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The adoption of wearable technologies for data analytics in South African netball

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A research proposal submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

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ABSTRACT

Limited research exists on the use of wearable technology in South African netball, and identifying the factors that influence adoption can help gain a better understanding of the drivers and barriers impacting data analytics within the sport.

There is a lack of knowledge about the factors influencing the adoption of wearable technologies in South African netball for data analytics purposes.

The population includes the coaches and team management staff of the South African senior national netball team, U21 team, and development team. This encompasses but is not limited to the head coach, assistant coach, high-performance coach, strength and conditioning coach, team manager, medical lead/team doctor, physiotherapist and performance analyst.

The proposed methodology for this study is a qualitative approach, employing qualitative techniques to gather comprehensive data. This approach is chosen to collect opinions and understand participants' experiences related to the study. The data collected will be analysed using appropriate quantitative techniques to explore how various factors influence the adoption of wearable technologies by key stakeholders within netball in South Africa. This study will employ semi-structured interviews as the data collection method, allowing for the exploration of themes, experiences, attitudes, and perceptions related to the research questions and topics about TAM 2 and external factors influencing the use of wearable technology in netball.

The key findings are that the adoption of wearable technologies in South African netball is influenced by multiple external factors, organisational, technological, and social factors.

KEYWORDS

Wearable technologies, South Africa, netball, adoption, data analytics

DECLARATION

I, Lehlohonolo Siwundla, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Lehlohonolo Siwundla Signature: 

Signed at …Johannesburg……

On the ……31…….. day of ……March…….2025…..

DEDICATION

This research is dedicated to my mother, Siphokazi, whose unwavering support for everything I pursue knows no bounds. To my sister, Boniswa, who is a constant source of strength and inspiration for never giving up on the dream. To my wonderful nieces, Lathi'tha and Ath'Aviwe, who are a constant source of joy and hugs. To my departed aunt, Nokwanda – I have kept my promise. This work is a tribute to ooJali, Wushe, Majiza, Mjoli, Qubulashe no Mshengu, Tshabalala, Mswazi, Siwalala, Sobhuza, Mavuso.

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My heartfelt appreciation goes to my family—my mother, sister, nieces, and dog—for their consistent and unwavering support, love, and encouragement, even in the most challenging times.

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TABLE OF CONTENTS

LIST OF TABLES ..... **xii**

LIST OF FIGURES ..... **xiii**

LIST OF ACRONYMS ..... **xiv**

CHAPTER 1. INTRODUCTION **1**

1.1 STATEMENT OF PURPOSE 1

1.2 BACKGROUND OF THE STUDY 1

1.3 RESEARCH PROBLEM 3

1.4 RESEARCH QUESTIONS 4

1.5 RATIONALE 5

1.6 DELIMITATIONS OF THE STUDY 6

1.7 DEFINITION OF TERMS 7

1.8 ASSUMPTIONS 7

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION 8

2.2 DEFINITION OF TOPIC OR BACKGROUND DISCUSSION 8

2.3 WHAT ARE THE FACTORS THAT IMPACT ADOPTION OF WEARABLE TECHNOLOGIES IN SOUTH AFRICAN NETBALL? 9

2.3.1 ECONOMIC 9
2.3.2 ENVIRONMENTAL 10
2.3.3 ORGANISATIONAL 10
2.3.4 SOCIAL 11
2.3.5 TECHNOLOGICAL 11
2.3.6 PROPOSITION 1 12
2.4 HOW CAN THE ADOPTION OF WEARABLE TECHNOLOGIES IMPROVE DATA ANALYTICS IN SOUTH AFRICAN NETBALL? 12
2.4.1 ENHANCED PLAYER PERFORMANCE MONITORING 13
2.4.2 STRATEGIC ADVANTAGE 13
2.4.3 PROPOSITION 2 13
2.5 ANALYTICAL FRAMEWORK 13
2.6 CONCLUSION OF LITERATURE REVIEW 16
CHAPTER 3. RESEARCH METHODOLOGY 18
3.1 RESEARCH PARADIGM 18
3.2 RESEARCH APPROACH 18
3.3 RESEARCH DESIGN 19
3.4 DATA COLLECTION METHODS 19
3.5 POPULATION AND SAMPLE 19
3.5.1 POPULATION 19
3.5.2 SAMPLE AND SAMPLING METHOD 20

3.6 THE RESEARCH INSTRUMENT 20

3.7 DATA ANALYSIS STRATEGIES AND INTERPRETATION 21

3.8 POSSIBLE LIMITATIONS AND CHALLENGES OF THE STUDY 21

3.9 ETHICAL CONSIDERATIONS 22

CHAPTER 4. PRESENTATION OF FINDINGS 23

4.1 INTRODUCTION 23

4.2 MULTIPLE EXTERNAL FACTORS INFLUENCING THE ADOPTION OF WEARABLE TECHNOLOGIES IN SOUTH AFRICAN NETBALL. 25

4.2.1 COST AND ACCESSIBILITY 25

4.2.2 GENERAL UNDERSTANDING AND AWARENESS 26

4.2.3 PERCEIVED EASE OF USE 27

4.2.4 PERCEIVED USEFULNESS 28

4.3 ORGANISATIONAL, TECHNOLOGICAL, AND SOCIAL FACTORS AFFECTING WEARABLE TECHNOLOGY ADOPTION WITHIN NETBALL. 31

4.3.1 ORGANISATIONAL FACTORS 31

4.3.2 TECHNOLOGICAL FACTORS 31

4.3.3 SOCIAL FACTORS 31

4.4 SUMMARY OF THE RESULTS/FINDINGS 32

CHAPTER 5. DISCUSSION OF THE RESULTS OR FINDINGS . 34

5.1 INTRODUCTION 34

5.2 DISCUSSION PERTAINING TO PROPOSITION 1 35

5.2.1 PERCEIVED USEFULNESS (PU) 35
5.2.2 PERCEIVED EASE OF USE (PEOU) 40
5.2.3 SUBJECTIVE NORM (SN) AND IMAGE 43
5.2.4 JOB RELEVANCE AND OUTPUT QUALITY 45
5.2.5 RESULT DEMONSTRABILITY 48
5.3 DISCUSSION PERTAINING TO PROPOSITION 2 50
5.3.1 ORGANISATIONAL 50
5.3.2 SOCIAL 52
5.3.3 TECHNOLOGICAL 53
5.4 CONCLUSION 54
CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS 55
6.1 INTRODUCTION 55
6.2 CONCLUSIONS REGARDING RESEARCH QUESTION / OBJECTIVE 1 55
6.3 CONCLUSIONS REGARDING RESEARCH QUESTION / OBJECTIVE 2 56
6.3.1 ORGANISATIONAL FACTORS AFFECT WEARABLE TECHNOLOGY ADOPTION WITHIN NETBALL 56
6.3.2 TECHNOLOGICAL FACTORS AFFECT WEARABLE TECHNOLOGY ADOPTION WITHIN NETBALL 57
6.3.3 SOCIAL FACTORS AFFECT WEARABLE TECHNOLOGY ADOPTION WITHIN NETBALL 57
6.4 RECOMMENDATIONS 58
6.4.1 FEDERATION 58
6.4.2 COACHES 58

6.4.3 PLAYERS 59

6.5 SUGGESTIONS FOR FURTHER RESEARCH 59

REFERENCES 64

APPENDIX A – THEME OCCURRENCE TABLE 70

APPENDIX B – INSTRUMENT 72

LIST OF TABLES

Table 4. Consistency table: research questions, propositions, data collection and data analysis

LIST OF FIGURES

Figure 1: Technology-Organisation-Framework (Tornatzky & Fleischer 1990)
Figure 2: Technology Acceptance Model (TAM 2) (Venkatesh & Davis, 2000).
Figure 3: Themes word cloud
Figure 4: Cost and accessibility occurrence
Figure 5: General understanding and awareness occurrence
Figure 6: PEOU occurrence
Figure 7: PU occurrence
Figure 8: TAM 2 Framework
Figure 9: Occurrence of factors
Figure 10: Researchers' own adapted from TOE Framework

LIST OF ACRONYMS

GPS – Global Positioning System

LSM – Living Standards Measure

NSA – Netball South Africa

PEOU – Perceived Ease of Use

PU – Perceived Usefulness

SN – Subjective Norm

TAM – Technology Acceptance Model

TNL – Telkom Netball League

TOE – Technological-Organisational-Environmental

TOS – Technological-Organisational-Social

WT – Wearable Technologies

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

This study investigates the factors that impact the adoption of wearable technologies for data analytics by netball stakeholders in South Africa.

1.2 Background of the study

Netball is a fast-paced game that displays skill, accuracy, and flair. A game comprises two teams of seven players on the court, aiming to throw, catch, intercept, defend, and shoot. The team with the most goals at the end of the match are crowned winners (*Netball explained* 2024). Netball has a rich history in South Africa, evolving from a recreational activity to a highly competitive sport. It is the country's most prominent women's sport, with thousands of players participating across various levels. Netball South Africa (NSA) governs the sport, overseeing a structured system that includes primary and high school teams, clubs, university leagues, and professional teams.

South African netball is played in multiple formats, from grassroots tournaments to elite competitions. NSA organises various leagues and tournaments, ensuring a comprehensive pathway for player development. Grassroots initiatives focus on introducing the sport to young players, while university leagues and professional competitions provide platforms for advanced skill development (*Governing and growing netball in South Africa* 2024).

Netball South Africa's mission is to develop, promote, and sustain netball as a leading sport for women (About Netball South Africa: Our history and story so far, n.d.). Their vision is to achieve excellence in netball, nationally and internationally, by providing opportunities for all players to reach their full potential. This involves fostering talent and embracing innovative technologies to enhance performance and maintain competitive standards. Given the imminent

launch of the first professional netball league in Africa, wearable technologies can be instrumental to the advancement of the game.

Wearable technology (WT) refers to electronic devices worn on the body to collect and analyse data related to health, fitness, and sports performance (Seçkin et al., 2023). These devices include GPS trackers, accelerometers, heart rate monitors, and inertial measurement units.

