Barriers to electronic health records deployment in Armenia:

A cross-sectional study

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by

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List of abbreviations

CFA	Confirmatory factor analysis
EFA	Exploratory factor analysis
EHR	Electronic health record
EMR	Electronic medical record
ESEM	Exploratory structural equation modeling
HIT	Health information technology
IT	Information technology
ML	Maximum likelihood
SEM	Structural equation modeling
TAM	Technology acceptance model
ULSMV	Robust unweighted least squares
WLSMV	Robust weighted least squares

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Abstract

Background: Currently health care systems face significant challenges related to the need to harness an ever increasing flow of information, which, if done correctly, can bring to many benefits including improved quality of care, efficiency and cost containment. Information technology (IT) provides powerful tools for optimizing health information management and modernizing the whole health care system. Electronic health record (EHR) is a crucial tool for that purpose. The literature review revealed that implementing EHR in a health care system is related to many different barriers at individual and organizational levels including individual characteristics, personal attitudes and negative perceptions of potential users, effort expectancy related to the usage, resistance to change, clinical concerns, financial, technical and structural barriers, lack of trust and facilitating conditions.

Objective: The main objective of this study is to understand major barriers to successful implementation and widespread adoption of EHR system from the perspective of physicians in Armenia.

Methods: The study is a cross-sectional survey of physicians working in hospitals of Yerevan and selected through multi-stage cluster sampling. The research team developed the survey instrument based on literature review and existing instruments. Results are analyzed in exploratory structural equation modeling (ESEM) framework using the Robust weighted least squares (WLSMV) estimator for categorical indicators. Analysis is done in two steps: first - evaluation and modification of measurement model; second - testing of structural model.

Results: Several factors have direct effects on Intention to use EHR including Projected group usefulness, Personal innovativeness, interference with patient-provider relationships and Resistance to change. Other effects are mediated through Projected group usefulness, Perceived usefulness and Perceived ease of use. Particularly, Innovativeness, Patient-provider relationships, Organizational support and Computer anxiety predicts Perceived ease of use. Ease of use with Resistance, Administrative monitoring and Professional relationships predict Perceived usefulness. Perceived usefulness with Professional relationships and Organizational change predict Projected group usefulness, which transmits all these effects to final outcome – Intention to use. Older age is associated with a decrease in Perceived usefulness and Projected group usefulness, while being female is associated with higher Projected group usefulness. Medical specialty also has significant effects.

Conclusion: Findings suggest that major barriers to EHR implementation in Armenia are clinical concerns at group level (Projected group usefulness), personal attitudes (Perceived usefulness), effort expectancy (Perceived ease of use), Resistance to change, personal characteristics such as Innovativeness and Computer anxiety, and negative perceptions such as interference with Patient-provider and Professional relationships. Organizational support, anticipated Administrative monitoring and Organizational change poses facilitating effects. The study team made the following recommendations to overcome the identified barriers: incorporate organizational reforms as part of EHR implementation in Armenia, demonstrate the utility of EHR at organizational level, provide trainings for users, identify and enroll local EHR champions in the implementation process.

1   Introduction

Health care systems now face challenges related to continuously increasing demand due to aging population and rising prevalence of non-communicable diseases [1, 2]. In addition to these challenges, the efficiency and quality of provided health services could be compromised because of lack of coordination of care at different levels, including lack or absence of health information management, and lack of integration of scientific evidence into health care practices and decision making [3]. Proper health information management is needed for achieving effective and efficient health care for the whole population. According to PRISM framework, improved information system processes improve performance of information systems, which in its turn improve health system performance bringing to improved health status [4]. Managing health information today is challenged by a large number of transactions and limitations of paper based records [5].

The report "Crossing the Quality Chasm" by the Committee on Quality of Health Care in the United States of America (US) recognizes the crucial role of information technologies (IT) in achieving six aims of health care: safety, effectiveness, patient-centeredness, timeliness, efficiency and equity [6].

Many countries now are on the way of upgrading their health care systems through IT. Appendix A summarizes some of the terms related to health IT with their definitions. Electronic health record (EHR) is one of the principal systems, which represent this trend. According to the US National Alliance for Health Information Technology: EHR is "an electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed and consulted by authorized

clinicians and staff across more than one healthcare organization" [7]. Countries face many barriers during EHR implementation and some problems emerge after its implementation. If these barriers and problems are identified and successfully managed beforehand, than EHR system implementation can provide more benefits to health care systems.

2   Background

2.1   Benefits of EHR

There are many studies pointing out different benefits of EHR. There is evidence that EHR improves quality of care and efficiency, reduces costs and brings other types of benefits [5, 8-10]. EHR should be compared to paper based records in terms of their characteristics and effects. In assessing the reliability of information from EHR, paper based records serve as the golden standard [10]. Paper based records are not ideal and can have the following issues: legibility problems, losing of records/reports, difficult navigation, difficulty in tracking and analyzing data, low accessibility for different parties, high transportation and storage expenses, not supportive for reporting and complex reimbursement schemes [11]. EHR can solve most of the listed problems.

2.1.1   Information management

EHR improves health information quality in terms of completeness, accuracy, timeliness, comprehensiveness, reliability, relevance and availability [10] due to structured data entry, more detailed documentation, reduced amount of lost charts/records [9], immediate access and available information management tools [9, 10, 12]. Therefore, information use is significantly enhanced [10].

2.1.2   Quality of care

Improvements in quality of care can be attributed to improvements in safety and effectiveness. The literature reports that EHR use leads to reduction in medical errors, improvements in medication dosing [5, 9] (which brings to reduced adverse drug events, shorter length of stay and lower total hospital costs [13]), and reduction of laboratory reporting errors [14]. EHR can bring to these outcomes partly because of its monitoring and evaluation capabilities including clinical control, large-scale screening, early outbreak identification and improved follow up of tests. EHR use can also enhance preventive health care delivery (vaccination and identification of high-risk patients) and improve adherence to clinical practice guidelines and protocols [5, 11].

2.1.3   Efficiency and Cost

Improved efficiency of care is attributed mostly to reduced utilization of unnecessary care (laboratory and radiology tests, visits to providers), while effects on provider time are mixed [5, 9, 10, 15]. The mentioned effects contribute to cost reductions, particularly reduced utilization of and spending on drugs [11, 16-18].

2.1.4   Other benefits

There are also such benefits as improved patient-centeredness, user satisfaction, and communication between different parties [9, 10, 19, 20].

2.2   Situation in Armenia

There are several parties involved in data collection related to health and several electronic data collection systems in Armenia. Significant gaps and limitations are reported in health information systems of Armenia. Health facility routine reporting is fragmented and incomplete. It includes numerous annual reporting forms which in some cases are redundant [21]. There are

gaps in information usage including lack of information exchange and utilization in decision and policy making [22].

The Government of Armenia developed a concept paper on nationwide implementation of EHR in Armenia with a general description of some components and a time-line [23]. It states that EHR will be mandatory for health-care facilities providing care on the basis of state financing (basic benefit package) and will be used for making decisions on reimbursements. According to the suggested timeline, development of the prototype is due to end of January 2014 and final acceptance of deployed EHR is due to end of April 2014.

3   Barriers to EHR implementation

Barriers are those factors presence or absence of which (at certain levels) can hinder the effective implementation of the EHR system. Literature review yielded a vast amount of barriers to implementation and adoption of EHR. Literature classifies barriers by the locus of occurrence such as individual level, group level, organizational level and system level [24]. In this paper, considering the local context, the research team decided to group the barriers at individual and organizational levels. Individual level barriers include individual characteristics, personal attitudes, effort expectancy, negative perceptions and resistance to change [25-35]. Organizational level barriers include financial, structural barriers, lack of trust, clinical concerns and lack of facilitating conditions [12, 27-29, 31, 32, 36-38].

3.1 Individual level

3.1.1 Individual characteristics

Individual characteristics are attributes of the user of the system[1], it includes experience and personal innovativeness (willingness to try new technology) [25, 26, 39]. Previous experience can determine what is perceived as intuitive and what is expected of the system, whether it seems familiar or not [37, 38, 40, 41]. Skill of typing also is important because it can bring to a new type of medical errors: typos [42].

3.1.2 Personal attitudes

Attitudes towards the system includes sense making, motivation, skepticism, perceived usefulness of the system and some other perceptions [27, 29, 32, 36]. Lack of vision, not shared goals, lack of understanding of long-term strategic value of the system are important barriers, because when long-term benefits are not well understood it is hard to cope with short-term difficulties [43]. More general perception is usefulness of the system. To be accepted the system must provide clear and immediate benefits to the users. Systems often fail because they are designed to support the values of management and not the values of medical staff. To be successful, the system should focus on improving medical practices and solving clinical problems [44, 45].

3.1.3 Effort expectancy

The other major barrier is effort expectancy which is the perceived ability to utilize and ease of use. There is a difficulty associated with technology use and initial effort to learn [38]. It relates to experience, related knowledge, receiving support, training and technology itself [37, 44].

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[1] In this section (Barriers to EHR implementation) the word "system" mostly refers to systems similar to EHR in terms of its impact on health care organization and health services delivery including different configurations of EHR, EMR and other health information technology applications.

Lack of understanding of different EHR features can increase the difficulty of using it. Effort expectancy is reported as a barrier for all health workers including physicians, nurses and managers [36].

3.1.4   Negative perceptions

Negative perceptions are expectancy of risk and disadvantages or unfavorable emotions related to the system [26, 33, 46]. This category includes perceived restrictiveness of the system; impact on productivity, workload and time; threat to autonomy; interference with relationships; legal, ethical and security concerns; and perceived inequity.

3.1.4.1   *Restrictiveness of the system*

There might be concerns related to the reliability of the system (e.g. frequency of downtimes) [25, 32], limitations imposed on documentation and inflexible mode of data entry [38, 45, 47].

3.1.4.2   *Productivity, time and workload impact*

It is a common perception that EHR negatively impacts productivity and efficiency of health professionals, causes time wasting and increased workload. The potential for a negative impact on physicians' productivity and efficiency is one of the largest barriers [48-50]. At the initial stages of EHR implementation a relevant barrier is time required to learn the system. More time required for data entry can make the process cumbersome. Another impact is spending more time on each patient which can bring to loss of revenue [32]. Impact on time is reported as a barrier for all health workers including physicians (take away time from clinical tasks), nurses (spent less time with patients), other health professionals and implementers [36, 37].

An increase in workload is another general widely reported negative perception. EHR can be associated with increased paper work [28, 48]. At initial stages parallel use of paper based and

electronic records (depends on implementation type) might be a problem, which, for example, can be continued because of legal concerns [38]. Impact on workload is reported as a barrier for physicians and managers (they are concerned about increasing workload of staff).

3.1.4.3   Autonomy

Professional autonomy is defined as "professionals' having control over the conditions, processes, procedures, or content of their work according to their own collective and, ultimately, individual judgment in the application of their profession's body of knowledge and expertise" [51]. Perception of the eroded capacity of decision making, dependency on computer systems and information sharing requirements can negatively affect physician's autonomy [37]. In EHR information needs to be shared among different providers but this can be a challenge, because loss of control over patients' information is perceived as a threat to autonomy. Physicians fear that shared information can be used to assess and penalize them [32, 36, 49]. Even in not centralized systems (as with EMR) physicians are worried about sharing their waiting lists or other information regarding their patients. Overall physicians also perceive this as a threat as patients are becoming more informed consumers and are gaining more power to protect their own interests [28, 52].

3.1.4.4   Interference with relationships

Interference with relationships is a perception that the system can distract social links and interactions among different parties. In general, adoption of the system is regarded as depersonalization of health care by opposing face-to-face interaction with new ways of communication [28]. We have distinguished two types of relationships: patient-provider and intra-organizational relationships.

3.1.4.4.1 Patient-provider relationships

Patient-provider relationships are perceived to be interfered by the system because of disturbed communication [32] and negative effect on rapport between them [36, 49]. Such negative perceptions are reported as barriers for physicians, nurses and health professionals. Physicians also are concerned about the possible distraction from a patient if records are patient-accessible [32].

3.1.4.4.2 Intra-organizational relationships

There are perceptions of possible distractions to intra-organizational relationships between employees and administration and between nurses and physicians related to introduction of EHR system [12, 27, 35].

3.1.4.5 *Legal and security concerns*

There are concerns that the EHR system might bring to legal problems because of the lack of legal framework or lack of acceptance of electronic records and electronic communication in cases taken to courts [28, 38, 50]. EHR, if not implemented properly, can compromise the privacy and confidentiality of patients and bring to security and safety problems undermining the reliability of the EHR system [29, 32, 47, 49, 50]. Who will be privileged with what access rights is important because it could be related to the risk of fraud and abuse [44], loss of autonomy if accessed by government or insurance companies [47]. Privacy and security issues are reported as barriers for all health workers including physicians, nurses, other health professionals and managers.

3.1.4.6 *Perceived inequity*

Perceived inequity can be of two types. In one case user can perceive inequity between own efforts and rewards because of the lack of direct benefits [33, 48]. In the other case perceived inequity can be between gained benefits of different parties. It is perceived that benefits of the system accrue largely to payers and not to health providers [37]. Overall negative emotions (such as doubts, upset, fear, anxiety and threat) are major obstacles for the implementation of the new health information technology (HIT) [46]. They can bring to resistance to change and hinder acceptance of the system.

3.1.5 Resistance to change

Change, regardless of the qualitative specifications can result in extra workload by altering long-established personal work styles, causing undesired conditions such as uncertainty, unfamiliarity and negative emotions [33, 38]. All these can bring to resistance which is defined as 'any conduct that serves to maintain the status quo in the face of pressure to alter the status quo' [53, 54].

3.2 Organizational level

3.2.1 Financial barriers

Financial barriers for EHR implementation include ongoing and training costs [32]. Maintenance, monitoring and upgrading can increase the ongoing costs. System downtimes may have high opportunity costs [37].

3.2.2 Technical barriers

These barriers include lack of infrastructure, suboptimal nature of the applied technology and solutions and technical limitations of the deployed system. Specifically, lack of interoperability

between different (existing and introduced) application components partly due to insufficient standardization of health care processes represents the major part of technical barriers [27, 45].

