Original Paper

Aligning Health Informatics Workforce Roles With Saudi Arabia's Health Sector Transformation Program: Multiphase Qualitative Study

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Abstract

Background: Successful digital health initiatives require a sustainable health informatics (HI) workforce. The lack of standardized job roles across health sectors may result in fragmented HI workforce planning.

Objective: This study aimed to develop a framework to guide HI workforce planning in Saudi Arabia aligned with two strategic branches of the Health Sector Transformation Program (HSTP): (1) governance and regulation and (2) data and digitalization.

Methods: A 4-phase qualitative exploratory study was conducted. In phase 1, semistructured interviews were conducted with Saudi HI experts identified through purposive sampling based on preset inclusion criteria: (1) a master's degree or higher in HI or a related field; (2) at least 10 years of experience; and (3) a current leadership, planning, or management role in digital health. Of the experts approached, 17 agreed to participate. Saturation was confirmed retrospectively. Content analysis was used to identify HI job roles necessary to achieve the HSTP. Phase 2 involved 3 researchers mapping the identified job roles to the relevant HSTP branch and to the 4 strategic objectives under data and digitalization. In phase 3, a health-related sector guide was developed based on reviewing nationally published documents. In phase 4, HI job roles were mapped to 3 job levels and to the health sectors. Descriptive statistics were used to summarize participant demographics and the distribution of job roles across job levels, HSTP branches and objectives, and health sectors.

Results: The sample had a nearly balanced gender distribution; 88.2% (15/17) held a master's degree and most (6/17, 35.3%) had 10 to 15 years of experience. Interviews identified 62 HI job roles relevant to the HSTP, of which 21 (33.9%) were mapped to the strategic objective of unified electronic health records for all under the branch of data and digitalization and 19 (30.6%) were mapped to the health sector governance and regulation branch. A health-related sector guide identified 6 potential employment sectors: health care provider organizations, health care authorities and agencies, health IT companies, research institutions, academic institutions, and health insurance. Job roles were further mapped to job levels and sectors: middle-level roles were most

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common (24/62, 38.7%), followed by entry-level (21/62, 33.9%) and top-level (17/62, 27.4%) roles. Health care provider organizations (55/62, 88.7%) and health care authorities and agencies (49/62, 79%) accounted for the largest share of sectors. The most frequently identified roles were health business analyst, chief information officer, HI specialist, data analyst, HI manager, and health care data scientist.

Conclusions: Findings identified job paths for HI professionals as identified by experts. These results may guide workforce planning and curriculum development. By clarifying roles and optimizing workforce placement, these findings help identify unique and overlapping positions between HI and other health specialists to ensure efficient use of human capital.

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KEYWORDS

health informatics; digital health; job roles; job titles; workforce planning

Introduction

Digitalization has become a crucial driver of any health sector transformation program worldwide. Transformation programs heavily depend on the implementation of primary digital health technologies such as electronic health records (EHRs), mobile health, remote patient monitoring, health information exchange, and AI to achieve sustainable, efficient, and patient-centered care. The successful implementation and adoption of these technologies requires a well-educated and sustainable health informatics (HI) workforce.

In Saudi Arabia, the Health Sector Transformation Program (HSTP) aims to reform and renovate the national health system to improve its efficiency, quality of health care delivery, accessibility of care, and patient safety [1]. The program consists of eight strategic branches: (1) health sector governance and regulation, (2) health sector value and cost, (3) private sector participation, (4) workforce and education, (5) integrated care provision, (6) economic contribution, (7) public health and health security, and (8) data and digitalization [1].

The HSTP's initiatives and projects have substantially increased the demand for HI professionals, notably to support the successful implementation of the HSTP and, more specifically, to lead the data and digitalization strategic objective [2-4]. HI professionals play a key role in managing and executing digital health projects that aim to establish new eHealth models within health care facilities. These professionals should actively engage in planning, implementing, monitoring, and managing activities related to information and communications technology projects [1].

Several factors lead to the increased demand for HI professionals. The first factor is the steady increase in the number of hospitals worldwide. A study conducted by Hersh et al [2] estimated that hospitals required 3.3 HI professionals for every 100 staff members working to support digital health and IT projects. In Saudi Arabia, there are 499 governmental and private hospitals, providing 80,072 beds across all health sectors, with an 18% increase over the past 10 years [5,6]. As a result, the increasing number of hospitals across the country will generate hundreds of HI jobs to lead digital health initiatives and projects.

The widespread adoption of EHR systems and the rapid progress of health information exchange are other factors that will increase the demand for skilled HI professionals in multiple health-related sectors such as governmental agencies and authorities, health IT, consulting, and insurance companies. According to the National Health Information Center, over 65 vendors are offering EHR systems and other health information systems throughout Saudi Arabia [7]. In 2024, the health information system market in Saudi Arabia was estimated to be worth more than US $364 million. This market is expected to reach more than US $517 million by 2030, with an average annual growth rate of 6.24% [8].

The Saudi Commission for Health Specialties (SCFHS) is the governmental body responsible for licensing and registering health professionals [9]. The SCFHS collaborates with relevant governmental and private bodies to plan and develop the health care workforce nationwide. This collaboration is crucial to ensure that enough qualified health professionals are available to meet growing demands. Moreover, strategic and comprehensive workforce planning identifies current gaps and shortages in the health workforce and avoids role duplication and underuse of resources [10]. As HI roles are emerging in the health care sector, effective HI workforce planning is essential to create structured pathways that improve standardized roles and competencies while ensuring sustainability. In response to the increasing demand for skilled HI professionals, the SCFHS has partnered with several governmental universities to offer multiple associate certificate programs, such as medical coding technician and stroke telemedicine programs [11]. Having well-defined job pathways that are relevant to the Saudi health context will not only reduce the reliance on externally trained professionals but also meet national policy priorities of well-educated, highly skilled Saudi citizens [12]. Thus, the SCFHS has funded multiple research projects to create the Saudi HI competency framework and establish structured job pathways for HI professionals [13,14].

