Article

Electronic Health Record Acceptance by Physicians: A Single Hospital Experience in Daily Practice

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Abstract: Introduction: Potential benefits of implementing an electronic health record (EHR) to increase the efficiency of health services and improve the quality of health care are often obstructed by the unwillingness of the users themselves to accept and use the available systems. Aim: The aim of this study was to identify factors that influence the acceptance of the use of an EHR by physicians in the daily practice of hospital health care. Material and Methods: The cross-sectional study was conducted among physicians in the General Hospital Pancevo, Serbia. An anonymous questionnaire, developed according to the technology acceptance model (TAM), was used for the assessment of EHR acceptance. The response rate was 91%. Internal consistency was assessed by Cronbach's alpha coefficient. A logistic regression analysis was used to identify the factors influencing the acceptance of the use of EHR. Results: The study population included 156 physicians. The mean age was 46.4 ± 10.4 years, 58.8% participants were female. Half of the respondents (50.1%) supported the use of EHR in comparison to paper patient records. In multivariate logistic regression modeling of social and technical factors, ease of use, usefulness, and attitudes towards use of EHR as determinants of the EHR acceptance, the following predictors were identified: use of a computer outside of the office for reading daily newspapers ($p = 0.005$), EHR providing a greater amount of valuable information ($p = 0.007$), improvement in the productivity by EHR use ($p < 0.001$), and a statement that using EHR is a good idea ($p = 0.014$). Overall the percentage of correct classifications in the model was 83.9%. Conclusion: In this research, determinants of the EHR acceptance were assessed in accordance with the TAM, providing an overall good model fit. Future research should attempt to add other constructs to the TAM in order to fully identify all determinants of physician acceptance of EHR in the complex environment of different health systems.

Keywords: electronic health record; hospital; acceptance; physician

1. Introduction

The Serbian law on medical records and records in the field of health defines an electronic health record (EHR) as a set of data on one person that combines all health information relevant to one's long-term health status [1]. The EHR would, according to necessity, authorize the future provision of health care so that the patient has a greater chance of being successfully treated [1]. The EHR is an electronic health card, which is

available on all hospital computers, from the first provider of healthcare to all hospital departments [2]. Assuming that the EHR can improve the quality and effectiveness of health care, many health organizations in developed countries have invested in the development and dissemination of such systems [3,4].

Implementation of an EHR increases the efficiency of health services, improves the quality of health care, and positively affects the level of user satisfaction [5,6]. However, the potential benefits of using computer performance are often obstructed by the unwillingness of the users themselves to accept and use the available systems [7]. To date, different methods have been developed in an attempt to understand how end users ultimately decide whether or not to use new technology. The theory of reasoned action (TRA) [8] and the theory of planned behavior (TPB) [9] originate from behavioral sciences, while the technology acceptance model (TAM) [10] and the unified theory of acceptance and use of technology (UTAUT) [11] come from the field of information technology. Adjustments of original methods were also done, with the intention of determining the success or failure of the implementation of new information technologies in the health care environment [12,13].

The technology acceptance model (TAM) is one of the methods for identifying factors determining whether health professionals will use health information technology, and it can partly explain the success or failure of any attempted application process [14]. The TAM model was first developed by Fred Davis in 1986 [10]. This model appears to be particularly applicable in the health information technology field because it focuses on specific variables believed to influence the use of information technology. The TAM distinguishes ease of use, perceived usefulness, and attitudes towards using as the factors which most influence the adoption of new technologies [10].

According to Davis [10,15], the perceived ease of use, which indicates how difficult the person believes the proposed system would be to use, has a direct influence on perceived usefulness, which is defined as a person's belief that using a system increases their efficiency. Lastly, these two factors impact the users' overall attitude towards using the given system, as a major determinant of whether or not the user actually uses it. Additionally, system design characteristics are also thought to have an effect on perceived usefulness and perceived ease of use [16]

Van der Meijden et al. [17] identified user resistance as one of the primary factors leading to unsuccessful EHR implementation. Despite its potential advantages, implementation of the EHR system can face resistance if the users themselves are not satisfied with the system [18]. According to the results of previous studies, the slow adoption of the EHR is affected by the strong resistance among physicians as the main users [19]. Regardless of whether they support the use of EHR or not, physicians will always have a major impact on the other users, such as nurses and administrative staff. Therefore, it is essential by the physicians themselves to understand the potential barriers to implementation of EHR [5]. The aim of this research was to identify factors influencing the acceptance of EHR by physicians in the daily practice of hospital health care.

