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Information Technology and E-Management Implementation Challenges in Zintan City Health Institutions: An Employee Perspective

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Abstract

Digital transformation in healthcare requires more than the introduction of information technologies; it also depends on organizational readiness, financial sustainability, technical infrastructure, cybersecurity, and workforce capabilities. This study examined employees' perceptions of barriers to implementing e-management in selected health institutions in Zintan city, Libya. A quantitative descriptive cross-sectional design was employed using a structured 28-item questionnaire covering four dimensions: administrative, financial, technical, and human-resource barriers. The target population comprised 420 employees across five selected health institutions. Of 175 questionnaires distributed, 150 valid responses were retrieved, representing an effective response rate of 85.7%. Data were analyzed using descriptive statistics and Cronbach's alpha. The reported reliability coefficients ranged from 0.785 to 0.842 for the four dimensions, with an overall alpha of 0.865, indicating good internal consistency. Administrative and technical barriers had the highest reported overall means (M = 4.35), followed by human-resource barriers (M = 4.31) and financial barriers (M = 4.19). The highest-rated individual barriers included inadequate maintenance funding (M = 4.76), lack of trust in information-security and cybersecurity measures (M = 4.68), shortage of practical computer and internet skills (M = 4.68), and rapid technological development and software obsolescence (M = 4.64). The findings indicate that e-management implementation requires coordinated organizational planning, sustainable infrastructure and maintenance financing, effective cybersecurity governance, and continuous workforce development. Because the study is descriptive and cross-sectional, the findings should be interpreted as employees perceived barriers rather than causal determinants of implementation failure.

Keywords: E-Management, Digital Health, Health Institutions in Libya, Cybersecurity, Health Information Systems.

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1. Introduction

Digital transformation has become an important component of contemporary healthcare-system development. Digital technologies can support administrative coordination, information

management, communication, resource allocation, decision-making, and continuity of services. However, successful digital transformation is not achieved simply by purchasing hardware or software. It requires the integration of organizational, financial, human, and technological resources within an appropriate governance framework. The World Health Organization (WHO) emphasizes that digital-health initiatives should be supported by coordinated strategies that integrate these dimensions rather than treating digital technologies as isolated interventions.

Evidence from low- and middle-income countries indicates that the sustainability of digital-health interventions can be affected by inadequate infrastructure, limited financial resources, insufficient technical support, workforce capacity, organizational constraints, and difficulties in maintaining digital systems over time. Kaboré et al. (2022), in a systematic review of digital-health interventions in low- and middle-income countries, identified multiple interacting barriers and facilitators associated with sustainability. At the organizational level, hospital information-system adoption is similarly influenced by multiple factors. Ahmadi et al. (2015), in an empirical investigation of Malaysian public hospitals, examined organizational decisions concerning hospital information-system adoption and demonstrated the importance of organizational and technological conditions in adoption decisions. Policy and governance are also central to digital-health implementation. A systematic review of eHealth policy frameworks in low- and lower-middle-income countries found that effective implementation requires attention to policy, governance, infrastructure, workforce capacity, and other contextual conditions.Within Libya, health institutions operate in an environment in which organizational resources, technical infrastructure, workforce capacity, and governance arrangements may affect the transition from conventional administrative processes to digitally supported systems. In this context, examining employees' perceptions provides useful evidence concerning the practical conditions that may need to be addressed before and during e-management implementation. The present study therefore investigates perceived barriers to e-management implementation in five selected health institutions in Zintan city. The analysis focuses on four dimensions: administrative, financial, technical, and human-resource barriers.

1.1 Research Problem

Despite the increasing importance of digital technologies in healthcare administration, the transition from conventional paper-based processes to integrated electronic management requires organizational and technical readiness. The original study identifies a perceived gap between the strategic need for e-management and its operational implementation in selected health institutions in Zintan. The problem addressed in this study is therefore the lack of empirical evidence concerning the specific administrative, financial, technical, and human-resource barriers perceived by employees within the selected institutions.

1.2 Research Question

The main research question is:

- What are the main perceived barriers to implementing e-management in health institutions in Zintan city from the perspective of employees?