Although the critical need for HI professionals to implement and manage data and digitalization initiatives and projects is highly recognized [15], their job roles are not well defined at the national level [16,17]. This issue causes fragmented HI workforce planning and misaligns the strategic objectives of the HSTP and the availability of appropriately skilled human capital. Furthermore, the unclear definition of HI roles and classifications leads to a misalignment between workforce planning and academic outputs. This study builds on our previously published work, which identified and prioritized competencies for HI master's graduates to support the HSTP on a national level [14]. As part of this broader national

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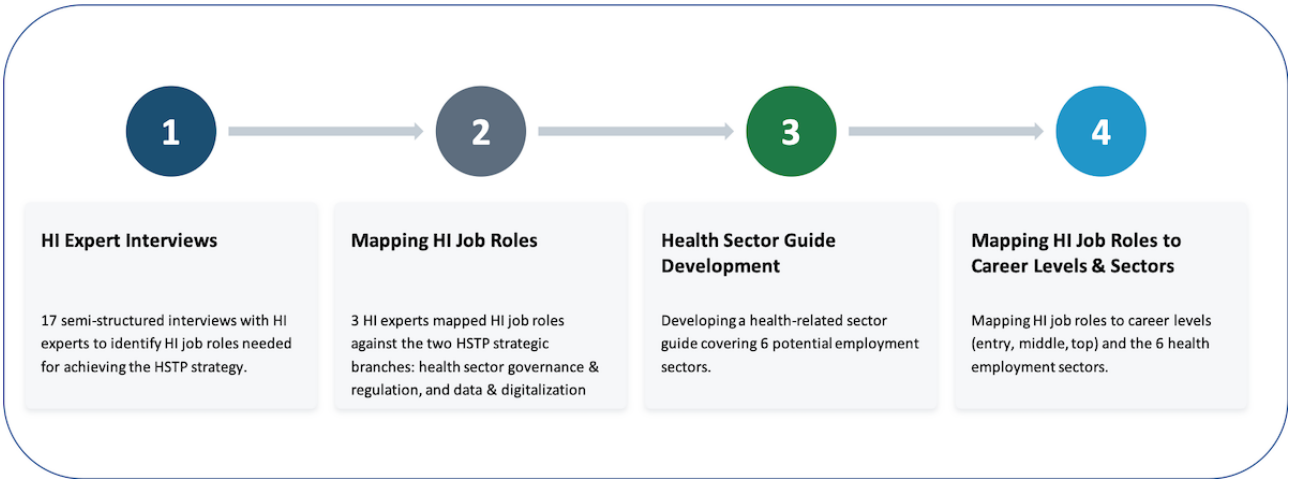
initiative, the current study aimed to develop a framework that can be used to guide workforce planning in the field of HI based on mapping HI job roles, their corresponding job levels, and health sectors in alignment with 2 strategic branches and objectives of the data and digitalization branch of the HSTP in Saudi Arabia.

Methods

Study Design

This study used a four-phase qualitative research design to identify the specific job roles for HI graduates, which support the HSTP in Saudi Arabia (Figure 1): (1) HI expert interviews, (2) mapping of HI job roles, (3) health sector guide development, and (4) mapping of HI job roles with job levels and health sectors.

Figure 1. Flowchart of the 4-phase research design, which includes data collection, mapping to the Health Sector Transformation Program (HSTP), guide development, and mapping to job levels and health sectors. HI: health informatics.



HI Expert Recruitment and Sampling

A purposive sampling strategy was used to identify Saudi HI experts via LinkedIn, reviewing profiles for educational background, work experience, job position, and location, as described by Alshoumr et al [14] in an earlier publication. Inclusion criteria were (1) a master's degree or higher in HI or a related field; (2) at least 10 years of HI experience; and (3) a current leadership, planning, or management role in digital health projects. Thirty-four experts were initially identified and screened by 3 researchers, resulting in a final pool of 29 eligible participants. Invitation messages outlining the study's purpose and procedures were sent via LinkedIn, with reminders sent after 14 days if needed. A total of 17 experts consented to participate. The other 12 experts did not respond to the invitation. The sample size for this study was guided by the concept of information power [18,19], which considers the aim, sample specificity, use of theory, quality of dialogue, and analysis strategy. The analysis was guided by an established content analysis methodology, providing a systematic and theoretically informed approach [20]. The analysis strategy was cross-case, comparing and synthesizing responses across all expert participants to identify common and unique job roles. Given these factors, our sample size was sufficient to achieve information power. Data saturation was confirmed retrospectively during the analytic phase as analysis of the complete set of expert interviews revealed no emergence of new job roles, indicating that the sample was adequate to address the research objectives.

Data Collection and Analysis Procedures

Phase 1: HI Expert Interviews

The semistructured interview consisted of 3 main sections. The first section included 7 structured questions designed to collect demographic and background information, which were recorded and verified with each expert at the beginning of the interview. These demographic data are analyzed and presented in the current study. The second section assessed competencies required for graduates of HI master's programs; those findings are reported in a separate published study [14]. The third section identified job roles relevant to the HSTP and digital transformation. For this, experts responded to a single open-ended question: "In alignment with the HSTP and digital transformation, what specific job roles should HI graduates be prepared to pursue within the Saudi healthcare-related sectors?" This study analyzed both demographic and qualitative data collected from this job role segment of the interview. Multimedia Appendix 1 provides the questionnaire items from the first and third sections used in this study's semistructured interview.

