

Original Research Article

Digital Transformation Management in Health Services: Health Professionals Perceptions as an Implementation Factor

Theodoros S. Tanis*, Chryssoula Chatzigeorgiou, Ioanna Simeli and Evangelia Stalika

International Hellenic University, Thessaloniki, Greece.

*Corresponding Author Email: thtanis1@gmail.com

ABSTRACT

Background and Objectives: The explosion of new digital technologies is fundamentally disrupting the world as it has been perceived until now, transforming it multilevel and at an unprecedented speed. At the same time, with traditional ways of providing health services, their quality and scale cannot meet user's needs and expectations. Within this context of constant search for improved quality, the path of health services towards a digital and value-based transformation is now a one-way street, with drastic and immediate effects that are capable of disrupting the sector and making it sustainable. The most defining issue is how an organization adapts its organizational culture, strategy, and leadership and mostly prepares the staff to operate effectively in a digital world, adding value to users and sustaining prosperity. The main goal of this study is to investigate the perceptions of health professionals regarding the usability and ease of use of digital transformation applications.

Material and Methods: To investigate the aim of the study, the USE Questionnaire was used. It was distributed completely paperless, exclusively through Google forms. For better common understanding, we edited an auxiliary video and embedded it in the Google form, to be watched before starting answering it. Our sample was healthcare professionals who worked in various Hospitals and health providers in Northern Greece.

Results: Age appears to have a greater influence on health professional self-efficacy. Regardless of specialty, they show positive perceptions of both the usefulness and ease of use and learning of digital applications. Those with a lower level of education showed a higher perceived ease of use and learning, as well as their usefulness, than expected.

Conclusion: The acceptance of digital transformation in healthcare professionals is based on understanding the concerns and feelings of insecurity that overwhelm healthcare professionals. Our findings can help us better understand the factors that influence their adoption of new digital technologies. Likely, this will help us to reduce the time required to make all the structural changes that are necessary, but also to guide us properly for the best use of our already limited available resources. As people accept change at different rates, there is no time for delay and their preparation should begin immediately.

Keywords—*Digital transformation, Health service management, Healthcare services, Healthcare professional's perceptions, Implementation factors.*

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INTRODUCTION

People adopt new technologies quickly and completely, regardless of whether they are intermediate or end users. They are more experienced in the use of technology, and how organizations take advantage of it, and are becoming increasingly selective and demanding about what they are going to use.¹ Many, mistakenly believe it will be a seamless experience, powerful and adaptable, allowing healthcare professionals to function as they have already embraced the digital world in their lives.² As this is complex and the existing structures and cultures of healthcare organizations are not sufficient to promote and harmoniously integrate innovative functions, the simple appearance of new digital technologies does not yield the expected service improvement.³ Health services are inherently high-risk and have complex structures that strongly resist any change.^{3,4} It therefore seems to make no sense to invest in cutting-edge technology if there is not the right workforce with the right roles and skills to fully exploit its potential for the benefit of patients.⁴ We fully understand that people are the real key to digital transformation.^{5,6}

This transition is essentially slowed down by strict regulations, the reluctance and resistance to change shown by all healthcare stakeholders, thus ignoring the importance of changes in the organization's culture and the human factor in an increasingly broad technological ecosystem taking shape.⁷⁻⁹ The coronavirus disease has forced many healthcare-related processes to move online, almost overnight. However, it will take some time to fully understand the multiple impacts of the recent digital changes that have occurred in response to the current pandemic.¹⁰ Professionals have different interests, perceptions, and beliefs. Change management programs focus on trying to convince people why they need to change. These reasons are usually not in line with their individual interests and beliefs. People don't change unless they want to. They have very little confidence in the new environment being formed mainly because of all these changing elements such as skills, processes, organizational structure, and hierarchy.¹¹

However, changing working methods in health services is not an easy task for whoever undertakes it. The

complex organization and high degree of complexity created by the variety of professional groups and regulatory systems complicates and often precludes the application of successful management techniques that perform exceptionally well in other forms of organizations. Deep-rooted perceptions, organizational norms, and established culture complicate and hinder efforts to introduce new systems in healthcare.^{12,13} A primary task of management when starting a change process remains to increase the degree of emotional attachment of employees, because this not only affects their satisfaction, but also the performance of each one individually. The effect of an emotional denial from disengaged employees is manifold. Without an emotional bond, they are much more likely to simply be absent from this endeavor.¹⁴

The purpose of this paper deals with the overall context of the management practice, during the process of digital transformation in health services. The main goal was the systematic investigation of the factors that influence health professionals in order to be committed and get involved in its implementation. For this purpose, the perceptions of health professionals regarding the usability of digital transformation applications were investigated. Our findings can likely contribute to a broader understanding of the factors influencing the adoption of new digital technologies by healthcare professionals. In this way, it will be possible to reduce the time of carrying out all the structural changes that are imposed and also to make the most of our already limited available resources.

