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RESEARCH ARTICLE

ADOPTION OF THE "ENOVA SANTÉ" HOSPITAL INFORMATION SYSTEM BY HEAD NURSES IN SOUSS MASSA, MOROCCO

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ABSTRACT

The integration of information technologies in the healthcare sector aims to enhance the quality of care, service efficiency, and clinical data management. Within this framework, hospitals in the Souss Massa region (Morocco) have deployed the hospital information system "ENOVA Santé". Although the perceived benefits of this system are recognized, its adoption remains closely linked to the users' involvement, particularly head nurses, whose role is essential in the deployment, appropriation, and dissemination of this technology within the nursing community. The present study examines the factors influencing the adoption of the "ENOVA Santé" by head nurses in hospitals in the Souss Massa region (Morocco).

A quantitative explanatory design was employed, using a hypothetico-deductive approach based on the UTAUT model. Data were collected through a questionnaire completed by 81 participants and analyzed using the PLS-SEM method via SmartPLS 4 software.

Statistical analysis revealed that effort expectancy and social influence have a positive and significant effect on the intention to adopt ENOVA Santé, which in turn significantly influences the actual adoption of the system. In contrast, performance expectancy and facilitating conditions showed no significant relationship with adoption.

These findings highlight the need to implement targeted strategies, including strengthening user engagement, mobilizing opinion leaders, maintaining strong organizational support, and improving the system's usability and security. While this research is limited to the local context studied, it paves the way for future research at a broader geographical scale and among more diverse populations.

KEYWORDS

ENOVA Santé, head nurses, hospital information system (HIS), Technology adoption, UTAUT

INTRODUCTION

The growing adoption of information technology (IT) has led to significant transformations in many aspects of our daily lives, and in various sectors. The healthcare sector, in particular, is no exception [1]. It's true that the traditional method, based on paper medical records, doesn't allow structured and easy access to important information for decision-makers [2]. Furthermore, faced with the large volume of data produced daily by various hospital services, healthcare institutions

rely on these technologies to improve patient care management [3], thereby enabling the transmission of the right information to the right person at the right time, to improve the quality of healthcare services and optimize processes [4]. IT, particularly Hospital Information Systems (HIS), plays a vital role by offering significant benefits for healthcare staff, patients, and organizations. These benefits include improved performance of healthcare professionals, higher quality of care and increased patient satisfaction, enhanced safety, reduced medical errors and costs, as well as easier access to information and more efficient patient records management [5].

Morocco places particular importance on these technologies, as demonstrated by the reforms initiated by the Ministry of Health, notably through the 2005-2007 action plan, which highlights the need to develop a high-performance HIS [6]. The "Health 2025" plan, structured around three pillars and divided into 25 strategic focus areas, includes 125 actions, with focus area 23 dedicated to the establishment of an integrated national information system (IS) [7]. Similarly, articles 28 and 29 of framework laws 06-22 on the national healthcare system emphasize the importance of digitizing the sector [8]. In this context, hospitals in the Souss Massa region have undertaken the implementation of the "ENOVA Santé" HIS, in order to meet growing needs and create a unified database accessible to all healthcare professionals, in particular head nurses.

However, although these technologies are supposed to meet users' expectations, they are sometimes left unused or abandoned shortly after deployment [9]. Despite perceived benefits, adoption rates remain generally low [10]. In this context, Markus and Keil raise the following question : «*why are some information systems that companies have invested millions of dollars in developing never used or avoided by the very people who are intended to use them ?*» [11].
One of the key factors in the successful implementation of healthcare IT lies in their effective adoption by users [12]. To fully benefit from these tools, appropriate nursing management is essential [13]. In particular, head nurses, who are heavily involved in the IT implementation and management process [14], recognize that plays an important role in their daily practice [15]. Their engagement and leadership also promote the dissemination of this technology within the nursing community [16].

Aware of the decisive role played by head nurses in the use and promotion of HIS within their teams, it is crucial to identify the factors influencing their adoption of HIS in hospitals in the Souss Massa region. To our knowledge, few studies have addressed this topic, and none appear to have been conducted within this specific geographical and organizational context. With this in mind, we formulated the following question:

WHAT ARE THE INFLUENCING FACTORS OF HIS ADOPTION AMONG HEAD NURSES IN HOSPITALS IN THE SOUSS MASSA REGION?

In this context, our study is founded on a simplified version of the Unified Theory of Acceptance and Use of Technology (UTAUT) model [17], offering a robust theoretical framework to predict the key factors influencing HIS adoption. The research focuses on identifying these factors within the specific hospital context under investigation. It also examines the level of adoption among nurses in hospitals in the Souss Massa region, proposes an explanatory model based on the UTAUT, and formulates recommendations to improve adoption.