3.2.3   Structural barriers

Structural barriers determine the magnitude of other barriers [32]. EHR implementation is more difficult in small facilities because they don't have enough resources to support the process [26]. Lack of inter-organizational integration and inefficiencies in cooperation between different facilities are also issues [36].

3.2.4   Lack of trust

Trust between users and trust in electronic communication is required to allow effective communication and exchange of information. Distrust may arise in cases of "double barreled" documentation (when clinical documentation is also used for assessing performance or deciding on reimbursement) and methodological inconsistencies which may strengthen the preference for informal information sources [28].

3.2.5   Clinical concerns

There might be clinical concerns about quality of care and safety of patients [37]. For example, physicians may think that the system could interrupt rather than support direct patient care provided by nurses [55].

3.2.6   Facilitating conditions

Facilitating conditions include involvement, training, organizational support, technical and expert support [29, 32, 37, 38, 40]. These factors can serve as catalyzers for system acceptance [28].

4   Research Objective

The main objective of this study is to understand the major barriers to successful implementation and widespread adoption of EHR system from the perspective of physicians in Armenia.

Due to lack of considerations of such obstacles implementation could be ineffective and unsuccessful, threatening the fate of the endeavor. EHR implementation can influence and be influenced by many users from different locations at different levels. Success of the system is highly dependent on these complex interactions. Having identified a wide set of different barriers we can estimate the behavior of different types of barriers in the local context.

The following research question has guided the analysis in this study: which barriers from the predefined set might influence physicians' acceptance of the EHR in Armenia? The predefined set of barriers includes: individual level barriers such as individual characteristics (Personal innovativeness, Related knowledge, Computer anxiety), personal attitudes (Perceived usefulness), effort expectancy (Perceived ease of use), negative perceptions (Autonomy, Patient-provider relationships, Professional relationships), Resistance to change and organizational level barriers such as technical barriers (Access), structural barriers (Organizational change), clinical concerns (Projected group usefulness) and facilitating conditions (Organizational support).

5   Methods

5.1   Instrument development

Literature review on different barriers to EHR implementation set the background enabling the application of quantitative methods and measurement of possible set of barriers. Additional search for instruments targeting different aspects of adoption of similar systems or different factors related to some types of barriers resulted in a wide range of various multi-item scales and

single-item measures, which could be used to operationalize different barriers to EHR implementation [30, 33, 39, 56-60].

Pooling all available questionnaires together, matching relevant items and scales with appropriate barriers gave ability to identify the existing scales addressing certain barriers of interest. Absence of a single instrument addressing all types of identified relevant barriers justified the need for designing a new instrument by combining scales from different existing instruments and developing some new ones. Such adjustments as changing formulations of questions, dropping some items or adding new ones to the existing scale made some of the scales more relevant to certain barriers and settings. After additional search the student investigator has developed several new scales to operationalize unaddressed, yet relevant barriers. Prioritization of barriers according to their relevance to the local context helped to finalize the instrument development (see Appendixes B and C).

5.1.1 Pretest

The student investigator pretested the questionnaire to check for clarity and understandability of the questions, identify mistakes and other issues, and assess the overall burden of the questionnaire. The pretest included five physicians and helped to improve the instrument (see Appendix C).

5.2 Design, population, sampling

The study is a cross-sectional survey of physicians working in hospitals of Yerevan. Physicians are one of the most powerful stakeholder groups whose work is most influenced by EHR implementation. We specifically targeted physicians working in hospitals because hospitals are perceived as one of the most influential tier of health care systems [61]. At the same time physicians working in primary care facilities have some prior exposure to a national electronic

system which could make them systematically different from hospital physicians in terms of their perceptions [62]. For feasibility our study population is limited to physicians working in Yerevan hospitals.

Eligibility of physicians is defined by the following inclusion criteria: working in a Yerevan hospital at least for 3 months (professionals who have some experience working in a hospital) and knowing Armenian. The exclusion criteria include: being a member of the top management (e.g., Chief Executive Officer) – they might have a different perspective than regular physicians.

The research team based sample size calculations on accurate estimation of incremental R-squared (squared semi-partial correlation coefficients) in regression equations. One study presents such sample size tables based on formulas for large-samples and simulations [62].

Calculations based on the correlation matrix reported in a similar study [63] show that the reduced model (a regression model without 'Perceived usefulness') may have R^2 =0.185 which we may consider as minimum R^2 for all reduced models (for the chosen size) because 'Perceived usefulness' is the variable with the most predictive power. And R^2 for the full model (with all variables from that study calculated based on reported correlation matrix) is 0.46, so incremental R^2 is 0.28. So we can consider 0.30 as the expected maximum for incremental R-squared between full and reduced models. These statistics will produce sample size of 190 for the width of 0.2 for estimated incremental R-squared (with precision ±0.01).

There are 36 republican and 14 municipal facilities providing hospital care in Yerevan [63]. The study utilizes multi-stage cluster sampling. The cluster size is 12. The design effect is 1.2 and the final sample size is 228 physicians from 19 randomly chosen hospitals.

5.3 Data collection

The interviewer administered the questionnaire to consented participants. No more than two-three participants are enrolled from each department of each hospital. The duration of each interview is approximately 12-17 minutes.

5.4 Analysis

The student investigator did a single entry from the questionnaires and, during the entry, did regular spot checks. Then exploratory analysis is done for data cleaning. Screening looked for unexpected values, outliers, unengaged responses (negligible variance in the row).

The dataset has low level of missing values. Ten variables have only one missing value (0.4%), four variables no more than four missing values. The maximum amount of missing values for any variable in the dataset is 1.7%. Medians of variables are imputed for missing values of variables that would be analyzed by covariance based structural equation modeling (SEM) to not drop any observation from the analysis.

Then dataset is converted from SPSS data file to raw data format to supply Mplus 7 [64]. Screening of converted dataset ensured flawless conversion.

Analysis is based on SEM methodology, which simultaneously estimates a set of interrelated dependence relationships: a) between latent variables and observed variables (loadings), where latent variables may not be measured directly and are measured by some observed variables; b) between endogenous variables and exogenous variables, where endogenous variables are latent variables with the role of dependent variables in at least one structural equation (here structural equation is a regression equation with latent variables), exogenous variables are latent variables which serve only as independent variables in structural equations of the model; and c) among

exogenous variables [65, 66]. We utilize an extension of SEM - exploratory structural equation modeling (ESEM) which allows simultaneous estimation of both exploratory and confirmatory factor analytic components within the same model [67]. One rationale for this choice is that proposed measurement model primarily is based on a wildly applied theory (technology acceptance model - TAM) while trying to extend it by introducing several new constructs which have not been explored previously. There are constructs from different studies and they have not been applied together in a single questionnaire. Some of these constructs have conceptual links and may overlap. ESEM also has several advantages over conventional exploratory factor analytic (EFA) and confirmatory factor analytic (CFA) technics. One advantage over EFA is that it provides global fit statistics for the overall model and allows estimation of confidence intervals for loadings of observed variables on latent variables. In contrast with CFA, it allows rotation and estimation of cross loadings and parameter estimates become less biased [67].

5.4.1   Model specification

The constructs of the measurement model adopted or adapted from previous studies, which already have been tested together in other studies and are not hypothesized to share common underlying factors with the other constructs of the measurement model are modeled in the CFA framework i.e. as unidimensional constructs with congeneric measures (cross-loadings fixed to be zero) [65, 68]. The rest are modeled into respective EFA sets. This is done to assist in establishing discriminant validity of the theoretically related constructs by screening for statistically significant and substantial (completely standardized path estimate larger than 0.4) cross loadings and to find out whether their operationalization allows us to treat them as separate latent variables [69].

The study team divided independent variables into three groups. Personal innovativeness, Related knowledge, and Computer anxiety are grouped in the 1st exploratory set (they all are targeting individual IT characteristics). Perceived usefulness, Projected group usefulness, Intention and Attitude are in the 2nd exploratory set. The 3rd exploratory set includes Professional relationships, Organizational change and Access, as they all are newly developed constructs. Indicators from an exploratory set load on number of factors specified for that set and then Geomin oblique rotation simplified factor structure within each set [70].

In the confirmatory part a marker indicator with fixed loading per latent variable served for setting its metric while in the exploratory part variances of the latent variables are fixed to 1 [67, 69].

5.4.2 Data screening and selection of the fitting function

The most common estimation method for CFA and SEM is maximum likelihood estimation (ML) which has several assumptions: indicators are continuous variables with multivariate normal distribution [69]. In some instances ML is robust to mild violations of these assumptions and it is common for researchers to treat five point Likert scales as continuous variables, but marked departures from these assumptions distort estimation with biases. Therefore, checking for multivariate normality of indicators is important.

Multivariate normality can be possible only after univariate normality. Appendix D shows descriptive statistics of variables and majority of them are not normally distributed (skewness ranging from -1.5 to 2.4 and kurtosis from -1.3 to 9.6). P-values associated with Mardia skewness and kurtosis strongly contradict the assumption of multivariate normality (see Table 1) [71, 72]. Exploration of Mahalanobis distances indicates a large number of outliers from

multivariate normality and beta Q-Q plot of scaled Mahalanobis distances (see Figure 1) visualizes substantial divergence from multivariate normality [73, 74].

When ML estimation is based on non-normal data, it causes spurious inflation of χ^2 values [75, 76], underestimation of goodness of fit indices such us CFI, TLI [77, 78] and more pronounced negative biases in parameter estimates and standard errors as levels of univariate skewness and kurtosis increases (marked floor or ceiling effects, no linear relationships) [76, 77].

There are other estimators which overcome limitations of maximum likelihood to some extent and are based on polychoric correlations which estimate latent correlations based on categorical indicators, assuming unobserved continuous distribution underlying each indicator [79]. This measure of correlations does not make distributional assumptions regarding observed variables as required with Pearson correlations and is robust to non-normality of underlying continuous distributions [80].

The two most promising estimators of this kind are robust unweighted least squares (ULSMV) and robust weighted least squares (WLSMV). ULSMV produces more accurate factor loadings and confidence intervals with ordinal variables up to seven categories as compared with robust ML estimation (MLMV) [81]. Overall, both methods provide accurate and very similar results, in some instances ULSMV slightly outperforms WLSMV [82, 83].

Standard error estimates are essentially unbiased for both of these estimators while ML has a tendency to underestimate them [84]. WLSMV outperforms ML also in terms of factor loadings, even with variables with 4-5 categories, they are less biased and more accurate [85]. There are conditions when WLSMV may overestimate factor intercorrelations but this can be neglected when the model has many factors [85].

WLSMV estimator [86, 87], available through Mplus 7 [64], estimated the models in this study because WRMR fit index is available with it while it is not available with ULSMV in MPlus 7 and fit indices are more investigated with WLSMV than with ULSMV [88]. For measurement model WLSMV estimation is with Theta parameterization to allow inclusion of error terms as model parameters, for structural model estimation is with default Delta parameterization, as in this stage we are not interested in error terms of indicators [64].

5.4.3 Behavior of descriptive fit indices with observed ordinal variables

Several simulation studies investigated behavior of descriptive fit indices with observed ordinal variables and mainly reported similarities between ML based estimation and categorical variable methodologies [78, 85, 88]. These findings can render suggestions for acceptable cutoff criteria based on observed continuous variables and ML estimation [89] as appropriate also with WLSMV estimation based on observed ordinal variables with five categories. Table 2 provides the full summary of guidelines for acceptable fit applied to this study.

6   Ethical considerations

The Institutional Review Board (IRB) / Committee on Human Research of the American University of Armenia reviewed and approved the study protocol. Appendix E presents the consent form.

7   Results

Data collection resulted in 233 completed interviews from 20 hospitals. Seventy physicians refused to participate, 56 physicians were unable to participate at the time of survey and 10 interviews were left incomplete. The overall response rate is 63%.

7.1   Descriptive Statistics

There is approximately uniform distribution of age between 25 and 65 years, sex and type of hospital ownership (see Appendix D). Minimum age is 21, maximum 85 and the mean 45. Table 3 present more detailed frequency distribution of specialty, preferred data entry person, type of training, hospital ownership and time commitment.

7.2   Measurement model

Initial measurement model (see Figure 2) has 65 observed dependent variables (questions from the questionnaire) and 15 continuous latent variables (scales measuring latent variables) from which 10 are in 3 exploratory sets as described above. All observed variables in the initial model have uncorrelated measurement errors, no equality constraints on loadings or error variances and all covariances of latent variables also are free parameters which leave the model with 1,828 degrees of freedom (according to WLSMV estimation). For details of hypothesized measurement model see Appendix F.

7.2.1   Model evaluation and modification

Rotations easily revealed the conceptual nature of factors in the EFA sets by pointing out indicators with high loadings on it and no or small cross loadings on other factors. Cutoff for high loadings is 0.5 or above and for small cross-loadings it is 0.4 or bellow [65], although WLSMV based unstandardized loadings for categorical indicators are probit regression coefficients and their interpretation is not straightforward, however standardized loadings for categorical indicators can be treated similar to the loadings for continuous indicators [69].

Model evaluation is based on interpretability, size and statistical significance of parameter estimates, localized areas of strain pointed out by modification indices and residuals, overall goodness of fit. Examination of directions of loadings have revealed that two items from the

Autonomy construct have opposite signs from the rest of the construct's items while all they have similar valence. To take into account this unexpected result and modification index suggesting correlated error terms between these two items we formed a new latent variable and named it as Administrative monitoring. After separating those two items from the Autonomy construct and dropping some other items it is apparent that initial construct is significantly altered and now the name of that construct is not reflecting its content. Remaining items tap primarily into security concerns which easily redefined the name of the latent variable to be Security concerns.

Based on decision rules mentioned above and theoretical considerations some of the observed variables have been dropped from the measurement model. As a result of these modifications the whole Access and Attitude constructs have been dropped.

Appendix G presents the summary of all modifications. Each step of model respecification contained single modification prior consecutive estimation. After these modifications there are no small factor loadings or substantial cross-loadings. Appendix H presents selected output for final measurement model.

7.2.2 Overall fit of the measurement model

The study team tests for the overall fit of the final model and finds that chi-square equals 763.01 with 581 degrees of freedom and p-value < 0.0001, which rejects the hypothesis of exact fit. This means the model estimates do not fully reproduce observed (sample) covariance matrix. The other descriptive fit indices are satisfactory including parsimony fit, comparative fit and absolute fit (see Table 4).