The primary functions of wearable technologies in sports (Seçkin et al., 2023) include:

- Performance Enhancement
- Injury Prevention
- Health Monitoring
- Data Analytics

Wearable technologies have the potential to revolutionise sports analytics in South African netball. By providing real-time data and detailed performance metrics, these technologies can significantly enhance training efficiency, game strategy, and player management (Luczak et al., 2019). As the leading netball federation on the African continent, with a robust infrastructure and strong competitive presence, South African netball can leverage wearable technologies to professionalise the sport further and maintain its dominance in Africa. The use of wearable technologies for data analytics is a growing trend globally. National rugby and football teams in South Africa have successfully integrated these technologies to enhance performance, training and strategies. This trend underscores the potential benefits of netball, suggesting a need for similar adoption in this sport. Of the top five netball nations in the world, three (Australia, New Zealand, and England) already use wearable technologies extensively.

South Africa can benefit from adopting similar practices, ensuring its players and teams remain competitive globally.

There is a noticeable gap in the literature regarding the adoption and impact of wearable technologies in South African netball. While rugby and football have extensively adopted these technologies, netball remains under-researched in this context. This study aims to fill this gap by exploring South African netball's unique challenges and opportunities.

1.3 Research problem

Professional team sports like basketball, football and rugby have incorporated wearable technologies into training through GPS sports vests, sensors placed in the insole of shoes, shin guards and other wearables. The data received from wearable technologies are used to measure a plethora of indicators and analyse real-time trends on web-based or mobile applications in a format that is easy to understand by players and coaching staff (Rebelo et al., 2023).

The data is used to inform in-game tactical strategies, monitor and maximise player performance, injury management and health statistics (Piłka et al., 2023). The use of wearable technologies in professional netball has increased over the years in countries like Australia and New Zealand. However, adoption has been limited compared to professional sports like basketball and football. In South Africa, adoption in sports like football and men's and women's rugby has been observed, especially in preparation for major international sporting events like the Rugby World Cup and the Africa Cup of Nations. There is limited research on the use of wearable technologies in South African netball, and identifying the factors that impact adoption can assist in gaining a better understanding of the drivers and barriers which impact the use of data analytics within the sport (Torres-Ronda et al., 2022).

1.4 Research questions

1.4.1 What are the factors that impact the adoption of wearable technologies in South African netball?

Netball as a sport faces challenges related to data collection for the use of individual and team performance management analysis globally. Specifically, in South Africa, digitalisation of the sport is limited, and data collection and analysis are still manual. The current manual methods of collecting data for analysis, which include observational analysis, notational analysis and video analysis (Cossich et al., 2023), are time-consuming and are prone to human error and inaccuracies based on the subjective view of the individual performing the analysis.

Integrating various sources of training and matching historical data with real-time match data is a challenge as the data sets are not centrally stored. Data can be used for analysis, monitoring, continuous improvement, and player and team performance management to contribute to the team's strategy and objectives. Using wearable technologies as a form of data capture can help reach those objectives. Adoption remains an issue for many high-performing teams across different age groups due to multiple factors (Habibipour et al., 2019), mainly:

- Economic
- Environmental
- Organisational
- Social
- Technological

1.1 What wearable technologies are used for data analytics in South African netball?

It is unknown if any official tools are used or endorsed within South African netball; however, the national senior team uses sponsored fitness trackers. Understanding the tools currently in use provides an opportunity to benchmark the technology against other netball-playing nations.

1.2 How can the adoption of wearable technologies improve data analytics in South African netball?

Adopting wearable technologies can significantly enhance data analytics in South African netball by providing comprehensive, real-time insights into player performance, health, and game strategy. South African netball is preparing for significant international events such as the Commonwealth Games, the Netball World Cup 2027, and various test series. Adopting wearable technologies can provide a competitive edge, helping the team to achieve its goal of medal placement in these prestigious tournaments.

1.5 Rationale

This study addresses the limited knowledge of wearable technologies to gather data related to and for player and team performance management and analysis within sports, specifically netball. Despite research available within the sports science fields, there remains a gap in understanding how netball's digitalisation can transform individual and team performance management and analysis,

enhancing data-driven decision-making within high-performance netball. This study aims to fill this gap by investigating the various factors that impact the adoption of wearable technologies by key stakeholders within netball in South Africa. Given the imminent launch of the first professional netball league in Africa, this study has the potential for adoption at the highest levels of the game, which could revolutionise performance management as we know it today.

1.6 Delimitations of the study

The scope of this study includes:

- Women's national netball teams
    - Senior national team
    - SA U21
    - SA development side

Out of scope:

- Men's national teams
- SA U19
- President XII S
- Provincial teams
- Semi-professional teams
- Fast 5
- Action netball – not affiliated with the NSA
- Primary and secondary school netball teams
- University netball

1.7 Definition of terms

- Adoption
- Data Analytics
- Netball
- South Africa
- Wearable technologies

1.8 Assumptions

- Wearable technologies are not accessible to all members of the national netball teams
    - All national senior teams have a dedicated coaching team, which includes but is not limited to:
        - Head coach
        - Assistant coach
        - High-performance coach
        - Team manager
        - Medical lead/team doctor
        - Physiotherapist
        - Performance analyst
- Teams currently do not make use of wearable technologies for analytics
- The majority of analytics in South African netball is done manually
- Digital transformation within netball in South Africa is in its infancy

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

Wearable technologies have revolutionised sports analytics globally, offering real-time data and insights that enhance player performance, team strategies, and injury prevention (Seçkin et al., 2023). In South Africa, the adoption of these technologies in netball is steadily gaining traction, offering opportunities to improve the competitiveness of the national teams, though it faces unique challenges.

This literature review explores the adoption of wearable technologies for data analytics in South African netball, focusing on applying the Technology Acceptance Model 2 (TAM2) and TOE frameworks to understand the factors influencing adoption.

2.2 Definition of topic or background discussion

Wearable technologies have been used by the top netball-playing nations in the world, like Australia, England and New Zealand. The New Zealand national netball team has used wearable technologies before the 2015 Netball World Cup (Ambler, 2024). After achieving a silver medal at the 2015 Netball World Cup, the New Zealand national netball team's use of wearable technologies increased. The usage of wearable technologies saw the team win the 2019 Netball World Cup. Australia can be considered a pioneer of wearable technologies across

sporting codes (Seewang, 2016). The formation of the Australian Sports Institute, which adopted a sports science approach to performance, saw the introduction of wearable technologies in sports. Netball, the most prominent female sport, was included in the sporting codes that used wearable technology. The Australian national netball team won the 2023 Netball World Cup hosted in South Africa.

The Technology Acceptance Model 2 (TAM2) is a revised version of the original TAM incorporating additional factors impacting technology acceptance. Developed by Venkatesh and Davis (2000), TAM2 expands upon TAM by including subjective norm (SN), image, job relevance, output quality, result demonstrability, perceived usefulness (PU), and perceived ease of use (PEOU). These factors collectively influence an individual's intention to use a technology, determining actual usage. Wearable technologies have revolutionised sports globally by providing real-time data for performance analysis, injury prevention, and strategy optimisation. Sports like football, basketball, and rugby have widely adopted wearable technologies. These technologies are crucial to modern coaching practices, allowing teams to gain a competitive edge through data-driven decision-making (Gabbett et al., 2017).

2.3 What are the factors that impact adoption of wearable technologies in South African netball?

External variables, including economic, environmental, organisational, social, and technological factors, impact the adoption of wearable technologies within South African netball.

2.3.1 *Economic*

The benefits of wearable devices in enhancing health outcomes could be substantial. However, they also significantly impact cost and resource allocation (De Sario Velasquez et al., 2024) regarding Total Cost of Ownership (TCO). This includes initial acquisition, implementation, and ongoing maintenance and support costs. The high upfront cost of wearable devices can be a significant barrier to adoption, particularly for sporting codes like netball with limited budgets. This includes the cost of the devices themselves, as well as any necessary accessories or software.

2.3.2 *Environmental*

Some wearable technologies produce much waste, and the low price of the components of wearable technologies compounds the problem. Even though there has not been a significant effort to reuse some waste materials of wearable sensors, electronic waste in South Africa is becoming a growing concern. There are concerns about wearable technologies' high energy usage and their potentially harmful impacts on the climate and the economy. Despite the relatively low price of current sensors, reducing energy consumption is an important technological challenge with environmental consequences (Njema et al., 2024).

2.3.3 *Organisational*

The support and commitment of leadership within the netball federation are crucial for adopting wearable technologies. Leaders who prioritise innovation and are open to integrating new technologies, particularly in the coaching directorate, can drive adoption. The level of education and training the coaching staff provides also affects how effectively the technology is adopted. Without proper training, even the most advanced technologies may not be used to their full potential ((Mulvenna et al., 2022).

2.3.4 *Social*

The level of acceptance and utilisation of the technology by key figures, such as coaches and other influential netball community members, can also influence its broader adoption. Other social concerns include the security of physical assets, the risk of data breaches, and the affordability of wearable technologies for users. This includes the cost of wearable technologies, which could lead to an increase in thefts and robberies. It is also important to factor in that personal information is required to personalise data and is at risk of exposure (Ching & Singh, 2016; Sivathanu, 2018).

2.3.5 *Technological*

Reliable internet access is essential for effectively using wearable technologies, especially those that rely on real-time data transmission and cloud-based analytics. In regions where internet connectivity is limited or unreliable, the adoption of wearable technologies can be significantly hampered. The availability of supportive infrastructure, such as data storage facilities, charging stations, and integration platforms, is crucial for seamlessly adopting and using wearable technologies (Canali et al., 2022).

The integration of wearable technology in netball can be examined using a modified TOE framework. In this framework, social factors such as players, culture, and ethics replace conventional environmental elements, highlighting the distinct dynamics within sports

teams.

