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# An Examination of Factors Influencing Physicians' Acceptance and Use of the e-Nabız System

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## Abstract

**Aim:** This study aims to identify the factors influencing physicians' acceptance and use of the e-Nabız system by comparing two models.

**Methods:** Conducted with 388 physicians from university hospitals across Turkey, the study utilized an online survey based on the Unified Theory of Acceptance and Use of Technology (UTAUT) scale. Descriptive analyses, frequency and percentage distributions, reliability analysis, confirmatory factor analysis, and structural equation modelling were applied to the collected data.

**Results:** In Model 1, the behavioral intention was influenced by performance expectancy and social influence, while usage behavior was shaped by social influence, facilitating conditions, and behavioral intention. Model 1 accounted for 75% of the variance in behavioral intention and 69% in usage behavior. In contrast, Model 2 identified performance expectancy, anxiety, habit, personal

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technology innovativeness, and workflow as significant predictors of behavioral intention. Usage behavior in Model 2 was influenced by habit, facilitating conditions, anxiety, personal technology innovativeness, workflow, and behavioral intention, explaining 84% of the variance in behavioral intention and 85% in usage behavior.

**Conclusion:** The findings indicate that Model 2 provides a more comprehensive explanation of the factors affecting the acceptance and use of the system. To enhance acceptance and usage, the study suggests focusing on anxiety management, emphasizing performance benefits, aligning the system with workflow, educating users about new technologies, and implementing incentives to foster habitual use. Future research should explore other technology acceptance models in various healthcare information systems to deepen understanding.

**Keywords:** IT Acceptance and Use, UTAUT, Structural Equation Modelling, physicians, e-Nabız

## INTRODUCTION

The importance of healthcare services in maintaining a healthy and quality life is undeniable. A comprehensive examination of an individual in healthcare service delivery requires not only assessing the current state but also considering past health data. Numerous stakeholders (healthcare professionals, service providers, suppliers, reimbursement agencies, judicial bodies, pharmacies, health authorities, health care planners, and health administrators) involved in healthcare delivery require access to health records (Dönmez and Uğurluoğlu, 2017; Dupont, et al., 2017).

The rapid advancement of technology has precipitated digital transformation in the healthcare sector, resulting in the extensive implementation of information and communication technologies, including artificial intelligence, machine learning, the Internet of Things, robotic systems, blockchain, wearable technologies, cloud computing, 3D printers, mobile health applications, and augmented and virtual reality (Atilla and Seyhan, 2022). Digital health services contribute to enhanced accessibility in healthcare, equitable service provision, improved health literacy, increased diagnostic and treatment capabilities, time and resource optimization, cost reduction, job satisfaction, productivity and efficiency, expanded service capacity, and the development of evidence-based health policies (Kayserili and Tefiroglu, 2023).

In the context of the Health Transformation Project, the Ministry of Health implemented a decision to establish health information systems to facilitate effective access to information in the decision-making process. Various systems have been implemented, including Sağlık-Net, Hospital Information Management System, Family Medicine Information System, MHRS (Centralized

Appointment System), Drug Tracking System, tele-radiology, tele-pathology, e-Nabız, e-Prescription, Family Medicine Information System, and Core Resource Management System (Avaner and Fedai, 2017; Orhan et al., 2021). The e-Nabız application was introduced in 2015 as a personal health record system. The users of the e-Nabız system comprise citizens, physicians, healthcare institutions, and health system administrators. Physicians serve not only as primary users of this system but also play a pivotal role in its successful implementation.

To facilitate individual health management, health records collected from healthcare institutions nationwide through the Sağlık-Net infrastructure and individual health data tracked by the person are integrated into e-Nabız. This system enables individuals to manage their personal health data and provides the option to share it with selected parties. Sharing health records with the physician can enable comprehensive evaluation during diagnosis and treatment, prevent time loss, avoid redundant tests, and reduce healthcare expenditures. The reduction of healthcare workers' and institutions' workload, the lowering of costs, and the enhancement of service quality, quantity, and efficiency become feasible (Aggelidis and Chatzoglou, 2009). The efficient and effective utilization of resources in the national economy facilitates the reduction of healthcare expenditures, thereby enabling the allocation of resources to new investments in healthcare. This contributes to increasing the capacity of healthcare services and fostering a healthier society. Furthermore, the system enables individuals to evaluate the healthcare services they receive, express their satisfaction, and contribute to the improvement of service quality based on this feedback.

Health information systems not only support the provision of healthcare services but also facilitate the collection, sharing, analysis, and utilization of information for administrative purposes and decision-making processes. In this context, e-Nabız contributes significantly to the digitalization of the healthcare system. Evaluating user acceptance is as important as developing and improving a new technology (AlQudah et al., 2021). It is noted that certain developed technologies are rejected by users, with the rate of information technology rejection in the healthcare sector being approximately 40%. Investigating the factors influencing user acceptance is essential for reducing investment costs, enhancing the quality of patient care, and increasing technology acceptance and usage (Liu et al., 2015).

Models such as the Technology Acceptance Model (TAM) and the Integrated Theory of Acceptance and Use of Technology (ITAUT) have effectively understood the adoption of technologies used in health care. The idea that TAM is not sufficient to explain the factors affecting the behavioural intention of individuals to adopt new technologies in the field of health (Penney et al., 2021; Yen et al., 2017), new models have been tried to be developed. UTAUT was created by combining eight different models. With the development and change of technological applications over time, it was necessary to investigate different variables that determine users' acceptance and use of new technologies. UTAUT was renewed in 2012 by adding hedonic motivation, habit, and price value variables, and it was named UTAUT-2. This model determined technology acceptance and usage as an eight-factor structure with the dimensions of 'performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, habituation and behavioural intention' (Venkatesh et al., 2012).

