/discharge process for decision-makers, in order to improve the quality of care given in Maltese Paediatric Emergency Departments.

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Conflict of Interest

The researcher is a Staff Nurse employed at the PED under study. The researcher had no direct contact with any of the research participants, avoiding any bias.

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03 Revolutionising the Skincare Industry: The Impact of Social Media Marketing & Influencer Features on the Purchasing Intention of Maltese Consumers

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Abstract

Objectives: This research seeks to measure the influence of specific social media marketing features—namely, interactivity, informativeness, entertainment, and perceived relevance—alongside influencer features including expertise, attractiveness, and trustworthiness, on the skincare purchase intentions of Maltese consumers.

Methods: This study employed a deductive exploratory approach using an online survey targeting Maltese consumers aged 18 and over, distributed via Facebook, LinkedIn, and Instagram. Data was analysed using the Spearman correlation coefficient test in SPSS.

Results: The study concludes that social media marketing features and influencer features influence skincare purchase intention among Maltese consumers. Results show that:

Social Media Marketing Features

- Interactivity (0.474–0.493) has a moderate impact.
- Informativeness (0.546–0.634) shows a strong correlation.
- Entertainment (0.586–0.640) significantly influences purchase intention.
- Perceived relevance (0.561–0.687) has the strongest effect.

Influencer Features

- Trustworthiness (0.673–0.696) is the most influential feature.
- Expertise (0.558–0.600) strongly influences purchase intention.
- Attractiveness (0.338–0.567) has a moderate effect.

Conclusion: The study underscores the importance of engaging, informative, and relevant content, along with credible influencers to enhance digital marketing effectiveness in the Maltese skincare market.

Keywords: "Brand Trust", "Skincare Industry", "Purchase Decision", "Social Media Marketing", "Influencer Marketing", Social Media Influencers".

Graphical Abstract - The Influence of SM Features & Influencer Features on Skincare Purchase Intention

Highlights:

- Social media effectively increases purchase intent for skincare products among Maltese consumers.
- All social media features (interactivity, informativeness, entertainment, and perceived relevance) and influencer features (expertise, attractiveness, and trustworthiness) are positively linked to skincare purchase intention.
- The study provides a clear method to analyse how social media and influencer features impact consumer behaviour, offering useful insights for future research.
- The findings show that brands can use social media and influencers to build stronger connections and boost skincare sales in niche markets.

Introduction

Beauty as a Tangible Manifestation and Industry Growth

Beauty has long been associated with pleasure, attention, and behaviours that promote survival (Etcoff, 2000), and it is often regarded as a tangible manifestation that provides social approval and personal contentment (Frith, 2014). Historically, cosmetics were made from natural ingredients, but modern skincare products now target specific effects such as moisturising, anti-ageing, and antioxidant benefits, achieved through active ingredients like peptides, vitamin C, and hyaluronic acid, delivered with advanced technology (Surber & Kottner, 2016).

The beauty industry has seen steady growth, fuelled by increased consumer awareness. Social media plays a key role in educating customers about skincare options, significantly driving market expansion (Lakshmi et al., 2023).

The Maltese Skincare Market

Malta's skincare market is growing. In 2023, it generated €18 million in revenue, with a compound annual growth rate (CAGR) of 2.14% projected from 2023 to 2028 (Statista, 2023). Major players like Prohealth Ltd. and VJ Salomone distribute well-known international skincare brands through the pharmacy channel (Falzon, 2012). This wide availability has made skincare a regular part of many Maltese consumers' routines.

The distributors shown in Table 1 provide a diverse portfolio of well-known international skincare brands.

Distributor	Brands
SV Beauty Ltd.	Lancaster, Clinians
VJ Salomone	Nivea, Eucerin
Metropolis Pharma	Uriage, Isdin
JV Pharma	Environ
Browns	Pharmaceris, Phyris, Nebiolina
George Farrugia & Sons	Cetaphil
Pharma MT	Avene, SVR
Vivian	Bioderma
Europharma	Sebamed

Table 1: Skincare Distributors, Malta (Falzon, 2012)

Top 10 Skin Care Brands in Malta – Market Share

The Maltese skincare market offers a wide range of brands, making skincare products a staple in many consumers' routines. Demand is driven by increased consumer education on skin health and conditions like eczema, as well as growing self-awareness about ageing. Innovation, tailored products, and the shift to online sales post-COVID have made local skincare options more accessible, prompting consumers to choose local distributors over international ones.

Skincare products are sold through pharmacies, supermarkets, beauty clinics, and online platforms, but this study focuses on the pharmacy channel. According to Sinopsis (2024), a tool for tracking product distribution in pharmacies, the top ten skincare brands in Maltese pharmacies (Figure 2) and their growth rates for November 2023 were analysed, showing changes in market share.

In 2023, La Roche-Posay, Vichy Laboratories (distributed by Prohealth Ltd.), and Uriage (distributed by Metropolis Pharma) saw significant growth, reflecting an increasing demand for these brands and skincare products.

Table 2 summarises the top 10 skincare brands in Maltese pharmacies based on sales data from Sinopsis (2024). The table highlights key performance indicators, including current month growth compared to the same month last year (LY), year-to-date (YTD) and moving annual total (MAT) growth, as well as share gains and losses.

Index	Manufacturer	Current Month Growth vs Same Month LY	Current Month	YTD / MAT Growth		Share Gain & Loss YTD / MAT
1	La Roche-Posay	24%	242,734	11%	3,129,506	28.60%
2	Uriage	59%	138,527	29%	1,605,388	14.70%
3	Vichy Laboratories	16%	131,262	10%	1,566,539	14.30%
4	Cerave	116%	81,641	81%	763,156	7.00%
5	Bioderma Laboratoire Dermatologique	47%	66,943	16%	670,293	6.10%
6	Pierre Fabre Laboratories	59%	50,246	17%	562,941	5.10%
7	SVR Laboratoire	38%	43,972	2%	422,810	3.90%
8	Isdin	70%	17,204	67%	322,528	2.90%
9	Ego Pharmaceuticals	3%	15,869	-10%	193,342	1.80%
10	Sebamed	30%	15,619	-5%	164,881	1.50%

Table 2: Market Performance of Top 10 Skincare Brands in Maltese Pharmacies (Sinopsis, 2024)

Purchase Intention

Purchase intention is a key marketing metric, used to assess marketing strategies and predict sales (Morwitz, 2012). It involves consumer decision-making, influenced by factors like individual needs, usage criteria, and social influences (Alves et al., 2016). Social media channels have significantly shifted consumer behaviour, transforming users from passive recipients to active participants, expressing opinions and engaging with brands (Jin et al., 2019). With 91.5% of the Maltese population aged 16-74 online in 2022 (NSO Malta, 2023), social media is a powerful tool for connecting brands with their target audience.

Drivers of Purchase Intention

Social media and influencer marketing have proven effective in influencing purchase intentions by fostering direct engagement between brands and consumers. Social media features like interactivity, informativeness, entertainment, and perceived relevance, along with influencer attributes such as trustworthiness, expertise, and attractiveness, significantly impact consumer purchase behaviour (Kiousis, 2002; Rotzoll et al., 1996; Cheung et al., 2020; Zhu & Chang, 2016; Ohanian, 1990). These features have been found to increase brand trust and consumer persuasion, making them integral to modern marketing strategies.

Methodology

In examining the influence of social media marketing and influencer features on skincare purchase intention, this study took a deductive approach. A correlational research design was used to identify potential relationships between variables and determine how changes in one variable might impact the outcome of another (Galliers, 1991; Healy & Perry, 2000).

Data Gathering Methods

The target population for this study consisted of Maltese consumers aged 18-74 who are active on social media platforms. This age range and demographic were chosen to capture insights from diverse user groups, ensuring representation from both younger and older consumers who actively engage with social media content.

The questionnaire was distributed via social media channels, including Facebook, Instagram, and LinkedIn, to reach a broad audience within Malta. These platforms were selected based on their high user engagement rates, making them effective channels for gathering responses from the target population in a short period of time.

The Questionnaire

The online self-completion questionnaire consisted of four sections: demographics, social media engagement, social media marketing features, and influencer features.

Demographic data was collected to establish participants' profiles, including age, gender, location, nationality, and highest level of education. The social media engagement section aimed to understand participants' usage of social media, including which platforms they frequented and whether they actively followed influencers.

The third section focused on social media marketing features. Participants responded to statements about these features on a 5-point Likert scale, from "Strongly Agree" to "Strongly Disagree." This scale allowed the researchers to capture attitudes toward interactivity, informativeness, entertainment, and perceived relevance of social media marketing content, drawing from Hanaysha (2022) and adapting the inventory to the skincare context.

The final section addressed influencer features. Here, participants again used a 5-point Likert scale to express their agreement or disagreement with statements about influencer traits such as expertise, attractiveness, and trustworthiness. These items were based on the influencer feature inventory by Chetioui et al. (2019) and tailored to the skincare industry.

The final questionnaire, adapted to the skincare context and validated, is available in Appendix 1.

Ethical Considerations

This study was approved by the IDEA Ethics Board, and the author strictly adhered to ethical guidelines outlined in the Data Protection Act (Malta) of 2018, the Electronic Commerce Act (2002) (Legislation Unit, 2023), and the General Data Protection Regulation (GDPR) (EU) 2016/679. Several measures were implemented to ensure ethical compliance and protect participants' rights. Participants were provided with the option to participate voluntarily and could withdraw from the study at any time without any requirement to provide justification.

Data Analysis

Validity and Reliability

The questionnaire used to measure social media marketing features, influencer features, and skincare purchase intention was adapted from validated scales previously tested for reliability and validity in similar contexts (Hanaysha, 2022; Chetioui et al., 2019). No modifications were made to the validated items beyond adapting them to the skincare industry, ensuring that the validity and reliability of the original instruments apply to this study as well (Chai et al., 2017; Wallander, 2016).

The questionnaire was piloted with a small sample before full distribution, allowing the researcher to refine and eliminate any ambiguous questions.

To control for potential bias, the researcher had no interaction with participants throughout the study. Since the questionnaire was disseminated through public social media channels, there was a potential for responses from individuals outside the target population. To mitigate this, a filter question was included, where participants indicated whether they were Maltese residents aged between 18-74.

Those outside this demographic were automatically disqualified from the survey. This control proved effective, resulting in 25 respondents being filtered out, yielding a final sample of 375 usable questionnaires with a confidence level of 95% and a margin of error of 5.2% (SurveyMonkey, 2023).

Research Variables

The independent variables in this study are social media marketing features and influencer features and skincare purchase intention is the dependent variable.

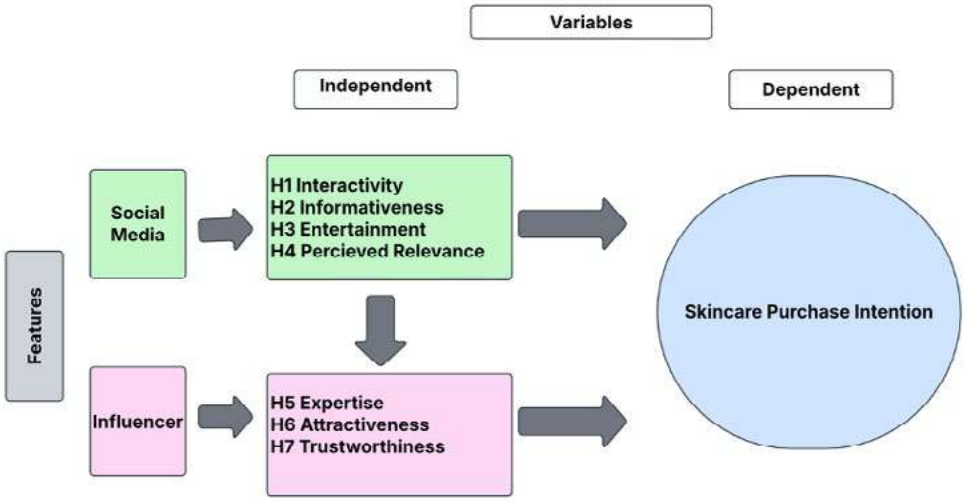

Figure 1: Research Variables

Hypothesis

- A positive correlation between social media marketing feature Interactivity and skincare purchase intention.
- A positive correlation between social media marketing feature Informativeness and skincare purchase intention.
- A positive correlation between social media marketing feature Entertainment and skincare purchase intention.
- A positive correlation between social media marketing feature perceived relevance and skincare purchase intention.
- A positive correlation between Influencer feature Expertise and skincare purchase intention.
- A positive correlation between Influencer feature Attractiveness and skincare purchase intention.
- A positive correlation between influencer feature Trustworthiness and skincare purchase intention.

The data was analysed using IBM SPSS Statistics, with Pearson's correlation coefficient applied to assess the relationships between social media marketing features, influencer features, and skincare purchase intention. This test measured the strength and direction of associations, helping to determine whether each hypothesis was supported.

Results

Descriptive Analysis

The total number of collected questionnaires was 378. The majority of respondents fell within the 25-31 age group, accounting for 31% of the total participants. This was followed by individuals aged 32-38 (19%) and 39-45 (13%). The smallest age group was 62 and above, representing only 6% of the respondents.

Regarding gender distribution, the sample was predominantly female, comprising 76% of the respondents, while males accounted for 24%. In terms of nationality, the vast majority of participants were Maltese, making up 99% of the sample, with only 1% being of foreign nationality.

When considering the locality region, the South Eastern region had the highest representation at 29%, followed by the Southern Harbour (22%) and Northern Harbour (20%). The Gozo and Comino region had the least representation with only 2% of respondents.

Educational attainment among participants varied, with the highest proportion holding a Bachelor's Degree (28%), followed by Secondary Education (26%) and Diploma holders (22%). Participants with a Master's Degree represented 16% of the sample, while those with no formal education or a Doctoral Degree constituted the smallest groups, each accounting for 1% and 2%, respectively.

All demographic information, categorised by variables such as age, gender, nationality, locality region, and education level, can be viewed in Table 3.

Variable	Category	Frequency	%
Age	18-24	30	8%
	25-31	117	31%
	32-38	72	19%
	39-45	49	13%
	46-54	49	13%
	55-61	38	10%
	62+	23	6%
	Total	**378**	**100%**
Gender	Female	288	76%
	Male	90	24%
	Total	378	100%
Nationality	Maltese	374	99%
	Foreign	4	1%
	Total	**378**	**100%**
Locality Region	South Eastern	109	29%
	Southern Harbour	83	22%
	Northern Harbour	76	20%
	Northern	61	16%
	Western	42	11%
	Gozo and Comino	7	2%
	Total	**378**	**100%**
Education Level	No Formal Education	5	1%
	Primary Education	17	4%
	Secondary Education	97	26%
	Diploma	84	22%
	Bachelor's Degree	106	28%
	Master's Degree	61	16%
	Doctoral Degree	8	2%
	Total	**378**	**100%**

Table 3: Demographic Information

Social Media Usage

The distribution of social media platform (table 4) usage among the 378 respondents highlights Facebook as the most popular platform, with 86% of participants using it. Instagram follows closely with 77% of respondents, while YouTube and Tik-Tok each have 43% user engagement. Snapchat and X (formerly Twitter) are used by 12% of the sample, and LinkedIn and Threads have minimal representation, at 1% each. This data illustrates the dominance of Facebook and Instagram in the social media landscape, with other platforms such as YouTube, TikTok, and Snapchat showing notable but less widespread usage.

Social Media Platform	Frequency	Percent
Facebook	324	86%
Instagram	291	77%
YouTube	164	43%
TikTok	161	43%
Snapchat	47	12%
X (formerly Twitter)	46	12%
LinkedIn	4	1%
Threads	3	1%
Total Sample Population	**378**	**100%**

Table 4: Social Media Usage

Influencer Following

The majority of respondents, 86%, actively follow influencers on social media, while 14% do not engage with influencers (Table 5). This indicates a strong preference for influencer-driven content among the sample population, highlighting the significant role influencers play in shaping consumer behaviour within the study's demographic. Respondents who answered "no" were not included in the testing of influencer features.

Influencer Following	Frequency	Percent
Actively Follow Influencers	323	86%
Do Not Follow Influencers	55	14%
Total Sample Population	**378**	**100%**

Table 5: Influencer Following

Social Media Features and Skincare Purchase Intention

To determine the influence between social media features and skincare purchase intention in Malta, the researcher conducted a Pearson correlation coefficient test. This analysis assessed the relationships between interactivity, informativeness, entertainment, and perceived relevance with skincare purchase intention. The findings provide insights into how social media marketing features affect consumer behaviour within the Maltese skincare market.

Interactivity and skincare purchase intention

Examining the impact of social media marketing feature interactivity on skincare purchase intentions, all Pearson correlation coefficients were positive, indicating that individuals with higher purchasing intentions are more responsive to interactive content.

The statistical analysis confirmed the significance of these relationships, with p-values less than 0.001, emphasizing the effectiveness of interactive strategies in shaping consumer behaviour. This underscores the importance for skincare brands to enhance engagement through polls, live Q&As, and real-time interactions, fostering stronger connections and influencing purchase decisions (Table 6).

Spearman Correlations

		SMQ1	SMQ2
SMPIQ1	Correlation Coefficient	0.542	0.468
	P-value	<0.001	<0.001
SMPIQ2	Correlation Coefficient	0.493	0.493
	P-value	<0.001	<0.001
SMPIQ3	Correlation Coefficient	0.474	0.477
	P-value	<0.001	<0.001

Table 6: Statistical analysis of Social Media Marketing Feature Interactivity and Skincare Purchase Intention Note: SMPIQ means Social Media Purchase Intention Question & SMQ means Social Media Question

Informativeness and Skincare Purchase Intention

Delving into the impact of social media marketing feature informativeness on skincare purchase intentions, all Spearman correlation coefficients were found to be positive. This indicates that individuals who score high on purchasing intentions also place a high value on informative content within social media campaigns.

The statistical analysis confirmed the significance of these relationships, as all p-values were less than 0.001. This finding allows us to infer that individuals actively seek out informative content before purchasing skincare products. For skincare companies, this highlights the importance of providing detailed information on social media platforms, such as product descriptions, benefits, ingredients, and usage instructions. Such content aids consumers in making well-informed decisions, ultimately influencing their purchasing behaviour (Table 7).

Spearman Correlations

		SMQ3	SMQ4
SMPIQ1	Correlation Coefficient	0.614	0.607
	P-value	<0.001	<0.001
SMPIQ2	Correlation Coefficient	0.546	0.564
	P-value	<0.001	<0.001
SMPIQ3	Correlation Coefficient	0.566	0.634
	P-value	<0.001	<0.001

Table 7: Statistical analysis of Social Media Marketing Feature Informativeness and Skincare Purchase Intention

Entertainment and Skincare Purchase Intention

The role of entertainment in social media marketing has been found to be statistically significant with skincare purchase. This suggests that individuals who score high on purchasing intentions also respond positively to entertaining content.

The statistical analysis confirmed the strength of these correlations with significant p-values (<0.001). As a result, it can be said that interesting and captivating information has an impact on the sample population. This emphasises how crucial it is for skincare brands to provide engaging social media content since it can boost brand awareness and influence consumers' propensity to purchase skincare products (Table 8).

Spearman Correlations

		SMQ5	SMQ6
SMPIQ1	Correlation Coefficient	0.624	0.640
	P-value	<0.001	<0.001
SMPIQ2	Correlation Coefficient	0.597	0.616
	P-value	<0.001	<0.001
SMPIQ3	Correlation Coefficient	0.586	0.640
	P-value	<0.001	<0.001

Table 8: Statistical analysis of Social Media Marketing Feature Entertainment and Skincare Purchase Intention

Perceived Relevance and Skincare Purchase Intention

The statistical analysis indicated p-values of less than 0.001, confirming the robustness and significance of these correlations. Given Malta's growing demand for personalized skincare, these findings highlight the importance for skincare brands to adopt personalised marketing strategies. By tailoring content to meet individual preferences and skin concerns, brands can foster deeper connections with consumers, ultimately influencing their purchasing decisions (Table 9).

		SMQ7
SMPIQ1	Correlation Coefficient	0.687
	P-value	<0.001
SMPIQ2	Correlation Coefficient	0.589
	P-value	<0.001
SMPIQ3	Correlation Coefficient	0.561
	P-value	<0.001

Table 9: Statistical analysis of Social Media Marketing Feature Perceived Relevance and Skincare Purchase Intention

Influencer Features and Skincare Purchase Intention

To assess whether a relationship exists between influencer features—specifically Expertise, Attractiveness, and Trustworthiness—and skincare purchase intention, the researchers conducted a Pearson correlation coefficient test. Each influencer feature was analysed individually against the skincare purchase intention inventory to evaluate the strength and significance of these relationships.

Expertise and Skincare Purchase Intention

When testing the relationship between influencer expertise and skincare purchase intention, it was found that all Spearman correlation coefficients were positive, indicating a significant positive relationship between influencer expertise and consumers' purchasing intentions. Specifically, individuals who scored high on purchasing intentions also scored high on perceptions of influencer expertise.

The statistical analysis revealed that all p-values were less than 0.001, which is below the 0.05 threshold for significance. This result underscores the importance for skincare brands to collaborate with influencers perceived as industry experts or to invest in comprehensive training programs to enhance influencers' credibility. Such partnerships and training initiatives can transform influencers into effective brand advocates capable of addressing audience inquiries promptly and convincingly. This strategy not only boosts consumer confidence but also significantly influences their purchasing decisions, thereby enhancing the brand's credibility and market presence (Table 10).

Spearman Correlations

		IQ1	IQ2
IPIQ1	Correlation Coefficient	0.558	0.563
	P-value	<0.001	<0.001
IPIIQ2	Correlation Coefficient	0.597	0.556
	P-value	<0.001	<0.001
IPIQ3	Correlation Coefficient	0.600	0.566
	P-value	<0.001	<0.001

Table 10: Statistical analysis of Influencer Feature Expertise and Skincare Purchase Intention

Attractiveness and Purchase Intention

The analysis of the correlation between influencer attractiveness and skincare purchase intention revealed consistently positive Spearman correlation coefficients. This indicates a robust positive relationship, where higher purchasing intentions are associated with greater perceptions of influencer attractiveness.

The statistical analysis revealed that all p-values were less than 0.001, which is below the 0.05 threshold for significance. Based on this strong correlation, it can be generalized that an attractive influencer has a significant influence on consumers' intention to buy skincare products. This can be linked to the notion that these influencers have beautiful skin or embody an ideal representation of skincare outcomes. This finding emphasises the importance of collaborating with attractive influencers to enhance brand appeal and consumer engagement (Table 11).

Spearman Correlations

		IQ3	IQ4	IQ5
IPIQ1	0.564	0.439	0.426	0.469
	<0.001	<0.001	<0.001	<0.001
IPIIQ2	0.557	0.425	0.391	0.453
	<0.001	<0.001	<0.001	<0.001
IPIQ3	0.567	0.400	0.338	0.422
	<0.001	<0.001	<0.001	<0.001

Table 11: Statistical analysis of Influencer Feature Attractiveness and Skincare Purchase Intention

Trustworthiness and Skincare Purchase Intention

In examining the influence of trustworthiness on skincare purchase intention, the results demonstrated uniformly positive Spearman correlation coefficients. This pattern suggests that individuals who exhibit strong purchasing intentions also perceive influencers as highly trustworthy.

The statistical analysis revealed that all p-values were less than 0.001, confirming statistical significance as they fall below the 0.05 threshold. From this data, it can be generalised that the sample population seeks trustworthy advice from influencers when making skincare decisions. Therefore, collaborations with influencers who are perceived as trustworthy can significantly impact consumers' skincare purchase intentions, reinforcing brand credibility and fostering consumer loyalty (Table 12).

Spearman Correlations

		IQ6	IQ7
SMPIQ1	Correlation Coefficient	0.683	0.686
	P-value	<0.001	<0.001
SMPIQ2	Correlation Coefficient	0.674	0.673
	P-value	<0.001	<0.001
SMPIQ3	Correlation Coefficient	0.696	0.678
	P-value	<0.001	<0.001

Table 12: Statistical analysis of Influencer Feature Trustworthiness and Skincare Purchase Intention

Discussion

The findings of this study confirm that both social media marketing features and influencer features significantly impact skincare purchase intention among Maltese consumers. The results demonstrate that interactivity, informativeness, entertainment, and perceived relevance in social media content positively influence consumer engagement and purchasing decisions. Similarly, influencer expertise, attractiveness, and trustworthiness are key factors in shaping consumer trust and brand perception.

The following section discusses each hypothesis in detail, providing insights into their implications for marketing strategies in the Maltese skincare industry.

Hypothesis 1: Social media marketing feature interactivity has a significant impact on skincare purchase intention.

Hypothesis 1 (H1) confirms a statistically significant positive relationship between social media marketing feature Interactivity and skincare purchase intention. This finding suggests that increased interactivity on social media platforms is associated with a higher likelihood of skincare purchase intention among consumers. This aligns with previous research indicating the importance of interactive content in driving consumer engagement and purchase intentions (Hanaysha, 2022; Liu et al., 2020; De Vries et al., 2012).

The role of interactivity in social media campaigns and its impact on skincare purchase intention revealed consistently positive Spearman correlation coefficients. This positive association indicates that individuals with higher purchasing intentions are more responsive to interactive elements within social media campaigns, such as engaging posts, polls, and real-time responses (Kiousis, 2002).

Given Malta's 91.5% internet penetration rate (NSO Malta, 2023), brands should prioritise interactive content—such as Instagram Stories and TikTok challenges—to capture attention and drive purchases.

Hypothesis 2: Social media marketing feature informativeness has a significant impact on skincare purchase intention.
Hypothesis 2 (H2) reveals a positive correlation between informativeness and skincare purchase intention, underscoring the importance of educational content in consumer decision-making. Informative content, such as ingredient breakdowns, product benefits, and application techniques, empowers consumers to make informed purchasing decisions (Clow & Back, 2015; De Vries et al., 2012). This finding aligns with the growing consumer awareness in the Maltese skincare market, which has seen an increase in demand driven by better education on skincare health (Lakshmi et al., 2023). Brands should incorporate detailed content through visually engaging formats such as GIFs, reels, and TikTok videos to effectively communicate their value proposition and meet evolving consumer expectations.

Hypothesis 3: Social media marketing feature entertainment has a significant impact on skincare purchase intention.
Hypothesis 3 (H3) demonstrates a statistically significant positive relationship between Entertainment in social media content and skincare purchase intention, suggesting that entertaining content enhances consumer engagement by evoking positive emotions and enjoyment (Sood et al., 2020; Bazi et al., 2020; Hanaysha, 2022). Campaigns like CeraVe's Super Bowl advertisement illustrate how humour and creativity can strengthen brand recall and impact purchase decisions. Given the competitive Maltese skincare landscape, brands can benefit from storytelling, gamification, and influencer collaborations to craft compelling and entertaining content that resonates with their audience.

Hypothesis 4: Social media marketing feature perceived relevance has a significant impact on skincare purchase intention.
Hypothesis 4 (H4) confirms a positive relationship between the perceived relevance of social media content and skincare purchase intention. This aligns with previous research emphasizing the role of customized marketing messages in enhancing consumer engagement and purchase behaviour (Zhu & Chang, 2016; Thaker et al., 2020; Hanaysha, 2022).

For skincare brands targeting Maltese consumers, leveraging data analytics and consumer insights is crucial for content personalization. Tools like Goo gle Analytics can help identify high-demand products and consumer preferences, allowing brands to tailor their messaging effectively and increase purchase intentions.

Hypothesis 5: Influencer feature Expertise has a significant impact on skincare purchase intention.
Hypothesis 5 (H5) establishes a significant positive correlation between Influencer Expertise and skincare purchase intention, reinforcing the notion that knowledgeable influencers can enhance consumer trust and perceived credibility (Martiningsih & Setyawan, 2022; Baig & Shahzad, 2022). As skincare products become more sophisticated with active ingredients such as peptides and hyaluronic acid (Surber & Kottner, 2016), collaborating with influencers who possess expertise in skincare science can provide consumers with valuable insights and reinforce trust in brand messaging.