The study addresses four sub-questions:

- What are the perceived administrative barriers?
- What are the perceived financial barriers?
- What are the perceived technical barriers?
- What is the perceived human-resource barriers?

1.3 Significance of the Study

The study contributes localized empirical evidence concerning digital-management readiness within selected Libyan health institutions. From a practical perspective, the findings may assist health administrators and relevant authorities in identifying areas requiring intervention, particularly infrastructure, maintenance, cybersecurity, organizational planning, and workforce development. From an academic perspective, the study contributes to the limited empirical literature addressing e-management implementation barriers in the Libyan healthcare context.

1.4 Objectives

The study aims to:
Assess employees' perceptions of administrative, financial, technical, and human-resource barriers to e-management implementation.
Identify the most highly rated barriers within each dimension.
Develop practical recommendations based on the observed barriers.

The original objective concerning an "actionable, multi-tiered framework" has been narrowed because the empirical design does not itself test or validate a formal implementation framework. The original manuscript stated this objective explicitly.

1.5 Scope of the Study

The study covers five health institutions in Zintan city:

- Zintan general teaching hospital
- Polyclinic complex
- Central blood bank
- Emergency hospital
- Health services administration

The target population consists of employees working within the selected institutions, including medical, allied-health, technical, and administrative personnel.

2. Literature Review

2.1 Digital Transformation and E-Management in Healthcare

Digital transformation in healthcare is a socio-technical process that requires coordination among technology, organizational structures, people, financing, governance, and implementation processes. WHO emphasizes that national and institutional digital-health initiatives require the integration of financial, organizational, human, and technological resources. The importance of this integrated approach is particularly evident in resource-constrained settings. Digital-health interventions may encounter difficulties related to infrastructure, financing, human resources, organizational support, and sustainability. Kaboré et al. (2022) identified these interacting conditions as important considerations for sustaining digital-health interventions in low- and middle-income countries.

2.2 Organizational and Administrative Barriers

Organizational readiness is a major component of successful information-system implementation. Hospital information-system adoption depends not only on the availability of technology but also on organizational conditions and decision-making processes. Ahmadi et al. (2015) examined these factors in Malaysian public hospitals, demonstrating that hospital information-system adoption involves multiple organizational and technological considerations. In the present study, administrative barriers include the absence of strategic planning, insufficient training, difficulty attracting qualified personnel, limited use of specialist consultants, management concerns, and insufficient regulatory support. These factors represent organizational-readiness issues rather than purely technical problems.

2.3 Financial and Infrastructure Barriers

Financial sustainability is an important component of digital-health implementation. Initial procurement costs are only one part of the financial requirements. Institutions must also allocate resources for maintenance, replacement, software updates, technical support, cybersecurity, and staff training. The systematic review by Kaboré et al. (2022) demonstrates that sustainability in low- and middle-income settings is influenced by infrastructure and resource conditions beyond the initial implementation stage.

2.4 Technical and Cybersecurity Barriers

Technical infrastructure constitutes another major component of digital transformation. Network connectivity, hardware, software, databases, technical support, and system maintenance affect the ability of institutions to implement and sustain digital systems. Cybersecurity is particularly important in healthcare because digital systems process sensitive information. Lack of confidence in information-security measures can reduce employees' willingness to rely on electronic systems. WHO continues to identify digital-health governance and secure digital transformation as important components of health-system development.

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2.5 Human-Resource Barriers

Employees are central to the successful adoption of digital systems. Even when adequate infrastructure exists, insufficient digital skills, limited training, resistance to change, and inadequate managerial support may restrict effective use.The present study therefore treats human-resource readiness as a separate dimension, covering digital skills, understanding of e-management, resistance to change, availability of IT personnel, language-related difficulties, and managerial support.

2.6 Policy and Governance

Digital-health transformation also requires appropriate policies and governance structures. Mengiste et al. (2023), through a PRISMA systematic review of e-Health policy frameworks in low- and lower-middle-income countries, identified policy, governance, workforce, infrastructure, and implementation considerations as important elements of successful e-Health policy development. Accordingly, regulatory support and institutional governance should be considered alongside technical infrastructure and financial resources.