Two researchers (BA and LA), one male and one female, trained in qualitative research methods conducted the interviews in English to facilitate transcription and data analysis. Upon explaining the research objective, verbal consent was obtained from participants for audio recording. All interviews were conducted virtually using Microsoft Teams in August and September 2024, and each interview lasted for approximately an hour. One researcher (LA) transcribed all audio recordings verbatim to ensure accuracy and reliability. The demographic data were analyzed using descriptive statistics, including

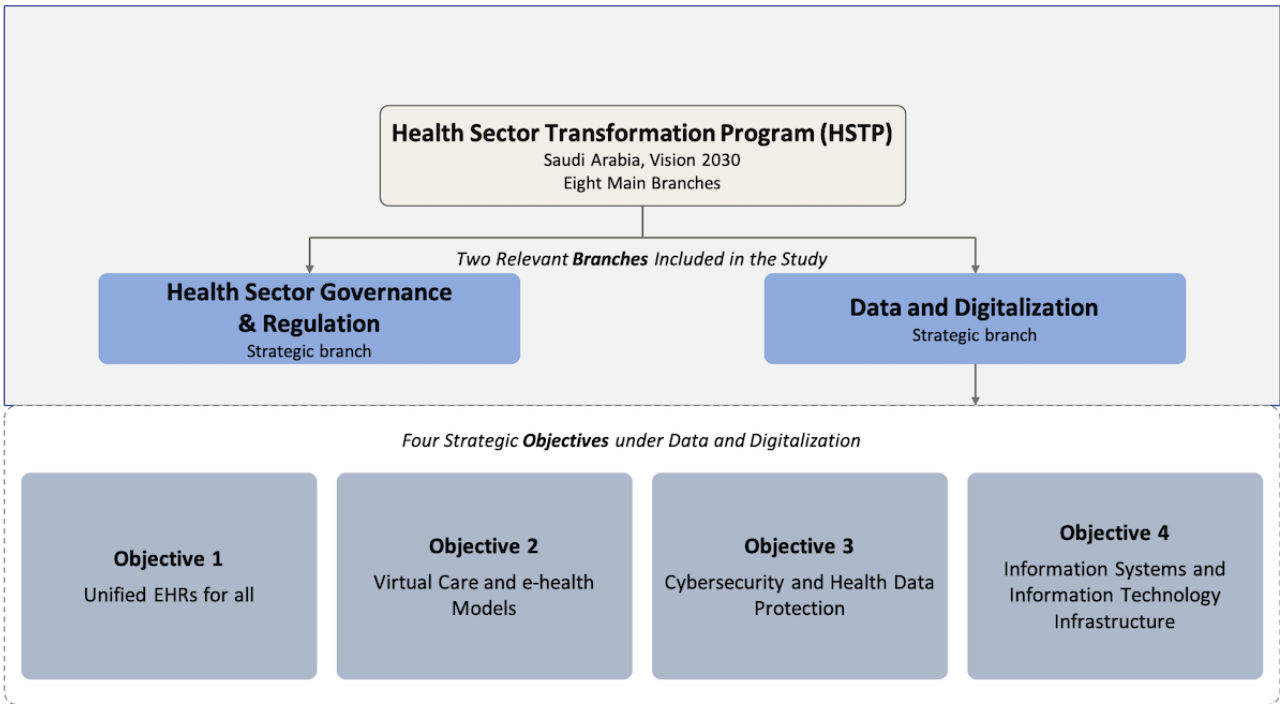
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frequencies and percentages. The qualitative data were analyzed using content analysis following the procedures described by Krippendorff [20]. The analysis began with the design phase, which established a systematic approach for identifying and interpreting job role contexts reported by HI experts. During the unitizing stage, interview transcripts were segmented into meaningful units relevant to the research objectives. All responses to the open-ended question were included, constituting the sampling phase. In the coding stage, each response was systematically assigned codes to capture job roles, which were derived from the data. These codes were then organized into categories and explored to draw inferences about workforce needs. To ensure the reliability and rigor of the analysis, 3 researchers (LA, BA, and RA) coded the data and resolved any discrepancies through discussion.

Phase 2: Mapping HI Job Roles

To classify HI job roles identified by experts through the interviews, we conducted content analysis. Using the framework from the HSTP [1], a categorization schema was developed to map job roles to two strategic branches: (1) health sector governance and regulation and (2) data and digitalization. These branches represent areas where HI professionals' contributions are most critical for aligning workforce capacity with national transformation goals [1]. Health sector governance and regulation establish the structural foundation for guiding and sustaining transformation, while data and digitalization provide the technological infrastructure for integration, efficiency, and innovation in health care delivery. For job roles within the data and digitalization branch, a secondary round of classification was conducted to map each role to its most relevant strategic objective: (1) unified EHRs for all, (2) virtual care and eHealth models, (3) cybersecurity and health data protection, and (4) information systems and IT infrastructure (Figure 2).

Figure 2. The Health Sector Transformation Program's (HSTP) 2 relevant strategic branches and the 4 strategic objectives under the data and digitalization branch included in the study. EHR: electronic health record.



Three research team members (BA, RA, and JAA) conducted the content analyses as well as job role mapping to ensure internal consistency and conceptual clarity. Any discrepancies between the researchers were resolved through discussion to reach a consensus.

Phase 3: Health-Related Sector Guide Development

To develop the health-related sector guide, we systematically reviewed published national documents using explicit inclusion and exclusion criteria. Documents were included if they (1) were official government or ministerial publications; (2) had a Saudi national scope; (3) were directly relevant to the HSTP, digital health strategy, or health sector organizational structure; and (4) were published within the last 10 years. Documents were excluded if they were not officially published or did not address digital health workforce planning or sector structure.

Three researchers (JAA, BA, and RA) identified potentially relevant documents based on the inclusion criteria, reviewed their content, and reached consensus on the final selection. Key documents included decision 469 (2022) of the Council of Ministers [21], the HSTP delivery plan [1], and the Health Sector Transformation Report 2024 [12]. Under Vision 2030, decision 469 marked a significant milestone in restructuring the health sector by redefining the Ministry of Health's role from direct service provision to regulation in collaboration with other authorities and agencies and by establishing the Health Holding Company and Center for National Health Insurance. The HSTP highlighted the advanced development of the digital health system in Saudi Arabia, as evidenced by the growing number of health IT companies such as Lean Business Services [22] and the National Unified Procurement Company [23]. These companies, in collaboration with the National Health

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Information Center, launched and managed several national digital health platforms such as the National Platform for Health and Insurance Exchange Services between health care providers and payers [24] and Wasfaty (ie, the electronic prescribing platform for streamlining medication prescribing and dispensing from community pharmacies) [25]. Other documents reviewed included the national initiatives of the HSTP, specifically the establishment of the research, development, and innovation authority and the Saudi National Institute of Health [26]. Additionally, universities have a mandate for promoting research and innovation within the digital health system in Saudi Arabia [11,12,27]. This systematic approach ensured that the guide was based on comprehensive, current, and authoritative sources reflecting national policies and developments in Saudi Arabia's digital health sector.