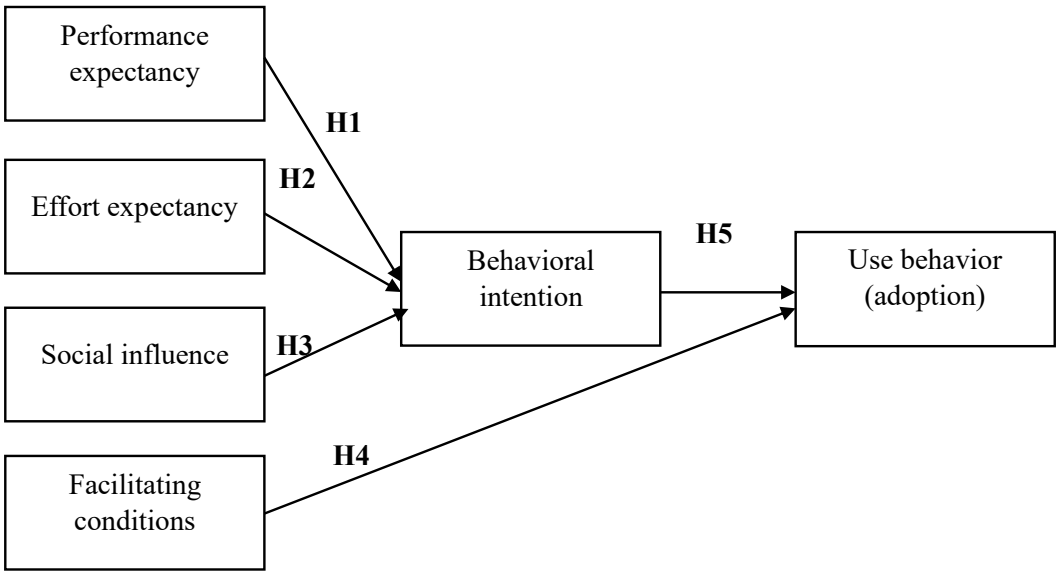
LITERATURE REVIEW AND RESEARCH MODEL

In 2003, Venkatesh and al. developed the UTAUT model to unify eight theories of technology acceptance, including: Theory of Reasoned Action, Technology Acceptance Model (TAM), Motivational Model, Theory of Planned Behavior, a combined TAM-TPB model, Model of PC utilization, Diffusion of Innovations Theory, and Social Cognitive Theory. They identified five main limitations of the previous models: the simplicity of the technologies studied, predominantly student participation, post-decision measurements, cross-sectional designs, and voluntary use contexts. To address these, UTAUT was proposed as a unified acceptance model. It was validated through longitudinal studies in four organizations, showing that it explained around 70% of the variance in usage intention, a result confirmed by data from two other organizations. The model includes four key constructs influencing intention and use: performance expectancy, effort expectancy, social

influence, and facilitating conditions. Behavioral intention directly predicts usage behavior, with gender, age, experience and voluntariness as moderating variables [17].

Given the previously mentioned characteristics, the UTAUT model emerges as a relevant theoretical framework for this study. It enables the examination of key factors influencing the adoption of the by head nurses in hospitals in the Souss Massa region. Figure 1 illustrates the proposed research model, based on a simplified version of the UTAUT model.

FIGURE1 : RESEARCH MODEL



PRESENTATION OF VARIABLES AND HYPOTHESIS FORMULATION:

Table 1 presents the description of the constructs.

TABLE 1: LATENT VARIABLES AND THEIR EXPLANATIONS

Variables	Explanations
Performance expectancy	« *The degree to which an individual believes that using the system will help to attain gain in job performance* ».
Effort expectancy	« *The degree of ease associated with the use of the system* ».
Social influence	« *The degree to which one perceives that important others believe one should use the system* ».
Facilitating conditions	« *The degree to which an individual believes that an organi- national and technical infrastructure exists to support the use of the system* ».
Behavioral intention	It is the intention and commitment of an individual to adopt the system.
Use behavior	It is the actual behavior of using the system.

Source: [17]

RESEARCH HYPOTHESES:

H1: performance expectancy will have a positive influence on users' intention to adopt the HIS.

H2: effort expectancy will have a positive influence on users' intention to adopt the HIS.

H3: social influence will have a positive influence on users' intention to adopt the HIS.

H4: facilitating conditions will have a direct positive influence on the adoption of HIS.

H5: the mediating role of behavioral intention will have a significant positive effect on the adoption of HIS by users.

METHODOLOGY:

THE STUDY DESIGN AND METHODOLOGICAL APPROACH:

This is an explanatory study that follows a quantitative hypothetico-deductive approach based on the UTAUT model.

SAMPLING AND TARGET POPULATION:

The target population of our study includes all head nurses of departments and services within the hospitals of the Souss Massa region (this includes nurses, midwives, health technicians, and rehabilitation specialists), representing a total of 101 professionals. Given the relatively small size of the population, an exhaustive approach was adopted, with a response rate of 80.2%, corresponding to 81 respondents.

This choice of target population is justified by easy access to essential resources, specific training on the HIS, and possession of the access codes necessary for its use.

DATA COLLECTION METHOD AND TOOLS:

A questionnaire (paper and online version) for head nurses was structured in three sections. The first introduced the study, its importance, a message of thanks, and a confidentiality statement. The first section covered demographic and professional data (gender, age, specialty, workplace, experience, etc.). The second section focused on HIS-related perceptions and behaviors, based on model variables (Table 2), measured with a 5-point Likert scale. A pre-test with eight experienced HIS users ensured clarity and minimized bias. The survey was distributed in two phases: an initial round followed by a reminder to enhance response rates.