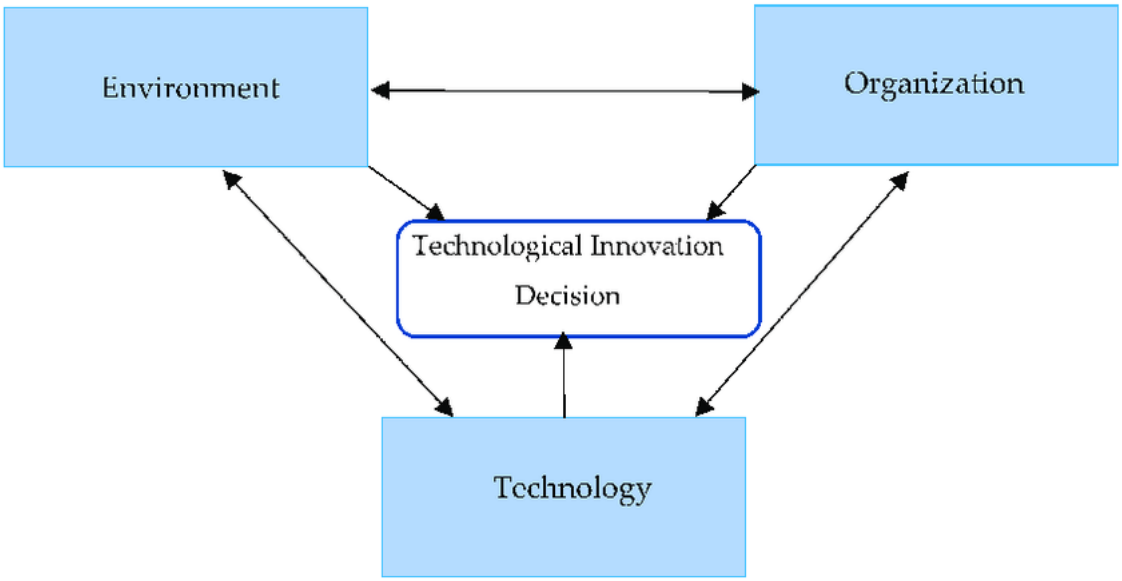


Figure 1: Technology-Organisation-Framework (Tornatzky & Fleischer , 1990)

2.3.6 *Proposition 1*

The adoption of wearable technologies in South African netball is influenced by multiple external factors.

2.4 How can the adoption of wearable technologies improve data analytics in South African netball?

There is an opportunity to improve data analytics in South African netball. This can be driven by adopting wearable technologies within the national team and

using the collected data for enhanced player performance monitoring, strategy, and analytics.

2.4.1 *Enhanced Player Performance Monitoring*

One of the primary benefits of wearable technologies is the ability to monitor player performance in real-time. Wearables provide detailed metrics such as heart rate, distance covered, acceleration, and jump height, which can be analysed to optimise training regimens and improve player performance (Cummins, Orr, & O'Connor, 2013). By continuously monitoring these metrics, coaches can tailor training programs to the specific needs of each player, ensuring that they reach peak performance during competitions (Akenhead & Nassis, 2016).

2.4.2 *Strategic Advantage*

Wearable technologies provide a wealth of data that can be used to inform strategic decision-making, enhance tactical insights, and improve team performance.

2.4.3 *Proposition 2*

Organisational factors, technological factors, and social factors affect wearable technology adoption within netball for enhanced player performance monitoring, strategy and data-driven analytics.

2.5 ANALYTICAL FRAMEWORK

Applying the Technology Acceptance Model to South African Netball

2.5.1 Perceived Usefulness (PU)

In the context of South African netball, perceived usefulness is influenced by the potential benefits wearable technologies offer, such as:

1. **Performance Enhancement**: Coaches may find wearable technologies helpful in monitoring and improving player performance.

2. **Strategic Advantage**: Teams may perceive wearables as helpful in gaining a competitive edge through data-driven strategies.

2.5.2 Perceived Ease of Use (PEOU)

The perceived ease of use of wearable technologies in South African netball is critical for adoption:

1. **User Interface Design**: The technology must be user-friendly, allowing coaches and players to navigate and interpret the data easily.

2. **Technical Support and Training**: Adequate support and training are necessary to ensure users feel confident using the technology effectively (Venkatesh & Davis, 2000).

3. **Integration with Existing Practices**: The technology should integrate seamlessly with current training and coaching practices to avoid disruptions.

2.5.3 Subjective Norm (SN) and Image

The social influence on the adoption of wearable technologies in netball cannot be underestimated:

1. **Peer Influence**: Coaches and players are more likely to adopt wearable technologies if they believe their peers and other teams are doing so (Venkatesh & Bala, 2008). This can be seen by the England national netball team joining Australia and New Zealand as top-ranked nations that use wearable technologies for in netball.

2. **Social Status**: Using advanced technologies may enhance a team's image, making wearables more appealing (Venkatesh & Davis, 2000). In Australia, amateur and semi-professional netball teams use wearable technologies, and this influence can be attributed to the Australian national netball team's success over the years.

2.5.4 Job Relevance and Output Quality

For wearable technologies to be adopted, they must be perceived as relevant and practical:

1. **Relevance to Netball**: Wearables must provide data directly applicable to netball, such as player movement, heart rate, and ground cover.

2. **Quality of Data**: The accuracy and reliability of the data provided by wearables are crucial for their acceptance. Poor-quality output can lead to mistrust and reduced usage (Sun & Zhang, 2006).

2.5.5 Result Demonstrability

The observable benefits of wearable technologies play a significant role in their adoption:

1. **Evidence of Effectiveness**: Demonstrable improvements in player performance or reductions in injury rates can enhance the perceived value of wearables, encouraging adoption (Venkatesh & Bala, 2008).

2. **Case Studies and Success Stories**: Sharing successful examples from other sports or teams can help convince sceptics of the benefits of wearable technologies

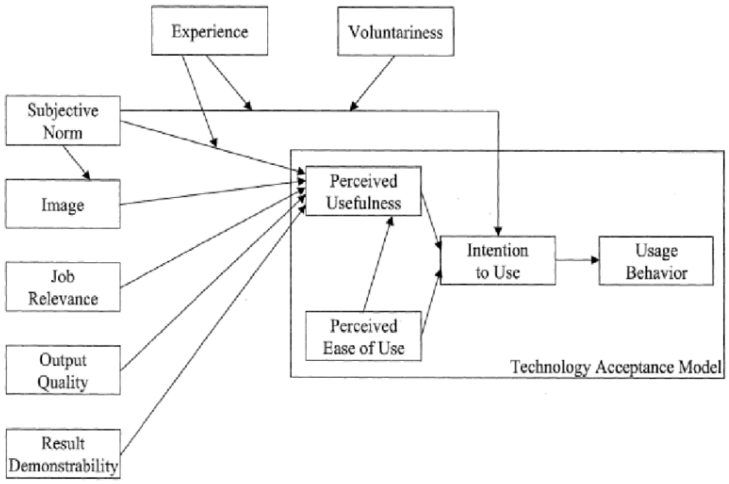


Figure 1: Technology Acceptance Model (TAM 2) (Venkatesh & Davis, 2000).

2.6 Conclusion of Literature Review

This conceptual framework comprehensively analyses the factors influencing wearable technology adoption in South African netball. By incorporating external variables and TAM2 factors and examining their impact on behavioural intentions and actual use, the framework provides a structured approach to understanding the adoption process. This framework is a foundation for further academic research and practical implementation strategies within sports technology adoption.

Proposition 1: The adoption of wearable technology in South African netball is influenced by multiple factors, which are covered in the TAM 2 framework.

Proposition 2: Organisational factors, technological factors, and social factors affect wearable technology adoption within netball for enhanced player performance monitoring, strategy and data-driven analytics.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Research Paradigm

“The interpretivist paradigm is a research approach in sociology that focuses on understanding the subjective meanings and experiences of individuals within their social context” (Nickerson, 2024). Interpretivism, as a chosen research paradigm, will give insight into how the sample perceives wearable technology and its benefits and potential challenges from different points of view. Individuals are from various social and economic backgrounds; hence, their experiences will differ. Through qualitative methods like interviews, the opportunity exists to explore at a deeper personal level how coaches perceive and experience the adoption of wearable technologies and how they can aid in current and future data analytics.

3.2 Research approach

The proposed methodology for this study is a qualitative approach, using qualitative techniques to collect holistic data. This approach has been selected to collect opinions and understand the participants' experiences related to the study. The data collected will be analysed using appropriate quantitative techniques to explore how the various factors impact the adoption of wearable technologies by key stakeholders within netball in South Africa.

3.3 Research design

The study design will take place in the form of interviews, which will take place in-person or on a virtual platform like Google Meet, Teams or Zoom. Interviews are the preferred qualitative method as they allow for effective collection of the sample's experiences, attitudes, and perceptions. The flexibility also allows for follow-up questions and the opportunity to explore context-specific feedback worth noting. Personalising the interaction with the sample opens an opportunity for nuanced feedback and exploring factors that directly or indirectly impact the adoption of wearable technology in netball. Interviews allow for a comprehensive understanding from an individual point of view.

3.4 Data collection methods

This study will use semi-structured interviews as the data collection method. This method allows the exploration of themes and experiences, attitudes and perceptions of the research questions and topics related to TAM 2 and external factors that influence the use of wearable technology within netball. The aim is to gain insights from each participant within the provided time. Interviews will be recorded and securely stored with the participant’s consent.

3.5 Population and sample

3.5.1 *Population*

The population consists of the coaches and team management staff of the South African senior national netball team, U21 team, and development team. This includes but is not limited to:

- Head coach
- Assistant coach

- High-performance coach
- Team manager
- Medical lead/team doctor
- Physiotherapist
- Performance analyst

The sample is chosen based on the exposure and engagement with analytics within the current landscape. Wearable technology adoption directly impacts the sample in day-to-day duties and strategy formulation.

3.5.2 *Sample and sampling method*

Based on the qualitative approach chosen, 8-10 participants will be targeted for qualitative interviews—this sample size factors in availability and possible response rates from the national teams. Saturation is anticipated to be reached at 8 to 10 as the sample size is adequate to fulfil the purpose of this study (Rusu Mocănașu, 2020). Coaching staff and team management will be approached directly at events and tournaments or indirectly through existing networks by stating the importance of their input into research where they are directly impacted. A snowball sampling method will be employed to exploit the opportunity to recruit additional participants within the netball fraternity.