Hypothesis 6: Influencer feature Attractiveness has a significant impact on skincare purchase intention.
Hypothesis 6 (H6) shows a positive correlation between Influencer Attractiveness and skincare purchase intention, consistent with previous studies that suggest physical appeal enhances consumer engagement and aspiration (Lou & Yuan, 2019; Weismueller et al., 2020). Attractive influencers can serve as relatable role models, motivating consumers to achieve similar results. Skincare brands should consider partnering with influencers whose appearance and style align with their target audience's aspirations, creating a stronger emotional connection.

Hypothesis 7: Influencer feature Trustworthiness has a significant impact on skincare purchase intention.
Hypothesis 7 (H7) reveals a significant positive relationship between Influencer Trustworthiness and skincare purchase intention, highlighting the importance of authenticity and credibility in influencer marketing (Nascimento, 2019; Lou & Yuan, 2018). Given the Maltese market's preference for genuine endorsements, micro-influencers who maintain transparency and honest communication may be more effective in fostering consumer trust than larger influencers. Brands should prioritize influencers who demonstrate a consistent commitment to authenticity to build lasting consumer relationships.

Limitations

Although this study has discovered significant findings on how social media marketing and influencer features affect the intention to purchase skincare products in Malta, it is still important to acknowledge some limitations inherent in the research design.

The research primarily focused on respondents of Maltese nationality residing in Malta, resulting in a low response rate from foreigners living in Malta. Considering that marketers in Malta also target this demographic, understanding their purchase intentions is also important.

Furthermore, the overrepresentation of female respondents may introduce bias, potentially narrowing the range of perspectives reflected in the findings.

Additionally, it was noted from the dataset that some participants, particularly those under the age of 18, were excluded from the analysis due to ethical considerations. As outlined in the Methodology section, there is a high probability that Generation Alpha will become the prospective market for the skincare industry. Observations by the author and online sources suggest that children as young as 13 are beginning to use skincare products and promote them on social media. Therefore, it could be beneficial to explore this topic further, obtaining consent from guardians and investigating the differences in perceptions among various age cohorts.

Looking forward, future studies could address these limitations by conducting cross-cultural analyses or longitudinal studies. Such approaches would facilitate a more comprehensive understanding of consumer behaviours across diverse contexts.

Recommendations

Expanding the study's sample size to encompass a more diverse demographic presents a promising avenue for scholarly progress. The survey has provided valuable insights with 378 responses. Future research that includes a broader and more varied participant base has the potential to deepen the understanding of the intricate interplay between social media marketing, influencer features, and purchase intention in the skincare industry. By adopting a more comprehensive sampling strategy, researchers can investigate a broader spectrum of consumer behaviours and attitudes, thereby reinforcing the generalisability and dependability of future findings.

Furthermore, conducting research explicitly focusing on demographics less represented in skincare studies, such as males, could uncover valuable insights. Contrasting results between genders may emerge, providing marketers with a deeper understanding of how to target male consumers effectively. For instance, providing information on skincare post-shaving or leveraging male influencers could be effective strategies to engage this demographic. Brands like Nivea are beginning to invest in understanding the male demographic. This can be seen in their use of male influencers, such as local influencer Luke Magro. Most of his videos emphasise the importance of self-care among men, promoting body lotions, post-shower grooming products, body shaving creams, and more. Understanding the influence of male influencers on the male demographic can help brands step out of their comfort zones and expand into content that is only female targeted. As a result, this may lead to more sales growth and awareness.

Conclusions

In assessing the influence of social media on skincare purchase intentions within the Maltese market, this study identified positive and statistically significant relationships between social media marketing features, influencer features, and skincare purchase intention. The analysis revealed that increased levels of interactivity, informativeness, and entertainment in social media marketing content were positively correlated with higher purchase intentions among consumers. Similarly, influencer features including expertise, attractiveness, and trustworthiness were found to significantly impact consumers' intentions to purchase skincare products.

While the study confirmed that engaging and informative social media content can drive consumer interest, it also underscored the importance of influencer credibility and relevance in shaping purchase behaviour. Skincare brands targeting the Maltese market can leverage these insights to craft more effective marketing strategies, focusing on building interactive and informative content and collaborating with trusted influencers to strengthen connections with their audience.

In conclusion, this research highlights that an effective blend of social media marketing and influencer engagement can significantly enhance skincare purchase intentions, offering valuable guidance for brands aiming to build a more meaningful relationship with their consumers in an increasingly digital landscape.

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Conflict of Interest

None

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04 Exploring Market Dynamics Affecting Pharmaceutical Prices in the Maltese National Health Service: A Qualitative Study

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Abstract

Pharmaceuticals differ from typical goods, with pricing influenced by factors beyond supply and demand. Malta's National Health Service (NHS) operates under a unique model, fully funded by taxation and offering full reimbursement to eligible patients. This study explores the complex factors impacting pharmaceutical prices within Malta's distinctive healthcare framework.

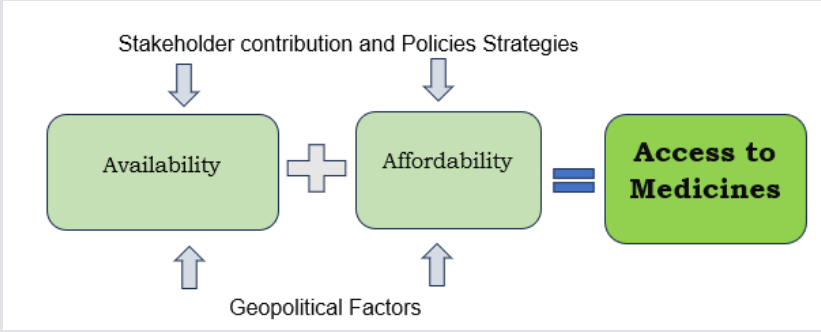
Objectives:
To explore the phenomenon of pharmaceutical price fluctuation and identify challenges perceived by the NHS stakeholders in terms of availability and affordability of pharmaceuticals.

Methods:
This exploratory study used semi-structured interviews and Inductive Thematic Analysis to reveal key themes on market dynamics, management, and pricing strategies in Malta's NHS, emphasizing stakeholder collaboration for effective service delivery.

Results:
The study reveals that global supply chain disruptions, exacerbated by conflicts and COVID-19, have led to pharmaceutical prices increase and shortages in Malta. Compounded by its small market and post-Brexit challenges, deficiencies in procurement strategies, real-time data management, and IT infrastructure further hinder effective stock management and decision-making.

Conclusions:
The study recommends revising pricing policies, integrating them with procurement strategies, and enhancing stakeholder collaboration to stabilize pharmaceutical supply and pricing in Malta. It underscores the need for future research with a broader geographic scope and diverse stakeholder input.

Keywords: "Geopolitical","Geographic","Availability","Affordability".



Graphical Abstract - Conceptual Framework related to the availability and affordability of pharmaceuticals.

Highlights:
- Price fluctuations in pharmaceuticals pose challenges for NHS stakeholders in ensuring equitable access to medicines and efficient management.
- Stakeholders have opined and are aware of the increase in prices and overall costs of pharmaceutical items in the local market
- Geopolitical forces, global markets, NHS management practices, policies, and stakeholder contributions drive pharmaceutical price deviations.

Abbreviations:
ERP – External Reference Pricing
HTA – Health Technology Assessment
NHS – National Health Services

Introduction

Pharmaceuticals have been instrumental in the effective treatment and prevention of various diseases over the past half-century. Their equitable access is widely regarded as a fundamental human right (Morgan et al., 2020). These medicines, which are highly valued in modern economies, are integral components of healthcare financing due to their significant consumption of healthcare budgets (Anggriani, 2018). Traditionally, pharmaceutical pricing is understood within the framework of market dynamics, where prices are influenced by supply and demand. However, medicines exhibit unique characteristics that set them apart from other tradable goods, making their pricing a complex issue (Parker-Lue et al., 2015). Ensuring access to these vital products generates substantial social value, but also presents challenges in terms of costs and funding (Morgan et al., 2020). Over the past decades, the affordability and accessibility of pharmaceuticals have become a growing concern globally, with price increases and shortages posing significant challenges. These challenges are not confined to lower-income countries but are increasingly affecting middle- and high-income nations, as pointed out by the World Health Organization (WHO). In this context, the ability of National Health Services (NHS), such as Malta's, to ensure equitable access to medicines is critical. Affordability is a key consideration for healthcare systems, especially in smaller markets like Malta, where the distinct characteristics of the pharmaceutical market add to the complexity of ensuring access to essential medicines.

The Local Scenario

Malta's National Health Service (NHS), fully funded through general taxation, provides 100% reimbursement for medications to entitled patients (Meli & Magrin Sammut, 2022). The country's pharmaceutical policy is governed by several pieces of legislation, including The Medicines Act (Cap. 458), Legal Notice 58 of 2009, The Health Act (Cap 528), and The Social Security Act (Cap 318).

Healthcare spending in Malta has increased at the highest rate in the European Union (EU), with high pharmaceutical spending partly reflecting the challenge of ensuring access to medicines (OECD, 2023; Grima et al., 2018). In 2020, 27% of Malta's health expenditure was devoted to pharmaceuticals and medical devices, significantly higher than the EU average of 17%. Malta's population in 2023 stood at 542,051, with a gross domestic product (GDP) per capita of 35,992 euros in 2022 (OECD, 2023).

However, one must be aware that Malta's healthcare system is distinctive from other countries in several ways. Despite its small population and limited resources, Malta is unique within the EU, as its Ministry for Health plays a dual role. The government is both the policymaker responsible for setting pricing and reimbursement policies, and the public payer for both inpatient and outpatient medications (Vogler et al., 2018). The dynamics of pharmaceutical pricing in Malta reflect a broader set of challenges faced by small island nations. While Malta's high healthcare expenditure demonstrates its commitment to providing access to essential medicines, the country's distinctive circumstances pose ongoing challenges in balancing affordability and availability (OECD, 2023).

Another factor affecting pharmaceutical pricing in Malta is its reliance on imports for the majority of its medicinal needs. The global nature of pharmaceutical supply chains, influenced by factors such as geopolitical tensions and international market fluctuations, makes it difficult for Malta to predict and stabilize medicine prices. As a result, the country is particularly vulnerable to external market forces, further complicating efforts to control healthcare costs while maintaining equitable access to medicines.

Malta employs a centralized procurement system that utilizes external reference pricing (ERP) for reimbursable medicines. As Vogler et al. (2022) explain, ERP serves as both a benchmark for procuring new medicines and a comparator during the tendering process. Despite its usefulness, the effectiveness of ERP depends on the countries selected for benchmarking and the methodology used to calculate prices. Misalignment in these areas can have significant consequences for smaller markets like Malta, where external market forces and geopolitical events can influence pricing and availability.

Market Forces

Malta's pharmaceutical market has been further impacted by recent global crises, including the COVID-19 pandemic, Brexit, and geopolitical conflicts such as the war in Ukraine. These events have disrupted supply chains, leading to concerns over the availability of essential medicines. To address these issues, the European Commission has introduced derogations to support small markets like Malta, Cyprus, and Ireland, but these measures are set to expire by the end of 2024 (EUR-Lex, 2022).

Malta's heavy reliance on imports, particularly from the UK, has made it vulnerable to supply disruptions. The country's smaller market size allows it to purchase partial batches of medicines, which previously suited the UK's production capabilities. However, post-Brexit trade changes have complicated this dynamic. The withdrawal of marketing authorizations (MA) has remained minimal, but shortages in essential medicines continue to be a concern due to supply chain disruptions, active pharmaceutical ingredient (API) manufacturing issues, and global market demands.

The literature highlights the global challenges of rising medicine prices and shortages, which threaten equitable access to healthcare. For small countries like Malta, affordability is a critical aspect of ensuring availability, with several factors contributing to the current challenges. While some studies attribute these difficulties to industry practices, there is also a need for better alignment between policies, processes, and stakeholder collaboration. The existing literature lacks a focused examination of the Maltese context, particularly due to limited national data and statistics.

The main objectives of the study included:

- To explore the phenomenon of pharmaceutical price fluctuation through the perspectives of the NHS stakeholders.
- To identify challenges perceived by the stakeholders in terms of availability and affordability of pharmaceuticals.
- To explore how established pharmaceutical policies, influence access to medicines from stakeholders' point of view.

The study aimed to capture the collaboration and understanding of the perspective of both the internal and external stakeholders within the National Health Service, and hence provide a platform for elucidating real-time experiences within a small country context, as perceived by the diverse stakeholders. Thereafter, establish the connection with existing policies and the prevailing challenges perceived.

Methodology

Design, Approach and Strategy

The real-case scenario strategy is essential for delving into the critical issue of pharmaceutical prices. The predominant purpose is to interpret current perspectives and rationales and to establish the foundational knowledge base. The qualitative approach helped the researcher to explore further factors and perspectives of participants. This followed an inductive Thematic Analysis, whereby data was codified, leading to emerge themes and concepts (Zukauskas et al., 2018) in order to generate a conceptual model (Naeem et al., 2023). The primary purpose of the inductive approach is to allow the researcher to gather findings to emerge from the frequent, dominant, or significant themes inherent in raw data, without the restraints imposed by numbers and restricted methodology (Scriven, 1991). This inductive approach emphasizes deriving findings directly from dominant or significant themes within the raw data, unencumbered by quantitative constraints. Figure 1 illustrates the Thematic Analysis process.

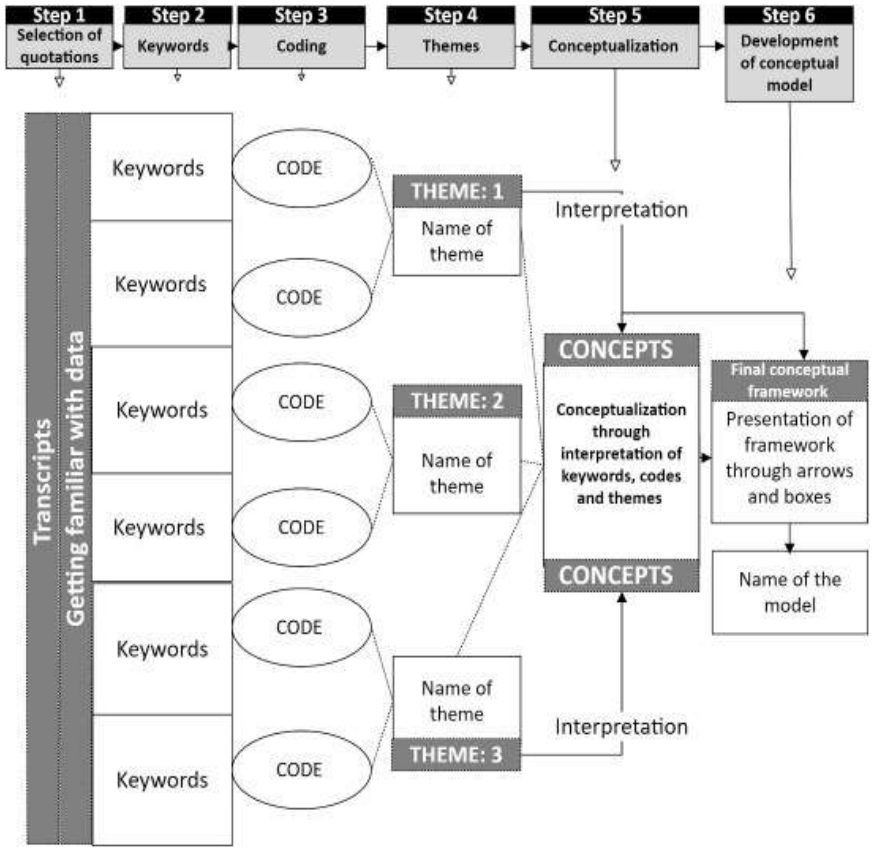


Figure 1. A systematic thematic analysis process: A novel six-step process for conceptual model development in qualitative research (Naeem et al., 2023).

This was crucial, as existing grey literature studies on the subject, mostly captured research through deductive approaches and failed to gather information about the context of the phenomenon. A subjective open approach was taken and as explained by Rabiee (2004), this is ideal when the sample size is specific, expert in the field and small.

Participants

This qualitative research employed purposeful sampling, operating under the principle that selecting specific cases that are most conducive to addressing the research objectives yields the highest quality data (Patton, 2002). This targeted sampling strategy enhances the depth and relevance of the data collected, thereby enriching the overall research findings. The complexity of the phenomenon under study required the identification of experts who could provide an accurate perspective. The two primary stakeholders identified were:

- Internal Stakeholders: This group includes high-level public sector officials, policymakers, managers involved in product licensing, procurement, and release, as well as committee chairpersons responsible for reimbursement and economists.
- External Stakeholder: This group comprises pharmaceutical companies that actively bid to supply pharmaceuticals to the public sector, including agents, wholesalers, and distributors representing parent companies.

Data Collection and Analysis

Data collection

This study employed semi-structured, in-depth interviews to collect qualitative data on pharmaceutical pricing and access in Malta. The interview guide with open-ended questions enabled both exploration of existing knowledge and discovery of new insights. Interviews were recorded to ensure accuracy, allowing the researcher to focus on verbal cues and interactions. A structured interview protocol checklist-maintained consistency, while a pilot study helped refine questions and procedures, enhancing reliability. Establishing rapport through active listening and engagement ensured participants felt comfortable sharing their perspectives, contributing to the depth and trustworthiness of the data.

Data Analysis

Audio recorded interviews were each transcribed verbatim so to ensure that all critical detail is captured, and that the information is thoroughly evaluated (Al-Yateem, 2012). Thematic Analysis (TA) was used to organise the data into codes and themes. This is a method for identifying, analysing, and interpreting patterns within the qualitative data collected. As Clarke and Braun (2006) explain, TA provides accessible and systematic procedures for generating codes that are the building blocks of themes (a shared core idea). The main aim is to identify and interpret features of the data guided by the research questions which could evolve during the TA.

Ethical Considerations

Ethical considerations were central to this study, ensuring participant privacy, autonomy, and confidentiality. Approval was obtained from Idea College and the Ministry for Health and Active Ageing. Informed consent was secured through detailed information sheets and signed agreements, emphasizing voluntary participation and the right to withdraw. Data protection measures included secure storage and restricted access, with all identifying information removed. No vulnerable participants or physical interventions were involved, and data will be discarded after two years. Ethical data management aimed to uphold transparency and benefit participating organizations by informing future strategies for improved access to medicines.

Results

The primary findings through identified codes, indicated that stakeholders have opined and are aware of the increase in prices and overall costs of pharmaceutical items in the local market. These prices go beyond market reference and last purchased prices. Both internal and external stakeholders agreed that they face challenges ranging from global disruptions to local demands of a small island, in this highly regulated market. The relevance and hindrance within the operational processes and policies were disputed, while the importance of health expenditure and social responsibility were highlighted. While price fluctuations were acknowledged, the concern was ensuring the requested medicine was accessible. This aligned with the research objectives to identify and address the challenges posed by pharmaceutical price dynamics, including current processes related to the availability and affordability of medicines. Another recurring theme was the lack of resources and the necessity for improved collaboration to uphold patients' right to access medicines.

The information gathered from the interviews were grouped into three main themes, each with two subthemes. These themes and subthemes are presented in Table 1. Some subthemes overlap and influence other themes, reflecting the complex global factors that affect the pricing and access to medicines.

Table 1 Themes and subthemes

Themes	Subthemes
Geopolitical and Global Market Dynamics	➢ Global supply chain disruptions and logistics upheavals ➢ Local market demand ramifications
Management and Policies Strategies	➢ Pricing and procurement operations: challenges and mitigation ➢ Data availability and resource constraints
Stakeholder Contribution	➢ Equitable challenges ➢ Untapped potential collaborative synergies

Table 1: Themes and subthemes

Theme 1: Geopolitical and Global Market Dynamics

Initial interaction with participants highlighted how geopolitical and market dynamics uniquely impact pharmaceutical pricing and availability in Malta. The subtheme on geopolitical influences, drawn from stakeholder insights, underscores that the global economic environment increasingly challenges the Maltese pharmaceutical market, driven by supply chain disruptions from conflicts, post-pandemic shifts, and Brexit. These factors complicate supply and inflate prices due to Malta's geographical and economic constraints.

Participants report that Malta's isolation intensifies vulnerabilities, as disruptions in transportation and border controls lead to shortages and higher costs. Malta's reliance on international manufacturers also means that global supply interruptions, such as those affecting active pharmaceutical ingredients (APIs), disproportionately impact local access to essential medications, including off-patent generics. The pandemic and current conflicts have limited the range of suppliers, creating instability in the supply-demand bal ance, while rising fuel and freight costs contribute further to escalating prices. In fact, pharmaceutical company participant insisted that:"…what has changed tremendously is the logistic part of it all; that is transportation and operations…. we have small demands and being an island doesn't help!" (Pharma. company representative).

The study also discusses Malta's market-specific difficulties, revealing compounded effects of low purchasing power, limited demand, and supply chain bottlenecks on cost and availability. A shift to generics and biosimilars offers partial relief yet changes in regulatory frameworks due to geopolitical events add further complications. Brexit, for instance, significantly affected Malta's procurement strategies, with EU-UK aligned trade relationships strained. Malta previously relied on the UK for pharmaceutical supplies; however, after Brexit, it redirected procurement to EU suppliers, increasing costs and logistical challenges. An NHS participant added that: "Malta had the best prices (unit price as a total) but after Brexit, these prices were no longer available. Malta used to take advantage of UK large bargaining power and take some of their stocks at good prices. This was also true for licensing regulations" (NHS representative).

Stakeholders, including NHS procurement officials, highlighted that Malta's legislative requirements for UK/Maltese certified lingual labelling increase costs. Further complexity arises with differing EU and UK prescribing trends, which still influence local clinical decisions, exacerbating supply and price management difficulties. The shift to EU sourcing faced challenges due to local prescribing trends still aligned with UK guidelines, complicating procurement strategies. It was stressed by the NHS procurement management that: "During preparation for Brexit, we tried to decrease procurement dependence on the UK from 85% to 65%. However, this was not sustainable and in 2023 showed a dependence of 95%" (NHS representative).

While these pressures affect high-demand medicines severely, access to rare, high-cost treatments is equally constrained by affordability. Regulatory adjustments, resilience in procurement practices, and adaptation to EU-aligned formularies instead of a UK-centric model are necessary steps to stabilize supply and pricing. This analysis underscores the need for robust procurement strategies and collaborative frameworks to mitigate Malta's inherent vulnerabilities in pharmaceutical access, shaped by its geopolitical and logistical position in the EU.

Theme 2: Management and Policies Strategies

The management and policy landscape surrounding pharmaceutical pricing and procurement within Malta's NHS emerged as a critical yet contentious topic in participant interviews. Stakeholders expressed that the complex journey of medicines from reimbursement approval to patient delivery is fraught with policy and procedural inefficiencies, often undermining the intended goals of cost-effectiveness and resource optimization. Pharmaceutical company participants agreed that: "The journey from A to Z is hazardous, to say the least. I would like to document the journey of one medicine exactly from EMA approval to patient access. This will show the timeline that our patients have access to a medicine available in the EU" (Pharma. company representative).

Stakeholders highlighted Malta's outdated pricing policies and reimbursement system, notably the external reference pricing (ERP) mechanism, as insufficient for accurately reflecting procurement costs, thereby compromising affordability. A participant added that: "The calculated reference prices do not tally with the bidding price, and this is very alarming since the reference price is being used for decision purposes in procurement to decide affordability" (NHS representative).

The current system's complexity and bureaucratic delays limit competitive market dynamics and patient access. Procurement and industry representatives recommended a comprehensive review of these policies, suggesting the Europid database as a valuable but underutilized resource for price management. The tendering process also faces challenges from the unpredictability of global markets, reducing the pool of bidders and increasing reliance on urgent, costlier procurement measures like urgent routes orders.

This unpredictability, coupled with closed tender specifications, has discouraged long-term commitments from suppliers. To address this, stakeholders proposed greater flexibility for newer pharmaceuticals, more inclusive pathways for biosimilars, other procurement models and the exploration of joint procurement initiatives with other EU countries.

Data availability and resource constraints pose additional challenges, significantly impacting the efficiency of procurement and stock management within the NHS. Stakeholders identified limited access to local consumption data as a major obstacle to accurate tendering, with gaps in data undermining Health Technology Assessments (HTA) and Pharmacoeconomic evaluations, both crucial for informed decision-making in pricing and supply chain management. Without a robust data infrastructure, stock planning and supply security become compromised, affecting both the NHS and pharmaceutical suppliers. To tackle these deficiencies, the Central Procurement and Supplies Unit (CPSU) is developing an integrated IT system to centralize logistics across NHS entities, aiming to eventually allow pharmaceutical companies to manage stock levels based on reliable, real-time data. This initiative has been welcomed by pharmaceutical companies as stakeholders called for an investment in data management, technology, and skilled personnel to support more efficient procurement cycles and cost containment. "Good stock management is also crucial but this needs to be backed by IT systems and data available. Unless these are in place, we pharm. companies cannot be onboard to start managing our selves the stock to be delivered to the entities" (Pharma. company representative)

Collectively, participants agree on the urgent need for policy reform and enhanced data and resource management to improve the NHS's ability to provide affordable, accessible pharmaceuticals. Emphasis was placed on creating a more agile, transparent, and collaborative framework that can adapt to Malta's unique market constraints and evolving global dynamics.

Theme 3: Stakeholder Contribution

This theme investigated the complex issues of healthcare access, cost control, and value-for-money within Malta's NHS, highlighting challenges tied to equity, trust, and ethical considerations. At the centre of these issues is Malta's distinctive 100% reimbursement model, designed to provide comprehensive coverage yet potentially limiting awareness of drug costs among patients and prescribers. Policymakers noted that this full reimbursement could create an imbalance between demand and affordability, suggesting a system review with potential options for co-payment or voucher systems, despite the political sensitivity of such measures. They also highlighted the need to assess high-cost medicines that consume significant budget portions to ensure sustainable, equitable access. In fact, participants insisted that: "…, patients and clinicians have to be aware of what is happening, and the funding concerned. Unless stakeholders are aware of the costs and availability, they cannot make an informed decision and access will not be fulfilled" (NHS representative).

While all stakeholders recognized the need for increased healthcare funding, they agreed that expanding access requires a structured procurement strategy to manage costs effectively. A tender model that guarantees continuity of patient care was advocated, with requirements for suppliers to support treatments for high-cost medicines like rare disease and oncology treatment through the entirety of patient care. Participants underscored the importance of stable pricing and consistent procurement cycles, with a suggestion that supplier contracts include clauses for long-term patient care continuity.

Pharmaceutical representatives acknowledged the NHS's efforts to secure competitive pricing, though they emphasized that evolving market conditions complicate these goals. This dynamic environment, coupled with NHS requirements, can lead to challenges in meeting shifting demands. Stakeholders collectively questioned the sustainability of the Malta's reimbursement model, recommending resource prioritization for high-cost and rare treatments, while considering potential revisions to reimbursement policies.

Collaboration emerged as a significant subtheme. Stakeholders stressed that cohesive alignment between internal actors (clinicians, policymakers, procurement staff) and external suppliers is critical for preventing fragmented efforts, bureaucratic inefficiencies, and delays. Pharmaceutical industry representatives voiced concerns over collaborative gaps within NHS operations, despite acknowledging NHS staff's dedication to medicine access. To address these issues, procurement managers and policymakers emphasized the importance of internal collaboration, open data sharing, and continuous communication to respond proactively to market changes and strengthen procurement processes.

They insisted that:"Data sharing is crucial, the fact that each department has no visibility of data when available is worrying. Procurement must work hand in hand with policy and vice versa" (NHS representative).

Additionally, collaborative agreements with EU neighbours and the identification of suppliers for local tenders were suggested to strengthen supply chain resilience. The pharmaceutical sector proposed fostering a closer, cooperative relationship with the NHS, supporting government healthcare objectives. They appreciated the Ministry for Health informative sessions and conferences, which encourage engagement and collaboration. Participants insisted that :"If we agree to a joint strong operation procedure and if need be, change legislation, then we can also agree at the EU level so that Maltese patients are not left behind…." (Pharma. company representative).

Across interviews, stakeholders emphasized that coordinated, transparent, and proactive strategies are essential to addressing Malta's unique challenges in healthcare access. Effective collaboration is seen as vital for maintaining equitable access to affordable medicines and achieving systemic healthcare goals, with a focus on enhancing procurement flexibility, cost efficiency, and overall sustainability within Malta's healthcare framework.

