


# Bridging digital divide in human resource functions: Information and communication technology usage within KwaZulu-Natal's public sector

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**Orientation:** Information and Communication Technology (ICT) in human resources (HR) is essential for enhancing operational efficiency. However, slow ICT adoption remains a challenge. This study explored the adoption of ICT in HR practices through the lens of Unified Theory of Acceptance and Use of Technology (UTAUT).

**Research purpose:** This study investigates ICT adoption in HR practices at Zululand Health District.

**Motivation for the study:** The coronavirus disease 2019 (COVID-19) pandemic highlighted significant gaps in ICT adoption within HR practices. This study was motivated by the need to explore the adoption and use of ICT in HR to ensure operational continuity.

**Research approach/design and method:** A qualitative approach employing semi-structured interviews with eight HR employees within the Zululand Health District was used. Thematic analysis was used to identify key themes and patterns.

**Main findings:** The findings revealed that through ICT, HR functions would be achieved with ease. Additionally, the constructs of the UTAUT framework, namely performance expectancy, effort expectancy and facilitating conditions, play a big role in ICT adoption and use.

**Practical/managerial implications:** Managers should prioritise procuring ICT resources and ensure access to up-to-date resources, as well as reliable Internet connectivity and a stable power supply. Digital health strategies and national policies should ensure digital equity by expanding rural ICT infrastructure and digital capacity-building programmes. Global digital health initiatives should prioritise ICT resources and training in rural settings.

**Contribution/value-add:** This study provides localised insights into ICT adoption and highlights lessons that are transferable to other rural health systems by extending the UTAUT model to a resource-constrained public sector.

**Keywords:** human resource information system; electronic human resource system; human resource management system; human resource systems; unified theory of acceptance and use of technology; information communication technology in human resources; information communication technology intentions in human resources.

## Introduction

Information and Communication Technology (ICT) encompasses a range of tools and technologies that facilitate the manipulation, storage, transmission and retrieval of information. In human resource (HR) practices specifically, ICT adoption began in the 1970s, limited initially to administrative tasks such as payroll processing and data archiving (Rajawat & Sharma, 2022). This limitation resulted from high computer costs and simple designs, which limited the use of computers to data processing. Over time, as technology advanced, HR practices evolved and incorporated automation and self-service systems to enhance productivity, ultimately shaping the gradual evolution of ICT in HR. In recent years, ICT tools and platforms have become integral to modern HR practices. Digital recruitment platforms, performance management tools and employee self-service portals are widely implemented to enhance efficiency and scalability. Udekwe et al. (2024) highlighted the implementation of HR platforms within the South African health sector, even though the implementation of these systems is often hindered by several factors in the

South African context. These platforms provide centralised access to employees' data, streamline administrative tasks, recruitment tasks and facilitate data-driven decision-making.

In modern days, organisations increasingly rely on diverse ICT tools and platforms to manage HR functions. These platforms include Human Resource Information System (HRIS), electronic Human Resource System (e-HRM), Human Resource Management System (HRMS) and e-Administration. According to TalenTeam (2022), HRIS software is specifically designed to aid HR departments in achieving their objectives, typically consisting of two main components. The first component involves data storage, which serves as a fundamental component in establishing a well-organised workforce. Human Resource Information System encompasses not only HR-related software but also includes the management of people, policies, procedures, forms and organisation's data (Reuben, 2021). Similarly, e-HRM systems were created to increase an organisation's effectiveness (Thathsara & Sutha, 2021), while HRMS provides scalability and flexibility in managing HR processes. These systems facilitate recruitment, onboarding, training, payroll and performance management, offering centralised access to employee data and analytics. These systems also enable managers to focus on strategic leadership and decision-making by automating repetitive tasks (Kumara et al., 2019). Furthermore, e-Administration and e-HRM advance remote working solutions (Onah et al., 2021). According to Onwuegbuna et al. (2021), these systems gave rise to novel work styles such as teleworking, remote working and visual networking among other work styles, all resulting in employees' availability on their jobs despite their geographical locations. Similarly, platforms such as LinkedIn and Facebook provide access to diverse talent pools while also allowing organisations to showcase their culture and working conditions. Overall, ICT adoption in HR practices offers numerous benefits, including task automation, improved data-driven decision-making, streamlined recruitment, streamlined training and development, as well as novel work possibilities. However, despite a plethora of advantages of ICT in HR functions, several factors affect the adoption and intention to use ICT platforms in HR practices more in developing nations (Brown & Johnson, 2020).

Globally, developed nations have embraced ICT for HR operations, thereby achieving significant advancements in digital transformation. These nations have replaced traditional systems with digital platforms supported by investments in ICT infrastructure and workforce upskilling (Song et al., 2020). South Africa (SA) has made considerable strides in ICT adoption, particularly in urban regions. However, rural areas continue to lag because of poor infrastructure and limited access to other ICT resources (Namulondo et al., 2023). Urban areas such as Gauteng have made significant investments in ICT infrastructure, while rural regions lag because of poor connectivity and other limited ICT resources (Namulondo et al., 2023).

The South African government has demonstrated a commitment to advancing ICT utilisation through national policies. Yet, disparities in ICT adoption persist between urban and rural areas, with the latter struggling to fully transition to digital systems. The Zululand Health District is not fully embracing ICT. The coronavirus disease 2019 (COVID-19) pandemic further exacerbated these challenges, as the Zululand Health District faced disruptions because of several factors, including limited connectivity, limited ICT infrastructure and insufficient training, which impacted ICT integration and use. During lockdown level five, services were compromised within the Zululand Health District; the organisation could not fully utilise ICT platforms. This slow ICT adoption and utilisation within the Zululand Health District remain a challenge. This study aimed to investigate the factors affecting ICT adoption and use in HR practices within this health district and to offer recommendations to enhance ICT adoption and use in sustaining HR functions and service delivery in rural healthcare settings. The study makes a significant contribution by providing localised insights into ICT adoption within a resource-constrained public sector, highlighting lessons that are transferable to other rural health systems, and by extending the UTAUT model to a resource-constrained public sector.

## Orientation

This study investigates the adoption and utilisation of ICT in HR practices at the Zululand Health District. The COVID-19 pandemic highlighted the organisation's reliance on traditional systems, with lockdown measures exposing limitations in existing ICT infrastructures. During this period, essential HR functions were disrupted, highlighting the need for a comprehensive approach to ICT adoption and use to ensure operational resilience during future crises. By determining how key constructs of the UTAUT model influence the adoption and use of ICT in a resource-constrained environment, this study provides a foundation for enhancing ICT adoption and use in HR practices.

Information and communication technology adoption in HR practices can transform organisational operations, enhancing communication, decision-making and employee productivity (Aithal, 2023). In addition to enhancing communication and employee productivity, Reuben (2021) attests that the adoption of ICT in organisations also enhances the ability to achieve enhanced efficiency in organisations. For organisations such as the Zululand Health District, ICT adoption is crucial for automating repetitive tasks, streamlining recruitment and improving data management. However, factors such as regional disparities in ICT infrastructure and limited resource allocation hinder effective ICT adoption and use.

The study's findings aim to guide HR departments in adopting ICT effectively by aligning their operations and resources with technological advancements and positioning HR functions for future disruptions. By

overcoming barriers to ICT adoption and use, HR departments can utilise ICT systems efficiently, thereby ultimately improving various aspects of service delivery, including workforce planning, quicker recruitment processes and optimised performance. This research contributes valuable insights into the adoption and use of ICT in HR practices, particularly in rural healthcare settings where unique challenges demand tailored solutions to bridge the digital divide in HR.

## Purpose and objectives

The purpose of this study was to assess the adoption and use of ICT in HR practices within the Zululand Health District. To assess the adoption and use of ICT within the Zululand Health District, this study employed a qualitative research approach to gain in-depth insights into ICT integration in HR practices at the Zululand Health District. Therefore, the objectives of this study were:

- To assess the perception of employees towards the adoption and use of ICT at the Zululand Health District.
- To evaluate the extent to which performance expectancy influences ICT adoption and use at the Zululand Health District.
- To evaluate the extent to which effort expectancy influences ICT adoption and use at the Zululand Health District.
- To examine facilitating conditions that influence the adoption and use of ICT at the Zululand Health District.

## Literature review

The adoption of ICT in HR practices has fundamentally transformed operations in varying organisations. Existing literature highlights that ICT enables automation of routine tasks, streamlining of processes and the facilitation of data-driven decision-making (Huang & Chen, 2021). The integration of ICT into HR practices has become a necessity for organisations seeking to enhance efficiency, improve employee engagement and support strategic decision-making (Kumara et al., 2019). For instance, ICT tools have revolutionised recruitment, training, performance management and payroll functions (Huang & Chen, 2021). Furthermore, the adoption of ICT in HR practices has transformed the management of human capital by enhancing efficiency and decision-making (Nanda & Mahalik, 2021). However, varying factors influence and hinder the effective adoption and use of ICT in HR practices (Brown & Johnson, 2020). This study employs the UTAUT framework to explore factors that influence the adoption and use of ICT in HR practices. The UTAUT framework and its core constructs, namely performance expectancy, effort expectancy, social influence and facilitating conditions, provide a comprehensive lens to evaluate the intention and use of ICT by HR employees. Therefore, the UTAUT framework forms a foundation for determining factors that influence the effective adoption and use of ICT in HR practices to bridge the digital divide in HR within the Zululand Health District.