3.6 The research instrument

The research instrument will be semi-structured, thus ensuring an opportunity for flexibility and exploration of themes. The instrument aims to gain in-depth insights into the population's experiences and awareness regarding adopting wearable technologies concerning TAM 2, such as perceived usefulness, ease of use,

subjective norm and image and external factors. The semi-structured interviews allow for open-ended questions and the participant to share their perceptions, beliefs and thoughts related to wearable technology, adoption and data analytics within netball.

3.7 Data analysis strategies and interpretation

"Thematic analysis is a well-established and flexible research method that organises qualitative data into a series of patterns or themes" (Braun & Clarke, 2006). Thematic analysis is the chosen strategy for qualitative data collected from interviews because of the themes that will be extrapolated from the data. This strategy will be applied by transcribing the interviews and compiling notes, linking themes to the TAM 2 framework and external factors influencing adoption and identifying the overall themes.

3.8 Possible limitations and challenges of the study

- A possible limitation of this research design is potential groupthink or resistance to introducing technology in data analytics within netball.
- Researcher bias when interpreting data due to the researcher's background as a netball player
- Participant availability if interviews take place during tournaments

3.9 Ethical considerations

- All participants will be informed about the purpose of the study, and their consent will be obtained before data collection. Each participant must sign a consent form.

- Participants' identities and responses will be kept confidential, and anonymity will be maintained to protect their privacy. All disclaimers and clauses are explained.

- Measures will be implemented to secure the collected data, ensuring that it is stored safely and accessible by researchers and mandated university personnel.

CHAPTER 4. PRESENTATION OF FINDINGS

4.1 Introduction

The previous chapter, Chapter 3, discussed the research methodology. This chapter presents the findings of the study based on the data collected and analysed. The results are structured according to the research objective, with tables, figures, and graphs used to illustrate key findings for clarity and better understanding. Data was collected from eight individuals through audio- and video-recorded interviews. The individuals interviewed are current and former coaches and team management of the South African U21 and senior national teams.

The Technology Acceptance Model 2 (TAM2) guided the analysis, which helped categorise the factors influencing adoption, including perceived usefulness, ease of use, and social influence at an individual acceptance and usage behaviour level. The adapted TOE framework categorised external factors such as social, economic and organisational constraints at an organisational level. Given the growing importance of data-driven decision-making in professional sports, wearable technologies offer significant potential to enhance player performance monitoring, injury prevention, and strategic planning.

To better understand this phenomenon, the dataset was categorised into different thematic groups, with the most frequently occurring themes including:

- Cost and Accessibility
- General Understanding and Awareness
- Perceived Ease of Use
- Perceived Usefulness

Subsequent sections will present these themes in detail, illustrating participants' perspectives and experiences with wearable technologies in netball. The findings discuss existing literature, offering insights into how these technologies can be more effectively integrated into the sport. The following discussion will present the themes in detail, ultimately providing a comprehensive understanding of the key drivers and barriers to adoption.



Figure 3: Themes word cloud

4.2 Multiple external factors influencing the adoption of wearable technologies in South African netball.

4.2.1 *Cost and Accessibility*

a. ***Cost constraints***

- Acquisition and maintenance of wearable technology is expensive
- Limited sponsorship at all levels of the sport
- Concerns about return on investment
- Low-cost alternatives have not been explored

b. ***Accessibility***

- Universities with high-performance centres have access to wearable technology (mainly, the University of Pretoria, Stellenbosch University, University of Free State and North-West University)
- Some coaches with accessibility are not using WT properly
- Limited accessibility and exposure at the semi-professional level

c. ***Data Analysis***

- Data analysis in younger age groups would assist in identifying talent across the country.
- Curiosity at an individual level allows one to understand wearable technology and the data better.

- The rise of wearable technologies for health consciousness is a good start to analysing data at your fingertips.

d. ***Availability***

- Availability at younger age groups across LSMs and geographical areas

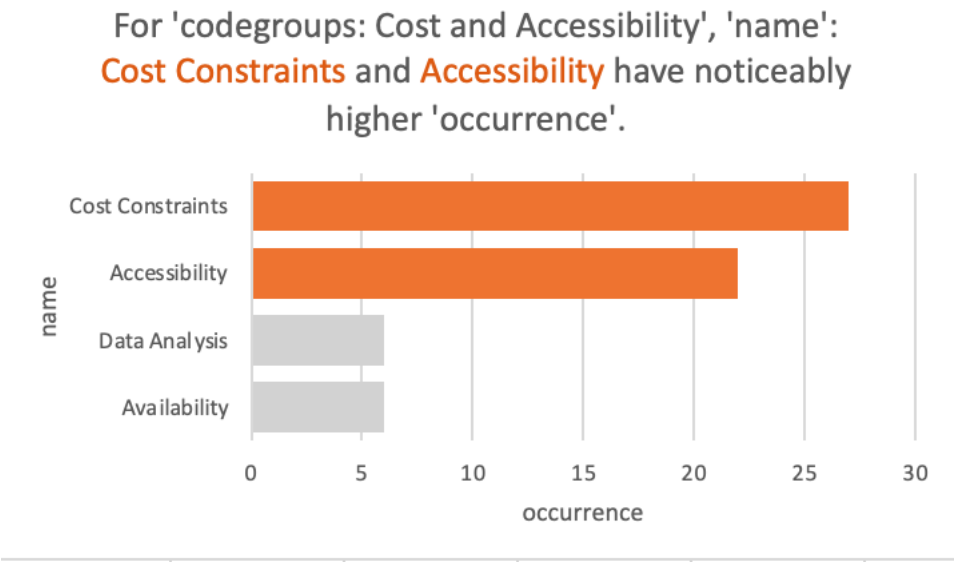


Figure 4: Cost and accessibility occurrence

4.2.2 *General Understanding and Awareness*

a. ***Wearable Technology***

- Wearable technologies listed included pods, smart bras, compression straps and bands, smart watches, heart rate monitors, and GPS.
- A participant mentioned wearable technology to detect concussions and exposure to augmented reality for netball.

- A participant mentioned wearable technology used on football boots.

b. ***Awareness***

- Awareness is at most top level of sport – national teams
- Disparate awareness in semi-professional leagues and universities

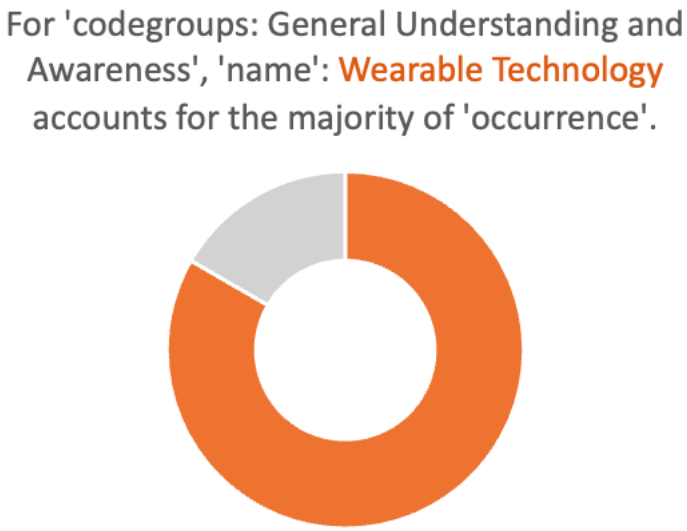


Figure 5: General understanding and awareness occurrence

4.2.3 *Perceived Ease of Use*

a. ***Insights***

- Former players turned coaches with international netball league exposure (mainly Australia, New Zealand or England) find wearable technology easy to use.
- Data is easier to understand if a team has personnel who can interpret, analyse, and communicate it.

b. ***Challenges***

Wearable technology that will dismantle or fall off the body during training

c. ***Player Performance***

Tracking player performance and player management is made easier with wearable technology.

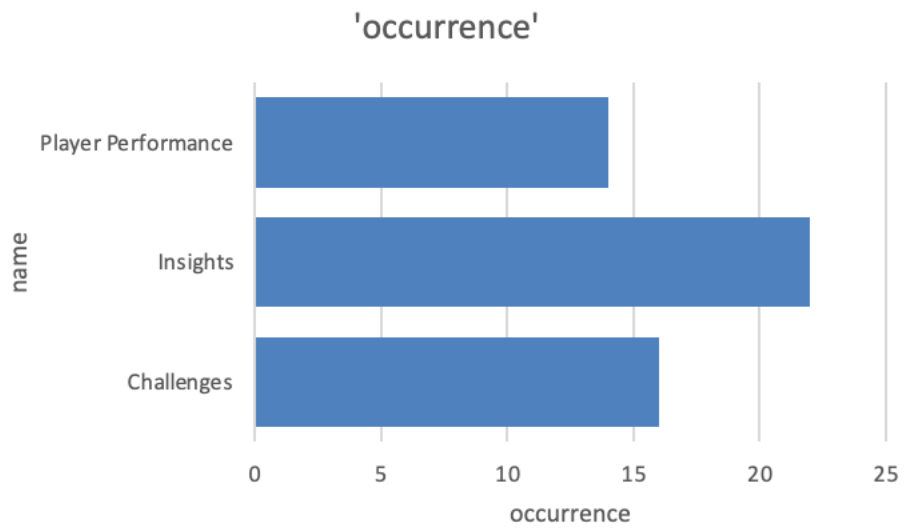


Figure 6: PEOU occurrence

4.2.4 *Perceived Usefulness*

a. ***Team Strategies***

Wearable technologies help improve player and team performance through enhanced program training, real-time data streaming, time-series analysis and forecasting.

b. ***Work rate***

Work rate impacts player performance by tracking training loads, intensity, efficiency, speed and elevation.

c. ***Injury prevention***

Wearable technologies can help in injury prevention by monitoring red/danger zones and the likelihood of injury occurring and comparing injury prevention to injury management.