Discussion

The study reveals the challenges facing Malta's pharmaceutical sector, particularly regarding the affordability, accessibility, and availability of medicines. Findings confirm that price fluctuations and rising costs, exacerbated by global crises, have heavily impacted the Maltese National Health Service (NHS). This observation aligns with OECD analyses (Morgan, 2023) that report increasing pharmaceutical costs across governments, reflecting economic disruptions. The pandemic and the Russia-Ukraine conflict have intensified these challenges, elevating fuel and transportation costs, caused supply chain disruptions, and inflated operational expenses for healthcare systems. Similar findings on availability challenges and global shortages following the pandemic have been extensively documented in the literature (Dijkstal et al., 2021) Participants pointed out that Malta's unique geographical and market characteristics, including its status as a small island nation with limited demand, contribute significantly to these issues. The local market's low demand discourages pharmaceutical companies, leading to diseconomies of scale that amplify logistical, regulatory, and packaging costs.

The study also highlights that pharmaceutical companies often deprioritize small markets like Malta, resulting in limited medicine availability. WHO and other research confirm that international pharmaceutical corporations favour larger markets, leaving small countries vulnerable to shortages and elevated prices (Voncina et al., 2023; Kochova et al., 2021). In Malta, these availability constraints impact procurement cycles, with participants noting that NHS struggles with shortages of essential medications, such as antibiotics, as they compete with larger markets for limited stocks. Post-pandemic stockpiling by large nations further intensifies these availability issues (Morgan, 2023). Monopoly pricing by multinational corporations also affects Malta's access to affordable generics, raising concerns over equitable medicine availability as documented by studies such as Gronde et al. (2017). Regulatory barriers and the limited profit potential of low-demand generics make it economically unfeasible for companies to supply Malta, which compounds the issues of high costs and scarcity.

Brexit has also disrupted Malta's pharmaceutical supply chain, significantly affecting both costs and availability. Previously, the NHS sourced items at lower prices from UK overspill, taking advantage of regulatory frameworks. However, post-Brexit changes now require separate EU and UK registrations, eliminating joint packaging options and raising compliance costs (Batraga et al., 2020). This situation has made securing essential drugs more difficult, especially given Malta's traditional reliance on the UK market. The NHS's attempts to shift to EU suppliers have seen temporary success, yet dependency on the UK remains high. With EU derogations set to end in 2025, the NHS faces a pressing need to adjust procurement strategies, including possible shifts in prescriber habits, to reduce reliance on the UK and stabilize the supply chain.

A key challenge lies in aligning procurement with prescribers' practices. Participants stressed that local prescribers often favour UK-prescribed medicines, which may limit the NHS's ability to diversify its supplier base. The reliance on UK standards exacerbates the issue, as procuring non-UK items necessitates additional costs for over-labelling and translating packaging, required by Maltese law. These measures are costly, estimated at over one million euros annually, and add to the NHS's financial burden.

This study underscores the need for a robust and adaptable procurement strategy in Malta, emphasizing collaboration between stakeholders. The findings highlight that the Maltese NHS must address prescriber alignment and explore regional alliances to secure medicines cost-effectively. The research points to an urgent call for policy adaptations that recognize Malta's small-market challenges, advocating for innovative and cooperative solutions to sustain equitable healthcare access amidst global market pressures.

This study also provides insights into Malta's pharmaceutical procurement and reimbursement challenges, highlighting concerns from both internal and external stakeholders over inefficiencies within current policies. External stakeholders find the reimbursement process cumbersome and cost-ineffective, while internal participants point to organizational disintegration within the procurement cycle. These issues reflect findings by Abraham and Franken (2023), though this study identifies additional factors that are intensifying pricing and access challenges in the Maltese context.

A significant focus is Malta's External Reference Pricing (ERP) policy, designed to control costs by benchmarking against similar countries. While the literature review showed that these methods are highly effective in reducing pharmaceutical prices (Brekke et al., 2009; and Anggriani, 2018), participants argue that ERP, in its current form, is ineffective due to frequent mismatches between reference prices and actual bidding prices, leading to delays or tender cancellations. Stakeholders recommend refining the ERP to benchmark against countries with similar socioeconomic contexts, an approach supported by Vogler, Schneider, and Zimmermann (2019).

Malta's centralized open tender model, historically effective, now faces pressures from a declining supplier pool and global supply chain disruptions. Frequent reliance on emergency procurements has increased costs and impacted long-term supply stability. Participants propose diversifying procurement through split tenders, multiple award systems, and joint EU procurements, drawing on successful models from other small nations like Cyprus. In fact, the latter successfully implemented tendering procedures, achieving significant savings and price reductions (Panayiotopoulou et al., 2020; Ciulla et al., 2023). Resource and data limitations further exacerbate these challenges. The NHS lacks sufficient expertise in certain areas due to insufficient training, and diverse competency, and the absence of robust IT systems hinders accurate forecasting and budgeting. Stakeholders stress the need for real-time data on disease trends, prescribing habits, and inventory to support effective procurement. Enhanced pharmacoeconomic training, IT infrastructure, and transparent data-sharing are essential for NHS decision-makers, aligning with Nemeth et al. (2022) findings on data's role in procurement efficiency.

Participants highlighted key issues including sustainable financing and the accessibility and affordability of essential, orphan, and cancer treatments. The pharmaceutical industry underscored Malta's challenges in accessing innovative therapies, referencing the "Waiting to Access Innovative Therapies" (WAIT) scores, which reveal significant delays compared to other EU countries (Newton et al., 2021). These concerns are corroborated in a WHO policy brief, which identifies similar challenges faced by small countries (Voncina et al., 2023). Equitable access and sustainable funding are critical to Malta's healthcare framework. Raising awareness of pharmaceutical costs among prescribers could encourage more cost-effective prescribing practices and reduce wastage.

Finally, collaboration emerges as crucial for sustainable access to medications. Participants suggest that stronger partnerships between NHS, industry, and policymakers are necessary, with procurement forums serving as effective platforms to align shared goals. Cooperative efforts within Malta and the broader EU—through initiatives like the Valletta Declaration and the Small Country Initiatives—are pivotal in adapting Malta's healthcare system to the increasingly complex pharmaceutical landscape. The study concludes that collaborative strategies, diversified procurement, and enhanced data capabilities are essential to stabilize Malta's access to affordable medicines.

Conclusions

This study offers valuable insights into the fluctuations in pharmaceutical prices within Malta, focusing on the interplay of NHS management practices, policy strategies, and global market dynamics. It emphasizes the significance of stakeholder collaboration in enhancing equitable access to medicines and sheds light on the systemic factors influencing pharmaceutical pricing. By engaging NHS and pharmaceutical industry experts, the study successfully captured detailed responses, addressing a notable gap in Maltese literature regarding pharmaceutical access and pricing. The qualitative inductive approach facilitated rich, contextual data collection, allowing for a deeper understanding of the complexities surrounding affordability and access issues in Malta's healthcare system. Despite its contributions, the study faced limitations. The sensitivity of pharmaceutical pricing as a topic made participant recruitment challenging, while time constraints restricted the diversity of stakeholders included in the research.

The study recommends future research to evaluate the impact of cost awareness programs on prescribing practices and budget efficiency. It suggests conducting a pilot study to trace the journey of new medicines from Market Authorization to patient access and assessing procurement strategies in other small EU markets. Further exploration of advanced data analytics in NHS decision-making and stakeholder perspectives on reimbursement models could inform improved access and financial sustainability. This study has provided profound insights into the complex issue of pharmaceutical prices within the Maltese National Health Service (NHS). Addressing the research objectives has significantly contributed to the existing body of knowledge, particularly in the context of Malta's healthcare system. The ever-evolving dynamics of pharmaceutical affordability and availability were thoroughly explored, emphasizing the importance of a comprehensive, collaborative approach to ensuring timely and equitable access to medicines. The research advocates for necessary policy updates to navigate the challenges posed by the global market and supply chain fluctuations.

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Conflict of Interest

With an extensive year of exposure in the domain of pharmaceutical access and pricing, the researcher role may have influenced the research process, however rigorous efforts were made to minimize any influence throughout all stages of the study including interviews, open coding, and thematic analysis.

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Authorship

Marcelle Fenech – 80%
Dr. Neville Schembri – 20%

05 The Patient Safety Culture and Communication Practices in a Radiotherapy Department in Malta

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Abstract

Error reduction and patient safety are increasingly being prioritised globally in high-risk industries such as radiotherapy. Fostering a culture of patient safety has proved critical in reducing the number of events and improving overall patient health.

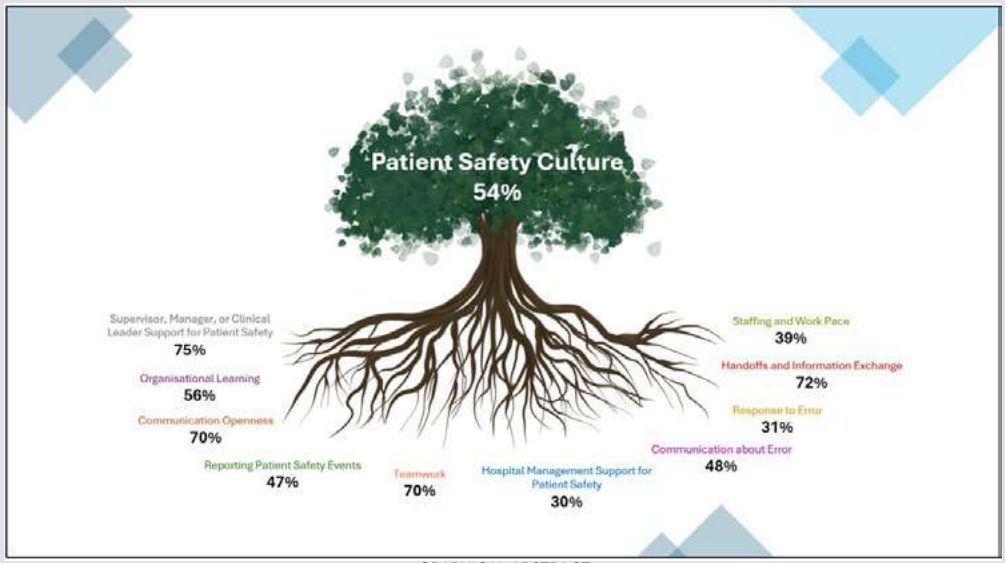
Objectives: The study's goal was to assess the status of patient safety culture, identify its strengths, weaknesses, and opportunities for growth, investigate variables that influence safety culture and communication levels, and increase departmental awareness. This study also sought to discover variations in patient safety culture perceptions depending on profession, tenure, and staff to patient interaction levels.

Methods: Data was collected using a deductive approach and quantitative design via a cross-sectional survey with a validated instrument, the Hospital Survey on Patient Safety Culture. This was delivered to the interdisciplinary team at an Oncology Centre in Malta. A total of 45 individuals from a pool of 50 specialists participated, including physicists, radiation oncologists, and radiation therapists.

Results: The composite percentage scores for the ten dimensions of safety culture and six identified dimensions of communication were 54% and 57.7%, respectively. Among the ten dimensions evaluated, 'supervisor, manager, or clinical leader support for patient safety' scored the highest, while 'hospital management support for patient safety' scored the lowest. The findings revealed that radiation therapy professionals had a marginally good perception of patient safety culture and communication levels, with plenty of room for improvement.

Conclusion: This study provided significant insights on areas that require improvement. Hospital management and radiotherapy section managers may use these findings to drive initiatives that improve patient safety culture and communication. This study also serves as a baseline for future evaluations of patient safety culture within the radiotherapy department.

Keywords:
Radiotherapy; Patient Safety Culture; Hospital Survey on Patient Safety Culture; Multidisciplinary team; Quality Improvement.



GRAPHICAL ABSTRACT

Highlights:

- There is a research gap in local healthcare on patient safety culture in radiotherapy.
- The Hospital Survey on Patient Safety Culture is a validated tool to measure safety culture characteristics.
- There were notable strengths and weaknesses found, highlighting areas in need of immediate attention. Hospital management support ranked the lowest at 30% and supervisor, manager, or clinical leader support scored the highest at 75%.
- The necessity of systemic, non-punitive approaches for promoting a just safety culture was emphasised, and practical insights for quality improvement initiatives were offered.
- Hospital and section managers can use this study's structure for future assessments of patient safety culture to create targeted initiatives that enhance communication, staffing levels, incident reporting systems, and other patient safety culture dimensions.

Abbreviations:

Agency for Healthcare Research and Quality **(AHRQ)**
Hospital Survey on Patient Safety Culture **(HSOPSC)**
Incident Learning System **(ILS)**
Joint Commission International **(JCI)**
Key Performance Indicators **(KPIs)**
Patient Safety Culture **(PSC)**
Quality Improvement **(QI)**
Radiotherapy Department **(RTD)**
Statistical Package for the Social Sciences **(SPSS)**
Organisation for Economic Co-operation and Development **(OECD)**

Introduction

A key component of oncology treatment is radiotherapy, which successfully preserves and extends the lives of cancer patients while maintaining their quality of life. As part of their treatment regime, more than half of cancer patients receive radiation therapy (Delaney et al., 2005). According to Leonard and O'Donovan (2018), administering radiation therapy is a complicated procedure that calls for cooperation from a number of specialists, including radiation therapists, medical physicists, and radiation oncologists. Radiotherapy is one of the safest areas of modern medicine with few radiation events since it is heavily regulated and follows strong quality assurance procedures (Shafiq et al., 2009).

When radiation events do occur, these can have catastrophic consequences and cause harm to many patients, which in some cases can cause serious injuries or even death in the worst scenarios (Tramacere et al., 2021). There have been several well-known cases of radiation errors, which have had detrimental effects on patients and the involved healthcare facilities (International Atomic Energy Agency, 2001; 2004). Therefore, the risk of inadvertent or accidental radiation exposure needs to be carefully considered, given the complexity and the requirement that professional groups coordinate and communicate during the planning and treatment stages (Malicki et al., 2015). Consequently, there is a growing awareness of the value of cultivating a safety culture to uphold high healthcare standards.

The term 'safety culture' was coined by the International Nuclear Safety Advisory Group (1986) in reaction to the devastating nuclear accident at Chernobyl and has subsequently been used to understand incidents in a variety of industries, including the medical field (Waterson et al., 2017).

Patient safety culture (PSC) can be defined as the outcome of individual and group beliefs, attitudes, perceptions, abilities, and behaviours that establish an organisation's capacity and dedication to safety management (Nieva and Sorra, 2003). According to Kusano et al. (2015), staff members' attitudes, abilities, and behaviours show a strong commitment to health and safety management in a positive safety culture. An open, cooperative atmosphere free from hierarchical barriers is fostered by employees who demonstrate a strong commitment to safety management (Kusano et al., 2015). Adverse occurrences are reduced in such cultures because they promote systemic learning and error reporting above individual responsibility (Nieva & Sorra, 2003; Chera et al., 2012).

Research Problem

The multidisciplinary team of the radiotherapy department (RTD) at the Sir Anthony Mamo Oncology Centre (SAMOC) has never investigated PSC. To identify gaps and carry out effective quality improvement (QI) measures, it is essential to understand the opinions and viewpoints of medical professionals regarding safety culture. Using the Hospital Survey on Patient Safety Culture (HSOPSC) tool, the study aimed to assess the present safety culture and look at differences in attitudes between the RTD and other hospitals and oncology units, as well as between different professional roles within the department.

Although the RTD and SAMOC have always strived to foster a positive safety culture, it is difficult to evaluate how effective it is at improving patient safety due to a lack of quantifiable data. It is difficult to show improvement and verify claims of enhanced safety culture when baseline data is lacking. Therefore, the purpose of this study was to identify areas that require improvement and to set a starting baseline for safety culture. This will guarantee that subsequent QI initiatives are data-driven and successfully address identified vulnerabilities**.**

Research Questions

The primary research question was:

What is the status of safety culture among the multidisciplinary team working in the radiotherapy department at Sir Anthony Mamo Oncology Centre, using the Hospital Survey on Patient Safety Culture?

Secondary research questions were:

• How does the department staff feel about communication openness?

• Which patient PSC dimensions are strongest and weakest?

• Does profession, tenure, and patient interaction influence PSC perception?

Research Objectives

SC is a crucial element for the safe delivery of radiotherapy treatments. The purpose of distributing a PSC survey to the RTD at SAMOC was to fulfil the following research objectives:

• To quantify the level of PSC in the RTD, as expressed by the dimensions of the HSOPSC survey tool.

Other specific objectives for this study were:

• To quantify the level of communication, based on the HSOPSC dimensions identified by Grixti (2022);

• To identify the strengths and weaknesses of PSC in the RTD and provide recommendations for improvement; and

• To quantify any differences in perceptions of PSC based on profession, tenure, and patient interaction.

Methodology

Research Approach and Design

A quantitative research design was adopted to gather numerical data for a statistical assessment of the PSC levels within the department using the HSOPSC survey tool. This cross-sectional study provided a picture of the safety culture of the department at this point in time.

Data Collection

Survey Tool:

Hospital safety culture was evaluated using the HSOPSC (v2.0). This was created by the Agency for Healthcare Research and Quality (AHRQ) and has undergone independent validation (AHRQ, 2019a). It features 10 dimensions of PSC and is made to be adaptable in a variety of healthcare environments. Previous research has validated the tool's psychometric validity and reliability (AHRQ, 2019b).

The HSOPSC has been widely used for hospital-wide evaluations, including RTDs. It gives participating hospitals the chance to add their results to a central database on the AHRQ website (Azyabi, Karwowski, and Davahli, 2021). A useful tool for comparing results with other institutions is the latest released 2022 database (Hare et al., 2022).

Data Collection Process:

Radiographers, physicists, and radiation oncologists that make up the multidisciplinary team were asked to complete an online version of the HSOPSC. The survey was only conducted after obtaining approval from the IDEA College Research Ethics Board and approvals from the Data Protection Office and the hospital Chief Executive Officer. Google Forms was used to distribute the survey, guaranteeing confidentiality and anonymity. Reminders were emailed to promote participation during the six-week data collection period. A 5-point Likert scale of frequency (never to always) or agreement (strongly disagree to strongly agree) was utilised in most of the instrument's questions.

Participants and Sample
Fifty multidisciplinary team members made up the study's population: 62% were radiographers, 20% were radiation oncologists, and 18% were medical physicists. To guarantee that every subgroup was adequately represented, stratified sampling was employed. Based on a 95% confidence interval and a 5% margin of error, the estimated sample size was 45 participants, comprising 9 radiation oncologists, 8 physicists, and 28 radiographers.

Research Model and Related Hypotheses

Research Hypotheses:
The following research hypotheses have been developed to reflect the objectives of this study:

Null Hypothesis 1 (H01): The multidisciplinary team within the radiotherapy department does not have a strong PSC.
Alternative Hypothesis 1 (HA1): The multidisciplinary team within the radiotherapy department has a strong PSC.
Rationale: As per Leonard and O'Donovan's (2018) findings, response scores >75% indicate a strong PSC. Scores between 50% and 75% show a positive safety culture with the ability to improve. Scores <50% indicate areas of poor safety culture.

Null Hypothesis 2 (H02): The level of communication between the multidisciplinary team professionals and with respective management is not strong.
Alternative Hypothesis 2 (HA2): The level of communication between the multidisciplinary team professionals and with respective management is strong.
Rationale: Following Grixti's (2022) framework for assessing this hypothesis, the score average for communication-related dimensions 2,3,5,6,7, and 9 of the HSOPSC survey yields the communication index. Classification of the yielded index followed the same being proposed for the first hypothesis.

Null Hypothesis 3 (H03): There is no unified perception of the level of PSC amongst the three main professions.
Alternative Hypothesis 3 (HA3): There is a unified perception of the level of PSC amongst the three main professions.
Rationale: No statistically significant difference in safety culture dimension scores across the three professions is indicative of a unified perception of the level of patient safety culture.

Research Model:
The survey findings were used to test hypothetical correlations between independent and dependent variables in the research. The model guiding this research was based on Grixti's (2022) model, which quantified communication levels and PSC at a Maltese geriatric and rehabilitation hospital.

Organisational structure, processes, and leadership have been identified as independent variables. The HSOPSC survey dimensions of PSC were the study's dependent variables. In addition to teamwork, communication, and leadership support, amongst other PSC dimensions, this study has also prioritised reporting of adverse events.

Intervening variables, such as tenure and patient interaction levels, play a role in mediating the relationship between independent and dependent variables. The occupational role within the department has been identified as a control variable that must be monitored for impartiality in the study.

Confounding variables include staff relationships and teamwork, as well as leadership relationships, which can impact the survey's dependent variables. Finally, the study's outcomes align with the objectives the study sought to attain.

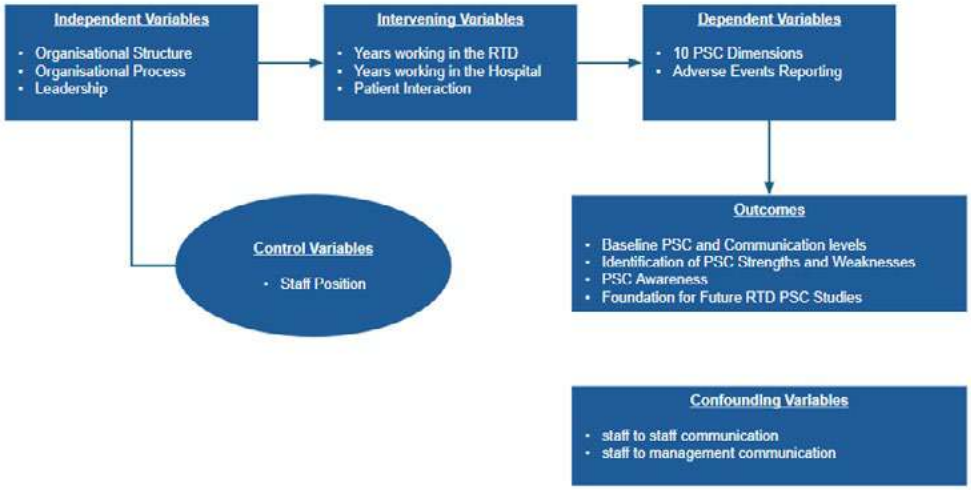


Figure 1 - The research model

Data Analysis

Microsoft Excel® was used to analyse the gathered data. HSOPSC guidelines were followed in calculating survey scores (AHRQ, 2019a). Negatively worded PSC dimensions underwent reverse scoring to ensure that every item contributed positively to the overall PSC score. This was accomplished by using the 'AHRQ HSOPSS 2.0 Data Entry and Analysis Tool,' developed by AHRQ. This tool was used to enter survey replies, and the results were automatically computed and compared to the 2022 AHRQ database. The software then creates tables and graphs to show the survey results in comparison to the 2022 database, which contains data from 400 hospitals and units. Additionally, the tool provides comprehensive results categorised by work area, staff role, patient interaction, and duration of service in the department.

To evaluate group differences, non-parametric tests were used. In particular, the Kruskal-Wallis test was employed for comparisons involving more than two groups, and the Mann-Whitney U-test was employed for comparisons involving two groups. The relationship between the variables was evaluated using the Spearman's Rank correlation test. The IBM® SPSS® (Statistical Package for the Social Sciences) software was used for all statistical analyses.

Results

Patient Safety Culture Dimensions

The survey assessed the ten dimensions of PSC, comparing the responses to AHRQ's 2022 hospital database, as well as database results specific to oncology units. Except for the dimension of handoffs and information exchange, the RTD scored worse than the AHRQ Hospital and Oncology unit databases in all dimensions. The PSC composite metric for the RTD is 54%, while the AHRQ database has a higher score of 70% and the Oncology database outperforms both at 72%. Table 1 presents these data, while Figure 1 visualises them using a bar chart.

Dimension	Current Research RTD	AHRQ 2022 Hospital Database	AHRQ 2022 Oncology Database
1. Supervisor, Manager, or Clinical Leader Support for Patient Safety	75%	80%	84%
2. Teamwork	70%	82%	84%
3. Communication Openness	70%	76%	80%
4. Reporting Patient Safety Events	47%	74%	78%
5. Organisational Learning – Continuous Improvement	56%	70%	74%
6. Communication About Error	48%	73%	77%
7. Hospital Management Support for Patient Safety	30%	64%	60%
8. Response to Error	31%	63%	67%
9. Handoffs and Information Exchange	72%	63%	59%
10. Staffing and Work Pace	39%	51%	53%
Composite Measure Average	**54%**	**70%**	**72%**

Note: AHRQ, Agency for Healthcare Research and Quality; RTD, Radiotherapy Department.

Table 1 - The mean percentage scores for each dimension for the RTD, and the AHRQ 2022 Hospitals and Oncology unit databases

The composite metric is calculated by averaging the results of each individual dimension. The composite measure average of 54% for the RTD indicates an overall positive PSC with ample potential for improvement. Only response values above 75% indicate a strong PSC.

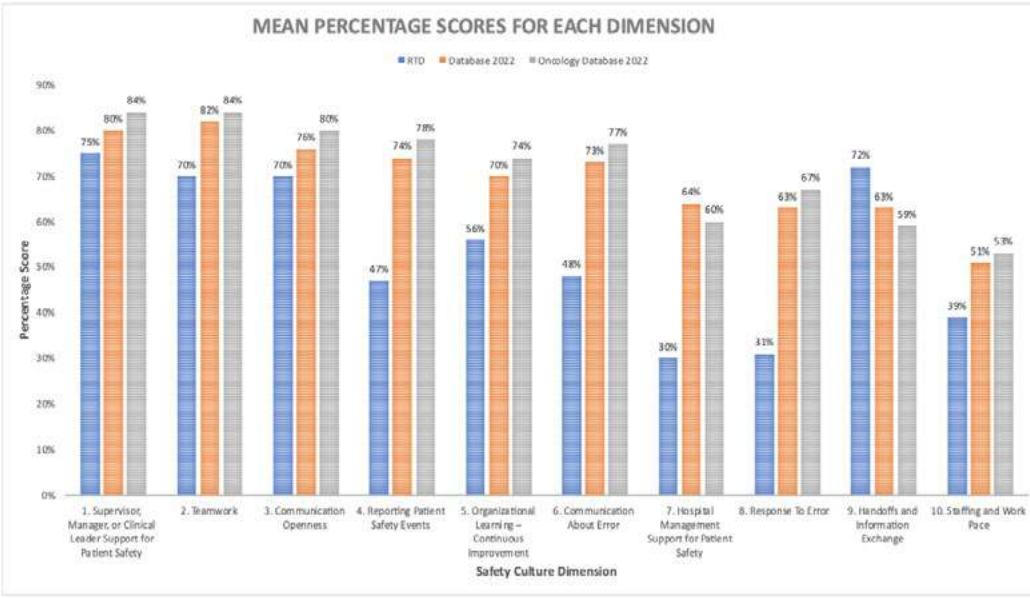


Figure 2 - Bar chart illustrating the mean percentage scores for each dimension for the RTD, and the AHRQ 2022 Hospitals and Oncology unit databases

The research results within each dimension of HSOPSC are presented as follows:

1. Supervisor, Manager, or Clinical Leader Support for Patient Safety

With a score of 75%, this dimension had the highest score and demonstrated a favourable opinion of departmental leadership. Strong leadership was indicated by the most positive perceptions (88%), which were reported by medical physicists. The lower score of 68% for radiographers indicates that, although positive, they require better support and communication at their level, particularly when it comes to address patient safety concerns.

2. Teamwork
Scoring 70%, teamwork emerged as a positive dimension within the department. Clinicians (81%) and medical physicists (88%) gave much better scores than radiographers (62%). According to the results, radiographers' teamwork should be further enhanced, with improved coordination and collaboration. Disrespectful behaviour was highlighted by some as a factor hindering teamwork.

3. Communication Openness
Communication openness scored 70%, with medical physicists scoring the highest (78%). A far lower perception, however, was recorded by clinicians (41%), suggesting difficulties in encouraging open communication within their professional group. This disparity underscores the importance of tailored interventions to improve communication practices, particularly in the medical profession. It was highlighted that those with more authority are not very open to patient safety concerns, and that some members of staff are afraid to ask questions when something does not seem right.

4. Reporting Patient Safety Events
This dimension's score of 47% indicates that staff in all professional groups are reluctant to disclose events. Radiographers had the highest proactive score (52%), while clinicians had the lowest (25%). These results point to a sizable event reporting gap, especially among doctors, which may impede quality improvement and incident learning.

