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The Integration of e-Health With e-Governance: An ANT Translation of the Influencing Factors

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ABSTRACT

There is a lack of integration between e-health and e-governance concepts, contributing to complexity and challenges for governments and service delivery in many countries. This has led to challenges such as a lack of cohesion of government activities from both health and governance perspectives, including poor service delivery. The study seeks to examine the factors that influence the integration of e-health with e-governance. The case study approach was employed using Namibia as the case. The interpretive approach was followed, and qualitative data were collected from both e-health and e-governance perspectives. Actor-network theory (ANT) was employed to guide the analysis. The analysis reveals the factors influencing the integration of e-health and e-governance, including alignment between business and technology, environmental assessment, collaboration among actors, enterprise architecture, skill and retention, and critical success factors. Based on these factors, a framework was developed to guide the integration of e-health with e-governance. The framework has implications for organizations' focus on e-health, e-governance, and policymakers, including governments.

1 | Introduction

Electronic healthcare (e-health) refers to information technology (IT)-enabled solutions used to provide healthcare services to patients (Hallberg and Salimi 2020), while e-governance is often defined as the use of technologies to better deliver government services (Adeodato and Pournouri 2020). Widen and Huseltine (2015) emphasized that e-health and e-governance should not be treated as separate entities because of their criticality. Increasingly, there is interest in both e-health and e-governance concepts. Thus, many studies have been conducted in the areas of both concepts worldwide (Aziz and Sallow 2022; da Fonseca et al. 2021; Kovačić et al. 2022; Ravšelj et al. 2022). In the process of conducting these studies, three things fundamentally stand out. First, the concepts have been mostly studied separately. Second, despite the numerous studies, challenges persist. Third, studies that combined the concepts did not address the integration aspect, such as Bhuvana and Vasantha (2020) and Sharma and Vaisla (2012).

From the e-health front, key challenges include socioeconomic development constraints, technology infrastructure and operational issues, skills, and human resources (Oleribe et al. 2019; Yusif and Jeffrey 2014). According to Hoque et al. (2017), the success of e-health implementation lies with end-users. Bhila et al. (2023) suggest that the implementation of e-health is characterized by training, a lack of regulatory policy, and the application of technology. In the area of e-governance, Basu (2004) examines the legal framework relating to e-governance from the perspective of developing countries. Also, from a developing country's perspective, Tennakoon (2020) highlights the challenges of e-governance as trust, resistance to change, digital divide, cost, privacy, and security. In a study conducted in the Tanzanian context, Mahundu (2016) argues that implementation challenges of e-governance differ from one country to another, based on sociotechnical factors.

The Namibian government invested over 54 million Namibian dollars in e-health between 2011 and 2014 to offer better health

services to its citizens (Smit 2011). Despite the investment and human efforts, the challenges persist. Some of the challenges result in the loss of medical records, duplication, and inconsistent health records, which lead to poor services that are detrimental to human lives, such as using incomplete data and following an inappropriate diagnosis process. According to Shaanika (2016), the challenges or deficiencies can be addressed by integrating healthcare with e-governance. However, in Namibia, the e-health system and e-governance are not integrated (Nengomasha et al. 2018). In Namibia, the situation is worse because healthcare data are often unstructured and scattered within public hospitals (Shaanika and Iyamu 2020).

Despite the growing interest in both e-health and e-governance, to narrow the functions of the concepts towards a single point of service delivery, Namibia and other African countries struggle with integrating the concepts (Chima and Kasim 2018). Thus, the challenges remain unresolved in both e-governance (Gregory and Tembo 2017) and e-health (Hossain et al. 2019). The severity of the challenges increases as there seems to be no empirical reference point. To put it bluntly, no study focuses on the integration of e-health and e-governance in Africa (Mutasa and Iyamu 2021; Sharma and Vaisla 2012).

On the one hand, e-health presents new challenges such as complex use of patient information, which increases requirements for service delivery (Kovačić et al. 2022). On the other hand, there is a lack of cohesion in e-governance, which leads to problems such as vulnerability of systems and poor service delivery (Solaja et al. 2021). This makes the integration between e-governance and e-health increasingly critical. The integration enables and facilitates improved effective service delivery because e-governance helps to identify challenges in e-health (Bindu et al. 2025; Bhuvana and Vasantha 2020). Additionally, Loghman Estarki (2023) suggests that the integration of both concepts is a suitable road map for development and improved service delivery. The integration of e-governance with e-health enables centralization of the health services, which helps to improve citizens' engagement (Rathee et al. 2024).

The research has two key motivations. First, Namibia and many other countries develop e-health and e-governance separately, and thereafter try to implement them to achieve the same goals and objectives of improving the quality of services they provide to the citizens. This research, by identifying key components that influence the integration of the two concepts, e-health and e-governance, seeks to contribute to the accomplishment of a consolidated strategy. Second, while Namibia and other countries are developing e-health and e-governance separately, little is known about the non-technical factors that influence the integration of the two concepts. To this end, actor-network theory is employed to examine the factors that influence the integration of e-health with e-governance in the Namibian government environment.

For ease of understanding, the paper is sequentially organized into eight main sections. The introduction is provided to give context to the study. This is followed by a review of the literature to identify existing gaps. Actor-network theory (ANT), which underpins the study, is discussed. Thereafter, the methodology employed is discussed. In the sections that followed, the findings and analysis are discussed and presented, respectively. Subsequently, the framework is presented. Finally, a conclusion is reached, which summarizes the benefit and relevance of the paper.

2 | Literature Review

In Malaysia, an e-health system was introduced but failed, owing to a lack of integration with an e-governance system (Ismail and Abdullah 2017). In Uganda, e-health and e-governance integration was introduced but lacked prior planning at the initial stages; hence, it was difficult to implement (Kiberu et al. 2017). Nyella (2011) reported that in Tanzania, political interference, connectivity problems, weak policies, and a lack of integration between e-health and e-governance led to the unsuccessful implementation of the e-health system. Considering the above, Thabit and Jasim (2019) highlighted that limited financial capacity and a failure to maintain and integrate data stalled a comprehensive and successful e-governance implementation. Although this study focuses on Namibia, its outcome would be of interest and benefit to many developing countries.

Integrating e-health and e-governance can result in improved healthcare service delivery (Radhikaashree 2018), although there is no empirical evidence of such in Africa. However, the scholarly argument can be attributed to the premise that e-governance efforts provide policies, regulations, and guidelines that enhance automated information sharing of health data across health facilities (Alguliev and Yusifov 2017). The fact is, from an e-health viewpoint, patients' data have been fragmented in many countries (Lal et al. 2021). From an e-governance perspective, the challenges have been in tracing, monitoring, and collaborating, as well as in transparency (Seitio-Kgokgwe et al. 2015).