METHODS

Research Design

To investigate the aim of the study, the USE Questionnaire¹⁵ was used. The USE questionnaire (Usefulness, Satisfaction, Ease of Use) has been proposed by Lund 2001 as a tool to categorize user responses into the 4 dimensions of usefulness (8 questions), ease of use (11 questions), ease of learning (4 questions) and satisfaction (7 questions). It includes a total of 30 questions, to be answered on a 7-level Likert scale.

The questionnaire was distributed completely paperless, exclusively through Google forms. The Questionnaire also

recorded Demographic Data regarding gender, age with a range of ten years, level of education, the Directorate they belong to, the hospital they work for, the Health Region to which the hospital belongs, and whether they hold a position of responsibility. It was possible to answer from any PC, or smart device regardless of operating system. Each participant had the possibility of a single answer.

For a better understanding of how everyday work is changing through digital transformation applications and to explore the perceptions of different categories of professionals, we had to create an auxiliary video of 3 min 16 sec duration. The video was embedded in the Google form, before the start of the questionnaire and immediately after the introductory informational notes. Each participant needed to watch it in order to continue with the questionnaire answers to participate in the research. At the end of the survey, there was the possibility to consent and to state his email in order to be informed early of the results of the survey.

Sample-Data Collection

The research lasted 2.5 months and ended a little prematurely due to the special conditions created for health professionals due to the COVID-19 pandemic. It was divided into two parts. The first part, which lasted two weeks, concerns a weighted sample in terms of the composition of professionals according to the departments to which they belong. The composition of the Directorates of the Papageorgiou Hospital was used as a standard sample. So initially the questionnaires were sent in digital form to 323 health professionals who had the following composition: 47 employees of the Administrative Department, 87 doctors of the Medical Department, 169 employees of the Nursing Department, 7 employees of the Financial Department, 4 employees of the IT Department and 9 employees of other Directorates. These professionals worked in various Hospitals and health providers in Northern Greece. Seven days after sending the questionnaire a reminder message was sent to complete it.

Data Analysis

For statistical analysis, Chronbach's alpha test was used to check the reliability of the questions of each dimension of the questionnaire.¹⁶ Independent samples t-tests were

also used to investigate the variables of gender, Hospital of service, and position of responsibility¹⁷, while to investigate the variables of age, level of education, Department, and the HR owned by health professionals, one-way ANOVA was used.^{18,19} To further investigate differences between samples Hochberg's GT2 test was used as the sample sizes were dissimilar.²⁰

RESULTS

Descriptive Statistics

Our sample (Figure 1) consisted of 224 health professionals, 63 men (28.1%) and 161 women (71.9%). Of these, 40 (17.9%) were aged 25–35, 85 (37.9%) 36–45, 88 (39.3%) 46–55 and 11 (4.9%) from 55+ years. 21 (9.4%) health professionals belonged to the basic education level, 103 (46%) to the Technological (TE) level, while 30 (13.4%) to the University (UE) level, 58 (25.9%) were holders of an MSc degree and 12 (5.4%) PhD holders. 127 (56.6%) of them worked at Papageorgiou Hospital, while the remaining 97 (43.4%) worked at other hospitals in Northern Greece. At the same time, 151 (67.4%) belonged to the potential of the 3rd Health Region, 65 (29%) to the 4th Health Region and 8 (3.6%) to the 6th Health Region. 51 (22.8%) held positions of responsibility while the remaining 173 (77.2%) did not hold any position of responsibility.

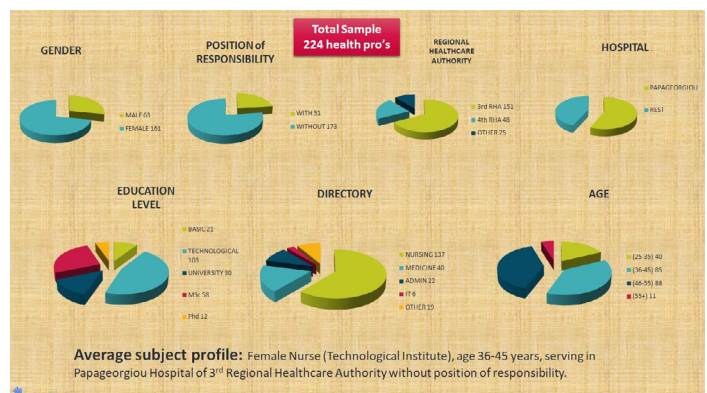


FIGURE 1. The profile of the average participant.