d. ***Fatigue Management***

Monitoring fatigue levels to understand the root cause and address accordingly

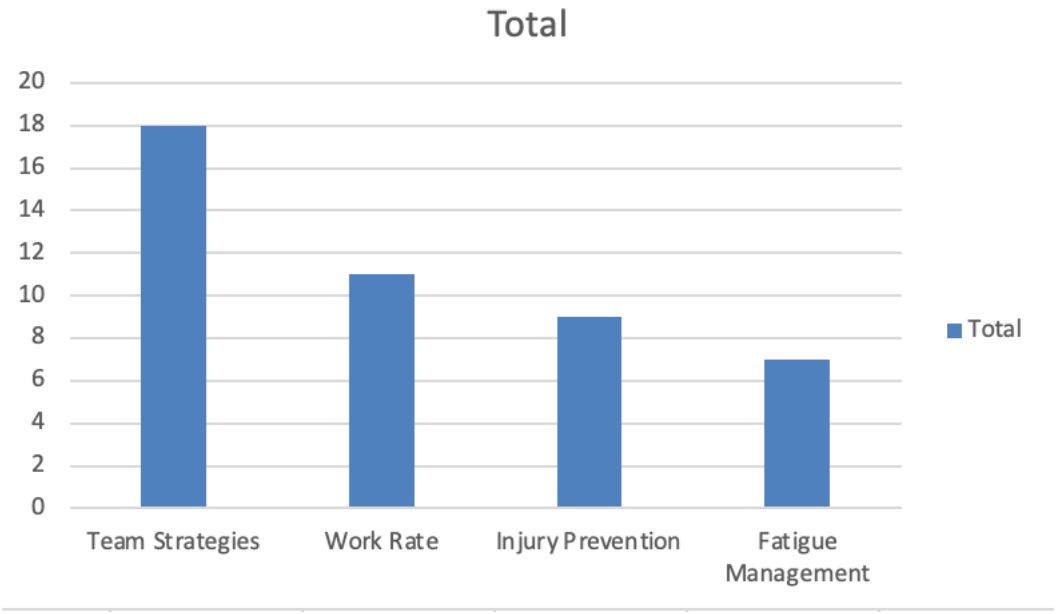


Figure 7: PU occurrence

The adoption of wearable technology in South African netball is influenced by some factors covered in the TAM 2 framework, mainly Perceived Usefulness and Perceived Ease of Use. It is worth noting that themes related to cost and

accessibility are contextual factors that influence Perceived Usefulness, Perceived Ease of Use, Job Relevance, Subjective Norm and Experience.

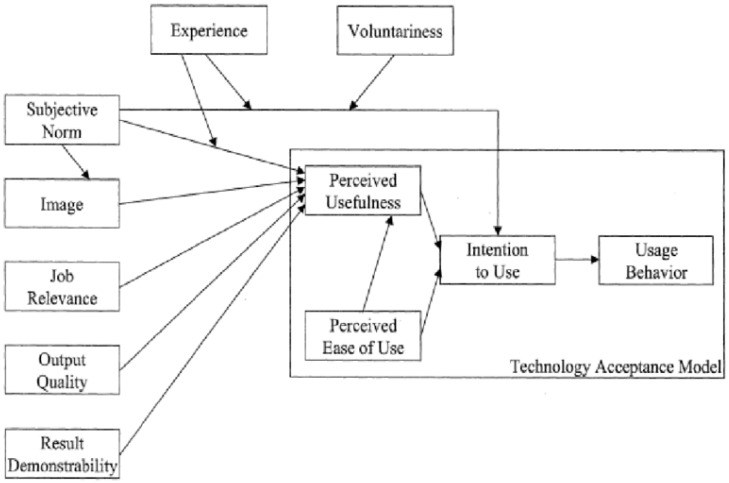


Figure 8: TAM 2 Framework

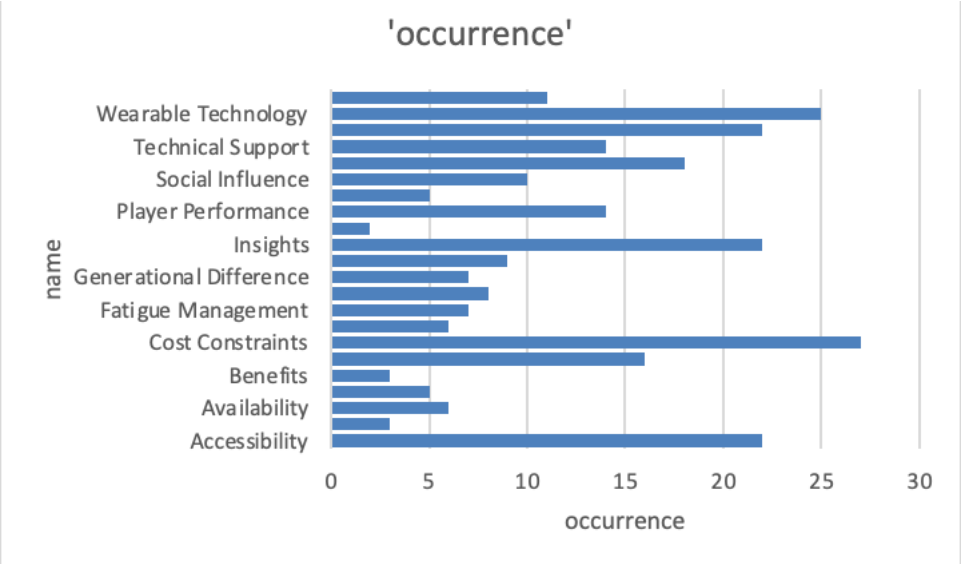


Figure 9: Occurrence of factors

4.3 Organisational, technological, and social factors affecting wearable technology adoption within netball.

4.3.1 *Organisational factors*

- Tools and technologies are not prioritised in budget allocation within federations.
- The federation's willingness to embrace new technologies is critical. Their perception of the benefits and return on investment often determines whether adoption occurs.
- Federation policies and netball rules around player safety and welfare may influence how wearable technology can be used.

4.3.2 *Technological factors*

- The accuracy and reliability of data collected impact the willingness to use wearable technology.
- With the implementation of the Protection of Personal Information Act, concerns have been raised about the intended use of data, retention, destruction, and safety.
- Technical support and training for team management and players are crucial for the adoption of wearable technology.

4.3.3 *Social factors*

- Players use wearable technology for training and game purposes if mandated by team management.
- Increased interest in and usage of wearable technology can positively impact its adoption based on the success of other teams using the technology.
- Multigenerational views on coaching and training within netball may contribute to resistance to change.

The availability of devices does not solely determine the adoption of wearable technology in netball; broader organisational, technological, and social factors also shape it. Some of these factors fall under the TOE Framework and are barriers to adopting wearable technologies within South African netball. For this research, the TOE framework has been adapted to include a social factor, a key element of this study.

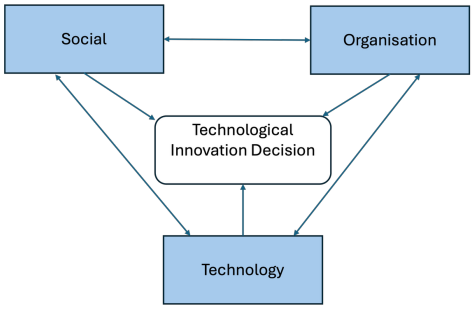


Figure 10: Researchers' own adapted from TOE Framework

4.4 Summary of the results/findings

While organisational, technological, and social factors provide an understanding of the structural enablers and barriers to wearable technology adoption within netball, the Technology Acceptance Model 2 (TAM2) offers a complementary individual perspective. Specifically, TAM2 focuses on individual users' behavioural intentions, highlighting how perceived usefulness, perceived ease of use, subjective norms, and social influence shape acceptance of new technologies.

In the context of netball, organisational and technological factors such as financial resources, device usability, and policy regulations may create the conditions for adoption. However, the successful implementation of wearable technology depends on individual acceptance by players, coaches, and staff, as explained by TAM2. For example, even if a national netball federation invests in wearable technology (organisational factor), adoption may be limited if players do not perceive the technology as applicable or feel social pressure against its use (TAM2 factors).

Therefore, to fully understand wearable technology adoption in netball, it is essential to consider structural influences (organisational, technological, social) and individual behavioural factors (TAM2). This combined approach provides a more holistic view of the challenges and drivers of technology adoption within the sport.

CHAPTER 5. DISCUSSION OF THE RESULTS OR FINDINGS

5.1 Introduction

This chapter discusses the study's key findings on wearable technology adoption in netball, focusing on the organisational, technological, and social factors highlighted in the research. The discussion integrates these findings with existing literature and theoretical models, such as the TOE and TAM2 frameworks. By examining these factors, the study provides a comprehensive understanding of the barriers and facilitators influencing the adoption of wearable technology within netball teams.

To ensure a thorough investigation, qualitative data were gathered from eight participants, including players, coaches, and support staff. These individuals provided valuable insights into their experiences, perceptions, and attitudes toward wearable technology. The qualitative research approach enabled an in-depth exploration of real-world perspectives, capturing the nuances of positive and negative experiences associated with the adoption process. The data collection process involved semi-structured interviews, which were carefully transcribed and analysed using various qualitative techniques. These techniques included transcription, coding, quoting, grouping, categorising, and theming. Additionally, data and sentiment analysis were employed to identify patterns, trends, and underlying emotions expressed by participants regarding the integration of wearable technology in netball. The thematic analysis helped structure the findings meaningfully, highlighting key themes related to organisational readiness, technological usability, and social acceptance.

This study aimed to address critical gaps in existing research by exploring how organisational policies, technological advancements, and social dynamics influence the adoption of wearable technology in netball. The research set out to answer the following research questions:

- What are the factors that impact the adoption of wearable technologies in South African netball?
- What wearable technologies are in use for data analytics in South African netball
- How can the adoption of wearable technologies improve data analytics in South African netball?

5.2 Discussion pertaining to Proposition 1

The adoption of wearable technology in South African netball is influenced by multiple factors, which are covered in the TAM 2 framework.