MEASUREMENT OF VARIABLES:

Studies on HIS adoption by head nurses remain limited, based on the original document by the creators of the UTAUT model, as well as studies in a context similar to ours, we were able to rely on carefully considered indicators. The table below presents the variables studied and their items:

TABLE 2: STUDIED VARIABLES AND THEIR ITEMS

Variables	Items	Sources
Performance expectancy (PE)	• PE1: Using the HIS improves my overall work performance • PE2: Using the HIS allows me to do my work more quickly. • PE3: Using the HIS increases my productivity. • PE4: If I use the HIS, I'll have more chances of advancing in my job	[17]
Effort expectancy (EE)	• EE1: My interaction with the HIS would be clear and understandable. • EE2: It would be easy for me to become proficient in using the HIS. • EE3: I would find the HIS easy to use. • EE4: Learning to use HIS is easy for me.	[17]

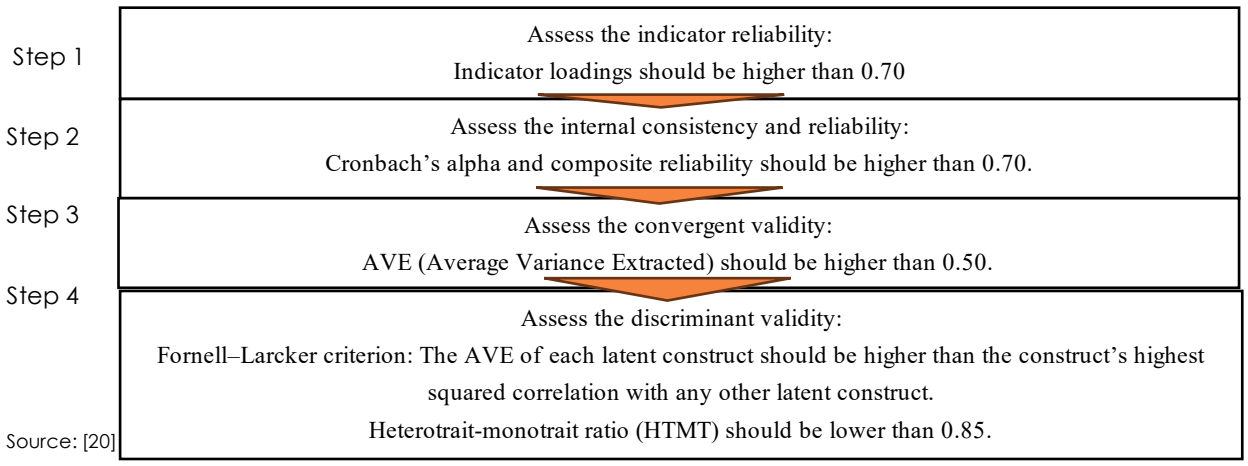
Social influence (SI)	• SI1: People who influence my behavior think I should use the HIS. • SI2: People who are important to me think I should use the HIS. • SI3: My superiors have been very helpful in using the HIS. • SI4: In general, the hospital has supported the use of the HIS.	[17]
Facilitating conditions (FC)	• FC1: I have the necessary resources to use the HIS. • FC2: I could easily access the resources needed to use the HIS. • FC3: I have the necessary knowledge to use the HIS. • FC4: When I encounter problems while using the HIS, someone can help me resolve them.	[17]
Behavioral intention (BI)	• BI1: I intend to use the HIS in the coming months. • BI2: I predict I would use the HIS in the upcoming months. • BI3: I plan to use the HIS in the next few months.	[17]
Use behavior (UB)	• UB1: The HIS service is a pleasant experience. • UB2: I currently use the HIS service. • UB3: I spend a lot of time on the HIS service. • UB4: I will continue to use HIS with conviction.	Adapted from [18 , 19]

TATISTICAL ANALYSIS AND TOOLS USED:

Data analysis was conducted using the PLS-SEM method, chosen because of the small sample size, and the recursive nature of the model, which allows for efficient hypothesis testing. This method follows these steps: first, validation of the measurement model, followed by validation of the structural model [20]. The explanatory analysis was performed using SmartPLS 4 software.