## Performance expectancy

Performance expectancy refers to the degree to which individuals believe that the use of ICT will improve their job performance (Venkatesh et al., 2016). Performance expectancy influences an individual's intentions to adopt and use HR systems (Alkhwaldi et al., 2023). In South African HR practices, ICT adoption is viewed as a critical enabler of efficiency and productivity. Organisations are actively seeking to integrate innovative technologies into their operations to enhance efficiency while simultaneously reducing costs and saving time (Nanda & Mahalik, 2019). According to Thathsara and Sutha (2021), HR systems were created to increase an organisation's effectiveness. Furthermore, studies highlight that ICT systems streamline administrative tasks, enhance recruitment processes and improve training outcomes by automating routine activities and enabling data-driven decision-making (Huang & Chen, 2021). Additionally, ICT in the form of automated and systematised transaction processing systems reduces the burdensome nature of administrative activities inside HR (Subhashree & Vasantha, 2020). In a study that aimed to determine the impact of COVID-19 on Human Resource Management (HRM), Hamouche (2023) highlighted that ICT plays a crucial role in HRM to sustain staffing. Reuben (2021) attested to this view and added that the adoption of ICT enhances communication and the ability to achieve organisational outcomes. According to Aithal (2023), ICT fosters communication through collaborative platforms, which allow teams to collaborate seamlessly regardless of their locations. Garg et al. (2022) attested to this finding and added that, in addition to increasing efficiency and effectiveness within HRM functions, ICT systems enhance team collaboration. According to Aithal (2023), this improves internal communication, promotes knowledge sharing and enhances teamwork, ultimately leading to improved organisational outcomes. Urban health organisations harness these benefits, whereas within the rural settings of South Africa, including KwaZulu-Natal, these benefits are often hindered by factors such as poor infrastructure, lack of digital literacy and limited employee training.

## Effort expectancy

Effort expectancy pertains to ease of use associated with ICT systems (Venkatesh et al., 2016). Effort expectancy influences the use of ICT within HR practices (Dey & Saha, 2020). In their study, Dey and Saha (2020) found that effort expectancy influences the use of HRIS by HR professionals in the healthcare sector. Similarly, Muzafar and Jhanjhi (2020) highlighted the importance of user-friendly ICT systems. In HR contexts, perceived simplicity of a technology plays a crucial role in encouraging use. Systems that are intuitive and user-friendly reduce the cognitive and physical effort required, thereby enhancing acceptance and use among HR professionals (Marikyan & Papagiannidis, 2023). A study by Rathee and Bhuntel (2021) found that ease of use of ICT systems, specifically e-HRM systems, influences use.

Similarly, a study by Anjum and Islam (2020) found that perceived ease of use, among other factors such as perceived usefulness, is critical in e-HRM adoption. To encourage HR professionals to use ICT systems such as e-HRM, Anjum and Islam (2020) urge organisations to look into how to make e-HRM useful and easy to use for employees. This will, in turn, change users' intentions towards the continuance usage of HR systems such as e-HRM. Onah et al. (2021) further add that, in addition to HR innovative technologies being user-friendly and seamless to use, these systems need to be compatible to meet HR functions and human needs.

According to Brown and Johnson (2020), ICT technologies present their own set of challenges, particularly in ensuring compatibility with on-premises systems, which demands meticulous planning and execution, deterring the adoption and use of these systems. Furthermore, poorly designed systems and the complexity of multi-system integration often increase the effort required to use ICT systems, therefore deterring adoption (Mutiarin et al., 2019). Effort expectancy, therefore, also hinges on the effective alignment of ICT systems with HR objectives and organisational processes. Aithal (2023) adds that ensuring compatibility of ICT systems is an additional crucial factor in encouraging adoption and use. Additionally, the integration of legacy systems with modern solutions often complicates user experience; therefore, effective training and development programmes are also found to be critical in fostering ease of use of HR systems, as they equip employees with skills needed to navigate ICT systems efficiently with ease. Mutiarin et al. (2019) found that organisations that invest in continuous training report higher levels of effort expectancy and subsequent technology adoption and use.

Ensuring effort expectancy requires a focus on developing systems that prioritise user-centric design as well as systems that are user-friendly and compatible with HR functions and processes while providing adequate training, support and resources. This has been found to further encourage adoption and the intention to use ICT systems (Mutiarin et al., 2019). The use of ICT within the Zululand Health District is impacted by these factors.

## Social influence

Social influence examines the extent to which individuals perceive that it is important that others believe they should adopt and use a technology (Venkatesh et al., 2016). In HR settings, social influence plays a significant role in shaping behavioural intention (Alkhwaldi et al., 2023). Management support is vital in adopting a new technology (Bellantuono et al., 2021). Management support, supervisors and colleagues collectively contribute to the perception of ICT importance. Management support is crucial, as it sets a tone for technology adoption and use (Wilde & Hsu, 2019). Additionally, management support is crucial to ensure that change initiatives are undertaken and that organisations maintain dynamism, advances in technology adoption and use, while

fostering a shift in workplace behaviour patterns when adopting a new technology (Darmawan & Azizah, 2019). Management support is also crucial in ensuring that employees align and adjust to a specific technology (Lee & Chen, 2021).

Employees are more likely to use new technologies if they perceive that their peers or supervisors value these tools (Marikyan & Papagiannidis, 2023). Furthermore, embracing a technology involves a mindset that values innovation and adaptability, which, in turn, contributes to the adoption and use of ICT solutions (Aithal, 2023). Therefore, social influence is further shaped by organisational commitment and leadership. When leadership expresses a clear intention to adopt and use a technology, employees are more likely to embrace that technology (Samsor, 2021). Transparent communication about the benefits of ICT adoption and consistent support from leadership can positively influence attitudes towards ICT technologies. Conversely, a lack of such support may lead to resistance to technological change, while management and leadership support can aid in driving change management to help mitigate resistance to change within an organisation (Bellantuono et al., 2021). The problem of slow ICT adoption and use within the Zululand Health District can be partially linked to the social influence construct, as the management does not constantly reinforce ICT use.

## Facilitating conditions

Facilitating conditions refer to factors such as the availability of organisational and technical resources for ICT adoption (Venkatesh et al., 2016). Facilitating conditions influence the use of ICT systems in HR (Alkhwaldi et al., 2023). These include resources such as software, hardware, ICT infrastructure and training (Aithal, 2023; Dixit et al., 2021). For instance, it is crucial to ensure that ICT solutions are equipped with proper software to aid departmental functions. In the context of HR, Mirji (2022) advises HR-specific software, such as the HRIS software, which emerges as a software solution that offers distinct features to assist HR professionals in organising, categorising and aligning their data resources. Similarly, TalenTeam (2022) perceives that HRIS software is fundamental in the context of HR functions, as this software was specifically designed to aid HR departments in achieving departmental objectives. Other facilitating conditions that influence the use of ICT systems are robust connectivity, as unreliable connectivity can act as a barrier to ICT use (Rahiem, 2020).

Similarly, in addition to Internet and software resources, hardware resources, including laptops and desktops, can act as a hindrance to ICT adoption and use (Oberholzer et al., 2024). These factors are pivotal in determining whether employees perceive that they have the necessary resources and infrastructure needed to use ICT effectively. Within the rural settings of South Africa, including the Zululand Health District in the rural area of KwaZulu-Natal, limited enabling conditions, such as limited

resources, challenges with ICT infrastructure, as well as unreliable Internet connectivity, hinder the use of ICT, thereby highlighting the importance of facilitating conditions for ICT adoption.

### Intention to use

In conclusion, literature established that in the context of HR, the use of ICT provides numerous benefits such as facilitating recruitment, onboarding, enhanced employee training, payroll and performance management, offering centralised access to employee data and analytics. Despite these advantages, several factors affect the adoption and intention to use ICT platforms in HR practices, which include performance expectancy of ICT systems encompassing usefulness, efficiency and productivity resulting from the use of ICT in HR functions. Effort expectancy, encompassing ease of use and user-friendliness of ICT systems for HR functions, also influences the use of ICT platforms in HR functions. Other factors include facilitating conditions such as ICT resources, ICT infrastructure, compatibility of ICT systems, training, technological resources, as well as social influence, which includes management and technical support, all of which play a crucial role in ICT use. In this context, intention to use ICT systems within the Zululand Health District is shaped by these factors, including resource constraints. The use of ICT in HR functions within the Zululand Health District is influenced by employees' perception of ICT in relation to these factors. Literature established that the use of ICT in HR functions could be enhanced by focusing on these factors.

## Research design

This section provides the research approach, research strategy and the research methods employed in this research study.

### Research approach

The researcher employed a qualitative research approach to obtain in-depth insights into ICT adoption in HR practices through interviews.

### Research strategy

The study adopted an interpretivist stance and followed an inductive approach, employing qualitative research to explore participants' perceptions and lived experiences. A case study strategy was adopted to gain an in-depth understanding of ICT adoption within the Zululand Health District. Data were collected through semi-structured interviews.

### Research setting

The study was conducted at the Zululand Health District in the Ulundi region. Zululand is in the northern part of the KwaZulu-Natal province of South Africa, and it is located within the Ulundi Local Municipality.