2. Materials and Methods

The cross-sectional study was conducted among physicians in the General Hospital Pancevo in November 2015. Physicians who, at the time of the study, were out of the hospital due to specialization and those who did not still work with the EHR due to the territorial separation of the hospital departments were excluded. As the instrument for this study, a tailored questionnaire developed according to the TAM was used for the assessment of EHR acceptance among the physicians. Additional statements were added for the purpose of this research, based on a literature search of the validated questionnaires with similar content [14,15]. Out of 172 questionnaires distributed to physicians, 156 questionnaires were submitted, giving a high response rate of 91%. The questionnaire was divided into several parts, which proffered information on various aspects of the use of EHR: (1) general data (age, sex, years of employment, previous experience, specialization, and hospital department), (2) use of computers (in daily life, for reading

professional literature, social networking, reading newspapers, information gathering, previous computer training, and need for additional training), (3) technical performance satisfaction (interface and browsing the patient records, terminology, and EHR capability), (4) EHR ease of use, (5) EHR usefulness, (6) attitudes towards use, and (7) acceptance of the EHR (Figure 1). Questions related to the use of computers had "yes" or "no" answers, for statements regarding daily use of computers and five levels of agreement were used (Likert scale), otherwise 7 possible levels of agreement were offered, from level 1 (very strongly disagree), 4 (neutral position) to 7 (very strongly agree). The following statements were used for assessing the technical performance of the EHR: Interface and browsing the patient records—"letters on the screen are easy to read", "commands and functions are understandable", "personal files are transparent", "accessibility of the patients files is better than in paper patient records", "time required to switch from page-to-page of the personal file is satisfactory", "not too many steps are required for certain tasks", and "steps are in logical order". Terminology—"the professional terminology is adequate", "computer terminology is clear", "error messages are useful", and "clarification of the commands and functions provided by the computer are helpful". EHR capability—"speed of the EHR system is satisfactory"; "the EHR system is always reliable (the system rarely fails)"; "EHR always alerts me to potential problems"; "mistakes made in personal files can be easily corrected"; "the system allows the cancellation of a given operation"; and "when technical problems arise, the problem is quickly resolved". Statements used in accordance with the TAM were as follows: Ease of use—"I find it easy to get the EHR to do what I want it to do"; "interacting with the EHR requires a lot of my mental effort"; "I find that it was easier to work with a paper patient record"; and "overall, I find that improvements are needed to simplify the use of the EHR. Usefulness—"using EHR improves the quality of the work I do", "using EHR enhances my effectiveness on the job", "using EHR reduces errors in prescribing medications", "using the EHR reduces errors in patients' identification", "using EHR reduces errors in diagnosis coding", "using the EHR provides a greater amount of valuable patient information", "using EHR shortens the time spent on administrative tasks, "using EHR increases my productivity", "using EHR improves communication with colleagues and superiors", "using EHR allows me to stay up-to-date with my work", and "overall, I find the EHR useful in my job". Attitudes towards use—"using EHR is a good idea", "using EHR is a wise idea", "I like the idea of using EHR, and "using EHR would be pleasant". Acceptance of the EHR was assessed through the following statement: "the EHR is better than the paper patient record".
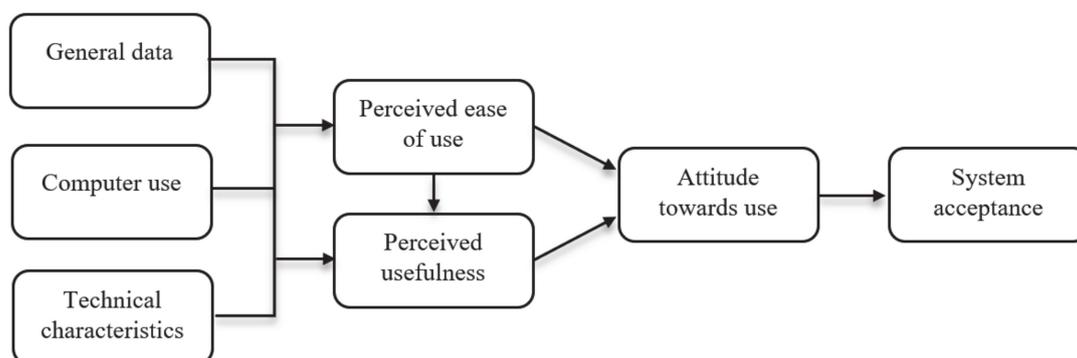
Figure 1. Modified structure of the technology acceptance model (TAM).