THE STEPS OF THE ANALYSIS AND MODEL VALIDATION CRITERIA: MEASUREMENT MODEL:

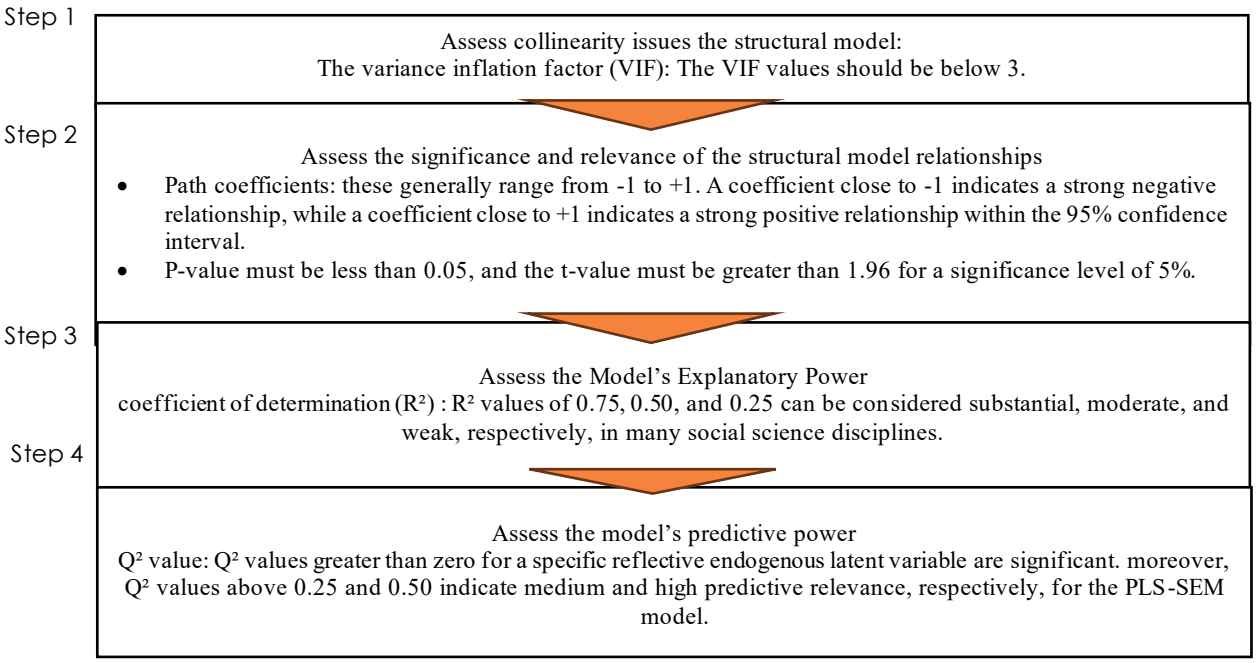
FIGURE 2: THE STEPS OF THE MEASUREMENT MODEL EVALUATION PROCESS



Source: [20]

STRUCTURAL MODEL:

FIGURE 3: THE STEPS OF THE STRUCTURAL MODEL EVALUATION PROCESS



Source: [20]

PRESENTATION OF RESULTS:

This section begins with a descriptive analysis of the first section of the questionnaire, providing a detailed profile of respondents based on their characteristics, followed by an explanatory analysis of the second section using the PLS-SEM method.

TABLE 3: DEMOGRAPHIC AND PROFESSIONAL CHARACTERISTICS OF RESPONDENTS

Control variable	Demographic and professional characteristics	Frequency	Percentage
Gender	Male	43	53,09%
	Female	38	46,91%
Age	< 25 years old	1	1,23%
	25 to 35 years old	38	46,91%
	36 to 45 years old	30	37,04%
	46 to 55 years old	5	6,17%
	> 55 years old	7	8,64%
Actual use of HIS	Yes	69	85,2%
	No	12	14,8%
Duration of HIS use	<6 months	8	11.6%
	6 months to 1 year	8	11.6%
	1 to 2 years	14	20,3%
	>2 years	39	56.5%
Use of the HIS as Part of the Head Nurses' Attributions	Yes	62	76,54%
	No	19	23,46%

Table 3 presents the results of the descriptive analysis of the participants, revealing a male predominance with 53.09%. The majority of participants are young. Regarding actual use of the HIS, 85.2% of respondents report using it. Among these users, 56.5% have been using it for more than 2 years. Furthemore, 76.65% consider that using the HIS is part of their job.

EVALUATION OF THE MEASUREMENT MODEL:

The evaluation of the measurement model will start with a reliability assessment (factor loadings, Cronbach's alpha and composite reliability). Then, convergent validity will be evaluated using the AVE metric. Discriminant validity will be illustrated by the correlation matrix according to the Fornell-Larcker criterion and the HTMT ratio.

TABLE 4: RESULTS OF RELIABILITY AND CONVERGENT VALIDITY

Variables	Items	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Performance expectancy (PE)	PA1	0.867	0.846	0.896	0.683
	PA2	0.819			
	PA3	0.879			
	PA4	0.733			
Effort expectancy (EE)	EA1	0.856	0.889	0.923	0.750
	EA2	0.822			
	EA3	0.918			
	EA4	0.867			
Social influence (SI)	IS1	0.537	0.700	0.801	0.505
	IS2	0.729			
	IS3	0.707			
	IS4	0.812			
Facilitating conditions (FC)	CF1	0.777	0.706	0.807	0.516
	CF2	0.583			
	CF3	0.851			
	CF4	0.630			
Behavioral intention (BI)	IC1	0.924	0.923	0.951	0.866
	IC2	0.938			
	IC3	0.930			
Use behavior (UB)	CU1	0.873	0.950	0.964	0.870
	CU2	0.955			
	CU3	0.946			
	CU4	0.955			

Table 4 shows the results of the factor loadings. The indicators SI1 (0.573), FC2 (0.583), and FC4 (0.630), although having loadings between 0.40 and 0.70, have been retained, as their removal would negatively affect the reliability and content validity of the model, thus compromising the overall coherence of the model in accordance with the literature recommendations [21]. Cronbach's alpha and composite reliability show values above 0.7, and AVE exceeds the 0.5 threshold, which is considered acceptable.