3. Methodology

3.1 Research Design

A quantitative descriptive cross-sectional design was adopted. The design was appropriate because the study sought to measure employees' perceptions of barriers at a particular point in time. The study does not employ an experimental design and therefore does not establish causal relationships between the identified barriers and actual implementation outcomes.

3.2 Population and Sampling

The target population consisted of 420 employees across the five selected health institutions. The original manuscript states that the following formula was used:

$$n = \frac{\mathrm{Np(1-p)}}{\mathrm{(N-1)}(\frac{\mathrm{d^2}}{\mathrm{z^2}})+\mathrm{p(1-p)}} (1)$$

with:
N = 420
z = 1.96
p = 0.50
d = 0.05

The original manuscript reports that the resulting sample size was 175.However, recalculation using the formula and parameters printed in the manuscript does not yield 175. Therefore, the revised manuscript does not present 175 as a mathematically verified minimum sample size. Instead, the study reports the actual field process:
Questionnaires distributed: 175

Valid questionnaires retrieved: 150
Non-retrieved/invalid: 25
Effective response rate: 85.71%
The original distribution table confirms these figures, although its percentage labels contain a minor formatting inconsistency. The valid sample of 150 therefore represents the actual dataset analyzed in the study.

3.3 Sampling Technique

The original manuscript states that stratified random sampling was used, with proportional allocation across the five facilities and functional groups. However, the manuscript does not provide the population size of each stratum or the detailed random-selection procedure. Therefore, the representativeness of the final sample should be interpreted cautiously.

3.4 Research Instrument

Data were collected using a structured questionnaire consisting of demographic information and 28 statements measuring e-management barriers. The 28 items were divided into four dimensions:

Table 1: Questionnaire consisting of demographic information

Dimension	Items	Number
Administrative	1–7	7
Financial	8–12	5
Technical	13–22	10
Human resource	23–28	6
Total	**1–28**	**28**

The questionnaire used a five-point Likert scale:
1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

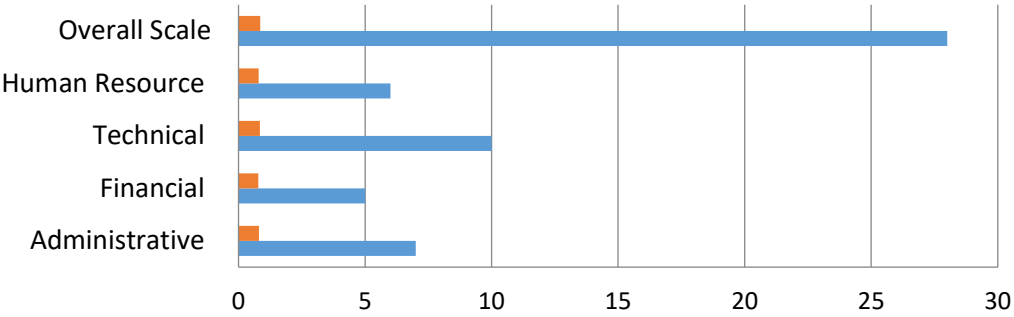
These details are consistent with the questionnaire included in the original manuscript.

3.5 Validity and Reliability

The questionnaire was reviewed by academic experts in health management and information technology, and modifications were made based on their feedback. However, the manuscript does not provide sufficient information concerning the number of experts, their selection criteria, or a formal content-validity index. Therefore, the revised manuscript describes this procedure as expert review/face-content review, rather than claiming complete construct validity.

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Internal consistency was assessed using Cronbach's alpha. The reported coefficients were:



	Administrative	Financial	Technical	Human Resource	Overall Scale
Cronbach's	0.814	0.785	0.842	0.796	0.865
Items	7	5	10	6	28

Figure 1: Distribution and retrieval summary

The values indicate good internal consistency. Cronbach's 1970 book is a genuine bibliographic source; however, Cronbach's alpha should be treated as evidence of internal consistency rather than as proof of overall construct validity.

3.6 Data Analysis

The analysis used descriptive statistics, including frequencies, percentages, means, and standard deviations. Cronbach's alpha was used to evaluate internal consistency.The manuscript classified mean values using five equal-width intervals.

Table 2: Cronbach's alpha to evaluate internal consistency

Mean	Interpretation
1.00–1.79	Very Low
1.80–2.59	Low
2.60–3.39	Moderate
3.40–4.19	High
4.20–5.00	Very High

This classification is mathematically based on an interval width of 0.80.