Research on technology acceptance in healthcare using TAM, UTAUT 1, and UTAUT 2 has included studies on hospital staff's acceptance of hospital information systems (Aggelidis and Chatzoglou, 2009), nurses' acceptance of electronic health records (Alsyouf et al., 2022), physicians' use of personal digital assistants (Başak et al., 2015), physicians' acceptance of; telemedical consultations (Diel et al., 2023), electronic medical records and decision support systems (Heselmans et al., 2012), e-health applications (Hoque et al., 2016), electronic health records (Hossain et al., 2019; Steininger et al., 2014), telemedicine services (Kissi et al., 2020), and mobile health applications (Wu et al., 2022); and healthcare workers' acceptance of e-prescription (Sema et al., 2024).

These studies have been carried out in order to identify factors affecting technology acceptance in healthcare such as top management support (Alsyouf et al., 2022), anxiety, education, and self-efficacy (Aggelidis and Chatzoglou, 2009), compatibility and information technology anxiety (Diel et al., 2023), personal innovativeness (Hoque et al., 2016; Hossain et al., 2019), resistance to change (Hossain et al., 2019), sacrifice, cognitive trust, and physicians' evaluation (Wu et al., 2022).

Grood et al. (2016) stated that the barriers to physicians' acceptance of e-health technology include threatened autonomy, privacy and security concerns, decreased patient-doctor interaction and increased workload. In the literature review, no study was found in which the effect of technology on workflow and workload on physicians' acceptance of technology and factors such as anxiety, personal technological innovation and workflow were examined together.

In this context, the aim of this study is to examine physicians' acceptance and usage levels of the e-Nabız system, along with the factors influencing these levels, through a comparative analysis of two versions of the Unified Theory of Acceptance and Use of Technology (UTAUT). By identifying the factors affecting physicians' acceptance of the e-Nabız system, this study provides essential information for e-Nabız stakeholders and contributes to the literature by explaining the influence of variables such as anxiety, personal technological innovativeness, and workflow on physicians' technology acceptance. This innovative study, which focuses on investigating the workflow in physicians' acceptance and use of technology, is a unique contribution to the literature.

## 1. RESEARCH METHODOLOGY

### 1.1. Ethical Considerations

Prior to the research, ethical approval was obtained from the Ethics Committee for Social and Human Sciences Research, with the decision dated 15/11/2019 and numbered 47083. Subsequently, a request for research permission was sent to all university hospitals for the implementation of the study, and permission was obtained from approximately 95% of them, allowing the research to proceed. Before administering the survey, participants were informed in writing about the purpose of the research and the voluntary nature of their participation, including their right to withdraw from the survey at any time.

### 1.2. Study Design

The research problem is to explain the level of acceptance and use of the e-Nabız system by physicians, as well as the factors influencing this level. To address this problem, a survey was conducted between January and July 2020 using a descriptive research model.

### 1.3. Participants

The study population comprises physicians employed in university hospitals, which are tertiary healthcare institutions. In addition to providing advanced diagnostic and treatment services, university hospitals engage in educational and research activities. To optimize patient outcomes and ensure efficient, safe, and high-quality care in tertiary healthcare institutions, comprehensive health records are imperative. In this context, the adoption and utilization of the e-Nabız system, a health record system, by physicians in university hospitals may yield significant benefits in service delivery. Approximately 32,000 physicians are employed in university hospitals (Health

Statistics Yearbook, 2019). To statistically represent this population with a 95% confidence interval, a sample size of 381 physicians is required (Taherdoost, 2017). A web-based survey was distributed to physicians via electronic mail addresses obtained through the electronic document management system and the institutional websites of their affiliated organizations, yielding 388 valid responses.

### 1.4. Data Collection

In this study, data were collected using an online survey method. The survey included items pertaining to demographic characteristics and functional variables based on the Unified Theory of Acceptance and Use of Technology (UTAUT) scale. The survey was converted into an online format utilizing Google Forms. The survey link was disseminated from the researcher's institutional email account to the email addresses of physicians accessible through institutional websites. In order to ensure data security in the study, each participant was limited to answering the questionnaire only once. Thus, a participant was prevented from answering the questionnaire more than once.

### 1.5. Instruments

A five-point Likert scale based on the Unified Theory of Acceptance and Use of Technology (UTAUT) was employed in this study. Both the first and second versions of the UTAUT model were utilized. The first version of UTAUT (Venkatesh et al., 2003) comprises 20 items across five dimensions, while the second version (Venkatesh et al., 2012) includes 47 items across eight dimensions. The first UTAUT model consists of performance expectancy, effort expectancy, social influence, facilitating conditions, behavioural intention, and use behaviour dimensions.

In the second version, the dimensions of hedonic motivation and price value were replaced with factors hypothesized to influence physicians' acceptance and use of the e-Nabız system: anxiety (Abdekhoda et al., 2015; Çalışkan, 2017; Zhou 2012), personal technological innovativeness (Zhou, 2012), and workflow (Grood et al., 2016). The constructed second model examines the effects of performance expectancy, effort expectancy, social influence, facilitating conditions, habit, anxiety, personal technological innovativeness, and workflow on acceptance intention and usage behaviour. Illustrations of both models are provided in Figures 1 and 2.

