

ENTERPRISE APPLICATION INTEGRATION ADOPTION IN HEALTH INDUSTRIES OF PAKISTAN

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Abstract

Scientific inventions changed the course of history whereby world has become global village, this became possible with the invention of internet revolution. The present societies are data driven whereby everything is stored in data-based systems. Single click could bring us whole world at our hand to watch everything of everywhere else in the world. Scientific knowledge has served the interests of human being in best way according to the modern age demands. Every institute needs an innovation to be productive and result oriented.

The central theme of this study is an adaptation of Enterprise Application Integration (EAI) into the health industry of Pakistan. The present research study has been carried out to find out the influential factors affecting the enterprise application integration adoption into the health industry of Pakistan. The selection of the participants was made on the basis of their positioning into the health industry. So, the participants were selected from managerial level for data collection process. Reviewing the literature on the entitled topic, it is revealed that very fewer researchers have worked in this area. The present study will fill the knowledge gap in understanding the factors which affect the adaptation process of enterprise integrating applications into health industry of Pakistan.

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The present research will be helpful for policy makers in the health care systems of Pakistan.

Key words: *Enterprise Application Integration, Health Industry*

1. Introduction

Just for a moment we think of life style of our forefathers back into the age of cave dwellers when there was nothing, neither electricity nor road communication, or cellular phones and anything else which we have in present age. How did they live in ages without all such facilities which we enjoy? It was toughest troubled life where they had to travel years long journeys and hundreds of miles in the search of food. They lived either in caves or on trees to save their lives from dangers. They lived for living where they had only one thing in their minds that was only how to be safe from the nature's hits and from the giant animals. At some point they reached to think of progress after thousands of years when they first invented tools for hunting and so forth they continued such progress through sacrificing the hundreds of lives and gave us new directions to live a luxurious life style in the present age. It was their wisdom and sacrifices which made it possible for us to live a life with comfort.

Two main advancements can be account for the recent trends in the world which could be count major developments in human life today; these are database systems and information analytical systems. Particularly we take the case of health care industry where information technological advancements have transformed the whole industry into the new era of advancements which have proved to be highly significant for patient care. This is, however fact that use of IT system in health care industry is yet slower as compared to the commerce and other business organizations. EAI software systems are suitable to integrate all the departments integrated with each other (Muhammad Fiaz, 2018). EAI (Enterprise Application Integration has main purpose of integration of various parts of the organizations, companies through the information systems to make the service delivery smooth for best results. This makes it an easy communication with all other communicative actors within the companies, business organizations as well (Kiosk.net, 2014). Not a single system is available but many information systems are to support the business organizations, companies and non-profit organizations including the government organizations. Enterprise Application Integration (EAI) enables to integrate the applications in enterprise and keep smooth the information flow without hindrances (Gabriel dos A. C. V. Real, 2019). As regards, these are scientists and their inventions in every field of life

which turned the course of human history from traditional to modernism. Invention of electric bulb turned world from darkness to light, computer and internet turned the scattered population of world into global village where all societies become the data driven. So, for everything changed from old to modern age. It is technological advancement that has given the new shape of material life. Scientists and their technological advancements even though yet have not completely controlled the natural hazardous rather they have reduced its dangers. The present research study is about the enterprise adoption integration into the health industries of Pakistan. EAI has become an important activity for the organization all over the world. It reduces the cost relating to the integrating information system within organizations. According to the previous research studies, 40 percent of cost goes into to the integrated related activities, however; 90 percent manager all around the world endorsed the importance of integrating process is extremely important for the IT system of organizations (Dahl, 2002).

2. Review of Literature

Application Integration (EIA) is an important for business world where technologies have become an important factor for their progress and efficient service delivery. Organizations use these technologies for information to integrate through the computer application of information technologies to ease workload for better results (Tariq Rahim Soomro, 2012). In order to gain the improvement in electronic commerce by the organizations, a case was developed for EAI through discussing the multiple ways whereby EAI was explained and is justified proper solutions for implementation. Combining the decision-making capabilities of participation of partners actually will enable the integration the inter-enterprise decision making for monitoring the entire elements. Moreover, it is explained that even though EAI could fulfill the new business needs but it is mandatory for the organizations to favor those technologies which could add value, delivered individually and in accord with other technologies (Erasala et al. 2003). It is proposed that the EAI impact on information system can be better understood through classification of framework which categorizes its type of application for integration into the existing technologies (Irani et al. 2003). As regards, classification of EAI is an appropriate tool for managers to evaluation and implementation of ERP technology within and between the customers/suppliers in their supply chain. It is argued in a paper that EAI is actually a result and road map which showing a clear strategic position of organization including the existing inhibitors and they are well aware of the benefits of chosen technology. (Chen and Wong, 2004). The two-model workflow and transition model based on database using COBRA interface for integrating different types of systems to control the processes, dynamically. Through this process organizations are well

defined about their business process and rules which motivate them to adapt changes in applications as well. There are three levels defined for EAI solutions such as software product development methodology, technical implementation, and functional analysis (Surugiu, 2012). There have been emphases on these approaches that business can be optimized through these processes of integrating approach in order to achieve fully integrated information system for maximum work efficiency. However, the traditional techniques of EAI, challenges and advantageous are discussed in to the application integration with Web Service Technology. The proposed model for EAI with Web Services is an efficient in integrating of different applications and systems within and between the enterprises. This model excels with provision of a broad support for service integration beyond application integration. The comparison of both frameworks was made through surveying common enterprise systems modeling a framework which is used to model EAI with other widely accepted frameworks. In order to identify the major weaknesses and strengths are defined using the set of reusable features. UML specification standard was used and introduction of the different integration views for each integration levels. The lack of participation of other stakeholders from the aspect of human which is fundamental to achieve the desired project goals is also a weak point including aforementioned weak points. The failure of the Enterprise Resource Planning (ERP) was analyzed with the legacy processes of using EAI approach and a model was presented for post-hoc evaluation to give an insight regarding the failed approach to ERP integration (Sharif et al. 2005).