Participants' overall responses to the USE questionnaire showed a mean value (M = 5.56, SD = 0.89) (Figure 2). 107 (47.8%) seemed to strongly agree (M > 5.5), while 200 (89.2%) agreed (M > 4.5). In the usefulness dimension,

they showed a mean value ($M = 5.76, SD = 0.95$), and 158 (70.5%) seemed to strongly agree ($M > 5.5$), while 204 (91%) agreed ($M > 4.5$). In the dimension of ease of use, they showed a mean value ($M = 5.42, SD = 0.96$), and 115 (51.3%) seemed to strongly agree ($M > 5.5$), while 191 (85.2%) agreed ($M > 4.5$). In the dimension of ease of learning, they showed a mean value ($M = 5.61, SD = 1.00$), and 139 (62%) seemed to strongly agree ($M > 5.5$), while 192 (85.7%) agreed ($M > 4.5$). In the dimension of satisfaction, they showed an average value ($M = 5.45, SD = 1.06$), and 112 (50%) seemed to strongly agree ($M > 5.5$), while 188 (89.2%) agreed ($M > 4.5$) (Figure 3).

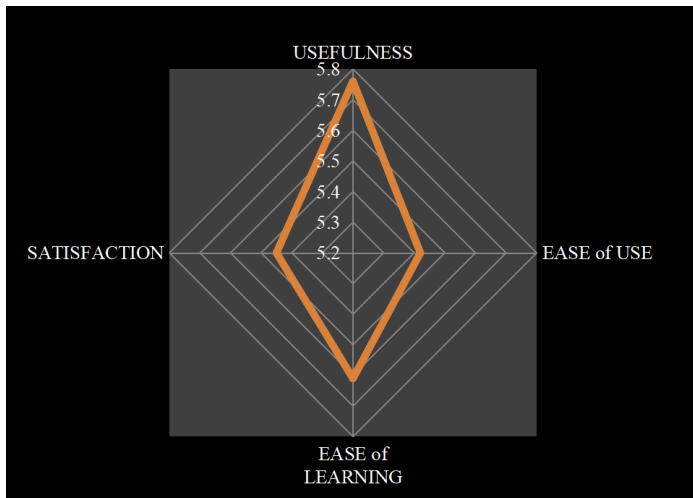


FIGURE 2. Radar diagram of the 4 dimensions of the USE questionnaire.

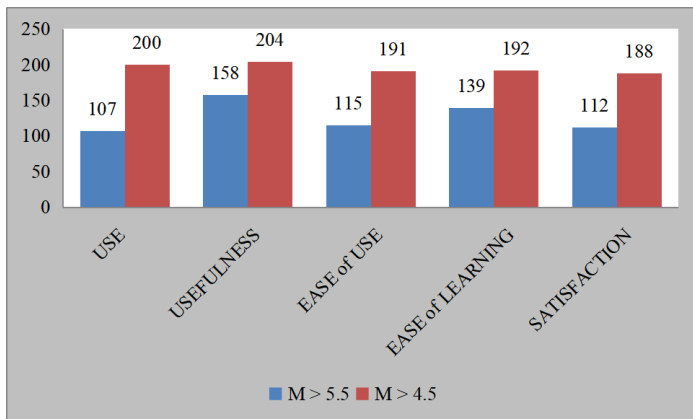


FIGURE 3. Levels of agreement by dimension and overall in the USE questionnaire.

Reliability

All dimensions were tested for and found to have acceptable limits for reliability using Chronbach’s alpha test. For the dimension of usefulness, it was found that $\alpha = 0.94$, for the dimension of ease of use it was found that $\alpha = 0.95$, for the dimension of ease of learning it was found that $\alpha = 0.95$, while for the dimension of satisfaction it was found that $\alpha = 0.96$ (Figure4).

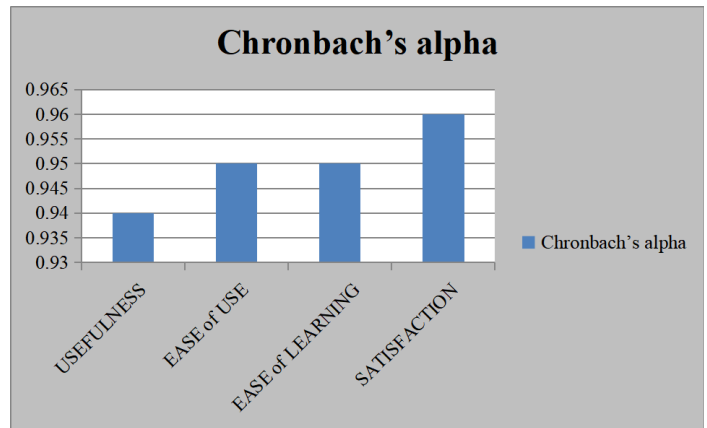


FIGURE 4. Reliability levels of the USE questionnaire.