The main challenges of e-health projects in Africa include inadequate ICT infrastructure, inadequate skills and human resources, and the lack of comprehensive laws and policies (Kiberu et al. 2017). Additionally, Mauco et al. (2020) identifies unskilled stakeholders, poor infrastructure, poor communication, and a lack of process guidance as challenges to e-health projects in developing countries. From an e-governance perspective, Thabit and Jasim (2019) argue that the challenges are 35% technical and 65% non-technical factors, while Bojang (2019) posits that e-governance challenges are based on sociotechnical factors and vary between countries.

Tracing and monitoring health information, records, and data using ICT systems helps track progress, ensure coordinated information sharing, and health interventions and resource management (Kotevski et al. 2016). The incorporation of e-health and e-governance would use ICT systems to overcome issues of transparency, such as red tape and lack of accountability as well as ensure efficient and effective collaboration among key players, such as government entities, the private sector, academic institutions, businesses, non-governmental organizations (NGOs), and so forth (Wadhwa 2020). The failure of various health stakeholders in the system to collaborate results in uncoordinated health information sharing, data loss, and information

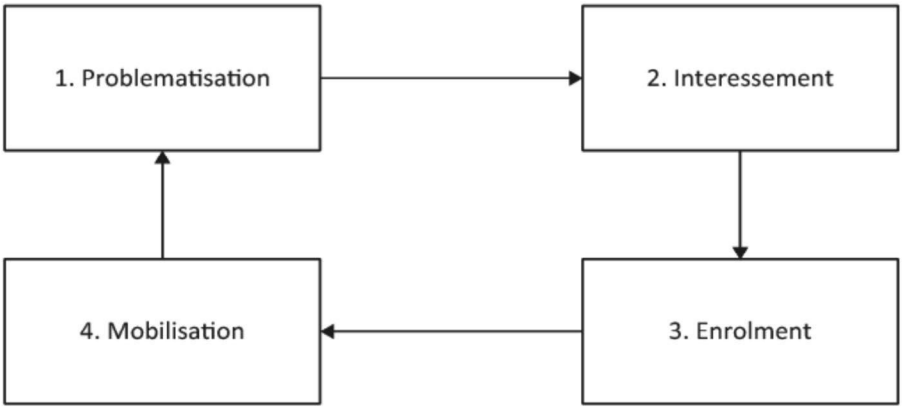

FIGURE 1 | Moments of translation (Callon 1984).

asymmetry, among others. This ultimately necessitates integrating the two systems to ensure a quality exchange of information towards improving the quality of healthcare service delivery (Richardson et al. 2012).

2.1 | Actor-Network Theory

Actor-network theory (ANT) is a socio-technical theory concerned with an actor-network relationship and heterogeneity (Callon 1984). The theory is often employed to understand and explain the relationship between social and technical factors that influence an activity within a network (Iyamu and Mgudlwa 2017). Explicitly put, Fornazin and Joia (2016) assert that ANT focuses on the relational effect shaped by the interaction or association between humans and non-humans in the networks they dwell in.

From an ANT perspective, the world is viewed as a social system comprising different networks, including human and non-human actors. In ANT, the social and technical are treated with equal value, and this also applies to human and non-human actors (Nehemia-Maletzky et al. 2018; Pokorny 2024). None is given priority over the other, and all are treated as making the same contribution to the network.

ANT incorporates what is called "moments of translation," whereby an activity in IS is given a new meaning (Callon 1984). A more comprehensive understanding of this phenomenon is cited by Elbana (2012, 119), who highlighted that "moments of translation" is a mechanism by which the network builder recruits actors and ensures their faithful associations. This implies that the relationship between actors, people, IT tools, processes, and networks is strong, and the network ensures that the actors support it effectively. As shown in Figure 1, the four moments of translation are problematization, interessement, enrolment and mobilization.

Problematization—actors within a network identify a problem that needs to be solved. Fornazin and Joia (2016) posit that problematization involves the formulation and articulation of a problem by actors within a network. Actors take the problem as theirs and act accordingly in a quest to solve an IS-related problem.

Interessement—more interested actors join in a network of a problem that has been identified and labeled as a problem by other actors. Here, initial actors can recruit or incorporate new actors to assist them with working on a problematized segment. There is unity of purpose among actors in a network, and many other procedures to counter the problem are addressed at this stage (Aka 2019; Muhammad and Wickramasinghe 2017).

Enrolment—actors accept the roles they are given by other actors in a quest to counter the problem of health data fragmentation, for instance. Only actors who agree with the responsibilities assigned to them in the interessement stage can work on building the new network (Pokorny 2024).

Mobilization—more and more actors become interested in the network, and they show their utmost commitment to come up with solutions. All actors are fully engaged in the network and, as a team, are willing to take responsibility for whatever outcome (Unsworth 2024). This stage is when the network is in full throttle, and advanced innovations and solutions are created.

We do not pretend that ANT does not have weaknesses and criticisms. For example, Iyamu (2021) argues that the symmetric treatment by ANT is one of its criticisms because the theory uses the same language to describe both human and non-human actors. The theory was applied in this study as a lens to examine the relationship between human and non-human actors and to determine their influence on the integration of e-health with e-governance in an environment. Primarily, it is to gain insights into the factors that influence integration between e-health and e-governance. The Namibian environment is used as the case study.

3 | Methodology

Qualitative data was collected using two different techniques: semi-structured interviews and document analysis. The semi-structured interview technique was employed primarily because it allows the interviewer to probe deeper and solicit more information from interviewees (Bolderston 2015). The interviewees included participants with technical and non-technical know-how from the Ministry of Information and Communication Technology (MICT), Office of the Prime

Minister (OPM), Ministry of Health and Social Services (MOHSS), and private and public health facilities.

As shown in Table 1, 22 people were interviewed. A set of criteria was used to select the participants, which included that a participant must have worked with an e-health or e-governance system for at least 6 months. The number was reached at the point of saturation, which means that no new information was forthcoming. For example, in the e-health interviews, the point of saturation was reached at eight interviews; the ninth and tenth persons offered the information that was already known and documented; hence, it was considered the point of saturation. Five (four middle managers and an administrator) were in a group during the interviews of the e-governance session. This was because the participants requested to be interviewed together. This was to enable them to corroborate or contrast and fill any gaps missed by their colleagues.

Based on the criteria, heads of sections assisted in identifying the participants. Also, some participants helped in identifying their colleagues for the interviews. An interview guide was used to gather the data. The guide included questions such as: What were some of the challenges that hindered the integration of e-health and e-governance? Why did the challenges exist? How could the challenges be addressed?

The research was conducted by a doctoral candidate and her supervisor at the Cape Peninsula University of Technology (CPUT), Western Cape province, South Africa. Contextualization and data curation were in 2021 and 2022, respectively. The analysis of the data was conducted in 2023, and the thesis write-up was completed in 2024.

TABLE 1 | Participants.

Unit	E-health	E-governance	IT specialist	Total
Senior management	2	2	1	5
Middle management	6	4	4	14
Others	2	1	0	3
Total	10	7	5	22

The Actor-network theory was used as a lens to guide the data analysis and interpretation of the findings. Figure 2 illustrates the use of ANT for data analysis and interpretation of findings in this study.