5.2.1 Perceived Usefulness (PU)

Participants' perspectives are shaped by their exposure to wearable technology as coaches and team management with netball player experience. Perceived usefulness is a key determinant in the adoption of wearable technology. They also share beliefs about how wearable technologies can help prevent injury and how data generated by wearable technologies can enhance team strategies and performance.

a. ***Player Performance Enhancement***

Participants expressed that they found wearable technologies helpful in monitoring and improving player performance (Seçkin et al., 2023).

"I think it has been used to improve performance". – A2

"…so that would make contribute to almost finding ways to make yourself better, and in the long run, it can contribute to better quality players." – A2

"I think it will be an advantage. If it is used correctly, it will increase the intensity and quality, and it will improve our players. Internationally, it will give us good-quality players. It is a way to improve your performance. So I think it will be to our benefit." – A2

A participant provided a specific example that was observed in their team:

"So, you know, when you are smaller, you have to work harder because it is the physical weight of a player against you. Therefore, we have always used it, you know, because you can see when a player is fatigued in its heart rate, and obviously in its work rate, before you can physically see the performance dropping. Moreover, you do not want to put a player into a red zone and then cannot bring it back. So we have used it to pull a player off and put fresh legs on. However, it might not be a player as good as that player; fresh legs give the player, the better player, the chance to recover. In that sense, it was a great help

for us in team changes in when to ring the changes to keep the team's performance up." – A1.

b. Injury Prevention

All participants believed wearable technologies could help prevent injuries (Preatoni et al., 2022). This includes identifying injuries, monitoring recovery, and adapting training to include strategies and drills to prevent injury.

"But there is also, like with all other things, there are many variables that play a role and but it is something that I think can play a role in identifying, maybe injuries." – A2

"And also, speak about injuries. You can track; once they say I had an injury, I can see how I am returning to my fitness from the injury" – A4.

"You absorb more on an astroturf in your ankles than you would on a clay court, right, because of the surface texture in that sense, which is another discussion as a whole, but basically, it will if we improve our agility drills, we are building healthier and stronger ankles and knees, which has a direct impact on the less risk of ankle and knees in our sport." – A6.

A participant provided a specific example that was observed in their team:

"Yes, absolutely. Injury prevention is in the sense that you know because I said you can beat a movement. So we have had players in the past where the player was only comfortable landing on their right, regardless of where on the court they were landing, or whether they were in a separate defence, they were constantly landing on their right, which was they were decelerating with their left and then landing on the right. That player was injury-prone in terms of ankles, and the moment we identified that we were then able to start coaching her and teaching her how to be balanced and learn with her left foot to minimise the overuse of the one leg," – A5.

c. Strategic Advantage

Participants expressed how they think data generated by wearable technologies can be used to enhance team strategies.

"So she was very individualistic when it came to every person's data, and then put a training program together based on that" – A7.

"… You know you have a particular player that is good at accelerating, and they are pretty fast and able to maintain their speed for long periods. And then maybe the opposing team has a player that is quite hard to manage, and you can then match that player with the opposing player; I think in that instance, it can fit with players that game strategy." – A5.

"Yeah, I mean, it might be more like for person to person, so very person specific or individual specific, because you could, if you are looking for a winger, you see

the acceleration, or de-acceleration, or the ability to, kind of, you know, to kind of move between players." – A1.

"almost the analysing what information was gathered and how we can use it to develop training and stuff further" – A1

"You just want to ensure that your session is the quality or intensity of a real game; that is how you would monitor it with that device. Having that information and understanding that then you can almost rate your session, whether it was on standard or it was not, or if you want to achieve 50% of match intensity" – A2

"But eventually we used it so I could integrate it in how long it takes to make a session and how hard a session could be" – A8.

A participant provided a specific example that was observed in their team:

"Yes, I remember last year I was coaching the national team. We are playing qualifiers, and we are training sessions. So I took my laptop and walked down the players on how exactly was needed, and I sat down with them, and while we were training, stop play, do the so as they as they are training, they could see it, and we wanted to stop one of their major players. They are good players in the attacking circle. So, we were watching what she does. What does she do? What is her next movement, her third movement? If she did not go, who would get the ball? Moreover, I always had goosebumps watching them the next day; they were just doing exactly, and they shot the player. She had no chances, and there was no plan B." – A4.

d. **Alignment with previous literature**

Today, national and professional sports teams utilise WT devices to enhance performance in training and competitions, collect quantitative biomechanical and physiological data, and track training loads (Seçkin et al., 2023).

The participants have indicated that since they found wearable technology beneficial for enhancing real-time player performance monitoring, coaches can customise training programs to meet the specific needs of each player, ensuring they achieve peak performance during competitions (Akenhead & Nassis, 2016).

Wearable technologies provide a wealth of data that can inform strategic decision-making, enhance tactical insights, and improve team performance.

The research reveals that widespread technology adoption benefits performance, injury prevention, fan engagement, and organisational efficiency (Qi et al., 2024). This is directly linked to the PU factor within the TAM 2 framework, reaffirming that participants who perceive wearable technology as beneficial are likelier to adopt it in South African netball for enhanced player performance, team performance, and injury prevention.

5.2.2 Perceived Ease of Use (PEOU)

Participants had mixed experiences with challenges they encountered or anticipated encountering when using wearable technology, citing exposure to different kinds of wearable technology in a local and global setting. They also shared views about how easy it is to use wearable technologies in training, how well they integrate with existing training practices, and potential challenges with data interpretation. However, proper training and technical support are crucial

when adopting WT, and there was mixed feedback on the different levels of support and expertise to provide training and technical support. Participants who found wearable devices easy to use were more likely to perceive them as beneficial and integrate them into their training programs.

a. User Interface Design

"Different wearable technologies that you have been exposed to, being the smart bras, the different dresses, you know, the little pockets and everything like that" – A2

"To put it (WT) in the pocket, you just put it in and go on. Moreover, after training sessions, you give it up, you give it back, and then information is sent to you," – A7.

b. Technical Support and Training

"The only people that I have come across who have this intense knowledge of, well, for the data produced by the wearable technology, are those who have gone and studied their honours, maybe in sports science, yeah. So you need an educational background there." – A1.

A participant provided a personal example:

"Yeah, I think a basic YouTube video, you know, that just explains these things, but specifically for a coach or, you know, having a team, we have all these things, we have team meetings, we have all these things. Use it, but I do believe that it

is. It is essential to have three or four follow-up sessions to ensure that people completely understand what the equipment or systems can do for them. Because you learn, you grow as you learn. You know, so you know, once you have got the first thing under the belt, you are ready for more, and then you need somebody to take you. However, it needs to be set up beforehand because, you know, people get complacent, or they get, you know, embarrassed that we do not know, but they need to be able to build anything onto it." – A3.

"As I said earlier, I must understand why and how something is done. For instance, if you find the specialist will give me something, I wonder why I cannot get something else. Yeah, yeah. However, I think the training is something that we cannot shy away from. Yeah, we will need to know about it because coaching, you cannot sit and say you know everything about coaching; it is so big this, you know, there are some small details that you, especially me, myself as one of the youngest coaches, upcoming coaches, I have got so much to learn. Every time I am part of the competition, I learn small things. Yeah, and I want to learn, so I need coaching from the specialist" – A4.

c. Integration with Existing Practices

"Well, I thought it was very easy. We had the pods out there, although they just had the bands. They strapped the bands on every player knew which. Amanda had to take it and log on to the iPad, and I could do live tracking, and afterwards, I thought it was so easy" – A3.

d. ***Alignment with previous literature***

Adequate support and training are necessary to ensure users feel confident using the technology effectively (Venkatesh & Davis, 2000). This sentiment has been consistent with all participants, with some citing what is currently done from a training and support perspective. In contrast, others have suggestions for quick and more straightforward support methods. User interface design is broad in the context of wearable technologies. However, for this study, this included appearance design that covers comfort design, aesthetic feeling, tactile feel, and convenience of carrying the WT (Wang et al., 2023).

The perceived ease of using wearable technologies in South African netball is critical for adoption. User training and device comfort are essential for improving the user experience and ensuring players and coaches embrace the technology. Addressing usability issues through straightforward, practical technical support and enhanced wearability can improve adoption rates.

5.2.3 Subjective Norm (SN) and Image

The social influence on adopting wearable technologies in netball cannot be underestimated, as the opinions of others (e.g., coaches, players, or team management) may influence the decision to adopt WT. Regional emerging trends spark curiosity and influence perspectives on adopting frequently used wearable technology for netball in South Africa. Coaches and team management associated with the top high-performance centres in South Africa play a critical role in this adoption, as these centres are known for their professionalism, advanced training methods, and proven success in the top leagues and national netball team participation. Some participants are not influenced by the opinions of other coaches, players and team management in their decision to use wearable technology.

a. **Peer Influence and Social Status**

"… it does not matter if it comes from inside the group and it is something that the coach wants, then we do it. If it is something she does not want, then we most likely will not do it" – A8.

"…I saw what we were doing with the under 21s and that a credible coach whose interests are very much scientific. I know she loves the gadget (WT), so, of course, that tickled my fancy, and then, once I saw what we could do with it, it played a role." – A3.

"I do not think I get easily influenced. So I would say, not me." – A5.

A participant made an interesting comment:

"Because someone else is doing it does not mean I will. Does it work for me? Does it fit into my coaching philosophy? Is it going to help me achieve what I want to achieve? Moreover, can I afford it? Because the reality is that I cannot afford those things. Yeah, so I am not easily influenced. It will be great to have it and the support around it, but you can also have it and not know what to do with it. Then what? Yes," – A5

a. **Alignment with previous literature**

Coaches and players are more likely to adopt wearable technologies if they believe their peers and other teams are doing so (Venkatesh & Bala, 2008). Regionally, it is noted that the netball structures at the university level that feed into the national U21 and senior netball teams that have high-performance

centres have players that are exposed to and adopt wearable technology earlier than other universities. These universities are mainly:

- University of Pretoria
- University of Free State
- Stellenbsoch University
- North-West University

Advanced technologies may enhance a team's image, making wearables more appealing (Venkatesh & Davis, 2000). This is evident in the success of teams with high-performance centres in domestic leagues and the number of players considered for the national netball teams. Overall, the study confirms that subjective norms and images can moderate social influences in adopting wearable technology in netball.