TABLE 5: DISCRIMINANT VALIDITY RESULTS (FORNELL-LARCKER CRITERION)

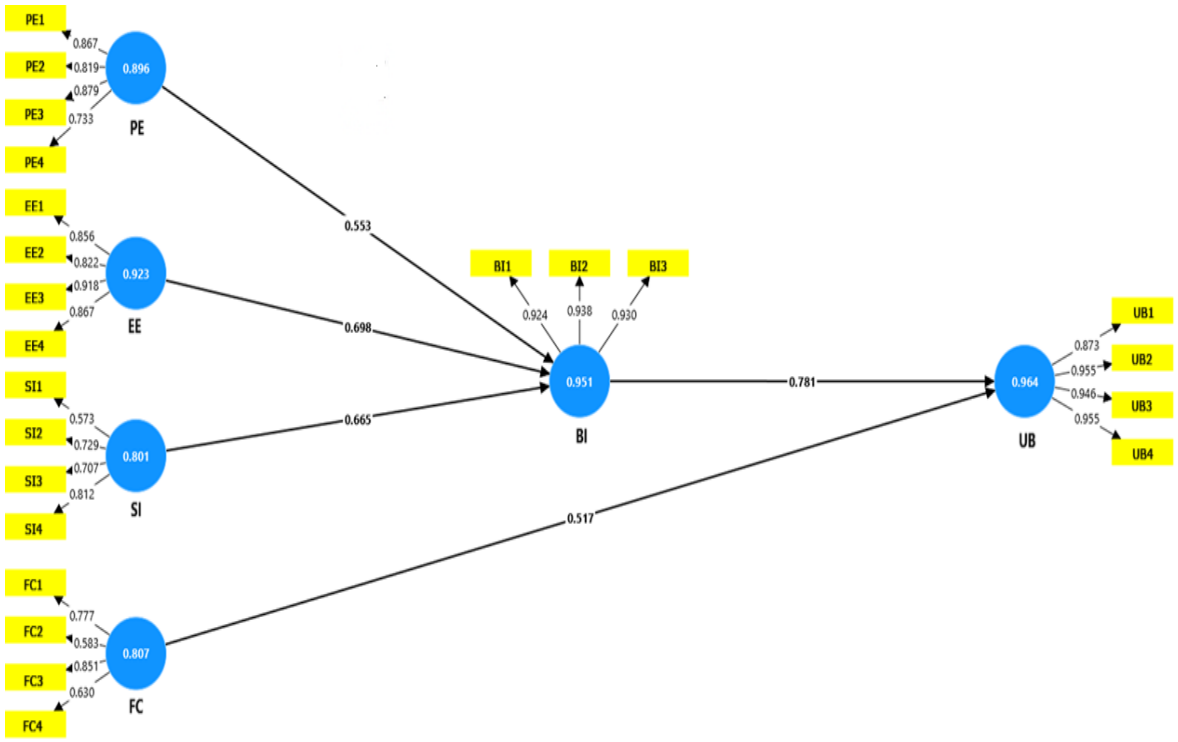
	FC	UB	EE	BI	SI	PE
FC	**0.718**					
UB	0.517	**0.933**				
EE	0.540	0.611	**0.866**			
BI	0.515	0.781	0.698	**0.931**		
SI	0.396	0.631	0.587	0.665	**0.710**	
PE	0.572	0.569	0.636	0.553	0.538	**0.827**

TABLE 6: RESULTS OF DISCRIMINANT VALIDITY (HTMT RATIO)

	FC	UB	EE	BI	SI	PE
FC						
UB	0.558					
EE	0.644	0.661				
BI	0.560	0.831	0.762			
SI	0.504	0.680	0.636	0.730		
PE	0.634	0.635	0.723	0.609	0.624	

Discriminant validity was validated using two criteria: firstly, the Fornell-Larcker criterion, which shows that the diagonal values (in bold) are higher than the corresponding correlations in the adjacent columns and rows (see Table 5); secondly, the HTMT ratio, which is below 0.85 (see Table 6), thus confirming discriminant validity.

FIGURE 4: MEASUREMENT MODEL



EVALUATION OF THE STRUCTURAL MODEL:

The evaluation of the structural model begins with checking for collinearity issues using the VIF indicator. Then, the significance and relevance of the relationships are assessed by examining the path coefficients, p-values, and t-values obtained through a bootstrap simulation. Following this, the model's explanatory power is evaluated using the R^2 indicator. Finally, the model's predictive power is assessed through the Q^2 indicator.