ANT was used to identify the human and non-human actors, including actor-networks that existed in the deployment (development and implementation) and use (practice) of both e-health and e-governance in the Namibian environment. Thus, human and non-human actors were identified first, followed by the actor-networks. This helps to understand the various roles and responsibilities as actors consciously or unconsciously form groups. Thereafter, ANT's four moments of translation—problematization, interessement, enrolment, and mobilization were applied to understand how various activities existed and their roles in the deployment and practice of e-health and e-governance.

4 | Findings and Discussion

Five main steps were followed in interpreting the findings. The first step presents the findings from data analysis from both e-health and e-governance perspectives. In the second step, the findings are placed in boxes (Figure 3), in preparation for mapping. As shown in Figure 4, the findings are mapped against each other in the third step. This was done to identify the common factors and avoid duplication. After that, in the fourth step, the common factors were categorized by putting together the factors that are most closely related or connected, as presented in Table 2. In the last step, the moments of translation from actor-network theory (ANT) are employed to interpret the factors in Table 2. The interpretation is summarized in Table 3.

4.1 | E-Health: Actor

Actors are both human and non-human within an environment or network, and these affect or impact the implementation,

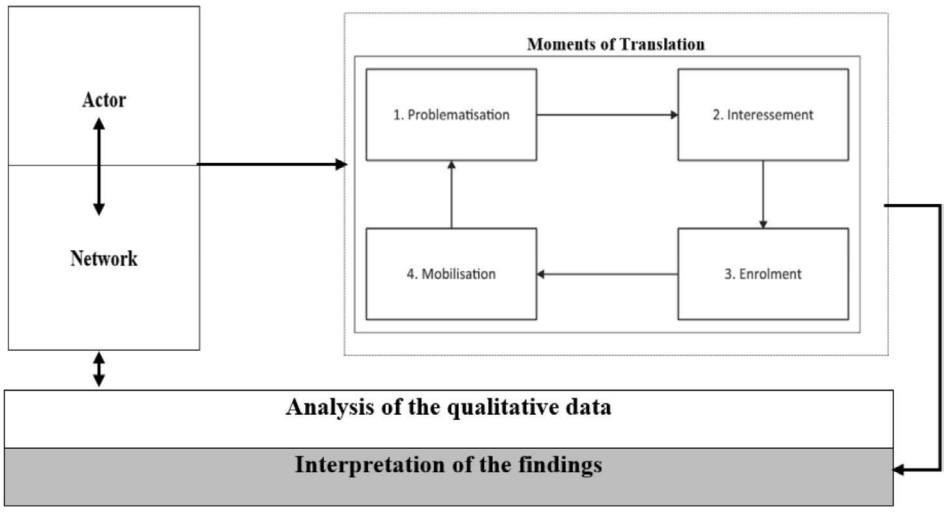

FIGURE 2 | Use of ANT for data analysis and interpretation.

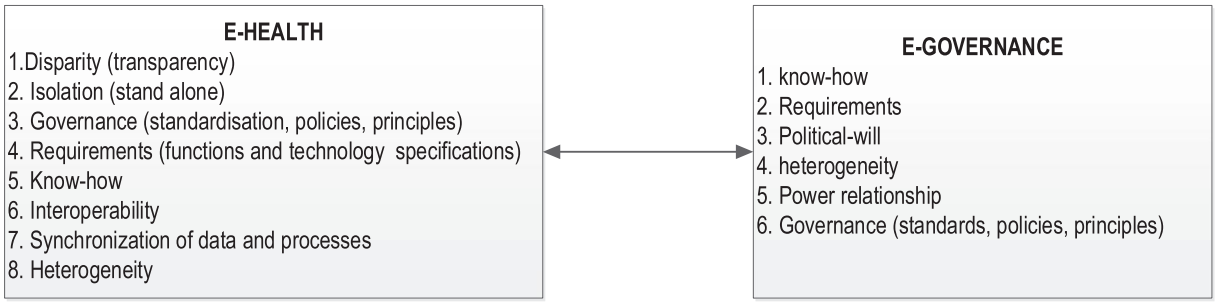

FIGURE 3 | E-health and E-governance findings.

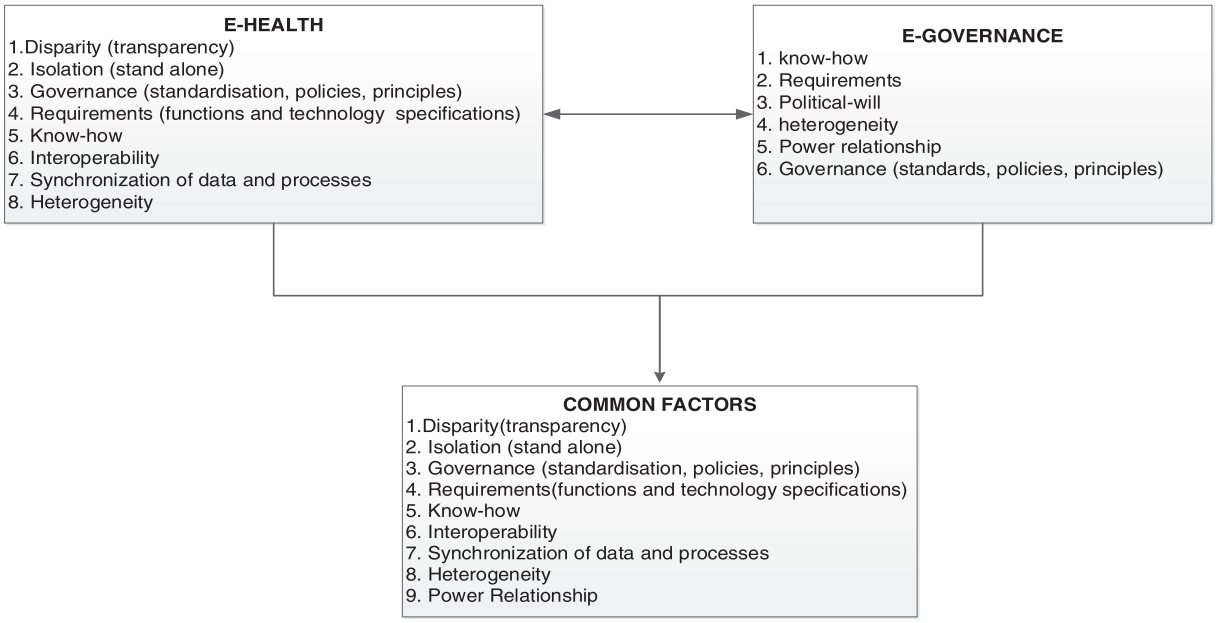

FIGURE 4 | Factors influencing the integration of e-health with e-governance.

TABLE 2 | Categorization of factors influencing integration.