As a result of the extensive review of these documents, six employment sectors were identified in the guide: (1) health care authorities and agencies, (2) health care provider organizations, (3) health insurance, (4) health IT companies, (5) research institutions, and (6) academic institutions. Multimedia Appendix 2 provides the health-related sector guide, featuring selected, nonexhaustive examples of organizations within each sector.

Phase 4: Mapping HI Job Roles With Job Levels and Health Sectors

To ensure practical relevance in role classifications, an expert in management and health care workforce planning (NA) mapped job roles to one or more sectors as outlined in the health-related sector guide. First, the expert suggested the potential role to one or more relevant health sectors. Then, the expert assigned an appropriate job level for each role: entry level, middle level, or top level. Following this initial mapping, 2 researchers (JAA and RA), both HI experts, independently reviewed the sector assignments and job levels. Any discrepancies were discussed collectively until consensus was reached. This multistep process was designed to reduce individual subjective bias and strengthen the validity of the categorizations. Three experts used a shared Google Sheet in a matrix format for data analysis. The sheet was developed with rows representing job roles and columns representing health-related sectors.

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki and received approval from the Institutional Review Board at King Saud University (KSU-HE-24-608). All interview participants were provided with detailed information about the study objectives, procedures, and their rights. Written informed consent was obtained from all participants prior to data collection. Participation was voluntary, with the right to withdraw at any time without consequence. To protect privacy and confidentiality, all data were anonymized before analysis, and all responses were stored securely, with access limited to the research team. All participants agreed to have their names mentioned in the Acknowledgments section of this manuscript. No financial or nonfinancial compensation was provided to participants for their involvement in this study. This study was designed, conducted, and reported in accordance with the COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist [28]; the completed checklist can be found in Multimedia Appendix 3 [28].

Results

HI Experts' Demographic and Background Characteristics

During the initial phase of this study, semistructured interviews were conducted with 8 male and 9 female HI experts to specifically identify HI job roles required to achieve the HSTP's objectives. The demographic and background characteristics were presented in the previous study [14]. In this study, an additional demographic variable (ie, region of work) is included in Table 1. A total of 52.9% (9/17) of the HI experts were from the government sector, 35.3% (6/17) of the participants worked in private organizations, and 76.5% (13/17) worked in Riyadh.

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Table 1. Saudi health informatics expert demographic and background characteristics from semistructured interviews conducted in Saudi Arabia in August and September 2024 (n=17).

Variables and subvariables	Participants, n (%)[a]
Educational level	
Master's degree or fellowship	15 (88.2)
PhD	2 (11.8)
Profession	
Health informatics	12 (70.6)
Computer science or engineering[b]	2 (11.8)
Digital health[b]	1 (5.9)
Management of information systems[b]	1 (5.9)
Health economic[b]	1 (5.9)
Experience (years)	
10-15	6 (35.3)
16-20	3 (17.6)
21-25	5 (29.4)
>25	3 (17.6)
Organization type	
Government	9 (52.9)
Private	6 (35.3)
Not for profit[c]	2 (11.8)
Role	
Chief information officer or vice president	6 (35.3)
Director (IT or health informatics division)	7 (41.2)
Consultant or advisor[d]	4 (23.5)
Region of work	
Riyadh	13 (76.5)
Northern region	1 (5.9)
Eastern region	3 (17.6)

[a]Percentages were adjusted to ensure that the subvariable percentages under each variable added up to 100%.

[b]"Digital health," "management of information systems," "health economic," and "engineering" were grouped under the "other" option in the original data collection tool.

[c]The "not for profit" category corresponds to "non-governmental health organization (eg, non for profit)" in the original data collection tool.

[d]"Advisor," grouped under the "other" option in the original collection tool, was merged with "consultant" due to similarity in roles.

HI Job Roles to Support the HSTP

A total of 62 job roles for HI professionals were identified and mapped to the relevant HSTP branches and to the strategic objectives under the data and digitalization branch (Table 2). The most frequently identified job roles by the HI experts were health business analyst (n=7); chief information officer and HI specialist (n=5); and data analyst, HI manager, and health care data scientist (n=4). Moreover, the roles of HI senior specialist, clinical system integration supervisor, digital health team leader, project manager, business intelligence engineer, and emerging technology specialist were identified 3 times during the interviews. However, most job roles (81%) were identified only once or twice during the interviews. Multimedia Appendix 4 provides a list of recommended HI job roles and titles along with their frequency of mentions, mapped to job levels and health sectors. A total of 33.9% (n=21) of the roles were mapped to the strategic objective of unified EHRs for all under the data and digitalization branch, and 30.6% (n=19) of the roles were mapped to the health sector governance and regulation branch.

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Table 2. Health informatics (HI) job roles and job levels mapped to relevant Health Sector Transformation Program (HSTP) branches and objectives in Saudi Arabia based on interviews conducted in 2024.