EAI adoption into health industry has parallel functions of benefits as well as barriers (Mantzana & Mistocleous, 2006). There have been more actors are mapped and identified in the terms of benefits and barriers. That proposed approach by them has enhanced the level of understanding of ERP and EAI adoption benefits and barriers, enhances the analysis of EAI adoption by incorporating an actor-oriented approach, and facilitates decision-makers in realizing EAI adoption.

3. Objectives

1. To determine the relative advantages of EAI adoption into the health care organizations.
2. To examine the influences of compatibility on adopting the EAI into the health care industries.
3. To determine the impacts of trialability into the health care industry.
4. Analyze the situation and identify needs of observability upon the EAI after adoption

5. To find out impacts complexity of the adoption of Enterprise Application Integration at health care centre.
6. To examine impacts of IT Support into the health care Centre.
7. To examine impacts of IT support into the process of adopting the enterprise application in health sector organizations.

4. Research Methodology Employed in the Present Study

Present study is followed by positivist approach proceed further. This approach is also called deductive as opposed to the inductive approach. This is objective based whereby a researcher (s) is unbiased and remain totally beyond the emotional touch with the research population. Adoption of this approach in research inquiry clarifies this that relations of multiple variables are explained and hypotheses are tested.

4.1 Deductive

The present study is comprised of deductive approach. In this research study the data is collected in numeric form and is saved into the computer for analyzing it. In the deductive approach a researcher has to focus on the objectivity. Quantitative research methods are purely for quantification of information gathered by the researchers. According to the Creswell, (2003), in quantitative research data is collected in numeric form for quantification in statistics to encounter the other claims of the knowledge. Quantitative research methods are highly supportive in testing existing theories, concepts and measuring the relationship among other variables (Collis and Hussey, 2003).

4.2 Research Design Employed in the Present Study

In empirical studies a detailed comprehensive plan for data collection is called research design to give the answer of research problem specifically formulated and for hypothesis test. It is comprised of three major parts: such as: (a) data collection (b) instrument development process (c) sampling for data collection. The present study is combination of exploratory and explanatory research in its nature to find the answer of the research question through careful investigation through statistical treatment. In order to answer the research question, there is need to have a comprehensive plan comprised of tools, techniques to gain knowledge regarding the research topic.

4.3 Sampling Strategy

A detailed comprehensive plan for data collection that gives a clear picture of the targeted unit of analysis, data collection procedures and instruments for data collection is called sampling strategy. The research is about the enterprise

adoption in health industry of Pakistan, it is therefore; researcher chose to undertake major government hospitals of the Sindh province for data collection. In the present study, researcher has selected the medical staff that comes in the circle of medical professionals from top to bottom middle level for responding the survey questions and give insightful information.

4.4 Targeted Population and Data Collection in Present Study

Seven major civil hospitals of Sindh province were selected for the present study from health industry of Pakistan. These are: Civil Hospital Karachi, Civil Hospital Tando Allhayar, Civil Hospital Nawabshah, Jeejal Maa Hospital Hyderabad, Civil Hospital Naushahro Feroze, LUMHS Jamshoro, Civil hospital Hyderabad. The doctor(s), physician(s) Nurse, IT assistant, Internee were major respondents for the study who could properly respond.

4.5 Sampling & Sample Size Used in the Present Study

It is not possible for researcher(s) to reach out to whole population due to the cost burden and time consuming, however; it is therefore; researchers choose to bring data through sampling of whole population. Through sampling a researcher collects the data from targeted units of analysis. According to the (Gay & Airasian, 2000) “the aim of sampling is to get information about the population by using the sample. The more the selected sample represents the population, the more the research results are to be found generalizable to the population”. The sample size in present study was totally 319 respondents demographically divided according to the main objectives of proposed research study where medical doctor, physician, nurse, IT assistant and internee enlisted.

4.6 Data Collection Procedure in the Present Study

There are two major data collection techniques: (1) primary (2) secondary. A primary data collection type was used in the present study with the survey questionnaire instrument and seven liker scales was used for data analysis. Seven major civil hospitals were selected within the Sindh province. Medical staff comprised was involved into the respondents based on the set criterion of this study whereby all said respondents were provided closed ended survey questionnaire. They were told section-wise technique of filling the questionnaire.

4.7 Survey Questionnaire as an Instrument

The main purpose of using cross-sectional questionnaire survey was for data collection of the present study was its appropriateness especially in the matter of technology acceptance and Application Integration research owing to its cost

effectiveness and rapid responsiveness that made it an efficient and applicable at large level administratively (Churchill, 1995; Sekaran, 2000; Zikmund, 2003).

The questionnaire was developed using Likert type scale ranking the respondent opinions at different degrees. A pilot study was carried out in order to test the ambiguity of questionnaire and also measuring whether the questions are fit for the respondents. Then the instrument was pilot tested for the assessment of the psychometric properties of the measurement items. In the field survey, 120 questionnaires were returned out of 150 distributed, which represented a response rate of 80% of the original sample. However, among those returned questionnaires, some responses were discarded because four of them were returned completely blank, five respondents had put the same answers on all the Likert scale items, seven respondents mentioned that they had never used internet before (i.e. not satisfying inclusion criteria) and six questionnaires were partially answered (i.e. some questions and/or some parts of the questionnaire such as demographic questions were left blank). Therefore, remaining 120 questionnaires were used for further data analysis. As a result, the final response rate in this study was 77.33%. All of these valid responses were coded into Statistical Package for the Social Sciences (SPSS) version 16.0 for statistical analysis. Two types of data analysis were performed on the data: descriptive analysis and inferential analysis. The latter included exploratory factor analysis and structural equation modeling analysis including confirmatory factor analysis and hypotheses testing. Descriptive analysis and exploratory factor analysis were performed using SPSS while structural equation modeling (SEM) analysis was performed using Analysis of Moment Structures (AMOS) software version 16.0. A two-stage approach was adapted to conduct SEM analysis as recommended by (Anderson & Gerbing, 1988). In the first stage measurement model using confirmatory factor analysis (CFA) was conducted to assess the reliability and validity of latent constructs. In the second stage, hypotheses related to influential factors were tested. The SEM model fit was determined using goodness-of-fit indices and coefficient parameter estimates, as suggested by (Byrne, 2001; Kline, 2005; Hair et al., 2006).