4. Results

4.1 Demographic Characteristics

Among the 150 valid respondents:

- 107 (71.3%) were male and 43 (28.7%) were female.

- 96 respondents (64.0%) were aged 30–39 years.
- 35 (23.3%) were under 30 years.
- 19 (12.7%) were aged 40–49 years.
- 110 respondents (73.3%) held intermediate institute qualifications.
- 25 (16.7%) held bachelor's degrees.
- 15 (10.0%) held high-school qualifications.
- 85 (56.7%) had 10–14 years of experience.
- 45 (30.0%) had 5–9 years of experience.
- 20 (13.3%) had 15 years or more of experience.

These distributions are reported directly in the original results section.

4.2 Administrative Barriers

The reported overall mean for administrative barriers was M = 4.35, SD = 0.685, classified as very high. The highest-rated items were:

- Weak conviction among top management regarding the feasibility of e-management: M = 4.49
- Lack of reliance on specialized consultants: M = 4.48
- Difficulty attracting qualified IT personnel: M = 4.46
- Insufficient training and workshops: M = 4.41

The lowest, although still very high, was the perceived threat to managerial authority (M = 4.21).

4.3 Financial Barriers

Financial barriers produced an overall mean of M = 4.19, SD = 0.631, corresponding to a high level.The highest-rated financial barrier was inadequate funding for hardware/software maintenance (M = 4.76), followed by limited financial incentives (M = 4.58).The lowest-rated item was the capital cost of hardware and infrastructure (M = 3.58), although it remained within the high category.

4.4 Technical Barriers

Technical barriers recorded an overall mean of M = 4.35, SD = 0.674, classified as very high.The highest-rated technical barriers were:

- Lack of trust in information-security and cybersecurity measures: M = 4.68
- Rapid technological advancement/software obsolescence: M = 4.64
- General deficit in core operational technologies: M = 4.57
- Weak electronic networking: M = 4.49
- Lack of high-speed telecommunications networks: M = 4.45

The absence of integrated databases had the lowest mean within this dimension (M = 3.69).

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4.5 Human-Resource Barriers

Human-resource barriers produced an overall mean of M = 4.31, SD = 0.532, corresponding to a very high level. The highest-rated items were:

- Shortage of practical computer and internet skills: M = 4.68
- Weak English proficiency for software use: M = 4.55
- Insufficient leadership support for workforce upskilling: M = 4.25
- Ambiguity concerning e-management concepts and benefits: M = 4.23

Psychological resistance to technology (M = 4.08) and shortage of IT personnel (M = 4.09) were classified as high rather than very high.

4.6 Overall Comparison

Table 3: Overall comparison

Dimension	Mean	SD	Interpretation
Administrative	4.35	0.685	Very High
Technical	4.35	0.674	Very High
Human Resource	4.31	0.532	Very High
Financial	4.19	0.631	High

Administrative and technical barriers therefore have the same reported mean and should be described as jointly highest rather than assigning one as higher than the other.

5. Discussion

The findings indicate that employees perceive substantial barriers across all four dimensions examined. Administrative and technical barriers received the highest reported overall means, while human-resource barriers followed closely. Financial barriers were somewhat lower but remained within the high category. The prominence of administrative barriers suggests that digital transformation cannot be treated solely as an IT procurement project. The high ratings for management commitment, strategic planning, specialized expertise, and training indicate the importance of organizational readiness. This interpretation is consistent with research on hospital information-system adoption, where organizational and technological factors interact in adoption decisions. Technical barriers were equally prominent. In particular, the high score for lack of trust in cybersecurity measures indicates that employees may perceive digital systems as insufficiently secure. This is especially relevant in healthcare because health information requires appropriate confidentiality, integrity, availability, and access-control measures. The finding supports the broader emphasis placed by WHO on secure and sustainable digital-health transformation. The financial results are also important. The highest financial concern was not the initial capital cost of hardware and infrastructure but the adequacy of funding for maintenance. This distinction highlights the importance of lifecycle financing. Digital-health systems require continuing expenditure for maintenance, replacement, software updates, technical support, and cybersecurity.