Statistical Analysis

Data are expressed as mean values with standard deviations or as medians with ranges. Categorical data are presented by absolute numbers with percentages and analyzed using a Chi-square test and Fisher's exact test. For continuous variables, Student's t test or the Mann–Whitney U-test (according to data distribution) was used. A logistic regression

analysis was used to identify the factors influencing the acceptance of the use of the EHR. Categories were grouped as "disagreement" for levels 1 to 4 (very strongly disagree, strongly disagree, disagree, and neutral attitude) and "agreement" for levels 5 to 7 (agree, strongly agree, and very strongly agree). The dependent variable was the physicians' acceptance of the EHR, assessed by the agreement that the current version of the EHR was better than the paper patient records. When deciding whether physicians prefer the EHR over traditional paper records answers from level 1 to 4 were considered negative, while answers from level 5 to 7 were affirmative. All significant variables from modeling social and technical factors, ease of use, usefulness, and attitudes towards use of the EHR were entered in the final modeling of the determinants of EHR acceptance by forward wald stepwise procedure. To assess the internal consistency of questionnaire, the Cronbach's alpha coefficients were calculated (ranges from 0–1, the latter meaning perfect reliability). Differences were considered significant at a *p* value of <0.05. Statistical analysis was performed using SPSS statistical software (SPSS for Windows, release 21.0, SPSS, Chicago, IL, USA).

3. Results

The mean age in the studied population was 46.4 ± 10.4 years, 58.8% participants were female. The years of employment ranged from 1 to 39 years. Most physicians (83.3%) were specialists, while general practitioners accounted for 16.7%. Thirty four percent were from the surgical department; 25.6% from the internal medicine department; 11.5% from anesthesia; 8.3% from pediatric department; X-ray, CT, and laboratory diagnostics (5.1%); emergency and emergency services (1.9%); and other services (4.5%). Most physicians (72.5%) used computers every day, 22.2% several times a week, while 3.3% did not use computers out of the office. In daily life, physicians used computers to review professional literature (94.6%), for obtaining various types of information (82.4%), reading daily newspapers (93.3%), and for social networking (56.0%). Most of the respondents (68.2%) received training in EHR use at the General hospital Pancevo, and a smaller number (27.3%) were certified at formal computer training. The majority (61.2%) expressed satisfaction with their computer skills, 24.3% were neutral, and 14.5% were not satisfied. One quarter of the respondents stated they need additional training for working with the EHR (24.6%). Most physicians (88.6%) had been working up to 2 years with the EHR.

Statements regarding interface and browsing the patient records (the readability, clarity of the commands and functions, transparency of patients files, and better accessibility of the patients files in comparison to paper documentation) were mostly marked with 5 (agree) on the Likert scale (Figure S1). Neutral attitude was often expressed regarding time needed to switch from page-to-page, the number of steps needed for performing certain tasks, and the logical order of the steps (Figure S1). All of the terminology statements were mostly marked with 5 (agree) on the Likert scale (Figure S2). Concerning EHR capability—system alerts, ease of correction, procedure cancelation, and quick resolution—statements were usually graded with 4 (a neutral attitude) (Figure S3). Grade 3 (disagree) was the average response to satisfaction with the speed of the EHR system (Figure S3). The reliability of the EHR system was graded the lowest (1—very strongly disagree) (Figure S3). Two EHR ease-of-use statements, "I find it easy to get the EHR to do what I want it to do" and "I find that it was easier to work with a paper patient record", were mostly marked with 4 (neutral) (Figure S4). Physicians most often graded with 3 (disagree) the statement "interacting with the EHR requires a lot of my mental effort" (Figure S4). Physicians supported the statement that "improvements are needed to simplify the use of the EHR" with grade 7 (very strongly agree) (Figure S4). Five out of eleven statements, regarding EHR usefulness, were mostly marked with 5 (agree) on the Likert scale—"using EHR improves the quality of the work I do", "using EHR reduces errors in patients' identification", "using EHR reduces errors in diagnosis coding", "using EHR provides a greater amount of valuable patient information", and "overall, I find the EHR useful in my job" (Figure S5). Attitudes towards using the EHR were expressed through 4 statements. "Using EHR would be pleasant" was mostly