4.8 Participants

Medical staff from seven major movement hospitals from Pakistan was selected for closed ended survey questionnaire. The present research study was carried out through employing the deductive approach whereby structured survey questionnaire was distributed among the targeted participants. The data was collected through structured pre-planned questionnaire followed by independent variable describing the 25 questions to attributes for relevancy and 5 questions of

relative advantages, 5 questions for compatibility, 5 questions for complexity, 5 questions for IT support and 5 for dependent variable enterprise application integrations.

The questionnaire was divided into following categories: The demographical, academic education, job position which was analyzed using descriptive statistical mode. This was used to explain demographical positioning of information as well as multiple regressions and factors analysis are used for analyzing the data of variables.

4.9 Independent Variables

1. Relative advantage
2. Compatibility
3. Trialability
4. Observability
5. Complexity
6. IT Supports

4.10 Hypotheses

H1: Relative Advantage has a positive and significant influence on the adoption of Enterprise Application Integration.

H2: The compatibility has a positive and significant impact on the adoption of Enterprise Application Integration.

H3: The trialability has a positive and significant influence on the adoption of Enterprise Application Integration.

H4: The observability has a positive and significant influence on the adoption of Enterprise Application Integration.

H5: The complexity is proven to be a negative and has insignificant influence on the adoption of Enterprise Application Integration.

H6: The IT Support is positive and significantly influence in adopting Enterprise Application Integration.

5. Results of the Study

This research was aimed at examining the enterprise application integration (EAI) adoption in health care industry using a questionnaire. Apart from the demographic information of the respondents, they were enquired on aspects

related to constructs of Innovation Diffusion Theory on their adoption and EAI use based on a Likert type scale describing the opinion as certain degree of agreement. The questionnaire also contained to enquire efficiency improvement of the respondents after EAI use; EAI facilitation and further aspects related to the technological advantages by EAI adoption. The results thus achieved are presented and described in the following paragraphs:

5.1 Cronbach's Alpha Reliabilities

The convergent validity of scale items was estimated by reliability (Fornell & Larcker, 1981) and Cronbach's Alpha loadings for all scale items exceeded the minimum loading criterion, and the composite reliabilities of all factors also exceeded the recommended level which was alpha 0.996. Cronbach's alpha estimate value above 0.70 is considered as acceptable (Nunally, 1978). According to (Sekaran, 2000), if the value of Cronbach's alpha reliabilities is less than 0.6, they are considered as poor, if the value is in 0.7, they are acceptable, and their reliabilities value above 0.8 are considered good. Therefore, the closer the Cronbach's alpha gets to 1.0 the better is the reliability. Table 4.1 presents the Cronbach alpha coefficients for all constructs obtained in the pilot study.

Cronbach Alpha	Of Items
0.896	35

5.2 Gender of Respondents

A total of 319 respondents were either provided with questionnaire personally or through courier for obtaining information on Enterprise Application Integration (EAI) adoption in health care industry and 19 of them either were incomplete or information they provided were irrelevant.

Hence, 300 valid respondents were taken into consideration for data collection. Findings of pilot study showed that out of 300 valid respondents most of them belonged to male gender (n=198, 66.0%); while remaining 34.00 percent respondents were females that were enquired on the basis of questionnaire.

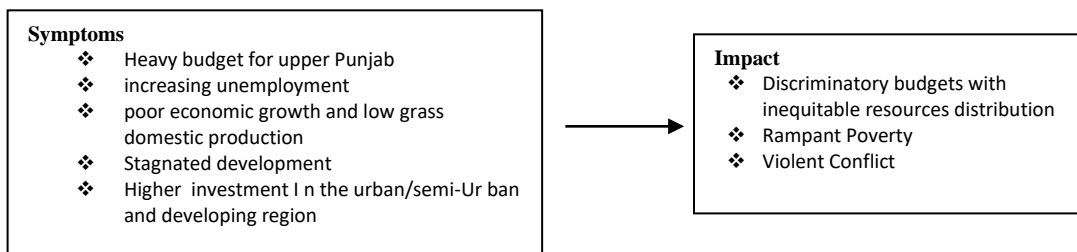


Table 4. 2
Gender of the respondents used for EAI adoption in health care industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	198	62.1	66.0	66.0
	Female	102	32.0	34.0	100.0
	Total	300	94.0	100.0	
Missing	System	19	6.0		
Total		319	100.0		

5.3 Respondents Age

Age of workers in an organizational management and administration supports in decision making process, however; adoption behavior of experienced workers also helpful in technological diffusion process. Information on Enterprise Application Integration (EAI) adoption in health care industry was obtained and valid 300 respondents were enquired on their age. Findings of pilot study showed that majority of participants (n=96, 32.0%) were in the age group of 25-34 years; followed by 35-44 years of age (n=78, 26.0%), under 25 years (n=54, 18.0%), 45-54 years (n=42, 14.0%), 55-64 (n=24, 8.0%) and remaining (n=6, 2.0%) respondents were above 65 years of age.