Vision	IT enablement	Management
Requirements	Governance	Power relationship
Know-how	Interoperability	Heterogeneity
Disparity	Isolation	
	Synchronization of data and processes	

innovation, and maintenance of information systems (IS). Concerning this study, the human and non-human actors involved in e-health systems and processes had a common interest in the implementation, innovation, management, and maintenance of information systems (IS) solutions. For these tasks mentioned above, involving e-health solutions, there were two different sets of human actors: professionals in information technology (IT), healthcare, and the affected citizens.

In IT, both technical and non-technical personnel were involved in the deployment, management, and support of the e-health solution in the country. Some of the technical personnel included software developers, system analysts, IT managers, and network administrators. Project managers and business analysts were the non-technical personnel. One of the participants explained:

> For the e-health solution, skilled people were needed in the areas such as project management, software development, and systems analysis.
>
> (GOV2, p. 2: 34–36)

Like IT, from a healthcare perspective, the human actors involved in the deployment and management of e-health solutions were both health practitioners and non-health practitioners. Some of the health practitioners were nurses. Others were physicians, such as medical doctors (general practitioners), dentists, radiographers, pathologists and pharmacists. The non-health practitioners were project managers, administrators, directors, deputy directors, data entry clerks, and patients. These IT and healthcare personnel were assigned to different teams, units, and departments in their organizations for various purposes. These are identified in the actor-network section below.

The computer network comprises Wi-Fi, Local Area Network (LAN), Wide Area Network (WAN), and other protocols used for different connectivity and various purposes. The software includes business applications, operating systems, and databases. The hardware comprises artifacts such as personal computers (PCs), servers, satellite devices, printers, scanners, mobile tablets, and mobile phones. Neither the hardware nor the software operates in a vacuum; software is deployed on hardware and connects through computer networks to enable, support, and facilitate healthcare processes and activities through different approaches and methods. An e-health strategy document by the government states as follows:

> Technology infrastructure is a critical requirement for e-Health. It includes several aspects and has a close relationship with the e-Health workforce needed to establish, maintain and support the infrastructure.
>
> (ST10, p. 29: 2–4)

Furthermore, the non-human actors also include documentation such as strategic documents, policies, reports and laws. This includes (1) the MoHSS Strategic Plan whose focus is related to the deployment of information systems and technology (IS/IT) solutions; (2) the World Health Organization (WHO) Country Cooperation Strategic Plan, which outlines the strategic agenda as adopted by the Namibian government; (3) e-health and MoHSS Universal Health Coverage Policy Framework, which assesses the existing health sector framework to propose interventions that cover the implementation of Health information systems and to achieve universal health coverage; and (4) the National Health Care Technology Policy, which sets out the goals and strategies to be followed by the MoHSS in acquiring and implementing information systems and technology solutions.

In addition, the country's Constitution, the Data Protection Act, the Cybercrime Law, and the Electronic Transactions Law, which concern or relate to healthcare or patients' data, are included as non-human actors in this study. The documents (policies, laws, and acts) govern how health information is stored, shared, and managed. For example, there is a statement in the e-health strategy document which reads as follows:

> A well-defined e-Health architecture should contain protocols on data standards, interoperability, security, privacy, confidentiality, and the necessary laws and policies. Infrastructure should include high-speed internet connectivity between facilities, computing devices and equipment fit for purpose.
>
> (ST10, p. 30: 22–25)

Some of the approaches and methods employed in the deployment and use of hardware, software and computer networks are also actors, by their capability to make a difference. According to Bencherki (2017), an entity is considered an actor if it can make a difference. It means that the actors can influence the integration of e-health with e-governance. Some of the approaches and methods include best practices

TABLE 3 | Moments of translation.

Problematization	**Interessement**
The factors that influence the integration of e-health with e-governance are problematized from various perspectives and at different levels. This is primarily to: (1) ensure a common understanding of the vision; (2) define the functions of IT enablement; and (3) enact management by including human actors responsible for various activities of the integration.	Various groups of individuals, including IT specialists, non-technology employees (such as health practitioners and government employees), and politicians, have shown interest in e-health or e-governance, or both solutions. The interests of the groups vary, based on personal objectives or environmental necessity, or both.
Mobilization	**Enrolment**
To ensure inclusiveness, individuals contractually or voluntarily act as spokespersons to mobilize employees and other stakeholders from their networks to understand and support the need for integrating e-health with e-governance. Thus, mobilization happens at different quarters, such as business, politics, professional (healthcare, government, and IT), and at different levels.	The activities and processes in integrating e-health with e-governance are allocated to individuals and groups based on interest or criteria. The execution of tasks is guided by the vision of the environment, availability of resources (such as enabling IT solutions) and required skillset. Also, participating in the integration requires a contractual agreement.

in planning, designing, and implementing IT solutions (hardware, software, and computer networks). Substantially, this reduces complexity and increases thoroughness in IT solutions that are selected and implemented to enable and support e-health solutions.

4.2 | E-Health: Actor-Network

An actor-network is a group of actors that work together or influence each other based on their allied interests through which they create links (Iyamu and Mgudlwa 2017). The networks were formed consciously or unconsciously by actors with allied interests. Different actor-networks were involved in the implementation and support of e-health solutions in the country. This includes the Business Process Reengineering (BPR) committee, healthcare professionals, IT specialists, and government agencies such as the MoHSS, the Department of Home Affairs, and the Namibia Statistics Agency (NSA).

The BPR committee comprises various actors involved in the implementation of e-health. These actors include systems analysts, project managers, and systems administrators employed by MoHSS, OPM, and MICT to streamline all processes and ensure that the e-health system works efficiently. One of the participants stated:

> The OPM is part of the BPR committee tasked with the implementation of the e-health solutions.
>
> (TECH2, p. 5: 29–30)

The healthcare professionals group was also involved in e-health implementation by contributing requirements. The group includes general practitioners, nurses, dentists, radiographers, pathologists, and pharmacists. These healthcare professionals worked together to ensure that all the patients' data were correctly recorded in the e-health system. All healthcare professionals use patients' data from different departments and facilities a patient has visited to access the patient's history, diagnose them, and offer them high-quality care.

In the implementation of e-health, the IT specialists involved are classified as a group, referred to as actor-network in ANT. These specialists include systems analysts, technicians, network managers, programmers, project managers, and IT managers who work at different health facilities around the country and different government agencies. The specialists' roles include providing technical support, maintaining and assessing the e-health solutions, and co-existing and integrating with other technology solutions.

Several government agencies were also involved in e-health implementation as networks. These included the Ministry of Home Affairs, the custodians of all the citizens' data required in an e-health system; the Ministry of Defence and the Namibian Police, which have various health centers and clinics around Namibia; the Namibia Statistics Agency (NSA) which was responsible for sharing information and data from the MoHSS, as it was the only entity allowed by law with such jurisdiction; the Ministry of Finance that approves the budgetary needs of the e-health project; the Office of the Attorney General that takes care of the legal issues; Namibia Institute of Pathology (NIP) and the Health Professions Council of Namibia (HPCN). Each of these agencies contributes to the deployment of e-health solutions. Consequently, the contributions cause disparity in the e-health solution, which makes some of the solutions unable to co-exist or integrate with other systems, such as e-governance.