7.3 Structural model

7.3.1 Specification of structural model

After achieving measurement model which approximates the reality without much problems, we have moved to imposing structural constraints. As we have no significant cross-loadings in the 2nd exploratory set and are interested in modeling structural paths between latent variables of that set, we constrain items to load only on their pertinent latent variables. This respecification is based only on theoretical considerations and the absence of statistically significant cross-loadings [69].

Figure 3 presents the hypothesized structural model. Structural model tests all direct effects from exogenous latent variables to the Intention, endogenous variables are Ease, Usefulness, Projected group usefulness and Intention. Appendix I summarizes the hypothesized structural paths. The research team added covariates (age, sex, specialty, preferred data entry person, time commitment and type of hospital ownership) to the structural model by regressing three endogenous variables (Ease, Perceived usefulness, and Projected group usefulness) on these covariates. We do not hypothesize direct effects from these covariates to the Intention, instead we are hypothesizing that possible effects of these covariates should be mediated through other endogenous variables.

7.3.2 Model evaluation and model fit

Inspection of modification indices suggests no theoretically relevant modifications. The only exogenous variables without any statistically significant path coefficients are Knowledge and Security. Covariates for preferred data entry person, time commitment and type of hospital ownership are also non-significant. These non-significant variables are dropped from the

structural model with covariates. The overall fit of the structural model with covariates is satisfactory (see Table 4).

7.3.3 Structural paths

Figures 4-6 present the model with only significant paths. Mplus 7 does not include in the produced output standard errors of standardized coefficients for the WLSMV estimated models with covariates. Standard errors for unstandardized coefficients and for standardized coefficients are estimated differently and for the last one they are generally less accurate [90]. For the point estimates we have used standardized path coefficients (to allow interpretability of coefficients for binary covariates standardization is based only on the variance of the latent variables, for the continuous covariate coefficient is completely standardized [64]) and have presented those which are statistically significant based on unstandardized solution. Appendix J presents the model parameter estimates (based on both unstandardized solution with its standard errors and standardized solution).

Model explains substantial amount of variance in endogenous variables. R-square for Intention is 0.85, for Projected group usefulness 0.84, for Perceived Usefulness 0.77 and for Ease of use 0.65 (see Appendix J). All direct effects to Intention are insignificant except effects from Innovativeness, Patient-provider relationships, Resistance and Projected group usefulness. The effects from other variables are only mediated by Ease of use and Projected group usefulness. The largest direct effect on Intention is from Projected group usefulness (standardized path coefficient of 0.56), then comes Innovativeness (standardized path coefficient of 0.33), Patient-provider relationships (standardized path coefficient of -0.27) and Resistance (standardized path coefficient of -0.14). In this model Personal innovativeness, Computer anxiety, Organizational support and Patient-provider relationships significantly predict Perceived ease of use. Computer

anxiety and threatened patient-provider relationships are negatively associated with the

Perceived ease of use. Perceived ease of use is the strongest predictor of Perceived usefulness

(standardized path coefficient of 0.59), then comes Administrative monitoring (standardized path

coefficient of 0.39), Resistance to change and Professional relationships which all significantly

predict Perceived usefulness. Perceived usefulness is the strongest predictor of Projected group

usefulness (standardized path coefficient of 0.29), then comes Organizational change

(standardized path coefficient of 0.24), Professional relationships (standardized path coefficient

of 0.22) and Patient-provider relationships as the remaining significant predictors of the

Projected group usefulness.

Age significantly predicts Perceived usefulness and Projected group usefulness (completely

standardized path coefficient of about -0.21 for both). Medical specialty also has significant

association with mentioned endogenous variables, particularly being anesthesiologist is related to

the increase in Perceived usefulness by 0.76 standard deviations as compared with specialists in

internal medicine and being a specialist in obstetrics/gynecology is related to the decrease in

Projected group usefulness by 0.48 standard deviations as compared with specialists in internal

medicine. Being female is positively associated with the Projected group usefulness

(standardized path coefficient of 0.55).

7.4   Power analysis

The final measurement model has 14 latent variables, 39 observed variables and 581 degrees of

freedom and the test of close fit is satisfactory: $p(H_0: \text{RMSEA} \leq 0.05) = 0.999$ and 90% CI of

0.039 - 0.044. The study team conducted power analysis for this test by specifying alternative

hypothesis as RMSEA of 0.06 and demonstrated that the power is 0.88 (see Figure 7) [91].

The final structural model has 678 degrees of freedom and produced satisfactory close fit test statistics: p (H_0: RMSEA $\leq$ 0.05) = 1.00 and 90% CI of 0.030 - 0.043. The power of this test (with the same H_a) is 0.92 (see Figure 8).

These results suggest that both models have enough power to reject the null hypothesis.

8   Discussion

The structural model suggests that effort expectancy related with the utilization of the newly introduced system (Perceived ease of use) predicts personal attitude towards the system (Perceived usefulness) which predicts clinical concerns at organizational level (Projected group usefulness) which, in its turn, predicts intention to use the system (Behavioral intention). The final model is partly consistent with the research based on technology acceptance model (TAM) [92]. However, the final model does not have significant direct effects from Perceived ease of use and Perceived usefulness to Behavioral intention which is not common in TAM studies lacking Projected group usefulness [56]. Effect from Ease of use is only mediated through personal attitude (Perceived usefulness) and the effect from personal attitude is only mediated through group level concerns (Projected group usefulness). The study suggests that such individual characteristic as Related knowledge has no significant effect on Perceived ease of use or Intention which is not consistent with other studies [57]. Instead, the model presents significant direct effect from the other individual characteristic which is Personal innovativeness to Intention to use and mediated effect through Ease of use. In this study the personality trait is more explanatory than the level of actual experience with computers (Related knowledge).

The other construct, items' performance of which does not allow carrying it through, is Physical access to the EHR. The operationalization of Physical access does not resonate with the physicians' perspectives or physicians are not concerned with such matters at all.

All path coefficients are positive except the ones for Patient-provider relationships, Computer anxiety and Resistance. These latent variables are expected to negatively influence Intention because they are capturing negative perceptions, unfavorable individual characteristics and resistance to change. However, some latent variables have positive influence on endogenous variables. Administrative monitoring has positive effect on Perceived usefulness (standardized path coefficient of 0.39) which means that physicians welcome increase of administrative monitoring through EHR in health care system of Armenia and perceive it as a contributor to the usefulness of EHR. The current study found that physicians are not concerned about their autonomy and also they do not show security concerns. This is contrary to the results from other studies that have modeled one latent variable Autonomy and reported negative relationships with the dependent variables (Attitudes, Usefulness) [34, 58]. The other interesting finding is the positive relationship of Organizational change with Projected group usefulness (standardized path coefficient of 0.24). This means that instead of invoking resistance, anticipation of organizational change contributes to the utility of EHR and lack of anticipated organizational change reduces Projected group usefulness of EHR and hinders Intention to use. This suggests that physicians regard organizational change with favor and consider structural modifications as beneficial for the whole hospital (increased Projected group usefulness) rather than a barrier.

Facilitating conditions such as Organizational support predicts only Perceived ease of use without affecting personal attitudes (Perceived usefulness). Existing studies found similar relationship between Organizational support and Perceived ease of use; however, the findings are

not consistent in the literature regarding Organizational support predicting Perceived usefulness [58]. Interference with patient-provider relationships influences effort expectancy (Perceived ease of use) and clinical concerns (Projected group usefulness) but not personal attitudes (Perceived usefulness). An existing study, which is lacking Projected group usefulness in the model, found that Patient-provider relationships influence Perceived ease of use and Perceived usefulness [45].

Some latent variables demonstrate themselves as more of personal concerns while others as more of interpersonal and group level concerns by predicting either personal attitudes (perceived usefulness) or clinical concerns at group level (projected group usefulness). Specifically, Resistance to change and Administrative monitoring predicts Perceived usefulness and not Projected group usefulness, which means that these factors may be regarded by physicians as more of personal concerns. While resistance to individual change reduces Perceived usefulness of the system, potential of organizational change enhances Projected group usefulness. Here Resistance to change also directly affects Behavioral intention as in existing studies but does not affect Ease of use in contrast to those studies [57]. Professional relationships affect both Perceived usefulness and Projected group usefulness which demonstrates the importance of relationships with colleagues at both individual and group levels.

The only covariates which have some statistically significant effects are age, gender and medical specialty. As expected, older physicians see less value in using the system. Female physicians perceive the system to be more beneficial at group level as compared with males. Specialty has some mixed effects on personal attitudes and clinical concerns.

The theoretical contribution of this study is conceptualization and operationalization of the Projected group usefulness apart from the Perceived usefulness and demonstrating it as a bridge

between Perceived (individual) usefulness and Behavioral intention. This extension of technology acceptance model (TAM) may help in explaining some processes inherent to enterprise-wide socio-technical systems more precisely and in modeling performance of members of complex organizations more realistically. This direction of inquiry is in line with the recent attentiveness to the socio-technical issues [29, 93]. Specifically, presented model may suggest that users first evaluate the utility of the system for their personal use then project this evaluation on their peers taking into account also other factors. As a result, they come up with an evaluation of the utility of the system for an interactive environment of their workplaces, which finally predefines their acceptance of the system in question.

8.1   Limitations and Strengths

The main limitation of the study is statistically significant chi-square test statistics for the final model which in this accept-support context (instead of more conventional reject-support tests) is unfavorable for the researcher's hypothesis. In an attempt to explicate the lack of exact fit, to reach insignificant chi-square test statistics and to reproduce sample covariance matrix with less discrepancies the measurement model is saturated up to freeing all cross-loadings of all items by placing all the appropriate constructs in the one exploratory set in the ESEM framework; however, the resulted chi-square statistics is still significant, particularly $\chi^2 = 420.904$, df $=288$, p-value< 0.0001. In this case the tested model is pretty complex but it is yet not fully saturated, as it does not include free error covariances. Freeing error covariances is equivalent (theoretically and mathematically) to introducing additional latent variables. This point suggests that a much more complex model with more latent variables would be needed to describe the reality and our final model is a rather simplified approximation of the reality.

The other limitation of this study is a relatively large amount of modifications and significant alteration of initial measurement model. This added substantial exploratory component to the study. However, the major part of modifications are limited to dropping poorly performing variables and not complicating the model by freeing for estimation theoretically unjustified relationships.

The other potential limitation is self-exclusion of eligible physicians from participation (refusals). Those who refused to participate might be systematically different from those who agreed to participate in the study.

One of the strengths of the study is in applied methodology of analysis. It utilizes ESEM in a theoretically driven manner. This recent extension of SEM empowers research with the double-edged tool, which allows merging of confirmatory and exploratory approaches in the contexts, where theory is not finalized and hypotheses are not fully mature. Applied WLSMV estimator takes into account categorical nature of collected data without posing additional unsafe assumptions. The other strength of the study is the extensive focus on theory both during instrument inception and analysis.

9   Conclusions and recommendations

The major barriers of EHR implementation in Armenia are group level clinical concerns, personal attitudes towards the utility of the system, required effort to utilize the system, a personal characteristic such as innovativeness, interference with patient-provider relationships and resistance to change. Other factors may be leveraged to mitigate these barriers.

According to our findings, to handle some of the major barriers the following strategies might be effective:

- Propose new structural changes in hospitals and in current Armenian health care system and incorporate organizational reforms as part of the project implementation.

- Develop workflows for EHR that will not negatively affect patient-provider and professional relationships

- Ensure organizational support from hospitals' administration

- Apply proper change management to mitigate resistance

- Execute proper and secure administrative monitoring capabilities within EHR

- Empower physicians with the skills to utilize EHR through appropriate trainings

- Demonstrate EHR utility at the organizational level

- Identify physicians with a high level of personal innovativeness (IT enthusiasts) and create an acting network of local EHR champions to facilitate deployment phase and disseminate acceptance in their facilities.

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Tables

Table 1. Statistical tests for joint normality

Test	Coefficients	Test Statistic	p-Value
Mardia Skewness	1,812.395	71,315.252	0.000
Mardia Kurtosis	4,908.499	45.264	0.000
Henze-Zirkler		1.000	0.000

Table 2. Guidelines for descriptive goodness-of-fit indices

Fit index	Recommended cutoffs	Sources
Absolute fit		
SRMR (standardized root mean square residual)	≤0.7	[88]
	≤0.8	[89]
WRMR (weighted root mean residual)	≤0.95	[88]
Parsimony fit		
RMSEA (root mean square error of approximation)	≤0.05	[88]
	≤0.06	[89]
Close fit - Probability (RMSEA ≤0.5)	≥0.50	[94]
Comparative fit		
CFI (comparative fit index)	≥0.96	[88]
	≥0.95	[89]
TLI (Tucker–Lewis index)	≥0.96	[88]
	≥0.95	[89]

Table 3. Frequency distributions for type of hospital ownership, time commitment status, specialty of respondents, preferred data entry person, and type of training

	Frequency	Percent
Hospital ownership		
Public	100	42.92
Private	133	57.08
Time commitment		
Full time	201	86.27
Part time	32	13.73
Specialty		
Internal medicine	95	40.95
Surgery	76	32.76
Anesthesiology	13	5.60
Obstetrics/gynecology	15	6.47
Radiology	19	8.19
Other	14	6.03
Data entry person		
Physician	55	23.91
Nurse	5	2.17
Partly physician, partly nurse	69	30.00
Special clerk	101	43.91
Type of training		
In groups	81	35.37
One-on-one	87	37.99
Online	24	10.48
Guidelines	15	6.55
Self-learning	21	9.17
Other	1	0.44

Table 4. Goodness-of-fit of the measurement and structural (with covariates) models

Fit index	Recommended cutoffs	Results from measurement model	Results from structural model (with covariates)
Absolute Fit			
χ^2 (df)		763.01 (581)	888.76 (678)
p-value		< 0.0001	<0.0001
SRMR	≤0.7	0.043	
WRMR	≤0.95	0.710	0. 914
Parsimony Fit			
RMSEA	≤0.05	0.037	0. 037
(90% CI)		(0.029 - 0.044)	(0.030 - 0.043)
Close fit - p(RMSEA ≤0.5)	≥0.50	0.999	1. 000
Comparative Fit			
CFI	≥0.96	0.988	0.985
TLI	≥0.96	0.985	0.983