HSTP branch or objective[a]	HI job roles (n=62)		
	Top level (n=17)	Middle level (n=24)	Entry level (n=21)
Health sector governance and regulation (strategic branch; n=19)	Change management manager, change management senior specialist, chief change management officer, digital health economic expert, portfolio manager, and revenue cycle manager or officer	Business intelligence engineer, governance specialist, legislation specialist, patient experience analyst, program manager, project manager, quality accreditation surveyor, and risk management specialist	Change management agent, digital health economic specialist, health business analyst, quality specialist, and revenue cycle analyst
Unified EHRs[b] for all (strategic objective; n=21)	Chief medical informatics officer, classification and coding manager, clinical system integration director, HI director, and nursing HI supervisor	Clinical system integration manager, clinical system integration supervisor, HI manager, HI senior specialist, HI system implementation specialist, medical application manager, medical coding specialist, pharmacy HI supervisor, and primary care informatics supervisor	Biotechnologist, clinical system project manager, HI analyst, HI specialist, HI team leader, HI trainer, and medical coder
Virtual care and eHealth models (strategic objective; n=5)	Telehealth or virtual health director	Health content developer, health content reviewer, and telehealth or virtual health manager	Digital health team leader
Information systems and IT infrastructure (strategic objective; n=12)	Chief digital transformation officer, chief information officer, digital transformation director, IT development director, and product manager	Command center manager, digital transformation manager, and technology service manager	Digital transformation specialist, digital transformation team leader, emerging technology specialist, and integration specialist
Cybersecurity and health data protection (strategic objective; n=5)	—[c]	Data analytics manager	Cybersecurity specialist, data analyst, database engineer, and health care data scientist

[a]The HSTP branch or objective indicate the relevant HSTP branch (eg, health sector governance and regulation) or 1 of the 4 strategic objectives under the data and digitalization branch, which was used for mapping job roles.

[b]EHR: electronic health record.

[c]Not applicable.

The Distribution of HI Job Roles Across Health-Related Sectors

The 62 identified HI job roles were mapped to multiple sectors based on their relevance and potential contribution to the HSTP's branches and relevant objectives. The sectors that had the highest number of job roles were health care provider organizations (n=55, 88.7%), health care authorities and agencies (n=49, 79%), and health IT companies (n=46, 74.2%). In contrast, research institutions (n=18, 29%), academic institutions (n=13, 21%), and the health insurance sector (n=11, 17.7%) had the lowest number of job roles (Table 3).

Table 3. Distribution of health informatics job roles across 6 health sectors in Saudi Arabia identified through qualitative analysis of health informatics job role data collected in 2024 (n=62)[a].

Sector	Job roles, n (%)
Health care provider organizations	55 (88.7)
Health care authorities and agencies	49 (79)
Health IT companies	46 (74.2)
Research institutions	18 (29)
Academic institutions	13 (21)
Health insurance	11 (17.7)

[a]Job roles could be mapped to more than one sector.

Findings from phase 4 showed the distribution of job roles across 3 job levels. A total of 27.4% (17/62) of the job roles were classified as top-level positions, 38.7% (24/62) were categorized at the middle level, and 33.9% (21/62) were identified as entry-level positions. Nearly half (8/19, 42.1%) of the HI roles supporting the health sector governance and regulation branch were positioned at the middle level. Similarly, 42.9% (9/21) of the HI roles mapped to the objective of unified EHRs for all were middle level. The identification of HI professionals in the cybersecurity and health data protection objective was limited to 4 entry-level roles and only 1 middle-level role. Table 2 shows the identified HI job roles

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mapped to the HSTP branch and objectives and to specific job levels. Multimedia Appendix 4 provides the list of recommended HI job roles and titles along with their frequency of mentions, mapped to the job level and health sectors.

Discussion

Principal Findings

This study identified the key roles that HI graduates are expected to undertake within Saudi Arabia's health care sector aligned with two relevant HSTP branches: (1) health sector governance and regulation and (2) data and digitalization. By identifying and mapping 62 HI job roles, this study highlighted the health care sectors that may potentially see a change in their workforce planning. These job roles were mostly classified as midlevel jobs and were mapped to 3 sectors: health care provider organizations, health care authorities and agencies, and health IT companies. In contrast, sectors such as research institutions, academic institutions, and health insurance had lower representation.

This study is significant as it establishes one of the first comprehensive mappings between HI workforce requirements and the HSTP agenda, providing data to inform workforce planning, curriculum development, and policy formulation. The findings of this study also demonstrate that mapping the workforce with national goals is essential for achieving success in digital health transformation on both a national and global scale.

Comparison to Prior Work

A substantial proportion of the identified job roles were aligned with the health sector governance and regulation strategic branch of the HSTP. This finding indicates the critical role of governance and management in leading the digital transformation. Significantly, these roles were shared among top-, middle-, and entry-level jobs, demonstrating that governance extends beyond executive decision-making and is integrated throughout the workforce. An example highlighted by several experts was the health business analyst role at the entry level. The role is critical as the analyst acts as a facilitator of digital health transformation and involves identifying organizational issues, assessing system requirements, and supporting digital projects [29], while midlevel manager roles such as project manager translate strategic guidelines and directives into concrete operational tasks [4]. At the top level, it is expected that executives ensure that the organization's priorities align with national health transformation goals by leading executive boards, providing strategic direction, and fostering a culture of accountability and excellence [30].

Professional HI associations such as the International Medical Informatics Association have generally identified that one of the primary roles of HI professionals is to play a significant part in the development of EHR systems and implement and maintain unified EHR systems across hospitals, regions, and national platforms [31], a finding confirmed by our study. Our findings indicate that most recognized job roles are related to tasks associated with the strategic objective of unified EHRs for all, highlighting the essential nature of these HI roles in fulfilling this strategic objective within the HSTP. These findings are aligned with those of a study conducted in the United States that found that EHR training is often considered an essential responsibility for HI professionals [32]. In the context of Saudi Arabia, the unified EHR system is a fundamental core in the HSTP that aims to provide extensive and immediate access to patient health data across all health care providers [1]. The strong representation of EHR-related roles in this analysis highlights the growing demand for professionals equipped with expertise in HI, medical coding, and classification, as well as interoperability and integration standards [32]. Indeed, HI job roles distributed across all levels are essential to achieving digital health transformation initiatives related to unified EHRs.