marked with 4 (neutral), whereas the physicians showed agreement (5—agree) with the rest of the three statements (Figure S6). Half of the respondents (50.1%) supported the use of EHR in comparison to the paper patients records (Figure 2). Reliability of the scales for technical performance, usefulness of the EHR, and attitudes towards use of EHR, all exceeded 0.85, and demonstrated high reliability of the scales. The domain "ease of use" presented the weakest Cronbach's alfa presenting lower reliability of this scale.
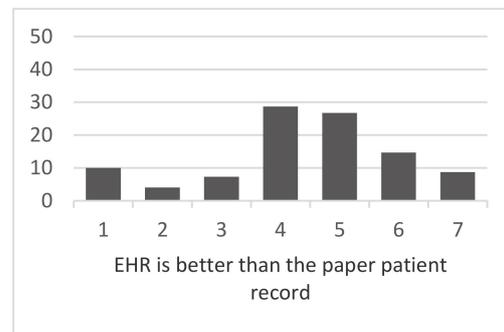
Figure 2. Acceptance of the EHR by physicians in daily practice.

3.1. Social and Technical Factors as Determinants of the EHR Acceptance

The socio-demographic variables and technical characteristics of EHR were used for modeling of EHR acceptance by physicians in the daily practice of hospital health care. In the group of socio-demographic factors—age, duration of employment, and use of the computer outside of the office for reading daily newspapers—were identified as significant predictors for the acceptance of the EHR (Table 1). In multivariate analysis, use of the computer outside of the office for reading daily newspapers was identified as the most significant predictor for the acceptance of EHR among social variables (Table 1). Among the statements regarding technical characteristics, which were all shown to be significant in univariate analysis, better accessibility of the patients files and clear computer terminology were identified as significant predictors, in multivariate analysis ($p < 0.001$ and $p = 0.009$, respectively) (Table 2).

Table 1. Univariate and multivariate logistic regression analysis for socio-demographic factors predicting acceptance of the electronic health record (EHR) in General hospital Pancevo.

Socio-Demographic Factors	Univariate			Multivariate		
	OR	95% CI	*p*	OR	95%CI	*p*
Age	0.967	0.936–0.998	0.036			
Gender	0.977	0.508–1.880	0.944			
Duration of EHR use	1.041	0.850–1.275	0.696			
Duration of employment	0.968	0.939–0.997	0.032			
Daily use of computers	1.888	0.905–3.937	0.090			
Use of computer outside of office hours for review of professional literature	3.541	0.689–18.186	0.130			
Use of computer outside of office hours for social networking	1.961	0.945–4.071	0.071			
Use of computer outside of office hours for reading daily newspapers and magazines which are not professional	3.733	1.355–10.284	0.011	3.733	1.355–10.284	0.011
Use of computer outside of office hours for obtaining information (sites of public and other enterprises, cultural, and social events)	2.211	0.528–9.251	0.277			
Completion of formal training for working with a computer during a professional course with certification	1.152	0.539–2.462	0.714			
Completion of training for working with electronic personal files in the General Hospital	1.067	0.526–2.165	0.857			
I am satisfied with my knowledge of working with a computer	1.847	0.938–3.638	0.076			
I need additional training for working with EHR	1.455	0.668–3.166	0.345			

Table 2. Univariate and multivariate logistic regression analysis for technical factors predicting acceptance of EHR in General hospital Pancevo.

Technical Factors	Univariate			Multivariate		
	OR	95% CI	*p*	OR	95% CI	*p*
Letters on the screen are easy to read	2.223	1.045–4.728	0.038			
Commands and functions are understandable	3.549	1.672–7.535	0.001			
Personal files are transparent	3.176	1.598–6.315	0.001			
Accessibility of the patients files is better than in paper patient records	7.520	3.569–15.846	<0.001	5.050	2.218–11.497	<0.001
Time required to switch from page-to-page of the personal file is satisfactory	4.183	2.089–8.376	<0.001			
Not too many steps are required for certain tasks	3.609	1.814–7.182	<0.001			
Steps are in logical order	5.019	2.503–10.063	<0.001			
The professional terminology is adequate	3.799	1.895–7.616	<0.001			
Computer terminology is clear	4.887	2.358–10.130	<0.001	3.081	1.328–7.147	0.009
Error messages are useful	3.289	1.627–6.649	0.001			
Clarification of commands and functions provided by the computer are helpful	4.053	2.010–8.170	<0.001			
Speed of the EHR system is always reliable	4.369	1.888–10.110	0.001			
EHR always alerts me to potential problems	3.929	1.820–8.480	<0.001			
Mistakes made in personal files can be easily corrected	3.226	1.613–6.450	0.001			
System allows the cancellation of a given operation	3.121	1.536–6.340	0.002			
When technical problems arise, the problem is quickly resolved	3.490	1.438–8.475	0.006			