TABLE 7: COLLINEARITY OF CONSTRUCTS (VIF INDICATOR)

Structural relationships	VIF
Performance expectancy **(PE) ->** Behavioral intention (**BI**)	1.806
Effort expectancy (**EE) ->** Behavioral intention **(BI)**	1.958
Social influence **(SI) ->** Behavioral intention **(BI)**	1.640
Facilitating conditions (**FC) ->** Use behavior **(UB)**	1.361
Behavioral intention (**BI) ->** Use behavior (**UB**)	1.361

Table 7 presents VIF values below 3, indicating the absence of collinearity issues.

TABLE 8: SIGNIFICANCE AND RELEVANCE OF RELATIONSHIPS BETWEEN LATENT CONSTRUCTS

Hypotheses	Original sample (β)	t-value	p-values	Significance
H1 :PE -> BI	0.081	0.814	0.416	Not supported
H2 : EE -> BI	0.429	3.223	0.001	Supported
H3 : SI -> BI	0.370	3.321	0.001	Supported
H4 : FC -> UB	0.157	1.655	0.098	Not supported
H5 : BI -> UB	0.700	6.339	0.000	Supported

Table 8 shows that all hypotheses are validated, except for hypotheses H1 and H4, which present a P-value greater than 0.05 and a t-value less than 1.96, indicating the absence of statistical significance.

TABLE 9: EVALUATION OF THE EXPLANATORY POWER OF THE STRUCTURAL MODEL (COEFFICIENT OF DETERMINATION R²)

Endogenous constructs	R-square	R-square adjusted
UB	0.627	0.618
BI	0.590	0.574

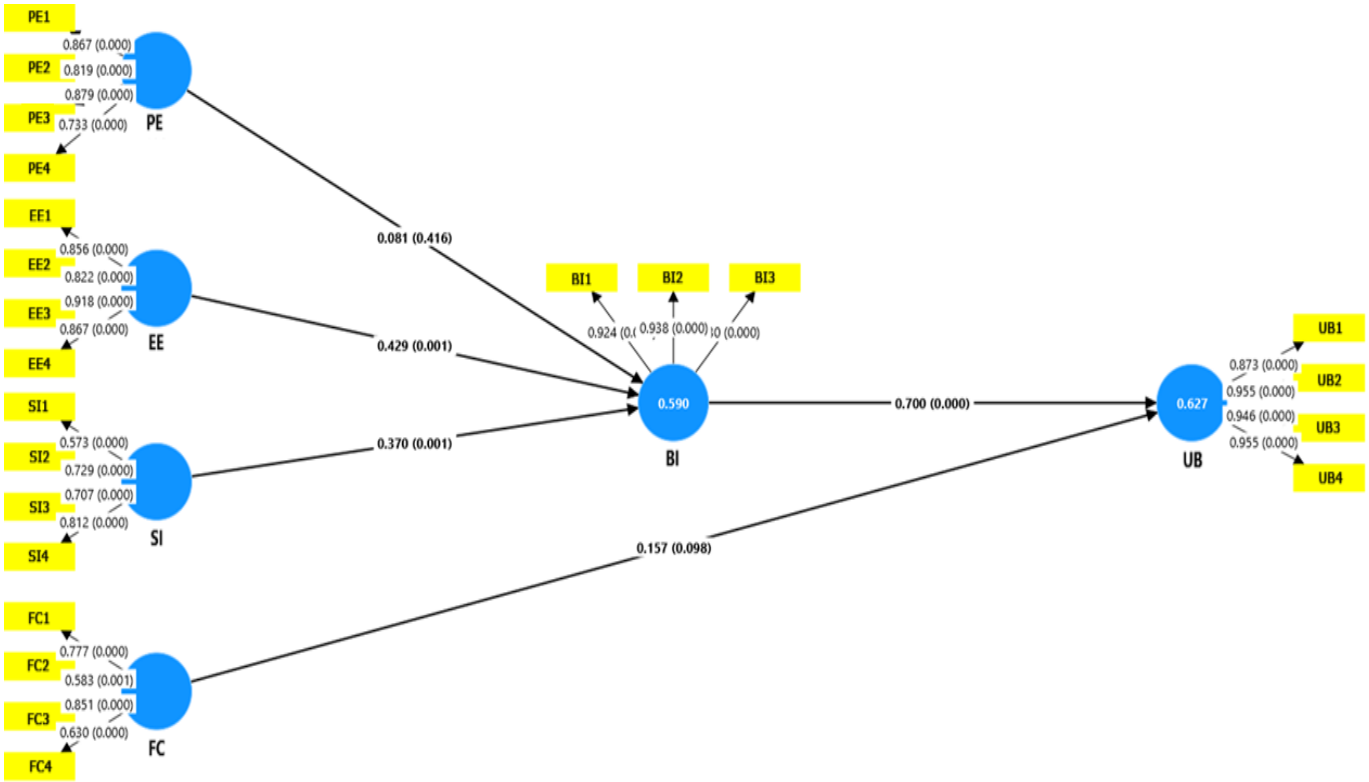
Table 9 presents the results for both constructs, with R^2 values (UB=0.627; BI= 0.590) within a moderate range, and these results are considered acceptable.