This is consistent with evidence concerning sustainability barriers in low- and middle-income countries. Human-resource barriers were similarly substantial. The high rating associated with practical computer and internet skills indicates that successful implementation will require continuous staff development rather than one-time training. Digital transformation is ultimately dependent on users being able and willing to integrate new technologies into routine administrative processes. The finding concerning English-language proficiency should be interpreted cautiously. The questionnaire measures employees' perception of language-related difficulty; it does not objectively measure English proficiency or establish that language limitations cause poor system adoption. Overall, the results support a multidimensional implementation strategy involving organizational governance, infrastructure, financial sustainability, cybersecurity, and workforce development. This multidimensional perspective is consistent with international digital-health policy literature, which emphasizes the interaction between governance, workforce, infrastructure, and implementation conditions. Importantly, the present study does not establish that any individual barrier causes unsuccessful implementation. The design measures perceptions at one point in time, and therefore causal language should be avoided.

6. Practical Recommendations

1. Develop a clear e-management strategy aligned with the health institutions' operational needs and national digital-health priorities.
2. Improve technical infrastructure, including hardware, networking, internet connectivity, integrated databases, and cybersecurity measures.
3. Increase and prioritize funding for system maintenance, software, technical support, and continuous technology upgrades.
4. Strengthen staff capabilities through regular training in computer skills, e-management, cybersecurity, and relevant English-language technical skills.
5. Recruit and retain qualified IT personnel and provide access to specialized technical consultants when required.
6. Increase management support and awareness to reduce resistance to technological change and encourage effective adoption.
7. Establish clear policies and regulations governing e-management implementation, information security, privacy, and accountability.
8. Adopt an incremental implementation approach, beginning with priority services and expanding the system based on performance evaluation and available resources.

7. Conclusion

This study examined employees' perceptions of barriers to implementing e-management in selected health institutions in Zintan city, Libya. The findings indicate that administrative and technical barriers were the most highly rated dimensions, followed by human-resource barriers, while financial barriers remained at a high level.The most prominent individual concerns involved maintenance funding, cybersecurity confidence, practical digital skills, and rapid technological

change. These findings indicate that successful e-management implementation requires more than the acquisition of hardware and software. It requires organizational commitment, strategic planning, sustainable financing, reliable infrastructure, cybersecurity governance, technical support, and continuous workforce development. The findings should nevertheless be interpreted within the limitations of the descriptive cross-sectional design and the achieved sample. Future research should use larger and more representative samples, document the sampling process more rigorously, strengthen instrument validation, and incorporate inferential or mixed-method approaches. Longitudinal research could also examine whether improvements in infrastructure, training, governance, and cybersecurity are associated with actual improvements in e-management adoption and sustained use.

References

[1] Ahmadi, H., Nilashi, M., & Ibrahim, O. (2015). Organizational decision to adopt hospital information system: An empirical investigation in the case of Malaysian public hospitals. International Journal of Medical Informatics, 84(3), 166–188. https://doi.org/10.1016/j.ijmedinf.2014.12.004

[2] Cronbach, L. J. (1970). Essentials of psychological testing (3rd ed.). Harper & Row.

[3] Kaboré, S. S., Ngangue, P., Soubeiga, D., Barro, A., Pilabré, A. H., Bationo, N., Pafadnam, Y., Drabo, K. M., Hien, H., & Savadogo, G. B. L. (2022). Barriers and facilitators for the sustainability of digital health interventions in low and middle-income countries: A systematic review. Frontiers in Digital Health, 4, 1014375. https://doi.org/10.3389/fdgth.2022.1014375

[4] Mengiste, S. A., Antypas, K., Johannessen, M. R., Klein, J., & Kazemi, G. (2023). eHealth policy framework in low and lower middle-income countries: A PRISMA systematic review and analysis. BMC Health Services Research, 23, 328. https://doi.org/10.1186/s12913-023-09325-7

[5] World Health Organization. (2021). Global strategy on digital health 2020–2025. World Health Organization. https://www.who.int/publications/i/item/9789240020924

[6] World Health Organization. (2025). Global strategy on digital health 2020–2027. World Health Organization. https://www.who.int/publications/i/item/9789240116870