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Electronic Health Records Prospects in Egypt: A Demand-Side Perspective

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Abstract

The present study sheds light on the expected factors that would impact the Electronic Health Records (EHR) service in Egypt from the demand-side perspective, i.e. the health care consumer. This empirical study is motivated by the widespread use of EHR as a method of promoting health services globally, where it is considered as an efficiency enhancing, cost effective technology. Moreover, the healthcare sector in Egypt is gaining momentum, especially that the comprehensive healthcare and social insurance law are expected to be discussed in the Egyptian Parliament in the near future. The underlying theoretical framework of this study implicates the Unified Theory of Acceptance and Use of Technology in Consumer Context (UTAUT2). It also applies an integrated framework from multifaceted perceptions to explain the expected adoption decision or behavior of the Egyptian consumer of EHR. The study relies on primary data, a survey of 559 respondents. Responses were collected by a telephone-based nationwide survey of respondents who completed college education or above. Their opinions were collected towards the EHR and the best way to apply this system in Egypt. The sample covered urban governorates, Lower Egypt and Upper Egypt, and it was collected in December 2015. Logistic regression results reveal that statistically significant constructs include the following: whether or not EHR is useful, willingness to pay for it, the gender perspective, the person in charge for uploading results, expected difficulties in using EHR, and the interaction term between gender and internet usage. Finally, more insight and recommendations are provided to policy makers.

JEL- Classification: 110, 115, 1 18, L96

Key words: Healthcare sector, e-health, UTAUT2, Egypt, Logistic regression.

1. INTRODUCTION:

Egypt has the largest healthcare market in the MENA region. It is the country with a large and growing population. Furthermore, healthcare sector in Egypt faces a stable inelastic demand. From the supply- side, healthcare sector is a resilient sector which draws many private investors due to its stability and protection against the market downturn (Multiples 2015). The benefits of ICT are cross-cutting through many industries and healthcare industry is no exception. Electronic Health Records (EHR) is a type of health information technology and an application of e-health. It allows structured medical data to be shared between authorized health stakeholders in order to improve the quality of healthcare delivery and to achieve massive savings (Alemán et al., 2013). It gave health system the opportunity to move from paper-based health records to electronic health records. EHR uptake entails many benefits, including cost reduction, improved quality of care, promoting evidencebased medicine and record-keeping, and finally mobility (Aleman et, 2013). EHR is considered an efficiency-enhancing, cost-effective technological change. It is worthwhile to start by the European Commission's e-Health definition. The European Commission's e-Health Action Plan 2012–2020 provides a useful benchmark for e-health. It defines e-health as follows: "The use of ICT in health products, services and processes combined with organizational change in healthcare systems and new skills, in order to improve health of citizens, efficiency and productivity in healthcare delivery, and the economic and social value of health. e-Health covers the interaction between patients and health-service providers, institution-to-institution transmission of data, or peer-to-peer communication between patients and/or health professionals." (http://www.ehr-impact.eu/).

This definition rightly puts citizens at the center of health services. e-Health, then, seeks to facilitate the generation, provision, evaluation, and communication of information for the benefit of citizens. This relies on an environment of trust whereby citizens disclose personal information to trusted entities (such as healthcare providers) and, in return, receive better and more personalized care (Zilgalvis, 2015). There are important conditions needed to reap the benefits of e-health, including combining EHR with e-prescribing (Dobrev et al., 2010).

Furthermore, the gains from EHR and e-prescribing systems rely on access to information regardless of place and time. Another condition for success is to ensure continuous engagement and a productive dialogue between clinical and administrative users on one hand, and ICT experts on the other, where healthcare professionals are too often not sufficiently involved. Interoperable EHRs are foundations of health information systems and support to other systems, such as e-prescribing, e-booking, management, administrative or logistics systems.

Egypt's status—being one of the developing or emerging countries— underscores the significance of e-health and m-health as a method to overcome many traditional obstacles to the delivery of health services to the poor in Low-and Middle-Income Countries (LMICs), especially obstacles such as access, quality, time, and resources (<u>http://www.ehr-impact.eu/</u>, Canada Health Infoway (2015).

Impediments confronting the Egyptian healthcare system include the delivery of adequate health services due to brain drain in medical staff and skilled physicians, and poor distribution of existing providers, and lack of economic resources. At present, globally, 57 countries face critical shortages of health workers, with estimates ranging from a global

deficit of 2.4 million to over 4 million of physicians, nurses, and midwives (mHealth Alliance, 2010). In addition, there exist deficiencies in skills, training, and distribution of the existing workforce. Furthermore, most of highly skilled health workers are available in urban centers. Thus, using ICTs, such as fixed broadband, and mobile technologies can help to augment or substitute existing health care models by focusing on distributed primary care and centralized administration, and to extend health knowledge directly to villages and community health workers.

There is little doubt regarding the expected Return on Investment (ROI) in e-health services, the inherent efficiency of e-health, especially its transformational impact on the overall healthcare system. ROI in e-health are estimated to reach 7%, where e-health brings efficiency to legacy health care system, and decreases demand on core resources and increase productivity. These returns can be expected start accruing from year 1 to year 5 or about gains that amount to 7% of the current operational budget (excluding capital investment). E-Health brings efficiency to new health care investments, depending on the overall capital investment: 5-7% per annum for capital programs, 50-80% for some operational and administrative programs. In addition, e-health opens up new internal market, as well as new export markets, which leads to creating jobs and increasing exports which enhances wellbeing and results in better patient outcomes. The economy, at large, would benefit as a result of extended life expectancy, improved quality of life, increased productivity during treatment, shorter treatment periods and decreased disruptions to labor supply (Department of Health, e-Health Strategy for Ireland, 2013.)

Many factors play a role when analyzing the prospects of EHR in Egypt. For example, the changing patterns of healthcare systems, where the majority of population in Egypt can't usually afford to pay the high medical fees or expenses of private health care, hence, they opt for the public health care services, which are usually subsidized in the context of the national health insurance services extended to the poor and people with low-income in Egypt. Thus, adopting EHR services in the public health care sector would be considered a paradigm shift in terms of cost effectiveness and health care quality enhancement in Egypt. Another relevant factor is the changing demographics, where Egypt is currently enjoying the youth dividend or youth bulge (60% of population is between 15-40 years old), which, in turn, will be translated into aging population in 30 years to come. Thus, the Egyptian government and the health sector, specifically, should start planning to meet the health needs of this aging population. EHR would be the suitable tool to manage the expected increase in the demand for health services in the future in a cost- effective way. A third important factor include e-health as a new market force, where entrepreneurs and small clinics could participate in the market and open up export markets. Egypt has a niche in health services, especially on a regional level, among less developed Arab countries and African countries.

This paper addresses the issue of the perception of the new EHR service in Egypt, focusing on the demand side. Obviously, there is a research gap that is not only reflecting the sheer fact that the EHR is considered a new technology in the Egyptian context, but also the fact that no attention was given to the perception and the expectations of the Egyptian consumer of this potential service. Thus, the present study gains momentum and offers important contribution in this respect. The aim of this paper is to give policy makers an allinclusive understanding of the Egyptian consumer perception for the new application of the e-health, namely EHR, based on multiple theoretical underpinnings such as the technology acceptance, health behavior and Protection Motivation Theory (PMT). (Rahman et al 2015)

The rest of the paper is divided into four sections, and an annex. The following section provides an analysis of the Egyptian healthcare sector. The third section tackles the literature review, where it divides the literature into 2 themes, one discusses the adoption of EHR from the demand side perspective and the factors impacting its adoption such as privacy as well as the patient—physician communication, while the other investigates studies conducted by the Unified Theory of Acceptance and Use of Technology in Consumer Context (UTAUT2) in this context in other countries or concerning other applications. In the fourth section, the methodology is presented and discussed, and the survey is reviewed, which includes highlights on the pertinent stylized facts. Then, in the same section the constructed logistic model is reported and analysis of the results are highlighted. The Final section concludes with policy recommendations.