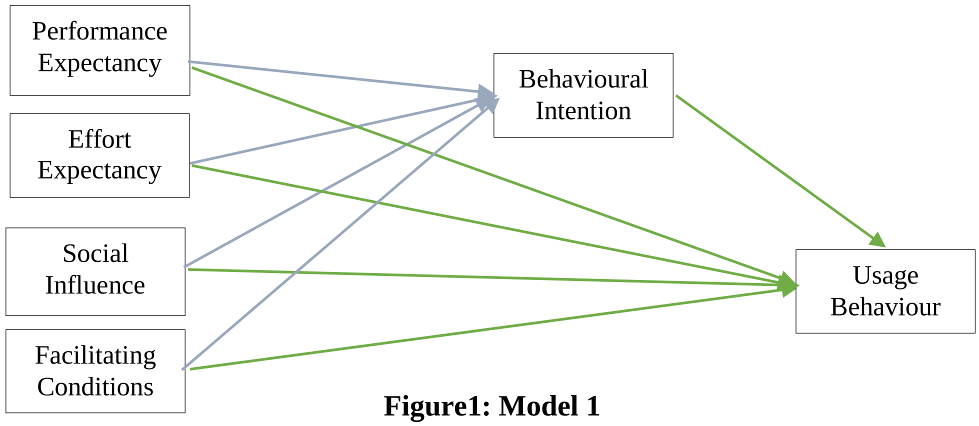


**Figure1: Model 1**

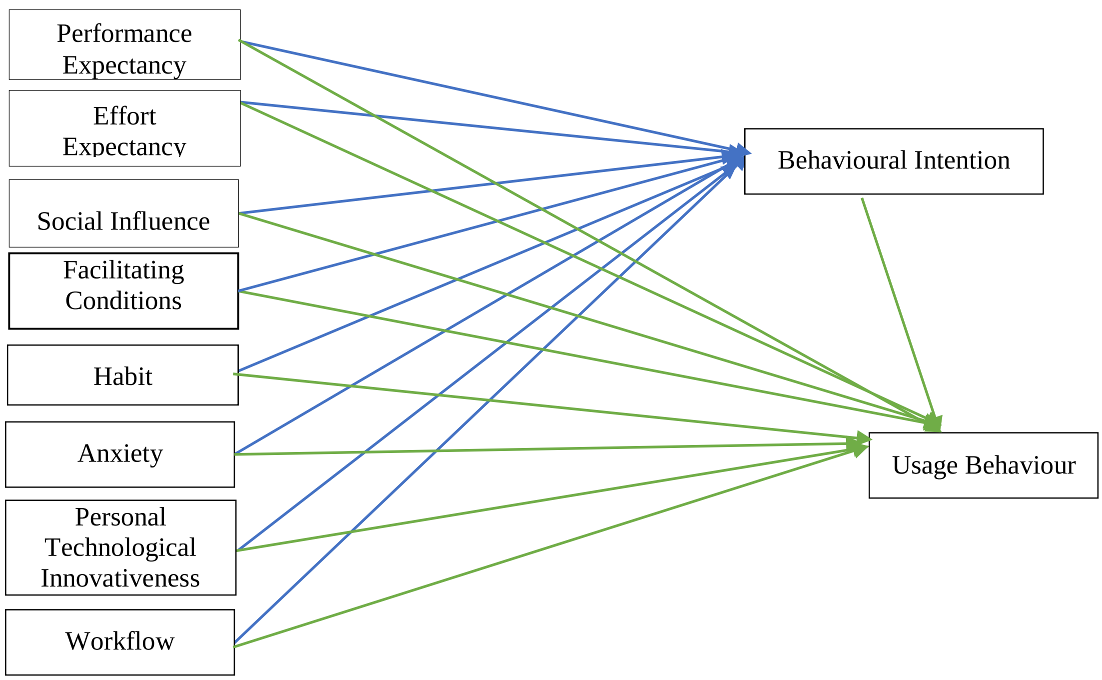


**Figure 2: Model 2**

## 2. ANALYSIS

In the study, demographic data were analysed using frequencies and percentages. For the analysis of functional variables, descriptive statistics, including minimum and maximum values, mean, and standard deviation, were obtained using SPSS software. Confirmatory factor analysis (CFA) and structural equation modelling (SEM) was conducted with the AMOS software. The goodness-of-fit criteria for the model were examined to evaluate the suitability and reliability of the model.

Cronbach's Alpha analysis was performed to assess the reliability of the scale. Statistical significance was determined at $p<0.05$.

### 2.1. Results of Analysis

The demographic data of the participants are presented in Table 1. According to the table, 66% of the participants are male, the majority fall within the 31-50 age range, and most have 11-20 years of work experience. The study was conducted nationwide in Türkiye, with the highest participation rate from the Marmara region at 30%.

**Table 1: Frequency Distribution of Participants' Demographic Variables**

| Variable | Category | Frequency (n:388) | % |
|---|---|---|---|
| Gender | Female | 132 | 34 |
| | Male | 256 | 66 |
| Age (average:42,2) | 30 and below | 75 | 19 |
| | 31-40 | 104 | 27 |
| | 41-50 | 109 | 28 |
| | 51-60 | 85 | 22 |
| | 61 and above | 15 | 4 |
| Duration of Practice (average:17,7) | 1-5 years | 78 | 20 |
| | 6-10 years | 33 | 8 |
| | 11-20 years | 123 | 32 |
| | 21-30 years | 105 | 27 |
| | 31 years and above | 49 | 13 |
| Region of Practice | Marmara | 115 | 30 |
| | Central Anatolia | 86 | 22 |
| | Black Sea | 81 | 21 |
| | Aegean | 40 | 10 |
| | Mediterranean | 38 | 9 |
| | Eastern Anatolia | 14 | 4 |
| | Southeastern Anatolia | 14 | 4 |

The normality of the data was assessed using mean, mode, median, kurtosis, and skewness values. The similarity or proximity of the mean, mode, and median values indicates normal distribution (Howitt and Cramer, 2011; Lind et al., 2006; McKillup, 2012; Tabachnick and Fidell, 2013). These values are presented in Table 2. As shown in Table 2, skewness and kurtosis values fall within the range of -1.5 to +1.5, confirming the normal distribution of the data (Tabachnick and Fidell, 2013).