### Entrée and establishing researcher roles

The researcher obtained a letter of permission from the Zululand Health District to access participants and conduct interviews.

### Research participants and sampling methods

A purposive, non-probability sampling technique was used to select participants to participate in this research. This sampling strategy was used to select participants who work within the Zululand Health District HR department and who actively use ICT tools in their HR functions. Human resource employees who met the inclusion criteria received information letters and were invited to participate in the study by means of email. No participant declined or refused the interview. The study conducted face-to-face interviews with all eight HR employees. This sample size was sufficient for a qualitative study that aimed to gather rich, deep and detailed insights. This sample size allowed for rich insights and detailed data collection. Data saturation was reached when no new themes and insights emerged. During the data analysis process, interview transcripts were reviewed and compared. During the last transcript, the collected data became repetitive, indicating that saturation was reached. This indicated that additional participants were unlikely to provide new insights into the researched phenomenon. The inclusion and exclusion criteria were as follows:

The inclusion criteria included HR employees who have 3 years of experience at the Zululand Health District, who are knowledgeable about the research subject and who worked during the COVID-19 pandemic era. The included participants demonstrated diversity in age, gender, qualifications and years of experience. The exclusion criteria included HR employees who had less than 3 years of experience and interns.

### Data collection methods

Data collection commenced after obtaining approval. A venue suitable for interviews was obtained. Written informed consent was obtained from participants. Participants were informed of their right to withdraw from participation. Confidentiality and anonymity were ensured; no personal identifying information was collected. The collected data were safely stored and secured on a password-secured device, only accessible to the researcher. The findings were reported using pseudo-codes. Participants were informed of the estimated interview duration. The interviews were semi-structured, consisting of open-ended questions.

### Data recording

With permission from participants, each interview was audio-recorded. An audio digital recorder (ADR) was used to record each interview for data analysis. Data collection continued until data saturation was reached. The resulting audio recordings were transcribed for data analysis.

### Strategies employed to ensure data quality and integrity

Primary data collection followed research principles. The researcher used an audio recorder to ensure that the collected data were accurately recorded. A verbatim translation of data included non-verbal cues displayed by participants noted during interviews. Additionally, the concepts of reliability and validity were followed by employing established qualitative research practices. Credibility was ensured by triangulation, member checking and peer debriefing. Dependability was ensured by maintaining an audit trail and by applying standardised interview protocols.

### Data analysis

The study employed thematic data analysis, which focused on organising data sets to examine themes. Thematic data analysis entails reading and reflecting on the transcripts and recorded audio (Cresswell & Clark, 2018). Thematic data analysis was adopted as the most suitable strategy, as supported by Brink et al. (2018). Thematic analysis was utilised to explore themes emerging from the collected data, which allowed for the examination of emerging patterns and themes from the collected data. The data analysis process was completed manually and followed the six phases of thematic analysis, namely familiarising and immersion of data, generating codes, constructing themes, reviewing potential themes, defining and naming themes and producing a report, as highlighted by Campbell et al. (2021). Interviews were audio-recorded and transcribed verbatim for accuracy. Transcripts were reviewed against recordings. The thematic analysis procedure involved reading transcripts for familiarisation and immersion of data. Coding was carried out to identify and capture meaningful patterns. Similar codes were grouped and refined into broader themes. Steps were taken to enhance consistency and dependability. Additionally, the researcher maintained a detailed audit trail documenting coding decisions and processes such as theme development and reflections. An outline of the coding framework is provided in Appendix 1 Table 1-A1.

### Ethical considerations

The researcher sought ethical approval from the Humanities and Social Sciences Research Ethics Committee (HSSREC) at the University of KwaZulu-Natal (UKZN). Furthermore, permission was obtained from the KwaZulu-Natal Department of Health (DoH) to conduct this research within the Zululand Health District. The researcher obtained permission to conduct the study within the Zululand Health District from the KwaZulu-Natal Department of Health (KZN DoH). Ethical clearance to conduct this study was obtained from the University of KwaZulu-Natal Humanities and Social Sciences Research Ethics Committee (HSSREC) (No. HSSREC/00006359/2023). Participants were provided with written informed consent to consent to their participation before participating in this research. Participants' privacy and anonymity were ensured. Participants were assigned pseudonyms to ensure privacy. The collected data were stored on password-protected storage and were only accessible to the researcher.

## Results

Table 1 summarises demographic profiles of participants, including age, gender, highest qualification and years of experience within the Zululand Health District. These demographic variables contribute to a broader understanding of the factors that impact the researched phenomena. In summary, collecting and presenting demographic information of participants (Table 1) offer a more comprehensive and nuanced understanding of the adoption and use of ICT within the Zululand Health District.

### Objective 1: To assess the perception of employees towards the adoption and use of ICT in Zululand health district

While responding to interview questions, the following themes and sub-themes (Table 2) emerged. The following paragraphs discuss each theme and sub-theme that emerged in more detail.

#### Sub-theme 1.1: Enhanced communication

From the findings of this study, participants have the perception that ICT plays an important role in facilitating internal communication (Table 2). Within the Zululand Health District, ICT is adopted and used to enhance communication channels, thereby allowing professionals to interact with employees, seamlessly address concerns and disseminate information more efficiently. Furthermore, the findings of this study show that participants perceive that ICT technologies enable employees not only to communicate

**TABLE 1:** Sample distribution ( $N = 8$ ).

Participant no.	Age (years)	Gender	Highest qualification	Years of experience
P1	≥ 56	Female	Higher certificate	13+
P2	36-55	Female	Diploma	3-6
P3	≥ 56	Female	Diploma	13+
P4	36-55	Female	Diploma	13+
P5	36-55	Male	Diploma	13+
P6	36-55	Female	Higher certificate	3-6
P7	36-55	Female	Diploma	6-10
P8	36-55	Female	Diploma	3-6

Note: Average age = 49 years; Average years of experience = 10.2.

**TABLE 2:** Perception of the adoption and use of information and communication technology.

Theme and sub-themes	Participant ID	Quote
<b>Theme 1: Increased operational efficiency</b>		
1.1 Enhanced communication	P3	'I think ICT plays an important role in facilitating internal communication and collaboration within the HR department and with employees ...'
1.2 Enhanced collaboration	P4	'I think technology allows employees within HR to communicate, capture, analyse and give meaning to data.'
1.3 Remote working capabilities	P1	'Technology can assist us to work from home.'
	P3	'ICT also enables remote working, which has become prominent especially during 2020-2021 pandemic era.'
	P6	'Without ICT, you can't work at home or outside your office.'

Note: The table presents the theme and the sub-themes identified from the interviews. ICT, information and communication technology; HR, human resource.

but also to capture, analyse and give meaning to organisational data. This finding is supported by existing literature, such as a study by Kumara et al. (2019), who, in their view, established that ICT plays an important role in managing and cascading information for different purposes. This finding is further supported by Reuben (2021), who stated that the global adoption and utilisation of ICT within organisations enhances communication and the ability to achieve improved outcomes.

### Sub-theme 1.2: Enhanced collaboration

In addition to ICT enhancing communication, participants perceive that ICT enhances collaboration (Table 2). This finding shows that ICT enhances collaboration within HR functions and enhances collaboration with employees. This finding is supported by Garg et al. (2022) in the existing body of literature, who highlighted that ICT systems used in HR departments enhance team collaboration within HR functions. Aithal (2023) attests to this finding and highlights that, in addition to enhancing communication, ICT enhances collaboration in organisations.

### Sub-theme 1.3: Remote working capabilities

Participants perceive that ICT enhances the potential to work from home. Other participants attest that ICT has indeed enabled remote working capabilities in the past, which became prominent in the recent shift in environments brought by the recent pandemic era. This finding is supported by several researchers in the context of remote operations within the HR domain. According to Onah et al. (2021), models such as e-HRM and e-Administration enhanced remote working solutions and capabilities during uncertainties such as the COVID-19 pandemic. Additionally, Hamouche (2023) highlighted that ICT facilitates the transition from face-to-face operations to virtual operations or remote working, extending to the COVID-19 period, thereby sustaining HR operations. Onwuegbuna et al. (2021) established that ICT plays a significant role, evidenced by the onset of the COVID-19 pandemic, where organisations engaged in varying working styles such as teleworking, remote work or work from home supported by ICT technologies.

To determine the use of ICT in HR practices within the Zululand Health District, participants were asked about ICT resources available in the HR department within the Zululand Health District. This was crucial to have a fundamental understanding of ICT resources in fostering ICT adoption and use within the Zululand Health District. Table 3 presents the theme and sub-themes that emerged. The following section discusses the themes and sub-themes (Table 3) that emerged in detail.

### Sub-theme 2.1: Desktops

From the findings of this study, the Zululand Health District possesses different ICT hardware resources, which include desktop computers. Literature, including recent studies (Aithal, 2023; Dixit et al., 2021), established that investments

in hardware resources and infrastructure are crucial in ensuring value from the use of ICT in organisations. Participants stated that the Health District uses desktop computers to store employee information, such as leave balance and various types of leaves within HR functions.