5. Organisational Learning – Continuous Improvement
Organisational learning scored 56%. The examination of work processes aimed at improving patient safety measures received a rating of 58%. The assessment to evaluate the efficacy of implemented improvements received a 47% rating. Only 62% of employees believe that the department prevents the recurrence of patient safety errors or concerns. These low ratings indicate a crucial gap in the feedback loop for organisational learning. This sentiment was most popular among radiographers (50%).

6. Communication About Error
Communication about errors in the RTD is ineffective (48%), with only 49% of respondents believing that errors are communicated to staff members. The discussion on how to prevent such errors is likewise inadequate, rating 52%. Furthermore, just 44% of employees acknowledged communicating any improvements or quality initiatives based on reported incidents. Clinicians scored the lowest for this dimension (32%).

7. Hospital Management Support for Patient Safety
This element, which expressed discontent with hospital leadership's participation in patient safety initiatives, obtained the lowest dimension score at 30%. Clinicians (27%) and radiographers (24%) had the least amount of trust in hospital administration. The results point to a discrepancy between departmental requirements and hospital management priorities, which may have an effect on resource allocation and safety culture.

8. Response to Error
The score of 32% indicates limited use of non-punitive approaches to error management. Radiographers reported the lowest scores (21%), followed by clinicians (41%). The survey question 'When an event is reported in this unit, it feels like the person is being written up, not the problem' yielded a score of just 23%. These findings emphasise the need for a blame-free environment to encourage error reporting and promote learning.

9. Handoffs and Information Exchange
With a 72% rating, this dimension emphasises how information flow during patient handoffs is frequently seen favourably. There is potential for standardising communication techniques, as some employees experienced irregular omissions during shift changes, despite the results indicating satisfaction. Only this dimension scored higher than the AHRQ 2022 hospital and oncology database scores.

10. Staffing and Work Pace
This component, which received a score of 39%, underlines concern around workloads and staffing levels. Merely 18% of participants concurred that there was sufficient manpower to manage workload demands. This perception was mostly significant with the medical physics cohort (31%). The results are indicative of a lack of resource planning and workload distribution.

Dimensions by Profession, Tenure, and Patient Interaction

Profession
The greatest aggregate score (63%), which reflects generally favourable opinions of safety culture, was attained by medical physicists. clinicians (49%) and radiographers (52%) had somewhat lower scores, and the latter two group expressing the least positive opinions on most factors. That said, no statistically significant difference was found between professions in terms of patient safety scores in a Kruskal Wallis test ($p=0.23>0.05$). This indicates that overall, there is a unified perception of the level of PSC.

Tenure
A significant difference ($p=0.02<0.05$) was observed between the composite scores of those with 1–5 years of experience (65%) and those with 6–10 years (50%). This indicates that the years of employment have an impact on the perception of PSC for RTD staff. This can indicate that while longer-serving employees may be facing more systemic difficulties, younger employees may bring more positive perspectives or receive more support.

Patient Interaction
Employees who do not work directly with patients scored higher (63%) than those who did (52%). However, no statistically significant difference was found $p=0.11>0.05$), indicating that views of safety culture may not be directly influenced by interaction levels.

Number of Events Reported
A slight majority (51%) of personnel reported at least one occurrence in the previous year, which is greater than both the hospital database average (45%) and the oncology database average (48%). Radiographers were the most proactive, reporting 54% of events, compared to 50% for physicists and 44% for doctors. The findings indicate that physicists and clinicians may need most assistance in enhancing their reporting habits.

Patient Safety Rating
Only 38% of participants considered patient safety as excellent or very good, which is much lower than the oncology database average of 75%. The majority of personnel considered safety as good (53%), with no one rating it as poor. Medical physicists gave the highest ratings, while clinicians reported the lowest.

Overview of Results

The composite measure average across every dimension was 54%, indicating a marginally positive safety culture with plenty of opportunity for improvement. Thus, the null hypothesis H01 was accepted. The communication index averaged 57.7%, also indicating significant potential for improvement. Thus, the null hypothesis H02 was accepted.

Tenure was discovered to have a significant effect on safety culture attitudes, with newer employees reporting more positive views. However, no statistically significant variations were found based on profession or patient engagement levels, reflecting a widely shared perspective of safety culture. The null hypothesis H03 was rejected.

While reporting rates scored higher than database averages, doctors and physicists reported the fewest incidents, indicating a need for better engagement and reporting standards. Staffing levels, hospital management support, and error response systems remain areas that evidently require targeted intervention to improve the department's safety culture.

Discussion

Woodhouse et al. (2016a) found that the mean PSC score improved from 73% to 89% between 2010 and 2015. This adjustment occurred with an increase in educational programs emphasising on quality and safety within the RTD. It shows that increasing staff awareness and education can considerably improve PSC across RTDs. Kusano et al. (2015) conducted a different research investigation using pre- and post-QI HSOPSC assessments. They saw a noticeable increase ranging from 10% to 20%. This trend was also observed in several other studies that compared PSC before and after QI initiatives (Chera et al., 2014; Gabriel et al., 2015; Simons et al., 2015). Gabriel et al. (2015) found that implementing an Incident Learning System (ILS) as part of their QI program resulted in greater levels of safety culture and improved employee involvement within quality and safety management. This implies that staff education, together with QI activities, is required to reduce the gap between the mean RTD and database PSC ratings.

Of all the dimensions examined by the HSOPSC, this study indicated one area of strength, four areas with substantial room for improvement, and five areas of weakness in the RTD. 'Supervisor, manager, or clinical leader support for patient safety' was regarded as its greatest strength, while 'hospital management support for patient safety' was seen as the primary issue. This suggests that while workers perceive assistance from direct management, there is a lack of commitment from hospital administration to organisational support. This discovery is consistent with Legg, Dempsey, and Aaron's (2013) findings. Their research on radiation therapists in the United States found good feedback on teamwork, staffing, and direct management support. However, communication and transparency, non-punitive approaches, and hospital administration's commitment to organisational assistance received lower ratings.

Strengths

'Supervisor, manager, or clinical leader support for patient safety' received the most positive responses in this study (75%). This was also identified as a strength in the AHRQ hospital (80%) and oncology unit (84%) databases, as well as previous research employing the HSOPSC (Hare et al., 2022; Legg, Dempsey, and Aaron, 2013). The fact that managers and clinical leaders do not place undue pressure on HCPs to perform quicker at busy periods, rather than encouraging shortcuts, contributed significantly to a high score in this dimension. The International Atomic Energy Agency (2000) and the World Health Organisation (2008) both acknowledged that the majority of events are triggered by human error. Adding pressure to an already fast-paced environment like the RTD undoubtedly raises the risk of human error. Radiotherapy leaders must emphasise the necessity of 'defence-in-depth' (International Atomic Energy Agency, 2000).

Areas for Improvement

Teamwork was identified as an area requiring improvement, scoring 70%, with the primary contributor to the reduced rating being instances of disrespectful behavior (62%). Positive teamwork within units fosters healthy work relationships and mutual respect, which are crucial for radiotherapy treatment (Sands, 2017). Studies using the HSOPSC have consistently shown the importance of teamwork in healthcare, as interdisciplinary teams rely on shared resources, effective communication, and supportive leadership to navigate evolving healthcare environments (Azyabi, Karwowski, and Davahli, 2021). Research indicates that clinical performance is significantly influenced by communication and leadership practices, and supportive managers enhance teamwork and communication levels (Hamdan and Saleem, 2013, in Azyabi, Karwowski, and Davahli, 2021). Leonard and O'Donovan (2018) stress that poor teamwork and communication are often at the root of adverse events, underscoring the need to encourage these practices within RTDs.

Communication openness scored 70%, with concerns regarding authority figures not being receptive to safety issues and staff feeling hesitant to ask questions. This reluctance is linked to traditional hierarchical structures in healthcare, where lower-level team members may find it challenging to question superiors (British Institute of Radiology et al., 2008). Promoting a culture of open dialogue, regardless of rank, is essential, as communication is central to a robust quality assurance program (Legg, Dempsey, and Aaron, 2013). Initiatives such as daily safety huddles can foster an environment where staff feel comfortable voicing concerns and contribute to education on PSC (Aldawood et al., 2020, in Grixti, 2022). Management must create spaces where multidisciplinary teams can discuss safety issues and overcome barriers to effective communication.

Organisational learning and continuous improvement scored 56%, indicating a need for better evaluation of safety-related changes.

Continuous improvement relies on analysing incidents, implementing risk assessments, and updating protocols through cohesive quality improvement initiatives (Nyflot et al., 2015). Techniques such as root cause analysis and the "five whys" can identify failure points and drive preventative measures (Ford and Evans, 2018; Ford et al., 2019; Gangidi, 2019). Establishing Key Performance Indicators (KPIs) to monitor progress and using adverse event reporting for education rather than punishment are recommended strategies to develop a safety-driven culture (Grixti, 2022).

Handoffs and information exchange scored 72%, with adequate time for patient care information exchanges receiving 86%, but inter-unit information transfers scoring lower at 59%. Effective handoffs require clear communication, transfer of responsibility, and opportunities for clarification (AHRQ, 2023). Using structured tools like SBAR improves communication during transitions and enhances patient safety (AHRQ, 2019b). Leonard and O'Donovan (2018) emphasise that proficiency in managing transitions within and across units is critical for secure and efficient patient care, as poor communication has been linked to adverse events.

Weaknesses

A poor rating was recorded for the 'reporting of safety events' dimension, with a rating of 47%, significantly lower than the 74% and 78% ratings of the hospital and oncology databases, respectively. This is particularly concerning given the widely recognised value of error reporting systems in the field of radiation oncology (Woodhouse et al., 2018). A low score of 33% was registered for the reporting of events caught and corrected before reaching the patient, whereas 61% acknowledge reporting errors that reached but did not harm the patient. The findings indicate the need for a more effective reporting system. These results align with those of Smith et al. (2014), who emphasised that the frequency of reporting near misses is notably lower than that of actual incidents, with minor occurrences being more likely to go unreported. This highlights the need for a deeper understanding of what constitutes a reportable incident in the RTD. Near miss errors and actual incidents often stem from the same underlying factors. Evidence suggests that implementing a robust ILS, coupled with a thorough analysis of near misses, reduces actual incidents in radiotherapy (Nyflot et al., 2015; Clark et al., 2010; Yang et al., 2014). Thus, hospitals must ensure that frontline staff are educated about and actively participate in the organisation's reporting system. A department's ability to consistently report occurrences or near misses demonstrates a positive PSC (Ford et al., 2019). In their study, Smith et al. (2014) found that apprehension and shame were the main barriers to reporting, with individuals being 4.5 times more likely to report major near misses and 2.5 times more likely to report minor ones when feelings of embarrassment were absent. Similarly, Gabriel et al. (2015) observed that incident analysis is often insufficient and delayed. Consequently, Azyabi, Karwowski, and Davahli (2021) urge managers and supervisors to foster a culture that promotes non-punitive responses to errors and encourages effective reporting. Such a culture would enable organisations to gain insights, refine strategies, enhance treatment effectiveness, and demonstrate commitment to patient safety. However, institutions must balance this with a culture of responsibility to maintain high standards of care (Azyabi, Karwowski, and Davahli, 2021).

A score of 48% was recorded for 'communication about error,' compared to 77% for the oncology database, reflecting sub-par communication levels within the RTD. Only 44% of participants acknowledged that changes from lessons learned through event reports are communicated, 49% recognised the communication of errors or incidents, and 52% noted discussions aimed at preventing similar errors. This dimension is essentially tied to the reporting of patient safety incidents, as insufficient initial reporting affects subsequent communication about errors. The Joint Commission International (JCI) highlights the importance of leadership in cultivating a just, transparent, and educational atmosphere for error communication (JCI, 2021). Management must establish incident reporting boards that not only scrutinise incidents but also disseminate findings effectively. Intermediate-level executives, who balance vicinity to employees with authority, are often best suited to promoting PSC (OECD, 2020 in Grixti, 2022). The International Atomic Energy Agency (1996) underscores the dissemination of findings to relevant parties to enable pre-emptive actions against similar incidents. According to Ganesh (2014), proper training and education are crucial final steps in a comprehensive ILS.

Hospital management support for patient safety scored the lowest among dimensions at 30%. This metric assesses the staff's perception of higher management's prioritisation of safety.

In this study, a distinction was observed between the high support score for line managers (75%) and the low support score for hospital management, in line with findings from Legg, Dempsey, and Aaron (2013). RTD staff expressed dissatisfaction with management's reactive approach to patient safety and insufficient resource allocation. Hospital management must prioritise resources, empower line managers with adequate support for QI measures, and establish transparent, non-punitive reporting systems to foster trust (JCI, 2021). Staffing shortages were frequently cited as contributing to incidents in healthcare (Ash, 2007; Dunscombe, Lau, and Silverthorne, 2008). Hellings et al. (2010) recommend consistent engagement between management and hospital staff, emphasising visits to departments to foster understanding of their role in incident occurrence.

The establishment of a blame-free culture is critical for promoting safety. Sands (2017) observed that despite claims of fostering such a culture, management may not always be perceived as supportive by staff. The punitive responses to errors contribute to low reporting levels (JCI, 2021). The dimension of response to error scored a mere 32%, with staff perceiving that the individual is blamed rather than the issue being addressed. This sentiment echoes findings by Leonard and O'Donovan (2018) and Azyabi, Karwowski, and Davahli (2021), who identified punitive reactions as barriers to incident reporting. To enhance reporting practices, management must cultivate a fair and transparent culture that prioritises systemic improvements over individual blame while maintaining accountability for known violations (Leonard and O'Donovan, 2018).

The staffing and work pace dimension scored 39%, with the lowest survey item receiving just 18% approval for adequacy of staffing to handle workload. This is consistent with global challenges in healthcare, as reflected by 51% and 53% scores for hospital and oncology databases, respectively. Staff shortages in radiation oncology can significantly increase workloads, leading to higher incident rates (Sands, 2017). Historical incidents, such as those in Ottawa and Epinal, highlight the risks associated with insufficient qualified staff (Ash, 2007; Dunscombe, Lau, and Silverthorne, 2008). Addressing staffing deficiencies is vital to maintaining patient safety in a demanding clinical environment characterised by rapid change.

The Impact of Profession, Tenure, and Patient Interaction on Patient Safety Culture

This study investigated how years of experience, profession, and patient interaction affect PSC. Longer-serving staff scored lower on PSC than newer staff, with a significant correlation between the two groups' ratings. This finding contrasts with previous studies suggesting experience does not impact PSC (Leonard and O'Donovan, 2018).

No significant difference in PSC scores was found between professionals with and without patient interaction, although those with no patient interaction generally scored higher. Physicists, radiographers, and clinicians had average PSC scores of 63%, 52%, and 49%, respectively. Radiographers highlighted the lack of hospital management support and response to errors, while clinicians cited poor reporting and low management support. This aligns with Smith et al. (2014), who found oncologists had the highest underreporting rates. Physicists, despite rating the highest for PSC, still felt staffing was insufficient, similar to Leonard and O'Donovan's (2018) findings.

Event Reporting

Event reporting is crucial for improving PSC, yet this study reveals significant reluctance to report incidents. About 49% of participants did not file any reports, and 40% submitted 1-2 reports in the past year, which is concerning. Barriers to reporting, such as fear of punitive consequences, are well-documented (Woodhouse et al., 2018; Bolderston et al., 2015). A low score on the 'response to error' dimension (31%) suggests that staff may avoid reporting due to concerns over punishment, contrasting with the AHRQ hospital database's higher score (63%).

The "To Err is Human" report highlighted that preventable errors are a leading cause of mortality and can be largely avoided (Kohn et al., 2000). Education and the removal of a blame culture are key to improving reporting and patient safety (Leonard and O'Donovan, 2018). Additionally, healthcare professionals express dissatisfaction with current incident reporting systems, citing challenges in reporting and lack of follow-up. Improving the functionality of incident reporting systems, possibly through digital platforms, could address these concerns (Montgomery et al., 2017).

Study Limitations

Although the 90% response rate increases the study's validity, the tiny population size limits generalisability outside the RTD. Social desirability bias and survey tiredness may possibly have had an impact on results, as participants may have supplied idealised rather than honest answers. Furthermore, while quantitative methodologies are useful for comparison, they may not adequately represent the dynamic nature of culture. A mixed-methods approach, including interviews or focus groups, could provide more detailed insights on the department's safety culture and communication processes.

Recommendations and Future Work

This study provided a full review of PSC inside the RTD, revealing strengths such as leadership support and handoffs, as well as deficiencies in hospital management support, incident reporting, and error communication. The findings highlight the need for a cultural transformation toward greater transparency, better leadership advocacy, and improved organisational learning.

Hospital administrators must prioritise staffing levels, advocate for safety, and maintain open communication regarding errors and incident reporting. Leaders within departments should encourage collaboration, develop a no-blame culture, and implement organised feedback procedures. The implementation of ILSs may promote continuous quality improvement and instructional opportunities, ultimately improving patient safety.

As the first study of its kind in the RTD, these findings serve as a benchmark for future assessments and will inform quality improvement measures aimed at strengthening the PSC in radiation.

Management should emphasise quality improvement (QI) initiatives that have a direct influence on PSC and apply the 'defense-in-depth' strategy to enhance patient safety. Section managers must promote teamwork and mutual respect, while hospital administrators should adopt a more proactive approach to patient safety by improving resource allocation and addressing staffing shortages.

Dimension	Recommendations for Management
1. Supervisor, Manager, or Clinical Leader Support for Patient Safety	Immediately address patient safety concerns and analyse processes to identify new safety barriers to enhance 'defence-in-depth.'
2. Teamwork	Provide support and encourage the team to build good working relationships through teamwork initiatives.
3. Communication Openness	Promote discussions about safety, irrespective of rank, and create an atmosphere where safety issues can be discussed regularly and openly, such as through daily safety huddles.
4. Reporting Patient Safety Events	Implement a more effective reporting system and establish a culture that promotes non-punitive responses to errors.
5. Organisational Learning – Continuous Improvement	Utilise formal RCA and the "five whys" for analysing incident reports and train staff on these techniques to aid in organisational learning.
6. Communication About Error	Cultivate a culture where employees exchange vital information for risk mitigation and establish incident reporting boards to communicate findings and recommendations with all staff.
7. Hospital Management Support for Patient Safety	Prioritise and allocate resources for line managers to handle workloads and QI measures, and ensure regular engagement and communication with hospital personnel.
8. Response to Error	Educate front-line employees on reporting protocols and establish a non-punitive atmosphere that addresses systemic issues rather than assigning individual blame.
9. Handoffs and Information Exchange	Employ effective hand-off instruments such as SBAR as a structured communication framework.
10. Staffing and Work Pace	Prioritise patient safety by immediately addressing staffing levels.

Table 2 – Recommendations to SAMOC and RTD management for effectively addressing each dimension of PSC

Managers should also promote open communication, allow employees to report problems without fear of retaliation, and put in place organised mechanisms for incident evaluation, such as setting up of incident reporting boards for an adequate Root Cause Analysis. Furthermore, a more effective incident reporting system should be implemented, emphasising a non-punitive approach to errors. Recommendations to management are summarised in Table 2.

Future study could benefit from using a mixed-methods approach to delve deeper into the causes of the low safety culture scores. Periodic staff surveys, every 3 to 5 years, would aid in monitoring PSC improvements and providing useful data for quality improvement initiatives.

Finally, the HSOPSC method is effective for identifying crucial areas of PSC and might be used to build a national database to track and promote PSC throughout the healthcare system.

Conclusions

The purpose of this study was to analyse the PSC in the RTD of the SAMOC, which was the first of its kind at a national level. Despite the low occurrence of errors in radiation, this study underscores the significance of remaining vigilant and taking a proactive approach to patient safety. The key findings show that strong support from management is essential for developing a safety culture. This includes encouraging incident reporting, increasing staffing, and promoting a non-blame culture.

Healthcare professionals in the RTD have a generally positive view of PSC, although they see ample room for improvement, notably in hospital management support for patient safety, staffing, and error response. Long-serving professionals are more pessimistic about PSC, while profession and patient engagement levels had no meaningful influence on their judgments. Although teamwork was perceived positively, many employees still saw incident reporting as a personal condemnation, suggesting a blame culture that inhibits open communication and reduces incident reporting.

The findings underscore the importance of management creating an environment in which employees feel comfortable reporting errors and where systemic issues are addressed rather than focusing blame on individuals. Despite its limitations, the study gives useful information about the current state of PSC in the RTD.

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Conflict of Interest

The researcher is a Medical Physics professional at the Oncology Centre under study. The researcher had no direct contact with any of the research participants, avoiding any bias.

Authorship

The percentage of each author's contribution to the manuscript
Paul Bezzina: 80%
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06 Evaluating Cost-Effectiveness, Patient Satisfaction, and Care Quality of Malta's HAT Service

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Abstract

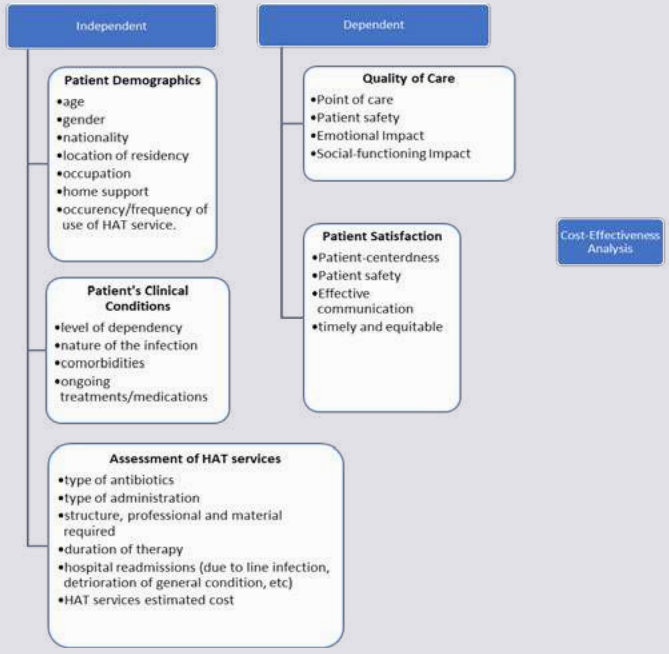
Objectives: This study evaluates the Outpatient Parenteral Antibiotic Therapy (OPAT) and Home Antibiotic Therapy (HAT) models, focusing on the implementation and outcomes of HAT in Malta. The primary aim is to explore the relationship between patient satisfaction, perceived quality of care, and cost-effectiveness, assessing whether HAT is a viable alternative to traditional inpatient care.

Methods: A retrospective, quantitative, cross-sectional study was conducted using patient feedback surveys and Activity-Based Costing (ABC) analysis. Participants included adults treated through the HAT service in 2022–2023, selected via purposive sampling. Data were collected through bilingual questionnaires and hospital records, with statistical analysis performed using SPSS.

Results: The findings revealed high patient satisfaction (mean score: 8.52/10) and strong perceived quality of care, particularly in communication and patient safety. Cost-effectiveness analysis demonstrated a 74.7% cost-saving compared to inpatient care, translating to €1.28 million over two years. A significant positive correlation was identified between patient satisfaction and quality of care.

Conclusions: The HAT service in Malta offers substantial benefits, including enhanced patient satisfaction, improved quality of care, and significant cost savings. However, variability in patient involvement and support highlights areas for improvement. These results support the broader adoption of HAT as an effective and sustainable healthcare model.

Keywords: "Outpatient Parenteral Antibiotic Therapy", "Home Antibiotic Therapy", "Patient Satisfaction", "Quality of Care", "Cost-effectiveness".



Graphical Abstract

Highlights:

- Home Antibiotic Therapy (HAT) is effective and enhance patient satisfaction, reducing hospital stays, and achieving significant cost savings, addressing a critical gap in Malta's localized healthcare research.
- Activity-Based Costing (ABC) analysis and patient feedback questionnaires were adopted and adapted for cultural relevance, to evaluate cost-effectiveness and quality of care comprehensively.
- HAT service increased in 74.7% cost-saving compared to inpatient care, avoiding €1.28 million in healthcare costs over two years while achieving high patient satisfaction (mean score: 8.52/10).
- A direct correlation between perceived quality of care and patient satisfaction was perceived, reinforcing the importance of patient-centered approaches in cost-effective healthcare delivery. This study provides evidence-based insights to support healthcare policy development, advocating for the scalability of HAT as a sustainable model for improving resource utilization and patient outcomes.

Abbreviations:

ABC - Activity-Based Cost
HAT - Home Antibiotic Therapy
MDH - Mater Dei Hospital
QoC - Quality of Care
PFQ - Patient Feedback Questionnaire
BSAC - The British Society for Antimicrobial Chemotherapy
OPAT - Outpatient Parenteral Antibiotic Therapy

Introduction

Outpatient Parenteral Antibiotic Therapy (OPAT) and Home Antibiotic Therapy (HAT) represent transformative advancements in modern healthcare, offering innovative solutions for managing infections requiring intravenous antibiotic treatments. It offers transitioning care from inpatient hospital settings to outpatient or home-based services, these models address critical healthcare challenges, including resource constraints, patient comfort, and cost-effectiveness. This article investigates the application and implications of these models, focusing particularly on the emerging adoption of HAT in Malta. Through a retrospective study, it was examined the correlation between patient satisfaction, quality of care (QoC), and cost-effectiveness of the HAT service in Malta.

OPAT has been widely adopted in countries such as the United States, the United Kingdom, and Australia, where it is supported by robust guidelines and specialized healthcare teams. The success of OPAT programs lies in their ability to reduce hospital stays, mitigate risks of hospital-acquired infections, and improve patients' quality of life while lowering healthcare costs. Conversely, Malta's journey with HAT is still in its infancy, introduced in 2016. The service aligns with global trends but is yet to be thoroughly evaluated for its feasibility, effectiveness, and impact on the Maltese healthcare system. This research aims to fill the existing gaps in localized studies, offering insights that can guide the development of effective and sustainable healthcare policies tailored to Malta's unique context.

This article is structured to provide a comprehensive overview of the topic, beginning with a discussion of OPAT and HAT services and the specific challenges and opportunities associated with implementing HAT in Malta. It explores the rationale and significance of this study, emphasizing the importance of localized research. The study's aims, objectives, research questions, and methodology are outlined, providing a clear framework for the subsequent analysis and findings. Finally, the article situates the research within the broader healthcare landscape, highlighting its potential contributions to improving patient care and optimizing healthcare delivery.

Outpatient Parenteral Antibiotic Therapy

OPAT is an established model of care that enables medically stable patients requiring long-term intravenous antibiotic treatments to receive these therapies outside traditional hospital settings. As noted by Chapman (2013), this approach has become integral to contemporary healthcare due to its numerous benefits, including reduced hospital stays, enhanced patient autonomy, and decreased healthcare expenditures. OPAT is particularly advantageous for managing chronic or complex infections, such as osteomyelitis, endocarditis, and skin or soft tissue infections, where prolonged antibiotic administration is essential.

Internationally, OPAT programs have demonstrated significant success, achieving high levels of patient satisfaction and substantial cost savings for healthcare systems (Dimitrova et al., 2021). Countries with established OPAT programs have invested in comprehensive infrastructure, including multidisciplinary teams, clear clinical guidelines, and efficient monitoring systems, which collectively ensure the safe and effective delivery of care.

Home Antibiotic Therapy in Malta

Malta presents a unique case for studying HAT due to its centralized healthcare system and geographical characteristics. As a small island nation with a compact population, Malta is well-positioned to leverage the benefits of home-based care models. The introduction of HAT in 2016 marked a significant step toward shifting the delivery of intravenous antibiotic therapy from hospitals to patients' homes. HAT aims to alleviate pressure on hospital resources, minimize risks of hospital-acquired infections, and enhance patient comfort and convenience.

However, the implementation of HAT in Malta faces several challenges. Limited research on the feasibility and effectiveness of HAT within the Maltese context raises questions about its overall impact on patient outcomes, healthcare costs, and resource utilization. Additionally, cultural factors, such as the acceptance of home-based care by both patients and healthcare professionals, may influence the adoption and success of the service. Despite these challenges, the potential benefits of HAT make it a promising avenue for healthcare delivery in Malta, warranting a thorough investigation into its implementation and outcomes.