Table 4. 3
Distribution of respondents used for obtaining information on EAI adoption
in health care industry by their age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 25	54	16.9	18.0	18.0
	25-34	96	30.1	32.0	50.0
	35-44	78	24.5	26.0	76.0
	45-54	42	13.2	14.0	90.0
	55-64	24	7.5	8.0	98.0
	Above 65	6	1.9	2.0	100.0
	Total	300	94.0	100.0	
Missing	System	19	6.0		
	Total	319	100.0		

5.4 Occupation of Respondents

The occupation of the participant has significant impact on the perception and opinions of a worker on the technological diffusion in the organization. The information on Enterprise Application Integration (EAI) adoption in health care industry was obtained and valid 300 respondents were enquired for their occupation in various organizations involved in the health care. Findings of pilot survey indicated that majority of the participants (n=81, 27.0%) were physicians; followed by nurses (n=66, 22.0%), Technicians (n=57, 19.0%), I.T. Assistants (n=48, 16.0%), Doctors (n=27, 9.0%) and remaining (n=21, 7.0%) respondents were Internees. The above respondent distribution indicates that there was a balanced participation of all the occupational categories of staff working in various organizations involved in health care to perceive EAI adoption.

Table 4. 4
Distribution of respondents used for obtaining information on EAI adoption
in health care industry by their occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Doctor	27	8.5	9.0	9.0
	Physician	81	25.4	27.0	36.0
	Nurse	66	20.7	22.0	58.0
	I.T	48	15.0	16.0	74.0
	Assistant				
	Technician	57	17.9	19.0	93.0
	Internee	21	6.6	7.0	100.0
	Total	300	94.0	100.0	
Missing	System	19	6.0		
Total		319	100.0		

5.5 Health Care Organizations/Units of Respondents

The respondents were selected from different health care units/hospitals of Sindh for obtaining information on Enterprise Application Integration (EAI) adoption in their organization. Out of valid 300 respondents used in this study, seven major hospitals were surveyed and interviewed the staff relevant to study aspects which included LUMHS Jamshoro (n=75, 25.0%); Civil hospital Nawabshah (n=63, 21.0%), Civil hospital Naushahro Feroze (n=60, 20.0%), Civil Hospital Tando Allahyar (n=48, 16.0%), Civil Hospital Hyderabad (n=33, 11.0%), Civil hospital Karachi (n=15, 5.0%) and remaining (n=6, 2.0%) respondents were from JeejalMaa hospital Hyderabad. The above respondent distribution indicates that there was a balanced participation of all the major hospitals of Sindh in function and obviously the information received from the sample respondents regarding EAI adoption at their organizations will be valid and well justified.

Table 4. 5
Distribution of respondents used for obtaining information on EAI adoption
in health care industry by their parent department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Civil Hospital Karachi	15	4.7	5.0	5.0
	Civil Hospital Tando	48	15.0	16.0	21.0
	Allhayar				
	Civil Hospital Nawabshah	63	19.7	21.0	42.0
	Civil hospital Hyderabad	33	10.3	11.0	53.0
	Civil Hospital Naushahro	60	18.8	20.0	73.0
	Feroze				
	LUMHS Jamshoro	75	23.5	25.0	98.0
	Jeejal Maa Hospital	6	1.9	2.0	100.0
	Hyderabad				
	Total	300	94.0	100.0	
Missing	System	19	6.0		
	Total	319	100.0		

5.6 Impact on Working Efficiency by EAI Adoption

The participants were offered different statements describing the impact of EAI adoption on the working efficiency of the staff and efficiency of EAI was ranked as Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5). Digits in parenthesis indicate the score on suggested opinions on a statement. The achieved results (Table 6) indicated that the respondents agreed that there were enough advantages of EAI for them to consider using this system (3.28 ± 1.080); they were helped by EAI installation to manage their time better (3.22 ± 1.103); correction of mistakes was easier for them through EAI adoption (3.20 ± 1.060); while the respondents were neutral on the statement that EAI improved their efficiency when they used (3.00 ± 1.115). The respondents also

showed neutral response over the statement that the mistakes were more likely to occur with EAI usage than manual one (2.80±1.133). The perceptions of the respondents clearly indicating the positive comments of the EAI users and mean score of Likert scale considers that the respondents were positive over the validity of EAI system for improving overall individual and organizational efficiency.

Table 4. 6
Statements on the relative advantage and EAI adoption as perceived by
respondents from different hospitals of Sindh province
Likert Scale: Strongly Disagree=1: Disagree=2: Neutral = 3: Agree=4
Strongly Agree= 5

Statements	N		Mean	Standard Deviation
	Valid	Missing		
EAI has improved my efficiency after using	300	19	3.00	±1.115
Mistakes with EAI are easier to correct than manual ones	300	19	3.20	±1.060
There are enough advantage of EAI for me to consider using this	300	19	3.28	±1.080
Mistakes are more likely to occur with EAI usage than manual one	300	19	2.80	±1.133
EAI help me to better manage my time	300	19	3.22	±1.103

5.7 Compatibility and EAI

The respondents were asked to perceive on certain statements describing the compatibility and EAI adoption in the health care industry in Sindh province and compatibility was measured by perceptions of respondents as Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5). The digits in parenthesis indicate the score on suggested opinions on a statement. The obtained results (Table 7) demonstrate that respondents agreed that it bothers them to use EAI when they could do their work manually (3.32 ± 1.258); EAI makes their work redundant (3.28 ± 1.186); they worry about the privacy and their perception is about the security of personal information. (3.14 ± 1.374); and they do not need EAI at their work (3.18 ± 1.262). The respondents showed neutral response over the statement that they are worried about the privacy of their information when using EAI (3.00 ± 1.402). The respondents' opinion in most cases on compatibility and EAI aspects were adverse and probably on EAI adoption they entirely showed negative attitude.