**Table 2: Arithmetic Mean, Mode, Median, Skewness, and Kurtosis Values for Sub-dimensions of the Scale**

| Sub-dimension | Arithmetic Mean | Mode | Median | Standard Deviation | Skewness | Skewness Std. Error | Kurtosis | Kurtosis Std. Error |
|---|---|---|---|---|---|---|---|---|
| Performance Expectancy | 4.12 | 5.00 | 4.20 | 0.82 | -1.17 | 0.12 | 1.43 | 0.25 |
| Effort Expectancy | 3.87 | 5.00 | 4.00 | 0.95 | -0.87 | 0.12 | 0.54 | 0.25 |
| Social Influence | 3.39 | 3.33 | 3.33 | 1.01 | -0.34 | 0.12 | -0.43 | 0.25 |
| Facilitating Conditions | 4.02 | 5.00 | 4.00 | 0.89 | -1.07 | 0.12 | 1.10 | 0.25 |
| Habit | 3.38 | 5.00 | 3.50 | 1.13 | -0.22 | 0.12 | -1.01 | 0.25 |
| Anxiety | 3.59 | 4.00 | 3.50 | 0.87 | -0.43 | 0.12 | 0.12 | 0.25 |
| Personal Technological Innovativeness | 3.71 | 5.00 | 4.00 | 1.01 | -0.59 | 0.12 | -0.30 | 0.25 |
| Workflow Impact | 2.97 | 2.67 | 3.00 | 0.69 | -0.03 | 0.12 | 0.60 | 0.25 |
| Behavioural Intention | 3.92 | 5.00 | 4.00 | 0.99 | -0.76 | 0.12 | 0.11 | 0.25 |
| Usage Behaviour | 2.78 | 3.00 | 2.80 | 0.51 | 0.28 | 0.12 | 1.89 | 0.25 |

The confirmatory factor analysis (CFA) results for Versions 1 and 2 of the Unified Theory of Acceptance and Use of Technology (UTAUT) model, performed using the AMOS software, are illustrated in Figures 3 and 4. To achieve the desired level of model fit, items with factor loadings below 0.50 were removed, and the analysis was repeated. Specifically, for Model 1, the items removed were "ease of use (item 4)" and "performance expectancy (item 5)." Subsequent modifications were implemented to ensure optimal model fit, yielding the following fit indices for the scale model: CMIN=690.150, Df=277, CMIN/Df=2.492, RMSEA=0.062, CFI=0.948, TLI=0.939. The path coefficients, along with both the standardized and unstandardized results, are detailed in Table 3. The final model structure adheres to the model fit criteria, demonstrating that the factor loadings are statistically significant. These findings validate the robustness and reliability of the model, affirming that it meets the necessary fit criteria and effectively explains the acceptance and use of technology.

**Table 3: Standardized Path Coefficients for Model 1**

| | | | Standardized Coefficient | Unstandardized Coefficient | S.E. | C.R. | p | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| PE6 | <--- | PE | 0.765 | 1.000 | | | | 0.584 |
| PE4 | <--- | PE | 0.680 | 0.709 | 0.053 | 13.442 | **<0.01** | 0.462 |
| PE3 | <--- | PE | 0.617 | 0.819 | 0.067 | 12.194 | **<0.01** | 0.380 |
| PE2 | <--- | PE | 0.847 | 1.322 | 0.077 | 17.249 | **<0.01** | 0.718 |
| PE1 | <--- | PE | 0.899 | 1.222 | 0.075 | 16.373 | **<0.01** | 0.809 |
| EE4 | <--- | EE | 0.847 | 1.000 | | | | 0.717 |
| EE3 | <--- | EE | 0.830 | 1.032 | 0.052 | 19.912 | **<0.01** | 0.689 |
| EE2 | <--- | EE | 0.848 | 1.060 | 0.051 | 20.653 | **<0.01** | 0.719 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| EE1 | <--- | EE | 0.886 | 1.110 | 0.050 | 22.177 | **<0.01** | 0.785 |
| SI6 | <--- | SI | 0.567 | 1.000 | | | | 0.321 |
| SI5 | <--- | SI | 0.883 | 1.666 | 0.137 | 12.127 | **<0.01** | 0.780 |
| SI4 | <--- | SI | 0.914 | 1.692 | 0.137 | 12.312 | **<0.01** | 0.835 |
| SI3 | <--- | SI | 0.794 | 1.553 | 0.136 | 11.458 | **<0.01** | 0.631 |
| SI2 | <--- | SI | 0.669 | 1.236 | 0.120 | 10.287 | **<0.01** | 0.447 |
| SI1 | <--- | SI | 0.702 | 1.262 | 0.119 | 10.632 | **<0.01** | 0.493 |
| FC3 | <--- | FC | 0.626 | 1.000 | | | | 0.391 |
| FC2 | <--- | FC | 0.926 | 1.446 | 0.103 | 14.048 | **<0.01** | 0.857 |
| FC1 | <--- | FC | 0.875 | 1.279 | 0.093 | 13.680 | **<0.01** | 0.765 |
| BI3 | <--- | BI | 0.962 | 1.000 | | | | 0.925 |
| BI2 | <--- | BI | 0.915 | 0.980 | 0.028 | 35.035 | **<0.01** | 0.837 |
| BI1 | <--- | BI | 0.880 | 0.826 | 0.027 | 30.619 | **<0.01** | 0.774 |
| UB5 | <--- | UB | 0.709 | 1.000 | | | | 0.502 |
| UB4 | <--- | UB | 0.841 | 1.296 | 0.087 | 14.927 | **<0.01** | 0.707 |
| UB3 | <--- | UB | 0.680 | 0.793 | 0.064 | 12.341 | **<0.01** | 0.462 |
| UB2 | <--- | UB | -0.647 | -0.927 | 0.079 | -11.777 | **<0.01** | 0.418 |
| UB1 | <--- | UB | -0.577 | -0.643 | 0.070 | -9.192 | **<0.01** | 0.333 |

PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, FC: Facilitating Conditions, BI: Behavioural Intention, UB: Usage Behaviour, S.E.: Standard Error,

Specifically, for Model 1, the items removed were "ease of use (item 4)", "performance expectancy (item 5)", “anxiety (item 5,6,7)” and “workflow (item 3)”. Subsequent modifications were implemented to ensure optimal model fit, yielding the following fit indices for the scale model: CMIN=1853.369, Df= 727, CMIN/Df= 2.549, RMSEA=0.063, CFI=0.914, TLI=0.903. The path coefficients, along with both the standardized and unstandardized results, are detailed in Table 4. The final model structure adheres to the model fit criteria, demonstrating that the factor loadings are statistically significant. These findings validate the robustness and reliability of the model, affirming that it meets the necessary fit criteria and effectively explains the acceptance and use of technology.