Figures
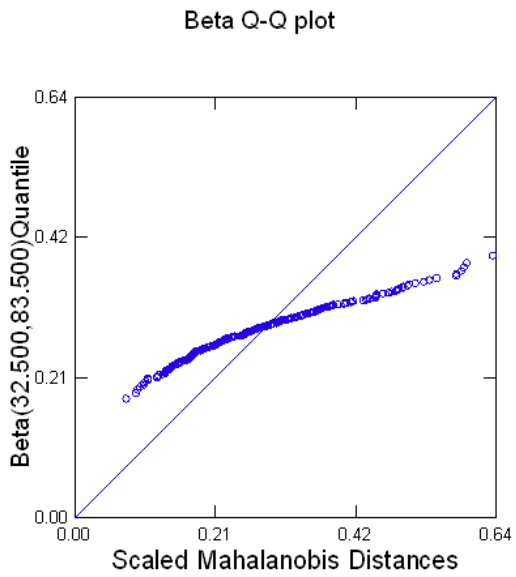
Beta Q-Q plot

Figure 1. Beta Q-Q plot of scaled Mahalanobis distances
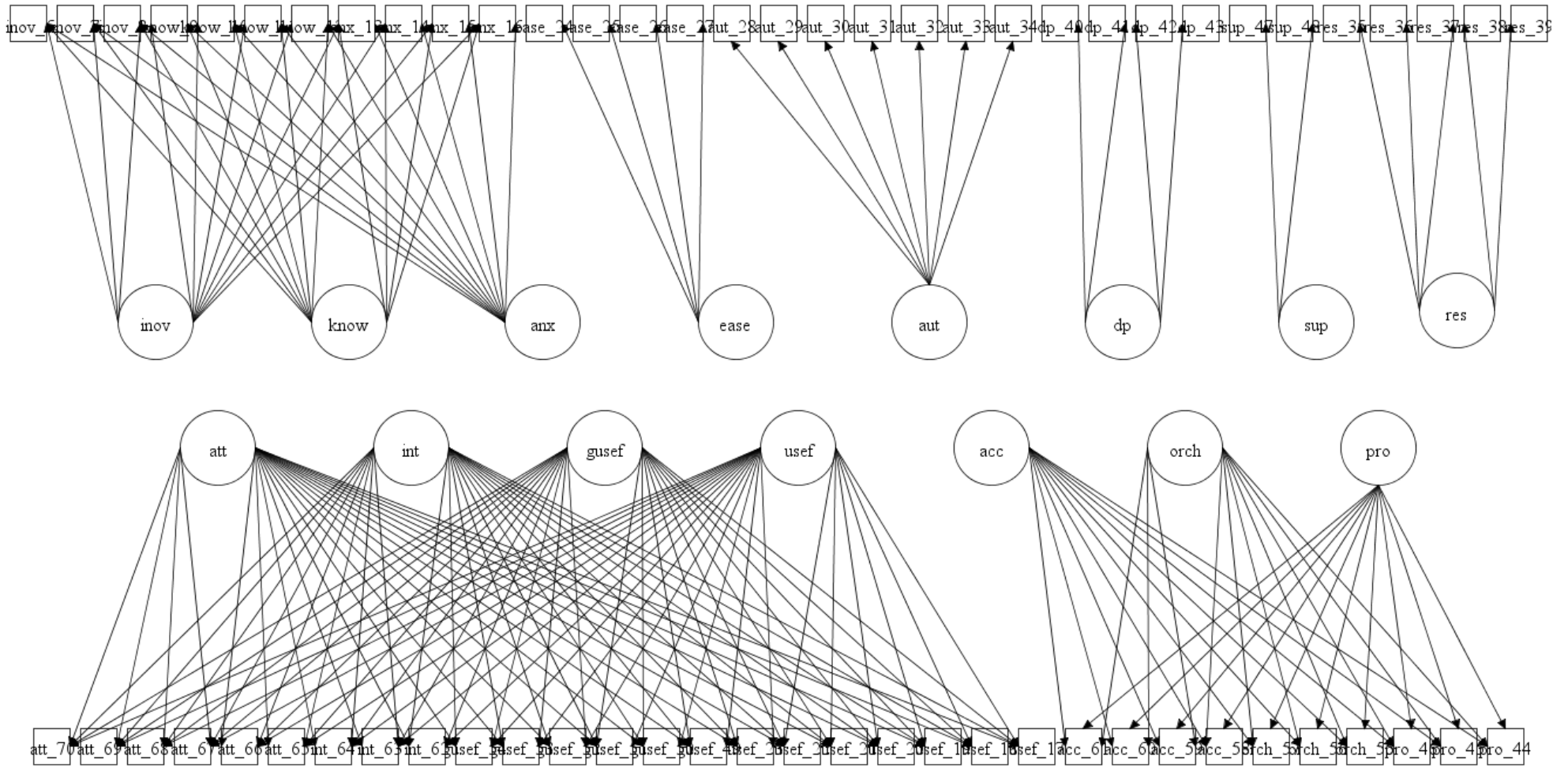
Figure 2. Hypothesized measurement model*

* Note: Circles represent latent variables, rectangles – observed variables. Correlations between latent variables are not presented to avoid cluttering the figure.
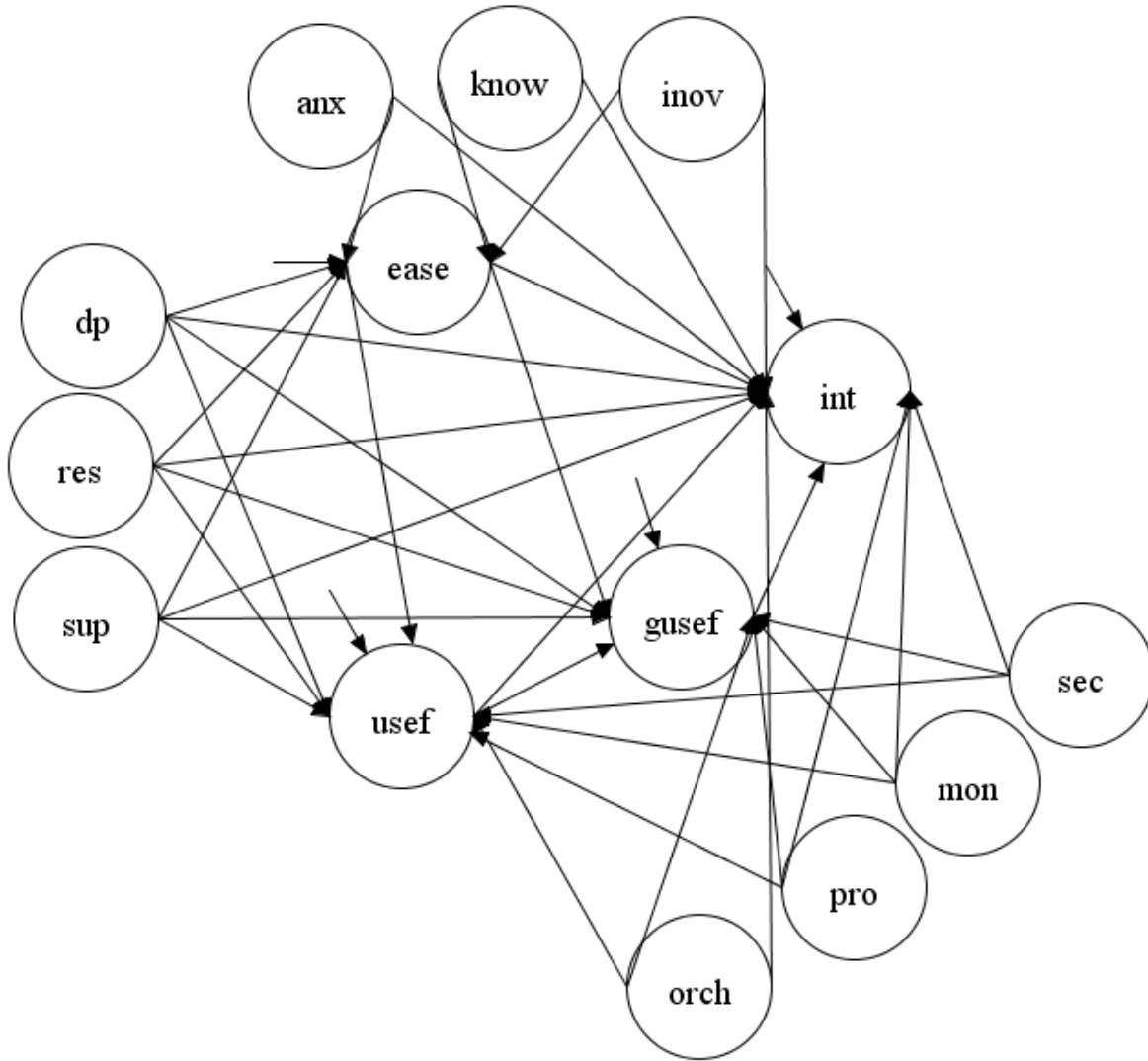
Figure 3. Hypothesized structural model*

* Note: Circles represent latent variables. Covariates, observed indicators and correlations between exogenous

variables are not presented to avoid cluttering the figure.
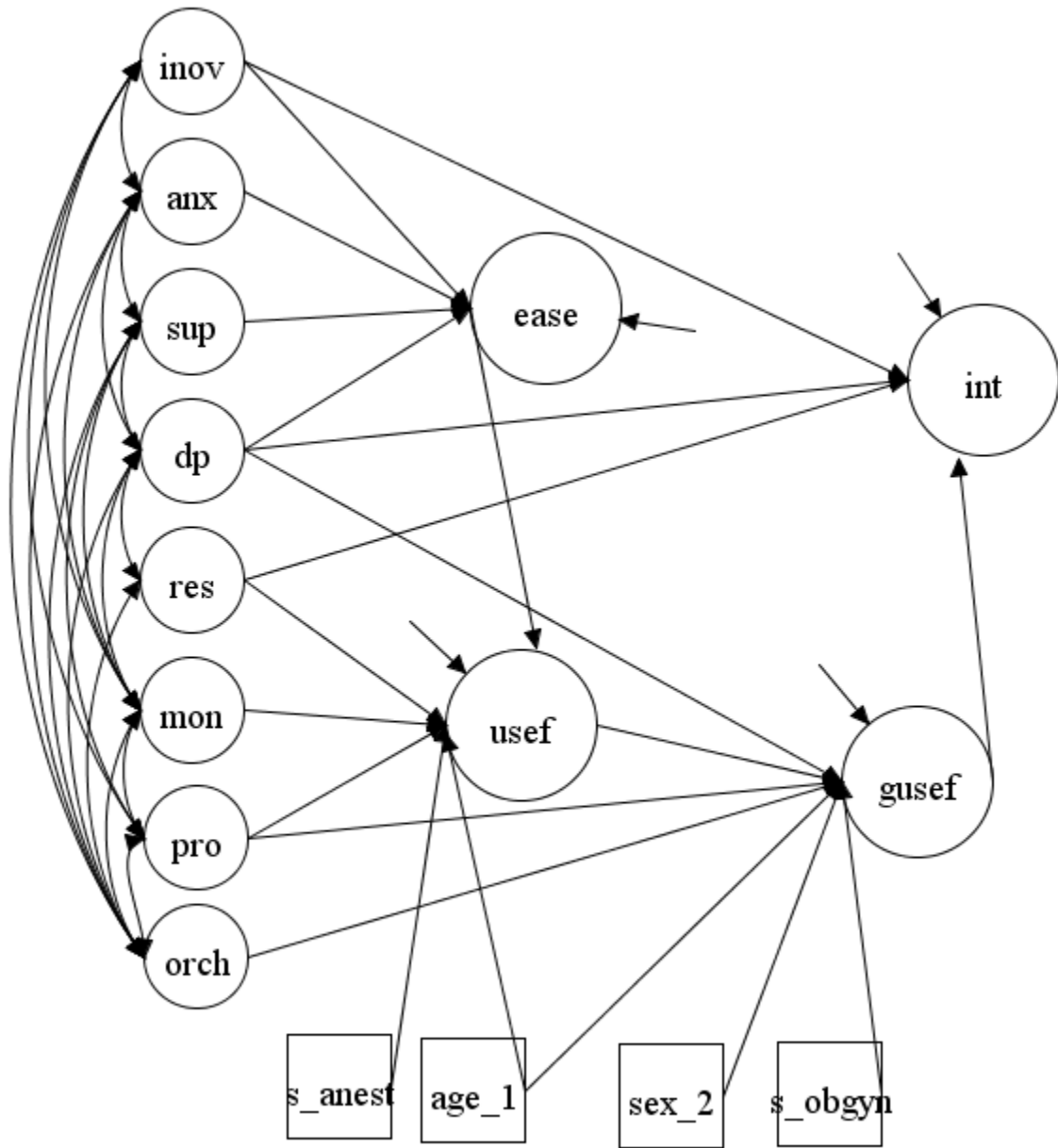
Figure 4. Resulted structural model with covariates*

* Note: Circles represent latent variables. Observed indicators are not presented to avoid cluttering the figure.