Table 4.7
Compatibility and EAI adoption as perceived by respondents from different
hospitals of Sindh province
Likert Scale: Strongly Disagree=1: Disagree=2: Neutral = 3: Agree=4
Strongly Agree= 5

Statements	N		Mean	Standard Deviation
	Valid	Missing		
I do not need EAI in my work	300	19	3.18	± 1.262
EAI makes my work redundant	300	19	3.28	± 1.186
It bothers me to use EAI when I could do my work manually	300	19	3.32	± 1.258
I worry about the privacy of my information when using EAI	300	19	3.00	± 1.402

I worry that EAI is not secure enough to protect my personal information	300	19	3.14	±1.374
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5.8 Trialability and EAI

This term best describes the intention of potential users that how they go on exploring innovations in however; it is not an easy process to impose the potential users rather they seek innovation using trial to satisfy them. As regards, respondents were offered EAI trialability and asked to perceive on statements related to EAI trialability for adoption in the health care units of Sindh province and opinions were ranked as Strongly Disagree (1), Disagree (2), Neutral (3), Agree(4) and Strongly Agree (5).The results obtained in (Table 8) showed that respondents agreed that it is better to experiment with EAI before its adoption (3.50 ± 1.348); they think there is no need to have trial version for convincing because EAI is best-fit IT option in organizational management (3.36 ± 1.074); it did not take them much time to try EAI before my final acceptance for its adoption (3.30 ± 1.362); it become an easy after trial to use this out this (3.24 ± 1.161). The respondents showed neutral response over the statement that the trial convinced them that using EAI was better than to work manually (2.90 ± 1.206). The respondents' perceptions on trialability and EAI aspects were generally positive and promising.

Table 4. 8
Trialability and EAI uses perceived by respondents from different hospitals of Sindh province
Likert Scale: Strongly Disagree=1: Disagree=2: Neutral = 3: Agree=4
Strongly Agree= 5

Statements	N		Mean	Standard Deviation
	Valid	Missing		
It was easy to use EAI more frequently after trying this out	300	19	3.24	± 1.161
A trial convinced me that using EAI was better than using manual	300	19	2.90	± 1.206
I do not need a trail to be convinced which EAI are the best for me	300	19	3.36	± 1.074

It did not take me much time to try EAI before I finally accepted their	300	19	3.30	±1.362
It is better to experiment with EAI before adopting them	300	19	3.50	±1.348

5.9 Observability and EAI

Observability is the impact or convincing of individuals for using a product after experimentally proven benefits and advantages. In this study, it was known based the perception of respondents towards the EAI use the respondents were asked to perceive what was observed by them after trialability about the EAI systems. They were asked to perceive on the basis of statements ranking as Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5) and their responses are shown in Table 9. The study outcomes indicated that respondents agreed that observing EAI users before using EAI was unnecessary (3.740 ± 1.018); it is easy to use EAI even if one has not used it before (3.38 ± 1.312); observed others using EAI and saw the advantages of doing (3.10 ± 1.287); while the respondents remained neutral on the statements that they have seen how others use EAI before using them (2.80 ± 1.402) and they were influenced by what they observed as the benefits of using EAI (2.80 ± 1.539).

Table 4. 9
Observability and EAI uses perceived by respondents from different
hospitals of Sindh province
Likert Scale: Strongly Disagree=1: Disagree=2: Neutral = 3: Agree=4
Strongly Agree= 5

Statements	N		Mean	Standard Deviation
	Valid	Missing		
I was influenced by what I observed as the benefits of using EAI	300	19	2.80	±1.539
I observed others using EAI and saw the advantages of doing	300	19	3.10	±1.287
Observing EAI users before using EAI is unnecessary	300	19	3.74	±1.018
I have seen how others use EAI before using them	300	19	2.80	±1.402
It is easy to use EAI even if one has not use them before	300	19	3.38	±1.312

5.10 Complexity and EAI

Complexity characterizes the behavior of a model or a system. In this investigation, respondents from different hospitals of Sindh province were asked to perceive on the complexities with the use of EAI systems considering statements ranking as Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5). Responses of the respondents (Table 10) indicated that participants agreed that EAI is difficult to understand and use (3.75 ± 1.301); EAI is complicated to learn (3.45 ± 1.163); EAI are confusing (3.26 ± 1.121); EAI are convenient to use (3.25 ± 1.222) and they also agreed that it is easy to use (3.10 ± 1.065). The mean \pm std deviation suggested some confusing results that the

respondents equally agreed both the negative as well as positive statements on the complexities and easiness of the EAI application.

Table 4. 10
Complexity in EAI uses perceived by respondents from different hospitals of Sindh province
Likert Scale: Strongly Disagree=1: Disagree=2: Neutral = 3: Agree=4
Strongly Agree= 5

Statements	N		Mean	Standard Deviation
	Valid	Missing		
EAI is complicated to learn	300	19	3.45	±1.163
EAI is difficult to understand and use	300	19	3.75	±1.301
EAI are convenient to use	300	19	3.25	±1.222
EAI are confusing	300	19	3.26	±1.121
It is easy to use	300	19	3.10	±1.065

5.11 IT Support and EAI Use

The respondents from different hospitals of Sindh province were enquired over the IT support and EAI use in their respective organizations and they were facilitated to rank the certain relevant statements on the basis of ranks such as: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5). Figures in the parenthesis represent the score assigned to respective rank/degree. The responses of the respondents (Table 11) demonstrated that participants strongly agreed that online registration is preferable (4.30 ± 0.879); agreed that facilities provided outdoor patients (3.95 ± 0.755); burden decreased from staff (3.70 ± 1.111); all computers are connected (3.30 ± 0.997) and they also agreed that IT based systems saved doctors and patients time (3.71 ± 1.136). The mean \pm std deviation described a positive perception of respondents on the use of IT based EAI application in health care industry and declared multiple benefits not only for the hospital staff, management and patients as well.