Inductive Statistics

Use

Independent samples t-tests (Table 1) were conducted to compare gender, Hospital of Service, and position of responsibility with usability and usability of digital applications. There appeared to be no significant difference in the overall evaluation of usability and ease of use of digital applications between men ($M = 5.58, SD = 0.87$) and women ($M = 5.55, SD = 0.90$), $t(222) = 0.20, p > 0.05$, between health professionals working at the Papageorgiou Hospital ($M = 5.52, SD = 0.90$) and at the other hospitals ($M = 5.61, SD = 0.88$), $t(222) = 0.73, p > 0.05$, as and between health professionals who hold a position of responsibility ($M = 5.65, SD = 0.76$) and those who do not ($M = 5.53, SD = 0.92$), $t(222) = 0.81, p > 0.05$.

A one-way ANOVA of the populations was performed in order to investigate the effect of age on the usability of digital applications (Table 2). The level of significance was set at $p < 0.05$ for all levels. Age appeared to have a

significant effect on the overall evaluation of usability and ease of use of digital applications $F(3.220) = 3.05$, $p = 0.029$. Post hoc comparisons using Hochberg's GT2 test indicated that the mean value of age 36–45 ($M = 5.33$, $SD = 0.95$) (Figure 5) differed significantly from that of age 46–55 ($M = 5.70$, $SD = 0.90$). However, the mean value of ages 25–35 ($M = 5.66$, $SD = 0.72$) and 55+ ($M = 5.82$, $SD = 0.57$) did not differ significantly from the other ages (Table 3).

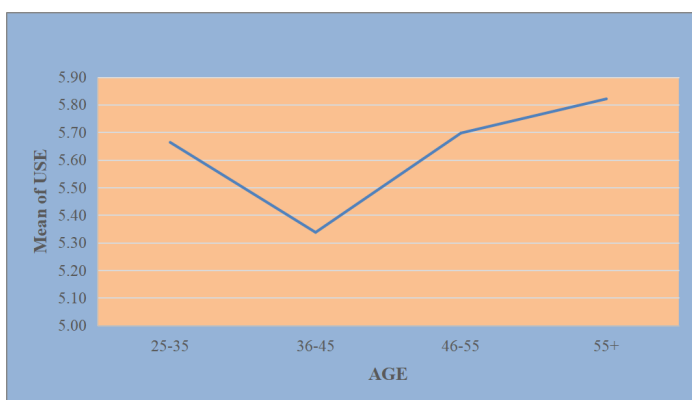
The level of education appeared to have no significant effect on the overall evaluation of the usability and ease of use of digital applications $F(4.219) = 0.82$, $p > 0.05$. Accordingly, the address to which the health professionals belong appeared to have no significant effect on the overall evaluation of the usability and ease of use of the digital applications $F(4.219) = 1.22$, $p > 0.05$, as well as the Ministry of Health to which the health professionals belong $F(2.221) = 0.38$, $p > 0.05$.

TABLE 1. Results of independent samples t-tests for the effect of gender, Hospital & position of responsibility on the dimensions of the USE questionnaire.

		Levene's Test for Equality of Variances		T value	Degrees of freedom	Sig. (2-tailed)	t-test for Equality of Means		95% Confidence Interval of the Difference	
		F value	Significance				Mean Difference	Std. Error Difference	Lower	Upper
GENDER	USE	0.901	0.344	0.199	222	0.843	0.02634	0.13247	-0.23472	0.28740
	USEFULNESS	0.358	0.550	0.096	222	0.924	0.01354	0.14162	-0.26555	0.29264
	EASE of USE	2.165	0.143	0.275	222	0.784	0.03915	0.14235	-0.24138	0.31968
	EASE of LEARNING	0.107	0.744	0.691	222	0.490	0.10266	0.14860	-0.19020	0.39551
	SATISFACTION	0.412	0.521	-0.317	222	0.751	-0.04999	0.15751	-0.36039	0.26042
HOSPITAL	USE	0.009	0.923	-0.728	222	0.467	-0.08743	0.12007	-0.32405	0.14920
	USEFULNESS	0.246	0.620	-1.426	222	0.155	-0.18237	0.12793	-0.43448	0.06974
	EASE of USE	1.176	0.279	-0.379	222	0.705	-0.04900	0.12915	-0.30351	0.20551
	EASE of LEARNING	0.036	0.849	-0.110	222	0.913	-0.01483	0.13498	-0.28085	0.25118
	SATISFACTION	0.107	0.744	-0.725	222	0.469	-0.10350	0.14278	-0.38489	0.17789
RESPONSIBILITY	USE	1.149	0.285	0.812	222	0.418	0.11519	0.14184	-0.16433	0.39471
	USEFULNESS	3.583	0.060	1.778	222	0.077	0.26815	0.15078	-0.02900	0.56529
	EASE of USE	0.842	0.360	0.912	222	0.363	0.13898	0.15237	-0.16130	0.43925
	EASE of LEARNING	0.287	0.593	-0.438	222	0.662	-0.06979	0.15944	-0.38399	0.24441
	SATISFACTION	3.479	0.063	0.732	222	0.465	0.12343	0.16871	-0.20906	0.45591

TABLE 2. Results of the one-way ANOVA for the effect of age, address, grade & HSE on the dimensions of the USE questionnaire.