2. THE STATUS OF HEALTHCARE SERVICES IN EGYPT:

Healthcare services in Egypt face numerous impediments, especially those concerning the quality of health services provided to citizens and the lack of integration of health insurance systems. This is in addition to the upsurge in personal spending on healthcare services, which has reached more than 55% of total spending on health in Egypt, and the lack of updated infrastructure and adequate trained human capital among other challenges.

There is a consensus among health sector analysts and the public that healthcare services continue to be unreasonably expensive for many Egyptians. Healthcare costs continue to rise with inflation. Between 2011 and 2016, the healthcare price index increased 33% (CBE 2016), and it is expected to have increased much more due to the recent adoption of floating exchange rate in Egypt. The burden of health expenditure is the highest for the low-income cohorts in the Egyptian Society. The bottom of the pyramid (the poorest 20% of households) spend 21% of their income on health, significantly more than the richest 20%, who spend 13.5% (UPR Briefing 2014). Furthermore, there is an immense gap in the provision of healthcare services between rural and urban regions in Egypt, to the extent that the high cost of healthcare services, individuals living in rural regions were twice as likely not to pursue medical care as their urban equals, citing the main reason to be the high costs of healthcare in rural areas. (UPR Briefing 2014).

In addition, Out Of Pocket (OOP) expenditure represents a major impediment for patients in Egypt. In 2008, OOP accounted for 70% of total spending on health care services (UPR Briefing 2014). However, OOP witnessed a decreasing trend, where it recently amounted to 55% of total spending.

Only half of the population has health insurance. Women, rural residents, those in the lowest income segment and those who work within the informal sector are more likely to be

uninsured. In rural Upper Egypt and rural Lower Egypt, only 19.4 % and 24.2% of the population, respectively, is covered (USAID, 2011b). Although 58% of Egyptians are covered by health insurance— most insurance covered by public sector companies and few private firms— insurance is not effective to low-income quintiles. Moreover, almost 42% of Egyptians buy the medical service on their own.

Bearing in mind that both Cairo and Alexandria are considered the most two important cities in Egypt, where the percentages of health insurance beneficiaries in these two governorates are high, unlike other governorates including Southern Sinai and the Red Sea.

Reforms to the current health insurance system have been made as the new draft of the health insurance law, aiming to address social justice through providing a more comprehensive system of health services.

One of the core dynamics that touches healthcare demand in Egypt is the sheer population size which reached92 million people, where 62% of Egyptians belong to the younger age groups of the segments (15- 64 years). Moreover, life expectancy for females is longer than males in the Egyptian society. The per capita expenditure on health sector reached \$178 annually. This amount is allocated to different entities including the private and public entities and on medical equipment, out-patient clinics, and hospitalization services. Urban governorates are found to have the highest spending rates at an average of 33,718 EGP annually (UPR Briefing 2014).



Source: World Bank (WDI)



Source: World Bank, (WDI)

It is worth mentioning that the new approved constitution in 2014 stipulates that the government has to, significantly, increase its spending on healthcare over the next three years. According to the new Egyptian constitution, the government is required to spend at least 3% of GDP on healthcare and at least 4% of GDP on education every year, increasing allocations gradually to comply with international standards.



Source: Egyptian Ministry of Health, 2011

2010 2011 2012 2013 2014

0.0

56.1

2013

Income Quintile

55.7

2014

From the supply side, healthcare is an attractive the sector which drew many private investments due to its stability against the market decline, while the government was facing a mounting budget deficit which limited its spending on the sector. However, the sector faces several challenges including the intense pressure faced by the government to increase wages and salaries of workers and professionals to avoid brain drain and immigration to GCC. (Multiples 2015)

Source: Egyptian Ministry of Health, 2011

It is worth noting that the Egyptian government is currently in the final stages of drafting the new healthcare law, "the comprehensive healthcare & social insurance law". In the proposed new law, the government will fully cover treatment for citizens who cannot afford to pay – who comprise 30-40 percent of the population. Furthermore, the new law will also guarantee a certain standard for quality of medical service. The Ministry of Social Solidarity will be in charge of determining which patients qualify for free medical care. Three new administrative bodies will be established to manage the new system, including a financing body; a healthcare body that delivers the service in primary healthcare units and hospitals; and a body that will handle accreditation of service units and providers, quality of service, and supervision of operations. Public hospitals will be the government's arm in the provision of services under the proposed health insurance law, while the participation of the private sector will be based on rules and standards set by the healthcare body. Primary Healthcare (PHC) units will provide services to almost 70 percent of the cases, and overflow cases or patients in need of surgeries will be referred to hospitals. If passed by parliament and ratified by the president, the new system will be implemented gradually, starting in the Suez Canal region to reflect a gradual geographical adoption of the law. Egypt has allocated EGP 53.3 billion in the current 2016/2017 fiscal year's budget to healthcare spending, representing 5.7 percent of total government spending – or 1.6 of the GDP. The share for healthcare in the budget has been criticized in recent years by physicians and patients as insufficient and far below international standards. (Daily News 2016)

3. LITERATURE REVIEW

Due to the fact that EHR are still considered a new emerging technology in most of developing countries, including Egypt, there is a knowledge gap and limited research published papers investigating the demand -side determinants of this new cost effective technology in developing countries. The present research paper focuses on the demandside perspective in the decision to adopt EHR when these are introduced in the Egyptian health sector. Thus the literature review section is broken down into 2 themes, one discusses the adoption of EHR from the demand side perspective and the factors impacting its adoption such as privacy as well as the patient-physician communication, while the other investigates studies conducted by the Unified Theory of Acceptance and Use of Technology in Consumer Context (UTAUT2) in the EHR framework in other countries or concerning other applications. The first study by Rathert et al., 2017 investigated the patient-physician communication and how it is impacted by the advent of EHR. The relationship between patients and physicians is critical for patient-centered health care. A systematic review of the literature was performed, where a comprehensive search of three databases (CINAHL, Medline, PsycINFO) yielded 41 articles for this paper's analysis. Results revealed that EHR use improves capture and sharing of certain biomedical information. Nevertheless, it may impede compilation of data related to psychosocial and emotional patients' conditions. The ramifications of this is that it becomes difficult to have supportive, curing interactions. On the other hand, findings show that Patients' access to the EHR and messaging functions may improve communication, patients' empowerment, engagement, and self-management.

Thus, according to the above-mentioned, paper practices must be amended, and EHRs must be established to include useful data without interfering with physicians' and patients' abilities to efficiently interconnect.

In another paper by Fernández-Alemán et al., 2013, the focus of the research was on the security and privacy of EHR systems, by reviewing the relevant literature on this important concern of using the EHR. The most widely used regulations are the Health Insurance Portability and Accountability Act (HIPAA) and the European Data Protection Directive 95/46/EC. In the latter paper, there was a review of the suggested measures to improve security of EHR. These include symmetric key and/or asymmetric key schemes; the pseudo anonymity technique in EHR systems; the use of a digital signature scheme based on PKI (Public Key Infrastructure); or a login/password (seven of them combined with a digital certificate or PIN) for authentication. The mostly suggested method according to literature is Role-Based Access Control (RBAC). Furthermore, the papers tackle the issue of rights to access the EHR systems and data, namely patients or health entities. Literature seems to point out that in case of an emergency stated access, policies should be overruled. Finally, suggestions to train the system users and/or health staff in security and privacy has been also underscored.

Another strand of literature comprises studies implemented the theoretical framework of the Unified Theory of Acceptance and Use of Technology in Consumer Context (UTAUT2) in analyzing EHR related research questions in other countries or regarding other applications. In 2003, Venkatesh et al. introduced the new UTAUT2 theory. UTAUT2 entails that inclusive combination of prior technology acceptance research is warranted when studying such as new technology.