TABLE 10: EVALUATION OF THE PREDICTIVE POWER OF THE STRUCTURAL MODEL (CROSS-VALIDATED REDUNDANCY Q²)

Reflective endogenous construct	Q²predict
UB	0.453
BI	0.540

The Q^2 value is obtained using the Blindfolding procedure, which has been replaced in SmartPLS 4 by the PLSpredict procedure. The results illustrated in Table 10 (UB = 0.453; BI = 0.540) reveal a high predictive relevance of the model.

FIGURE 5 : STRUCTURAL MODEL



DISCUSSION

The main objective of our study was to determine the factors influencing the adoption of the "ENOVA Santé" HIS by head nurses in hospitals in the Souss Massa region, using the UTAUT Model.

The results obtained show that performance expectancy does not have a significant influence on intention. This suggests that, for head nurses, the perceived benefits of using ENOVA Santé are not a determining motivating factor. In other words, awareness of the functional advantages of the system seems to play a minor role in their decision to adopt it [22]. These findings are consistent with those of the study conducted by Oumlil and al. (2014), which revealed that users do not attach great importance to the utilitarian aspect of IT [23].

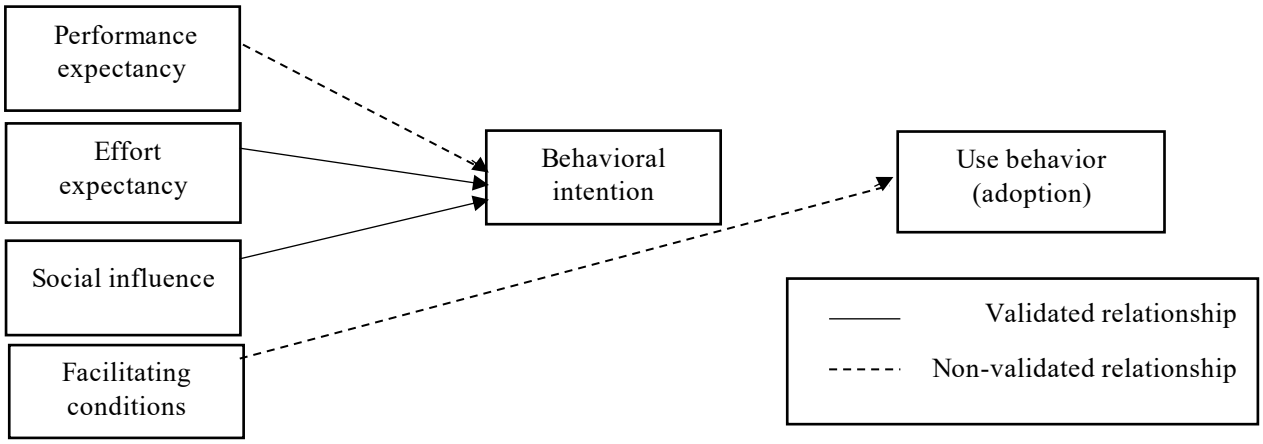
On the other hand, Effort expectancy shows a significant relationship with behavioral intention, indicating that head nurses perceive ENOVA Santé as easy to use and requiring no additional effort. In the healthcare sector, several studies based on the UTAUT model have confirmed this relationship [12], demonstrating that the perception of ease of use plays a decisive role in the adoption of IT [24]. Furthermore, a study conducted in Ethiopia highlights the importance of the effort expectancy in the intention to use systems, particularly in low-resource contexts. It emphasizes the need for decision-makers and healthcare professionals to prioritize the design of ergonomic and intuitive IS in order to simplify their use [25]. These systems must be easy to learn and use, flexible, and allow for clear data management by healthcare staff [26]. Accordingly, training specifically designed for head nurses could help reduce the cognitive load associated with system usage. Moreover, the results indicate that more than half of users (56.6%) are young professionals already familiar with digital technologies. Most also have two years of experience using the HIS, lowering their perceived effort (see Table 3).

Social influence refers to the extent to which an individual believes that important people around them (colleagues, supervisors, peers, etc.) expect them to use the HIS [17]. The results in Table 8 confirm the positive effect of social influence on intention. Other studies have also shown that the stronger the perceived social influence, the greater the behavioral intention to use IS [27]. In addition, some results indicate that users perceive system adoption as enhancing their professional status compared to their non-user colleagues. This dynamic could be reinforced by institutional support, as hospitals have likely encouraged system use as part of a broader effort to improve the quality of care [28]. According to Venkatesh and al. (2003), social influence plays a key role in a context of mandatory use [17]. In our study, data from table 3 indicate that 76.54% of respondents consider HIS use to be integral to their duties. However, no regulatory text clearly states that the use of the HIS is part of their responsibilities, suggesting voluntary adoption that is nonetheless perceived as mandatory by head nurses. This contradiction could indicate either a lack of clarity in the definition of their duties or an adoption driven by habit or the influence of organizational culture.