			Sum of Squares	Degrees Of freedom	Mean Square	F value	Significance
Between Groups	DIRECTORATE	USE	3.842	4	0.961	1.219	0.304
		USEFULNESS	5.839	4	1.460	1.633	0.167
		EASE of USE	4.013	4	1.003	1.100	0.358
		EASE of LEARNING	1.064	4	0.266	0.263	0.901
		SATISFACTION	10.547	4	2.637	2.417	0.050
	AGE	USE	7051	3	2.350	3.053	0.029
		USEFULNESS	5917	3	1.972	2.217	0.087
		EASE of USE	8679	3	2.893	3.263	0.022
		EASE of LEARNING	10.569	3	3.523	3.658	0.013
		SATISFACTION	5.534	3	1.845	1.664	0.176
	EDUCATION	USE	2.592	4	0.648	0.816	0.516
		USEFULNESS	2.408	4	0.602	0.662	0.619
		EASE of USE	2.246	4	0.562	0.610	0.656
		EASE of LEARNING	4.754	4	1.188	1.195	0.314
		SATISFACTION	4.317	4	1.079	0.964	0.428
	HEALTH REGION	USE	0.610	2	0.305	0.383	0.682
		USEFULNESS	2.192	2	1.096	1.214	0.299
		EASE of USE	0.487	2	0.244	0.265	0.768
		EASE of LEARNING	0.557	2	0.278	0.277	0.758
		SATISFACTION	0.931	2	0.466	0.414	0.662

**FIGURE 5.** Results of the mean of usability and ease of USE by age.

Ease of Use

Age appeared to have a significant effect on the ease of use dimension of digital applications $F(3,220) = 3.26, p = 0.022$. Post hoc comparisons using Hochberg's GT2 test indicated that the mean value of age 36–45 ($M = 5.18, SD = 1.04$) differed significantly from that of age 46–55 ($M = 5.58, SD = 0.94$) (Table 4). However, the mean value of the ages 25–35 ($M = 5.50, SD = 0.78$) and 55+ ($M = 5.76, SD = 0.64$) did not differ significantly from the other ages (Figure 6).

TABLE 3. Results of Hochberg's GT2 test for the effect of age on the usability of digital applications.

AGE		Mean Difference	Standard Error	Significance	95% Confidence Interval	
					Lower Bound	Upper Bound
25-35	36-45	0.32622	0.16825	0.281	-0.1203	0.7727
	46-55	-0.03373	0.16732	1.000	-0.4778	0.4103
	55+	-0.15750	0.29873	0.996	-0.9503	0.6353
36-45	25-35	-0.32622	0.16825	0.281	-0.7727	0.1203
	46-55	-0.35995	0.13344	0.044	-0.7141	-0.0058
	55+	-0.48372	0.28116	0.418	-1.2299	0.2624
46-55	25-35	0.03373	0.16732	1.000	-0.4103	0.4778
	36-45	-0.35995	0.13344	0.044	0.0058	0.7141
	55+	-0.12377	0.28061	0.998	-0.8685	0.6209
55+	25-35	0.15750	0.29873	0.996	-0.6353	0.9503
	36-45	0.48372	0.28116	0.418	-0.2624	1.2299
	46-55	0.12377	0.28061	0.998	-0.6209	0.8685

TABLE 4. Results of Hochberg's GT2 test for the effect of age on ease of use of digital applications.