**Table 4: Standardized Path Coefficients for Model 2**

| | | | Standardized Coefficient | Unstandardized Coefficient | S.E. | C.R. | p | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| PE6 | <--- | PE | 0.764 | 1.000 | | | | 0.584 |
| PE4 | <--- | PE | 0.659 | 0.689 | 0.053 | 13.059 | **<0.01** | 0.434 |
| PE3 | <--- | PE | 0.611 | 0.812 | 0.067 | 12.050 | **<0.01** | 0.374 |
| PE2 | <--- | PE | 0.843 | 1.315 | 0.077 | 17.065 | **<0.01** | 0.710 |
| PE1 | <--- | PE | 0.907 | 1.233 | 0.076 | 16.280 | **<0.01** | 0.822 |
| EE4 | <--- | EE | 0.783 | 1.000 | | | | 0.614 |
| EE3 | <--- | EE | 0.929 | 1.250 | 0.059 | 21.275 | **<0.01** | 0.864 |
| EE2 | <--- | EE | 0.942 | 1.273 | 0.059 | 21.609 | **<0.01** | 0.887 |
| EE1 | <--- | EE | 0.803 | 1.088 | 0.051 | 21.348 | **<0.01** | 0.645 |
| SI6 | <--- | SI | 0.569 | 1.000 | | | | 0.324 |
| SI5 | <--- | SI | 0.884 | 1.660 | 0.136 | 12.213 | **<0.01** | 0.782 |
| SI4 | <--- | SI | 0.909 | 1.674 | 0.135 | 12.369 | **<0.01** | 0.827 |
| SI3 | <--- | SI | 0.797 | 1.549 | 0.134 | 11.541 | **<0.01** | 0.635 |
| SI2 | <--- | SI | 0.671 | 1.235 | 0.119 | 10.359 | **<0.01** | 0.451 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SI1 | <--- | SI | 0.706 | 1.262 | 0.118 | 10.718 | <**0.01** | 0.498 |
| FC3 | <--- | FC | 0.629 | 1.000 | | | | 0.396 |
| FC2 | <--- | FC | 0.920 | 1.428 | 0.101 | 14.072 | <**0.01** | 0.846 |
| FC1 | <--- | FC | 0.879 | 1.277 | 0.093 | 13.784 | <**0.01** | 0.773 |
| H4 | <--- | H | 0.901 | 1.000 | | | | 0.811 |
| H3 | <--- | H | 0.702 | 0.650 | 0.038 | 16.935 | <**0.01** | 0.493 |
| H2 | <--- | H | 0.880 | 1.012 | 0.039 | 25.694 | <**0.01** | 0.775 |
| H1 | <--- | H | 0.909 | 1.052 | 0.038 | 27.853 | <**0.01** | 0.826 |
| A1 | <--- | A | 0.783 | 1.000 | | | | 0.612 |
| A2 | <--- | A | 0.810 | 1.014 | 0.062 | 16.344 | <**0.01** | 0.657 |
| A3 | <--- | A | 0.810 | 1.023 | 0.063 | 16.342 | <**0.01** | 0.656 |
| A4 | <--- | A | 0.620 | 0.903 | 0.075 | 12.114 | <**0.01** | 0.385 |
| PTI1 | <--- | PTI | 0.782 | 1.000 | | | | 0.611 |
| PTI2 | <--- | PTI | 0.902 | 1.437 | 0.071 | 20.107 | <**0.01** | 0.813 |
| PTI3 | <--- | PTI | 0.918 | 1.386 | 0.067 | 20.541 | <**0.01** | 0.842 |
| PTI4 | <--- | PTI | 0.869 | 1.428 | 0.075 | 19.168 | <**0.01** | 0.755 |
| W1 | <--- | W | 0.866 | 1.000 | | | | 0.751 |
| W2 | <--- | W | -0.537 | -0.601 | 0.059 | -10.115 | <**0.01** | 0.288 |
| W4 | <--- | W | 0.811 | 0.933 | 0.066 | 14.225 | <**0.01** | 0.657 |
| BI1 | <--- | BI | 0.879 | 1.000 | | | | 0.773 |
| BI2 | <--- | BI | 0.917 | 1.189 | 0.043 | 27.480 | <**0.01** | 0.840 |
| BI3 | <--- | BI | 0.960 | 1.209 | 0.039 | 30.651 | <**0.01** | 0.922 |
| UB1 | <--- | UB | 0.565 | 1.000 | | | | 0.319 |
| UB2 | <--- | UB | 0.658 | 1.499 | 0.150 | 9.962 | <**0.01** | 0.433 |
| UB3 | <--- | UB | -0.671 | -1.244 | 0.123 | -10.084 | <**0.01** | 0.450 |
| UB4 | <--- | UB | -0.843 | -2.067 | 0.180 | -11.505 | <**0.01** | 0.711 |
| UB5 | <--- | UB | -0.714 | -1.601 | 0.173 | -9.239 | <**0.01** | 0.510 |

PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, FC: Facilitating Conditions, H: Habit, A: Anxiety, PTI: Personal Technological Innovativeness, W: Workflow, BI: Behavioural Intention, UB: Usage Behaviour, S.E.: Standard Error,

Within the scope of the study, reliability tests were conducted for the developed models. The Cronbach's Alpha coefficient for Model 1 was calculated to be 0.869, while for Model 2, it was found to be 0.877. These Cronbach's Alpha values indicate a high level of reliability for both models, suggesting that the scales used are consistently reliable for measuring the constructs of interest.

Structural equation modelling (SEM) path analysis was conducted using the SPSS AMOS program to analyse the structure of the two models developed based on confirmatory factor analysis results. The results of the analysis are presented in Figures 5 and 6.