The lack of co-existence creates a situation in the country where many of the core stakeholders, such as the agencies identified above, have their e-health solutions. Some solutions duplicate the functions of each other. Also, there was no synchronization of data and processes. This makes it difficult for the MoHSS to electronically coordinate some functions and activities executed by e-health solutions in the country. In addition, from an IT perspective, the deployment of enabling and supporting technologies becomes prohibitive in such scattered and isolated approaches.

Having identified the actors and actor-networks as presented above, the activities involved in implementing e-health solutions are analyzed. Subsequently, this is to gain a deeper understanding of substantiated circumstances, such as when, how, and why the e-health solution is implemented in the manner it is, without being integrated with the e-governance.

4.3 | E-Governance: Actor

Concerning this study, the human and non-human actors involved in e-governance were responsible for authorizing and regulating the implementation, innovation, management, and maintenance of information systems (IS). For these tasks involving e-governance, human actors applied other materials and processes (non-human actors) to carry out various functions in organizations in deploying e-governance in Namibia. Technical and non-technical personnel (human actors) were involved in implementing e-governance in Namibia. Those considered technical personnel include system analysts, software developers, system administrators, and IT specialists employed by various government ministries, including the OPM. The non-technical personnel (human actors) involved in e-governance activities, such as requirements gathering and user testing, included procurement officers, policymakers, the legal team, directors, deputy directors, and the Prime Minister. A participant explained:

> OPM uses its in-house software developers, systems analysts and project managers for some e-governance projects and outsources for other projects.
>
> (GOV1, p. 2: 19–20)

Some of the non-human actors applied in the e-governance activities are categorized into two parts in this analysis. First, they include information technology (IT) solutions such as Wi-Fi, Local Area Network (LAN), Wide Area Network (WAN), software (e.g., business applications, operating systems, and databases), servers, and hardware (e.g., computers, satellite devices, printers, scanners, telephones, and mobile phones). Second, the

non-human actors are mainly documentation associated with or relevant to e-governance activities, particularly in the requirements gathering, development, and implementation stages. Some of these include (1) policy documents; (2) strategic documents; (3) National Development Plan (NDP) documents dedicated to IT solutions; (4) government leveraging and strategic documents on IT infrastructure; and (5) the e-services and innovations documents.

4.4 | E-Governance: Actor-Networks

From the ANT perspective, as mentioned in the e-health section of the analysis, a network consists of actors with a common interest, and the networks can be formed knowingly or unwittingly (Minn 2016). Different actor-networks were involved in implementing and supporting the e-governance solutions in the country. Thus, some of the actors were in various working groups (networks), which were consciously or unconsciously formed. Consciously, groups and teams were created as allowed by policy, within the organizational hierarchy. Accordingly, the groups or teams consisted of people with similar skills or knowledge. In addition to the formal groupings, some actors were involved in some group activities without being recognized members, making them unconscious members.

Some of the groups (networks) were the Business Process Reengineering (BPR) committee, IT, and the government. These were the primary stakeholders in the deployment of e-governance in the country. This is because the groups play vital roles, such as providing and determining requirements, technology enablement and support, financial project sponsorship, and political will for decision-making. There were conflicting ideas, sometimes defined or addressed through relationships that were upheld. In terms of conflict, a power relationship was employed. These groups were workers in different government ministries.

Although the BPR is discussed in e-health, the same committee consists of different people who were involved in e-governance because of the different requirements. The roles and responsibilities of this committee were critical in that they contributed to the requirements used to develop and guide the implementation of e-governance. The requirements were major determinants in deciding whether to integrate e-governance with e-health.

The IT group was responsible for enabling the technological support for e-governance. Owing to the vast nature of the responsibility, the group was further divided into subgroups and teams, such as software development, systems analysis, project management, and systems administration. This was based on the specialized nature of their tasks and disciplines. From the project management pool (team), managers were assigned to manage other groups, such as teams of software developers, which ANT refers to as heterogeneity. In ANT, heterogeneity is when an actor is part of multiple networks (Sekgweleo 2018). The heterogeneity brings synergy and corroboration between teams and groups, which is critical for integration.

The involvement of the government administration came from different ministries. The Ministry of Information Communication Technology (MICT), the Ministry of Finance (MoF), the Office of the Prime Minister (OPM), the cabinet, and the parliament were also actor-networks in the deployment of e-governance through their capability to make a political will difference. Politically, the cabinet wills its power to approve the budget for e-governance projects, including their implementation. The approval was often not based on the technical aspect of the projects but on politics and power. This implies the existence of a power relationship between the government's administration and the IT specialists. This relationship was often not spoken about because it was sometimes unconscious. After the cabinet's approval, the e-governance project is then presented to parliament for approval. MoF is responsible for releasing funds for e-governance projects after the parliament has approved. One participant explained this below:

> Every e-governance project needs the approval of the cabinet because there's money involved. The project is presented to the cabinet, thereafter, to the parliament, and both structures (groups) employ their power to approve or not approve.
>
> (GOV2, p. 7: 19–21)

However, the cabinet lacks the expertise to identify and understand the appropriateness of e-governance functions. MICT works with OPM in implementing and deploying e-governance projects in the country, but OPM leads the process. The OPM manages the procurement process of ICT resources and the development and implementation of ICT policies and standards for all Namibian government ministries. One participant explained below:

> The Prime Minister has the mandate and, therefore, has the power to deliver the e-governance projects, hence its office coordinates the activities and makes important decisions concerning the solution.
>
> (GOV2, p. 2: 24–27)

Based on the analysis of e-health and e-governance, the factors that influence the integration of e-health with e-governance in the Namibian government environment are revealed. The factors were first identified for both variables. Eight factors were identified to influence e-health: (1) disparity, which affects transparency; (2) isolation; which means that e-health solutions are currently stand-alone; (3) governance; which includes standardization, policies, and principles; (4) requirements that cover functions and technology specifications; (5) know-how; entails skillset and human capacity; (6) interoperability; exchange and information use between IT solutions; (7) synchronization of data and processes; and (8) heterogeneity; variability of entities.

Similarly, from e-governance, six factors were found to influence the integration of e-health with e-governance: (1) know-how; (2) requirements of both technical and non-technical components; (3) political will, which draws on power to make decisions; (4) heterogeneity; a repertoire of actors; (5) power relationship; and (6) governance, which includes standards, policies, and principles.

To get the common factors, factors from both e-health and e-governance were mapped against each other. Factors found on both sides were then added to the common factors list. Also, similar and closely related factors were combined and added to the list as one. At the end of the process, nine (9) common factors were found to influence the integration of e-health with e-governance. From the common factors, three categories were formulated: vision, IT enablement, and management, as shown in Table 2.

Vision—this category determines the direction of integrating e-health with e-governance and consists of three other factors: requirements, know-how, and disparity. IT enablement, focusing on how the integrated system will be implemented, the standards and policies involved, the platforms, and how data will be handled, consists of four factors: governance, interoperability, isolation, and synchronization of the data and processes. The management category has two factors: power relationship and heterogeneity. This category focuses on how responsibilities are assigned to human actors, including the authority and political issues involved when deploying e-health and e-governance.