With regard to facilitating conditions, these are directly related to adoption and indicate the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system [17]. However, these conditions did not show a positive impact on adoption, as illustrated in the results in Table 8. This suggests that infrastructural support, particularly the availability of an IT system, is not perceived as a key factor. Instead, IT appear instead to be complementary resources in the adoption process [27]. This observation contrasts with previous findings indicating that the more favorable the conditions for using technologies, the greater the likelihood of it adoption and effectiveness [28]. These findings highlight the importance of technical reliability and quality, as well as the ability of technical support services to respond quickly in the event of malfunctions.

Finally, users' intentions demonstrate a strong commitment to adopting the system, as presented in the results (see Table 8). These data are consistent with the work of Ifinedo (2012), who highlights that a high behavioral intention toward IS among healthcare professionals is generally correlated with greater effective adoption of these systems [22]. Similarly, Saxena and al. (2022) indicate that people with a strong intention are more likely to adopt information technologies [29]. Consequently, behavioral intention appears to be a major determinant of adoption [27, 30].
In the light of the results discussed, we present the final theoretical model reflecting the various relationships identified.

FIGURE 6: PRESENTATION OF THE FINAL RESEARCH MODEL



CONCLUSION

The integration of IT is essential for enhancing the quality and efficiency of healthcare services. However, the human factor, particularly head nurses, plays a key role in the adoption of these technologies. The main challenge lies not in the mere acquisition of digital tools, but rather in their governance and the professionals' willingness to adopt them.

This study explored the factors influencing the adoption of the HIS by head nurses in the Souss Massa region of Morocco, using the UTAUT model. To our knowledge, this is the first study conducted in Morocco specifically on the adoption of HIS by head nurses, thus constituting a significant contribution to the scientific literature.

The results indicate that head nurses show a strong intention to use the system, resulting in a high adoption rate of the HIS, with social influence and effort expectancy as determining factors, while performance expectancy and facilitating conditions were not confirmed, due to the specific context. These findings highlight the importance of a comprehensive and contextual approach that integrates several factors for the successful adoption of HIS.

MANAGERIAL IMPLICATIONS:

Based on these findings, practical recommendations were proposed for managers and decision-makers responsible for HIS implementation in the Souss Massa region, structured around four main axes.

Individual factors mainly concern the perceived benefits of HIS use and the personal commitment of users to adopting this technology. To encourage broader adoption, it is important to implement communication strategies highlighting the advantages of the HIS. It is also essential to recognize and motivate healthcare professionals by valuing their contribution and actively involving them in all stages of the process, from implementation to system adjustment, to ensure sustainable engagement. The social factor: related to the social influence of peers and opinion leaders within hospitals, plays an important role in HIS adoption. The active involvement of key figures can create a climate of trust and support for system implementation, especially given the voluntary nature of adoption. The organizational factor is based on the facilitating conditions essential to successful HIS adoption. These include adequate technical support, access to resources, continuous user support, as well as targeted and regular training. Finally, the technological factor highlights the importance of making the HIS accessible and easy to use. This means simplifying the interface and navigation. Prompt resolution of user issues is critical to enhancing system usability. Furthermore, data security and confidentiality must be a priority, to ensure user confidence and compliance with current standards.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This study presents several limitations. Firstly, the sample studied may limit the generalizability of the results. A future study could include a larger and more diverse sample to enhance external validity, particularly by including different user categories and geographical contexts. Moreover, while the UTAUT has demonstrated its relevance, it exhibits a certain rigidity in its conceptual framework, and does not allow exploration of all determinants of technology adoption. Another limitation is the absence of moderating variables such as age, professional experience, and gender, which are all

recognized in the UTAUT model, since their inclusion would have shed light on the influence of these characteristics on technology adoption.

Despite these limitations, several avenues of research deserve to be explored in order to deepen this study. The use of other methodological approaches (qualitative, mixed, longitudinal...) would also be relevant to explore the factors influencing users' resistance to IS adoption, in order to develop strategies to overcome them. Future research could also consider the extension of the UTAUT model or combining it with other theoretical frameworks to offer a more comprehensive analysis and enrich understanding of the factors influencing HIS adoption.

In light of the above conclusions, it is essential to explore new dimensions that may foster HIS adoption. Future research should focus on all the multidimensional factors (human, organizational, technological, cultural, etc.) influencing this adoption, particularly within the Moroccan healthcare context.

ACKNOWLEDGEMENT

We would like to thank all our colleagues who participated in this study. We also declare that we used the generative artificial intelligence model ChatGPT as a writing assistance tool to enhance the clarity and readability of the manuscript.

CONFLICT OF INTEREST

The authors declare that no financial or personal conflicts of interest that could have influenced the work reported in this manuscript.

ETHICAL CONSIDERATIONS:

The study was approved by the administration of ISPITS Agadir, under approval number (2276/ISPITSA/Agadir). This authorization was communicated to the relevant departments. Informed consent was obtained from all participants, and their anonymity and data confidentiality were strictly respected.

AUTHOR CONTRIBUTIONS

AA: study design, literature review, assessment of literature quality, statistical analysis, writing, and revision of the manuscript.
EM and AO: methodological support, manuscript revision, and scientific quality assessment.

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