Job roles related to top-level positions within the information systems and IT infrastructure objective, such as chief information officer, are essential in HI. The role of the chief information officer has changed from managing IT functions to acting as a strategic leader who drives digital transformation efforts, promotes interoperability, and ensures data governance within the health care system, as supported by previous studies [3,33]. Midlevel roles such as digital transformation manager act as essential connectors between senior leadership and frontline technical teams, promoting effective communication throughout health care organizations [4]. Integrating new technologies into clinical care workflows, engaging stakeholders, and encouraging innovation within an organization are key responsibilities of entry-level roles such as integration specialist and emerging technology specialist. Within this objective, the identified HI roles were allocated across all job levels, highlighting the diverse organizational capacities required to drive digital transformation forward.

A key component of the HSTP is the expansion of virtual care and eHealth models, which improve access to health care through digital platforms [34,35]. Several job roles aligned with the HSTP objectives related to telehealth, virtual care, and telemedicine were recognized in the current study, such as telehealth or virtual health director, digital health team leader, and health content reviewer. Furthermore, the required expertise to execute virtual care initiatives across all job levels was recognized. In light of the shift to digitizing health care systems, Alzghaibi [17] highlighted the growing need for specialized workforces in telehealth and eHealth. In fact, the interdisciplinary training of HI graduates makes them particularly well suited to support this shift as they can assist decision-makers in identifying system needs and designing, implementing, maintaining, and evaluating telemedicine applications [36].

Under the data and digitalization strategic branch, cybersecurity and health data protection are central objectives of the HSTP [1]. Since the implementation of the personal data protection law in Saudi Arabia in 2023, health care organizations have increasingly required professionals to secure data and protect digital systems [37]. There were several relevant roles identified in this study, mostly at the entry level and one at the midlevel. The data analytics manager, classified as a midlevel position, was identified as critical for data security and governance. Protective measures and standards for data interoperability can be implemented through the roles identified at the entry level,

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such as cybersecurity specialist, data analyst, and health care data scientist. HI graduates possess the necessary skills for roles in system security, data governance, and interoperable EHRs, all of which are critical to supporting a comprehensive digital health environment [38].

The strong presence of middle-level roles in our study highlighted that HI professionals play a fundamental part in connecting strategic goals with day-to-day operations in health care organizations. This work requires them to have both technical and management skills [39]. The most frequently identified job roles were found in health care provider organizations, health care authorities and agencies, and health IT companies. This shows that these sectors are driving digital transformation significantly [1,12,21-23]. The comparatively limited representation of research institutions, academic institutions, and health insurance suggests underdeveloped but emerging opportunities. These findings are consistent with those of international research that positions HI professionals at the center of health system modernization [38,39]. They also emphasize the importance of developing workforce strategies that focus on the skills required for middle-level leadership and coordination [40].

This study presents Saudi Arabia's digital health transformation to illustrate global trends in adopting digital health technologies and the resulting increased demand for HI professionals. By identifying emerging job roles, this study enables stakeholders to anticipate trends in digital health expansion. Furthermore, the health-related sector guide establishes a framework for expanding HI career opportunities, coordinating education and workforce planning, and promoting international collaboration. By presenting a structured, sector-based view, it supports global standardization and evidence-based workforce development. Although this study focuses on Saudi Arabia's HSTP, its methodology and findings are applicable in broader contexts. The framework for mapping HI job roles to national strategic objectives and sectoral needs can be adapted by other countries pursuing digital health transformation. Aligning workforce planning with national policy goals and sectoral requirements enables countries to anticipate workforce needs, guide HI education, and optimize human capital allocation. Furthermore, the method for reviewing and synthesizing policy documents provides a model for other regions seeking to develop or enhance their HI workforce frameworks. These findings support the integration of workforce development with health sector reform and can inform international practices in digital health workforce planning.

Limitations and Future Directions

While this study provides valuable insights into the crucial roles of HI professionals within the HSTP in Saudi Arabia, it has several limitations that should be considered. First, purposive sampling may limit the generalizability of the findings; despite the 17 participating HI experts coming from diverse backgrounds and health care sectors, their opinions may not be generalizable. Future research with larger, randomly selected samples and involving additional stakeholders would strengthen the reliability and relevance of the results. Second, the expert panel was geographically concentrated, specifically in the capital city, Riyadh. This reflects the concentration of major health sector organizations and leadership positions in this region. No experts from the western or southern regions were included, which may limit the generalizability of the proposed framework as workforce role needs could differ across regions. Third, while the findings reflect workforce needs in the current phase of the HSTP, some of these roles are not unique to the HI profession. Identifying unique HI roles may result in less than 62 roles, which may be further investigated in future studies. Given the fast-changing nature of policies, technologies, and organizational priorities, the roles identified are likely to evolve; long-term or follow-up studies would be useful to track these changes. Finally, although the qualitative approach was appropriate for investigating emerging roles and generating detailed insights, it inherently limits the generalizability of the findings to the broader HI workforce. Future studies using larger quantitative samples may enhance generalizability and provide further insights. Despite these limitations, the results highlight the strategic importance of workforce planning in ensuring that HI professionals are well prepared to support national digital health initiatives under Vision 2030.

Conclusions

The findings of this study systematically address current gaps in HI workforce planning and policy formulation within health care and health-related organizations. This study developed a framework for guiding workforce planning in HI by explicitly identifying and mapping HI job roles, defining specific job levels, and categorizing these roles across various health sectors. The framework is designed to directly align with the relevant branches and strategic objectives of the HSTP in Saudi Arabia. The findings emphasize the HI workforce's critical role in achieving digital health transformation locally and worldwide. Furthermore, the results support ongoing efforts to develop academic programs that bridge the gap between educational outcomes and workforce needs.

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Data Availability

Deidentified transcripts and interview guides are available upon request from the corresponding author. The phase 4 master spreadsheet can be found in Multimedia Appendix 5.