5.2.4 Job Relevance and Output Quality

Wearable technologies must be viewed as relevant and practical for adoption. This includes wearable technology data that specifically addresses the needs of netball and the accuracy and reliability of this data as it pertains to the tasks and responsibilities of netball stakeholders. The study found that netball players and coaches were more inclined to adopt wearable technology when they perceived a direct link between its use and improved performance, injury prevention, and tactical decision-making. Players who believed that wearable devices provided meaningful insights into their workload and movement patterns considered them more relevant to their roles, leading to higher adoption rates.

Output quality, a key aspect of TAM2, refers to how users perceive the accuracy, reliability, and usefulness of the data generated by a technology. Participants indicated that their readiness to embrace wearable technology depended on the perceived quality of the performance metrics provided. High-quality, actionable data that enhanced training effectiveness and match preparation fostered favourable views towards adoption, while inconsistencies or inaccuracies in data interpretation resulted in scepticism.

a. Relevance to Netball

“Track the health and work rate of our players, I think, not only just for your work rate but also your efficiency in where you are” – A1.

A participant shared some invaluable insight:

“Oh, I love it. I love it. It is, especially if you have the pods (WT) that can read your elevation, speed, decreases, and increases. It is just your running paths. You know, that is just because often we were at a stage where the under 21s got to the state where we knew how many passes we needed to play if we played in a winning game and when we needed to play in the losing game because we were competing against the same side for five games in a row. So, when we played too many passes, it meant our timing was off, so we lost the game. So it was I found it extremely valuable for our netball because it is not just because, with netball, it is not just your pace that you play at; it is also your lines that you run, the timing of those runs and even your place, you can see which is the most effective place that you can play with those tracking things.

Furthermore, data is just as valuable as what we have with selection. It is magnificent because that data capture that's happening there can give you stats like in, you know, then it is raw data. If you do not use it as a weapon and take the background in it, it is just, there is nothing to compare it.” – A3.

b. **Quality of Data**

“I think if we almost had, like, a bunch of norms that were set for that age group and that level of playing, it would be a lot easier to be then able to comment if it was accurate.” A2

“Monitor the distance, the workload, the heart rate, sleeping patterns, and daily movement. Moreover, the last one is the strap they wear while playing, which monitors their heart rate and ensures that you know we are not pushing them beyond what their bodies can take. Furthermore, if it gets too dangerous, they come off if the heart rate is too high because now the player is aggressive” – A4.

“And two of my players’ heart rates just went ballistic after vaccination, and I think, and to the state that the one girl, the one girl recovered, but the other girl never did. She got myocarditis and had to stop playing netball completely.” – A5.

c. **Alignment with previous literature**

All participants agreed that the data received from WT must be accurate and relevant to exploit it fully for monitoring, tracking, and strategies.

These devices, which range from smartwatches and fitness trackers to advanced sensors embedded in clothing, offer real-time data on key performance metrics, including heart rate, speed, distance, and muscle activity. (Espinosa et al 2025)

The accuracy and reliability of the data provided by wearables are essential for their acceptance. Low-quality data can hinder the adoption of wearable technology in South African netball (Sun & Zhang, 2006).

In general, the relevance of the job and the quality of output heavily impacted the uptake of wearable technology in netball. When players and coaches viewed the technology as essential to their training and decision-making, they were more willing to adopt it. By providing high-quality, dependable results and showcasing the direct advantages of wearable technology in netball, its adoption can be further promoted.

5.2.5 Result Demonstrability

As defined in TAM2, Result demonstrability refers to the degree to which users believe a technology's benefits are tangible and visible. Participants shared examples of wearable technologies demonstrating tangible benefits in training and performance and highlighted the importance of seeing measurable outcomes before fully adopting wearable technologies. The study confirms that result demonstrability plays a crucial role in technology adoption within netball. When users perceive the positive outcomes of wearable devices, they are willing to continue using the technology. Enhancing data visualisation and providing concrete examples of performance improvements can further strengthen adoption rates.

a. ***Evidence of Effectiveness:***

"Look, I think it would be beneficial to convince people to use it so the people who may be doubting its relevance. Yeah, I think it would help if they could see physical examples of what, yeah, how it is benefit certain benefited certain people" – A1.

“I think, you know, it is about how big the investment is because I think it is like anything, you know, if you can buy a mother the best Kenwood, but if she does not believe that you must whisk eggs with a Kenwood” – A3.

“You cannot just work on it just once and expect change, and it will be a continuous thing over and over. Furthermore, change it up and go back to the first option, you know. So it is something that you can measure, but also the patient is very important.” – A7.

“So this player, she naturally has a high heart rate. So if you were not, if you did not know or you were not, you were not observing her over a long period, you would panic when you saw a heart rate on the iPad because all the information gets fed onto the iPad, thinking, Oh no, she is going to die. Honey is going to explode. Meanwhile, she has a high heart rate ” - A8.

b. ***Alignment with previous literature***

Demonstrable improvements in player performance or reductions in injury rates can enhance the perceived value of wearables, encouraging adoption (Venkatesh & Bala, 2008). Based on participant insights and shared examples, the demonstrability of the result is an important factor in adopting wearable technology within South African netball.

5.3 Discussion pertaining to Proposition 2

Organisational factors, technological factors, and social factors affect wearable technology adoption within netball for enhanced player performance monitoring, strategy and data-driven analytics.

5.3.1 *Organisational*

Leadership support and commitment within the netball federation are crucial for adopting wearable technologies. Leaders, particularly those in the coaching directorate who prioritise innovation and are open to integrating new technologies, can drive adoption. The level of education and training the coaching staff provides also affects how effectively the technology is utilised. Without proper training, even the most advanced technologies may not be used to their full potential (Mulvenna et al., 2022).

Findings indicate that organisational support plays a significant role in netball's adoption of wearable technology. Financial constraints are a primary barrier, with many teams struggling to allocate sufficient budgets for purchasing and maintaining wearable devices. Leadership attitudes and decision-making also influence adoption, as teams with forward-thinking coaches and management are more likely to integrate wearable technology into training and performance analysis. Additionally, policies and regulations regarding data privacy and player welfare shape the extent to which wearable devices are utilised, with some organisations hesitant due to concerns about data security and ethical considerations.

"*For example, the POPI Act. Not many athletes would sign over for their data and their performance data to be analysed, and they it sends it to biometric performance data at the end of the day, right? And now they want to know who*

owns this data because if you get some random coach who feels like, okay, you know what, I cannot read this, I am going to give this to someone else. Now, someone else can access their player's data, which is so easily shared that it can be shared with overseas coaches. It can be shared with other TNL coaches to break or make a player—how secure is this data as well?" – A6.

These findings align with the TOE framework, highlighting the role of organisational resources and leadership in technology adoption.

Tools and technologies are often not prioritised in budget allocation within federations. The federation's willingness to embrace new technologies is critical. Their perception of the benefits and return on investment often determines whether adoption occurs.

Federation policies and netball regulations regarding player safety and welfare may influence wearable technology use. This is evident in World Netball (governing body that governs netball federations globally) rules:

"Players may not wear anything that could endanger themselves or other players, specifically:

a. No body piercings, including earrings, may be worn.

b. No adornment that may endanger player safety may be worn.

c. No communication devices may be worn.

d. Any other adornment worn must be securely covered with tape and/or padding.

e. Medical devices may be worn provided they are securely covered with tape and/or padding.

f. Player monitoring devices may be worn provided they are secured within the playing uniform.

g. Fingernails must be short and smooth. h. Hair must be suitably tied back (for example in a ponytail, plait or braided) and free from any adornment." (World Netball, 2024)

5.3.2 *Social*

The acceptance and utilisation of the technology by key figures, such as coaches and other influential netball community members, can influence its broader adoption. Other social concerns include the security of physical assets, the risk of data breaches, and the affordability of wearable technologies for users. This includes the cost of wearable technologies, which could lead to an increase in thefts and robberies. It is also important to consider that personal information is required to personalise data and is at risk of exposure (Ching & Singh, 2016; Sivathanu, 2018).

Players use wearable technology for training and game purposes if mandated by team management.

"Sometimes, it can be optional, and I can choose to use it. So if the team management says yes, use it, then I will use it" – A2

Increased interest in and usage of wearable technology can positively impact its adoption based on the success of other teams using the technology.

Multigenerational views on coaching and training within netball may contribute to resistance to change.

“It is a lack of understanding where traditional coaches will shy away from technology because they do not know we did not understand it because way back, it was not used.” – A5.

“You will definitely find coaches who are more traditional and do not believe in technology or tools. They feel like they have got all the knowledge they have got in their head, but you more modern, maybe the younger generations would totally be more open to getting as much data to be able to enhance their performance.” – A1.

The availability of devices does not solely determine the adoption of wearable technology in netball; broader organisational, technological, and social factors also shape it. Some factors fall under the TOE Framework and present barriers to adopting wearable technologies within South African netball.

5.3.3 *Technological*

The integration of wearable technology in netball can be examined using a modified TOE framework, where social factors such as players, culture, and ethics replace conventional environmental elements, highlighting the distinct dynamics within sports. The study found that wearable technology’s accuracy, reliability, and ease of use significantly impacted adoption. Players and coaches expressed concerns regarding the data's precision, particularly regarding movement tracking and physiological monitoring. Moreover, if devices were perceived as cumbersome or disruptive to gameplay, their acceptance tended to be lower. Data security emerged as another critical concern, with stakeholders questioning the confidentiality and ethical use of performance-related data.

5.4 Conclusion

This chapter examines the critical findings regarding the adoption of wearable technology in netball, focusing on organisational, technological, and social dynamics through the perspectives of the TAM2 and TOS frameworks. The results show that perceived usefulness, ease of use, subjective norms, job relevance, output quality, and result demonstrability significantly influence adoption decisions.