Alazzam et al. (2015), applied the UTAUT2 model to investigate the determinants of the acceptance of EHR in Jordan. They used the a supply- side study to investigate whether using EHR among physicians has a good impact on hospital quality and reduces health costs. The study introduced a new construct to the conceptual framework, which is the trust factor. It reached a solid conclusion that the UTAUT2 factors are related to the adoption of EHR technology. Another study, (Tavares et al., 2016), was motivated by identifying the factors that drive individuals to adopt EHR portals. The UTAUT2 model was also embraced as the appropriate methodology for the empirical analysis. Furthermore, the study presented a new construct specific to health care based on the health belief model and used online questionnaire to collect the sample. The Abovementioned study concluded that this new construct had a significant impact on understanding the adoption of EHR portals.

In a different study (Shupei et al., 2015), the health and fitness applications were the focus of the study. In particular, the study applied the UTAUT2 model to investigate the predictors of the user's intention to accept health and fitness applications. Results show that the additional constructs, extended to the original UTAUT model, namely the performance expectancy, hedonic motivation, price value and habit constructs were significant predictors of the user's intentions of continued usage of health-fitness apps. The conclusion show that the obtained important results are helpful for the applications design as well as the marketers in terms of providing them with a clear vision about the use of health fitness applications.

Thus, a conclusion can be drawn from the previous literature about EHR adoption that first privacy and security are of main concern of this new technology. Second, EHR is not yet designed to capture the critical relationship between physicians and their patients. Both these two concerns need to be addressed in the implementation of EHR on a global level and in Egypt as well. Then, the empirical studies in this domain which applied the (UTAUT2) theoretical underpinning, concluded that the controlling of specific constructs related to health care consumers reveal a lot about the adoption decision of EHR. Additional constructs such as those based on the health belief model, or the extended ones in the new theory, namely the performance expectancy, hedonic motivation, price value and habit constructs were significant predictors of the user's intentions to embrace m-applications at large. Thus, the current study will attempt to add new constructs to the UTAUT2, based on the data availability and the theoretical soundness of the suggested constructs in Egypt's case that is under investigation. Moreover, this study contributes to the existing work on EHR by applying this new methodology to analyze the potential determinants for the uptake of EHR in Egypt from the demand side perspective.

4. METHODOLOGY:

This study adopted the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) Model to examine the potential predictors of the users' intention to adopt electronic health records in Egypt (EHR). The original UTAUT has four key constructs that influence behavioral intention to use a technology and/or technology use (Venkatesh et al., 2003). These are described as follows:

- PERFORMANCE EXPECTANCY: the degree to which using a technology will provide benefits to consumers in performing certain activities. It reflects the utilitarian value for users using the technology, which has been recognized in other technology acceptance models, such as perceived usefulness in the Technology Acceptance Model (TAM), extrinsic motivations in the Motivational Model, and relative advantages in the Innovation Diffusion Theory (IDT). The utilitarian benefits from using health and fitness apps include monitoring a health situation and managing and controlling particular health conditions. These health benefits can increase users' motivation to continue using this app (Venkatesh et al., 2003, Shupei et al 2015);
- 2. EFFORT EXPECTANCY: is the degree of ease associated with consumers' use of technology
- 3. SOCIAL INFLUENCE: is the extent to which consumers perceive that other people (e.g., family and friends) believe they should use a particular technology;
- 4. FACILITATING CONDITIONS: refer to consumers' perceptions of the resources and the support available to perform a behavior (e.g., Brown and Venkatesh 2005; Venkatesh et al., 2003). According to the UTAUT, performance expectancy, effort expectancy, and social influence are theorized to influence behavioral intention to use a technology, while behavioral intention and facilitating conditions determine technology use (Shupei et al 2015). In order to extend the original theory of UTAUT to be more consumer centric UTAUT2 model, three extra constructs are being added to the original model;

- 5. HEDONIC MOTIVATION (HM): is defined as the fun or pleasure derived from using a technology, and it has been shown to play an important role in determining technology acceptance and use;
- 6. PRICE VALUE (PV): an important difference between a consumer use setting and the organizational use setting— where UTAUT was developed— is that consumers usually bear the monetary cost of such use whereas employees do not. The cost and pricing structure may have a significant impact on consumers' technology use.
- 7. EXPERIENCE AND HABIT (HT): finally, we add habit to UTAUT. Prior research on technology use has introduced two related yet distinct constructs, namely experience and habit. Experience, as conceptualized in prior research (e.g., Kim and Malhotra 2005; Venkatesh et al., 2003), reflects an opportunity to use a target technology and is typically operationalized as the passage of time from the initial use of a technology by an individual.

UTAUT2 is built on the 4 constructs of the original UTAUT plus demographic variables and three additional constructs. Additional Constructs in our analysis include the health benefit construct and the perceived health status. According to the literature, users of early adoption of this technology have significantly high education levels. Hence, this study focused on respondents who are college graduates or above in terms of education level.

4.1 The Survey:

A survey of 559 respondents was funded by the National Telecom Regulatory Authority in Egypt (NTRA). Responses were collected by a telephone-based nationwide survey to investigate a sample of 559 citizens who have college education or above. Their opinions were collected towards the electronic medical records and the best way to apply this system in Egypt. The sample covered Urban governorates, Lower Egypt and Upper Egypt, and it was collected on 29 December 2015. To guarantee that the distribution of respondents by gender and place of residence reflects the true distribution of the target population; the data was re-weighted using national statistics.

Table (1) shows the characteristics of the sample after applying proper weights in order to reflect the same characteristics of the target population.

Sample characteristics reveal the following: about 56% of the respondents were female, respondents lived primarily in urban areas (73%), especially in lower Egypt. They were concentrated in age group (30-49) years, where the average age of the survey participant was 40 years.

			Percent
Condor		Male	56.3
Gender		Female	43.7
Place	of	Urban	73.4
residence		Rural	26.6
•		Less than 30	28.4
Age		30-49	49.4

Table (1): Sample characteristics

	50+	22.1
	Urban governorates	33.4
Region	Lower Egypt	39.6
	Upper Egypt	27

4.2 Some Stylized Facts:

About 82% of the respondents think that it would be useful for them for different reasons. Among the most mentioned reasons were the accessibility of these records in any time and any place. A percentage of 67% and 23% of the respondents mentioned that this system would be useful for them because their medical records would be safe and not exposed to loss, then the ease to follow up the medical history of a patient and saving time come in the third and fourth place with percentages of 13% and 8% respectively. (see Appendix)

The majority of the samples showed their willingness to pay money for this service with a percentage of 62%, while a lower percentage of 34% answered that they don't have the intention to pay money for this service while 4% are not sure. The percentage of those who have the intention to pay money for this service does not significantly differ according to gender as it is 61% for males and a slightly higher percentage of 63% for females, and this percentage scored its lowest value for those living in upper Egypt with a percentage of 51%, however, it increases to about 65% for both urban governorates and Lower Egypt. The lowest value for this percentage according to age categories appears for old-aged respondents as it is 58% for those who are 50 years old or above and it increases to 62% for the middle-age category 30-49 and then another increase to 65% for the lowest age category (22-29). On the other side, the percentage of those who don't have the intention to pay for this service slightly increase from 33% for males to 35% for females, and it has relatively low values in urban governorates and Lower Egypt with 30% while it reaches 43% in Upper Egypt, however, this percentage doesn't significantly differ according to different age categories.