Generative AI Use

During the preparation of this work the authors used GPT-4 (OpenAI) to improve readability and facilitate the identification of relevant scientific literature. Claude (Anthropic) was used to generate figures and format references. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the publication's content.

Authors' Contributions

Conceptualization: BA (equal), JAA (equal), RA
Data curation: BA (equal), JAA (equal)
Formal analysis: BA (equal), JAA (equal), RA, LA, NA
Funding acquisition: RA
Investigation: BA (equal), JAA (equal), RA, LA
Methodology: BA (equal), JAA (equal), RA
Project administration: BA (equal), JAA (equal)
Supervision: RA
Validation: BA (equal), JAA (equal), RA, NA
Writing—original draft: BA (equal), JAA (equal), RA, LA, NA
Writing—review and editing: BA (equal), JAA (equal), RA, LA, NA
All authors have read and agreed to the published version of the manuscript. All authors are accountable for all aspects of the work.

Conflicts of Interest

RA served as a paid consultant for the Saudi Commission for Health Specialties; however, their consultancy work was managerial in nature unrelated to this research. All other authors declare no other conflicts of interest.

Multimedia Appendix 1

Data collection tool: questionnaire and semistructured interview questions.
[DOCX File , 24 KB-Multimedia Appendix 1]

Multimedia Appendix 2

Health-related sector guide with selected, nonexhaustive examples of organizations under each sector.
[DOCX File , 22 KB-Multimedia Appendix 2]

Multimedia Appendix 3

COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist.
[DOCX File , 26 KB-Multimedia Appendix 3]

Multimedia Appendix 4

The distribution of health informatics job titles and roles and the frequency of mentions by experts mapped to job levels and health care sectors in Saudi Arabia.
[PDF File (Adobe PDF File), 199 KB-Multimedia Appendix 4]

Multimedia Appendix 5

The phase 4 master spreadsheet.
[XLSX File (Microsoft Excel File), 43 KB-Multimedia Appendix 5]

References

1. Health sector transformation program: delivery plan 2020-2021. Saudi Vision 2030. URL: https://www.vision2030.gov.sa/media/x3jbf45y/2021-2025-health-sector-transformation-program-delivery-plan-en.pdf [accessed 2026-10-03]

XSL•FO
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2. Hersh WR, Boone KW, Totten AM. Characteristics of the healthcare information technology workforce in the HITECH era: underestimated in size, still growing, and adapting to advanced uses. JAMIA Open. Jul 20, 2018;1(2):188-194. [FREE Full text] [doi: 10.1093/jamiaopen/ooy029] [Medline: 31984332]
3. Alfuraydi AS. The role of chief information officer (CIO) in implementing IT governance in health care sector. Power Syst Technol. Dec 31, 2024;48(4):7676-7695. [doi: 10.52783/pst.1745]
4. Boutcher F, Berta W, Urquhart R, Gagliardi AR. The roles, activities and impacts of middle managers who function as knowledge brokers to improve care delivery and outcomes in healthcare organizations: a critical interpretive synthesis. BMC Health Serv Res. Jan 02, 2022;22(1):11. [FREE Full text] [doi: 10.1186/s12913-021-07387-z] [Medline: 34974827]
5. Healthcare establishments and workforce statistics publication 2023. General Authority for Statistics. URL: https://www.stats.gov.sa/documents/20117/2435273/Healthcare+Establishments+and+Workforce+Statistics+2023EN.pdf/dffcd9a0-21c9-1c30-5317-cb9dfbc14dba [accessed 2026-10-03]
6. Private sector participation to modernise Saudi health care. Oxford Business Group. URL: https://tinyurl.com/3m96b7ba [accessed 2026-10-03]
7. Distribution of health information systems in the facility [Webpage in Arabic]. National Center for Health Information. URL: https://nhic.gov.sa/dashboard [accessed 2026-10-06]
8. Saudi Arabia healthcare information system market, by region, competition, forecast & opportunities, 2020-2030F. Research and Markets. Jan 2025. URL: https://www.researchandmarkets.com/report/saudi-arabia-healthcare-information-system-market [accessed 2026-10-03]
9. Saudi Commission for Health Specialties. URL: https://scfhs.org.sa/en [accessed 2026-10-03]
10. Doll J, Anzalone AJ, Clarke M, Cooper K, Polich A, Siedlik J. A call for a health data-informed workforce among clinicians. JMIR Med Educ. Jun 17, 2024;10:e52290. [FREE Full text] [doi: 10.2196/52290] [Medline: 38889091]
11. The Health Academy. URL: https://hatms.scfhs.org.sa [accessed 2026-10-03]
12. 2024 health sector transformation report. Saudi Vision 2030. URL: https://www.vision2030.gov.sa/media/h0yb5d03/health-sector-transformation-report-2024.pdf [accessed 2026-10-03]
13. Almalki M, Jamal A, Househ M, Alhefzi M. A multi-perspective approach to developing the Saudi Health Informatics Competency Framework. Int J Med Inform. Feb 2021;146:104362. [FREE Full text] [doi: 10.1016/j.ijmedinf.2020.104362] [Medline: 33360116]
14. Alshoumr B, Almulhem JA, Alkadi K, Aljarallah L, Aljuffali LA, Aldekhyyel RN. Identifying and prioritizing competencies for health informatics master's graduates to support the health sector transformation program in Saudi Arabia. Int J Med Inform. Sep 2025;201:105944. [FREE Full text] [doi: 10.1016/j.ijmedinf.2025.105944] [Medline: 40328058]
15. Patel JS, Vo H, Nguyen A, Dzomba B, Wu H. A data-driven assessment of the U.S. health informatics programs and job market. Appl Clin Inform. Mar 2022;13(2):327-338. [FREE Full text] [doi: 10.1055/s-0042-1743242] [Medline: 35354210]
16. Zakaria N, Zakaria N, Alnobani O, AlMalki M, El-Hassan O, Alhefzi MI, et al. Unlocking the eHealth professionals' career pathways: a case of Gulf Cooperation Council countries. Int J Med Inform. Feb 2023;170:104914. [doi: 10.1016/j.ijmedinf.2022.104914] [Medline: 36521421]
17. Alzghaibi H. The gap between bachelor's degree graduates in health informatics and employer needs in Saudi Arabia. BMC Med Educ. Jun 26, 2023;23(1):475. [FREE Full text] [doi: 10.1186/s12909-023-04442-7] [Medline: 37365545]
18. Wutich A, Beresford M, Bernard HR. Sample sizes for 10 types of qualitative data analysis: an integrative review, empirical guidance, and next steps. Int J Qual Methods. Oct 25, 2024;23:16094069241296206. [doi: 10.1177/16094069241296206]
19. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. Qual Health Res. Nov 2016;26(13):1753-1760. [doi: 10.1177/1049732315617444] [Medline: 26613970]
20. Krippendorff K. Content Analysis: An Introduction to Its Methodology. 4th Edition. Thousand Oaks, CA. SAGE Publications; 2019.
21. Saudi Arabia cabinet decision no. 469/1443 on the approval of the licence to establish the Health Holding Company and the regulation of the Centre for National Health Insurance. Lexis Middle East. 2022. URL: https://www.lexismiddleeast.com/law/SaudiArabia/CabinetDecision_469_1443/en [accessed 2026-10-03]
22. About Lean. Lean. URL: https://lean.sa/en/about [accessed 2026-10-03]
23. The National Unified Procurement Company (nupco). Public Investment Fund. URL: https://www.pif.gov.sa/en/our-investments/our-portfolio/the-national-unified-procurement-company/ [accessed 2026-10-03]
24. Measuring the ‘voice of the beneficiaries’. Council of Health Insurance. URL: https://www.chi.gov.sa/knowledge-center/DocLib3/WP%20-%20Measuring%20Beneficiaries%20Voice.pdf [accessed 2026-11-19]
25. Kandasamy G, Orayj K, Shorog E, Asiri R, Alanazi T, Alshahrani AM, et al. Determinants of patient satisfaction with Wasfaty and community pharmacy services in Aseer, Saudi Arabia: a cross-sectional study. Front Med (Lausanne). Jul 22, 2026;13:1845392. [FREE Full text] [doi: 10.3389/fmed.2026.1845392] [Medline: 42558349]
26. Health and wellness RDI national priority in Saudi Arabia: analytical study. Research Development and Innovation Authority. 2025. URL: https://tinyurl.com/22bwddjf [accessed 2026-10-03]
27. Research, Development, and Innovation Authority. URL: https://rdia.gov.sa/en [accessed 2026-10-03]