Arrows represent statistically significant relationships.
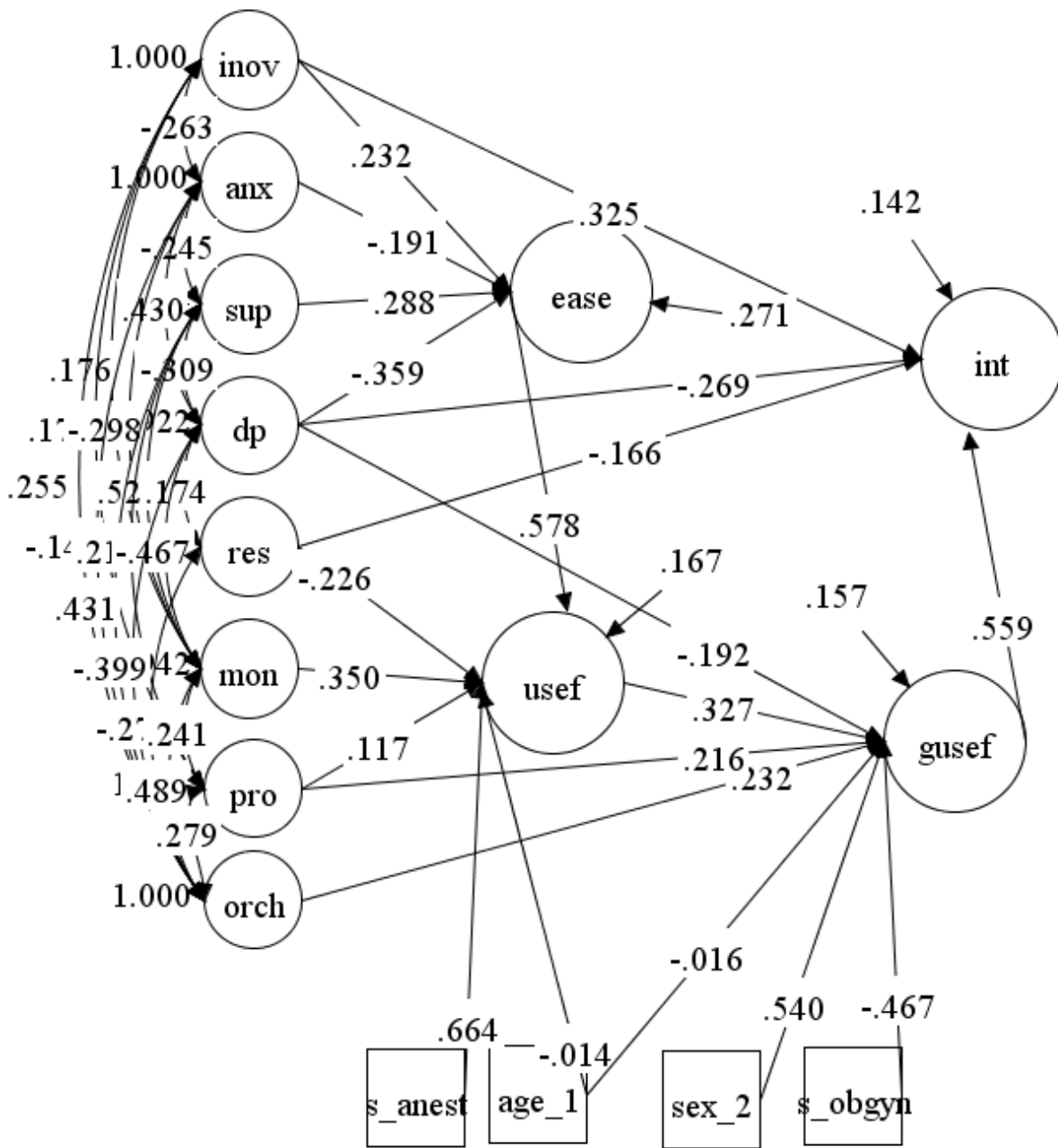
Figure 5. Resulted structural model with covariates and unstandardized path estimates*

* Note: Circles represent latent variables. Observed indicators are not presented to avoid cluttering the figure. Arrows represent statistically significant relationships.
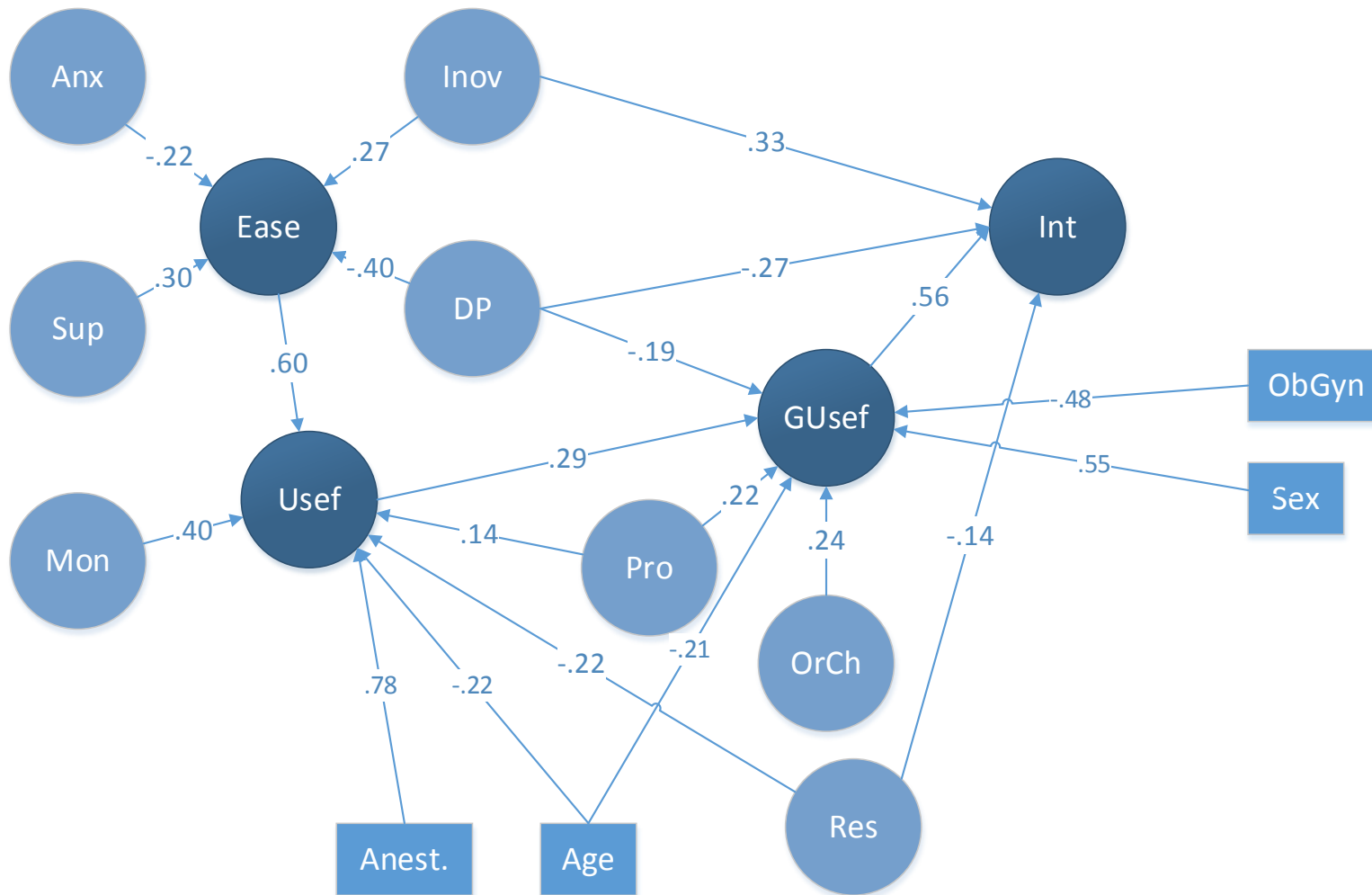
Figure 6. Resulted structural model with covariates and standardized path estimates*

* Note: Circles represent latent variables. Observed indicators and correlations between exogenous variables are not presented to avoid cluttering the figure. Arrows represent statistically significant relationships based on unstandardized solution.
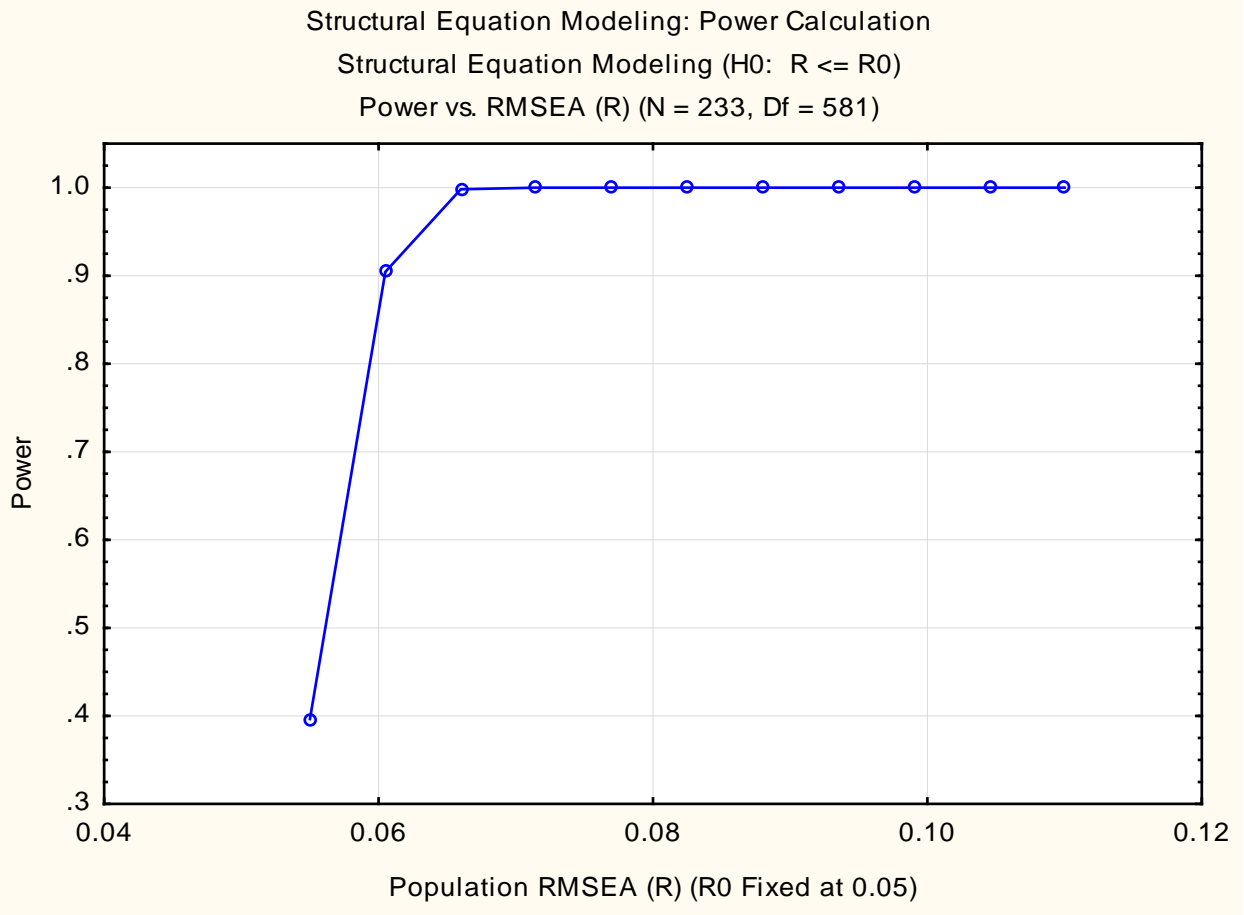
Figure 7. Power for measurement model

Structural Equation Modeling: Power Calculation
Structural Equation Modeling (H0: R <= R0)
Power vs. RMSEA (R) (N = 233, Df = 678)

Power

Population RMSEA (R) (R0 Fixed at 0.05)
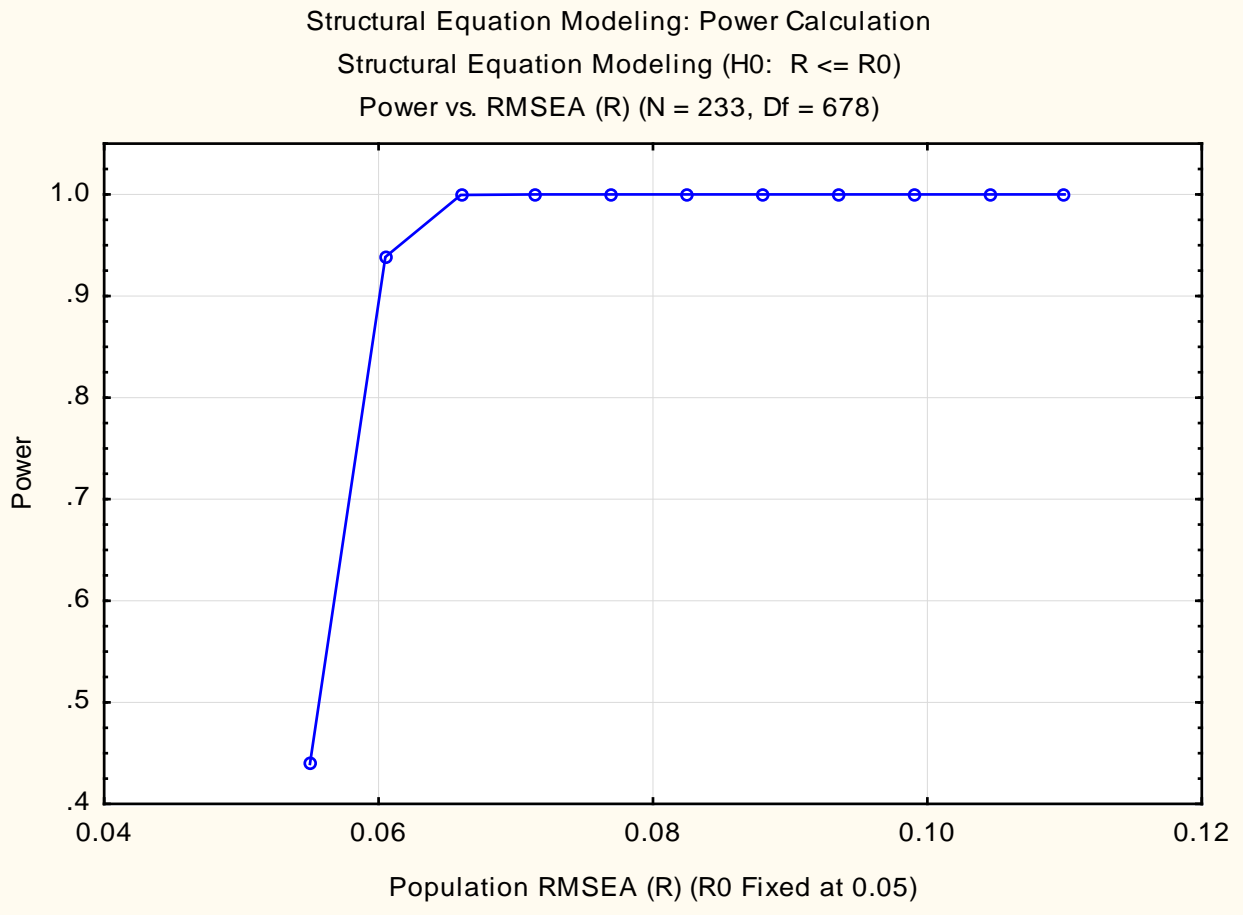
Figure 8. Power for structural model with covariates

Appendix A. Glossary

Term (abbreviation)	Definition	Source
eHealth	"Health services and information delivered or enhanced by the Internet and related technologies".	[95]
Electronic health record (EHR)	Electronic health record "An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed and consulted by authorized clinicians and staff across more than one healthcare organization"	[7]
	Shareable EHR and Integrated Care EHR (ICEHR) "Repository of information regarding the health of a subject of care in computer processable form, stored and transmitted securely, and accessible by multiple authorized users. It has a commonly agreed logical information model which is independent of EHR systems. Its primary purpose is the support of continuing, efficient and quality integrated health care and it contains information which is retrospective, concurrent and prospective"	[96].
	Basic-generic EHR "EHR is a repository of information regarding the health status of a subject of care, in computer processable form"	[96].
Electronic medical record (EMR)	"An electronic record of health-related information on an individual that can be created, gathered, managed and consulted by authorized clinicians and staff within one healthcare organization".	[7]
Health information system	"Information system spreading over institutional boundaries to support	[97]

(HIS)	trans-institutional patient care", so it is not constrained by the technology but constrained by the level of application.	
Healthcare information technology (HIT)	Overarching term relating to any kind of use of information communication technologies (ICT) in healthcare and defined as "technology used to store, manage, and transmit information between healthcare providers and consumers"	[95]
Hospital information system (HIS)	"Socio-technical subsystem of a hospital that comprises all information processing as well as the associated human or technical actors in their respective information processing roles"	[97].
Personal health record (PHR)	"E-health tools that let patients manage all of their health information in one location"	[95].