5 | Analysis of the Findings: Moments of Translation

The actor-network theory incorporates what is called "moments of translation" whereby an activity in IS is given a new meaning (Callon 1984). Elbana (2012, 119) states a more comprehensive understanding of the concept as "moments of translation is a mechanism by which the network builder recruits actors and ensures their faithful associations." This implies that the relationship between actors, people, IT tools, processes and networks is strong, and the network ensures that the actors support it effectively. There are four moments of translation as shown in Table 3: problematization, interessement, enrolment, and mobilization.

The discussion that follows presents the interpretation of the factors that influence the integration of e-health with e-governance solutions. The moments of translation from ANT are employed in the interpretation.

5.1 | Problematization: Vision/IT Enablement/Management

Problematization is the first stage of translation and involves formulating and articulating a problem by a focal actor within a network (Fornazin and Joia 2016). In integrating e-health with e-governance, problematization must happen from three perspectives: vision, IT enablement, and management. Vision is a concept used to describe the goals of an organization, where it would like to be positioned in the future, and what it would like to achieve (Slatten et al. 2021). To integrate e-health and e-governance, the government and other focal actors must (1) have a vision; (2) avail IT solutions capable and appropriate for enablement; and (3) provide management that can manage the processes and activities.

Vision is often problematized at the level where it gets buy-in for sponsorship; thereafter, the inclusiveness of other relevant actors is sought. The vision to integrate e-health with e-governance helps determine three main fundamental factors: gathering relevant requirements, including personnel with specialized know-how, and understanding the disparity that exists. In addition to the initial problematization, each of these factors needs to be problematized separately and at different levels. Requirements come in two forms—functional requirements and technology requirements, which are both geared towards integrating e-health with e-governance. These two sets of requirements are problematized at two different units. The functional requirements are problematized at the business unit, while the technology requirements are problematized at the IT unit.

Functional requirements describe the operation of a system/software and include user interaction and technology specifications, data sharing, and the business processes involved. Technology requirements include specifications of the type of IT infrastructure required, the platform the system should be built on, and other hardware and software specifications for integrating e-health and e-governance. Thus, an alignment between business IT solutions and non-technical (business) requirements is critical to bridge any potential gaps. Also, an alignment between the different requirements fortifies collaboration between the various networks, increasing inclusiveness and promoting the chances of a successful integration between the two concepts. Considering the cruciality, both alignment and collaboration can therefore form parts of the critical success factors in assessing integration in the Namibian environment.

Considering the critical roles of IT enablement and management in the integration process, the problematization must be initiated at all three levels as shown in Table 3. This is because these factors bring about other factors and attributes such as transparency, governance, interoperability, and an understanding of actors' relationships and heterogeneity. Together, these factors enact a successful integration of e-health with e-governance while fulfilling the requirements of the stakeholders. In addition, transparency ensures collaboration between the various networks of stakeholders. Also, transparency sets the pace for proper integration and results in a solution that addresses the current problems. On the other hand, if problematization is not initiated at the three levels, it is going to be disjointed, resulting in the integration process being derailed and negatively affecting other important factors such as cost.

5.2 | Interessement: Vision/IT Enablement/Management

Interessement is the stage in translation where interested actors join in a network that has been identified and labeled to find a solution to a problem (Nehemia-Maletzky et al. 2018). The analysis reveals that three main different groups of individuals show interest in either e-health or e-governance, or both solutions in integrating e-health with e-governance at the interessement stage. The first group is made up of IT specialists. The second group consists of health practitioners and government employees, and the third group comprises politicians.

The interest of the groups is understandably based on the mandate and focus of the entities they are affiliated with, employed

by, or represent. For example, the OPM is responsible for all e-governance-related projects in the country. Both e-health and e-governance are inevitably enabled by IT solutions, making IT specialists core members of the stakeholders. The practitioners and other employees show interest as the outcome enables them to execute their roles and responsibilities. The interest of the politicians is primarily based on power to control and financial involvement. The politicians approve the budget at the parliament and cabinet levels. It is therefore crucial to ensure collaboration between the different groups for support and cooperation purposes.

Thus, it is essential to have a good understanding of the visions of the groups of people and, thereafter, gather requirements from the groups to avoid disparity. Consequently, the alignment between IT solutions and non-IT entities (such as health practitioners and politicians) can be fortified to improve IT enablement through governance, interoperability, and data synchronization, which are critical in integrating e-health and e-governance. In addition, IT solutions can eradicate the isolation of systems by enabling the integration of the concepts. The interest of the groups varies based on personal objectives or environmental necessity, or both. IT specialists center their objectives mainly on the design, testing, and deployment of both e-health and e-governance solutions in a way that allows data and process synchronization to maintain consistency. The objectives of some government employees include formulating standards, policies, and rules for the integration process.

The management of the various factors increases the chances of successful integration of e-health with e-governance in the country. Furthermore, the interest of the politicians and some managers is the outcome, which therefore makes it necessary to develop criteria for measuring success. Alhabeeb and Rowley (2018) explain the role of critical success factors (CSFs) in enhancing the accomplishment of a project in an environment. Thus, enrolling and engaging relevant stakeholders from the various groups is essential.

5.3 | Enrolment: Vision/IT Enablement/ Management

Enrolment is the stage where actors who agree with the responsibilities assigned to them in the interessement stage accept their roles in a quest to solve the problem (Pokorny 2024). Certain criteria and interests are used to determine which roles and tasks are allocated to different individuals and groups in integrating e-health with e-governance. The criteria can be the area of expertise of the individuals, the department or organization they work under, and the individual's job level.

Several factors guide the execution of the tasks, including the environment's vision. The different groups and individuals perform their tasks guided by the goals set at the beginning of the project to fulfill the functional and technological requirements, which must be aligned with the organizational vision. Relevant steps are taken to ensure that every goal is fulfilled, as this also determines the success of integrating e-health with e-governance. The availability of resources also guides the execution of tasks. This includes enabling interoperable IT solutions to support the integrated solution. Additionally, only qualified and specialized personnel are allocated tasks in their areas of expertise. Possessing adequate skill and in-depth know-how is very critical to e-health and e-governance integration.

Stakeholders' participation in the integration also requires a contractual agreement between the different groups of individuals. This requires qualified personnel to carry out the various tasks from e-health and e-governance perspectives. Also, through management, the relationship between the groups is strengthened to improve collaboration and alignment and reduce disruptive characteristics. Also, the alignment and governance guide and enforce uniform formulation and coherent integration of the concepts. However, the process requires skilled personnel because of the uniqueness and specialized nature of the concepts. Thus, skill capacity development is not necessarily enough; a strategy for retention is needed to ensure continuity. Narayanan et al. (2019) suggest that talent management should be considered a strategic priority for organizations, specifically for complex situations.