The study points out that although wearable technology can significantly improve training, injury prevention, and performance, obstacles related to usability, data accuracy, and integration with current systems may impede adoption. Overcoming these challenges through enhanced training, more transparent data presentation, and greater awareness of the tangible benefits of wearable technology is essential for encouraging widespread acceptance.

The findings enrich the ongoing discussion on sports technology adoption by highlighting the need to align technological advancements with users' needs and expectations. Future research could investigate additional factors such as cost, data privacy issues, and long-term engagement with wearable devices to enhance further understanding of adoption dynamics in netball and other team sports.

CHAPTER 6. CONCLUSIONS & RECOMMENDATIONS

6.1 Introduction

This chapter integrates the study's findings with the research questions and objectives outlined in Chapter 1. Each research question is addressed systematically, linking the study's propositions and hypotheses to the collected data and offering a structured analysis of how the results align with or diverge from existing literature and theoretical models such as TAM2 and the TOS framework.

6.2 Conclusions regarding research question / objective 1

What are the factors that impact the adoption of wearable technologies in South African netball?

The factors that impact the adoption of wearable technologies are:

- Perceived Usefulness
- Perceived Ease of Use
- Subjective Norm (SN) and Image
- Job Relevance and Output Quality
- Result Demonstrability

Wearable technologies provide a wealth of data that can inform strategic decision-making, enhance tactical insights, and improve team performance.

The perceived ease of using these technologies in South African netball is critical for adoption. User training and device comfort are essential for enhancing the user experience and ensuring players and coaches fully embrace the technology.

Addressing usability issues through straightforward yet effective technical support and improved wearability can boost adoption rates.

Overall, the study confirms that subjective norms and social image can moderately influence the adoption of wearable technology in netball. Additionally, the relevance of the job and the quality of output significantly impact the uptake of wearable technology in this sport. When players and coaches perceive the technology as essential to their training and decision-making, they are more inclined to adopt it. Its adoption can be further encouraged by providing high-quality, reliable results and showcasing the tangible advantages of wearable technology in netball.

The demonstrability of the results is a crucial factor in adopting wearable technology within South African netball.

Using a conceptual framework that comprehensively analyses the factors influencing wearable technology adoption in South African netball provides a structured approach to understanding the adoption process. This framework is a foundation for further academic research and practical implementation strategies within sports technology adoption.

6.3 Conclusions regarding research question / objective 2

How can the adoption of wearable technologies improve data analytics in South African netball?

6.3.1 *Organisational factors affect wearable technology adoption within netball.*

The first research question aimed to explore how organisational factors affect the adoption of wearable technology in netball. The study revealed that support from

the organisation, financial resources, and training accessibility were crucial for adoption. Teams with robust managerial support and dedicated budgets for wearable technology saw higher adoption levels. Moreover, structured training initiatives enabled players and coaches to understand better and leverage these technologies' advantages.

Challenges such as insufficient funding and resistance from coaching staff were highlighted as obstacles, highlighting the importance of a top-down approach to cultivate a technology-friendly culture in netball teams.

6.3.2 *Technological factors affect wearable technology adoption within netball.*

The second research question explored how technological factors affect the acceptance of wearable technology. Findings indicated that perceived usefulness and ease of use were central to adoption, as suggested by TAM2. Players and coaches who found the technology intuitive and beneficial for performance enhancement were more inclined to integrate it into their routines. However, issues related to complex user interfaces and unclear data outputs were highlighted as challenges.

Participants suggested that improvements in wearable device design, such as simpler data visualization and automated performance recommendations, could enhance usability. These insights bolster current literature on technology acceptance, highlighting the significance of user-centred design in increasing adoption.

6.3.3 *Social factors affect wearable technology adoption within netball.*

The third research question explored how social influences affect attitudes and behaviours towards wearable technology. The study revealed that peer pressure, support from coaching staff, and endorsements from sports analysts significantly

impacted technology adoption. Players were more inclined to adopt wearable tech upon witnessing teammates' benefits or when coaches highlighted its significance during training.

This supports TAM2's claim that subjective norms shape an individual's intent to embrace technology. Moreover, participants indicated that positive feedback and acknowledgement of their performance enhancements attributed to wearable data encouraged them to engage more deeply with the technology.

6.4 Recommendations

6.4.1 *Federation*

Prioritise budgets for wearable technologies and tools to transform individual and team performance management and analysis, enhancing data-driven decision-making in high-performance netball. Seek partnerships with wearable technology companies that specialise in netball. Obtain sponsorships for the effective wearable technology rollout, including acquisition, training, support, and insurance maintenance.

6.4.2 *Coaches*

Coaches must ensure that all coaching staff, team management, and players receive comprehensive training on wearable technology, champion its use, and highlight its benefits. The coach will also be responsible for integrating wearable technologies into existing training practices and using the data to enhance player, team, and game strategies.

6.4.3 *Players*

Players will be responsible for ensuring they engage with training resources and remain current with the latest developments in wearable technology the team uses. They will also have to review the data, ensure they understand what is being displayed, and provide feedback to the team, which could assist in refining strategies. There is an opportunity for players to support each other in cases of low adoption due to various reasons such as confidence, missed training, or assistance with the interface in a “buddy” system.

6.5 Suggestions for further research

While this study provides valuable insights into wearable technology adoption in netball, there are several areas for future research:

- The haves and have-nots: How universities with higher wearable technology adoption and high-performance centres perform better, and how to level the playing ground
- Sociological barriers to adoption: High-performance players from disadvantaged backgrounds
- How to increase Subjective Norm (SN) and Image for wearable technology adoption within South African netball

Table 4. Consistency table: research questions, propositions, data collection and data analysis

RQ #		State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
1		What are the factors that impact the adoption of wearable technologies in South African netball?	1			
1.1		What wearable technologies are in use for data analytics in South African netball	1.1	The adoption of wearable technologies in South African netball is influenced by multiple external factors.	Interview guide questions	Thematic analysis

RQ #		State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
1.2		How can the adoption of wearable technologies improve data analytics in South African netball?	1.2	Organisational factors affect wearable technology adoption within netball	Interview guide questions	Thematic analysis
1.2		How can the adoption of wearable technologies improve data analytics in South African netball?	1.2	Technological factors affect wearable technology adoption within netball	Interview guide questions	Thematic analysis

RQ #		State Research Question or Objective	Prop/hyp #	State Proposition or Hypothesis	Data collection detail	Data analysis method
1.2		How can the adoption of wearable technologies improve data analytics in South African netball?	1.2	Social factors affect wearable technology adoption within netball	Interview guide questions	Thematic analysis

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APPENDIX A – Theme occurrence table

Theme	Sub-theme	Sum of occurrence
Cost and Accessibility	Cost Constraints	27
	Accessibility	22
	Data Analysis	6
	Availability	6
Cost and Accessibility Total		**61**
Cultural and Organizational Factors	Resistance To Adoption	5
Cultural and Organizational Factors Total		**5**
Future Perspectives	Future Prospects	8
	Partnerships	2
Future Perspectives Total		**10**
General Understanding and Awareness	Wearable Technology	25
	Awareness	5
General Understanding and Awareness Total		**30**
Job Relevance and Output Quality	Benefits	3
	Accuracy	3
Job Relevance and Output Quality Total		**6**
Perceived Ease of Use	Insights	22
	Challenges	16
	Player Performance	14
Perceived Ease of Use Total		**52**
Perceived Usefulness	Team Strategies	18

	Work Rate	11
	Injury Prevention	9
	Fatigue Management	7
Perceived Usefulness Total		**45**
Social Influence and Subjective Norms	Social Influence	10
	Generational Difference	7
Social Influence and Subjective Norms Total		**17**
Technical Support and Training	Tracking	22
	Technical Support	14
Technical Support and Training Total		**36**
Grand Total		**262**

APPENDIX B – Instrument

General Understanding and Awareness

1. Can you describe your understanding of wearable technologies in sports?
2. How familiar are you with wearable technologies currently being used in netball or other sports?
3. What specific types of wearable technologies have you encountered or used in your training or coaching?

Perceived Usefulness

4. In your opinion, how useful do you think wearable technologies are for improving player performance in netball?
5. Do you believe that wearable technologies can help in injury prevention? If so, how?
6. How do you think data generated by wearable technologies can be used to enhance team strategies?

Perceived Ease of Use

7. How easy or difficult do you find the use of wearable technologies in training sessions?
8. What challenges have you encountered (or do you anticipate encountering) when using wearable technologies?
9. How well do wearable technologies integrate with your existing training practices?

Social Influence and Subjective Norms

10. To what extent do the opinions of other coaches, players, or team management influence your decision to use or not use wearable technologies?

11. Have you noticed a trend among other teams in your league or region regarding the use of wearable technologies? How does this influence your perspective?

Cost and Accessibility

12. What are your thoughts on the cost of acquiring and maintaining wearable technologies?

13. Do you believe that financial constraints are a significant barrier to the adoption of wearable technologies in South African netball?

14. How accessible do you think these technologies are to teams of different levels (e.g., professional vs. amateur teams)?

Technical Support and Training

15. How important do you think it is to have proper training and technical support when adopting wearable technologies?

16. What kind of training or support have you received (or would you like to receive) to use wearable technologies effectively?

Cultural and Organizational Factors

17. How do traditional coaching methods in netball affect the adoption of wearable technologies?

18. Do you feel there is resistance to adopting new technologies within your team or the broader netball community? If so, what are the reasons?

Job Relevance and Output Quality

19. How relevant do you find wearable technology data to the specific needs of netball?

20. Have you found the data provided by wearable technologies to be accurate and reliable? How does this impact your willingness to use them?

Result Demonstrability

21. Can you share any specific examples where wearable technologies have demonstrated tangible benefits in training or performance?

22. How important is it for you to see measurable outcomes before fully adopting wearable technologies?

Future Perspectives

23. What do you believe are the future prospects of wearable technologies in South African netball?

24. What recommendations would you make for improving the adoption of wearable technologies in netball?

Open-Ended

25. Is there anything else you would like to add regarding the adoption of wearable technologies in South African netball?