Research Problem

The adoption and evaluation of HAT in Malta remain underexplored, creating a critical gap on the other hand international studies provide robust evidence on the efficacy, cost-effectiveness, and patient satisfaction associated with OPAT (Dimitrova et al., 2021; Gilchrist et al., 2022). This discrepancy underscores the need for research tailored to Malta's unique healthcare environment, including its centralized system, population demographics, and cultural attitudes toward home-based care.

Key issues include identifying barriers to HAT implementation, such as limited awareness, infrastructure challenges, and potential resistance from healthcare professionals or patients. Moreover, there is a lack of data on patient outcomes, quality of care, and satisfaction levels associated with HAT in Malta. Understanding these factors is essential for developing evidence-based policies and practices that ensure the successful adoption of HAT.

Cost-effectiveness is another critical aspect of evaluating HAT. Although a previous study examined the cost-effectiveness of HAT in Malta (Bugeja et al., 2021), there has been no comprehensive analysis linking cost-effectiveness with patient satisfaction and quality of care. By addressing these gaps, this research aims to provide a holistic understanding of HAT in Malta, contributing to the broader goals of improving healthcare delivery and resource optimization.

Rationale and Relevance of the Study

The motivation for this study stems from the researcher's professional experience as a full-time nursing professional in the HAT team at Mater Dei Hospital (MDH) since 2019. Observing the impact of intravenous antibiotic treatments on patients' health and well-being, alongside the transformative potential of the HAT service, highlighted the importance of linking patient satisfaction and quality of care to cost-effectiveness. Despite the evident benefits of HAT, its significance is often underestimated by hospital management and staff, emphasizing the need for localized research to inform policy and practice.

This study represents an opportunity to contribute to the improvement of healthcare delivery in Malta. By exploring the feasibility, effectiveness, and outcomes of HAT, the research aims to provide valuable insights for healthcare professionals, policymakers, and patients. It also underscores the importance of adapting healthcare innovations to meet the specific needs and circumstances of the local population, ensuring that services like HAT are accessible, effective, and sustainable.

Purpose, Research Questions, and Design

The primary aim of this study is to investigate the relationship between perceived quality of care and patient satisfaction among users of the HAT service in Malta. Additionally, it seeks to analyse the cost-effectiveness of HAT compared to inpatient antibiotic therapy and explore potential relationships between cost-effectiveness, quality of care, and patient satisfaction.

The study is guided by the following research questions:

1. What is the level of patient satisfaction and quality of care associated with the HAT service from a patient perspective?

2. Is HAT more cost-effective compared to inpatient antibiotic therapy?

3. If HAT is cost-effective, is there a relationship between quality of care, patient satisfaction, and cost-effectiveness?

A retrospective, quantitative, cross-sectional research design was adopted. Data on demographic characteristics, QoC and patient satisfaction were collected through questionnaires administered to patients who used the service in 2022 and 2023. The questionnaire utilised in this study was adapted from the questionnaire published by the British Society for Antimicrobial Chemotherapy in 2021 specifically for assessing the OPAT service offered in the United Kingdom (Gilchrist, et al., 2022). Additionally, an Activity-Based Cost (ABC) analysis was conducted to evaluate the costs associated with HAT compared to inpatient care. This approach provides a comprehensive understanding of the resources consumed and the efficiency of the service delivery.

Methodology

Study Design and Approach

This study research focused on three interrelated aspects: perceived quality of care, patient satisfaction, and cost-effectiveness compared to traditional inpatient antibiotic therapy. A positivist philosophical stance underpinned the study, emphasizing empirical evidence, structured methodologies, and statistical analysis.

To achieve these objectives, the research utilized a descriptive normative survey for gathering patient feedback on satisfaction and quality of care. Simultaneously, ABC analysis provided a structured evaluation of the cost-effectiveness of the HAT service. By combining these two approaches, the study ensured a comprehensive evaluation of both qualitative and quantitative aspects of the service.

The research was guided by hypotheses examining correlations between the independent variables (e.g., demographic factors, treatment characteristics) and the dependent variables (e.g., satisfaction, cost-effectiveness). This hypothesis-driven approach facilitated the systematic exploration of complex interactions within the HAT service framework.

Study Population and Sampling

The target population for the study comprised adult patients (≥18 years) who received intravenous antibiotic therapy through the HAT service during 2022–2023. These patients were identified as suitable for home-based treatment following discharge from MDH. The eligibility criteria included the following:

• Inclusion criteria: Patients referred by an infectious disease consultant, proficient in English or Maltese, and receiving treatment for at least five days.
• Exclusion criteria: Patients treated outside MDH or using the HAT service for less than five days, minors (<18 years), and those not fluent in the specified languages.

The intermediary, responsible for accessing patient records, identified 166 eligible participants from a database of 232 HAT episodes after applying the criteria. This total population was selected through purposive sampling, ensuring that the sample represented the diverse demographic and treatment profiles within the HAT service user base.

A bilingual questionnaire in English and Maltese was mailed to participants. Each mailing included an information letter detailing the study's purpose, a consent form (with implied consent upon return), and a pre-addressed envelope for confidentiality. This approach ensured inclusivity and participant convenience while maintaining ethical standards.

Research Tools and Instruments

Patient Feedback Questionnaire (PFQ)

The PFQ was adapted from the British Society for Antimicrobial Chemotherapy (BSAC) OPAT PFQ. This instrument, originally designed for assessing outpatient antibiotic therapy (OPAT) services, was customized to align with the study's objectives and the local context. Adaptations included translating the questionnaire into Maltese and modifying questions to reflect the specific characteristics of the HAT service.

The questionnaire underwent validation during a pilot study, which ensured cultural relevance, clarity, and comprehensibility. Key revisions included refining ambiguous terms (e.g., replacing "revizjonijiet medici" with "follow-ups medici") and adding an "N/A" response option to certain questions. These changes enhanced the instrument's ability to capture nuanced patient feedback.

A modified 5-point Likert scale (-2 to 2) was employed to harmonize the analysis of Likert-scale items with binary (Yes/No) and non-applicable responses. This scoring adjustment ensured consistency in data interpretation across different question types.

Activity-Based Costing (ABC) Analysis
ABC analysis was employed to evaluate the cost-effectiveness of the HAT service. This methodology involved systematically identifying and assigning costs to specific activities within the service, covering direct expenses such as staff salaries and transportation, as well as indirect costs like administrative overheads. Consumables (e.g., antibiotics, syringes) were excluded from the analysis, as they are standard across both inpatient and HAT services. The ABC analysis relied on detailed cost data, including staff time allocation calculated using the Full-Time Equivalent (FTE) method. Vehicle costs for house visits were derived from fleet usage data, converted to kilowatt-hour (kWh) consumption, and monetized using official Enemalta tariffs. This granular approach ensured accurate cost attribution for each service component.

Data Collection
The study utilized two primary data sources: patient questionnaires and hospital records. Data collection occurred between March and May 2024 and followed a structured protocol to ensure accuracy and completeness.

Patient Feedback Collection
The questionnaire was distributed via postal mail by the intermediary, who also included an information letter explaining the study and a stamped, self-addressed envelope for response submission. To maintain anonymity, questionnaires contained no identifying details, and participants were explicitly instructed not to include their names.

Responses were manually entered into Microsoft Excel and subsequently transferred to SPSS Version 29 for statistical analysis. A codebook was developed to standardize data classification and facilitate reproducibility. The Likert-scale responses were re-coded (-2 to 2) to align with the modified scoring system, enabling consistent analysis alongside binary and N/A responses.

Cost Data Collection
Cost data for the ABC analysis were compiled from hospital records, covering key variables such as staff salaries, vehicle usage, and patient service utilization. Data on hospital bed costs were sourced from official billing rates (€256.23 per day). Costs avoided due to HAT service utilization were calculated by comparing the total treatment duration (HAT days + hospital days) to the duration of hospitalization in the absence of HAT. This method quantified the financial impact of avoided hospitalizations.

Data was organized into multiple Excel sheets, capturing patient demographics, treatment variables, and cost components. This structured dataset facilitated the calculation of weekly and overall costs for HAT services and hospitalizations, forming the basis for cost-saving percentage analysis.

Data Analysis
Quantitative data were analysed using SPSS Version 29. Descriptive statistics summarized participant demographics, treatment patterns, and satisfaction levels. Inferential tests, including correlation analyses, evaluated relationships between independent variables (e.g., age, education) and dependent variables (e.g., satisfaction, cost-effectiveness).

For the ABC analysis, weekly costs of HAT and hospitalizations were calculated and compared using cost-saving percentage analysis. The formula used was:

$$\text{Cost-saving \% of HAT} = \frac{(\text{average weekly cost of inpatient} - \text{average weekly cost of HAT})}{\text{the average weekly cost of inpatient}} \times 100$$

Data collected through the pilot study
= (15630.03 – 3037.25) / 15630.03 = 0.806 * 100 = 80.6 %

Pilot Study
A pilot study was conducted to refine the research tools and validate the methodology. Twenty-three patients who used the HAT service between January and April 2024 were invited to participate, with an 87% response rate. Feedback from the pilot study informed several adjustments to the questionnaire, including language refinements and response option modifications.

The pilot also validated the ABC framework. Data showed an average treatment duration of six weeks, avoiding 913 hospital days, and achieving significant cost savings. Pilot findings confirmed the feasibility of the research approach and guided refinements for the main study.

Reliability and Validity Assessments
To ensure reliability, the pilot questionnaire's internal consistency was tested using Cronbach's alpha, which yielded a score of 0.595. Although this fell slightly below the ideal threshold (≥0.7), the small sample size of the pilot study was considered a limiting factor. Further validation with the full dataset was planned.

The validity of the questionnaire was assessed through content and construct analyses. Experts in outpatient antibiotic therapy reviewed the instrument to ensure comprehensive coverage of relevant domains. Correlation analyses revealed significant associations between key variables (e.g., perceived support and overall satisfaction), supporting construct validity.

Ethical Considerations
Ethical approval was obtained from the IDEA Academy Research Ethics Board and the Dissertation, Thesis, and Research Board. Institutional permissions were secured from MDH's CEO and Data Protection Officer. Additional approvals were obtained for using the BSAC questionnaire and for conducting the study within the HAT service.

Informed consent was implied through the voluntary return of questionnaires. Confidentiality and anonymity were strictly maintained, with the intermediary handling participant recruitment and data collection. All data were anonymized, securely stored, and destroyed after the study's completion.

Results

Patient Feedback and Quality of Care
Patient feedback forms a core element of the study, as it helps evaluate the overall performance of the HAT service. The questionnaire, designed to capture insights on quality of care, was assessed for reliability, achieving Cronbach's Alpha coefficients of 0.735 for patient satisfaction and 0.719 for quality of care. This confirmed the robustness of the survey tool.

In terms of specific feedback domains, patients rated communication highly. Their experiences with receiving clear instructions and comprehensive information reflected positively, with scores close to the upper end of the scale. Similarly, the aspect of patient involvement demonstrated favourable results, though it showed some variability in responses, particularly in the context of resuming daily activities. These findings suggest a largely positive but somewhat diverse perception of involvement.

The strongest results were observed in the "feeling of safety and freedom" domain, where patients valued the HAT service's ability to provide care in a secure yet flexible environment. Overall, the mean quality of care was rated positively, although there was significant variability across demographic groups. These insights underline the importance of tailoring care models to meet diverse patient needs.

Patient Satisfaction with HAT Service
Patient satisfaction emerged as a key strength of the HAT service, with an average score of 8.52 out of 10. This indicates that the majority of participants held a favourable view of their experience. However, notable differences in satisfaction were based due to demographic factors.

Gender differences were significant, with female participants expressing higher satisfaction and perceiving better quality of care compared to males. This discrepancy suggests that women may have a more favourable perception of the personalized and home-based nature of the HAT service.

Age group analysis revealed a gradual decline in satisfaction and perceived quality of care with increasing age. Younger participants, particularly those aged 18 to 50, reported the highest satisfaction levels, whereas the oldest group, aged 71 and above, reported the lowest. This trend suggests that older individuals may face additional barriers or have different expectations that influence their perceptions of care.

Living status also played a role in satisfaction levels. Participants living with family reported the highest satisfaction, reflecting the added support provided by family members during home-based care. Conversely, nursing home residents reported lower satisfaction levels, likely due to a lack of personalized family support or differences in care quality perceptions.

Accessibility and Demographic Insights
The study also examined the accessibility of the HAT service and its impact across various demographic groups. This analysis provides valuable insights into the inclusivity and adaptability of the service.

Living arrangements significantly influenced perceptions of care. Participants living with family not only reported the highest satisfaction but also rated the quality of care more favourably. This indicates that familial support may enhance the home-care experience. In contrast, nursing home residents may suggest that institutional settings may lack certain personalised care elements intrinsic to the HAT model.

Employment status revealed interesting trends. Employed individuals expressed the highest levels of satisfaction and perceived quality of care. This may reflect a better alignment of the HAT service with their active and independent lifestyles. Students and retirees also reported relatively high levels of satisfaction, whereas individuals in unspecified employment c ategories showed lower satisfaction and perceived care quality.

When analysing treatment administration methods, satisfaction remained consistently high regardless of whether care was provided by nurses, self-administered, or supported by family members. This consistency underscores the flexibility of the HAT service in accommodating various patient preferences and circumstances.

Correlation Between Satisfaction and Quality of Care
A critical finding of the study is the strong positive correlation between patient satisfaction and perceived quality of care. Statistical analysis revealed a correlation coefficient of 0.61, indicating a significant and meaningful relationship. This suggests that improvements in the quality of care directly enhance patient satisfaction, reinforcing the interdependence of these two critical metrics.

The positive correlation underscores the importance of maintaining high standards of care, particularly in communication, patient involvement, and safety. By addressing these dimensions effectively, healthcare providers can enhance overall patient experiences, leading to higher satisfaction levels.

Figure 1 presents all research findings on quality of care and patient satisfaction.

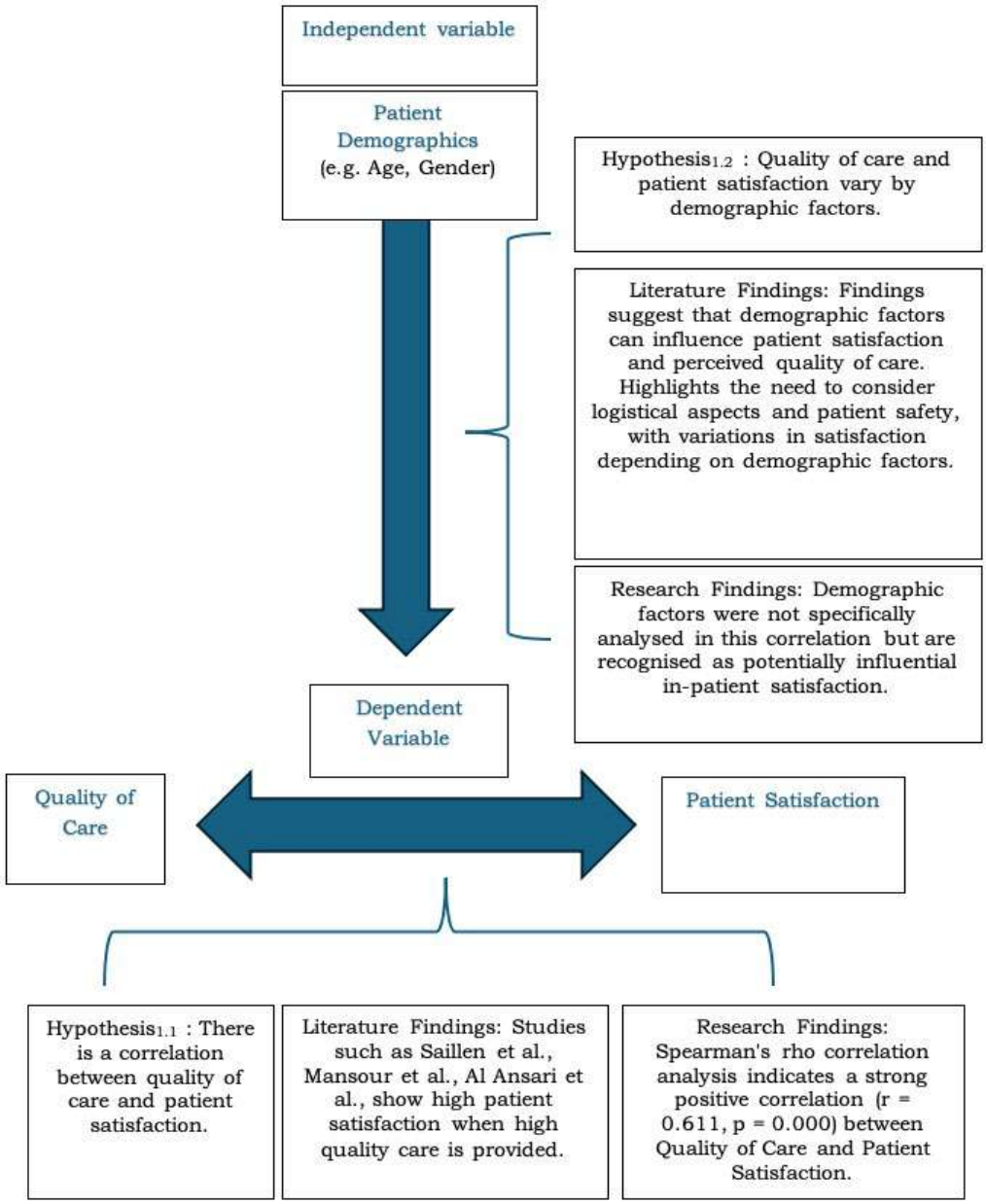


Figure 1 Research findings on quality of care and patient satisfaction.

Cost-Effectiveness of the HAT Service

A significant contribution of the study lies in its cost-effectiveness analysis, which compares the expenses of the HAT service to traditional inpatient care. Over a two-year period, the HAT service supported 232 treatment episodes, avoiding 6,675 hospital bed days. This translates into a total cost avoidance of €1,710,335.23 for inpatient care.

In contrast, the total expenditure for running the HAT service, including costs for consumables, staffing, and transportation, amounted to €430,747.94. The resulting savings of €1,279,587.29 highlight the substantial financial benefit of the HAT service.

The cost-saving percentage was calculated to be 74.7%, far exceeding the established threshold of 31.86% for cost-effectiveness. This underscores the economic advantage of delivering care through the HAT model, particularly for conditions requiring prolonged intravenous therapy. The findings strongly support the viability of transitioning to home-based care as a cost-efficient alternative to traditional inpatient models.

Figure 2 summarises all research findings on cost-effectiveness analysis.

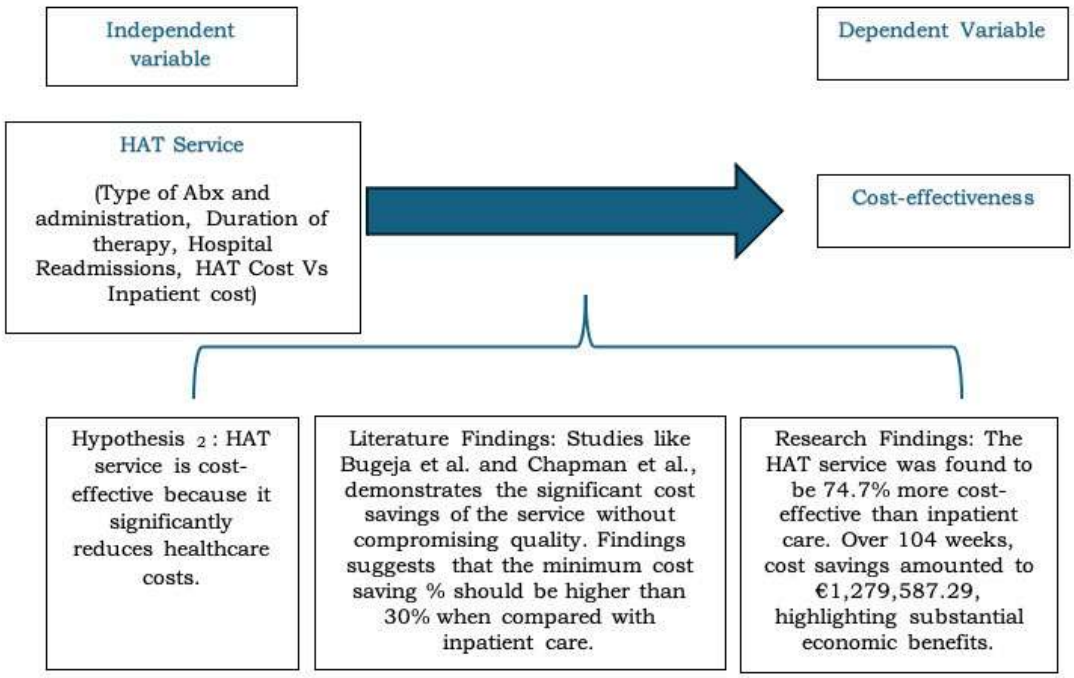


Figure 2 Research findings on cost-effectiveness analysis.

Contributions to Scientific and Practical Problems

The study provides valuable contributions to both scientific knowledge and practical healthcare solutions. It validates the HAT service as a viable model for addressing critical challenges in healthcare delivery. The findings have implications for policymakers, healthcare administrators, and practitioners.

On a scientific level, the study enriches the existing literature by quantifying the relationship between care quality and satisfaction in home-based models. It also introduces a robust cost-effectiveness analysis, offering evidence of substantial financial savings without compromising QOC.

From a practical perspective, the study highlights the potential of the HAT model to improve patient experiences while reducing the burden on healthcare systems. The insights on demographic influences offer a roadmap for tailoring services to meet diverse patient needs, ensuring inclusivity and equity in care delivery.

The study also provides a framework for future research and implementation, advocating for the scalability of the HAT service across different healthcare settings. By addressing both patient satisfaction and cost-efficiency, the findings pave the way for innovative care models that optimize outcomes for patients and healthcare providers alike.

The findings of this study demonstrate the HAT service's effectiveness in delivering high-quality, patient-centered care while achieving substantial cost savings. By reducing the reliance on inpatient care, the HAT model offers a transformative approach to healthcare delivery, with significant implications for policy and practice.

The results underscore the importance of patient satisfaction and quality of care as interdependent metrics. They also highlight the need to consider demographic factors in designing and delivering home-based care services. The cost-effectiveness analysis further validates the economic viability of the HAT service, making a compelling case for its broader adoption.

Discussion

This section interprets the results in relation to the study's hypothesis, acknowledges limitations, discusses the generalizability of findings, and offers practical and research-focused recommendations.

Patient Satisfaction and Quality of Care

One of the most notable outcomes of the study is the high level of patient satisfaction with the HAT service. Patients reported positive experiences across multiple dimensions, including communication, involvement in care, and a strong sense of safety and autonomy during treatment. Effective communication emerged as a critical factor, aligning with findings from prior studies, such as those by Mansour et al. (2019), which emphasize the role of clear communication in enhancing both quality of care and patient satisfaction. The HAT service's focus on consistent, transparent communication has significantly contributed to its perceived quality.

Patient involvement also received favourable feedback, with some variability across demographic groups. This indicates room for improvement in tailoring engagement strategies to meet diverse patient needs. Enhancing educational and support initiatives can bridge these gaps, ensuring more equitable involvement in care processes. The sense of safety and autonomy reported by patients underscores the positive impact of receiving treatment in familiar surroundings. This finding is consistent with research by Seaton & Barr (2013), which links patient involvement and choice to higher satisfaction levels.

Despite overall positive feedback, the variability in patient involvement points to the need for targeted strategies to improve consistency. By fostering deeper patient engagement and enhancing support systems, the HAT service can ensure that all patients benefit equally from its offerings.

Cost-Effectiveness of the HAT Service

The economic evaluation of the HAT service reveals its remarkable cost-effectiveness. Over two years, the service has saved approximately €1.28 million, with total cost savings of €1,710,335.25 against an expenditure of €430,747.94. This substantial financial benefit stems from reduced hospital bed days and optimized resource allocation. Importantly, these savings are achieved without compromising care quality. High levels of perceived quality—particularly in communication and safety—contribute to the service's success in promoting treatment adherence and reducing complications. Research by Chapman et al. (2009) supports this dynamic, demonstrating that high-quality care enhances both patient outcomes and cost savings. The ability of the HAT service to deliver effective treatment in a home setting not only improves patient well-being but also strengthens the healthcare system's resource efficiency.

Correlation Between Satisfaction and Cost-Effectiveness

A significant correlation between patient satisfaction and the service's cost-effectiveness was identified. Patients with higher satisfaction scores are more likely to adhere to treatment plans, resulting in fewer complications and reduced hospital readmissions. This relationship is supported by research from Al Ansari et al. (2013), which links patient satisfaction with cost savings through better treatment compliance.

The study identified out-of-hours support as an area requiring improvement. Strengthening these support mechanisms can further enhance patient satisfaction, adherence, and overall cost-effectiveness. Ensuring timely responses to patient needs is essential for optimizing both patient experiences and economic outcomes.

Correspondence of Results to Study Hypothesis

The study hypothesized that the HAT service would be cost-effective while maintaining high levels of patient satisfaction and perceived quality of care. The findings strongly support this hypothesis. Over two years, the HAT service saved 6,675 hospital bed days, yielding a net cost saving of €1,279,587.31. This 74.7% cost-saving percentage aligns with findings from comparable studies, such as those by González-Ramallo et al. (2017) in Spain (80% savings) and Chapman et al. (2009) in the UK (61% savings). These results underscore the economic advantages of home-based treatment, demonstrating its viability as a cost-effective alternative to inpatient care.

The high patient satisfaction score (mean: 8.52) further validates the hypothesis. Key drivers of satisfaction included effective communication, patient involvement, and a strong sense of safety and freedom. These findings are consistent with literature indicating that patient-centered approaches enhance satisfaction and adherence to treatment plans (Seaton & Barr, 2013; Mansour et al., 2019). The HAT service's high perceived quality of care, particularly in communication and patient safety, corroborates the hypothesis that outpatient therapy can deliver care standards comparable to or better than inpatient care.

Generalisation of Results

The findings of this study are particularly relevant to healthcare systems with resource constraints, as the HAT service demonstrates a model for efficient resource utilization and cost savings. The inclusion of a diverse patient population spanning various medical and surgical specialties strengthens the generalizability of the results, making them applicable across different patient groups and healthcare settings.

However, the study focuses on a single healthcare institution in Malta which may limit its broader applicability. Healthcare systems vary in terms of infrastructure, cost structures, and cultural attitudes toward home-based care. For instance, the cost-saving percentage observed in this study aligns closely with findings from Spain and the UK but differs from Brazil (31.86%) due to differing healthcare systems and cost structures (Psaltikidis et al., 2018). Future research across multiple sites and healthcare contexts would enhance the generalizability of the findings.

Limitations of the Study

Despite its strengths, this study has limitations that may affect the interpretation and application of its results.

1. Reliability and Validity of the Questionnaire

The questionnaire used for data collection, adapted from the British Society for Antimicrobial Chemotherapy, lacked prior validation and reliability testing. Although the pilot study mitigated this limitation to some extent, the absence of a widely validated tool introduces potential biases in measuring patient satisfaction and perceived quality of care.

2. Variability in Patient Experiences

While overall feedback was positive, variability in responses—particularly regarding patient involvement and out-of-hours support—indicates disparities in patient experiences. This variability highlights the need for targeted strategies to address these gaps.

3. Short Follow-Up Period

The study's two-year duration limits its ability to capture long-term outcomes, such as sustained cost-effectiveness and patient adherence. Extending the follow-up period in future research could provide deeper insights into the long-term benefits and challenges of the HAT service.

4. Subjectivity of Self-Reported Data

Measures of patient satisfaction and quality of care rely on self-reported data, which are inherently subjective and influenced by individual expectations and experiences. This subjectivity introduces potential response bias.

5. Lack of a Control Group

The absence of a control group receiving traditional inpatient care restricts direct comparisons between HAT and standard care. Incorporating a control group in future studies could strengthen the evidence base.

6. Limited Economic Scope

While the study demonstrated significant cost savings, it did not account for indirect costs, such as those associated with complications, caregiver burden, or long-term health outcomes. A more comprehensive economic analysis would provide a fuller picture of the HAT service's financial impact.