AGE		Mean Difference	Standard Error	Significance	95% Confidence Interval	
					Lower Bound	Upper Bound
25-35	36-45	0.31578	0.18056	0.398	-0.1634	0.7950
	46-55	-0.08512	0.17957	0.998	-0.5617	0.3914
	55+	-0.26488	0.32060	0.957	-1.1157	0.5859
36-45	25-35	-0.31578	0.18056	0.398	-0.7950	0.1634
	46-55	-0.40090	0.14321	0.033	-0.7810	-0.0208
	55+	-0.58065	0.30174	0.289	-1.3814	0.2201
46-55	25-35	0.08512	0.17957	0.998	-0.3914	0.5617
	36-45	0.40090	0.14321	0.033	0.0208	0.7810
	55+	-0.17975	0.30115	0.992	-0.9790	0.6195
55+	25-35	0.26488	0.32060	0.957	-0.5859	1.1157
	36-45	0.58065	0.30174	0.289	-0.2201	1.3814
	46-55	0.17975	0.30115	0.992	-0.6195	0.9790

The level of education did not appear to have a significant effect on the dimension of ease of use of digital applications $F(4.219) = 0.61, p > 0.05$, as well as the directorate to which the health professionals belong $F(4.219) = 1.10, p > 0.05$ and the HR to which health professionals belong $F(2.221) = 0.26, p > 0.05$.

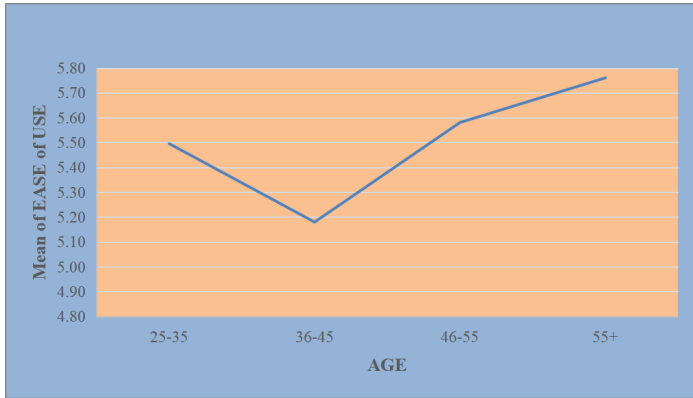


FIGURE 6. Results of the mean of EASE of USE dimension by age.

Ease of Learning

Age appeared to have a significant effect on the ease of learning dimension of digital applications $F(3.220) = 3.66, p = 0.013$. Post hoc comparisons using Hochberg’s GT2 test indicated that the mean value of age 25–35 ($M = 5.86, SD = 0.83$) differed significantly from that of age 36–45 ($M = 5.34, SD = 1.05$) (Table 5). However, the mean values of ages 46–55 ($M = 5.72, SD = 1.02$) and 55+ ($M = 5.90, SD = 0.50$) did not differ significantly from the other ages (Figure 7).

However, the level of education did not seem to have a significant effect on the dimension of ease of learning of digital applications $F(4.219) = 1.19, p > 0.05$, as well as the address to which the health professionals belong $F(4.219) = 0.26, p > 0.05$ and the HSE to which they belong $F(2.221) = 0.28, p > 0.05$.

TABLE 5. Results of Hochber’s GT2 test for the effect of age on the ease of learning digital applications.

AGE		Mean Difference	Standard Error	Significance	95% Confidence Interval	
					Lower Bound	Upper Bound
25-35	36-45	0.51213	0.18818	0.041	0.0127	1.0115
	46-55	0.13182	0.18715	0.980	-0.3648	0.6285
	55+	-0.05284	0.33413	1.000	-0.9396	0.8339
36-45	25-35	-0.51213	0.18818	0.041	-1.0115	-0.0127
	46-55	-0.38031	0.14925	0.067	-0.7764	0.0158
	55+	-0.56497	0.31447	0.367	-1.3995	0.2696
46-55	25-35	-0.13182	0.18715	0.980	-0.6285	0.3648
	36-45	0.38031	0.14925	0.067	-0.0158	0.7764
	55+	-0.18466	0.31386	0.992	-1.0176	0.6483
55+	25-35	0.05284	0.33413	1.000	-0.8339	0.9396
	36-45	0.56497	0.31447	0.367	-0.2696	1.3995
	46-55	0.18466	0.31386	0.992	-0.6483	1.0176

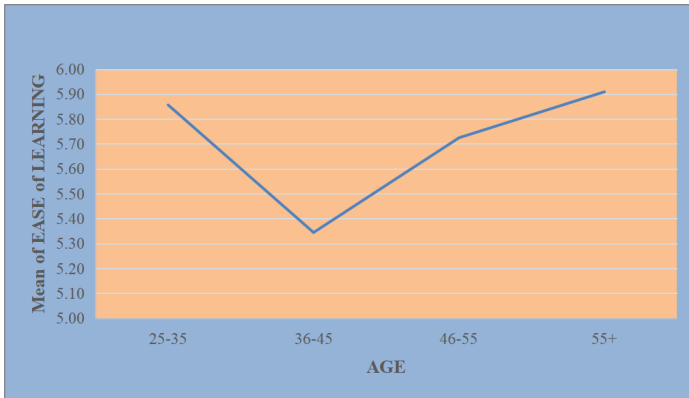


FIGURE 7. Results of the mean of the dimension of EASE of LEARNING by age.