Appendix B. Instrument development and operationalization of variables

Independent variables

Scales for personal innovativeness from [39], computer anxiety from [56] are adopted and scale for related knowledge from [57] is adapted to address individual characteristics, computer experience and skills.

To address personal attitudes towards the system, perceived productivity and time impact the scale for perceived usefulness from [58] is adopted (similar scales have been used in [25, 33, 34, 57], etc.).

The scale for perceived ease of use from [58] (similar scales have been used in [30, 34, 57], etc.) is addressing effort expectancy and workload expectations.

Appropriate scales are adopted from [58] for physician autonomy and provider patient relationships.

To operationalize resistance to change a scale from [57] is adopted.

We are addressing technical barriers using new 'Physical access' scale. Structural barriers are measured by 'Organizational change' scale (two items adapted from [59]).

'Organizational support' scale consists of items from [30, 58, 60] and taps into facilitating conditions.

Reviewed instruments were leaving unaddressed physicians' concerns about clinical performance of their colleagues and quality of end product as an output of collaborative group performance. Newly developed scale 'Projected group usefulness' is trying to address these perceptions and operationalizes anticipated quality of team deliverables projected from their

personal perceptions. Also reviewed instruments were not touching on interference with intra-organizational relationships at the extent which the literature review would suggest. Therefore a new scale 'Professional relationships' is developed to capture perceptions about the effect of EHR on professional relationships.

Dependent variables

Choice of dependent variables deserves separate discussion. Whether the implementation is in voluntary or in mandatory settings it plays an important role in deciding what "outcome" to measure. In mandatory settings system use is not appropriate outcome variable, instead user acceptance can be measured [98]. In pre-implementation stage measuring intention to use seems more convincing especially when significant positive correlations are reported between intention and self-reported behavior [99]. The fact that the use of the system is going to be mandatory may distract intention to use as measure of acceptance and success but in this stage lack of internalization of that fact and lack of awareness about specific usage requirements may overcome this limitation. Attitude towards the system is another commonly used dependent variable particularly in pre-implementation stage and mandatory settings [34, 58]. The scale 'Attitude about EHR usage' is adopted from [58]. 'Behavioral Intention' scale is adapted from [33]. Each of these two scales can serve as reasonable dependent variable in given settings.

Other questions

We have also demographic questions (age, gender), type of hospital (ownership), working hours per week and specialty of the physician. These variables mostly may be not directly linked to the dependent variables but may be correlated with certain barriers or may modify relationships between dependent and independent variables. For example, several studies report that attitudes

may be different between professional groups [43] or magnitude of certain barriers may vary

across specialties [48].

Operationalization and coding of variables of measurement model

Latent variables	Observed variables	Coding of Variables
Personal innovativeness		Inov
	If I heard about a new information technology, I would look for ways to experiment with it.	inov_6
	Among my peers, I am usually the first to try out new information technologies.	inov_7
	I like to experiment with new information technologies.	inov_8
Related knowledge		Know
	I am using computers fairly extensively.	know_9
	I am using many software programs extensively.	know_10
	I am using e-mail extensively.	know_11
	I am using internet extensively.	know_12
Computer anxiety		Anx
	Computers do not scare me at all.	anx_13
	Working with a computer makes me nervous.	anx_14
	Computers make me feel uncomfortable.	anx_15
	Computers make me feel uneasy.	anx_16
Perceived usefulness		Usef
	Using the EHR will improve the quality of my work in providing better patient care.	usef_17
	Using the EHR will allow me to accomplish tasks more quickly.	usef_18
	Using the EHR will allow me to accomplish more work than would otherwise be possible.	usef_19
	Using the EHR will give me greater control over my work schedule	usef_20
	Using the EHR will enhance my overall effectiveness in my job.	usef_21
	Using the EHR will make my job easier to perform.	usef_22
	Overall, the EHR should be a useful tool for practicing my profession.	usef_23
Perceived Ease of Use		Ease
	My interaction with the EHR will be clear and understandable "user friendly".	ease_24
	Learning to use the EHR will be easy for me.	ease_25
	I expect to become skilled at using the EHR.	ease_26
	Overall, I expect the EHR will be easy for physicians to use.	ease_27
Physician Autonomy		Aut
	Using the EHR will increase the hospital administration's ability to control and monitor the physicians' clinical practices and decision-making.	aut_28

	Using the EHR will increase the Ministry's ability to control and monitor the physicians' clinical practices and decision-making.	aut_29
	Using the EHR may threaten the physicians' personal and professional privacy.	aut_30
	Using the EHR may limit the physicians' autonomy in making clinical decisions or judgments.	aut_31
	Using the EHR may result in legal or ethical problems for the physician.	aut_32
	Overall, the physicians' attitude about using the EHR may be negatively affected as a result of the increased control and monitoring of his/her clinical practices and decision-making.	aut_33
	Overall, the physicians' attitude about using the EHR may be negatively affected as a result of the security, legal and/or ethical concerns associated with using the EHR.	aut_34
Resistance to change		Res
	I don't want the EHR to change the way I order patient tests.	res_35
	I don't want the EHR to change the way I make clinical decisions.	res_36
	I don't want the EHR to change the way I interact with other people on my job.	res_37
	I don't want the EHR to change the way I prescribe medications to the patients.	res_38
	Overall, I don't want the EHR to change the way I currently work.	res_39
Patient-provider Relationship		DP
	The patient's confidence in the physician will likely be diminished if the patient sees the physician using computer-based technology as a diagnostic aid.	dp_40
	Using the EHR will likely threaten the physician's credibility with his/her patients.	dp_41
	Using the EHR will likely reduce the patient's satisfaction with the quality of health care he/she receives.	dp_42
	Overall, using the EHR will likely interfere with the effectiveness of the doctor-patient interaction.	dp_43
Professional Relationships		Pro
	What influence will have EHR usage on your professional relationships with other physicians from the hospital?	pro_44
	What influence will have EHR usage on your professional relationships with the nurses from the hospital?	pro_45
	What influence will have EHR usage on your professional relationships with the administrative staff of the hospital?	pro_46
Organizational support		Sup
	I think management of my hospital will be helpful in the use of the EHR.	sup_47
	I think, in general, the management of my hospital will support the use of the EHR.	sup_48
Projected group usefulness		GUsef
	Using the EHR will improve the quality of the work of other	gusef_49

	health professionals who contribute to my patients' care	
	Using the EHR will allow other health professionals who contribute to my patients' care to accomplish tasks more quickly	gusef_50
	Using the EHR may interfere with the primary responsibilities of other health professionals who contribute to my patients' care	gusef_51
	Using the EHR will allow other health professionals who contribute to my patients' care to accomplish more work than would otherwise be possible.	gusef_52
	Using the EHR will enhance the overall effectiveness of our hospital	gusef_53
	Using the EHR will improve the quality of care in our hospital	gusef_54
Organizational change		OrCh
	I think using the EHR will require some important changes in department structure of our hospital.	orch_55
	I think the management structure of our hospital will need to be changed due to EHR integration in our practices	orch_56
	Overall, I think using the EHR will change the working climate in our hospital.	orch_57
Physical access		Acc
	I am concerned about possible lack of computers in the appropriate places.	acc_58
	There is enough space in our offices for locating needed computers.	acc_59
	I am not concerned about lack of appropriate communication infrastructure (internet connection)	acc_60
	Overall I am concerned about possible lack of physical access to the EHR.	acc_61
Behavioral Intention		Int
	I intend to use the EHR.	int_62
	I intend to use more new features/modules of the EHR.	int_63
	I intend to use the EHR for more of my job responsibilities.	int_64
Attitude About EHR Usage		Att
	The development and implementation of the EHR technology will support the physician in providing better patient care.	att_65
	I will encourage the use of the EHR among my colleagues.	att_66
	I need the EHR technology to provide effective patient care.	att_67
	I am not satisfied with using the paper-based patient record in my job.	att_68
	All physicians should learn to use the EHR effectively.	att_69
	Overall, my attitude about EHR usage will be positive.	att_70

Questionnaire in English

ID   _____   Starting time: _____ (h:m)   **Barriers to EHR**
Date ___ / ___   2013 (d/m)   Ending time: _____ (h:m)   **deployment in**
                                                                                     Armenia.

Questionnaire

2. Your Age _____
3. Gender
    1. Male
    2. Female

4. Type of hospital ownership
    1. Public hospital
    2. Private hospital

5. Area of primary specialization. *(check one)*
    1. Internal medicine
    2. Surgery
    3. Anesthesiology
    4. Obstetrics/gynecology
    5. Psychiatry
    6. Radiology
    7. Other_____

6. Currently what is your time commitment for the hospital?
    1. Full time
    2. Part time

Personal innovativeness	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
6. If I heard about a new information technology, I would look for ways to experiment with it.	1	2	3	4	5
7. Among my peers, I am usually the first to try out new information technologies.	1	2	3	4	5
8. I like to experiment with new information technologies.	1	2	3	4	5

Related knowledge	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
9. I am using computers fairly extensively.	1	2	3	4	5
10. I am using many software programs extensively.	1	2	3	4	5
11. I am using e-mail extensively.	1	2	3	4	5
12. I am using internet extensively.	1	2	3	4	5

Computer anxiety	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
13. Computers do not scare me at all.	1	2	3	4	5
14. Working with a computer makes me nervous.	1	2	3	4	5
15. Computers make me feel uncomfortable.	1	2	3	4	5
16. Computers make me feel uneasy.	1	2	3	4	5

Perceived usefulness	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
17. Using the EHR will improve the quality of my work in providing better patient care.	1	2	3	4	5
18. Using the EHR will allow me to accomplish tasks more quickly.	1	2	3	4	5
19. Using the EHR will allow me to accomplish more work than would otherwise be possible.	1	2	3	4	5
20. Using the EHR will give me greater control over my work schedule	1	2	3	4	5
21. Using the EHR will enhance my overall effectiveness in my job.	1	2	3	4	5
22. Using the EHR will make my job easier to perform.	1	2	3	4	5
23. Overall, the EHR should be a useful tool for practicing my profession.	1	2	3	4	5

Perceived Ease of Use	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
24. My interaction with the EHR will be clear and understandable "user friendly".	1	2	3	4	5
25. Learning to use the EHR will be easy for me.	1	2	3	4	5
26. I expect to become skilled at using the EHR.	1	2	3	4	5
27. Overall, I expect the EHR will be easy for physicians to use.	1	2	3	4	5

Physician Autonomy	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
28. Using the EHR will increase the hospital administration's ability to control and monitor the physicians' clinical practices and decision-making.	1	2	3	4	5
29. Using the EHR will increase the Ministry's ability to control and monitor the physicians' clinical practices and decision-making.	1	2	3	4	5
30. Using the EHR may threaten the physicians' personal and professional privacy.	1	2	3	4	5
31. Using the EHR may limit the physicians' autonomy in making clinical decisions or judgments.	1	2	3	4	5
32. Using the EHR may result in legal or ethical problems for the physician.	1	2	3	4	5
33. Overall, the physicians' attitude about using the EHR may be negatively affected as a result of the increased control and monitoring of his/her clinical practices and decision-making.	1	2	3	4	5
34. Overall, the physicians' attitude about using the EHR may be negatively affected as a result of the security, legal and/or ethical concerns associated with using the EHR.	1	2	3	4	5

Resistance to change	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
35. I don't want the EHR to change the way I order patient tests.	1	2	3	4	5
36. I don't want the EHR to change the way I make clinical decisions.	1	2	3	4	5
37. I don't want the EHR to change the way I interact with other people on my job.	1	2	3	4	5
38. I don't want the EHR to change the way I prescribe medications to the patients.					
39. Overall, I don't want the EHR to change the way I currently work.	1	2	3	4	5

Patient-provider Relationship	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
40. The patient's confidence in the physician will likely be diminished if the patient sees the physician using computer-based technology as a diagnostic aid.	1	2	3	4	5
41. Using the EHR will likely threaten the physician's credibility with his/her patients.	1	2	3	4	5
42. Using the EHR will likely reduce the patient's satisfaction with the quality of health care he/she receives.	1	2	3	4	5
43. Overall, using the EHR will likely interfere with the effectiveness of the doctor-patient interaction.	1	2	3	4	5