### Sub-theme 2.2: Laptops

The Zululand Health District possesses different ICT hardware resources, which include laptops. However, participants also highlighted challenges with these laptops, as participants stated that most of the laptops cannot operate without being plugged in, while others are outdated and therefore not fully functional, highlighting challenges of old laptops utilised within the Health District. According to Onwuegbuna et al. (2021), functional technical resources such as laptops are crucial in supporting an organisation's functions. According to Oberholzer et al. (2024), limited access to functional hardware, including laptops, significantly hinders the use of ICT in organisations. According to Onwuegbuna et al. (2021), organisations needed to distribute modern technologies, including laptops, to sustain operations during the COVID-19 unforeseen circumstances, thereby highlighting the importance of functional ICT hardware resources.

### Sub-theme 2.3: Telephones

Additional ICT hardware resources that this Health District possesses include telephones. However, from the findings of this study, the landline connections are not functional.

### Sub-theme 2.4: Portable phones

Additionally, from the findings of this study, other ICT hardware resources that the Health District possesses include portable phones. Participants emphasised that the Health District uses portable phones as telephones are not functioning. Literature such as the study by Oberholzer et al.

**TABLE 3:** Hardware resources.

Theme and sub-themes	Participant ID	Quote
<b>Theme 2: ICT hardware resources</b>		
2.1 Desktops	P2	'We use desktop computers to store employee information like leave balance and types of leave taken'.
	P3	'We have hardware like desktop computers'.
	P4	'Desktop computers'.
2.2 Laptops	P3	'We have laptops'.
	P4	'Laptops are available for office work, but they have limited functions, on old version laptops cameras are not accessible'.
	P8	'We have laptops, although most of them cannot operate without the charger being plugged in. I think their batteries are too old'.
2.3 Telephones	P1	'Telephones, although landlines are no longer working'.
2.4 Portable phones	P1	'Portable phones at selected sections'.
	P5	'Computers, laptops and portable phones'.
	P6	'Portable phones since the landline is no longer working'.
2.5 Printers	P7	'Printers'.

ICT, information and communication technology.

(2024) highlighted that in addition to hardware resources such as laptops and desktops, smartphones are a prerequisite in HR functions.

### Sub-theme 2.5: Printers

Lastly, this study found that the Health District possesses other ICT hardware resources, such as printers.

Additionally, ICT software resources emerged. Table 4 presents the theme and sub-themes. Within the theme ICT software resources, the sub-themes Microsoft Office software, communication and management software and telecommunication and collaboration software sub-themes emerged (Table 4). These sub-themes are outlined as follows:

#### Sub-theme 3.1: Microsoft Office software (Microsoft Word, Excel, PowerPoint, Google and Microsoft Outlook)

This study found that the Zululand Health District also possesses ICT software resources such as Microsoft Office. This includes programmes such as Excel, PowerPoint and Microsoft Outlook for emails. Recent studies (Aithal, 2023; Dixit et al., 2021) established within the existing body of literature that, in addition to hardware resources, suitable software resources play a crucial role in the adoption and use of ICT technologies.

#### Sub-theme 3.2: Communication management software (WhatsApp and Video conferencing)

Additionally, the organisation uses communication management software, including WhatsApp Messenger and video conferencing. According to Oberholzer et al. (2024), telecommunication software as well as video conferencing tools are crucial in HR functions for online onboarding of new employees.

#### Sub-theme 3.3: Teleconferencing and collaboration software (Zoom and Microsoft Teams)

Furthermore, the organisation uses teleconferencing and collaboration software such as Zoom and Microsoft Teams. Literature such as the study by Mirji (2022) advises on other HR-specific software, such as the HRIS, which emerges as a software solution that offers distinct features to assist HR professionals in organising, categorising and aligning their data resources. TalenTeam (2022) also perceives that HRIS is fundamental in the context of HR functions, as this software is specifically designed to aid HR departments in achieving departmental objectives. Moussa and El Arbi (2020) support this view by adding that HRIS software encompasses

TABLE 4: Software resources.

Theme and sub-themes	Participant ID	Quote
<b>Theme 3: ICT software resources</b>		
3.1 Microsoft Office software (Microsoft Word, Excel, PowerPoint, Google and Microsoft Outlook)	P4	'Microsoft Office such as Microsoft Word, Excel, PowerPoint, Google and communication resources such as Microsoft Outlook for emails'.
3.2 Communication management software (WhatsApp and Video conferencing)	P4	'And we also use WhatsApp group and video conferencing'.
3.3 Teleconferencing and collaboration software (Zoom and Microsoft Teams)	P4	'We have Zoom and Microsoft Teams'.

ICT, information and communication technology.

comprehensive features designed to acquire, store, retrieve, analyse and distribute information related to an organisation's human resources. Reuben (2021) agrees and further adds that HRIS does not only consist of HR-related software but also includes other functions for organisational policies and procedures.

From Table 5, within the organisational support factor's theme, the sub-theme of training emerged as follows:

#### Sub-theme 4.1: Training

From the findings of this study, organisational support factors such as training influence the adoption and use of ICT within the Zululand Health District. According to Aithal (2023) and Dixit et al. (2021), training is a crucial factor in ICT adoption and use. This finding is further supported by Song et al. (2020), who noticed that one of the factors affecting organisations to adopt ICT includes workforce upskilling.

#### Sub-theme 4.2: Technical support

Additionally, from the findings above, other factors that influence the adoption and use of ICT within the Health District include ICT technical support. This finding is supported by researchers such as Song et al. (2020), who attest that staff should be supported to ensure that they embrace technology in working environments. According to a study by these researchers, technological support is crucial during the adoption and utilisation of ICT technologies, as it facilitates a smooth transition from manual processes and functions. Technological

TABLE 5: Factors influencing information and communication technology adoption within human resource practices.

Theme and sub-themes	Participants ID	Quote
<b>Theme 4: Organisational support factors</b>		
4.1 Training	P1	'Training of staff regarding current technologies ... training related to technology in human resources department is needed'.
	P2	'Training of all staff'.
	P7	'Training'.
	P8	'I think is enough resources, training'.
4.2 Technical support	P2	'We have to be assisted to have electronic signatures, that will assist staff to fill forms and sign online and no need to print out unnecessarily'.
	P7	'Technical support, and connectivity to network'.
	P8	'Technical support'.
4.3 Provision of technological resources	P4	'Enough resources, training and support can make a change'.
	P5	'Finance is the main reason for using technology because you have to buy gadgets, some items are prohibited to buy, and procuring of IT resources has some restrictions. Ink, cartridges are expensive, and some services need to be outsourced'.
	P7	'I think is enough resources'.
4.4 Top management support	P4	'From my experience, if management is in support of an idea, everything is possible and if management is against any new technology, no change can be implemented'.
4.5 Change management support	P6	'Resistant to change and attitudes have an influence on using a technology. I have also noticed that older people have a challenge in using technology, even if they use a technology, they tend to be so slow, thereby clicking keyboards keys one by one. The young generation is so fast and comfortable in using new technologies'.

IT, information technology.

support ensures a quick grasp of new ICT technologies. Additionally, technological support is crucial in minimising disruptions to workflows. Furthermore, ongoing technological support ensures that employees stay current with updates, ensuring system security and incorporating necessary enhancements.

#### Sub-theme 4.3: Provision of technological resources

From the findings of participants, the other factor that influences the adoption and use of ICT within the Zululand Health District includes the provision of technological resources. From the findings above, these include financial resources to procure hardware resources, including ICT gadgets and other resources necessary for ICT integration and use. According to Aithal (2023), Dixit et al. (2021), ICT resources encompassing software, hardware, ICT infrastructure and training are crucial in ICT use. Additionally, participants highlighted that some of these resources are expensive, while some of the technological services need to be outsourced. Existing literature, such as a study by Oberholzer et al. (2024), highlighted that access to resources, including hardware and the overall funding of ICT resources, is crucial, as this facilitates ICT usage within HR functions.

#### Sub-theme 4.4: Top management support

Furthermore, an additional factor influencing the adoption and use of ICT within the Zululand Health District includes management support. This finding highlights that when top management is in support of an idea, a technological change is possible, and if management is against new technologies, no change can be implemented. According to Wilde and Hsu (2019), management support is a crucial factor when adopting and using a new technology, as this sets a tone for organisational commitment to a technology transition. While in Samsor's (2021) view, when leadership expresses a clear endorsement of a new technology, employees are more likely to embrace and invest effort in a technology being adopted. Furthermore, management support encompasses the provision of necessary resources, encompassing both financial and human resources, for the successful implementation of new technologies.

#### Sub-theme 4.5: Change management support

Lastly, this study found that an additional organisational support factor that influences the adoption and use of ICT is change management support. To ensure change management support, researchers such as Darmawan and Azizah (2019) realise that change initiatives should be undertaken to ensure that an organisation maintains its dynamism, advances its progress, enhances employee performance, aligns with its environment and fosters shifts in workplace behaviour patterns when adopting a new technology. Furthermore, this finding highlights that older people have challenges when using technology. Lee and Chen (2021) assert to this finding and emphasise that employees may require an adjustment period to align with a specific technology. According to Bellantuono et al. (2021), change management support is vital

when adopting and using a new technology. According to these researchers, change management helps mitigate resistance to change within an organisation. People often feel anxious about adopting new technologies, while change management provides a structured approach to addressing concerns, communicating benefits and building a positive attitude towards impending changes. Furthermore, change management support ensures that employees are adequately prepared for the transition, both in terms of skills and mindsets.