4.3. Logit Model

Logistic regression, also called a logit model, is used to model dichotomous outcome variables. In the logit model, the log odds or the odds ratio of the outcome is modeled as a linear combination of the predictor variables. This current study has a binary dependent variable called (Y) which is whether or not respondents would rely on this new technology of EHR if it is introduced in Egypt. There are many predictor variables. The explanatory variables represent the various constructs of the UTAUT2 theory. Performance Expectancy is measured by the (X_1) construct, which reflects the utilitarian value for the users who are expected to use this new technology (Venkatesh et al., 2003). The variable measuring this construct is whether the EHR is expected to be useful or not. Effort expectancy is measured by (X_2) , which reflects the answer of the respondents about who should be in charge for uploading the medical records to EHR. Price value (X₃) is measured by the willingness to pay for EHR when it will be introduced. Hedonic motivation construct will be excluded from the analysis as it is not suitable, since the EHR technology has not been implemented yet in Egypt. The habit construct is measured by the proxy of the habit of using the Internet (X_4) . The facilitating conditions construct (X_5) is measured by the respondents' answers to the problems that they expect to face as users of EHR, when it is implemented in Egypt. (X_6)

construct represents how often do you make medical examinations. This reflects the perceived vulnerability and is the construct for Protection Motivation Theory (PMT). Thus, explanatory variables measure the frequency of undertaking medical check-ups by the potential users of EHR services. It is also pertained to the Health Belief Model (HBM) or health behavior. The patient awareness about his or her own health status can be a driver to adopt the EHR technology. Self-perception has an indirect effect on the behavioral intention to use e-health. This reflects the significance of measuring this dimension to this study of a consumer centered adoption model (Rahman et al 2015). Furthermore, perceived health threat significantly impacts health consumer behavior. Finally, a group of individual demographic explanatory variables representing the characteristics are controlled for in the logistic model. These include gender, age, education, rural/urban, employment as well as owning a car to express the social status. A more detailed description of the variables used in the model as well as the reference categories of the dichotomous variables are reported in Table 2.

The paper demonstrates the relationship between the predicted outcome and the potential factors that impact the adoption of EHR in Egypt. Stata statistical software v11 is used to perform the empirical study and run the model. Taking into consideration that Stata has two commands: "logit" & "logistic". Logit, by default, produces raw coefficients, logistic, by default, produces odds ratios (Schofer 2007).

4.5. Results of Logistic Regression

The logistic regression model can then be written as follows:

$$Log(\pi/1 - \pi) = a + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i$$
(1)

Where p is the probability of using EHR and $X_1, X_2 \dots X_i$ are the explanatory variables. Steps for estimating the model include first estimating the logit model, followed by estimating the classification table. Next, obtaining the odds ratio from the logistic regression, estimating the margins at the mean and finally estimating the marginal effects (dy/dx).

 $Log(\hat{\pi}/1 - \hat{\pi}) = \beta_0 + \beta_1 \text{ useful or not } + \beta_2 \text{ uploading results } + \beta_3 \text{ willingness to pay } + \beta_4 \text{ habit} + \beta_5 \text{ Problems } + \beta_6 \text{ medical check } + \beta_7 \text{ Demographics } + \text{ interaction terms } + \epsilon..$ (2)

The following results are highlighted inTables 3-7.

In Table 3, the number of observations is 559. The likelihood ratio chi-square of 196.67 with a p-value of 0.0000 tells us that our model as a whole fits significantly better than an empty model (i.e., a model with no predictors) (Bruin, J. 2006). Bearing in mind that, in Stata, the logistic command produces results in terms of odds ratios while logit produces results in terms of coefficients scales in log odds. The model as a whole is significant, where the P(chi 2)>0.000. In Table 3, the cut off points for this model was changed to 0.8, since the percentages of potential consumers of EHR and non-consumers of EHR are not close to each

other. The percentage of potential demand on this service is 80% which affects the model classification. The following explanatory variables are statistically significant: gender, urban/rural, useful or not, who is in charge of uploading the results, expected difficulties in using EHR, as well as the interaction term between gender and internet usage. The logit regression coefficients give the change in the log odds of the outcome for a one-unit increase in the predictor variable. (Bruin, J. 2006).

In Table 4, namely the classification table, the model yields predicted p>.8 for 389 people; the majority of 364 of them would use EHR if this service was introduced in Egypt. Overall, this model offers a highly accurate prediction, where 81% of people are correctly classified. The overall rate of correct classification is estimated to be 80.86%, with 77.88% of the normal weight group correctly classified (specificity) and only 81.61 % of the low weight group correctly classified (sensitivity). Classification is sensitive to the relative sizes of each component group, and always favors classification into the larger group. This phenomenon is evident here, Table 2.

Next, Table 5, the logistic model output is presented by exponentiating the coefficients and interpreting them as odds-ratios, to do so we use the Stata command logit, i.e. the dependent variables are measured in the odds matric rather than the probability metric. In Table 5, the interpretation of the gender odds ratio implies that the odds of using EHR for males is 4.412 times that of females. The place explanatory variable, which controls for urban/rural implies that the odds of using EHR in urban areas is 4.287 times that of rural. In addition, the odds of uploading the results by the user himself is 0.335 times that of uploading the results by labs or physicians. The odds of willing to pay for the EHR, once introduced, is 3.1 times that of not willing to pay for it. The odds of the consumer expecting difficulties in implementing the EHR service is 1.9 times that of not expecting to face any difficulties in implementing the EHR.

For the interaction term between gender and Internet usage that was statistically significant, it is worth noting that when a model has an interaction term of two predictor variables, it attempts to describe how the effect of a predictor variable depends on the level/value of another predictor variable. In this model, the presence of interaction term of using internet by gender, where the interaction term reflects the effect of the frequency of using the internet on the odds using the EHR differs between males and females, and it does so in multiplicative terms. It is interpreted as the odds ratio of using the internet often and being a male is statistically significant compared to not using the internet often and being a female. (Bruin, J. 2006.)

Table 6 reports the margins at the mean output, where it computes the marginal effect as the difference between expected odds of using EHR or not (Buis 2010). The marginal effects measure the overall effects of the various constructs of mainly the UTAUT2 Theory affecting the potential use of EHR in Egypt. Interpretation of the predictive margin for the control variable of gender is as follows: if all respondents were females holding all other variables at their means, the average response would be 0.85. However, if all the respondents who answered were all males holding constant all of the other control variables, the average response would be 0.90.

The predictive margins for the control variable useful or not is interpreted as follows: if all the respondents answered that EHR not useful, the average response would be 0.46. But if

all responses answered yes to the usefulness of EHR, the average response would be 0.9 holding other independent variables in the model at their average.

The predictive margins for the control variable willingness to pay is interpreted as follows: if all the respondents were not willing to pay for the service of EHR, the average response would be 0.7. But if all respondents answered yes to the willingness to pay for EHR, the average response would be 0.9 holding other independent variables in the model at their average.

Notice that there aren't any marginal effects for the interaction terms, because the value of the interaction term can't change independently of the values of the component terms. Thus, we can't estimate separate marginal effects for interaction terms. (Williams 2017)

In Table 7, we report the Marginal Effects for Discrete Variables, and the Average Marginal Effects. The effect of age breakdown to below 50 years and 50 years or older is presented in table 7 by the difference in predictive margins. The difference is highly significant. Furthermore, there is an average decrease of 0.1 points on the response scale for the effect between the 2 categories of age.

The effect of EHR perceived to be useful or not is reported in table 7 by the difference in predictive margins. The difference is highly significant, furthermore, there is an average increase of 0.5 points on the response scale for the effect between the 2 categories of EHR perceived to be useful or not. Notice that the effect of willingness to pay as well as facing difficulties in using EHR is highly significant as well between the categories of the respective average marginal effects of each control variable with an average increase of 0.2 and 0.06 points on the response scale for the effect between the relevant categories of the two variables respectively (Williams 2017).