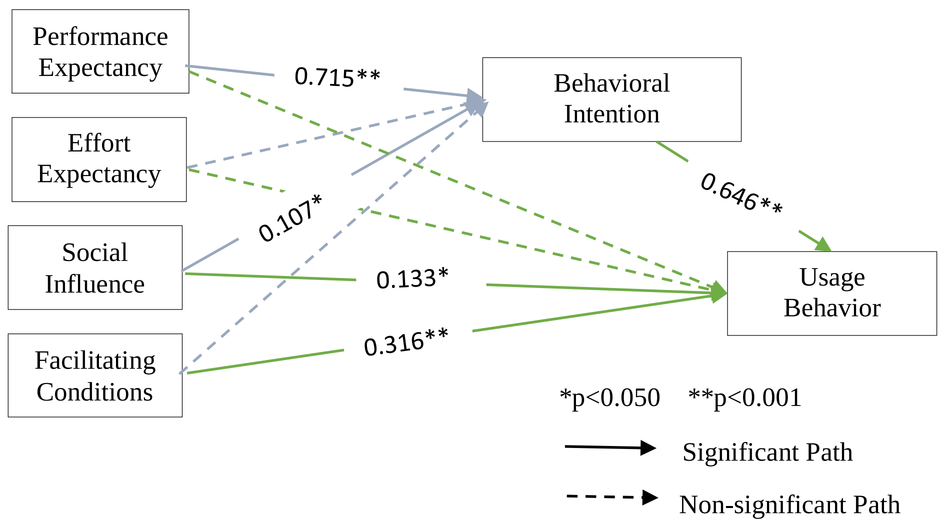


**Figure 5: Path Analysis Results of Model 1**

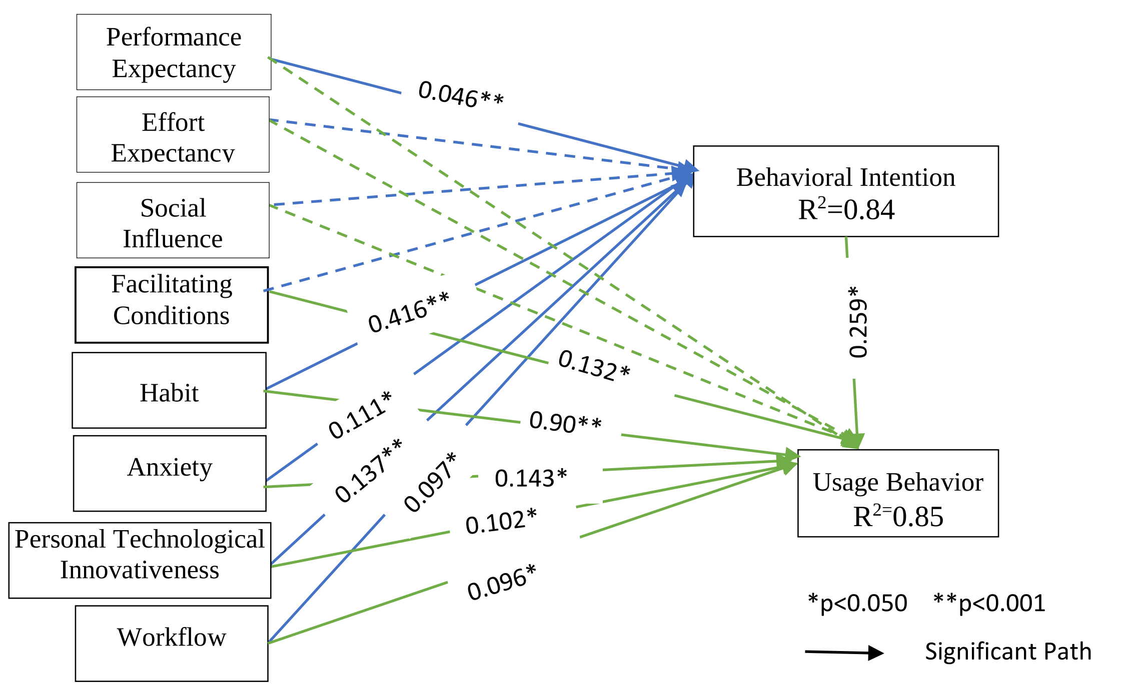


**Figure 6: Path Analysis Results of Model 2**

The structural equation analysis results for Model 1 are detailed in Table 5. According to these results, the factors influencing behavioural intention were performance expectancy (0.715) and social influence (0.107). The factors affecting usage behaviour were social influence (0.133), facilitating conditions (0.316), and behavioural intention (0.646). Performance expectancy was identified as the most influential factor on behavioural intention. Model 1 explained 75% of the variance in behavioural intention and 69% in usage behaviour.

**Table 5: Path Analysis Table for Model 1**

| | | | Unstandardized Coefficient | Standardized Coefficient | S.E. | C.R. | p | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| **PE** | → | **BI** | 0.962 | 0.715 | 0.086 | 11.15 | **<0.01** | |
| EE | → | BI | -0.01 | -0.009 | 0.097 | -0.107 | 0.915 | 0.741 |
| **SI** | → | **BI** | 0.165 | 0.107 | 0.066 | 2.503 | **0.012** | |
| FC | → | BI | 0.204 | 0.132 | 0.105 | 1.952 | 0.051 | |
| **BI** | → | **UB** | 0.575 | 0.646 | 0.08 | 7.21 | **<0.01** | |
| PE | → | UB | -0.094 | -0.078 | 0.11 | -0.851 | 0.395 | |
| EE | → | UB | -0.079 | -0.073 | 0.103 | -0.76 | 0.447 | 0.693 |
| **SI** | → | **UB** | 0.183 | 0.133 | 0.071 | 2.562 | **0.01** | |
| **FC** | → | **UB** | 0.437 | 0.316 | 0.119 | 3.687 | **<0.01** | |

PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, FC: Facilitating Conditions, BI: Behavioural Intention, UB: Usage Behaviour, S.E.: Standard Error,