Table 4. 11
IT Support and EAI uses perceived by respondents from different hospitals
of Sindh province
Likert Scale: Strongly Disagree=1: Disagree=2: Neutral = 3:
Agree=4Strongly Agree= 5

Statements	N		Mean	Standard Deviation
	Valid	Missing		
Online registration is preferable	300	19	4.30	±0.879
Facilities provides outdoor patients	300	19	3.95	±0.755
Burden decreases from staff	300	19	3.70	±1.111
All computers are connected	300	19	3.30	±0.997
Saves doctors and patients time	300	19	3.71	±1.136

5.12 EAI Use and its Benefits

The staff employed in different hospitals of Sindh province including paramedics, Physicians and Doctors were asked to disclose the benefits associated with the EAI use in the respective hospitals. Certain statements were presented to perceive according to scale as: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5). Perceptions of the respondents (Table 12) suggested that participants agreed that they intention using EAI because of time management which it covers through this process easily. (3.88 ± 1.118); because EAI are appropriate to their profession they will use them in future (3.43 ± 0.963); EAI usage was appropriate for their working style and they will continue using it (3.22 ± 1.103); while respondents were neutral over the statements that the difficult in learning for using EAI will make them not use EAI in future (2.57 ± 1.390) and the benefits of EAI will make them continued to use EAI in the future (2.30 ± 1.348). The mean \pm std deviation suggested a positive opinion of respondents on the use of EAI application in health care industry and supported its associated benefits.

Table 4. 12
EAI use and probable benefits as perceived by respondents from different
hospitals of Sindh province
Likert Scale: Strongly Disagree=1: Disagree=2: Neutral = 3:
Agree=4Strongly Agree= 5

Statements	N		Mean	Standard Deviation
	Valid	Missing		
The benefits of EAI will make me continue to use them in the future	300	19	2.30	±1.348
I intend to continue to use EAI because they help manage my time better	300	19	3.88	±1.118
Because EAI are appropriate to my profession i will use them in future	300	19	3.43	±0.963
EAI usage is appropriate for my working style and I will continue using it	300	19	3.22	±1.103
The difficulty in learning to use EAI will make me not use them in future	300	19	2.57	±1.390

5.13 Correlation Coefficients among the Advantages

The discriminant validity was determined by the average variance extracted for each construct compared with the corresponding squared inter-construct correlation and the average estimate larger than estimates present results of squared inter-construct correlations and the discriminant validity for each construct used in this study.

The correlation analysis described positively significant ($P < 0.01$) association EAI vs relative advantage ($r = 0.978^{**}$), EAI vs compatibility ($r = 0.981^{**}$), EAI vs trialability ($r = 0.979^{**}$), EAI vs observability ($r = 0.978^{**}$), EAI vs complexity ($r = 0.972^{**}$), EAI vs IT support ($r = 0.995^{**}$). All the possible interrelationships among studied parameters was positive and highly significant ($P < 0.01$). This

suggested that with the installation of EAI application, the organizational management and facilitation will improve tremendously (Table 13).

Table 4. 13
Correlation coefficients

Correlations								
		Relative_ Advantage	Compatibility	Trial_ Ability	Observability	Complexity	IT_ Support	EAI
Relative_ Advantage	Pearson Correlation	1	.969**	.989**	.960**	.982**	.939**	.978**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	300	300	300	300	300	300	300
Compatibility	Pearson Correlation	.969**	1	.983**	.986**	.969**	.940**	.981**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	300	300	300	300	300	300	300
Trial_ Ability	Pearson Correlation	.989**	.983**	1	.975**	.985**	.946**	.979**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	300	300	300	300	300	300	300
Observability	Pearson Correlation	.960**	.986**	.975**	1	.953**	.936**	.978**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	300	300	300	300	300	300	300
Complexity	Pearson Correlation	.982**	.969**	.985**	.953**	1	.945**	.972**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	300	300	300	300	300	300	300
IT_ Support	Pearson Correlation	.939**	.940**	.946**	.936**	.945**	1	.955**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	300	300	300	300	300	300	300
EAI	Pearson Correlation	.978**	.981**	.979**	.978**	.972**	.955**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	300	300	300	300	300	300	300

** . Correlation is significant at the 0.01 level (2-tailed).

5.14 Model Summary

Results of regression analysis for EAI adoption in the health care industry as dependent variable and IT Support, Observability, Complexity, Relative advantage, Compatibility, Trialability as independent variables appeared in Table-14. Regression coefficient was investigated positive and highly significant ($P < 0.01$), which was the indication of significant improvement on overall performance and facilitation of patients in health care industry. The results further showed that R^2 (coefficient of determination) value was very high (98.2%), which was an indication of strong relationship between dependent and independent variables. However, 98.2 percent change in management and work efficiency in the health care units is predicted by EAI adoption. F-value for regression equation (Table 15) was also found highly significant ($P < 0.01$), it is an indication of good fit of regression model.