XSL•FO
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28. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. Dec 2007;19(6):349-357. [doi: 10.1093/intqhc/mzm042] [Medline: 17872937]
29. Kowalska-Styczeń A, Juszczyk K. Employer expectations of business analysts: knowledge and insights from job offer analysis. J Innov Knowl. 2026;11:100859. [doi: 10.1016/j.jik.2025.100859]
30. IHF Leadership Model 2023. International Hospital Federation. URL: https://ihf-fih.org/what-we-do/ihf-leadership-model/ [accessed 2026-10-03]
31. Bichel-Findlay J, Koch S, Mantas J, Abdul SS, Al-Shorbaji N, Ammenwerth E, et al. Recommendations of the International Medical Informatics Association (IMIA) on education in biomedical and health informatics: second revision. Int J Med Inform. Feb 2023;170:104908. [doi: 10.1016/j.ijmedinf.2022.104908] [Medline: 36502741]
32. McLane TM, Hoyt R, Hodge C, Weinfurter E, Reardon EE, Monsen KA. What industry wants: an empirical analysis of health informatics job postings. Appl Clin Inform. Mar 2021;12(2):285-292. [FREE Full text] [doi: 10.1055/s-0041-1726423] [Medline: 33792008]
33. Kim DH, Lemak C, Jones D, Pena D. Evolving role of the health system CIO: perspectives from 33 health systems. BMJ Lead. Sep 25, 2025;9(3):237-241. [doi: 10.1136/leader-2023-000969] [Medline: 39089863]
34. Suleiman AK, Ming LC. Transforming healthcare: Saudi Arabia's Vision 2030 healthcare model. J Pharm Policy Pract. Jan 21, 2025;18(1):2449051. [FREE Full text] [doi: 10.1080/20523211.2024.2449051] [Medline: 39845746]
35. Mani ZA, Goniewicz K. Transforming healthcare in Saudi Arabia: a comprehensive evaluation of Vision 2030's impact. Sustainability. Apr 15, 2024;16(8):3277. [doi: 10.3390/su16083277]
36. Chikware AB, Roman NV, Davids EL. Improving health informatics competencies: a scoping review of the components of health informatics academic programs. SAGE Open. Nov 15, 2024;14(4):21582440241293259. [doi: 10.1177/21582440241293259]
37. Data protection. Saudi Data and Artificial Intelligence Authority. URL: https://sdaia.gov.sa/en/Research/Pages/DataProtection.aspx [accessed 2026-10-03]
38. Gupta K, Mishra V, Makkar A. A global cybersecurity standardization framework for healthcare informatics. IEEE J Biomed Health Inform. Sep 25, 2024:1-8. [doi: 10.1109/jbhi.2024.3467179]
39. Gjellebæk C, Svensson A, Bjørkquist C, Fladeby N, Grundén K. Management challenges for future digitalization of healthcare services. Futures. Dec 2020;124:102636. [doi: 10.1016/j.futures.2020.102636]
40. Meehan R. Health informatics workforce in the digital health ecosystem. Stud Health Technol Inform. 2024;310:1226-1230. [doi: 10.3233/shti231160]

Abbreviations

COREQ: Consolidated Criteria for Reporting Qualitative Research
EHR: electronic health record
HI: health informatics
HSTP: Health Sector Transformation Program
SCFHS: Saudi Commission for Health Specialties

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