5.4 | Mobilization: Vision/IT Enablement/ Management

To ensure inclusiveness, individuals can contractually or voluntarily act as spokespersons and mobilize employees and other stakeholders from their networks to understand and support the need for integrating e-health with e-governance. Certain individuals are employed to be spokespersons for certain groups; for example, the different health managers represent teams and units. Through such groupings, mobilization can be used to educate and create awareness for a greater population across various stakeholders to increase the integration solution. In addition, training can be used to inform interested persons and stakeholders about the benefits and usefulness of integrating e-health with e-governance.

Thus, different professionals, healthcare administrators, and IT specialists can view the integration from their perspectives to plan support and maintenance for the integration. This can result in spokespersons volunteering for groups knowingly or unknowingly. For example, a nurse who is more computer-literate comprehends technological concepts better than their peers and, as such, is potentially able to mobilize colleagues and other people about the integration purposes and benefits. According to Heeks and Stanforth (2014), mobilization improves interaction across networks. Through mobilization, sources of power can be detected and managed to avoid derailing the integration process.

Mobilization also happens in different quarters, such as business, politics (government), professionals (healthcare and IT), and at different levels, including senior, middle, and lower-income earners' categories of employees or groups. Often, certain narratives exist along these groupings or networks, which were not the vision or requirement of the integration purposes. From this angle, conflicting narratives among stakeholders can be managed through mobilization (Vickers et al. 2018). The mobilization of different quarters and levels was vital because if the actors do not understand the benefits of integration, it will be difficult to realize the goal. This could influence requirements

gathering, budget approval, and ultimately affect IT support for the integration project.

Mobilization brings together all stakeholders involved in integrating e-health with e-governance and ensuring its success. Including actors fully in the integration project fosters teamwork and arouses ownership and accountability among the team. Tripathy (2018) suggested that ownership makes team members effective contributors to the project and to put more effort into dealing with any obstacles that might arise. This is a vital attribute needed for the success and assessment of the outcome of integrating e-health with e-governance.

6 | Framework for the Integration of E-Health With E-Governance

From the findings' interpretation, as detailed in Section 6, six factors mostly determine the integration of e-health with e-governance in the Namibian environment. The factors are (1) alignment between business and technology; (2) environmental assessment; (3) collaboration between actors of both e-health and e-governance; (4) enterprise architecture; (5) skill and retention; and (6) critical success factors to evaluate the fulfillment of the integration goal. Based on these factors, a framework for integrating e-health with e-governance was developed, as shown in Figure 5. The relationship between the factors and how they interconnect is illustrated with arrows in the framework. Also, the sequence of steps is numbered for easy understanding. The factors are discussed below, to be read with Figure 5 (Framework) for a better understanding of the integration concept.

6.1 | Alignment Between Business and Technology

Alignment is a form of synchronization between the business and IT solutions in the areas of objectives, strategies, and processes towards achieving a common goal and vision, including cost reduction and increased return on investment (Munoz and Avila 2019). In the context of this study, business refers to all non-IT solutions. In the integration of e-health with e-governance, the business and technology concepts require synchronization to enable and support a common objective. The alignment ensures that the objectives of e-health and e-governance are considered, and the integration of the two does not derail any set targets or alter the business strategy. As explained by Bourdeau et al. (2018, 134), all "IT project management activities should be aligned with top business direction," and if any changes occur in the business strategy, the IT activities also need to be altered accordingly to ensure smarter decisions in areas like infrastructure requirements, staffing, and budgeting needs. Lack of alignment can lead to disjoints between business and technology solutions in integrating e-health with e-governance in the Namibian environment. Thus, some challenges would remain unaddressed, which could negatively affect either enabling or supporting the integration.

Based on its significance, aligning business and technology in integrating e-health with e-governance is crucial. Therefore, it sets the foundation for the integration project. Both business and technology requirements are obtained from e-health and e-governance and are synchronized to ensure holistic coverage. This requires an assessment of the environment to ensure context. Essentially, the environmental factors need to be analyzed, fully understood, and incorporated into the alignment for successful integration purposes (Mutasa and Iyamu 2021). In addition, alignment strengthens the collaboration between the various actors and networks involved in the project from both e-health and e-governance standpoints. Due to the importance of alignment, it forms part of the critical success factors. Kurti et al. (2013) pointed out that critical success factors can be enablers and inhibitors of business and technology alignment. This is a point that requires attention in the integration of e-health and e-governance to achieve the objective. There is also a direct link between business and technology alignment and environmental assessment.

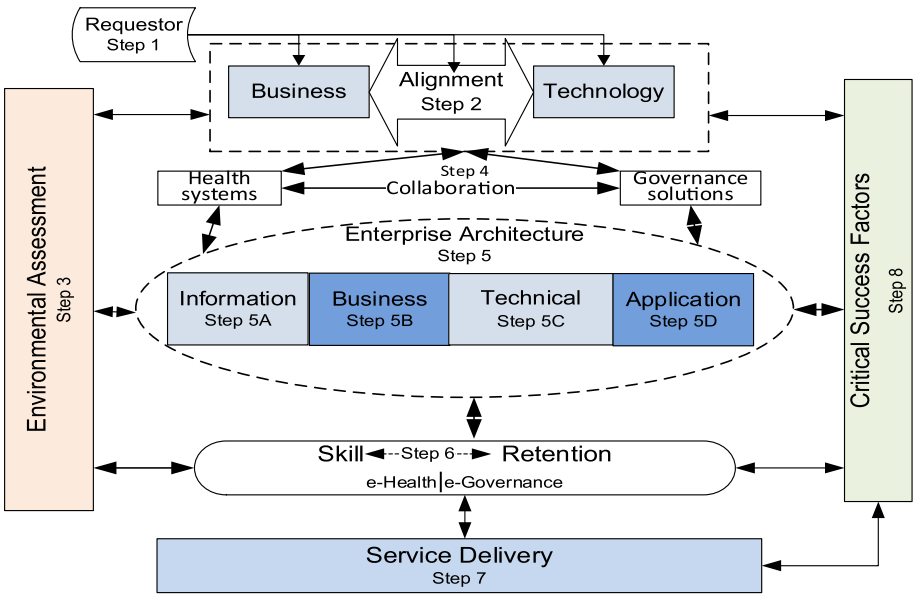

FIGURE 5 | E-health and E-governance integration framework.

6.2 | Environmental Assessment

Environmental assessment refers to the evaluation of the internal and external factors that constitute a project, which may include the structure of the organization, the people involved, the political environment, and the available resources (Englund and Graham 2019). This is critical for integration, particularly because of the diverse nature of actors and networks that can be involved in the process. Failure to assess the environment in the integration of e-health with e-governance poses a great risk to the project, as the environment and context influence the outcome. According to Mutasa and Iyamu (2021), the integration of e-health with e-governance is not influenced by technological factors alone; it also relies on environmental factors. Therefore, carrying out an environmental assessment will ensure that factors from both e-health and e-governance that could influence the integration success in any way are considered in the process.