Conclusions

This study has provided a comprehensive evaluation of HAT in Malta, focusing on its impact on patient satisfaction, perceived quality of care, and cost-effectiveness. The analysis has yielded several key findings that underscore both the benefits and areas for improvement within the HAT service.

The study concludes that the HAT service in Malta successfully integrates patient satisfaction, quality of care, and cost-effectiveness, making it a valuable component of the healthcare system. Its ability to deliver high-quality treatment at reduced costs highlights its potential for broader implementation and expansion. However, addressing gaps in patient involvement and support systems will be vital to maximizing its effectiveness and sustainability.

Future research is necessary to explore the long-term impact of the HAT service, compare its benefits with alternative care models, and assess how technological advancements can enhance patient care. By focusing on continuous improvement and education, the HAT service can remain a cornerstone of efficient, patient-centred healthcare in Malta, offering significant benefits to both patients and the healthcare system.

Suggestions for Practical Application
The results of this study provide a robust foundation for scaling and optimizing the HAT service. Practical recommendations include:

1. Enhancing Patient Involvement
Addressing variability in patient involvement requires structured educational programs to empower patients. Providing comprehensive resources and personalized care plans can improve engagement and satisfaction.

2. Improving Out-of-Hours Support
Variability in satisfaction with out-of-hours support highlights the need for robust support systems. Establishing dedicated helplines, on-call teams, or digital communication platforms could address this gap.

3. Streamlining Treatment Administration
The predominance of once-daily antibiotic administration (76%) simplifies treatment regimens, but the HAT service should continue exploring innovative administration methods, such as wearable infusion devices, to further enhance convenience.

4. Integrating Feedback Mechanisms
Continuous feedback collection from patients and caregivers can help identify areas for improvement, ensuring the service remains responsive to patient needs.

5. Promoting Multidisciplinary Collaboration
The high cost of nursing staff underscores the importance of multidisciplinary teams. Collaborating with pharmacists and leveraging telehealth could reduce costs while maintaining high-quality care.

6. Advocating for Policy Support
The demonstrated cost-effectiveness of the HAT service should inform healthcare policy, advocating for increased funding and support for home-based care initiatives.

Suggestions for Future Research
Building on the insights from this study, future research should address the following areas:

1. Longitudinal Studies
Extending the follow-up period to capture long-term outcomes, such as sustained cost savings, patient adherence, and quality-of-life improvements.

2. Validation of Tools
Developing and validating standardized tools for measuring patient satisfaction and quality of care in outpatient settings.

3. Control Group Comparisons
Incorporating control groups receiving traditional inpatient care to enable robust comparisons of outcomes, satisfaction, and costs.

4. Exploring Broader Economic Impacts
Conducting comprehensive economic analyses that include indirect costs, such as caregiver burden and societal costs.

5. Evaluating Technological Interventions
Investigating the role of digital health technologies, such as telemonitoring and AI-driven decision support, might enhance the efficiency and effectiveness of HAT services.

6. Cross-Cultural Studies
Replicating the study in diverse healthcare systems to evaluate the adaptability and impact of HAT services across different cultural and economic contexts.

7. Patient-Centered Innovations
Exploring novel approaches to improve patient engagement, such as gamification of treatment adherence or community support networks.

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Conflict of Interest

The researcher is a Senior Staff Nurse at the HAT service under study. The researcher had no direct contact with any of the research participants, avoiding any bias.

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07 Investigating Problems in Employment Faced by Maltese Manufacturing Plants: In Particular, the Labour Shortage Crisis

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Abstract

Objectives: The objective of this research was to assess the challenges and competitiveness in the local labour market due to the lack of qualified local employees and the rise of foreign workers. The EU membership has significantly impacted the manufacturing industry, making Malta a popular job destination for foreign nationals. The study investigates the reasons local employees avoid the manufacturing sector, including stigma, public perception, shift towards smart technology, reputational issues, workforce perspectives, foreign influx, required skills, and reasons individuals are not interested in applying for jobs in the industry.

Methods: A study was conducted on a Gozo-based company and a Malta-based company to assess group cohesiveness and similarities. The study involved in-depth interviews, questionnaires, focus groups, and ethnographic analysis with 95 individuals from six cohorts. The thematic approach was used for data interpretation, capturing significant aspects of the research question.

Results: The Maltese Islands' employment situation has evolved due to a focus on innovation and digitalization, requiring increased research, technology adoption, and improved output quality. Local workers are unwilling to work low wages and in low-educated environments, while foreigners are more willing to work in higher-paying countries. Public sector work offers during elections encourage turnover rates, but no evidence suggests that foreign employees' increased numbers are due to lower wages than Maltese employees.

Conclusions: The study aims to provide insights into the Manufacturing industry and suggests a nationwide evaluation of Maltese integration with foreigners to evaluate public perception, service quality, and employer's foresight. It also recommends the continuous assessment of skills, increased educational involvement, and the development of a database for stakeholder information.

Keywords: "Manufacturing Industry", "Local employees", "foreign employees", "Labour Shortage", "Challenges/opportunities".

Employment by sector and by nationality Dec-2022	Gozo Employement by Economic Sector		Malta Employement by Economic Sector		Employed EU Nationals		Employed Third Country Nationals	
Economic sector								
Agriculture, forestry and fishing	516	0.14%	2,149	0.60%	95	0.03%	343	0.10%
Manufacturing + Mining and quarrying	1,244	0.35%	22,256	6.19%	2345	0.65%	5323	1.48%
Construction	1,793	0.50%	16,536	4.60%	2001	0.56%	8065	2.24%
Wholesale, retail trade, and motor vehicles/motorcycles repair	1,700	0.47%	30,138	8.38%	7026	1.95%	10761	2.99%
Accommodation and food services	1,433	0.40%	17,692	4.92%	3756	1.04%	9475	2.63%
Financial and insurance services	502	0.14%	13,099	3.64%	3016	0.84%	1786	0.50%
Administrative, support services, professional, scientific and technical duties	2,636	0.73%	47,650	13.25%	7846	2.18%	16726	4.65%
Public administration, defence, and compulsory social security	1,254	0.35%	15,740	4.38%	1950	0.54%	4918	1.37%
Arts, entertainment and recreation	367	0.10%	13,158	3.66%	6405	1.78%	2483	0.69%
Other service activities	285	0.08%	5,568	1.55%	1017	0.28%	1635	0.45%
	15,669		247,092		35457		61515	
Total employed persons	359,733							

Table 1: Top 10 Employment status by nationality Dec-2022
Source: own calculations using administrative data provided by Jobsplus (Jobsplus, 2023a).

Highlights:

- Concerns about employment at two firms include foreign workers, local employee opinions, sector reputation, compensation, stress, language barriers, staff satisfaction, and training.
- Best practices to balance foreign worker recruitment with collaboration between research institutes, industry, and academics to foster technological advancements.
- The significant influence of advanced systems, STEM capabilities, skills, innovation, and digitalization on the global competitiveness.
- Identify challenges, develop innovative strategies, anticipate future needs in a culturally diverse workplace, and prioritize staff motivation.

List of Abbreviations:
EURES- European Network of Employment Services
GDP- Gross domestic product
IIOT- Industrial Internet of Things
IoT- The Internet of Things
IT- Information technology
NSO- National Statistics Office
OECD- The Organization for Economic Cooperation and Development
R&D- Research and development
SSI- semi-structured interviews
STEM - Science, technology, engineering, and mathematics
TCN- Third country nationals
UoM- University of Malta

Introduction

Background of the Study

The manufacturing industry has undergone significant transformation, presenting both opportunities and challenges. The McKinsey Global Institute's analysis shows that manufacturing functions are evolving, necessitating higher education and training (Manyika et al., 2012). As countries develop, their focus shifts to innovation, productivity, and trade over growth and employment. Finding and keeping talent, particularly in fields like engineering, robotics, and data science, is challenging. During the EURES survey (2023), most countries, including Malta, have identified shortages in these fields, which require STEM credentials at all levels.

Malta's manufacturing sector, despite its global value, is often underappreciated and associated with young people struggling with education. The Maltese Chamber of Commerce reports that the sector needs more attention and investment (Grima, 2019). Marisa Xuereb, Managing Director of Raesch Quarz, and Mr. Cachia, Chairman of the Manufacturing and Other Industries Economic Group, emphasize the need for talented individuals and local workers in the industry, focusing on competitive remuneration, partnerships, and shift-based benefits (Grima, 2019). Malta's status as a smart manufacturing hub attracts high-quality production and overseas investment (Azzopardi, 2019). Malta Enterprise Chairman, William Wait, calls for transformation in perceptions as the industry adapts to new technologies (Grima, 2019).

The Maltese manufacturing industry

The Times of Malta and the European Commission have identified a labour shortage in the Maltese manufacturing industry due to an aging workforce, education gap, and negative perception of manufacturing (Cutajar, 2022). The Malta Employers Association (MEA) has also identified a low birth rate as a significant human resources gap, potentially hindering economic growth and affecting expertise levels (MEA, 2021). The European Employment Services (EURES, 2023a) highlights the lack of skills required by local companies in the European labour market as a major contributor to labour shortages. Lifelong learning is crucial for the trade market, and businesses prefer hiring Maltese workers due to their reliability, ease of training, and communication (Cutajar, 2022, MEA, 2021). The European Commission has identified challenges in Malta's labour market, including low elementary skills, low-skilled staff, low learning participation, and high school leaver rates (Cutajar, 2022).

The Current situation of the Maltese Labour Market

Malta's manufacturing sector, accounting for over 11% of the island's workforce, offers stability and employment to thousands of people. As of August 2022, Malta has over 51,167 full-time public sector employees (NSO, 2023). The Malta Chamber of Commerce, Enterprise, and Industry has highlighted the challenges faced by private businesses in Malta due to the high number of public employment opportunities, a lagging education system, ineffective recruitment measures, and poor retention of skilled foreign workers. Additionally, infrastructure, industrial space, high payroll, and energy costs also pose challenges (Malta Independent, 2022a). In Malta, 63.3% of the population was employed in Q4 2022, with cleaners, clerks, salespeople, building construction labourers, and waiters as the top five occupations with the most vacancies (EURES, 2023). The National Statistics Office (NSO) (2023a) reported that 87.6% of the workforce were full-time, while 12.4% were part-time. Self-employed individuals made up 15.0% of the overall working population.

The National Statistics Office (NSO) (2023a) reported that 87.6% of the workforce were full-time, while 12.4% were part-time. Self-employed individuals made up 15.0% of the overall working population. The 2023 National Statistics Office reported an 8.4% increase in registered full-time employment in March 2022, while part-time employment increased by 3.6%. From March 2022 to March 2023, private sector employment increased by 10.9%, while full-time employment in the public sector fell by 0.2%. As at March 2023, the National Statistics Office reported a significant increase in male full-time employment by 8.9%, while female full-time employment saw a 7.7% increase (NSO, 2023).

Industrial Revolution

The manufacturing industry is transitioning from traditional roles, causing businesses to struggle to find qualified talent. Such transformation requires professionals to combine engineering capabilities, traditional industrial skills, and soft skills (IBM Commerce Report, 2016). The Skilled Workforce for Strong, Sustainable, and Balanced Growth report emphasizes the global significance of skill development for both younger and existing workforce generations (International Labour Office, 2011).

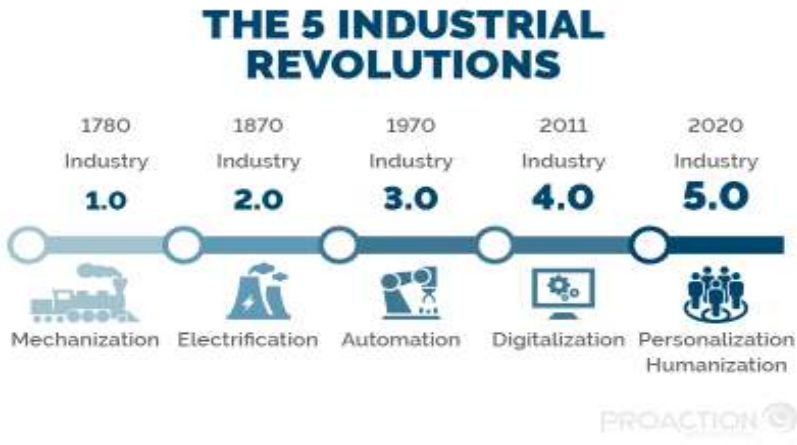

Figure 1: The 5 Industrial Revolutions
Source: proactioninternational.com

Industry 4.0 and Industry 5.0 are concepts focusing on human-machine collaboration, robotic precision, and virtual reality for unique industrial operations (Bandyopadhyay, 2022). Achieving full potential requires a gradual transition from one maturity level to another. The European Union prioritizes employees, adopts new technologies for growth, and aligns with I4.0 for long-term sustainability, circular economics, and generative practicality (Kraaijenbrink, 2022). The maturity model for Industry 4.0 measures a company's digital transformation and integration, with six phases each requiring distinct actions and expenditures (Ganesh, 2023; and Dikhanbayeva et al., 2013).

Research Questions

For the accomplishment of this study, an inductive qualitative technique was used. Such an approach prioritizes understanding the context of research, emphasizing how researchers frequently aim to comprehend behaviour, values, beliefs, and other key factors within that context. Azungah (2018) adds that qualitative research will give context and clarity for the study subjects. Furthermore, qualitative research empowers researchers to construct concepts, perspectives, and understandings based on patterns observed in the collected data. As a result, it is necessary to comprehend why Maltese individuals, regardless of education level, choose not to apply for positions in the manufacturing sector, resulting in increasing staff turnover. This research focuses on two industrial firms in Gozo and Malta, evaluating the causes behind foreign immigration requests, and the economic impact of foreign worker migration to Malta since 2004's EU accession, and the standard of work.

The study investigates the response of Maltese manufacturing plants to labour shortage crises, analysing their impact on businesses, the labour market, and public perception, while also identifying strategies for workforce retention and attracting new applicants.

This contextual research centres its investigation on the following question;

• What is causing the manufacturing in Malta to face labour shortage crisis?

Followed by four secondary research questions which explores the reasons;

• RQ1- Why Maltese Nationals are less attractive to apply for jobs in the manufacturing sector?
• RQ2- Is the impact of foreign employees, reducing opportunities to Maltese Nationals?
• RQ3- How the quality of work of foreign employees is compared to Maltese employees - are they more productive, and is their quality level better than that of Maltese employees?
• RQ4- What approaches and incentives can manufacture companies implement to attract local employees?

Moreover, the study highlights the significant challenges faced by manufacturing businesses in Malta, including labour shortages, skills shortages, wages, and increased material and component costs. A survey by EY and the Malta Chamber of Commerce, Enterprise, and Industry revealed employment shortages as a significant challenge for manufacturing businesses in Malta (Malta Chamber, 2022).

Methodology

The study explores the manufacturing industry's theoretical, policy, strategic, and academic foundations, examining whether repetitive jobs have benefited foreign workers, particularly third-country nationals, despite poor pay. Malta's rapid expansion and globalization have led to concerns about increasing foreign migration. The study also highlights the importance of innovation in changing business structures, considering factors like corporate size, market dynamics, and competitiveness. This interdisciplinary field presents new opportunities and challenges for industry, business leaders, and policymakers, highlighting the need for a comprehensive understanding of the manufacturing industry (Malerba et al., 2016; Mancini, 2021).

The study analysed the reasons behind the lack of local workers and the influx of foreigners in Malta's manufacturing industry, considering factors like capabilities, skills, education, and advanced manufacturing technology. The research aimed to assess the current characteristics of modern technologies and future improvements for the sector considering industry 4.0 needs. It used a qualitative approach for data analysis and explored the shift towards smart technology in manufacturing, highlighting challenges in finding local workers and the need for an upgrade of the entire supply chain for future competitiveness.

Research Approach

The study utilized Gabriel's (2013) inductive research model, based on qualitative ethnographic analysis, to investigate manufacturing issues. Open-ended and closed-ended questions were used to gather evidence, opinions, attitudes, and behaviours from respondents. The study focused on conversations, debates, words, phrases, and narrations rather than numerical data. Streefkerk (2019) emphasizes the importance of qualitative research in understanding individual social realities. The study highlights the significant influence of advanced systems, skills, innovation, and digitalization on the global competitiveness of the manufacturing industry, highlighting the shift in technology production. The strategy helped understand employee experiences in the workplace, focusing on manufacturing concerns and cultural environments, contributing significantly to knowledge development on the topic (Creswell, 2014; Losekoot and Wright, 2012).

Research Instruments

The research problem involved using various instruments like interviews, online surveys, focus groups, and ethnographic observation to gather feedback on manufacturing employee shortages and foreign influx, with in-depth, semi-structured interviews (SSI) tailored to each category:

• HR Representatives
• Departmental managers, both locals and foreigners
• Local employees
• European nationalities employees
• Third-country nationalities employees
• Former employee's

Following a literature study, the author developed six questionnaires, one for each cohort schedule to gather workers' opinions, HR representatives' incentives, skill requirements, turnover, and local application rates to identify strategies for workforce retention and attract new applicants in the Maltese manufacturing sector.

The On-line Survey Approach

The study utilized an online survey method to collect data from two manufacturing plants, employing semi-structured questionnaires. According to Price et al. (2015), this strategy is versatile and can be applied to various research concerns. The researcher utilized client assistance to select a suitable group of respondents, ensuring a comprehensive and effective study. The questionnaire was designed to address research questions by focusing on what, how, and who to ask. It was drafted with ex-colleagues to gather feedback from a diverse audience, following Sanders et al.'s (2021) guidelines. This ensured participants understood the question in its intended context, avoided unintentional bias, and had a parallel understanding of the question's purpose.

In-Depth Interview

The study conducted in-depth interviews with foreign participants using open-ended questions, ensuring body language and questioning were not influenced. The aim was to understand the topic and facilitate the exchange of opinions and perceptions. Research interviews facilitate interaction, communication, and understanding of participants' concepts, preventing language barriers and fostering rapport. This approach helps uncover the studied facts and avoids misleading information, as per Hussein (2022).

Focus Group

The study used exploratory and explanatory methodologies, including a focus group of mixed-nation department managers, to understand trends and patterns between two manufacturing companies. The research aimed to analyse data on the issue of the absence of local employees and the influx of foreigners. The focus group considered industry impact, stakeholders' perspectives, skills, education, initiatives, and experiences. Group dynamics, focus group responses, and body language provided more nuanced feedback than individual interviews (Tegan, 2021).

Ethnographic Research

Given the nature of the study, an ethnography design was applied to analyse data from production department operators to answer the research questions. This qualitative research, as defined by Denzin and Lincoln (2003), aimed to understand occurrences and society in scenarios, providing a comprehensive understanding of the crisis among industry participants. Methods used included focus groups, interviews, articles, journals, data observation, participant observation, and the researcher's impression and perception. The observation research provided valuable insights into employee interactions and cultures, enabling the application of new data and enhancing our comprehension of the situation.

Non-Probability Sampling

The study examined the impact of company capacity on issues in two local manufacturing industries in Malta and Gozo. The medium-sized company had up to 250 employees, while the large-sized company had over 1000 employees. The non-probability sampling method was used, focusing on real-life situations rather than statistical inferences as explained by Yin (2003). The sample size was determined based on research goals, participant willingness, data collection techniques, and available resources. The researcher followed Showkat & Parveen's (2017) criteria to reduce biases and mistakes, employing the Purposive sampling approach, which allowed participant selection based on the researcher's assessment.

Thematic Approach

The study utilized Braun and Clarke's (2006) thematic method to identify common themes in data, focusing on respondents' experiences and how the material addresses the research question. The chosen themes provided structured responses and coherence, highlighting a significant feature of the research topic.

Themes	Sub-themes
Human Resources	Recruitment, workforce aging
Employment of Local workers	Satisfaction, resources, opportunities
Employment of foreign workers	Challenges, language barriers, culture impacts, inclusivity, communication
Labour market	Benefits, salaries, competitors, challenges, politics
Operations	Impact on production, training, operational activity
Skills and competencies	Qualifications, skills diversity, skills shortage
Manufacturing competitiveness	Future advance technology, techniques and processes, benefits and challenges

Table 2: Themes and sub-themes category
Source: Author

These seven themes as shown in Table 3 provide a crucial component for understanding local nationals' views on the manufacturing sector, the reasons behind younger generations' lack of interest, and the viewpoint of foreigners and its significance for the manufacturing industry.

Results & Discussion

Findings

Both companies have a diverse workforce, with two Maltese national women in human resources. The increase in employees with EU and third-country nationalities is due to a shift in nations, cultural origins, socioeconomic levels, ethnic backgrounds, and habits, coincided with the significant influx of foreign labourers in the Maltese Islands. In 2023, only 1% of Maltese and Gozitans applied for work in Company A's manufacturing sector, with 95% being third-country nationals and 4% EU citizens. Company B had 77% TCNs, 8% EU nationals, and 15% Maltese applicants. Company B employs over 1,000 people, with 38% locals and 62% foreigners, representing over 50 nationalities, compared to Company A's 52% foreigners and 48% locals. Company A primarily employs local workers in assembly areas, performing repetitive work. Technical positions are dominated by males, with 16.67% being locals, 16.67% EU nationals, and 66.66% third-country nationals. Females make up 33.34% of managerial positions, while males dominate with 66.66%. There is no managerial position among TCN workers, dominated by EU nationals. Local workers receive higher monthly salaries than foreign workers, with local employees having over 7 years of experience and 4.5 years in Company B. Foreign workers have over 1.5 years of experience and work longer shifts and later hours. The study revealed that foreign respondents' work satisfaction varied across two companies, with 83.3% being very satisfied and 16.7% finding their current position challenging. Maltese citizens in production line operations found their jobs very satisfactory, while local respondents found their roles significant and challenging. A small percentage of employees with diplomas believed they could do more and saw limited career advancement opportunities. Participants from company B expressed that they have much to learn and grow, but low wages hinder sustainable growth.

Workforce Aging

The working-age population is decreasing, posing a risk to the industry's skilled workforce. The Gozo Company, employs a majority of its workforce aged 35-65, with only 1.5% of its workforce aged 18-24. In contrast, the Maltese company employs 15 people aged 18-24, accounting for only 0.83% of its total overhead. Many youths believe industrial occupations are underappreciated and lack creativity. 72% of former participants and internal workers in Malta and Gozo would not recommend a manufacturing profession to their children due to lack of career prospects. However, 28% believe in a better future, highlighting the power of advanced manufacturing technology in connecting educational institutions, creativity, technological advancement, robotics, and business creation.

In preparation for an aging workforce, the two research participants are addressing the loss of experience, skills, and knowledge in an aging workforce by offering opportunities for learning and skill development. They highlight how advanced manufacturing technology connects educational institutions, creativity, technological advancement, robotics, and business creation, elevating the advanced sector to an economic role model and fostering innovation.

Employment of Local workers

Primary factors show that local nationals find manufacturing positions are less appealing to local nationals due to low wages, lack of opportunities, and inadequate working hours. Government ministries and public departments offer less demanding work opportunities, which locals take advantage of. The manufacturing industry is not appealing to the younger generation, and strict work schedules make it difficult to be flexible with employees. Companies prefer hiring local workers due to the lack of language barriers and the preference for quality over quantity. However, hiring foreigners offers flexibility and job preferences, but each has its advantages and disadvantages. Local workers are preferred due to their superior quality and care, while foreigners, mainly TCNs, face difficulties in obtaining work permits and residence cards. European citizens have rights that allow them to work instantly in any EU nation.

Local respondent's outlook

Locals generally have a positive relationship with foreigners and are open to working with them. However, the language barrier is a noticeable obstacle. Foreigners accept all assigned tasks without dispute as long as the money comes in and they don't worry about extra work on weekends or holidays. Foreigners are perceived favourably by locals, as they typically come without family and have few obligations, making their schedules easily adjusted. This leads to both organizations hiring foreign labour to cover staff shortages, despite the possibility of worse job quality than local workers.

Overall respondent's outlook

Despite advancements in technology is reducing physical strain on workers, the Gozo firm employee's express dissatisfaction with the wage package, with 83% dissatisfied, 3% neutral, and 14% satisfied. In Malta, 78% of the staff were dissatisfied, while 22% were neutral. This is concerning given the increased cost of living and inflation. The minimum wage is insufficient to sustain a family, paying rent, and other expenses, leading to part-time work if overtime is not available. Most foreign workers share flats or rooms due to financial constraints, and some participants believe the country is heading towards poverty and homelessness among mainly foreign workers, as many may leave for better opportunities.

Effect on Operations

The skills gap is causing difficulties for managers and supervisors to oversee employees' performance due to a scarcity of local staff and the need to hire international labour. The main issue is language barriers, which limit communication and integration, reducing efficiency and work quality. This is due to employees' misunderstandings of task requirements and work culture. Eliminating communication errors is crucial as they negatively impact productivity. Locals have positive perceptions, attitudes, and commitment, while foreign workers have a significant impact on meeting labour demands and a less positive quality. However, the quality of work depends on individuals, not ethnic groups.

Companies are funding internal employee training, mentorship, and digital skills development programs to educate workers, academic institutions, and the manufacturing industry about suitable career paths, aligning with industry capacity and skill requirements.

The Global manufacturing growth

The global manufacturing industry is a key driver of economic growth and technical advancements, with innovation shaping industrial structures. HR departments emphasize the need for a strong vision, leadership team, supportive culture, flexibility, reliability, secure systems, data management, skilled labour force, continuous training, a cooperative ecosystem, and sustainable systems. Modern manufacturing involves assessing maturity, setting goals, planning, monitoring, and evaluating progress to regulate strategies and tactics (Dikhanbayeva et al. 2013; Proenca 2016).

Malta`s labour Market

Malta's labour market is resilient and dynamic, with low unemployment rates. The National Statistics Office (2024b) reported that only 706 males and 351 females were unemployed. The Gozo HR Director highlighted that jobs requiring physical labour or repetitive duties are not sought by locals, creating opportunities for third-country nationals. The manufacturing sector has become tight in attracting individuals due to larger salaries and higher education.

Companies are working with policymakers to address workforce shortages and adapt to new dynamics, with the help of other companies.

Drivers of Change in the Manufacturing Industry

The manufacturing sector is facing challenges due to the changing nature of work, leading to a shortage of qualified talent. The Fourth Industrial Revolution has introduced advanced robotics, automation, artificial intelligence, and biotechnology. Businesses must adapt by combining engineering, traditional industrial skills, and soft skills to maintain a competitive edge. Managers emphasize the need for collaboration between businesses and governments to address industrial disruptions caused by the 4th and 5th Industrial Revolutions. Rob Mesirow, leader of PwC Connected Solutions/IoT practice, emphasizes the importance of extending technology adoption through training, upskilling, and creating opportunities for manufacturing to appeal to future generations (Fretty, 2019). Companies without IoT are falling behind competitors, and Forbes highlights the shift in technology, virtualization, and digitization during the pandemic as driving digital transformation (Marr, 2021). The study suggests that the growth of businesses is not influenced by their size, but rather by their structural policy efforts to improve growth and overcome economic and environmental challenges. This includes increasing investment, productivity, and labour force participation. So, the exasperating question to ask is: What are businesses and policymakers doing to reap benefits, retain their workforce, and attract more youngsters to the manufacturing sector? The research suggests that businesses and policymakers need to change the perception of manufacturing and the meaning of jobs within the sector, with the support of academic and governmental institutions. The study also highlights the increasing skill levels in manufacturing processes, which could lead to higher value added as we approach the fifth Industrial Revolution.

Employment, skills, and competencies

The 4th industrial revolution demands skilled, innovative, and technological workers, necessitating proactive planning and preparation. HR directors of companies express concerns about employment effects and urge businesses, governments, and individuals to seize opportunities and prepare for future skills requirements.