Professional Relationships	Very positive	Some-what positive	Neither positive nor negative	Some-what negative	Very negative
44. What influence will have EHR usage on your professional relationships with other physicians from the hospital?	1	2	3	4	5
45. What influence will have EHR usage on your professional relationships with the nurses from the hospital?	1	2	3	4	5
46. What influence will have EHR usage on your professional relationships with the administrative staff of the hospital?	1	2	3	4	5

Organizational support	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
47. I think management of my hospital will be helpful in the use of the EHR.	1	2	3	4	5
48. I think, in general, the management of my hospital will support the use of the EHR.	1	2	3	4	5

Group usefulness	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
49. Using the EHR will improve the quality of the work of other health professionals who contribute to my patients' care	1	2	3	4	5
50. Using the EHR will allow other health professionals who contribute to my patients' care to accomplish tasks more quickly	1	2	3	4	5
51. Using the EHR may interfere with the primary responsibilities of other health professionals who contribute to my patients' care	1	2	3	4	5
52. Using the EHR will allow other health professionals who contribute to my patients' care to accomplish more work than would otherwise be possible.	1	2	3	4	5
53. Using the EHR will enhance the overall effectiveness of our hospital	1	2	3	4	5
54. Using the EHR will improve the quality of care in our hospital	1	2	3	4	5

Organizational change	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
55. I think using the EHR will require some important changes in department structure of our hospital.	1	2	3	4	5
56. I think the management structure of our hospital will need to be changed due to EHR integration in our practices	1	2	3	4	5
57. Overall, I think using the EHR will change the working climate in our hospital.	1	2	3	4	5

Physical access	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
58. I am concerned about possible lack of computers in the appropriate places.	1	2	3	4	5
59. There is enough space in our offices for locating needed computers.	1	2	3	4	5
60. I am not concerned about lack of appropriate communication infrastructure (internet connection)	1	2	3	4	5
61. Overall I am concerned about possible lack of physical access to the EHR.	1	2	3	4	5

Behavioral Intention	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
62. I intend to use the EHR.	1	2	3	4	5
63. I intend to use more new features/modules of the EHR.	1	2	3	4	5
64. I intend to use the EHR for more of my job responsibilities.	1	2	3	4	5

Attitude About EHR Usage	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
65. The development and implementation of the EHR technology will support the physician in providing better patient care.	1	2	3	4	5
66. I will encourage the use of the EHR among my colleagues.	1	2	3	4	5
67. I need the EHR technology to provide effective patient care.	1	2	3	4	5
68. I am not satisfied with using the paper-based patient record in my job.	1	2	3	4	5
69. All physicians should learn to use the EHR effectively.	1	2	3	4	5
70. Overall, my attitude about EHR usage will be positive.	1	2	3	4	5

71. In your opinion who should do the data entry into the EHR. *(Check one answer)*
1. Physician
2. Nurse
3. Partly physician, partly nurse
4. Special Clerk
5. Other _____

72. Which type of training will be more effective for health providers to become skilled in using EHR *(Check one answer)*
1. Training in groups for healthcare professionals.
2. One-on-one training provided by an EHR specialist.
3. Online tutorial (video demonstrations, interactive media environment)
4. Providing of guidelines
5. Learning during the practice
6. Other _____

Thank You for your participation!

Questionnaire in Armenian

Առողջապահական էլեկտրոնային տեղեկատվական համակարգի (ԱԷՏՀ) ներդրման խոչընդոտները Հայաստանում:

Հարցաթերթ

ID _____   Հարցման սկիզբ: _____ (ժ:ր)
Ամսթիվ ___ / ___ 2013 (ամիս/օր)   Հարցման ավարտ: _____ (ժ:ր)

1. Ձեր տարիքը _____   2. Սեռը   3. Հիվանդանոցի սեփականության ձև
                             1. Արական   1. Պետական
                             2. Իգական   2. Մասնավոր

   4. Ձեր մասնագիտացման առաջնային ոլորտը *(ընտրել մեկը)*
        1. Ներքին հիվանդություններ
        2. Վիրաբուժական
        3. Անեսթեզիոլոգիա
        4. Մանկաբարձություն, գինեկոլոգիա
        5. Հոգեբանություն
        6. Ռադիոլոգիա
        7. Այլ_____

   5. Ինչպիսին է ձեր զբաղվածությունը հիվանդանոցում.
        1. Լրիվ դրույք
        2. Կես դրույք
        3. Այլ_____

Ստորև բերված են տարբեր պնդումներ, խնդրում եմ ընտրեք այն պատասխանը, որ հնարավորինս ճշգրիտ է արտահայտում ձեր անձնական կարծիքը, պատկերացումները կամ ակնկալիքները.

Անհատական նորարարություն	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
6. Եթե ես լսում եմ նոր տեղեկատվական տեխնոլոգիայի մասին, ապա փորձում եմ գտնել ձևեր այն փորձարկելու համար:	1	2	3	4	5
7. Իմ գործընկերների շրջանում ես սովորաբար առաջինն եմ, ով փորձում է նոր տեղեկատվական տեխնոլոգիաները օգտագործել:	1	2	3	4	5
8. Ես սիրում եմ փորձարկել նոր տեղեկատվական տեխնոլոգիաներ:	1	2	3	4	5

Հարակից գիտելիք	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
9. Ես հաճախ եմ օգտագործում համակարգիչներ:	1	2	3	4	5
10. Ես հաճախ եմ օգտագործում շատ համակարգչային ծրագրային փաթեթներ:	1	2	3	4	5
11. Ես հաճախ եմ օգտվում էլեկտրոնային փոստից՝ իմայլից:	1	2	3	4	5
12. Ես հաճախ եմ օգտվում ինտերնետից:	1	2	3	4	5

Անհանգստություն համակարգչից	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
13. Համակարգիչները ինձ ընդհանրապես չեն վախեցնում:	1	2	3	4	5
14. Համակարգչով աշխատելը նյարդայնացնում է ինձ:	1	2	3	4	5
15. Համակարգիչները ինձ անհարմարություն են պատճառում:	1	2	3	4	5
16. Համակարգիչները ինձ անհանգստության զգացում են պատճառում:	1	2	3	4	5

Օգտակարություն	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
17. ԱԷՏՀ օգտագործումը կբարելավի իմ աշխատանքի որակը հիվանդին ավելի լավ բուժօգնություն տրամադրելու հարցում:	1	2	3	4	5
18. ԱԷՏՀ օգտագործումը թույլ կտա ինձ ավելի արագ ավարտել իմ անելիքները:	1	2	3	4	5
19. ԱԷՏՀ օգտագործումը թույլ կտա ինձ կատարել ավելի շատ աշխատանք, քան հնարավոր կլիներ մինչ այդ:	1	2	3	4	5
20. ԱԷՏՀ օգտագործումը ինձ կօգնի ավելի լավ կառավարել իմ աշխատանքային գրաֆիկը:	1	2	3	4	5

	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն եմ չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
21. ԱԷՏՀ օգտագործումը կավելացնի իմ աշխատանքի ընդհանուր արդյունավետությունը:	1	2	3	4	5
22. ԱԷՏՀ օգտագործումը կհեշտացնի իմ աշխատանքի կատարումը:	1	2	3	4	5
23. Ընդհանուր առմամբ՝ ԱԷՏՀ պետք է որ օգտակար գործիք լինի իմ մասնագիտությամբ զբաղվելիս:	1	2	3	4	5

Օգտագործման դյուրինությունը	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն եմ չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
24. ԱԷՏՀ-ից իմ օգտվելը կլինի պարզ և հասկանալի՝ օգտագործման համար հեշտ:	1	2	3	4	5
25. Ինձ համար հեշտ կլինի սովորել օգտագործել ԱԷՏՀ:	1	2	3	4	5
26. Ես ակնկալում եմ հմտանալ ԱԷՏՀ-ի օգտագործման մեջ:	1	2	3	4	5
27. Ընդհանուր առմամբ՝ ես ակնկալում եմ, որ ԱԷՏՀ հեշտ կլինի օգտագործել բժիշկների համար:	1	2	3	4	5

Բժշկի ինքնուրույնությունը	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն եմ չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
28. ԱԷՏՀ-ի օգտագործումը կմեծացնի հիվանդանոցի ղեկավարության՝ բժիշկների կլինիկական գործունեությունն ու որոշումների կայացումը վերահսկելու և հետևելու կարողությունը:	1	2	3	4	5
29. ԱԷՏՀ-ի օգտագործումը կմեծացնի Առողջապահության նախարարության՝ բժիշկների կլինիկական գործունեությունն ու որոշումների կայացումը վերահսկելու և հետևելու կարողությունը:	1	2	3	4	5

	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
30. ԱԷՏՀ-ի օգտագործումը կարող է վտանգել բժիշկների անձնական և մասնագիտական զարգանիությունը:	1	2	3	4	5
31. ԱԷՏՀ-ի օգտագործումը կարող է սահմանափակել բժիշկների ինքնուրույնությունը կլինիկական որոշումներ կայացնելու կամ դատողություններ կատարելու հարցում:	1	2	3	4	5
32. ԱԷՏՀ-ի օգտագործումը կարող է առաջացնել իրավական կամ էթիկական խնդիրներ բժիշկների համար:	1	2	3	4	5
33. Ընդհանուր առմամբ՝ բժիշկների կլինիկական գործունեության և որոշումների կայացման վրա վերահսկողության և մոնիտորինգի աճը կարող է բացասաբար ազդել բժիշկների՝ ԱԷՏՀ-ի հանդեպ վերաբերմունքի վրա:	1	2	3	4	5
34. Ընդհանուր առմամբ՝ ԱԷՏՀ-ի օգտագործման հետ կապված անվտանգության, իրավական և/կամ էթիկական հարցերի շուրջ մտահոգությունները կարող են բացասաբար ազդել բժիշկների՝ ԱԷՏՀ-ի հանդեպ վերաբերմունքի վրա:	1	2	3	4	5

Դիմադրություն փոփոխության նկատմամբ	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
35. Ես չեմ ուզում, որ ԱԷՏՀ փոխի իմ հիվանդներին հետազոտություններ նշանակելու իմ ձևը:	1	2	3	4	5
36. Ես չեմ ուզում, որ ԱԷՏՀ փոխի իմ կլինիկական որոշումներ կայացնելու ձևը:	1	2	3	4	5
37. Ես չեմ ուզում, որ ԱԷՏՀ փոխի այն, թե ես ինչպես եմ շփվում այլ մարդկանց հետ իմ աշխատավայրում:	1	2	3	4	5

	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն եմ չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
38. Ես չեմ ուզում, որ ԱԷՏՀ փորձի հիվանդներին դեղորայք նշանակելու իմ մոտեցումը:	1	2	3	4	5
39. Ընդհանուր առմամբ՝ ես չեմ ուզում, որ ԱԷՏՀ փորձի այն, թե ես ինչպես եմ աշխատում ներկայումս:	1	2	3	4	5

Բժիշկ-հիվանդ փոխհարաբերություն	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն եմ չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
40. Հիվանդի վստահությունը բժշկի հանդեպ կնվազի, եթե հիվանդը տեսնի, որ բժիշկը ախտորոշման համար դիմում է համակարգչային տեխնոլոգիայի օգնությանը:	1	2	3	4	5
41. ԱԷՏՀ-ի օգտագործումը ամենայն հավանականությամբ կկտանցի հիվանդների համար բժշկի հուսալիությունը:	1	2	3	4	5
42. ԱԷՏՀ-ի օգտագործումը ամենայն հավանականությամբ կնվազեցնի հիվանդների բավարարվածությունը իրենց ստացած բուժսպասարկումից:	1	2	3	4	5
43. Ընդհանուր առմամբ, ԱԷՏՀ-ի օգտագործումը ամենայն հավանականությամբ կխանգարի բժիշկ-հիվանդ փոխհարաբերությունների արդյունավետությանը:	1	2	3	4	5

Աշխատանքային փոխհարաբերություն	Խիստ դրական	Որոշակի դրական	Ոչ դրական, ոչ բացասական	Որոշակի բացասական	Խիստ բացասական
44. Ինչպիսի՞ ազդեցություն կունենա ԱԷՏՀ-ի օգտագործումը հիվանդանոցի մյուս բժիշկների հետ Ձեր աշխատանքային փոխհարաբերությունների վրա.	1	2	3	4	5
45. Ինչպիսի՞ ազդեցություն կունենա ԱԷՏՀ-ի օգտագործումը հիվանդանոցի բուժքույրերի հետ Ձեր աշխատանքային փոխհարաբերությունների վրա.	1	2	3	4	5
46. Ինչպիսի ազդեցություն կունենա ԱԷՏՀ-ի օգտագործումը հիվանդանոցի ղեկավարության հետ Ձեր աշխատանքային փոխհարաբերությունների վրա.	1	2	3	4	5

Կազմակերպության աջակցությունը	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
47. Կարծում եմ, որ հիվանդանոցի ղեկավարությունը օգտակար կգտնվի ԱԷՏՀ-ի օգտագործման հարցում:	1	2	3	4	5
48. Կարծում եմ, որ հիվանդանոցի ղեկավարությունը ընդհանուր առմամբ կաջակցի ԱԷՏՀ-ի կիրառմանը:	1	2	3	4	5

Խմբային օգտակարություն	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
49. ԱԷՏՀ-ի օգտագործումը կբարելավի մյուս այն բուժաշխատողների աշխատանքի որակը, ովքեր ես մասնակցում են իմ հիվանդների բուժպասարկման գործընթացում:	1	2	3	4	5
50. ԱԷՏՀ-ի օգտագործումը թույլ կտա մյուս այն բուժաշխատողներին, ովքեր ես մասնակցում են իմ հիվանդների բուժպասարկմանը, ավելի արագ ավարտել իրենց անելիքները:	1	2	3	4	5

	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
51. ԱԷՏՀ-ի օգտագործումը կարող է խանգարել իմ հիվանդների բուժսպասարկումը մասնակցող մյուս բուժաշխատողներին կատարելու իրենց առաջնային պարտականությունները:	1	2	3	4	5
52. ԱԷՏՀ օգտագործումը թույլ կտա մյուս այն բուժաշխատողներին, ովքեր մասնակցում են իմ հիվանդների բուժսպասարկմանը, ավելի շատ աշխատանք կատարել քան հնարավոր կլիներ մինչ այդ:	1	2	3	4	5
53. ԱԷՏՀ օգտագործումը կբարելավի մեր հիվանդանոցի ընդհանուր արդյունավետությունը:	1	2	3	4	5
54. ԱԷՏՀ-ի օգտագործումը կբարելավի բուժսպասարկման որակը մեր հիվանդանոցում:	1	2	3	4	5