Satisfaction

Age appeared to have no significant effect on the dimension of satisfaction using digital applications $F(3,220) = 1.66, p > 0.05$. Accordingly, the level of education did not seem to have a significant effect on the dimension of satisfaction with the use of digital applications $F(4,219) = 0.96, p > 0.05$, as well as the HR to which the health professionals belong $F(2,221) = 0.41, p > 0.05$. The directorate to which the health professionals belong, however, appeared to have a marginally significant effect on the dimension of satisfaction with the use of digital applications $F(4,219) = 2.41, p = 0.05$ (Table 3). Post hoc comparisons using Hochberg's GT2 test, however (Table 6), did not indicate that the mean value of the Nursing Division ($M = 5.54, SD = 1.02$) differed significantly from that of the Administrative Division ($M = 5.13, SD = 1.14$), the Medical Division ($M = 5.15, SD = 1.12$) of the IT Department ($M = 5.64, SD = 0.92$) and the other Departments ($M = 5.90, SD = 0.91$).

DISCUSSION

The digital maturation of healthcare professionals is a natural process, but it will not happen automatically and without appropriate guidance.^{21,22} The adoption of new digital technologies is a complex process with many factors influencing at the individual level, such as perceptions of ease of use and learning, usefulness, and satisfaction of use. Many negative and positive emotions are stimulated by them and affect this process.²³

It appears that the effort they are expected to put into learning and properly using digital technologies is often cited as a key factor affecting the motivation of health workers to adopt them.²⁴ Healthcare workers can be empowered, adopt and use new digital technologies in environments where they align with their needs, workload, training, and skills. In turn, new digital technologies can empower health workers and equip them with skills and the necessary confidence when they are perceived as useful and easy to use and learn, in environments that enhance end-user recognition.²⁵ While other professionals may decide to engage with new technologies or at least experiment with them more easily, healthcare professionals are more likely to demand greater levels of utility and ease of use to increase the appropriateness of their care, as they appear particularly wary of streamlining, of their use.²⁶ Generally, in the hospital setting user acceptance theories do not represent the ultimate explanations for individual behaviors. The core features of professional functioning require both institutional compliance and a requirement for autonomous decision-making.²⁷

Various organizational, cultural, and technological factors influence how people perceive the concept of usefulness and ease of use. But when individual decision-making is largely shaped by them, professionals embedded in the same institutional framework should exhibit isomorphic perceptions of the usefulness and ease of use of new practices or technologies, which may have also appeared in our results. After all, the existence of heterogeneous perceptions in a very strictly institutionalized environment such as that of health services would constitute, as it is traditionally considered, a paradox.²⁷ In this regard, a form of dominantly imitative (and not coercive or normative) isomorphism seems to appear²⁸, probably also as a result of the informative video. Despite the fact that professionals use the distinctness of their role and their knowledge as resistance to institutional pressures and make individual decisions about new technology, it seems that they are not completely unaffected by them.²⁷

New digital technologies are promoted by early adopters in the workforce predominantly as significant advances in clinical suitability, and in particular in quality of service, stability, and reliability. At the same time, however, they are promoted by managers and policymakers as sources

TABLE 6. Results of Hochberg's GT2 test for the effect of management on the satisfaction of using digital applications.

Directorate	Directorate	Mean Difference	Standard Error	Significance	95% Confidence Interval	
					Lower Bound	Upper Bound
MEDICINE	NURSING	-0.39403	0.18579	0.298	-0.9192	0.1312
	ADMIN	0.01539	0.26847	1.000	-0.7435	0.7743
	IT	-0.49652	0.45658	0.960	-1.7872	0.7941
	OTHER	-0.74890	0.31520	0.168	-1.6399	0.1421
NURSING	MEDICINE	0.39403	0.18579	0.298	-0.1312	0.9192
	ADMIN	0.40942	0.23102	0.550	-0.2436	1.0625
	IT	-0.10248	0.43561	1.000	-1.3339	1.1289
	OTHER	-0.35487	0.28398	0.905	-1.1576	0.4479
ADMIN	MEDICINE	-0.01539	0.26847	1.000	-0.7743	0.7435
	NURSING	-0.40942	0.23102	0.550	-1.0625	0.2436
	IT	-0.51190	0.47678	0.963	-1.8596	0.8358
	OTHER	-0.76429	0.34381	0.239	-1.7361	0.2076
IT	MEDICINE	0.49652	0.45658	0.960	-0.7941	1.7872
	NURSING	0.10248	0.43561	1.000	-1.1289	1.3339
	ADMIN	0.51190	0.47678	0.963	-0.8358	1.8596
	OTHER	-0.25238	0.50457	1.000	-1.6787	1.1739
OTHER	MEDICINE	0.74890	0.31520	0.168	-0.1421	1.6399
	NURSING	0.35487	0.28398	0.905	-0.4479	1.1576
	ADMIN	0.76429	0.34381	0.239	-0.2076	1.7361
	IT	0.25238	0.50457	1.000	-1.1739	1.6787