5. CONCLUSION & POLICY RECOMMENDATIONS:

This study adopted the Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) Model to examine the predictors of the users' intention to adopt Electronic Health Records(EHR) in Egypt. The immense benefits accruing from the implementation of this new technology in Egypt are quite clear. Methods used include, primarily, conducting a survey where selected respondents having university degree or above. Results reveal that statistically significant constructs include the following: EHR being perceived as useful or not, the willingness to pay for it, gender, who is in charge for uploading results in the EHR system, the expected difficulties in using EHR, and finally the interaction term between gender and internet usage.

There is little doubt of the advantages of e-health and EHR. e-Health enables personalized medicine as well as results in lower healthcare costs by reducing care redundancies and readmissions (Kohl 2013) . Thus, it empowers patients as well as physicians. This empirical study has proved that by far the potential Egyptian user of EHR is aware of the significant impact and usefulness of EHR that are related to his health. Additionally, the Egyptian user is willing to pay for this new service.

In Egypt, the new constitution stipulates that healthcare spending should amount to the equivalent of 3% of Egypt's GDP on health care by 2017. Article 18 of the country's constitution says that "every citizen has the right to complete healthcare, according to quality standards, and the government should preserve the healthcare infrastructure and support raising its efficiency. The government is obliged to accredit a percentage of their public expenditure to healthcare that is not less than 3 percent of the GDP." (Daily News

2016) The increase in the budget was for establishing the Program for Healthcare for the Poor. This program subsidizes the cost of health care for people who are beneficiaries of the Social Pension Assistance Program, starting with beneficiaries living in Upper Egypt, a largely underdeveloped region. Egypt's policy makers should adopt pro-poor health care coverage policies, (WB Blog 2016). It is worth noting that goals envisioned for the future, by the Egyptian government, are mainly to increase the number of users, extend functionalities, expand interoperability, and utilize more current system functions. For regional initiatives, integrating healthcare services and connecting healthcare professionals is a priority. Boosting benefits by data sharing, is a common feature among all regional EHR and e-prescribing systems in the EHR best practice studies. Furthermore, interoperability with regional or global EHR existing platforms is a critical target in any future e-health strategy adopted in Egypt.

Bearing in mind the benefits accruing from the use of secondary health data from the expected adoption of EHR, where comparing public health data, and gaining more knowledge from anonymized analyses of EHRs and e-prescribing data, would, definitely, help to monitor outcomes and set clinical guidelines. Laws and regulations must be an enabler for the private sector to participate and practice in this new investment as shown by international best practices in the take- up of this new technology. This entails establishing a mandatory *universal healthcare* system through private insurance system, where the government plays a regulatory role and *gives assistance to low income patients*.

Another important caveat is that, in Egypt, it is expected that in 30 years' demographics will change from a youth bulge to aging population. Under these new circumstances, the ageing populations would have developed growing prospects in the long term. Growing prospects of satisfying the growing needs of the aging population will only materialize by benefitting from the fast-evolving technological change for more and improved health services. Only through the adoption of new innovations in healthcare sector, can e policy makers meet these growing prospects.

Thus, the government is embarking on drafting a new healthcare law, "the comprehensive healthcare & social insurance law". From the policy viewpoint, incorporating EHR in social insurance plans would mean a meaningful use of EHR. Suggested plans would provide financial and other incentives to reward care providers and organizations that embrace this new technology to update the healthcare service in Egypt.

Policy makers need to be aware that best practices in the EHR entails enacting a separate ehealth act that promotes the following fundamental rights for the users: the fundamental right to privacy, the fundamental right to private and family life, the principle of equality and, the protection of property. "The principle of equality ensures for example that all patients may receive healthcare under the same conditions regardless whether they opted out of an EHR system or not ("anti-discrimination"). Equal treatment of healthcare providers (HCP) requires that all healthcare providers face the same deadlines for adaption of their systems (hardware, software, organization,) or financial burdens. The protection of property prevents imposing unreasonable financial burdens and risks on healthcare providers, e.g. high IT infrastructure investments in a short period of time." (Reimer 2016 p12).

recommendations embrace increasing awareness to public about the Policy abovementioned principles and following the best practice in implementing the EHR service. In this respect, it is worth noting that media plays a major role to increase awareness of this new service. A political will increases the ICT penetration and uptake across the various sectors of the Egyptian economy. Decentralization of the EHR projects across governorate, and planning should be discussed on national and local levels and to be incorporated in the new Egyptian health and social insurance law. The sector should adopt a more transparent healthcare system that processes the feedback of the general public. Good Governance practices are to be followed to establish trust. This is in addition to opening up channels with all stakeholders to coordinate moves (private hospitals, pharmacies, pharma companies, private insurance companies, donor organizations, etc.), and encouraging the Public Private Partnership (PPP) scheme in healthcare. Addressing and solving security and privacy concerns are significant. Furthermore, inking pending to Disease Burden and Demographic Trends are to be taken into consideration, in addition to moving resources to high disease-burden governorates and increasing focus on prevention (Daily News 2016). The sector should focus on and prioritize chronic diseases, develop programs for the new developing groups, e.g., the elderly.

To conclude, this study proves that there is willingness to embrace new healthcare related technologies from the demand-side in the healthcare sector in Egypt. Moreover, there is willingness to pay for these new e-services, thus the prospects entail numerous benefits from leveraging the ICT advances in the healthcare sector. Eventually, the success in adoption and sustainability of use of EHR services will result in both higher patient quality of life as well as commercial sustainability of the system in the long run. This necessitates launching a broad database for the health sector, interacting with all service providers, and providing technical assistance for capacity-building, training, and qualification of human resources. Furthermore, the sector should identify the target beneficiaries— the eligible poor— to offer them health services including EHR free of charge or subsidized service. This study provides the necessary motivation for the Egyptian policy maker to embrace the EHR technology. Thus a new regulatory and technical framework is necessary to adopt EHR effectively in Egypt.

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Type of variables		Variables				
Dependent	Y	Using medical records	Description and Break down			
	X1	gender	Gender; Female, male			
	X2	Age	Age group; Less than 50, 50 and above			
	X ₃	education	Education level; University degree, above University			
	X4	urban or rural	Area; Rural, Urban			
	X5	employment Status	Employment Status; No, Yes			
	X ₆	owning a car	Do you own a car? No, Yes			
Indonondont	X7	useful or not	Do you think EHR would be useful for you? No, Yes			
independent	X ₈	uploading results	Who would be responsible for uploading your medical data?			
	Х ₉	willingness to pay	Do you have willingness to pay money for this service? No, Ye			
	X ₁₀	using the internet	How often do you use the internet? No, Yes			
	X ₁₁	using the internet for medical	How often do you use the internet to search for medical infor			
	X ₁₂	trusting internet information	Do you trust internet information? No, Yes			
	X ₁₃	difficulties and problems	Do you expect problems in EHR if implemented? No. Yes			
	X ₁₄	medical check	How often do you make medical check? Regularly, Only if nee			
	X ₉ * X ₂	willingness to pay * age	Do you have willingness to pay money for this service? * Age			
	X ₁₀ * X ₂	using the internet * age	How often do you use the internet? * Age group			
	X ₁₀ * X ₁	using the internet * gender	How often do you use the internet? * gender			
	X ₁ * X ₂	gender * age	Gender * Age group			
Interaction	X ₁₀ * X ₄	using the internet * urban or rural	How often do you use the internet? * Area			
terms	X ₉ * X ₃	willingness to pay * education	Do you have willingness to pay money for this service? * Educ			
	X ₁₀ * X ₆	using the internet * owning a car	How often do you use the internet? * Do you own a car?			
	X ₉ * X ₆	willingness to pay * owning a car	Do you have willingness to pay money for this service? * Do y			
	X ₁₀ * X ₃	using the internet * education	How often do you use the internet? * Education level			
	X ₉ * X ₁	willingness to pay * gender	Do you have willingness to pay money for this service? * Gen			