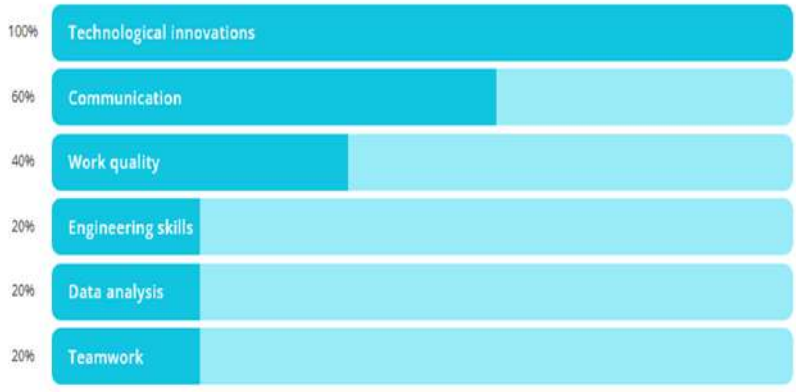

Table 3: List of skill deficiencies encountered by both companies
Source: Author

Reyes and Wellener (2021) and Hennessey (2022) suggest that increasing the availability and capacity of training programs for technical and digital skills in manufacturing professions could be a potential solution. They suggest collaborating with stakeholders like educational institutions, governmental organizations, business associations, and community organizations to create talent environments for future careers. Departmental managers emphasize the need for STEM education to strengthen science, technology, engineering, and math education, which is crucial for global competitiveness. The manufacturing sector's sustainable growth vision should align with the appropriate skills match, attracting more people and determining future manpower requirements. The survey revealed that 83% of managers felt their workload was negatively impacted by skill shortages, leading to disruptions and resource constraints.

Company B, on the other hand, has stepped up its efforts by supporting internal staff training, mentoring, and digital skills development initiatives. These programs aim to educate workers, academic institutions, and the manufacturing industry about suitable career paths. To create a competitive advantage, companies must invest in new or modified knowledge practices, be flexible, and collaborate on knowledge to adapt and recreate the supply chain (Castaner & Oliveira, 2020). This can be achieved by investing in innovation and technology, enhancing staff knowledge updates, and fostering innovative research streams. Malta Enterprise Support Measures provide incentives for businesses to expand and thrive in their business and ongoing operations.

Strategies

Manufacturing companies are seeking academic and governmental support to address industry image issues, encourage diversity, equity, and inclusion in the workplace, and cultivate a sense of belonging and respect. Reyes and Wellener, (2021); (2022) emphasized on this approach to help organizations overcome obstacles and gain a competitive advantage.

Apprenticeship programs combine college-based learning with industry-based training, preparing students for their careers and enhancing technical competence and problem-solving skills. Gozo Company collaborates with the MCAST Institute to enhance creativity and problem-solving through hands-on experience. Departmental managers emphasize the importance of apprenticeship and industry training programs in attracting young talent and treating existing employees as valuable assets.

Deloitte (2023) suggests leaders adopt emerging manufacturing trends, minimize voluntary exits, embrace smart factory initiatives, and prioritize sustainability. To address recruiting challenges, companies should train existing employees for hard-to-fill positions and collaborate with educational institutions, focusing on sustainability. This reinforces the idea that manufacturers should be creative in their search for new employees.

Maltese Manufacturing Industry

Malta is a cost-effective industrial hub that facilitates trade between Europe, North Africa, and the Mediterranean Basin, transforming agricultural goods into semi-customized small batch products like food, apparel, accessories, and cosmetics (International Trade Administration,2021). Deguara (2024) shows how Malta ranks fourth for new business, surpassing larger countries like Spain, France, and Belgium. Based on existing research, it appears that as living standards increased and salaries increased over time, the country's competitiveness with respect to China, India, and North Africa declined. As a result, attention shifted to higher-value, high-tech sectors (Camilleri, 2017).

Salaries and benefits

The results of interviews with HR managers from both firms demonstrate that the Gozo Company pays less than Malta. Operators in Gozo generally earn the minimum salary of €925.3 (Figure 2) per calendar month before taxes for newly recruited employees, and roughly €1020 (figure 3) for operators who have been with the firm for more than five years. According to HR data, employees at the Gozo Company earn between €5.34 and €5.89 per hour. Clerical and administrative salaries in Gozo generally range from €1250 to €2083.25 per month (Figure 5). The average monthly salary for management jobs at Company A ranges from €2083.3 to €3749.92 (Figure 4). Employees with five years or more of experience at business B earn roughly €1500 per month (Figure 3), or €8.66 per hour, whereas newbies, as seen in Figure 2, receive €1,030 per month, or €5.94 per hour. Clerical and administrative positions in Malta generally pay between €2083.33 and €2916.58 per month (Figure 5). The average monthly salary for management jobs at firm B ranges from €2916.67 to €4583.25 (Figure 4). The research found that, notwithstanding Malta's labour laws, every participating operator in business A believes their pay is insufficient to support the cost of living.

Figure 2: Monthly wages for new recruits, sourced by the HR participants of Company A in Gozo and Company B in Malta

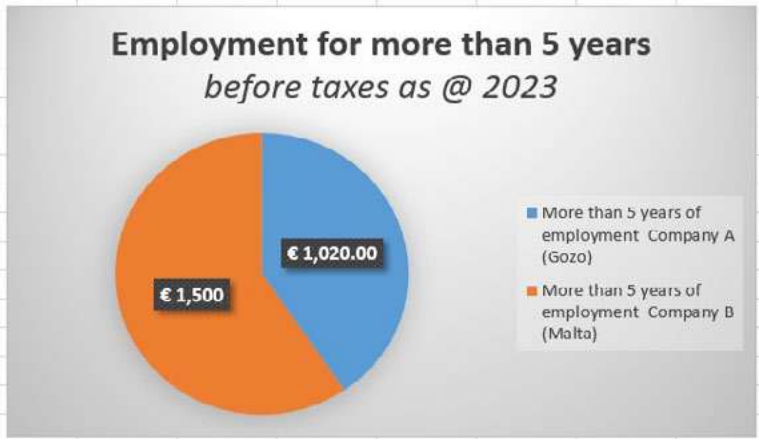

Figure 3: Monthly wages: Employment of workers for more than 5 years; sourced by the HR participants of Company A in Gozo and Company B in Malta

Figure 4: Estimate of the average monthly income of a managerial position, sourced by the HR participants of Company A in Gozo and Company B in Malta

Figure 5: Estimate of the average monthly income of a clerical and administrative position, sourced by the HR participants of Company A in Gozo and Company B in Malta

Although operators at Company B earn more money, many employees emphasize that their salaries are too low and would quit if offered a higher salary elsewhere. This finding is consistent throughout all age groups and nationalities in both organizations; nevertheless, it was discovered that citizens of third countries employed in Gozo reported fewer complaints compared to the overall survey. So, what's the root of the Gozitans complaints? Furthermore, why did foreign workers who reside in Malta complain about their earnings more than those working in Gozo?

A recent survey predicts a family of four in Malta to spend €2,870.7 per month, excluding rent and debts, compared to Malta's minimum wage of €925.3 before tax (Malta Jobs, 2023). An individual's projected monthly expenditure, excluding rent, is €789.5, exceeding the minimum national salary of €777.06 after taxes, according to Leġiżlazzjoni Malta (2023).

Workers' complaints about the minimum wage system in Malta and Gozo are understandable, as the inflation rate needs to be considered. Gozo and Malta share similar daily necessities, but Malta's rent has increased significantly, making it twice as high as in Gozo. Many foreign participants suggest moving to Gozo for lower income, lower rent costs, and tranquillity. However, Gozitans also face additional costs, such as apartment rentals, for families with children studying in Malta, who must pay for their children's education.

Concerns in the Maltese Manufacturing Industry

The Maltese manufacturing sector is presently dealing with some serious issues, according to the literature published by EY and the Malta Chamber of Commerce, Enterprise, and Industry (2022). The industry's inability to innovate and expand is being hampered by labour shortages in the Maltese market, increasing raw material and freight costs that are affecting the sector's profitability and competitiveness, and supply chain disruptions brought on by these factors (Camilleri, 2020; Independent, 2022; Malta Independent, 2022). The survey revealed a shortage of local workers in the manufacturing sector for both Malta and Gozo companies.

In 2023, only 1% of Maltese and Gozitans applied for jobs at Company A, with 95% being Third Country citizens and 4% EU nationals. EFTA nations did not submit any applications. In 2023, firm B received 77% of its applications from TCNs, 8% from EU citizens, and only 15% from Maltese applicants. Malta has increasingly relied on foreign labour due to a shortage in various industries. While foreign workers play a crucial role in supporting industry growth, it raises questions about whether these workers are talented, competent, or professionals, and if they are only seeking entry-level work as long as they can earn a living wage.

The manufacturing sector is facing a significant talent shortage, with foreign workers being more accessible but of lower quality compared to local operators. To address this, the Specialist Employee Initiative (SEI) was introduced in Malta to attract highly qualified overseas workers. The SEI requires a written contract with a Maltese-registered firm and targets third-country nationals with the necessary qualifications for specific employment opportunities in Malta (Identita, 2024).

The Manufacturing Industry Outlook for 2022 predicts a 2.1 million skilled employment deficit by 2030 (Deloitte, 2021). Despite traditionally paying production workers a higher starting salary, the survey shows that manufacturing businesses must review their compensation plans and raise wages to maintain workforce competence and skill.

Manufacturing faces a negative image, with skilled trades and manufacturing careers often viewed as low-paying and boring. However, respondents from both companies showed motivation and took advantage of opportunities to enhance their education. Company B, operating in a larger industry, offered numerous opportunities for employee growth. Managers from both companies recognized the potential of advanced technology as a foundation for professional growth. The manufacturing industry is shifting towards technology-driven automated processes, requiring professionals to combine engineering, traditional industrial skills, and soft skills.

The following figures represent the talents that respondents are seeking in the manufacturing industry in 2024.

Figure 6: Own source; Top talents required by respondents in 2024 manufacturing sector

The engineering sector is attracting more women, aligning with programs like The Step Ahead and the Manufacturing Institute's efforts to promote women's STEM achievements and close the gender gap in manufacturing (NAM, 2023). Both companies are prioritizing fairness and inclusion, creating an inclusive workplace while balancing employee retention, cultural backgrounds, improvement, and technical goals. They are progressively enhancing diversity, equity, and inclusion techniques to create more inclusive settings for all ethnicities and genders.

Employment of Foreign Workers

Malta's stable economy has led to a surge in foreign labour demand, prompting companies to expedite recruitment processes. As of December 2022, over 27% of Malta's labour force was non-Maltese residents (Jobsplus, 2023). Organizations have had to adapt leadership styles to emphasize inclusivity, autonomy, commitment, and ethical behaviour due to operational urgency and a shortage of local candidates. They have had to expedite the recruitment and selection process for foreign nationals. 95% of respondents agreed that foreigners are more available and willing to work overtime and dirty jobs compared to local employees. Foreign workers are willing to work any job as long as they are compensated and do not complain about extra hours. Local employees are becoming picky about their jobs, only wanting 8-hour shifts. Corporations must hire foreign workers to stay in business. A small percentage of international participants in advanced positions anticipate career advancement through skill growth, benefits, assistance, and recognition.

Malta's stable economy and increasing foreign worker demand have facilitated economic growth. As of January 2024, Malta's foreign workforce comprises 37,224 EU and EFTA nationals, with 68,775 mainly Indian nationals. Indians hold the largest employment positions in organizations (NSO, 2024b). Malta is home to 105,999 foreign workers, with migration significantly impacting the economy, population, labour market, and social structure. The study by maltadaily.mt (2024) highlights the importance of foreign labour in driving economic growth.

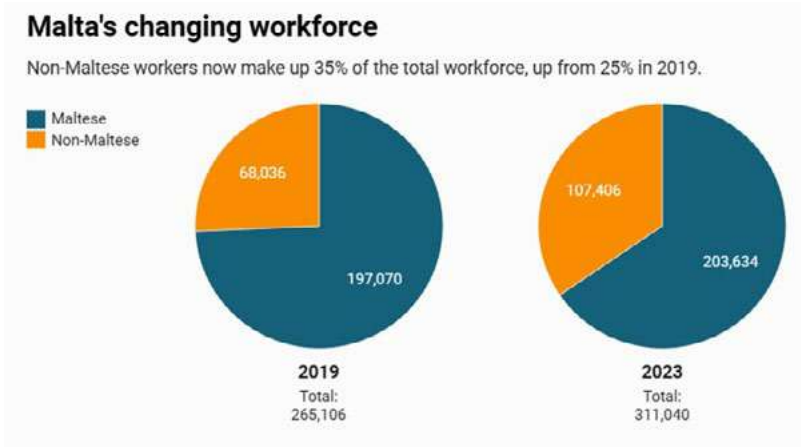

Figure 7: Malta's changing workforce
Source: Times of Malta- in collaboration with the Finance Ministry in Malta

Malta's stable economy has increased worker demand, with migration impacting society, labour market, and demographics. Grech (2015) highlights how this has led to new service industries and rapid economic growth. Migration also expanded income taxes and social security contributions, increasing the working-age population and contributing to social security.

Manufacturing industry perception

Older people often view the manufacturing sector as outdated, advising their children against it due to poor educational standards and lack of career prospects. However, professionals in technical, electrical, supervisory, and managerial fields believe it offers diverse employment opportunities with unique functions and skill needs. Drive and professional growth are essential for success in the industry. The main challenge is the lack of information awareness and industry knowledge, as businesses now require more technical, competent, motivated, and talented individuals. Companies should collaborate with educational, technical, and vocational institutions to provide skilled workers, and competitive compensation and benefits are crucial for attracting and retaining qualified personnel.

Locals and foreigners manufacturing perception

Maltese employees fear foreigners will outcompete locals and be preferred by companies, leading to concerns about preferential overtime. Shopfloor operators in Gozo are concerned about foreign employees receiving lower hourly rates. No statistics or proof were found to demonstrate that immigrants are preferred over natives. In Malta, participants reported no concerns and overtime is accessible to all. Foreign employees are more willing to accept lower salaries than local employees, especially in developing nations with favourable exchange rates like India, Sri Lanka, Bangladesh, and the Philippines. The perception is that immigrant workers are often paid less than local workers due to their higher incomes, allowing them to accept less compensation (Sobaih and Elnasr, 2023).

Employers in companies A and B ensure that all new-entry employees, local or foreign, follow minimum wage guidelines. However, this does not guarantee a living for locals. Employers must consider that foreigners with fewer expenses are not the same as local citizens who support families and pay for rent and education. It is unclear how employers can find local applicants willing to pay so little and how companies can expect motivation. Is there anything being done to lure more locals to the industrial sector? The statement "locals are preferred over outsiders" is not entirely accurate, and employers may be placing themselves in a situation where they cannot afford to pay €5.33 per hour considering the significant increase in the cost of living. HR and management officials favour hiring locals for quality assurance and workforce retention. Employers should balance financial sustainability with fair treatment to create a healthy working environment and prioritize employee well-being. Foreign workers not only replace native labour but also meet their market needs, leading to job satisfaction, job security, and reach productivity. A 50/50 response by TCNs was received on understanding tasks and language barriers, with half reporting no issues and half feeling language hindered performance. European citizens did not experience communication issues.

Malta Finance Ministry data shows the number of Maltese citizens (blue) and foreign workforces (orange) by industry, as shown in Fig.8. (Borg and Drury, 2024).

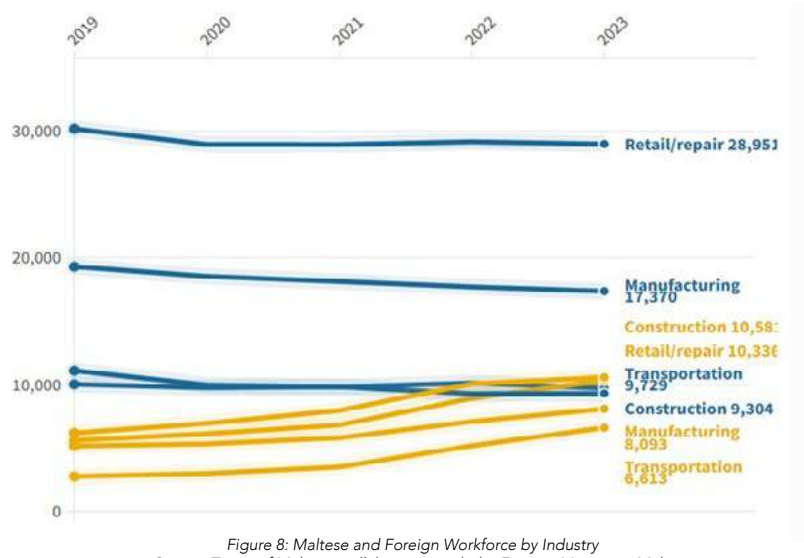

Figure 8: Maltese and Foreign Workforce by Industry
Source: Times of Malta, in collaboration with the Finance Ministry in Malta

The Maltese labour market is experiencing a decline, particularly in hard labour, with foreign workers filling gaps between 2019 and 2023. The construction and retail industries in Malta employ the most foreign workers, with 9.85% and 9.62% respectively. In manufacturing, 7.53% of the workforce is non-Maltese, while 8.53% is Maltese nationals. Transportation heavily relies on foreign labour (6.15%), with Maltese citizens accounting for 4.78% of the working population (Borg and Drury, 2024).

Conclusions

Manufacturing evolution is influenced by changes in production processes, technology, tactics, and dynamics, impacting economic, cultural, and business aspects. The future of manufacturing systems depends on flexibility, reactivity, and the integration of human knowledge with intelligent technology. Collaboration among academics, researchers, and industry experts is crucial for this evolution. However, a shortage of local personnel and expertise has led to foreign labour filling vacancies. The Malta Independent reports a population increase of 100,000 individuals in the past decade, indicating a need for more effort and training for a future vision
(Orland, 2023).

The study highlights the low earnings in the industrial sector, which is causing Maltese citizens to be reluctant to seek employment if their earnings are inadequate. This is not a result of establishing slavery in Malta, as low earnings are accepted by TCN workers. The question is directed at organizations and governance, who should be blamed for the lack of interest among local employees and whether Malta is motivating its youth. To attract more locals to the sector, a value-added strategy should be adopted. By understanding and rethink the economic model to shift to a value-added strategy in certain professions, Malta can remain a country with clear ethics and avoid poverty.

Malta's manufacturing sector, which contributes over 13% to the GDP, is crucial for the country's economy (Malta Enterprise, 2018). To boost the sector, the government should focus on improving the education system and attracting more young people, rather than importing workers, to create value-added employment opportunities and generate revenue. Workplace transformation, fostering innovation, diversity, inclusiveness, justice, and equal opportunity, is also essential.

Upskilling, particularly for SMEs, and government support for digital transformation training are crucial for maintaining competitiveness. Larger companies have more investment opportunities than medium-sized ones, but both organizations consistently exhibit issues. HR professionals suggest additional incentives for the private sector and a focus on corruption. The government should invest in a manufacturing transformational system, focusing on Malta's proven industrial sectors and reskilling the current workforce to reflect modern realities.

Malta is nearly in full employment, with only 2.5% of job seekers registered in Q3 2023 (Trading Economics, 2023). The six highest-demand jobs include I Gaming, IT Specialist, Blockchain Developer, Pharmacy Technician, and Hotel Manager (Maltajobs,2022). However, the manufacturing sector in Malta has a negative reputation due to past experiences, such as stress, insufficient recognition, and limited advancement opportunities. Malta's manufacturing factories have evolved towards I4.0 and I5.0, bringing innovations, adaptability, and commitment to producing high-quality components. To enhance efficiency and quality standards, a systematic procedure should be implemented for both existing and new workers to learn fundamental knowledge, techniques, and procedures for effective organizational participation.

The study reveals that the factory sector is facing an aging population and a need for more education to adapt to the rapidly changing world. Traditional school structures and standardized exams are no longer sufficient, and it is crucial to reassess and update these frameworks. Investments in intellectual people can generate more opportunities, such as better project managers, technicians, and business analysts. While foreign support is still needed due to inventiveness and digitalization breakthroughs, the focus should be on greater prospects. A contract system with foreigners can ensure no language barriers, transfer skills, and train locals to share expertise. By focusing on weaknesses and developing long-term success strategies, a better future can be created for the country. Malta's low unemployment rate and unfilled vacancies may cause wage pressure, but employers struggle to afford higher wages to keep up with private sector wage increases or compete with IT or gaming industries. The Malta Council for Economic and Social Development (MCESD) released a report highlighting investment necessities, wage-productivity correlation, foreign direct investment, innovation, and educational developments for economic expansion implementation (National Productivity Board, 2024). The Maltese industry should meet with MCESD stakeholders to discuss salaries, wage increases, and operational obligations. If government agencies cannot directly assist, SMEs could be subsidized for importing and exporting goods, reducing labour costs and allowing salary increases.

The study highlights a significant gap in locating competent employees despite firms' training programs, emphasizing the need for manufacturers to upskill and reskill their staff and update educational curricula to meet labour market demand. The importance of STEM education in manufacturing is emphasized due to the rising demand for innovative technologies. Collaboration with the University of Malta and MCAST is needed to support economic growth. Offering employees opportunities to grow through educational partnerships and financing courses is ideal. Manufacturers should seek investors who are creative, innovative, and enthusiastic about young people. The research highlights the importance of international workforce relocation in organizations, urging them to develop global competences and cross-cultural abilities. Recognizing human dignity and cultural diversity promotes international competence, innovation, and better profits. Cultural diversity also fosters strong company-employee relationships, making organizations more attractive to potential employees and enhancing their competitiveness in the marketplace (Reynolds, 2019).

The analysis found no evidence that the increase in foreign employees is due to lower pay than Maltese employees. The Maltese's hostile approach towards immigrants is driven by fear of cultural impact and job loss. Employers prefer hiring Maltese workers because the process and risks are simpler, while employing foreign employees often results in higher turnover and higher recruitment and training costs. However, the government should promote local job opportunities and emphasize the role of foreign workers in Malta's economic growth to counter negative attitudes and concerns. Maltese attitudes towards foreigners are opportunistic and utilitarian, with some locals expressing concern while others acknowledge its economic benefits.

Nevertheless, the study's results and recommendations are intended to shed light into the manufacturing industry and recommends a nationwide evaluation of Maltese integration with foreigners to assess public perception, service quality, and employers' foresight in migrant integration. It also suggests continuous assessment of skills and educational involvement, with a database being developed to inform stakeholders about the country's needs and available resources. Further research on Maltese workers is needed to determine if recruiting foreign labour is a viable solution to the resource shortage and to identify local talents required in manufacturing. A study on the influence of foreign workers on the Maltese manufacturing sector is recommended due to concerns about their influence and the need for deeper understanding to develop local industrial development policies.

Ethical Considerations

The researcher refers to the Research Proposal and Ethical Consideration form as provided by the Idea College, which meets all legal and ethical requirements in Malta and other countries. The respondent's confidentiality and rights were always respected, and data protection or any legal requirements were followed. The study respected participant privacy by adhering to the Malta Data Protection Act 2018 and the General Data Protection Regulation (GDPR). Participants were informed that their data would be used for research for two years after the study's completion, and this was explicitly stated in the consent form and information letter. Every precaution was taken to guarantee confidentiality by keeping the data anonymous.

The following ethical considerations were considered when undertaking this study:

• This study employed a participant code number to safeguard the privacy and personal information of its participants as well as their anonymity.

• The participants' dignity, rights, and well-being were safeguarded.

• The research participants were informed about the study's significance and risks while adhering to the "Do Not Harm Principle" to uphold individual rights.

• The research was conducted in an open and honest dialogue with the public.

• Upon enrolment, respondents were informed about their freedom to withdraw from the study at any time without explanation or repercussions, and they also had the right to have any collected data destroyed upon withdrawal.

• The data collected will be exclusively used for this research study, with no disclosure of data to third parties.

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08 Electronic Health Records & Health Information Systems: The Perspectives of Allied Health Professionals in Community & Residential Care Home Settings

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Abstract

Objectives: This study investigated the perspectives of Allied Health Professionals (AHPs) on the use of Health Information Systems (HISs) and Electronic Health Records (EHRs) within elderly Residential Care Homes (RCHs) and elderly community settings in Malta.

The research aimed to identify existing systems' strengths and limitations and explore how technological, organisational, personal, and environmental factors influence AHPs' views. It also investigated whether AHPs' views varied based on workplace setting. Furthermore, the study sought practical recommendations for improving HISs and EHRs.

Methods: A quantitative, cross-sectional approach with a deductive design was used, employing a researcher-developed questionnaire distributed to AHPs within Malta's Active Ageing and Community Care (AACC). Participants represented five professions: Dieticians, Occupational Therapists, Podiatrists, Physiotherapists, and Speech Language Pathologists. Data was analysed through descriptive, frequency, and inferential statistics.

Results: The findings highlighted perceived strengths and limitations of HISs and EHRs and revealed significant influences of technological, organisational, and AHPs' technological proficiency factors. No associations were found between perspectives and environmental factors, profession, age, or experience within AACC, nor any significant difference between AHPs' perspectives based on workplace setting.

Conclusion: The study underscores the need for enhancing organisational, technological factors and users' proficiency. Recommendations include improved response to users' feedback, system accessibility, training, streamlined data entry, integrated systems, and portable devices, advocating a unified approach to HISs and EHRs implementation across RCHs and community settings.

Keywords: "Allied Health Professionals", "Health Information Systems", "Electronic Health Records", "Residential Care Homes", and "Community settings"

Graphical Abstract

Highlights:

- This study fills a critical research gap by examining the less-explored environments of RCHs and community settings, offering a valuable comparison between the two.
- Offers stakeholders actionable recommendations to improve existing HISs and EHRs used by AHPs in both RCHs and elderly community settings.
- Promotes positive advancements in the implementation and management of HISs and EHRs by providing evidence on the impact of enhanced technological factors, organisational factors, and users' technological abilities.
- Encourages a cohesive approach when improving and implementing HISs and EHRs within RCHs and elderly community settings.

Abbreviations:
AACC: Active Ageing and Community Care
AHP/s: Allied Health Professional/s
HER/s: Electronic Health Record/s
HIS/s: Health Information System/s
RCH/s: Residential Care Home/s

Introduction

The healthcare sector has undergone a digital revolution, with HISs and EHRs emerging as critical technologies to improve the efficiency, accuracy, and quality of healthcare delivery. These systems support data-driven healthcare environments by providing better access to patient information, streamlining workflows, and enabling evidence-based decision-making (Shapiro & Kamal, 2022). Despite their advantages, HISs and EHRs also introduce challenges, and their adoption depends on a complex interplay of technological, organisational, environmental, and personal factors (Malik, Kazi & Hussain, 2021).

Health Information Systems

HISs are centralised platforms for recording, processing, and managing health data (World Health Organization, 2017). They provide timely, accessible, and reliable information that supports rapid, informed decision-making in patient care (Bogaert & Van Oyen, 2017; Haule, Muhanga & Ngowi, 2022). They enable the standardisation of health data, fostering consistency across services (Ahmadian, Dorosti, Khajouei & Gohari, 2017), and enhance operational efficiency, helping organisations allocate resources effectively (Walker, 2018). HISs also contribute to environmental sustainability by reducing paper use and operational waste (Gholami, Watson, Hasan, Molla & Bjornandersen, 2016). Furthermore, they support clinical and strategic decision-making, aligning patient care with organisational goals, and enhancing stakeholder communication for coordinated healthcare (Bush, Lederer, Li, Palmisano & Rao, 2009; Hose et al., 2023). Ultimately, HISs are designed to improve patient care quality and safety (Bardhan & Thouin, 2013).

HISs face several limitations that need addressing. Implementation requires significant time and financial investment, which can be challenging for healthcare organisations (Jalghoum, Tahtamouni, Khasawneh, Al-Madadha, 2021). User resistance is also common, as staff may struggle to adapt to new digital processes (Serrano, Garzia-Guzman, Xydopoulos, Tarhini, 2020). HIS reliability depends on accurate data input, with errors compromising system dependability (Endriyas et al., 2019). Security and privacy concerns are notable, as HISs increase the risk of unauthorised access to sensitive data (Kaye, Kokia, Shalev, Idar & Chinitz, 2010). Additionally, data loss or corruption can disrupt patient care, and technical issues may cause delays, reducing efficiency (Tu, Spoa-Harty & Xiao, 2015; Zwaanswijk, Verheij, Wiesman & Friele, 2011). These challenges highlight the importance of thorough planning, training, and support to maximise HIS potential in healthcare.