### Objective 2: The extent to which performance expectancy influences information and communication technology adoption and use at the Zululand health district

The performance expectancy construct was used to indicate the degree to which HR officials perceive that ICT adoption enhances performance. Participants were asked to determine the extent to which the performance of ICT technologies influences the adoption and use of ICT within HR functions. The study's second objective was to ascertain how performance expectancy of ICT systems influences the adoption and use of ICT in HR functions.

Table 6 presents the theme and the sub-themes that emerged. The following section discusses the theme and the sub-themes that emerged.

**TABLE 6:** Performance expectancy.

Theme and sub-themes	Participants ID	Quotes
<b>Theme 5: Optimised performance</b>		
5.1 Enhanced efficiency	P1	'Technology can be helpful in human resource management, as it can make work more lighter, simpler, efficient. I think recruitment, selection, and all employment processes will be easy. I will be able to conduct virtual trainings'.
	P2	'I do believe that the use of technological related tools can help us in our daily activities. Like, meetings are now conducted thorough Teams and Zooms, that means if we have relevant resources it will be easy because sometimes we postpone critical meetings. If we had resources we can connect via technology, especially if we have smart phones with connectivity to networks'.
5.2 Enhanced training and development	P3	'ICT may help with in-service education, induction, orientation and conducting of short courses, although we don't have adequate resources'.
	P4	'ICT allows for e-learning, webinars, virtual meetings, and other online training, especially in human resource training and development, then it is easy for HR to conduct training to remote employees and monitor personalised teaching and learning experiences'.
5.3 Automation	P6	'The use of technological tools and systems can automate routine activities, streamline processes, and improve the working system'.
	P7	'The use of technological tools and systems can automate routine tasks'.
	P8	'Technology in human resource related activities will reduce lot of documents and papers and make it easier to share information with all stakeholders'.
5.4 Improved productivity	P6	'I think it can result in improved productivity for human resource officials, allowing us to handle high workload and focus on different critical activities'.

ICT, information and communication technology; HR, human resource.

### **Sub-theme 5.1: Enhanced efficiency**

Participants perceive that ICT enhances efficiency within the HR department. Participants believe that technology can be significant in HR functions and management. The findings highlight that ICT has the potential to make work easier, simpler and efficient. Furthermore, this study found that through ICT, daily HR functions can be achieved with ease. This finding is supported by Subhashree and Vasantha (2020), who stated that through using HR systems such as the automated and systematised transaction processing system, individuals can devote excessive focus to reducing burdensome administrative activities within HR. This finding is further supported by Kumara et al. (2019), who observed that ICT has transformed information access, making tasks faster, more efficient and convenient. Furthermore, researchers such as Thathsara and Sutha (2021) believe that HR systems, including e-HRM, were created to increase efficiency and effectiveness in organisations. Because of enhanced performance efficiency perceived through the use of ICT in HR functions, organisations such as the Zululand Health District are likely to adopt and utilise ICT for HR functions. Overall, participants perceive that ICT enhances efficiency; however, these perceptions were limited by several factors in this resource-constrained provincial environment. Lack of necessary resources shaped how performance expectancy is perceived, highlighting that performance expectancy manifests differently in a resource-constrained environment, such as in the rural of KwaZulu-Natal. This reveals that performance expectancy is moderated not only by perceived usefulness but also by an organisation's technological capacity and ICT resources.

### **Sub-theme 5.2: Enhanced training and development**

Additionally, participants perceive that ICT enhances training and development. From the findings above, ICT has the potential to aid in in-service education, induction, orientation and conducting of short courses. Additionally, from the findings above, ICT allows for webinars, virtual meetings and other online trainings in the context of HR training and development. This study found that this, in turn, makes it easy for HR to conduct training to remote employees and to monitor personalised teaching and learning experiences. This finding is supported by existing literature; a study conducted by Aithal (2023) found that, through the use of ICT, organisations enhance the training and development of employees, resulting in increased productivity. Similarly, a study by Oberholzer et al. (2024) highlighted that ICT enhances training and development through virtual training. This was especially crucial during periods when employees were geographically dispersed and when employees had their movement restricted because of the COVID-19 pandemic. Overall, participants perceive that ICT enhances training and development; however, these perceptions were further impacted by several factors within this resource-constrained rural environment. Participants highlighted a lack of resources for training and development; these factors shape how performance expectancy is perceived. Overall, participants

perceive that ICT enhances training and development; however, these perceptions were further impacted by several factors within this resource-constrained rural environment. Participants highlighted factors such as the lack of resources for training and development; these factors shape how performance expectancy is perceived.

### **Sub-theme 5.3: Automation**

Additionally, this study found that ICT enhances performance expectancy through automation. The findings highlight that through ICT, HR departments can automate routine tasks, streamline processes and reduce paper-based tasks. This finding is supported by Subhashree and Vasantha (2020), who realised that through the use of automated systems such as the systematised transaction processing system, individuals devote excessive focus to reducing burdensome administrative activities within HR functions.

### **Sub-theme 5.4: Improved productivity**

Furthermore, this study found that ICT enhances performance expectancy by improving productivity. From the findings above, this can in turn allow HR professionals to tackle high workload tasks and focus on different critical functions. According to Nanda and Mahalik (2021), organisations utilise ICT in HRM practices to improve efficiency, to ensure ease of operations and accuracy, as well as to foster effective decision-making and transparency. This view is further supported by Thathsara and Sutha (2021), who add that advanced HR systems such as e-HRM were solely developed to expedite HR activities and to increase organisations' effectiveness. Overall, participants perceive that ICT enhances efficiency, automation, productivity, training and development. However, these perceptions are impacted by other factors in a resource-constrained environment. Factors such as limited resources shape how performance expectancy is perceived, highlighting that performance expectancy manifests differently in a resource-constrained environment. This highlights that performance expectancy is not solely influenced by the perceived usefulness of ICT systems but also by an organisation's technological capacity and resources. Lack of ICT resources influences how perceived usefulness is observed. Similar patterns have been observed in other resource-constrained environments highlighted by researchers such as Khoza et al. (2023), Namulondo et al. (2023) and Omweri (2024), suggesting that performance expectancy in such settings is influenced by similar contextual factors.

### **Objective 3: The extent to which effort expectancy influences information and communication technology adoption and use at the Zululand health district**

To determine the extent to which effort expectancy influences ICT adoption and use, participants were asked about the extent to which effort expectancy influences ICT adoption and use.

### Sub-theme 6.1: Ease of use

From the findings above, ICT system designers need to focus on enhancing the usability of ICT systems, as participants perceive that this enhances effort expectancy by offering ease of use. Participants emphasised the importance of the ease of use of ICT systems in optimising the adoption and utilisation of ICT within HR. Additionally, this study found that the perceived effort required to learn and utilise a technology significantly influences the adoption and use of ICT in HR. Similarly, this research found that perceived effort required to learn and use ICT systems or technologies may create hesitation among users. For this, literature such as a study by Rathee and Bhuntel (2021) advocates for the ease of use of ICT systems. Additionally, researchers such as Anjum and Islam (2020) found that ease of use of ICT systems is a crucial factor that influences the use and utilisation of ICT systems such as the e-HRM system. It is therefore imperative that HR system designers focus on this vital factor of ease of use.

### Sub-theme 6.2: User-friendly technologies

Furthermore, this study found that effort expectancy can be enhanced through the user-friendly aspect of ICT systems. Similarly, researchers Muzafar and Jhanjhi (2020) advocate for user-friendly ICT systems. From the findings of this study, it is emphasised that organisations need to ensure that they adopt user-friendly ICT systems to encourage a successful adoption and utilisation of HR systems. According to Soja and Soja (2020), this is more crucial for older users. This finding aligns with the views of Muzafar and Jhanjhi (2020), who advocate for user-friendly systems. This study established that the user-friendliness of ICT systems is crucial for the adoption and use of ICT within the Zululand Health District. Existing literature further established that poorly designed systems and the complexity of multi-system integration often increase the effort required for the adoption and utilisation of ICT systems, therefore deterring adoption (Mutiarin et al., 2019). This finding shows that the lack of user-friendly and compatible technologies influences effort expectancy. This reveals how effort expectancy is determined not solely by ease of use but also by additional factors such as user-friendly and compatible HR systems. This finding extends the UTAUT construct of effort expectancy by highlighting that, in resource-constrained environments, effort expectancy depends on the organisational ability to procure user-friendly and compatible systems.

### Sub-theme 6.3: Compatibility

Similarly, participants perceive that incompatibility between hardware and software resources impacts the construct of effort expectancy. From the findings of this study, ICT hardware resources must be compatible with the latest software. This study found that effort expectancy can be enhanced through an alignment with the latest software

releases. Furthermore, according to Aithal (2023), compatibility of systems, together with compatibility of varying software, is crucial in enhancing effort expectancy and in creating value for organisations through ICT. Similarly, Onah et al. (2021) add that, in addition to user-friendliness, compatibility is crucial for ICT usage.