Appendix 1: Table 1: Variables description

Table 2: Logit model						
Log likelihood = -	Number of	obs	559	183.04615		
	LR chi2(23)		196.67			
	Prob > chi2		0.000			
	Pseudo R2		0.3495			
Using medical records	Coef.	Std. Err.	Z	P>z	[95% Con	f. Interval]
Gender	1.4844	1.0077	1.47	0.141	-0.491	3.459
Age	-1.0452	1.0395	-1.01	0.315	-3.082	0.992
Education	-0.7411	1.2737	-0.58	0.561	-3.237	1.755
Place	1.4557*	0.8689	1.68	0.094	-0.247	3.159
employment status	-0.0871	0.3335	-0.26	0.794	-0.741	0.567
Owning a car	-1.2033	0.8431	-1.43	0.154	-2.856	0.449
useful or not	2.6836***	0.3079	8.71	0.000	2.080	3.287
uploading results						
2	0.0884	0.2974	0.3	0.766	-0.495	0.671
3	-1.0924**	0.4562	-2.39	0.017	-1.987	-0.198
Payment	1.1238*	0.6198	1.81	0.070	-0.091	2.338
using internet	0.8418	1.0401	0.81	0.418	-1.197	2.880
Difficulties	0.6440**	0.2941	2.19	0.029	0.067	1.221
medical check	0.2710	0.4014	0.68	0.500	-0.516	1.058
payment *age						
11	-0.6795	0.6412	-1.06	0.289	-1.936	0.577
using internet * age						
11	1.0390	1.0672	0.97	0.330	-1.053	3.131
using internet * gender						
11	-1.7965*	1.0373	-1.73	0.083	-3.829	0.237
gender * age						
11	-0.4158	0.7572	-0.55	0.583	-1.900	1.068
using internet * place						
11	-1.2720	0.9562	-1.33	0.183	-3.146	0.602
payment * education						
11	-0.1218	1.0435	-0.12	0.907	-2.167	1.923
using internet * Owning a						
car						
11	0.9386	0.8880	1.06	0.291	-0.802	2.679
payment * Owning a car						
11	-0.0358	0.5764	-0.06	0.951	-1.166	1.094
using internet * Education						
11	0.9983	1.3907	0.72	0.473	-1.727	3.724
payment * gender						
11	1.0319	0.6503	1.59	0.113	-0.243	2.307
_cons	-2.2476	1.0574	-2.13	0.034	-4.320	-0.175

*** p < 0.01 ** p < 0.05 * p < 0.1

Table 3 : classification Table " Estat"

Classified	D	~D	Total
+	364	25	389
-	82	88	170
Total	446	113	559

Classified + if predicted Pr(D) >= .8 , the cutoff value = 0.80 True D defined as using medical records! = 0

Sensitivity	Pr(+ D)	81.61%
Specificity	Pr(-~D)	77.88%
Positive predictive value	Pr(D +)	93.57%
Negative predictive value	Pr(~D -)	51.76%
False + rate for true ~D	Pr(+~D)	22.12%
False - rate for true D	Pr(- D)	18.39%
False + rate for classified +	Pr(~D +)	6.43%
False - rate for classified -	Pr(D -)	48.24%
Correctly classified	80.8	36%

Table 4: Logistic Regression "Logit , or"

Log likelihood = -	Number of obs	559	183.04615
	LR chi2(23)	196.67	
	Prob > chi2	0.000	
	Pseudo R2	0.3495	

Using medical records	Odds Ratio	Std. Err.	Z	P>z	[95% Con	f. Interval]
Gender	4.412	4.4461	1.47	0.141	0.6123	31.7972
Age	0.352	0.3655	-1.01	0.315	0.0458	2.6969
Education	0.477	0.6070	-0.58	0.561	0.0393	5.7850
Place	4.287*	3.7255	1.68	0.094	0.7808	23.5417
employment status	0.917	0.3057	-0.26	0.794	0.4768	1.7622
Owning a car	0.300	0.2531	-1.43	0.154	0.0575	1.5670
useful or not	14.638***	4.5077	8.71	0.000	8.0050	26.7675
uploading results						
2	1.092	0.3249	0.3	0.766	0.6098	1.9569
3	0.335**	0.1530	-2.39	0.017	0.1372	0.8201
Payment	3.076*	1.9066	1.81	0.070	0.9131	10.3651
using internet	2.321	2.4136	0.81	0.418	0.3021	17.8219
Difficulties	1.904**	0.5601	2.19	0.029	1.0698	3.3889
medical check	1.311	0.5264	0.68	0.500	0.5970	2.8801
payment *age						
11	0.507	0.3250	-1.06	0.289	0.1442	1.7812
using internet * age						
11	2.826	3.0161	0.97	0.33	0.3490	22.8867
using internet * gender						
11	0.166*	0.1721	-1.73	0.083	0.0217	1.2669
gender * age						
11	0.660	0.4996	-0.55	0.583	0.1496	2.9104
using internet * place						
11	0.280	0.2680	-1.33	0.183	0.0430	1.8261
payment * education						
11	0.885	0.9238	-0.12	0.907	0.1145	6.8436
using internet * Owning a						
car						
11	2.556	2.2699	1.06	0.291	0.4485	14.5698
payment * Owning a car						
11	0.965	0.5562	-0.06	0.951	0.3118	2.9863
using internet * Education						
11	2.714	3.7738	0.72	0.473	0.1777	41.4293
payment * gender						
11	2.807	1.8251	1.59	0.113	0.7846	10.0393

0.106 0.1117 -2.13 0.034 0.0133 0.8394

*** p < 0.01 ** p < 0.05 * p < 0.1

Table 5 : Margins at means

	Delta-method							
Variables	Margin	Std. Err.	z	P>z	[95% Con	f. Interval]		
Gender								
0	0.847** *	0.0373	22.7	0.000	0.77421 8	0.92057 9		
1	0.897** *	0.0203	44.17	0.000	0.85702 4	0.93661 3		
Age								
0	0.906** *	0.0190	47.65	0.000	0.86854 1	0.94306 1		
1	0.803** *	0.0440	18.23	0.000	0.71641 1	0.88905 5		
education								
0	0.884** *	0.0192	45.93	0.000	0.84629 3	0.92173 5		
1	0.890** *	0.0535	16.65	0.000	0.78513 4	0.99467 7		
Place								
0	0.854** *	0.0420	20.33	0.000	0.77153 7	0.93615 8		
1	0.891** *	0.0196	45.47	0.000	0.85283 3	0.92966 1		
Employment status								
0	0.891** *	0.0292	30.51	0.000	0.83368 5	0.94813 3		
1	0.882** *	0.0214	41.31	0.000	0.84030 5	0.92400 5		
Owning a car								
0	0.903** *	0.0221	40.93	0.000	0.86006 3	0.94658 1		
1	0.862** *	0.0271	31.86	0.000	0.80910 9	0.91517 2		
useful or not								
0	0.458** *	0.0640	7.16	0.000	0.33276 4	0.58352 5		
1	0.925** *	0.0143	64.49	0.000	0.89712 2	0.95336 4		

uploading results						
1	0.890** *	0.0222	40.08	0.000	0.84653 5	0.93358
2	0.898** *	0.0237	37.9	0.000	0.85194 5	0.94487 6
3	0.731** *	0.0819	8.92	0.000	0.57026 5	0.89141 7
Payment						
0	0.729** *	0.0413	17.65	0.000	0.64806 3	0.80996 4
1	0.934** *	0.0150	62.1	0.000	0.90430 8	0.96324 6
using internet						
0	0.931** *	0.0430	21.64	0.000	0.84661 1	1.01523 7
1	0.876** *	0.0187	46.91	0.000	0.83964 5	0.91286 9
Difficulties						
0	0.854** *	0.0250	34.1	0.000	0.80503 4	0.90321
1	0.918** *	0.0205	44.73	0.000	0.87747 4	0.95789 7
medical check						
0	0.859** *	0.0474	18.11	0.000	0.76554	0.95137 5
1	0.888** *	0.0190	46.88	0.000	0.85116 4	0.92544 7
payment * age						
0 0	0.751** *	0.0440	17.08	0.000	0.66476 4	0.83714 1
01	0.662** *	0.0913	7.25	0.000	0.48320 7	0.84106 8
10	0.950** *	0.0145	65.5	0.000	0.92137 9	0.97821 6
11	0.862** *	0.0428	20.12	0.000	0.77780 1	0.94568 5
using internet* age						
0 0	0.956** *	0.0380	25.15	0.000	0.88118 4	1.03011 4
01	0.786** *	0.0782	10.05	0.000	0.63225 7	0.93864 9
10	0.896** *	0.0192	46.64	0.000	0.85818 2	0.93346 7