Electronic Health Records

EHRs are digital records of patients' medical histories, encompassing entries from various healthcare professionals within a given care episode (Rahman & Reddy, 2015). EHRs improve healthcare delivery by enhancing efficiency and reducing documentation time, allowing providers to prioritise patient care (Silow-Carroll, Edwards & Rodin, 2012). They offer swift access to critical patient information (King, Patel, Jamoom & Furukawa, 2014), reduce errors from illegible handwriting, and promote consistency in documentation (Menachemi & Collum, 2011). Additionally, EHRs support adherence to healthcare standards and facilitate communication among providers, fostering team collaboration (Vos, Boonstra, Kooistra, Seelen & Van Offenbeek, 2020). EHRs reduce data loss by allowing data tracing and recovery (Côrtes & Côrtes, 2011), and reduce paper usage, contributing to environmental sustainability (Turley et al., 2011). They also enhance care quality and safety by improving data accuracy and accessibility, while streamlining billing processes for better expense management (Seymour, Frantsvog & Graeber, 2012).

However, EHRs face challenges, such as data security risks and potential data loss, which could impact patient care (Bowman, 2013; Chao, Hu, Ung & Cai, 2013). Implementation is resource-intensive, often straining budgets (Schmitt & Wofford, 2002) and encountering user resistance due to workflow changes (Cho, Kim & Choi, 2021). Technical issues, including system downtime, can further disrupt care delivery (Zwaanswijk et al., 2011).

Effective EHR implementation demands careful planning, robust security, and comprehensive training to maximise benefits and minimise these challenges.

Key factors affecting implementation of HISs and EHRs

Successful HIS and EHR implementation relies on technological, environmental, organisational, and personal factors (Malik, Kazi & Hussain, 2021).

Technological Factors

Technological factors essential for successful HIS and EHR adoption include user experience, software components, software reliability, and data security (Malik, Kazi & Hussain, 2021). Practical, efficient, user-friendly interfaces enhance adoption (Khalifa & Alswailem, 2015). Integrated systems unify data across departments, reducing redundant entries and improving accessibility (Azadi & García-Peñalvo, 2023). Reliable software which addresses specific user requirements (Teixeira, Ferreira & Santos, 2012), technical support (Farokhzadian, Khajouei, Hasman & Ahmadian., 2020), and robust security (Lalband & Kavitha, 2019) are also crucial, with continuous software improvements enhancing data retrieval and patient care (Khalifa & Alswailem, 2015).

Environmental Factors

The workplace environment significantly affects HIS and EHR integration into daily healthcare practices (Malik, Kazi & Hussain, 2021). Various settings, from hospitals to community care, present unique operational demands. Functional analysis of these environments is essential to ensure equal system access across roles (Vest & Kash, 2016). Afrizal, Handayani, Eryando and Sartono (2018) underscores the importance of adaptable HISs and EHRs that can support professionals across all healthcare environments, particularly as organisations expand services into community-based care.

Organisational Factors

Organisational factors, including access to hardware, software and connectivity are key to successful HIS and EHR adoption (Malik, Kazi & Hussain, 2021). Change management and training are crucial to overcoming staff resistance, as introducing HISs and EHRs requires thorough engagement and training (Khalifa, 2013). Effective change management involves engaging staff in planning and training to reduce resistance (Harrison et al., 2021), while financial investment is necessary to support these systems (Wang, Wang & McLeod, 2018). Strategic implementation can yield productivity gains, making HIS and EHR investments beneficial.

Personal Factors

Personal factors such as technological proficiency (Hailey, Yu & Munyisia, 2014), age and work experience (Arning & Ziefle, 2009), profession type and job level (Yu, Li & Gagnon, 2009) influence HIS and EHR adoption. Training is vital to enhance skills and encourage engagement, with studies showing a positive link between proficiency and willingness to adopt these systems (Hailey, Yu & Munyisia, 2014). Demographics also impact acceptance, with younger professionals often expecting faster, more user-friendly systems (Khalifa & Alswailem, 2015), while different job roles affect perceived system utility (Mishra, Liebovitz, Quinn, Kang, Yackel & Hoyt, 2022).

Perspectives of Healthcare Professionals

The perspectives of healthcare professionals on HISs and EHRs vary significantly due to their diverse roles and the complex nature of their practices (Rowlands, Tariq, Coverdale, Walker & Wood, 2022).

Nurses

Nurses play a key role in using HISs and EHRs, perceiving them as beneficial for enhancing care quality, efficiency, communication, and documentation (Farokhzadian et al., 2020). However, many systems do not meet nurses' specific needs, and limitations like inadequate system design, insufficient computer access, hybrid system issues, and high workloads lead to frustration and compromise patient safety (Baghini & Baniasadi, 2020; Rowlands et al., 2022).

Physicians

Physicians also value HISs and EHRs for improving care quality (Bouamrane & Mair, 2013), but they often cite concerns about system integration and design that fail to consider user needs (Rowlands et al., 2022). Specialties of endocrinology, nephrology, pulmonology, neurology, and family medicine report lower satisfaction, citing issues with computer support, hybrid systems, and workload demands impacting system use and patient safety (Mishra et al., 2022; Rowlands et al., 2022).

Allied Health Professionals

AHPs generally have a positive outlook on HISs and EHRs, recognising their potential to enhance daily tasks (Hailey, Yu & Munyisia, 2014). After implementation, most AHPs experienced reduced workplace stress and routine use (Schwarz, Coccetti, Draheim & Gordon, 2020), though they noted issues with training, system flexibility, poor design and increased workload (Mishra et al., 2022). The limited research on AHPs suggests a need for timely information access, strong technical support, and sufficient adaptation time for effective system use (Schwarz et al., 2020).

In summary, HISs and EHRs hold transformative potential in healthcare. Their success depends on a balanced implementation approach that addresses technological, organisational, environmental, and personal factors. This study contributes to understanding these elements by exploring factors that drive HIS and EHR success, filling gaps in research on professionals' perspectives.

Methodology

Research philosophy

The philosophical underpinnings played a critical role in shaping the goals, objectives, design, methodological choices, data collection, and analysis of results (Brown and Dueñas, 2020). The research objectives were achieved through ontological and positivist perspectives. An ontological approach was chosen as the study sought to understand the conditions, experiences, and interactions existing within the organisation to gain a comprehensive view of its reality (Saunders, Lewis, Thornhill & Bristow, 2019). This reality was explored by identifying the strengths, limitations, relationships, and differences among various researched factors. The quantitative design and deductive approach further reinforced the ontological perspective, as they captured the organisation's reality through objective measures and hypotheses testing. A positivist orientation complemented this approach by enabling a structured methodology to examine the singular reality of the research context (Saunders et al., 2019). Given the quantitative design and representative sample size, the findings aimed to accurately reflect an objective truth (Saunders et (Mohajan, 2020).

Research methods

The study employed a quantitative design and deductive approach. According to Abuhamda, Ismail, and Bsharat (2021), quantitative research designs facilitate variable comparisons and identification of relationships and patterns while minimising researcher bias. A deductive approach was deemed suitable as the research questions addressed a theory derived from existing knowledge (Reyes, 2004). This led to hypotheses development, allowing the researcher to determine the theory's applicability to the target population and research environment (Reyes, 2004). Additionally, a quantitative, deductive approach was optimal for engaging a larger proportion of AHPs

A cross-sectional, non-experimental strategy was adopted, enabling observation of relationships among variables (Bonds-Raacke & Raacke, 2016) and addressing questions related to practices, perspectives, and improvement recommendations within the study's time constraints (Vega, Maguiña, Soto, Lama-Valdivia & Correa López, 2021).

Target population

The study was conducted with AHPs working in elderly community and RCH settings within AACC. At the time of data collection, the team consisted of 58 AHPs (n = 58), subdivided into seven professional groups: Allied Health Assistants, Dental Hygienists, Dieticians, Occupational Therapists, Podiatrists, Physiotherapists, and Speech Language Pathologists. Due to their non-Allied Health Professional classification, Allied Health Assistants (n = 2) were excluded. Dental Hygienists were also excluded due to the limited representation of only one individual, as this measure was necessary to maintain confidentiality (n = 1). Additionally, AHPs in full-time managerial roles (n = 2) were excluded as their lack of clinical responsibilities suggested minimal engagement with HISs and EHRs.

Following these exclusions, the target population consisted of 53 AHPs (n = 53). The desired sample size was determined to be 47, calculated using Cochran's formula for small populations, assuming a 95% confidence level and a 5% margin of error.

Data collection methods
The study objectives were realised through a researcher-developed questionnaire, created in alignment with the research objectives following a thorough review of existing literature. The 66-item questionnaire comprised 60 ordinal Likert-scale questions and six categorical questions, organised into three sections: general information, AHPs' perspectives on existing information systems, and generic views on HISs and EHRs. Data collection involved two phases: a pilot study followed by the main questionnaire distribution.

For the pilot study, five AHPs were selected to represent all eligible professions and settings: two from the community, two from RCHs, and one from both settings. Participants reviewed the questionnaire and provided feedback on clarity, difficulty, and relevance. Based on this input, adjustments were made to improve clarity for the main study.

The questionnaire was then disseminated via Google Forms, allowing for anonymous participation through a mediator-sent email. A simple random probability sampling strategy was implemented to produce generalisable findings. Completion required approximately 15 minutes, and weekly reminders were sent for three weeks to boost response rates.

Data analysis
Data obtained was all analysed quantitatively. The close-ended questions were assigned codes and analysed through IBM Statistical Package for the Social Sciences (IBM Corp., 2023).

The Shapiro-Wilk test was used to assess data distribution, informing the choice of parametric or non-parametric tests for hypothesis testing. The Shapiro-Wilk test was selected due to the sample size being under 50 ($n = 43$) and its strong effectiveness in detecting normal distribution, making it preferable over other tests (Guzik & Więckowska, 2023).

Descriptive and inferential statistics were applied to examine relationships and differences between independent and dependent variables.

SPSS tests were used to examine the research questions and hypotheses: Chi-squared tests assessed variable independence (McHugh, 2013), Spearman's rho correlation analysed relationships (Rebekić Lončarić, Petrović & Marić, 2015), and Mann-Whitney tests evaluated differences between two independent groups (Okeh, 2009). Non-parametric tests were chosen for relationship and difference analyses, since at least one variable in each case did not follow a normal distribution (Eden, Li & Shepherd, 2022). Statistical significance was set at a p-value below 0.05, indicating rejection of the null hypothesis when met.

Validity and reliability
Validity was ensured to confirm that the questionnaire met its intended purpose (García de Yébenes, Salvanés & Ortells, 2009). Face validity was assessed during the pilot study, whereby participants were asked to verify clarity, relevance, and lack of ambiguity in the questionnaire.

Reliability was maintained to ensure that the research tool measured variables accurately and consistently, yielding repeatable results under identical conditions (Kimberlin & Winterstein, 2008). Cronbach's Alpha in SPSS tested internal consistency, with a value of 0.7 or higher indicating reliable results (Tavakol & Dennick, 2011). This test was conducted on all Likert scale responses of the questionnaire, totalling 58 questions. The Cronbach's alpha value result exceeded 0.9 ($\alpha = 0.933$), indicating exceptional reliability in terms of internal consistency (Hussein, 2020).

Ethical considerations
Ethical considerations were integral to this research. Approval was obtained from the IDEA College Research Ethics Board, AACC's Data Protection Officer, AACC's Chief Executive Officer, and appointed mediator, ensuring adherence to both academic and organisational standards. Participation in this study was voluntary and invitations to participate were sent through a mediator to prevent coercion. Informed consent was requested before questionnaire completion. All data was collected anonymously and securely stored on an encrypted, password-protected device accessible only to the researcher, with planned deletion two years post-study. Privacy was safeguarded in compliance with GDPR and the Malta Data Protection Act (2018), using a GDPR-compliant platform (Google Forms). The study posed no physical or moral risks, as researcher-participant contact was absent, and questions avoided morally sensitive topics. The organisation's financial security and competitive standing were likewise protected.

Results

The sample population

A response rate of 81% was achieved, with 43 allied health professionals (AHPs) participating in this research study out of a total of 53 eligible AHPs. Response rates varied by profession: RCH physiotherapists, RCH Speech Language Pathologists (SLPs), and dieticians (both RCHs and community) each achieved a 100% response rate, while other professions held response rates between 56% and 83%.

Sociodemographic characteristics

Participants' profession type and workplace

As outlined in Table 1, the majority of participants worked in RCHs (n = 22) or community settings (n = 19), with only two participants across both environments.

		RCHs	Community	Both RCHs and Community	Total
Profession type	Physiotherapy	9	10	-	19
	Occupational Therapy	4	4	-	8
	Podiatry	4	5	-	9
	Speech Language Pathology	5	-	-	5
	Dietician	-	-	2	2
Total		22	19	2	43

Table 1: Participants' profession type and workplace.

Participants' profession type and age

Figure 1 illustrates the distribution of age groups among participants. Physiotherapists were represented across all age categories, with the largest group aged between 30–39. In contrast, occupational therapists and podiatrists were mainly within the 20–29 age range. Notably, dieticians and SLPs were exclusively aged 20–29, indicating a lack of older professionals in these fields, given their 100% response rate.

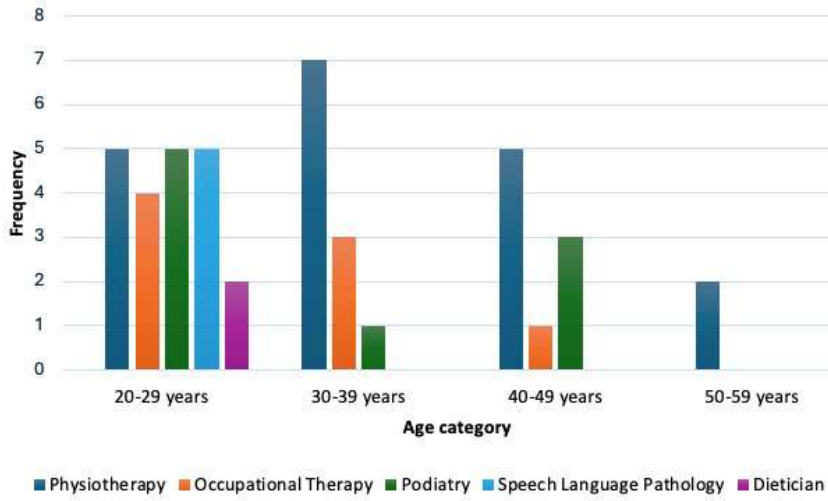

Figure 1: Participants' age categories per profession.

Participants' experience within AACC

The majority of participants (n = 29) reported having between two and eight years of experience. Smaller groups included those with eight to fourteen years (n = 6), less than six months (n = 5), six months to two years (n = 2), and more than fourteen years (n = 1).

AHPs' technological proficiency

Participants self-rated their technological proficiency, with 58.1% rating themselves as having good proficiency, followed by 25.6% as average, 9.3% as excellent, 4.7% as poor, and 2.3% as very poor. Overall, these results indicate a generally positive perception of technological proficiency among participants.

Distribution of data

Assessing data distribution is crucial for determining whether to employ parametric or non-parametric tests (Vaclavik, Sikorova & Barot, 2019). The Shapiro-Wilk test revealed that age category, profession type, experience at AACC, workplace, technological proficiency, and AHPs' overall perspectives (including motivational factors and views on HISs and EHRs) were not normally distributed, with p-values below the 5% significance threshold. Conversely, variables of organisational factors, technological factors, and perspectives on HISs and EHRs (excluding motivational factors) were normally distributed, meeting the normality assumption with p-values exceeding 5%.

Perceived strengths and limitations of existing HISs and EHRs

The strengths and limitations of existing HISs and EHRs were evaluated based on the mean values of participants' responses to Likert scale questions. Higher means indicated strengths, while lower means indicated limitations (Sözen and Güven, 2019). Table 2 summarises these results for HISs and EHRs, both separately and combined.

	Strengths	Limitations
HISs	Continuous technical support available (μ = 3.44).	Present with issues when inputting data (μ = 2.51).
EHRs	Reliable - data inputted is not erased (μ = 3.42).	Cannot be amended and improved easily (μ = 2.51).
	Easy communication and flow of information with other professionals within AACC (μ = 3.42).	Do not allow for effective caseload management (μ =2.60).
	Easy access to information about the patient's history (μ = 3.63).	
HISs and EHRs (combined)	Secure in terms of privacy and confidentiality (μ = 3.67).	Not integrated and linked to each other (μ = 2.02).
	Supported by the presence and access to hardware [computers, laptops, tablet etc.] (μ = 3.51)	Slow and inefficient (μ = 2.37).
	Can be used across different environments and internet networks (μ = 3.72).	Somewhat increase time on administrative tasks, introducing complexities or inefficiencies that require additional time to manage (μ = 1.88).
		Cannot be used when connected to the internet (μ = 1.60 for EHRs, and μ = 1.65 for HISs).
		Lack of convenient portable devices to allow for inputting of information while on the move (μ = 2.47).
		Involve repetitive inputting of information (μ = 1.88).

Table 2: Strengths and limitations of existing HISs and EHRs

Null hypotheses tests

Inferential statistics were employed to identify relationships and differences among the research variables. The results of the hypothesis tests are summarised in Table 3 below. Prior to hypothesis testing, all variables underwent Chi-square tests, which revealed no significant associations. A hypothesis was accepted if the p-value exceeded the 5% significance threshold.

			Spearman's correlation result (p-value)		Result		Strength of relationship (if present)
Hypothesis 1	*Null Hypothesis ($H1_0$)*	There is no significant relationship between technological factors and overall perspectives of AHPs on HISs and EHRs.	0.010		Rejected		Moderate positive relationship
Hypothesis 2	*Null Hypothesis ($H2_0$)*	There is no significant relationship between environmental factors and overall perspectives of AHPs on HISs and EHRs.	0.997		Accepted		N/A
Hypothesis 3	*Null Hypothesis ($H3_0$)*	There is no significant relationship between organisational factors and overall perspectives of AHPs on HISs and EHRs.	0.002		Rejected		Moderate positive relationship
Hypothesis 4	*Null Hypothesis ($H4_0$)*	There is no significant relationship between personal factors and overall perspectives of AHPs on HISs and EHRs.	Age	0.275	Accepted	All 4 variables in combination: Rejected	N/A
			Profession type	0.797	Accepted		N/A
			Experience within AACC	0.533	Accepted		N/A
			Technological proficiency	0.015	Rejected		Moderate positive relationship
Hypothesis 5	*Null Hypothesis ($H5_0$)*	There is no significant difference between the overall perspectives of AHPs who work within community and RCH settings.			Accepted		

Table 3: Hypotheses testing results.

The findings revealed that AHPs' overall perspectives on HISs and EHRs were positively influenced by technological factors, such as user experience and software components, as well as organisational factors, including access to hardware, software, internet connectivity, and training opportunities. No such relationship was identified for the environmental factor of AHPs' workplace. Personal factors produced mixed results; while profession type, age, and experience within AACC showed no correlation with AHPs' perspectives, a positive relationship was observed between AHPs' perceived technological proficiency and their overall views on HISs and EHRs.

Discussion

Perceived strengths and limitations of existing HISs and EHRs

The strengths and limitations of existing HISs and EHRs identified in this study align with, and occasionally diverge from, findings in existing literature.

In particular, the study highlights the positive perceptions of technical support for HISs, with ongoing support seen as a strength by AHPs within AACC, which contrasts with findings from Farokhzadian et al. (2020) and Lluch (2011), who report technical support as a significant barrier in other healthcare settings. This variation may reflect AACC's targeted investment in technical support, emphasising the potential influence of localised resource allocation on system perception.

Regarding EHRs, the study found strengths in data reliability, interprofessional communication, and access to patient histories. These findings are consistent with Lalband and Kavitha (2019), who underline the importance of reliable software in maintaining data integrity, and Hose et al. (2023), who recognise communication-enhancing software as vital to healthcare practices. King et al. (2014) similarly highlight EHRs' role in improving information accessibility, supporting this study's observations on streamlined access to patient records.

In terms of combined HIS and EHR systems, AHPs viewed the privacy, confidentiality, and hardware availability as notable strengths. This partially supports findings from Alipour et al. (2023), who reported adequate user perceptions of privacy, though some users in their study noted confidentiality concerns. In contrast, Bani Issa et al. (2020), Bowman (2013), Chao et al. (2013), Kaye et al. (2010), and Tu, Spoa-Harty and Xiao (2015) frequently cite compromised privacy as a limitation in HIS and EHR use. The differences may arise from the differing roles and system integration levels across these studies, as Bani Issa et al. (2020) observed privacy concerns from a nursing perspective, while the current study considers AHPs in a community context, potentially benefiting from individually assigned hardware and prioritised support in community settings.

Despite these strengths, several limitations in HISs and EHRs were also noted. AHPs cited challenges with data inputting in HISs and inadequate support for caseload management within EHRs. These findings align with Baghini and Baniasadi (2020), who note the need for more adaptable systems to support workload demands, and Rowlands et al. (2022), who emphasise challenges arising from non-integrated systems. However, Farokhzadian et al. (2020) report that integrated, multifunctional HISs in modern hospitals facilitate effective caseload management, underscoring the critical role of integration in system efficacy - a feature lacking in AACC's current setup.

Additionally, this study identified several combined HIS and EHR limitations: reliance on internet connectivity, lack of system integration, slow performance, and absence of portable devices for on-the-go documentation. These findings support existing literature on the need for integrated systems (Sumarlin, 2018), efficiency in data entry processes (Azadi & García-Peñalvo, 2023), and streamlined processes to reduce administrative burdens (Farzandipour, Meidani, Nabovati, Sadeqi Jabali & Dehghan Banadaki, 2020). The limitation of lacking portable devices for community settings also mirrors observations by Afrizal et al. (2018), who identified similar gaps in accessibility for documentation on-the-go.

Factors affecting the perspectives of AHPs on HISs and EHRs

The current study's examination of factors influencing AHPs' perspectives on HISs and EHRs is consistent with findings in the literature regarding the role of technological, organisational, and personal factors, though there are notable divergences, particularly with respect to personal factors.

Technological Factors

The positive correlation identified in the study between enhanced technological capabilities - such as user-friendliness, workflow alignment, and reliable support systems - and favourable AHP perspectives is widely supported in existing literature. Mishra et al. (2022) and Schwarz et al. (2020) similarly found that deficiencies in system personalisation, design, and technical support tend to foster negative attitudes towards HISs and EHRs among healthcare professionals, underlining the value of systems designed with high functionality and support in mind. In addition, findings from Yu, Li, and Gagnon (2009) underscore that ease of use and efficiency are critical in shaping healthcare providers' acceptance of information systems.

This alignment across studies reinforces that investment in well-designed and user-centred technology can improve adoption rates and satisfaction.

Organisational and Environmental Factors
This research supports prior findings regarding the influence of organisational factors - such as access to hardware, training, and managerial strategies - on AHP perspectives towards HISs and EHRs, while highlighting that the environmental factor of workplace setting alone (e.g., community versus RCH settings) does not significantly affect attitudes. The current findings are congruent with Rowlands et al. (2022), who found that insufficient hardware access hindered system acceptance among nurses and physicians, as well as studies by Adepoju and Opele (2021) and Khalifa (2013), who observed that accessible internet connectivity and robust training improve user experience and satisfaction with HISs and EHRs.

Additionally, the current study's neutral findings on early AHP involvement in system development deviate from Khalifa (2013), who advocated for early staff engagement to boost acceptance during implementation. This discrepancy suggests that while organisational factors are critical for positive system perception, the specific value of early involvement in design phases may vary by context.

Personal Factors
In contrast to previous research, the current study found no significant correlation between collective personal factors (age, professional role, years of experience) and AHP perspectives on HISs and EHRs. This outcome diverges from studies by Khalifa (2013) and Malik, Kazi, and Hussain (2021), which identified that demographic factors such as age and professional role can influence healthcare professionals' system perspectives. However, this discrepancy may be attributed to sample composition differences, as Sharma (2021) noted that smaller, homogenous samples - like the current study's limited size and younger demographic - may mask potential correlations.

Interestingly, the positive link identified between perceived technological proficiency and AHP attitudes towards HISs and EHRs aligns with findings by Hailey, Yu, and Munyisia (2014) and Yu, Li, and Gagnon (2009). This correlation underscores the importance of ongoing training and support to build technological competence, as improved proficiency correlates with more favourable views of information systems.

In sum, the study's findings are largely consistent with existing literature regarding the influence of technological and organisational factors on AHP perspectives, reinforcing the significance of user-centred design, robust support, and organisational readiness. Divergences in findings about the impact of personal demographics suggest that factors such as age and professional background may be more context-dependent than previously considered. The study's emphasis on technological proficiency as a key factor in positive HIS and EHR perceptions highlights the importance of targeted training to enhance system adoption across healthcare environments.

Differences in perspectives of AHPs in RCHs and community settings
The study's finding that AHPs' perspectives on HISs and EHRs do not differ between RCH and community settings is distinctive, revealing a gap in existing literature, which has seldom explored comparative perspectives across these specific healthcare environments. Studies such as Afrizal et al. (2018) have contrasted community settings with primary healthcare environments, identifying technology access challenges, like limited portable devices, as key factors influencing healthcare professionals' attitudes. However, Afrizal's work did not investigate whether these challenges contributed to differing perspectives across various settings, thus not directly addressing this study's findings.

The current study's alignment with Malta's "National Strategy Policy for Active Ageing 2023-2030" (Ministry for Active Ageing, 2022) also supports its unique findings. This policy recommends a gradual integration of community and RCH services, aiming for greater operational efficiency. The research outcomes imply that AHPs' unified views of HISs and EHRs across settings may facilitate this policy shift, suggesting that future improvements to these systems can be implemented uniformly, without needing setting-specific adjustments. In this way, the study provides practical evidence to support an integrated approach, in line with the ongoing restructuring within Malta's healthcare system.

Conclusions

This study's limitations provide a pathway for future research and highlight areas for improvement in HIS and EHR implementation. Key limitations include the small sample size (n=58) and specific focus on AHPs in RCH and community settings, limiting generalisability. The quantitative design, while beneficial for breadth, constrained the depth of understanding and contextualisation of findings, as did reliance on self-reported data, which may introduce participant biases. Neutral responses on the Likert scale also presented interpretive challenges, as they left certain user perspectives unclear. The study's grouping of HISs and EHRs as collective entities rather than isolating specific systems may have obscured unique system-related issues. Finally, while this research addresses technological, organisational, and personal factors, it does not consider potentially influential variables, such as cultural or program-specific impacts, that could enrich understanding.

Practical recommendations drawn from these findings underscore the need for improvements to both HISs and EHRs. Recommendations for HISs include optimising data entry processes and considering innovative tools, such as voice recognition systems, to minimise input errors and delays (Khalifa & Alswailem, 2015). For EHRs, enhancements in patient caseload management and the efficiency of amendment processes are key priorities. Shared recommendations for both HISs and EHRs focus on integrating systems to eliminate redundant data entry, improving system accessibility (such as ensuring offline functionality), enhancing system response times, and providing AHPs with portable devices and technological training. These changes align with lean management principles, prioritising efficiency, value creation, and user satisfaction (Teixera, Bernardi & Rijo, 2021).

The study's impact is substantial. By highlighting how technological and organisational factors, as well as users' technological proficiency, contribute positively to AHPs' perspectives on HISs and EHRs, this research offers actionable insights for healthcare management. Policymakers are particularly encouraged to continue integrating RCH and community services, given that AHPs' perspectives did not significantly differ across these settings, supporting a cohesive, unified approach to implementation of HISs and EHRs. This finding, alongside the practical recommendations, promises improvements in operational efficiency, data accuracy, and user experience, ultimately benefiting healthcare delivery and patient care.

Future research could build upon this study by adopting a mixed methods approach to achieve a more nuanced understanding, integrating additional healthcare perspectives, or expanding the sample to include various healthcare professionals and different settings for a more generalisable analysis. Comparing healthcare professionals' perspectives with those of management could provide valuable insights into alignment and discrepancies in system expectations and implementation. Examining additional variables such as cultural factors or specific training programmes may reveal further determinants of HIS and EHR effectiveness. Finally, addressing each HIS and EHR system individually could yield more precise recommendations tailored to the strengths and limitations of specific systems.

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Conflict of Interest

A potential conflict of interest is that the researcher is also an Allied Health Professional within the targeted research environment at the Active Ageing and Community Care. This role may have influenced the research process, although all efforts were made to ensure objectivity and impartiality throughout the study.

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