### Sub-theme 6.4: Training and support

This study found that effort expectancy of ICT systems can further be enhanced through training and support. From the findings in this research, organisations need to invest in training to ensure that employees obtain the required technical skills for operating emerging ICT systems, specifically within the HR department. From the findings of this study, this will likely enhance the adoption and utilisation of ICT solutions. This research highlights training as a significant factor in fostering a seamless adoption and utilisation of ICT solutions. This finding is supported by Song et al. (2020), who observed that factors affecting organisations' adoption and use of ICT solutions are HR development policies, training and development. Likewise, Mutiarin et al. (2019) emphasise that organisations that invest in continuous training report higher levels of effort expectancy and subsequent technology adoption and use.

### Sub-theme 6.5: Technological resources

Lastly, this study found that resources provided by the organisation for ICT adoption and utilisation have a significant influence on adopting and utilising new technologies. Therefore, to enhance effort expectancy, this study found that organisations need to provide the resources necessary to adopt and utilise ICT technologies. This finding advocates that the health department should invest more in upgrading HR systems, including ICT infrastructure. This finding is supported by Song et al. (2020), who further observed that additional factors affecting organisations' adoption and utilisation of ICT solutions include the development of science and technology, among other factors. However, in the South African context, Harerimana et al. (2023) perceive that technological resources in the country might be a challenge. This view is supported by Namulondo et al. (2023), who observed that developing nations struggle to offer ICT infrastructure because of the financial constraints these nations face. In contrast, Song et al. (2020) observed that developed nations have financed technological infrastructure and invested in human resource development to upskill employees in ensuring that employees adapt to emerging technologies. This research found that, to enhance the adoption and utilisation of ICT within the Zululand Health District, the Health District must foster effort the efficiency of ICT systems through providing necessary resources. This thereby aligns with research conducted by Song et al. (2020), who observed that resources, as well as training, are crucial factors in fostering effort expectancy, which contributes to the overall adoption and utilisation of ICT systems in HR functions.

## Objective 4: Facilitating conditions that influence the adoption and use of ICT at the Zululand health district

To determine facilitating conditions that influence the adoption and use of ICT at Zululand Health District, participants were asked about facilitating conditions that influence the adoption and use of ICT within the Zululand Health District. Table 8 summarises the themes and the sub-themes that emerged.

### Sub-theme 7.1: Information and communication technology resources

Participants perceive that facilitating factors for the adoption and utilisation of ICT include ICT resources. According to the findings above, the adoption and use of ICT technologies is significantly influenced by the synergy of hardware components. According to Dixit et al. (2021), access to suitable hardware, such as computers and laptops, forms a foundation for technology adoption, impacting how individuals and organisations adopt and engage with ICT. Furthermore, according to Aithal (2023) and Dixit et al. (2021), hardware resources influence ICT use among other factors, including software and overall ICT resources. Similarly, literature found that these factors have the potential to hinder ICT adoption and use (Oberholzer et al., 2024).

### Sub-theme 7.2: Robust information and communication technology infrastructure

Additionally, from the findings of this research, robust infrastructure is another factor that influences the adoption

**TABLE 7:** Effort expectancy.

Theme and sub-themes	Participants ID	Quotes
<b>Theme 6: Enhanced usability</b>		
6.1 Ease of use	P3	'It is simple and easy to use technology, as nowadays everyone is using smart phones with all the features computers have'.
	P8	'I think if an ICT system is simple and not complicated, everyone would be glad to use it. Human Resources officials are trying their best to use allocated ICT resources as trained. Hesitation to adopt a new technology may occur due to the perceived effort required to learn and use a technology effectively, and being scared to make errors'.
6.2 User-friendly technologies	P2	'The desktop I have is user-friendly'.
	P3	'The department has to introduce user-friendly ICT systems'.
6.3 Compatibility	P1	'Laptops are of an outdated nature; IT technicians told us that these laptops are no longer compatible with latest software'.
6.4 Training and support	P2	'I see a great benefit of using technology in human resource management, but only if we have adequate resources and training on how to use them'.
	P3	'The department has to organise training in order to obtain required technical skills for operating any new system within human resources. We are likely to adopt and use any convenient to use technology within HR'.
	P7	'Train and support, this can promote the adoption and use of technologies in HR'.
6.5 Technological resources	P7	'Resources provided by the organisation for adopting ICT can influence employees to adopt new technologies in HR. The health department has to invest more in upgrading human resource systems and ICT infrastructure'.

Note: The table summarises the themes and the sub-themes that emerged.

ICT, information and communication technology; HR, human resource; IT, information technology.

and use of ICT technologies. Participants emphasised that the Health District needs to ensure robust infrastructure for technology. This research found that robust ICT infrastructure significantly influences the adoption and utilisation of ICT technologies. A well-established infrastructure ensures seamless integration of diverse technologies, providing an environment where users can access and use ICT technologies seamlessly. Reliable infrastructure components contribute to a positive user experience. Moreover, according to Song et al. (2020), organisations are likely to adopt ICT when there is a robust infrastructure, ultimately driving the adoption and use of ICT in organisations. However, the Health District faces a variety of challenges relating to ICT infrastructure. Harerimana et al. (2023) attest to this challenge by noting that technological components, including robust ICT infrastructure in the South African context, are often challenging. Namulondo et al. (2023) observed and extended this view by noting that developing countries, including South Africa, struggle to offer robust ICT infrastructure because of the financial constraints these countries face.

### Sub-theme 7.3: Robust connectivity

Moreover, an additional factor that facilitates the adoption and use of ICT technologies includes robust Internet connectivity. Internet connectivity is a critical factor influencing the adoption and use of ICT technologies.

**TABLE 8:** Facilitating conditions of information and communication technology adoption and use.

Theme and sub-themes	Participant ID	Quote
<b>Theme 7: Facilitating conditions</b>		
7.1 ICT resources	P2	'Circulars from the department have classified some ICT items as prohibited items, and we are not allowed to buy laptops, only management were given new and latest laptops. I think circulars must not restrict us to have access to IT resources'.
	P4	'If there is no network, you cannot access the system and during load shedding you cannot use computers. Only the management section have back up. Budget for ICT resources can solve all problems'.
	P6	'Availability of ICT resources such as individualised computers or laptops, and other relevant gadgets should be provided by the employer. Mobile networks should be provided as an additional boost for connectivity'.
7.2 Robust ICT infrastructure	P1	'Limited routers are available, although they do not cover the whole office. Wi-Fi should be installed, landlines are no longer working and there are few portable phones per selected section which do not work without being connected to the network. Latest laptops compatible with current technology, infrastructure for ICT should be upgraded'.
	P3	'Telephones, network, Wi-Fi, routers, laptops compatible with latest software. I think the speed of the internet and the network is not interrupted. Maintenance of technological equipment when broken down and infrastructure for technology'.
7.3 Robust connectivity	P2	'Connectivity to internet, good network coverage, as some areas have poor connection'.
	P6	'Mobile networks should be provided as an additional boost for connectivity'.
7.4 Embracing technology use	P5	'When other people embrace the use of technology within a department, everyone is positively influenced'.
7.5 Training	P2	'Training'.
	P7	'Training on online record filing'.

ICT, information and communication technology; IT, information technology.

Seamless and high-speed Internet access facilitates the efficient utilisation of various digital tools, platforms and services. Reliable Internet connectivity allows HR professionals to utilise HR systems such as the HRIS effectively and efficiently. According to Rahiem (2020), insufficient or unreliable Internet connectivity can act as a barrier to the adoption and use of ICT technologies. This often limits the potential of ICT technologies, while reliable Internet connectivity positively influences the adoption and full use of ICT technologies. This finding concurs with the view of Rahiem (2020); the study established that robust Internet connectivity is crucial in influencing the adoption and utilisation of ICT in HR functions.

#### Sub-theme 7.4: Embracing technology use

Embracing the use of technology is another factor that facilitates the adoption and use of ICT technologies. Aithal (2023) hinted that embracing technology involves a mindset that values innovation and adaptability, which, in turn, contributes to the adoption and use of ICT solutions. Organisations that are open to embracing ICT technologies are positioned to leverage the benefits offered by ICT technologies. This study aligns with Aithal (2023), who highlighted embracing ICT technologies as a significant factor that has the potential to influence the adoption and utilisation of ICT. This study established that embracing ICT has a positive influence on its adoption and utilisation.

#### Sub-theme 7.5: Training

Lastly, the other factor that facilitates the adoption and use of ICT is training. This finding is supported by Song et al. (2020), who observed that additional factors facilitating organisations to adopt ICT solutions include training. Training is a crucial factor that influences the adoption and use of ICT, as training can empower staff with the knowledge and skills to use ICT.

Lastly, this study aimed to determine ways to enhance ICT adoption. Table 9 presents the theme and the sub-theme that emerged.

#### Sub-theme 8.1: Procure information and communication technology resources

From the findings above, one of the recommendations to enhance the adoption and use of ICT includes procuring ICT resources. This includes procuring ICT hardware and software resources, which include laptops and smartphones. This also extends to software resources, which include the latest software, as well as Wi-Fi and routers to ensure Internet connectivity. Literature based on recent studies (Aithal, 2023; Dixit et al., 2021; Mirji, 2022; Oberholzer et al., 2024; Rahiem, 2020; Reuben, 2021) established that resources, including Internet connectivity, laptops, smartphones, as well as HR software, are crucial for the adoption and use of ICT in HR functions. Latest software in the context of HR, according to Mirji (2022), includes HRIS software, which emerges as a software solution that offers distinct features to assist HR professionals in organising, categorising and aligning their

data resources. This software, according to Reuben (2021), encompasses not only crucial features and HR-related software but also includes features for managing people, policies, procedures, forms and organisational data to aid in HR functions. The importance of procuring the latest ICT hardware and software is fundamentally crucial in the adoption and utilisation of ICT in HR, while more findings in literature (Aithal, 2023; Onah et al., 2021) emphasised ensuring compatibility of these resources in aligning ICT with departmental functions.