11	0.805** *	0.0480	16.77	0.000	0.71097 7	0.89910 7
using internet * gender						
0 0	0.759** *	0.1479	5.13	0.000	0.46917 1	1.04898 8
01	0.960** *	0.0311	30.88	0.000	0.89890 6	1.02075 1
10	0.857** *	0.0364	23.53	0.000	0.78585 1	0.92869 6
11	0.883** *	0.0215	41.02	0.000	0.84092 5	0.92531 6
gender * age						
0 0	0.866** *	0.0388	22.3	0.000	0.78955 9	0.94174 6
01	0.786** *	0.0925	8.5	0.000	0.60474	0.96738 8
10	0.918** *	0.0207	44.31	0.000	0.87780 3	0.95905
11	0.809** *	0.0479	16.89	0.000	0.71514 9	0.90290 4
using internet * place						
0 0	0.808** *	0.1148	7.04	0.000	0.58300 4	1.03296 1
01	0.948** *	0.0377	25.14	0.000	0.87360 3	1.02135 8
10	0.859** *	0.0443	19.4	0.000	0.77261 7	0.94623 9
11	0.880** *	0.0201	43.84	0.000	0.84084 4	0.91954 3
payment * education						
0 0	0.727** *	0.0432	16.84	0.000	0.64225 4	0.81144 6
01	0.753** *	0.1219	6.17	0.000	0.51395 5	0.99194 8
10	0.934** *	0.0154	60.75	0.000	0.90358 3	0.96383 3
11	0.935** *	0.0475	19.66	0.000	0.84139 4	1.02772 8
using internet * Owning a car						
0 0	0.961** *	0.0263	36.49	0.000	0.90951 9	1.01278 2
01	0.879**	0.0931	9.44	0.000	0.69642	1.06147

	*				9	4
10	0.891** *	0.0248	36	0.000	0.84237 8	0.93939 7
11	0.860** *	0.0263	32.64	0.000	0.80804 4	0.91128 3
payment* Owning a car						
0 0	0.764** *	0.0503	15.21	0.000	0.66596 1	0.86299 7
01	0.690** *	0.0605	11.41	0.000	0.57114 2	0.80815
10	0.945** *	0.0182	52.02	0.000	0.90978 4	0.98103
11	0.920** *	0.0224	40.98	0.000	0.87562 5	0.96358 7
using internet* Education						
0 0	0.935** *	0.0420	22.24	0.000	0.85265	1.01743 1
01	0.864** *	0.1520	5.69	0.000	0.56613 1	1.16183 2
10	0.875** *	0.0194	44.99	0.000	0.83657 3	0.91277 7
11	0.893** *	0.0551	16.22	0.000	0.78521	1.00105 6
payment * gender						
0 0	0.757** *	0.0746	10.15	0.000	0.61077 2	0.90300 6
01	0.717** *	0.0465	15.42	0.000	0.62627 7	0.80871 3
10	0.886** *	0.0384	23.07	0.000	0.81085 3	0.96145
11	0.946** *	0.0152	62.33	0.000	0.91709 2	0.97663 9

*** p < 0.01 ** p < 0.05 * p < 0.1

Table 6 : margins dydx

Variables	Delta-m	nethod				
Variables	dy/dx	Std. Err.	Z	P>z	[95% Conf	. Interval]
Gender	0.050	0.0412	1.2	0.23	-0.0313	0.1302
Age	-0.103**	0.0472	-2.18	0.029	-0.1956	-0.0105
education	0.006	0.0549	0.11	0.915	-0.1017	0.1135
Place	0.037	0.0442	0.85	0.397	-0.0492	0.1240
employment status	-0.009	0.0331	-0.26	0.791	-0.0736	0.0561
Owning a car	-0.041	0.0323	-1.28	0.202	-0.1044	0.0220
useful or not	0.467***	0.0636	7.34	0.000	0.3424	0.5918
uploading results						
2	0.008	0.0280	0.3	0.765	-0.0465	0.0632
3	-0.159*	0.0830	-1.92	0.055	-0.3218	0.0034
Payment	0.205***	0.0416	4.92	0.000	0.1231	0.2864
using internet	-0.055	0.0442	-1.24	0.216	-0.1413	0.0320
difficulties	0.064**	0.0281	2.26	0.024	0.0085	0.1186
medical check	0.030	0.0477	0.63	0.531	-0.0636	0.1233

*** p < 0.01 ** p < 0.05 * p < 0.1

Appendix 2:

		Gender		Region			Age			
		Male	Female	Urban Governorates	Lower Egypt	Upper Egypt	Less than 30	30 -49	50 or above	Total
	Regularly	14.20%	11.90%	13.00%	15.10%	10.10%	6.90%	11.60%	25.00%	13.10%
	In case if illness only	84.20%	87.70%	85.30%	84.40%	88.60%	91.80%	87.70%	73.40%	85.80%
	Don't know	1.60%	0.40%	1.60%	0.50%	1.30%	1.30%	0.70%	1.60%	1.10%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table (2): Do y	ou make medica	l tests regularly	v or when [•]	vou are ill only?
	you make meulea	i tests regulari	y or writen	you are in only:

Figure (1): Do you make medical tests regularly or when you are ill only? By Age



Table	(3):	Where	do	you	usually	save	your	medical	reports,
tests r	esult	ts and X	-ray	s?					

Q102	Number of	Percent of Cases
Q102	Number of	Percent of Cases

	cases	
My wardrobe	131	23.5%
I don't save them	129	23.2%
at home/ my room	88	15.9%
Special file	76	13.6%

Figure (2): Where do you usually save your medical reports, tests results and X-rays?



Table (4): Do you face any problems to reach your previous medical reports, tests results and X-rays?

		Gender		Region			Age			
		Male	Female	Urban Governorates	Lower Egypt	Upper Egypt	Less than 30	30 -49	50 and above	Total
Q103 -	Yes	44.00%	43.60%	43.30%	47.60%	39.00%	48.40%	43.80%	38.80%	43.90%
	No	56.00%	56.40%	56.70%	52.40%	61.00%	51.60%	56.20%	61.20%	56.10%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100%

Figure (3.1): Do you face any problems to reach your previous medical reports, tests results and X-rays? By Region



Figure (3.2): Do you face any problems to reach your previous medical reports, tests results and X-rays? By Age



Table (5): When you finish your medical tests, do you prefer to have printed results or to get them from the website of the medical center?

		Gender		Region	Region			Age			
		Male	Female	Urban Governorates	Lower Egypt	Upper Egypt	Less than 30	30 -49	50 and above	Total	
	Printed	90.20%	89.30%	87.00%	94.10%	86.60%	85.50%	90.60%	93.50%	89.80%	
0104	From the website	7.00%	7.80%	9.20%	4.60%	9.40%	11.30%	5.80%	5.60%	7.30%	
	Other	1.90%	1.60%	3.20%	0.90%	1.30%	1.30%	2.50%	0.80%	1.80%	
-	Don't know	1.00%	1.20%	0.50%	0.50%	2.70%	1.90%	1.10%		1.10%	
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Table (6): Do you think that electronic medical records would be useful for you? Why?