Table 4. 14
Regression analysis (Model Summary)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.991^a	.982	.981	.151

a. Predictors: (Constant), IT Support, Observability, Complexity, Relative advantage, Compatibility, Trialability

Table 4. 15
ANOVA^b

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	359.832	6	59.972	2.643E3	.000^a
Residual	6.648	293	.023		
Total	366.480	299			

a. Predictors: (Constant), IT Support, Observability, Complexity, Relative advantage, Compatibility, Trialability

b. Dependent Variable: EAI

5.15 Coefficients

In the present study, adapted items for measuring the content validity were used from past research works for ensuring the content validity. The questionnaire was divided into three major parts. The first part was nominal scales and rest were 5-point Likert scales. Part 1 was consisted of questionnaire based on IDT and relative advantages (ADV), compatibility (CPA), trialability (TRI), observability (OB), complexity (CPL) and IT-Support (ITS) as described by (Karahanna et al. 1999). Two confirmatory factor analyses (CFA) were computed using AMOS 6.0 to test the measurement models. The model-fit measures were used to assess the model's overall goodness of fit (χ^2 /df, GFI, NFI, CFI, RMSEA) and values all exceeded their respective common acceptance levels (Hair et al. 2006). Above statements ensure its good-fit of model measurement with the data which is collected.

**Table 16.
Coefficients**

Model	Unstandardized		Standardized	t	Sig.
	Coefficients				
	B	Std. Error	Beta		
(Constant)	-.210	.052		-4.080	.000
ADV	.483	.058	.465	8.354	.000
CPA	.184	.053	.211	3.501	.001
TRI	-.275	.071	-.296	-3.879	.000
OB	.306	.045	.351	6.806	.000
CPL	.097	.050	.099	1.937	.054
ITS	.212	.031	.177	6.850	.000

a. Dependent Variable: EAI

6. Discussion

In the words of (Agrawal & Prasad, 1999), that there is positive association between new information technology acceptance and the and an individual who has prior compatible experience, however; it is certain and proved that such prior experience towards the new information technology has positive association in the context of ease of use belief system to the new innovative information technologies. Compatibility has positive and significant effects (Chau and Hu, 2001). Another writer has confirmed this that compatibility proven to be a significant in term of direct effectiveness on behavior intention. Chang and Tung (2008). The compatibility has been investigated for different aspects in the previous studies (Hardgrave et al.2003).The study showed that the perceptions of the respondents clearly indicating the positive comments of the EAI users and mean score of Likert scale considers that the respondents were positive over the

validity of EAI system for improving overall individual and organizational efficiency.

On compatibility and EAI the respondents' opinion in most cases on compatibility and EAI aspects were adverse and probably on EAI adoption they entirely showed negative attitude. Similarly, on trialability and EAI, the respondents showed neutral response over the statement that the trial convinced them that using EAI was better than to work manually (2.90 ± 1.206). The respondents' perceptions on trialability and EAI aspects were generally positive and promising. In case of Observability and EAI, respondents agreed that observing EAI users before using EAI was unnecessary; it is easy to use, observed EAI advantageous. Study showed that the complexity analysis on EAI suggested some confusing results that the respondents equally agreed both the negative as well as positive statements on the complexities and easiness of the EAI application. Moreover, IT support analysis on EAI use described a positive perception of respondents on the use of IT based EAI application in health care industry and declared multiple benefits not only for the hospital staff, management and patients as well. On the EAI use and its benefits, the paramedics, Physicians and Doctors were asked to perceive and positive opinion of respondents on the use of EAI application in health care industry was recorded and they were convinced on the associated benefits and supported EAI adoption. Hence, following hypotheses are proposed on behalf of the past research studies. Cronbach's alpha estimate value above 0.70 is considered as acceptable (Nunally, 1978). According to (Sekaran, 2000), if the value of Cronbach's alpha reliabilities is less than 0.6, they are considered as poor, if the value is in 0.7, they are acceptable, and their liabilities value above 0.8 are considered good. Therefore, the closer the Cronbach's alpha gets to 1.0 the better is the reliability. Correlation among constructs analyzed and observed that all the possible interrelationships among studied parameters was positive and highly significant ($P < 0.01$). This suggested that with installation of EAI application, organizational management and facilitation will improve tremendously. The regression coefficient was positive and highly significant ($P < 0.01$), which was the prediction of significant improvement in overall performance and facilitation of patients in health care industry due EAI adoption. The F-value for regression equation remained highly significant ($P < 0.01$), which was an indication of good fit of the regression model.

Findings

Present study was carried out during the year of 2017 with the main focused on examining the adoption of Enterprise Application Integration (EAI) in health care industry. The work efficiency after EAI use, EAI facilitations and other aspects

related to the technological advantages were assessed through questionnaire into the different hospitals of Pakistan. The findings of the present study are summarized under the below:

The demographic evaluation of the respondents showed that most of the sample belonged to male respondents (n=198, 66.0%); while remaining 34.00 percent were females. The majority (n=96, 32.0%) aging 25-34 years; followed by 35-44 years of age (n=78, 26.0%), under 25 years (n=54, 18.0%), 45-54 years (n=42, 14.0%), 55-64 (n=24, 8.0%) and remaining (n=6, 2.0%) were above 65 years of age. By occupation, majority (n=81, 27.0%) was of physicians; followed by nurses (n=66, 22.0%), Technicians (n=57, 19.0%), I.T. Assistants (n=48, 16.0%), Doctors (n=27, 9.0%) and remaining (n=21, 7.0%) were Internees. The respondents belonged to LUMHS Jamshoro (n=60, 20.0%); Civil hospital Nawabshah (n=48, 16.0%), Agha Khan Hospital Karachi (n=63, 21.0%), Civil Hospital Tando Allayer (n=33, 11.0%), City hospital Multan (n=75, 25.0%), Civil hospital Karachi (n=15, 5.0%) and remaining (n=6, 2.0%) respondents were from Jinnah hospital Lahore. The EAI adoption impact on working efficiency of organization was assessed and respondents agreed that there were enough advantages of EAI system to use (3.28±1.080); EAI helped to manage their time better (3.22±1.103); helpful in correction of mistakes (3.20±1.060). Considering EAI compatibility the respondents agreed that it bothers them to use EAI when they could do their work manually (3.32±1.258); EAI makes their work redundant (3.28±1.186); they are worried that EAI has no privacy to their personal data and information (3.14±1.374); they do not need EAI at their work (3.18±1.262) and they are worried about the privacy of their information when using EAI (3.00±1.402). On trial ability respondents agreed that it is better to experiment with EAI before its adoption (3.50±1.348); there is no need for trial because EAI are best IT option in organizational management (3.36±1.074); it did not take them much time to try EAI before my final acceptance for its adoption (3.30±1.362); it was found an easy to use EAI in a frequent way after trying this out (3.24±1.161) and respondents were neutral over the statement that the trial convinced them that using EAI was better than to work manually (2.90±1.206). Considering observability respondents agreed there is no need to observe EAI users before using EAI was unnecessary (3.740±1.018); it is easy to use EAI even if one has not used it before (3.38±1.312); observed others using EAI and saw the advantages of doing (3.10±1.287); while the respondents remained neutral on the statements that they have seen how others use EAI before using them (2.80±1.402) and they were influenced by what they observed as the benefits of using EAI (2.80±1.539).