3.2. Ease of Use and Usefulness as Determinants of the EHR Acceptance

Among ease of use determinants, a significant predictor of the acceptance of EHR was the easiness to get the EHR to do what one wanted (*p* < 0.001) (Table 3). While all of EHR usefulness determinants were significant in univariate analysis, improvements in productivity, quality of the work using EHR, and providing a greater amount of valuable information were identified as a significant predictors of the acceptance of the EHR in multivariate analysis (*p* = 0.004, *p* = 0.032, and *p* = 0.002, respectively) (Table 4).

Table 3. Univariate logistic regression analysis for EHR ease of use, predicting acceptance of the EHR in General hospital Pancevo.

EHR Ease of Use	Univariate		
	OR	95% CI	*p*
I find it easy to get the EHR to do what I want it to	3.975	1.991–7.936	<0.001
Interacting with the EHR requires a lot of my mental effort	1.356	0.590–3.115	0.473
I find that it was easier to work with a paper patient record	0.452	0.194–1.054	0.066
Overall, I find that improvements are needed to simplify the use of the EHR	0.826	0.423–1.615	0.577

Table 4. Univariate and multivariate logistic regression analysis for EHR usefulness predicting acceptance of EHR in General hospital Pancevo.

EHR Usefulness	Univariate			Multivariate		
	OR	95% CI	*p*	OR	95% CI	*p*
Using EHR improves the quality of the work I do	7.250	3.507–14.990	<0.001	2.906	1.099–7.686	0.032
Using EHR enhances my effectiveness on the job	6.444	3.115–13.334	<0.001			
Using EHR reduces errors in prescribing medications	4.299	2.059–8.977	<0.001			
Using EHR reduces errors in patients' identification	4.706	2.274–9.740	<0.001			
Using EHR reduces errors in diagnosis coding	4.214	2.011–8.830	<0.001			
Using EHR provides a greater amount of valuable patient information	7.338	3.331–16.167	<0.001	4.400	1.739–11.130	0.002
Using EHR shortens the time spent on administrative tasks	6.773	3.200–14.334	<0.001			
Using EHR increases my productivity	13.125	5.747–29.975	<0.001	4.477	1.608–12.464	0.004
Using EHR improves communication with colleagues and superiors	5.476	2.626–11.418	<0.001			
Using EHR allows me to stay up-to-date with my work	6.103	2.929–12.718	<0.001			
Overall, I find the EHR useful in my job	4.338	2.118–8.887	<0.001			

3.3. Attitude towards Use as Determinant of the EHR Acceptance

Among attitude determinants, which were all significant in univariate analysis, statements that "using EHR is a good idea" and "it would be pleasant to use it" were significant predictors in multivariate analysis ($p = 0.001$ and $p < 0.001$, respectively) (Table 5).

Table 5. Univariate and multivariate logistic regression analysis for attitudes towards use of EHR predicting acceptance of EHR in General hospital Pancevo.

Attitudes Towards Use of EHR	Univariate			Multivariate		
	OR	95% CI	*p*	OR	95% CI	*p*
Using EHR is a good idea	17.302	4.988–60.019	<0.001	9.819	2.713–35.545	0.001
Using EHR is a wise idea	3.722	1.748–7.926	0.001			
I like the idea of using EHR	8.967	3.645–22.061	<0.001			
Using EHR would be pleasant	8.195	3.782–17.759	<0.001	5.210	2.304–11.784	<0.001

In multivariate logistic regression modeling of social and technical factors, ease of use, and usefulness and attitudes towards use of EHR as determinants of the EHR acceptance, the following predictors were identified: "use of computer outside of the office for reading daily newspapers" ($p = 0.005$), "EHR providing a greater amount of valuable information" ($p = 0.007$), "improvement of the productivity by EHR use" ($p < 0.001$), and "using EHR is a good idea" ($p = 0.014$) (Table 6). The overall percentage of correct classification in the model was 83.9%.