of efficiency, standardization, and continuous monitoring. These rationales are often perceived as a managerial intrusion into the unaffected exercise of professional practice and are met with suspicion and skepticism.²⁷ Essentially, therefore, employees should be given a sense of control over how the digital transformation will take place, demonstrating that new technologies are introduced as a means of enhancing rather than canceling them, in order to do much better and more easily what they already do exceptionally well.²⁹

Otherwise, healthcare professionals who have considerable power and resistance to managers and other professional groups, and are variously shielded from other social pressures and obligations outside their group, will not commit to and adopt the effort to digital transformation or they may even sabotage it. As a consequence, even the managers and promoters of the new technologies, who carry the institutional idea of spreading their use, will distance themselves as is usually the case or will be completely subordinated by the intermediate users (health professionals) in order to avoid ruptures and

confrontations.²⁷ This can be fatal not only for the quality but also for the sustainability of the health services of the future.

Age appears to influence health professionals' self-efficacy. Usually, the aging workforce will bring about adverse effects for the near future of the health services provided, as their physical capabilities begin to decline and they will be constantly called upon to apply new digital technologies for which they will have little or zero knowledge.^{23,30} Of particular concern is the fact that the older workforce typically holds positions of responsibility. Equally worrying in our findings is the fact that the 36–45 age group appears to have the least positive perceptions of ease of use and learning, with potential interest in their disengagement from the digital transformation project, despite the fact that they will inevitably be the dominant group that will be called upon to implement and manage it.

Gender, knowledge, and position of responsibility despite the fact that they are determining factors of the relative readiness and utilization of new digital technologies, did not seem to influence the perception of usefulness and ease of use and learning and indirectly the degree of their adoption. However, increasing the awareness, knowledge, and skills of health professionals in these technologies before their implementation is necessary to increase their adoption.³¹

Our findings also showed that professionals with a lower level of knowledge of new digital technologies show a higher perceived ease of use and learning as well as their usefulness, than expected. This, despite the fact that it may act as an aid to their adoption, does not automatically constitute the achievement of an improved capacity on their part. The self-confidence and belief of health professionals should be activated and effectively increased in order to achieve high levels of self-efficacy.²⁵ Health professionals, regardless of specialty, show positive perceptions of both the usefulness and the ease of use and learning of digital applications. This does not fully agree with corresponding findings that state that nurses can be characterized as laggards in the adoption of technology both in their personal life and in their workplace²³, or the strongly negative attitude of doctors.²⁶

CONCLUSION

In conclusion, the optimal application of personalization, work needs, and technology will enable increased adoption of new digital technologies.

An in-depth understanding of users' opinions and perceptions about the usability of new digital technology applications is essential for their effective adoption and their successful integration into the health services provided. These views and perceptions are complex and each user group has unique professional priorities and roles, which should be taken into account by decision-makers to increase adoption.³²

Acceptance of digital solutions and innovative medical technologies from all (intermediate and end users) is based on understanding their concerns and insecurities. The process will take time because people accept change at different rates. Therefore, the development of an extensive user community for the full and successful implementation of e-Health is less likely in the immediate and short term. However, this should not hinder the push for digital transformation in health services.²⁶

CLINICAL ADJUSTMENTS

Recognizing the particularities and the necessity of immediately starting the digital transformation in health services, an integrated framework for its operation should be formed in our country as elsewhere.^{33,34} Initially, independent digital transformation offices should be created which will report directly to the general administration or the board. The main concern of these offices should initially be the awareness and information of the organization's employees about the necessity but also the real benefits that the employees will get from its implementation. On a second level, they should act as gatekeepers to help create and ensure that a single strategy is implemented across the length and breadth of the organization. This can be made possible as they will act as the intermediate coordinating link of all collaborative teams that will be involved in any digital transformation project. Administrators of these offices should be clinical professionals with at least ten years of experience who have demonstrated an increased interest in digital technologies (something

equivalent to NHS CCIO's).³⁴ The main concern of health policymakers should be to encourage the development of an integrated educational framework, both with the systematic restructuring of the detailed curriculum of health professions, but also with the creation of specialization programs at the postgraduate level that will support the development of the existing human potential and skills. The immediate, relevant formation of this potential can be performed by developing the Boot camps method (under the auspices of the Ministry of Health in cooperation with the local educational institutions), a practice followed with great success by all major organizations for the short and intensive training of their newly recruited executives.

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