#### Sub-theme 8.2: Update information and communication technology systems

Additionally, participants recommend being intentional about upgrading ICT systems. Upgrading ICT systems plays a significant role in influencing the adoption and use of ICT technologies. Regular system upgrades contribute to improved performance and increased security, thereby providing a positive environment for users. When users experience the benefits of upgraded systems, they are more likely to adopt and utilise ICT technologies. System upgrades also demonstrate a commitment to staying current with ICT technologies. Additionally, upgraded systems ensure compatibility of ICT systems. According to Onah et al. (2021), compatibility ensures that ICT systems seamlessly integrate with existing organisational tools, workflows and organisational needs, thereby encouraging adoption and use of ICT systems.

#### Sub-theme 8.3: Ensure budget for information and communication technology resources

Furthermore, from the findings of this study, setting budgets for ICT resources is recommended as being crucial for the adoption and use of ICT. The allocation of ICT

**TABLE 9:** Recommendations for information and communication technology adoption and use.

Theme and sub-themes	Participant ID	Quote
<b>Theme 8: Recommendations to enhance ICT adoption and use</b>		
8.1 Procure ICT resources	P1	'Procure smart phones for HR officials'.
	P3	'Procure laptops with installed HR software. Install Wi-Fi and procure individual routers'.
	P4	'Procure laptops which are compatible with latest software, router for each person which will allow the person to work even at home or outside the office setting'.
	P6	'Procurement of computers which are compatible with current technologies'
	P8	'Procure adequate resources as per employees needs, such as latest laptops or new computers, procure smart phones for HR officials'
8.2 Upgrade ICT systems	P4	'Install Persal and Government Pension Administration Agency (GPAA) system on laptops'.
	P2	'Upgrade ICT systems'.
8.3 Ensure budgets for ICT resources	P5	'Budget for IT resources should be in place'.
8.4 Train employees on ICT technologies	P6	'Train employees on new technologies'.
	P8	'Motivate employees to use new technologies though training and create positive culture and expel any fear'.
8.5 Ensure backup for systems	P8	'Backup system for electricity to ensure continuity of service delivery during load shedding'.

IT, information technology; ICT, information and communication technology; HR, human resource.

budgets for ICT resources has a significant role in influencing the adoption and use of ICT technologies. Adequate budget allocation enables organisations to invest in the necessary hardware, software, training programmes and infrastructure required for the adoption and use of ICT. According to Dixit et al. (2021), access to suitable hardware, such as computers and laptops, is fundamental for technology adoption, impacting how individuals and organisations at large engage with ICT. This makes allocating budgets for these resources crucial. Training budgets can contribute to a positive user experience. This, according to Sharma and Dhar (2020), will in turn lead to increased employee satisfaction and motivation resulting from ICT adoption and use. This makes allocating budgets for resources needed for training crucial to ensure an effective adoption and use of ICT. This also includes budgets for ICT infrastructure, as observed by Song et al. (2020). According to Song et al. (2020), organisations are likely to adopt ICT technologies when there is a robust infrastructure to support these technologies. This study aligns with the findings by these researchers; it found that ICT budgets play a significant role in the adoption and utilisation of ICT.

#### Sub-theme 8.4: Train employees on information and communication technology technologies

From the findings above (Table 9), another recommendation to enhance the adoption and use of ICT is training. This finding aligns with the existing body of knowledge in literature. According to Song et al. (2020), training is a crucial factor that enhances the adoption and use of ICT. Training empowers staff with the knowledge and skills necessary to use ICT. Mutiarin et al. (2019) highlighted that organisations that invest in continuous training report higher levels of technology adoption and use. This finding of the study aligns with the findings by these researchers that training is a crucial factor in enhancing the adoption and use of ICT.

#### Sub-theme 8.5: Ensure backup of systems

This research found that ensuring backup structures for power or electricity significantly influences the adoption and use of ICT technologies. Reliable power backup solutions, such as generators or uninterrupted power supply (UPS) systems, mitigate the risk of disruptions caused by power outages, thereby ensuring continuous use of ICT. This reliability fosters confidence among users, as users can rely on consistent access to ICT systems without service interruptions. In regions prone to power fluctuations, the existence of robust backup systems becomes a critical factor in encouraging the adoption and use of ICT technologies, particularly in critical operational settings. The assurance of uninterrupted power contributes to a seamless user experience, reduces potential downtime and enhances the overall reliability of ICT systems, ultimately promoting widespread adoption and sustained use of ICT systems. Although literature based on recent studies (Harerimana et al., 2023; Namulondo et al., 2023) hints that such technological components in the South

African context might be a challenge. However, this research urges organisations in South Africa to pursue feasible backup solutions to ensure a seamless adoption, integration and utilisation of ICT into HR functions.

The above section outlined the empirical findings. Table 10 presents the findings in relation to the key constructs of the UTAUT framework to bring forward how UTAUT constructs manifest differently in a resource-constrained public sector environment.

## Discussion

The findings highlight that performance expectancy is a significant factor for ICT adoption, more so in HR functions, where ICT has the potential to enhance efficiency. However, within KwaZulu-Natal's resource-constrained public sector, these perceptions were moderated by limited resources and ICT training. The finding is consistent with observations in other South African provinces where similar patterns of limited access to functional resources and ICT training have hindered performance (Omweri, 2024). Additionally, the findings revealed that effort expectancy is shaped not only by modern technologies but also by additional factors such as training, user-friendly systems and up-to-date, compatible software and hardware. These factors were found to have a direct impact on the effort required to use ICT systems effectively. Information and Communication Technology adoption and use were also shaped by social influence, including factors such as change management and top management support. Additionally, facilitating conditions were perceived as a significant factor influencing ICT use. Resources, robust ICT infrastructure and connectivity shape the use of ICT technologies. Omweri (2024) observed similar patterns in six diverse developing nations, including other rural settings of South Africa, India, Nigeria, Brazil, Indonesia and Kenya. The findings suggest that contextual factors significantly shape how

TABLE 10: Mapping table.

UTAUT construct	Main themes	Sub-themes	Frequency (n)
Performance expectancy	Optimised performance	Enhanced efficiency	2
		Enhanced training and development	2
		Automation	3
		Improved productivity	1
Effort expectancy	Enhanced usability	Ease of use	2
		User-friendly technologies	2
		Compatibility	1
		Training and support	3
		Technological resources	1
Facilitating conditions	Facilitating conditions of ICT adoption and use	ICT resources	3
		Robust ICT infrastructure	2
		Robust connectivity	2
		Embracing technology use	1
		Training	2
Social influence	Organisational support factors	Management support	1
		Change management	1

UTAUT, unified theory of acceptance and use of technology; ICT, information and communication technology.

**TABLE 11:** Structured recommendation.

Category	Action	Responsible stakeholder	Estimated resources implications	Suggested time frames (months)
Immediate low-cost interventions	Ensure designation of ICT facilitators within HR departments	Human resource department and ICT managers	Minimal: use internal staff and internal resources	0–3
	Implement ICT training using internal ICT staff	Human resource department and ICT managers	Minimal: use internal staff and internal resources	0–3
Short-term moderate-cost strategies	Foster capacity-building strategies, including training, peer mentoring and ongoing professional development	Human resource department and external trainers	Moderate: allocate training budgets	6–12
	Upgrade essential ICT resources, (hardware and software) and ensure regular updates	ICT department	Moderate: allocate budgets for hardware, software and licences	3–6
	Design user-friendly guidelines and standard operating procedure of internal ICT systems	ICT department	Moderate: allocate budgets for resources	6–12
	Ensure pooled procurement agreements	Procurement and ICT department	Moderate: allocate budget for administration	6–12
Medium-term higher-cost initiatives	Ensure adoption of cloud-based solutions	ICT department, Finance and ICT Vendors	Moderate-high:	6–18
	Invest in ICT infrastructure and network expansion	ICT, infrastructure division, financial, external vendors (hardware vendors, Internet service providers)	High: budget for hardware, connectivity and maintenance	12–24
	Ensure provision of uninterrupted power supplies	ICT department, finance department, external energy supply department	High: cost for backup sappy, generators and UPS	6–12

ICT, information and communication technology; UPS, uninterrupted power supply.

UTAUT constructs manifest. Lengthy procurement processes, including bureaucratic procedures, hierarchies in approval processes and adherence to public sector regulations, impact timely access to necessary and updated ICT resources, thereby impacting performance expectancy, effort expectancy and facilitating conditions by limiting the usefulness and ease of use of ICT systems. Infrastructure gaps, including Internet connectivity and an often-disrupted power supply, further constrain performance expectancy. Furthermore, although policy directives encourage ICT use, their top-down approach impacts ICT use within resource-constrained environments such as the Zululand Health District. Policy directives in resource-constrained environments, without resource provision, impact the adoption and use of ICT. This ultimately impacts social influence by creating organisational and managerial expectations and compliance pressures. These contextual factors extend the UTAUT model by highlighting how structural and organisational factors impact on ICT adoption and use in a resource-constrained public sector context.