Yes (82.5%)		No (15.7%)				
Reason	Percentage	Reason	Percentage			
Accessibility	66.5%	I prefer to save my records at home	27.0%			
Safety	22.9%	I don't need it because I don't make medical tests frequently	23.6%			
East to follow medical history	12.7%	Not innovative/ Not useful	22.2%			
Time saving	7.5%	I don't use the internet	17.6%			

Figure (4.1): Why "yes"



Figure (4.2): Why "No"



Table (7): Do you think that electronic medical records would be useful for you?

		Gender		Region	Region			Age			
		Male	Female	Urban Governorates	Lower Egypt	Upper Egypt	Less than 30	30 -49	50 and above	Total	
Q105	Yes	80.0%	86.1%	80.5%	87.6%	78.5%	86.2%	81.6%	79.7%	82.5%	
	No	17.5%	13.1%	16.8%	11.0%	20.8%	11.3%	17.3%	17.9%	15.7%	
	Don't know	2.5%	.8%	2.7%	1.4%	.7%	2.5%	1.1%	2.4%	1.8%	
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Table (8): If the system of electronic medical records is applied, would you rely on it?

		Gender		Region	Region			Age			
		Male	Female	Urban Governorates	Lower Egypt	Upper Egypt	Less than 30	30 -49	50 and above	Total	
0107	Yes	78.4%	80.7%	80.4%	82.6%	74.5%	84.3%	81.5%	67.7%	79.3%	
Q107	No	16.8%	9.8%	15.2%	9.2%	19.5%	10.7%	11.6%	23.4%	13.9%	
	Don't know	4.8%	9.4%	4.3%	8.3%	6.0%	5.0%	6.9%	8.9%	6.8%	
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Table (9): What other services that would encourage you to use the electronic medical records?

	Pe	ercentage			
Don't know	50	50.1%			
Guidebook to physicians	16				
Info about the user (Blood pressure, blood type, weight)	7.0%				
Health awareness Table (10): What are the problems that would face while using this system?	5.4 you	% think you th	at you		
		Percent of Ca	ses		
Connection issues		34.0%			
Don't know		19.3%			
There's no problem		14.7%			

Hacking	13.8%
Using issues	7.6%

Table (11): To whom would you give the right to log in to your medical records?

	Frequency	Percentage
My parents	161	28.9
Brother/ Sister	173	30.9
Son / daughter	168	30.1
My private physician	142	25.4
Friends	11	2.0
Other	296	52.9
Don't know	11	1.9

Table (12): In your point of view, who would be responsible for uploading your medical data?

		Gender		Region			Age			
		Male	Female	Urban Governorates	Lower Egypt	Upper Egypt	Less than 30	30 -49	50 and above	Total
	Medical centers & physicians	54.0%	55.4%	53.8%	51.6%	58.7%	62.3%	52.6%	48.8%	54.5%
Q111	Only me	38.7%	34.3%	35.7%	38.4%	35.3%	32.7%	40.1%	35.0%	36.9%
	Other	6.0%	10.3%	9.3%	9.1%	5.3%	5.0%	6.9%	13.8%	7.9%
	Don't know	1.3%		1.1%	.9%	.7%		.4%	2.4%	.7%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Figure (5): In your point of view, who would be responsible for uploading your medical data? By Age



Table (13): There's a national health insurance project will be presented by health ministry to parliament, do you prefer that this project contains the service of electronic medical records?

		Gender		Region			Age			
		Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total
0116	Yes	89.8%	89.0%	88.3%	90.7%	88.6%	86.8%	91.9%	86.8%	89.3%
Q116	No	8.0%	8.9%	7.2%	7.4%	10.7%	10.7%	7.0%	9.1%	8.5%
	Don't know	2.2%	2.1%	4.4%	1.9%	.7%	2.5%	1.1%	4.1%	2.2%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table (14): Do you have the willingness to pay money for this service?

		Gender		Region			Age categor	у		
		Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total
Q112	Yes	61.1%	62.7%	65.9%	65.5%	51.3%	64.6%	61.9%	58.1%	61.8%
	No	32.8%	34.9%	30.2%	30.5%	42.7%	32.3%	34.4%	33.9%	33.7%
	Don't know	6.1%	2.5%	3.8%	4.1%	6.0%	3.2%	3.7%	8.1%	4.5%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table (15): What is the favorite payment method?

Gender		Region			Age			
Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total

Q113	Once in lifetime	21.9%	13.3%	17.6%	18.8%	18.2%	19.8%	21.9%	6.9%	18.2%
	Annual Subscription	63.0%	67.3%	61.3%	64.6%	71.4%	72.3%	58.6%	69.4%	64.8%
	Other	9.9%	10.7%	15.1%	6.3%	9.1%	6.9%	9.5%	16.7%	10.3%
	Don't know	5.2%	8.7%	5.9%	10.4%	1.3%	1.0%	10.1%	6.9%	6.8%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table (16): How often do you use the internet?

		Gender		Region			Age			
		Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total
	Always	53.7%	53.6%	63.1%	48.4%	50.3%	72.6%	53.1%	30.1%	53.6%
0117	Sometimes	32.6%	31.6%	25.7%	36.9%	32.2%	24.8%	35.8%	33.3%	32.2%
QII/	No at all	13.7%	13.5%	9.5%	14.7%	17.4%	2.5%	11.1%	34.1%	13.7%
	Don't know	0%	1.3%	1.7%	0%	0%	0%	0%	2.4%	.5%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table (17): How do you use the internet?

	Gender		Region	Age					
Mentioned	Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total
Computer	54.5%	44.3%	53.8%	48.9%	46.3%	50.3%	51.4%	46.8%	50.1%
Mobile	64.8%	61.5%	68.1%	61.2%	61.7%	81.8%	68.5%	28.2%	63.40%
Other	1.0%	2.5%	1.1%	2.7%	.7%	2.5%	.7%	2.4%	1.60%

Table (18): Have you ever used the internet to send medical data to any physician inside or outside Egypt

		Gender		Region			Age			
		Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total
	Yes	22.20%	17.50%	25.80%	18.90%	15.20%	23.50%	22.90%	10.70%	20.30%
Q119	No	76.80%	82.50%	73.00%	81.10%	84.10%	76.50%	77.10%	86.80%	79.20%
	Don't know	1.00%		1.10%		0.70%			2.50%	50.00%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

		Gender		Region			Age			
		Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total
	Yes	63.80%	69.20%	70.20%	63.60%	64.10%	78.40%	66.10%	50.00%	65.90%
Q120	No	34.90%	30.80%	29.20%	35.50%	35.20%	21.60%	33.20%	48.40%	33.30%
	Don't know	1.30%		0.60%	0.90%	0.70%		0.70%	1.60%	0.70%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table (19): Have you ever used the internet to find any medical information?

Table (20): To what extent do you trust in the information you get from the internet?

		Gender		Region			Age			
		Male	Female	Urban governorates	Lower Egypt	Upper Egypt	Less than 30	30-49	50+	Total
Q121	No trust	5.80%	5.20%	4.50%	4.10%	9.70%	3.90%	5.20%	9.10%	5.70%
	Weak	7.10%	4.30%	5.10%	2.80%	11.10%	6.50%	6.30%	4.10%	5.90%
	Moderate	36.20%	35.60%	36.00%	36.40%	35.40%	34.60%	40.60%	27.30%	36.00%
	Good	32.70%	34.80%	31.50%	36.90%	29.90%	41.80%	31.70%	27.30%	33.60%
	Very good	11.70%	12.90%	15.20%	11.50%	10.40%	11.80%	11.40%	14.00%	12.10%
	Don't know	6.50%	7.30%	7.90%	8.30%	3.50%	1.30%	4.80%	18.20%	6.80%
Total		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%