In case of complexity of EAI the participants agreed that EAI they found out a difficult in understanding and use (3.75 ± 1.301); EAI is complicated to learn (3.45 ± 1.163); EAI are confusing (3.26 ± 1.121); EAI are convenient to use (3.25 ± 1.222) and they also agreed that it is easy to use (3.10 ± 1.287). On IT support and EAI use, the participants strongly agreed that online registration was preferable (4.30 ± 1.879); agreed over the facilities provided outdoor patients (3.95 ± 1.755); decreased burden from staff (3.70 ± 1.111); all computers are connected (3.30 ± 0.997) and IT based systems saved doctors and patients time (3.71 ± 1.136). Discussing EAI use and its benefits, participants agreed that they intend to continue using EAI because they were helped managing their time better (3.88 ± 1.118); EAI are appropriate to their profession they would definitely like to use them in times to come (3.43 ± 0.963); EAI usage was appropriate for their working style and they will continue using it (3.22 ± 1.103); while respondents were neutral saying that difficulty in learning to use EAI will make them not use EAI in future (2.57 ± 1.390) and the benefits of EAI will make them continued to use EAI in the future (2.30 ± 1.348). There was positive and highly significant ($P < 0.01$) of EAI vs relative advantage ($r = 0.978^{**}$), compatibility ($r = 0.981^{**}$), trial ability ($r = 0.979^{**}$), ($r = 0.978^{**}$), complexity ($r = 0.972^{**}$) and IT support ($r = 0.932^{**}$). The regression coefficient was proved to be a positive and highly significant ($P < 0.01$) showing significant improvement in overall performance and facilitation of patients in health care industry by EAI adoption. The R^2 value was very high (72.4%) suggesting strong relationship between dependent and independent variables and 72.4 percent change in management and work efficiency in the health care units is predicted by EAI adoption.

Cronbach's alpha reliability suggested that alpha loadings for all scale items (0.841) exceeded the minimum loading criterion (0.70) which is considered good. Therefore, the closer the Cronbach's alpha gets to 1.0 the better is the reliability.

Discussion

The results of present study show that the prior compatibility of experience of an individual relevant to the information technology acceptance has positively association which is reported by other researchers whereby an individual's prior compatible experiences in relation with the ease of use belief are positively observed towards innovations of information technologies. So far, it is investigated the compatibility is significantly positive and has direct effects on the behavioral intentions. Compatibility has been investigated for different aspects in the previous studies. The study showed that the perceptions of the respondents clearly indicating the positive comments of the EAI users and mean score of Likert scale considers that the respondents were positive over the validity of EAI

system for improving overall individual and organizational efficiency. On compatibility and EAI the respondents' opinion in most cases on compatibility and EAI aspects were adverse and probably on EAI adoption they entirely showed negative attitude. Similarly, on trial ability and EAI, the respondents showed neutral response over the statement that the trial convinced them that using EAI was better than to work manually (2.90 ± 1.206). The respondents' perceptions on trial ability and EAI aspects were generally positive and promising. In case of Observability and EAI, respondents agreed that observing EAI users before using EAI was unnecessary; it is easy to use, observed EAI advantageous. The findings of previous studies have investigated that no one would ever take chance or intend to adopt anything until he or she get it experienced in favor of their interests. So far, perceived relative advantage is positively effects on the users' intention to within among different participants. Study findings and results investigated that the higher perception towards the relative advantageous are proven to be higher for users to use the systems. As regards many other research studies have investigated that the observability of users has positive effects on the users' intention towards system for using. The study showed that the complexity analysis on EAI suggested positive statements on the complexities and easiness of the EAI application. Moreover, IT support analysis on EAI use described a positive perception of respondents on the use of IT based EAI application in health care industry and declared multiple benefits not only for the hospital staff, management and patients as well. On the EAI use and its benefits, the paramedics, Physicians and Doctors were asked to perceive and positive opinion of respondents on the use of EAI application in health care industry was recorded and they were convinced on the associated benefits and supported EAI adoption. If the value of Cronbach's alpha reliabilities is less than 0.6, they are considered as poor, if the value is in 0.7, they are acceptable, and their liabilities value above 0.8 are considered good. Therefore, the closer the Cronbach's alpha gets to 1.0 the better is the reliability.

The correlation among constructs analyzed and observed that all the possible interrelationships among studied parameters was positive and highly significant ($P < 0.01$). This suggested that with installation of EAI application, organizational management and facilitation will improve tremendously. The regression coefficient was positive and highly significant ($P < 0.01$), which predicted of significant improvement in overall performance and facilitation of patients in healthcare industry due EAI adoption. The F-value for regression equation was also found highly significant ($P < 0.01$), that was the indication of good fit of the regression model.

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