The structural equation modelling (SEM) analysis outcomes for Model 2, utilized in this research, are detailed in Table 6. Analysis of Table 6 indicates that performance expectancy (0.462), anxiety (0.111), habit (0.416), personal technological innovativeness (0.137), and workflow (-0.097) are significant determinants of behavioural intention. Consistent with Model 1, performance expectancy is the most influential factor on behavioural intention. The variance in behavioural intention explained by these factors in Model 2 is 84%. In terms of usage behaviour, significant determinants include habit (-0.900), facilitating conditions (-0.132), anxiety (0.143), personal technological innovativeness (0.102), workflow (0.096), and behavioural intention (-0.259). Habit, with the highest factor loading, emerges as the most critical determinant of usage behaviour. Model 2 accounts for 85% of the variance in usage behaviour. Comparative analysis of the results from both models suggests that Model 2 offers a more comprehensive explanation, elucidating 85% of the factors influencing the acceptance and utilization of the e-Nabız system.

**Table 6: Path Analysis Table for Model 2**

| | | | Unstandardized Coefficient | Standardized Coefficient | S.E. | C.R. | p | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| **PE** | → | **BI** | 0.514 | 0.462 | 0.065 | 7.947 | **<0.01** | |
| **EE** | → | BI | -0.106 | -0.099 | 0.058 | -1.835 | 0.067 | |
| SI | → | BI | -0.013 | -0.01 | 0.05 | -0.264 | 0.792 | |
| FC | → | BI | -0.058 | -0.046 | 0.064 | -0.908 | 0.364 | |
| **H** | → | **BI** | 0.306 | 0.416 | 0.051 | 6.054 | **<0.01** | **0.836** |
| **A** | → | **BI** | 0.117 | 0.111 | 0.05 | 2.327 | **0.02** | |
| **PTI** | → | **BI** | 0.158 | 0.137 | 0.037 | 4.303 | **<0.01** | |
| **W** | → | **BI** | -0.077 | -0.097 | 0.026 | -2.916 | **0.004** | |
| PE | → | UB | 0.111 | 0.147 | 0.061 | 1,803 | 0.071 | **0.847** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| EE | → | UB | 0.086 | 0.118 | 0.051 | 1.697 | 0.09 |
| SI | → | UB | 0.015 | 0.017 | 0.043 | 0.339 | 0.734 |
| FC | → | **UB** | -0.114 | -0.132 | 0.056 | -2.018 | **0.044** |
| H | → | **UB** | -0.45 | -0.9 | 0.062 | -7.256 | **<0.01** |
| **A** | → | **UB** | 0.102 | 0.143 | 0.045 | 2.282 | **0.022** |
| **PTI** | → | **UB** | 0.079 | 0.102 | 0.033 | 2.387 | **0.017** |
| **W** | → | **UB** | 0.051 | 0.096 | 0.023 | 2.195 | **0.028** |
| **BI** | → | **UB** | -0.176 | -0.259 | 0.069 | -2.556 | **0.011** |

PE: Performance Expectancy, EE: Effort Expectancy, SI: Social Influence, FC: Facilitating Conditions, H: Habit, A: Anxiety, PTI: Personal Technological Innovativeness, W: Workflow, BI: Behavioural Intention, UB: Usage Behaviour, S.E.: Standard Error

## 3. DISCUSSION

This study examines the acceptance and usage levels of the e-Nabız system among physicians, as well as the factors influencing these levels. The factors affecting intention and usage were identified by comparing the two models considered in the study. It was observed that Model 2 explained intention and usage behaviour with a greater number of factors. The results obtained were then discussed in relation to findings from existing literature on health-related studies.

Performance expectancy refers to the belief that using the system will enhance one's performance. Physicians can achieve faster access to data, reduce redundant tests, and save time, thereby providing more services by using the e-Nabız system. Studies examining various Technology Acceptance Models (TAM) have found that the relationship between performance expectancy and intention is significant in all reviewed studies, highlighting the importance of perceiving information technologies (IT) as useful for acceptance and promotion (Holden and Karsh, 2010). Performance expectancy is a crucial determinant of physicians' intention to adopt technology (Başak et al., 2015; Breil et al., 2022; Diel et al., 2023; Liu et al., 2015). The design, training, and informational processes of IT should ensure that its benefits in the healthcare sector are perceived and that it is easy to use. Therefore, it is essential to organize in-service training and awareness programs about the system's performance-enhancing features or to support users through methods that boost motivation.

Effort expectancy refers to the belief that using the technology does not require much effort. It can influence the intention to use technology either directly or through attitude (Alsyouf et al., 2022). In their meta-analysis, Holden and Karsh (2010) found inconsistent results regarding the relationship between effort expectancy and intention. On the other hand, 7 out of 13 studies show a significant relationship. Başak et al. (2015) identified effort expectancy as a factor affecting physicians' intention to adopt technology (personal digital assistants).

On the other hand, Liu et al. (2015) and Heselmans et al. (2012) found no significant effect of effort expectancy on the intention to use technology, aligning with the findings of our study (Heselmans et al., 2012; Liu et al., 2015). The lack of a significant effect of effort expectancy on intention in our study might be due to integrating the e-Nabız system with the existing information systems that participants already use, or it could be related to the ongoing usage over time. It is noted that effort expectancy is more crucial during the initial stages of technology use and tends to diminish in importance over time (Liu et al., 2015).

Social influence refers to the impact individuals deemed important, such as friends, colleagues, and supervisors, have on one's behaviour. It is posited that social influence can affect an individual's intention to use technology and their performance expectancy (Steininger et al., 2014). In our comparative study of the two models, social influence emerged as a factor influencing behavioural intention in the first model. In contrast, the second model did not identify it as a determinant. A review of the literature on technology acceptance models within the healthcare sector reveals that the effect of social influence on intention needs to be clarified, being significant in only four out of eight studies. The insignificance of social influence among physicians could be explained by their professional independence, general resistance to peer pressure, or the mandatory nature of the system's usage (Holden and Karsh, 2010).