Table 6. Final multivariate logistic regression model for predicting acceptance of EHR in General hospital Pancevo.

Determinants of EHR Acceptance	b	SE	OR	95% CI	*p*	PPV	NPV
Use of computer outside of office Hours for reading daily newspapers and magazines which are not professional	1.948	0.698	7.013	1.786–27.534	0.005	58.3%	72.7%
Using EHR provides a greater amount of valuable patient information	1.452	0.536	4.271	1.493–12.216	0.007	66.3%	78.8%
Using EHR increases my productivity	2.231	0.569	9.309	3.052–28.388	<0.001	83.3%	72.4%
Using EHR is a good idea	1.936	0.785	6.934	1.488–32.323	0.014	62.6%	91.2%
Constant	4.856	1.077	0.008		<0.001		

4. Discussion

This study aimed to bridge the gap between information technology (IT) departments and the growing demands of expanding technology use in health care and physician IT skills. It is broadly accepted that EHR records are inevitable for future healthcare, yet it is a challenge to make the change and convince leaders to put their organizations through the transformation process and make an effort for EHR implementation [20]. This study was conducted for the first time in the hospital setting of the Western Balkans using TAM. The acceptance of the EHR with physicians was associated with its technical characteristics, ease of use, usefulness, and attitudes towards use of the EHR.

According to the literature, the largest barrier to accepting new technologies for the physician was a lack of knowledge of the technology and its complexity [21]. Physicians are not familiar with IT products and believe that implementation of new technology would be overly complicated, or would change the routine of the medical practice. This leads to stress and anxiety, resulting in physicians' hesitation to use new technology [22]. Other barriers responsible for inhibiting the development and application of IT in the health care system have been identified. Variables related to these barriers include changes in the efficiency of physicians, an inadequate legal framework, a deficiency of explicit standards, interoperability, system implementation problems, breaches in privacy and confidentiality, and insufficient research in this area [23].

Satisfaction with the technical performance of the EHR in this study was analyzed using three areas—interfacing and browsing patient records, terminology, and EHR capability. Physicians have expressed greater satisfaction with the interface, but less satisfaction with browsing through patient records. The greatest satisfaction expressed by physicians was easy readability of the screen (74.8%) and the clarity of appointed commands and functions (70.5%). A study by Ludwick and Doucette [24], which analyzed implementation of the EHR in seven countries, showed that quality of the system design and graphical user interface can have an effect on the outcome of implementation. Another great improvement of implementing EHR is better accessibility of the patient files, which can significantly enhance the coordination of care and efficiency of hospital care practice. Regarding the terminology in the EHR, physicians being surveyed were largely satisfied with the professional medical, as well as the computer terminology, which is an integral part of the use of EHR. On the other hand, fewer than half of those surveyed were satisfied with EHR capability. The greatest disagreement was related to reliability of the EHR system, resolution of technical and functional problems, and EHR system speed satisfaction. This was supported by the results from Bloom [25] where physicians were greatly dissatisfied by the time required for documentation management within the EHR. In research regarding the impact of EHR in our region, 55% of respondents answered that the expansion of work due to EHR use has shortened the time spent talking to patients [26].

Concerning the ease of use of EHR, almost half of physicians agree with the statement that it is easy to get the EHR to do what one wants it to do (44.4%) and more than half stated that improvements are needed in order to simplify the use of EHR (64%). The majority of physicians in our study expressed satisfaction with their computer skills and most of them use computers daily. However, as with every new technology, there is an inevitable period of adaptation as one quarter of physicians in our study think that they still need additional education to work with the EHR. It is important to keep in mind that the majority of health workers have used a computer only superficially as a workplace tool, and that it cannot be expected that full productivity will be achieved without additional training [27]. Training is therefore the right setting for introduction to the principles of security policy and the rules of using the system. In this sense, well planned and timed training of health care workers to use informational technology in everyday practice can be considered as an operational goal [28]. The importance of the training and its effect on acceptance of technology was recognized in other studies as well, where over 90% of surveyed physicians expressed positive attitudes towards training and reported that it helped them use EHR more efficiently [29]. In addition to the process of implementation, it

has been shown that quality of the system is equally important, which means EHR must be flexible, user-friendly, and functional in order to be acceptable [30].