## Practical implications

This study highlights several practical implications for enhancing the adoption and use of ICT in HR practices. At a district level, the Zululand Health District and similar organisations should invest in essential ICT resources as well as reliable Internet connectivity. Additionally, it is crucial to procure up-to-date hardware and software relevant to HR functions and to ensure compatibility with existing systems. Regular upgrades of HR systems are recommended to enhance performance, security and user experience. Furthermore, the organisation must allocate sufficient budgets to support ICT adoption and utilisation, including infrastructure and employee training. Furthermore, system designers should prioritise intuitive, user-friendly systems to improve HR system usage and user satisfaction. Additionally, ensuring reliable power backup solutions such as generators or UPS systems is also critical to foster operational continuity, particularly in regions prone to power outages. At the national level, the study

suggests that digital health strategies prioritise ICT resources, infrastructure expansion and targeted digital training programmes in rural areas. Additionally, the South African government should continue to foster a commitment to ICT policies and should continue to demonstrate a commitment to advancing ICT utilisation in rural areas. In terms of rural health equity, the study highlights the need for equitable allocation of digital health resources. These findings contribute new knowledge to the limited literature on the adoption and use of ICT in HR practices within resource-constrained settings. Additionally, these findings make a significant contribution to international discussions on the digital divide by providing empirical evidence from a low-resource rural setting, highlighting that global digital health initiatives must address both technological and training barriers, specifically in low-resource rural settings, to ensure inclusive access.

## Recommendations and limitations

Based on the findings of this study, this article proposes a structured action plan to strengthen ICT adoption in rural settings (Table 11).

### Immediate low-cost interventions

Ensure designation of ICT facilitators or ‘champions’ within HR departments and implement ICT training using internal staff.

### Short-term moderate-cost strategies

Foster capacity-building such as internal training, peer mentoring and ongoing professional development. Upgrade essential hardware and software resources. Ensure regular updates. Design standard operating procedures of ICT systems. Ensure pooled procurement agreements.

### Medium-term higher-cost initiatives

Ensure adoption of cloud-based solutions and provision of UPSs. Invest in ICT infrastructure and network expansion.

## Limitations

This study has several limitations. The sample size was small and drawn from a single health district, which may limit the representativeness of the findings and their generalisability to other districts and regions. Furthermore, gender distribution among participants was uneven; this could potentially influence perspectives captured. Data collection occurred post-COVID, which may have affected participant experiences and responses. Additionally, as with all self-reported data, responses may have been influenced by social desirability bias, with participants providing answers they perceived as favourable rather than fully reflective of their experiences.

## Conclusion

These findings contribute new knowledge to the limited literature on the adoption and use of ICT in HR functions within the Zululand Health District in Ulundi. The study aimed to gather employees' perception towards the adoption and use of ICT in Zululand as well as the extent to which performance expectancy, effort expectancy and facilitating conditions influence ICT adoption. The findings revealed that participants perceived that through ICT, HR functions would be achieved with ease. Additionally, the findings revealed that the major constructs of the UTAUT framework, namely performance expectancy, effort expectancy and facilitating conditions, play a big role in ICT adoption and use. Additionally, the findings revealed that procuring necessary ICT resources, upgrading ICT systems, allocating adequate ICT budget, as well as ensuring reliable power backup solutions will enhance ICT adoption and use. Furthermore, the findings revealed that ICT training empowers staff with knowledge and skills to enhance ICT adoption and use. It is, therefore, imperative that the Zululand Health District and similar organisations take into consideration valuable insights provided by these findings to enhance ICT adoption and use in HR functions.

The findings of this study extend the UTAUT framework by demonstrating how IT infrastructure, training and the overall resources impact perceived effort and performance expectancy of ICT systems in rural settings, highlighting the importance of digital capacity-building as a health policy priority and infrastructure development in rural settings as an integrated ICT policy. The study was conducted at a single health district in KwaZulu-Natal employing a qualitative research method, with a focus on the digital divide in HR functions. It is, therefore, imperative for future research to explore multi-district comparative analyses, employing mixed-methods approaches and assessing the cost-benefit of ICT adoption in HR processes to provide stronger evidence for policy and practice.

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## Competing interests

The author declares that no financial or personal relationships inappropriately influenced the writing of this article.

## CRedit authorship contribution

Siyabonga Ziqubu: Conceptualisation, Data curation, Formal analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. The author confirms that this work is entirely their own, has reviewed the article, approved the final version for submission and publication and takes full responsibility for the integrity of its findings.

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## Data availability

Data collected and used in this study are available from the corresponding author, Siyabonga Ziqubu, upon reasonable request and will be available for the period of 5 years as per the university policy.

## Disclaimer

The views and opinions expressed in this article are those of the author and are the product of professional research. They do not necessarily reflect the official policy or position of any affiliated institution, funder, agency or that of the publisher. The author is responsible for this article's results, findings and content.

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Appendix starts on the next page →

## Appendix 1

**TABLE 1-A1:** Coding framework.

Themes	Sub-themes	Code	Definition	Frequency (n)
1. Increased operational efficiency	1.1 Enhanced communication	Commutation facilitation	Instances where participants highlight ICT facilitates communication	2
	1.2 Enhanced collaboration	Teamwork support	Instances where employees work together with other employees and other departments	1
	1.3 Remote working capabilities	Remote work	Instances where ICT support remote work	3
2. ICT hardware resources	2.1 Desktop	Desktop computers	Instances where participants mentioned using desktop computers as organisational resources	3
	2.2 Laptops	Office laptops	Instances where participants mentioned using laptops for office work	3
	2.3 Telephone	Office telephones	Instances where participants mentioned using office telephones	1
	2.4 Portable phones	Portable phones	Instances where participants mentioned using portable phones at selected sections	3
	2.5 Printers	Printers	Instances where participants mentioned printers	1
3. ICT software resources	3.1 Microsoft office software (Microsoft Word, Excel, PowerPoint, Google and Microsoft Outlook)	Microsoft Office software suite	Instances where participants mentioned Microsoft Word, Excel, PowerPoint, Google and Microsoft Outlook	1
	3.2 Communication management software (WhatsApp and Video Conferencing)	Communication management software	Instances where participants mentioned WhatsApp and Video Conferencing	1
	3.3 Teleconferencing and collaboration software (Zoom and Microsoft Teams)	Teleconferencing and collaboration software	Instances where participants mentioned Zoom and Microsoft Teams	1
4. Organisational support factors	4.1 Training	ICT training	Instances where participants mentioned training	4
	4.2 Technical support	ICT support	Instances where participants mentioned technology support	3
	4.3 Provision of technological resources	ICT resources	Instances where participants mentioned resources	3
	4.4 Top management support	Management engagement	Instances where participants mentioned management engagement	1
	4.5 Change management support	Change support	Instances where participants mentioned resistance to change	1
5. Optimised performance	5.1 Enhanced efficiency	Operational efficiency	Instances where participants mentioned lighter and easy work	2
	5.2 Enhanced training and development	Learning and training	Instances where participants mentioned the prospects of enhanced, training, induction or learning	2
	5.3 Automation	Streamline processes	Instances where participants mentioned automating routine tasks	3
	5.4 Improved productivity	Workload optimisation	Instances where participants mentioned ICT prospects in managing high work load	1
6. Enhanced usability	6.1 Ease of use	Simplicity	Instances where participants mentioned ICT as easy to use	2
	6.2 User-friendly technologies	User-friendly	Instances where participants mentioned user-friendly design of ICT system	1
	6.3 Compatibility	Compatible software	Instances where participants mentioned compatible ICT resources	1
	6.4 Training and support	IT skills development and use support	Instances where participants mentioned ICT training support	3
	6.5 Technological resources	ICT Infrastructure	Instances where participants mentioned ICT infrastructure enhancement	1
7. Facilitating conditions	7.1 ICT resources	Resource procurement	Instance where participants mentioned procuring, providing and securing resources	3
	7.2 Robust ICT infrastructure	Infrastructure upgrade	Instance where participants mentioned enhancing infrastructure	2
	7.3 Robust Connectivity	Internet connectivity	Instance where participants mentioned sufficient Internet coverage	2
	7.4 Embracing technology use	Technology endorsement	Instance where participants mentioned embracing a technology	1
	7.5 Training	System training for HR functions	Instance where participants mentioned training	2
8. Recommendations to enhance ICT adoption and use	8.1 Procure ICT resources	Resource acquisition	Instance where participants mentioned obtaining ICT resources	5
	8.2 Upgrade ICT systems	ICT system upgrade	Instances where participants mentioned enhancing and upgrading ICT systems	2
	8.3 Ensure budgets for ICT resources	ICT budget allocation	Instances where participants mentioned ensuring budgets for ICT resources	1
	8.4 Train employees on ICT technologies	Workforce upskilling	Instances where participants mentioned being up-skilled on new technologies	2
	8.5 Ensure backup for systems	Power backup	Instances where participants mentioned ensuring reliable stable power supply and backup	1

ICT, information and communications technology; IT, information technology; HR, human resources.