Facilitating Conditions refer to users' perceptions that adequate technical infrastructure, expert support, and compatibility are available to support the use of technology (Venkatesh et al., 2003). Consistent with our study, previous research has found a significant relationship between facilitating conditions and behavioural intention (Aggelidis and Chatzoglou, 2009; Boontarig et al., 2012; Heselmans et al., 2012; Liu et al., 2015; Wu et al., 2022). Furthermore, facilitating conditions impact usage behaviour significantly (Venkatesh et al., 2003; Hossain et al., 2019).

Habit is a critical determinant of technology usage (Venkatesh et al., 2012). Habit encompasses both the repetition of past behaviours and the automaticity of behaviour (Cobelli and Blasi, 2024), implying that well-established habits are likely to predict future behaviour and fulfil expectations for technology investments. Therefore, the habit factor must be considered an essential element. Prior studies consistently support the significant relationship between habit, intention, and usage behaviour (Sergueeva et al., 2019; Wu et al., 2022; Yu et al., 2021).

Physicians' concerns regarding the use of the e-Nabız system are often related to its reliability and data security. They may fear that entering patient health data into mobile health systems could pose risks, create legal and ethical issues, or compromise privacy. Users of information technology frequently express concerns about the loss, theft, or misuse of personal information, and these privacy concerns can negatively impact behavioural intention (Sergueeva et al., 2019). In recent years, the increasing incidence of cyberattacks on health information systems (Diel et al.,, 2023; Jalali et al., 2021) may heighten physicians' anxieties about information technology. Our study identifies concern as a factor affecting both behavioural intention and usage. Contrary to our findings, Breil et al. (2022) discovered that anxiety did not impede the acceptance of m-health applications among physicians (Breil et al., 2022). Another study found that concerns about autonomy significantly impacted perceived ease of use (Abdekhoda et al., 2015). Research indicates that privacy concern represents the most significant negative predictor of behavioural intention (Çalışkan, 2017). Zhou (2012) stated that trust in information technology influences usage intention. Measures such as trainings on information security, cyberattack simulations, data encryption, software updates, two-factor authentication, and antivirus software can be implemented to alleviate these concerns (Jalali et al., 2021).

Personal innovativeness in technology reflects users' willingness to try new technologies. It encourages individuals to be open-minded, take risks, and engage in experimentation (Zhou, 2012). Our study found a significant relationship between personal innovativeness in technology, intention, and usage behaviour consistent with previous studies (Hossain et al., 2019; Hoque et al., 2016). Enhancing personal innovativeness in technology can be supported through professional development and in-service training programs.

Physicians' use of information systems during clinical workflows can impact efficiency and patient comfort (Abdekhoda et al., 2015; Hossain, 2019; Sema et al., 2024). Integrating new technology into any process can lead to changes in workflows. Therefore, processes should be redesigned to accommodate new technology, and organizational structures should be adapted to align with these changes (Yen et al., 2017). Our study determined that workflow significantly relates to both intention and usage.

Behavioural intention has been consistently identified as the primary determinant of usage behaviour in previous studies (Hossain et al., 2019; Kissi et al., 2020; Wu et al., 2022; Zhou, 2012).

Our study corroborates these findings, demonstrating that behavioural intention significantly influences usage.

This study presents several limitations. It encompasses only physicians employed at university hospitals who voluntarily participated in the electronic survey. Due to the pandemic, the research was conducted via an online survey methodology to mitigate the risk of infection, and the survey was distributed to physicians with accessible email addresses. Physicians who did not participate in the survey and those whose email addresses were unobtainable were excluded from the study. The study is temporally confined to the period from January to July 2020.

## 4. CONCLUSIONS AND RECOMMENDDATIONS

User evaluations of health information systems (HIS) are essential for enhancing these systems and realizing desired benefits for all stakeholders. Physicians' acceptance and usage levels of the e-Nabız system are particularly significant in achieving its strategic objectives. This study evaluates whether different versions of the Unified Theory of Acceptance and Use of Technology (UTAUT) offer a more comprehensive explanation of physicians' acceptance and usage of the e-Nabız system. The results indicate that the model developed based on the second version of UTAUT provides a more effective explanation of physicians' acceptance and usage of the e-Nabız system.

The second model, which produced more comprehensive results than the first model, was interpreted in the evaluations conducted. In the second model, factors that were found to have a statistically significant impact on behavioural intention include performance expectancy, facilitating conditions, habit, anxiety, personal technological innovativeness, and workflow. Factors such as effort expectancy, social influence, and facilitating conditions were found to have no significant impact on intention. The factors that were identified as having a statistically significant impact on usage behaviour are behavioural intention, facilitating conditions, habit, anxiety, personal technological innovativeness, and workflow. The model's ability to explain technology acceptance and usage was high, with a variance of 85%.

To enhance the effective and efficient use of the e-Nabız system by physicians, information system designers, healthcare institution administrators, the Ministry of Health, and other stakeholders can utilize the results of this study. Measures that could contribute to the acceptance and use of information technologies include conducting initiatives to reduce physicians' anxiety and build their confidence, making technological investments in cybersecurity, employing prevention and detection tools, communicating the performance enhancement contributions of the e-Nabız system to physicians, designing the information system to facilitate workflow, educating individuals on new technologies to develop personal technological innovativeness, and supporting physicians through incentive systems to foster habit development.

This study utilizes the Unified Theory of Acceptance and Use of Technology (UTAUT) model to investigate physicians' acceptance of technology, thereby contributing to the development and management of the e-Nabız system and extending the UTAUT framework. Additionally, this research addresses the growing demand for more studies in the healthcare sector, where information technology investments and applications are increasingly prevalent. Future research should explore the factors influencing the acceptance and use of the e-Nabız system across public and private sectors and primary healthcare institutions. Furthermore, the acceptance and use of various health information systems could be examined using different iterations of technology acceptance models.

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