Results showing that perceived usefulness provides a reliable prediction for system acceptance were first shown in a study by Schultz and Slevin [31], and later confirmed by Robey [32]. This is consistent with our study results, where a considerable effect of perceived usefulness on physicians' technology use acceptance was confirmed. Furthermore, Bandura [33] considers that both perceived usefulness and ease of use are important when it comes to predicting user behavior. Yang and Yoo [34] proposed that attitude needs to be an essential part of the TAM because of its crucial effect on system use and acceptance. This was confirmed by our study results, as well as study results conducted in Iran [35], where perceived ease of use and usefulness were shown to have significant value in attitudes toward users' system acceptance.

When it comes to technology acceptance, numerous methods have been developed in order to predict the drawbacks of the implementation and tailor it to users' needs. One of the models that set the foundations in the field of technology was the theory of reasoned action, developed by Fishbein and Ajzen (1975) [36]. According to this model one's specific behavior is determined by behavioral intention, which is influenced by two main concepts—prior attitude and the subjective norm regarding this behavior. In a study comparing the TRA and the TAM, while both showed notable results in predicting intention to use a system, the TRA presented limited correlation between subjective norm and behavioral intention variables [10]. As an extension to the TRA, the TPB has the similar approach to this question, but with one additional construct [9]. This improvement has made a more complete model, so in a research by Mathieson, the TPB came up as superior compared to the TAM in some areas such as delivering specific information [37]. Looking at the overall preferences the TAM has remained more attractive because it is simpler, easier to apply, and has modest empirical advantage.

A fresher model developed in 2003 [11], the unified theory of acceptance and use of technology, is based on eight different technology acceptance models, with the TAM and TRA among them. It considers four variables, providing more information, which leads to a longer and more complex questionnaire. Questionnaires that are too long exponentially increase the time for respondents and therefore they are more susceptible to careless answers and a lower response rate [38].

Despite the fact that the TAM have been used in numerous studies and has been widely accepted as a tool of predicting whether users will accept or decline the system, studies in health care show mixed results. In order to adapt the model, researchers added different variables, as well as revised the original model instruments which shows that the original TAM is not perfect when it comes to predicting technology acceptance in health care [39]. The main criticism is that the TAM focuses mostly on the technology component (ease of use, usefulness) as the crucial factor for acceptance. On the other hand external aspects such as social, cultural, and emotional and also different groups of users are overlooked [40]. Another drawback is that all of the models were designed outside health care settings—the TAM was developed in studies linked to e-mail and word processing systems [39]. This utilization encounters difficulties when it's transferred to a complex environment such as health care. The systems TAM was developed on involved voluntary use, while implementing technology in health care means they are mandatory, which can induce aversion among users. Answer to this could be incorporating appropriate variables to extend model design in order to adapt it to health care settings. Analyzing all previously mentioned characteristics among these models resulted in the making of the TAM, which was our choice as a foundation for developing a model that would consider personal viewpoint on technology use as well as external factors and, thus create a straightforward survey.

Other than the unquestioned benefits of its use, IT can also provoke unwanted effects and resistance from employees [41]. Since IT creates new working environments, it has influenced changes in work culture and systems of employee values so that these changes

are perceived and accepted to varying degrees [42]. Research conducted on our physicians has shown that computerization has another side to it. The implementation of IT in the selected health care center, did not proceed without issue, especially in its initial phase. Simultaneous changes in methods of working and renunciation of established routines to acquire new ones is a complex mental process further complicated by the nature of the healthcare organization [26]. The EHR is considered to be the backbone supporting the combination of different information tools that could advance the uptake of evidence into clinical decisions. It also facilitates decision-making and knowledge-exchange among physicians by granting them significant, up-to-date, and timely information [43]. If physicians' attitudes reflect the notion that they are more eager to use and to spend more time learning the EHR system, it seems more likely for them to adapt EHR technology [20].

5. Conclusions

The TAM is useful in identifying factors influencing physicians from different backgrounds in the use of EHR, but it only partly explained physicians' EHR adoption. In multivariate logistic regression modeling of social and technical factors, ease of use, usefulness, and attitudes towards use of EHR as determinants of the EHR acceptance, the following predictors were identified: use of computers outside of the office for reading daily newspapers ($p = 0.005$), the EHR providing a greater amount of valuable information ($p = 0.007$), improvements in productivity by EHR use ($p < 0.001$), and the statement that using EHR is a good idea ($p = 0.014$). Future technology acceptance research should attempt to add other constructs or integrate other theories with the TAM in order to fully identify all determinants of physicians' acceptance of the EHR in the complex environment of different health systems.

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