Environmental assessment is crucial to the alignment between business and technology (Radujković and Sjekavica 2017). The environment needs to be fully defined to provide a solid foundation for alignment and integration. Assessing an environment helps detect gaps and potential challenges that could hamper processes or activities and ultimately influence outcomes. For example, it can be used to identify the relationship between business objectives and technology solutions. Also, through assessment, required skills are identified and mapped against areas, particularly scarce specializations such as enterprise architecture (EA). Since EA involves creating a map of the structure of an organization's IT landscape and operations, this can only be done with a full assessment of the environment to capture all the factors involved. Thus, assessing the environment provides useful insights into the influencing factors and significantly fortifies the integration of e-health with e-governance.

6.3 | Collaboration Between Actors

Collaboration refers to an association between actors or entities towards achieving common goals (Schruijer 2020). In the integration of e-health with e-governance, collaboration is required between the actors responsible for both e-health and e-governance. For holistic purposes, the actors should cover technical and non-technical aspects of e-health and e-governance. The collaboration is primarily to avoid gaps and eliminate the possibility of isolating solutions, requirements, and communication. Another aspect is to ensure interoperability, which is a support factor for integration. Mutasa and Iyamu (2021) assert that processes involved in integrating e-health and e-governance need to be synchronized and uniform. Some of the substantial benefits of collaboration are enabling resources and information sharing. In integrating e-health and e-governance, it is crucial to share technology solutions, processes, and a skilled workforce. This can assist in aligning the interests, goals, and requirements of the actors primarily involved in the integration process.

Also, the collaboration between health systems and governance solutions is directly linked to the alignment between business and technology. This is because collaboration between the two concepts can only be strengthened if there is proper alignment between business and technology. The collaboration and alignment can be fortified by enterprise architecture for a successful integration of e-health with e-governance.

6.4 | Enterprise Architecture

At the center of the integration of e-health with e-governance is enterprise architecture. This is because EA defines processes that help organizations standardize IT solutions, enable alignment between the business and technology, and govern activities. Vitally, this can be attributed to the focus of EA, which spreads across four domains: information, business, technical, and application (Saleem and Fakieh 2020). Thus, EA assists in managing information exchange and flow, defining business design and processes, and governing IT solutions in integrating e-health with e-governance. According to Gellweiler (2020), EA integrates and aligns various components of an enterprise in accomplishing the enterprise's goals. The domains of EA have distinctive deliverables that allow and guide the manageability of the entire process of integration between e-health and e-governance in the Namibian environment.

Enterprise architecture supports the collaboration of e-health with e-governance as it offers standards, governance, and principles required for the manageability of integration. In addition, EA can be used to guide readiness assessments and define critical factors for a successful integration of e-health with e-governance. Rouhani et al. (2019) pointed out that when implementing EA in projects, not utilizing critical success factors may result in the project taking an inappropriate direction and some requirements being unmet.

6.5 | Skills Development and Retention

Skills development is defined as the capacity and ability acquired through different forms of training to enable personnel to carry out different tasks and job activities (Chandra 2019). This is very crucial for integration purposes, as specialized personnel are needed from e-health and e-governance perspectives. According to Mutasa and Iyamu (2021), there is a shortage of skilled personnel for the integration of e-health with e-governance. Thus, a strategy is needed for skills development to ensure successful integration. However, skills development by itself is not enough; the trained personnel need to be retained. A high personnel turnover will negatively affect the integrated solution if there are frequent changes of personnel responsible for enablement and support. Singh (2019) points out that retaining skilled personnel is challenging for organizations, as the replacement costs of key personnel are too high.

Skilled personnel are needed in all the processes involved in the integration of e-health with e-governance (Lam et al. 2016). This includes implementing EA and conducting environmental assessments. The criticality of skilled personnel makes it a part of the critical success factors, which can be used to measure the integration of the concepts of e-health and e-governance. The same skilled personnel can be tasked with evaluating the overall success of the integration, which requires highly skilled personnel. Also, CSFs for skills development and retention need to

be defined. This produces an integrated solution that facilitates improved service delivery to the citizens.

6.6 | Critical Success Factors

Critical success factors (CSFs) are defined as the indicators required for success in a project and should be prioritized higher than any other factors (Tuan 2022). In the integration of e-health with e-governance, the CSFs are vital and should be aligned with the objectives of both e-health and e-governance. CSFs can be used by managers to monitor the progress of the project to ensure that the objectives for the integration of e-health with e-governance are met. Without the CSFs, it would be impossible to conclude or measure the success of the integration solution (Rouhani et al. 2019).

In coming up with the integrated solution, different CSFs must be set for all the major processes. It is critical to define the CSFs for the alignment between business and technology because not doing the alignment properly has a huge impact on the project, as the requirements will not be properly defined (Kurti et al. 2013). CSFs for EA are also required to ensure processes that help organizations to standardize IT solutions are included, and all four domains are addressed (Rouhani et al. 2019). CSFs for skills development and retention need to be set to ensure the right skilled personnel for the job are involved in the project to produce an integrated solution. CSFs of service delivery are also crucial as they ensure that the goal of improving service delivery to the citizens is accomplished.

7 | Conclusion

Many countries, including Namibia, are confronted with various challenges such as a lack of cohesion in the implementation of e-governance and e-health concepts. Primarily, this was because of a lack of integration of the concepts, contributing to the complexity and challenges of service delivery for the Namibian government. This triggered this empirical study. Qualitative data were collected from citizens who have been involved in either e-governance or the e-health concept. From the data analysis, six factors were found to determine the integration of the concepts: (1) know-how; (2) requirements of both technical and non-technical components; (3) political will, which draws on power to make decisions; (4) heterogeneity; a repertoire of actors; (5) power relationship; and (6) governance, which includes standards, policies, and principles. Based on the factors, a framework (Figure 5) was developed following the constructivist approach.

This study's contributions come from two fundamental aspects: revealing the influencing factors and framework for the integration of e-health with e-governance. Although it was known that integration facilitates and coordinates services between e-health and e-governance, significantly, what was not empirically known, which this study reveals, are the factors that influence the integration. Systems integration is most effective in using technology solutions to provide services. As emphasized by this study, integration is the assimilation of technology solutions, resources, and practices into a single routine for management and transparency purposes. Another important point made known by the study is that, although the two concepts may be well implemented, it does not necessarily mean that their individual goals and objectives can be achieved. This is primarily because the cost may be prohibitive owing to a lack of synergy and resource sharing. Also, duplications are likely to occur. In addition, transparency is not achieved, which contributes to poor performance in many countries.

The framework can be used as a reference point for other countries that explore the integration of both concepts. For the framework to be effective, a comprehensive change management plan is required. The plan should include measures for data management, entities responsible for different tasks, and how the integrated solution will be deployed. Also recommended is a strong collaboration between the government and the private sector to counter the shortage of skilled personnel. This study is limited in that the framework developed to integrate e-health with e-governance has not been tested. IT specialists need to apply and assess it to see if it is fit for purpose.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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