Կազմակերպական փոփոխություն	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
55. Վարծում եմ՝ ԱԷՏՀ-ի օգտագործումը կպահանջի որոշ կարևոր փոփոխություններ մեր հիվանդանոցի բաժանմունքների կառուցվածքում:	1	2	3	4	5
56. Վարծում եմ՝ մեր հիվանդանոցի կառավարման համակարգը փոփոխությունների կարիք կունենա՝ մեր գործունեությունում ԱԷՏՀ-ի ինտեգրման արդյունքում:	1	2	3	4	5
57. Ընդհանուր առմամբ՝ կարծում եմ, որ ԱԷՏՀ-ի օգտագործումը կփոխի աշխատանքային մթնոլորտը մեր հիվանդանոցում:	1	2	3	4	5

Հասանելիություն	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
58. Ես մտահոգված եմ համապատասխան տեղերում համակարգիչների հավանական պակասով:	1	2	3	4	5
59. Մեր աշխատասենյակներում բավարար տարածք կա անհրաժեշտ համակարգիչների տեղադրման համար:	1	2	3	4	5
60. Ես մտահոգություն չունեմ հեռահաղորդակցման համապատասխան ենթակառուցվածքի (ինտերնետ միացման) պակասի առումով:	1	2	3	4	5
61. Ընդհանուր առմամբ՝ ես մտահոգված եմ, որ շատերը մուտքի հնարավորություն չեն ունենա օգտվելու ԱԷՏՀ-ից:	1	2	3	4	5

Մտադրություն	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլրովին համաձայն չեմ
62. Ես մտադրված եմ օգտագործել ԱԷՏՀ	1	2	3	4	5
63. Ես մտադրված եմ օգտագործել ԱԷՏՀ-ի ավելի շատ նոր հնարավորություններ ու ծառայություններ:	1	2	3	4	5
64. Ես մտադրվում եմ ԱԷՏՀ-ը օգտագործել իմ աշխատանքային պարտականությունների առավել լայն շրջանակի համար:	1	2	3	4	5

Վերաբերմունք	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ համաձայն չեմ	Համաձայն չեմ	Բոլորովին համաձայն չեմ
65. ԱԷՏՀ-ի մշակումը և իրականացումը կաջակցի բժիշկներին ավելի լավ բուժօգնություն տրամադրելու հարցում:	1	2	3	4	5
66. Ես կիրախուսեմ ԱԷՏՀ-ի օգտագործումը իմ գործընկերների շրջանում:	1	2	3	4	5
67. Արդյունավետ բուժպասարկում տրամադրելու համար ես ԱԷՏՀ-ի պես տեխնոլոգիայի կարիք ունեմ	1	2	3	4	5
68. Ես բավարարված չեմ իմ աշխատանքում հիվանդի թղթային անկետաներ օգտագործելով:	1	2	3	4	5
69. Բոլոր բժիշկները պիտք է սովորեն օգտագործել ԱԷՏՀ արդյունավետորեն:	1	2	3	4	5
70. Ընդհանուր առմամբ՝ իմ վերաբերմունքը ԱԷՏՀ-ի օգտագործման նկատմամբ դրական կլինի:	1	2	3	4	5

71. Ձեր կարծիքով ո՞վ պիտի կատարի տվյալների մուտքագրումը ԱԷՏՀ *(ընտրել մեկ պատասխան):*
1. Բժիշկը
2. Բուժքույրը
3. Մասամբ բժիշկը և մասամբ բուժքույրը
4. Հատուկ գործավարը
5. Այլ _____

72. Ձեր կարծիքով ուսուցման ո՞ր ձևը ամենա արդյունավետը կլինի օգնելու բուժաշխատողներին հմտանալ ԱԷՏՀ օգտագործման մեջ *(ընտրել մեկ պատասխան):*
1. Բուժաշխատողների խմբային ուսուցում
2. Անհատական ուսուցում ԱԷՏՀ մասնագետի կողմից
3. Առցանց ուսուցողական բովանդակություն (վիդեո ներկայացումներ, ինտերակտիվ մեդիա միջավայր)
4. Ուղեցույց ձեռնարկների տրամադրում
5. Սովորել կիրառման ընթացքում սեփական փորձի արդյունքում
6. Այլ _____

Շնորհակալություն մասնակցության համար:

age_1
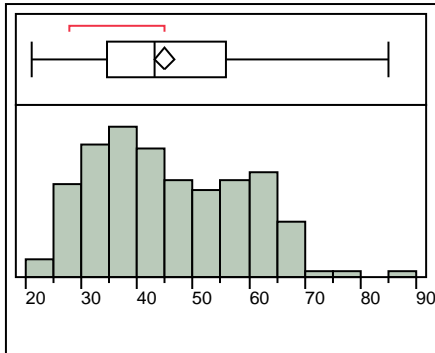
Summary Statistics

Mean	44.886957
Std Dev	12.827614
Std Err Mean	0.8403649
N	233
Range	64
Interquartile Range	21.5

sex_2
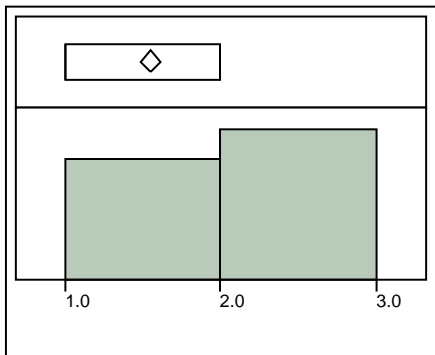
Summary Statistics

N	231

h_own_3
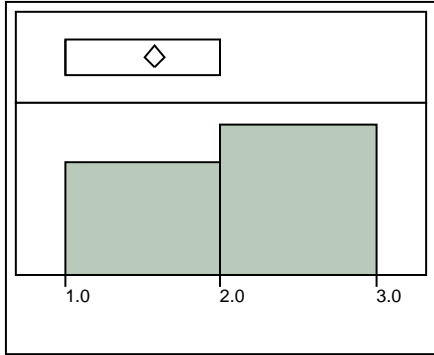
Summary Statistics

N   233

spec_4
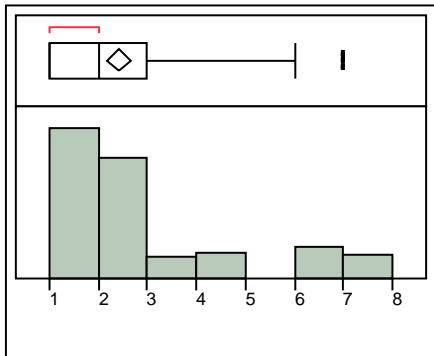
Summary Statistics

N   232

time_cmt_5
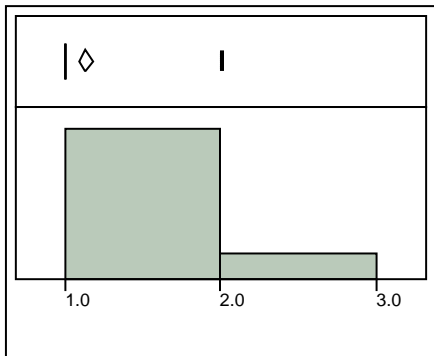
Summary Statistics

N   233

inov_6
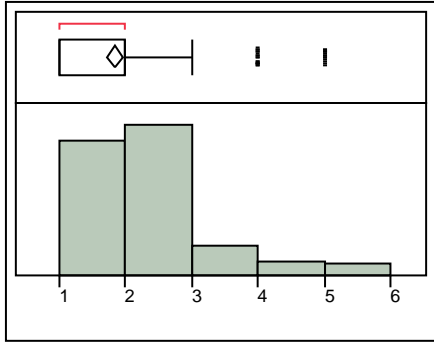
Summary Statistics

Mean	1.8454936
Std Dev	0.9433016
Skewness	1.4635088
Kurtosis	2.3737071
Median	2

inov_7
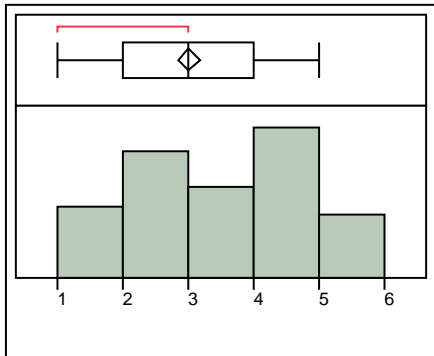
Summary Statistics

Mean	3.0128755
Std Dev	1.2746896
Skewness	-0.074648
Kurtosis	-1.15859
Median	3

inov_8
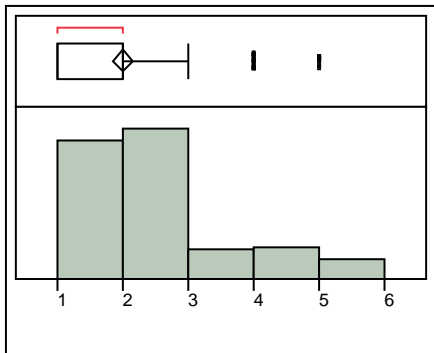
Summary Statistics

Mean   2
Std Dev   1.102505
Skewness   1.2263264
Kurtosis   0.8587312
Median   2

know_9
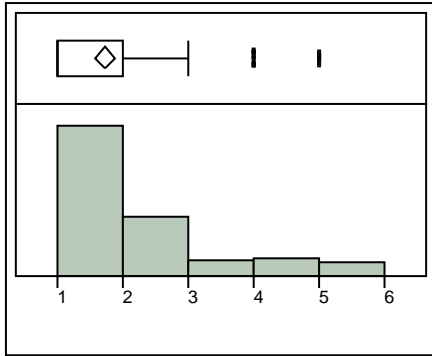
Summary Statistics

Mean   1.7296137
Std Dev   1.1256524
Skewness   1.627916
Kurtosis   1.7281611
Median   1

know_10
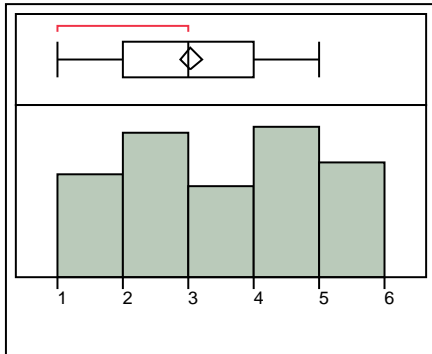
Summary Statistics

Mean   3.0429185
Std Dev   1.3920507
Skewness   -0.038525
Kurtosis   -1.322768
Median   3

know_11
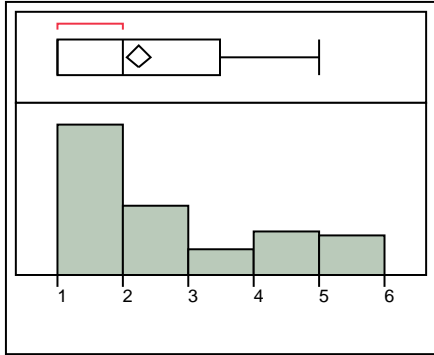
Summary Statistics

Mean	2.2317597
Std Dev	1.4465848
Skewness	0.8122632
Kurtosis	-0.824442
Median	2

know_12
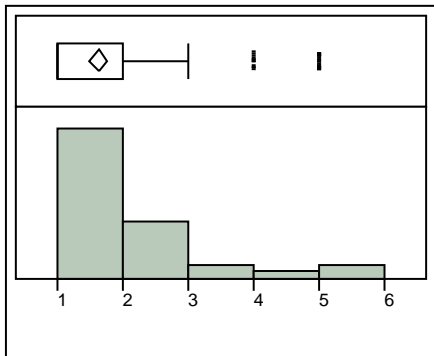
Summary Statistics

Mean	1.6223176
Std Dev	1.0561069
Skewness	1.9995246
Kurtosis	3.4327861
Median	1

anx_13
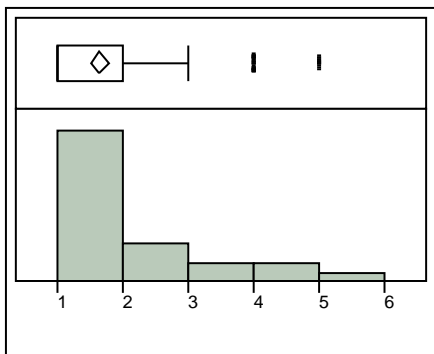
Summary Statistics

Mean	1.6351931
Std Dev	1.0747723
Skewness	1.6935562
Kurtosis	1.8754862
Median	1

anx_14
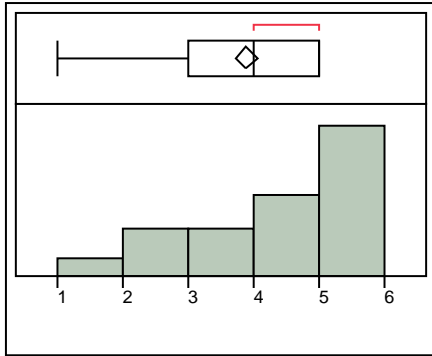
Summary Statistics

Mean	3.888412
Std Dev	1.2441219
Skewness	-0.816077
Kurtosis	-0.547117
Median	4

anx_15
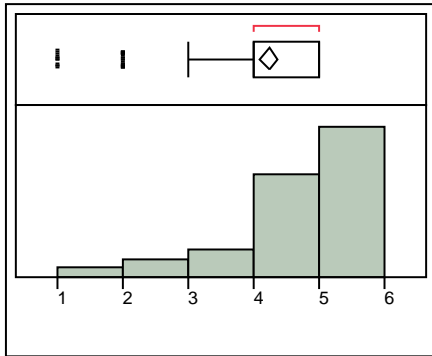
Summary Statistics

Mean	4.2317597
Std Dev	0.985859
Skewness	-1.459585
Kurtosis	1.8253767
Median	4

anx_16
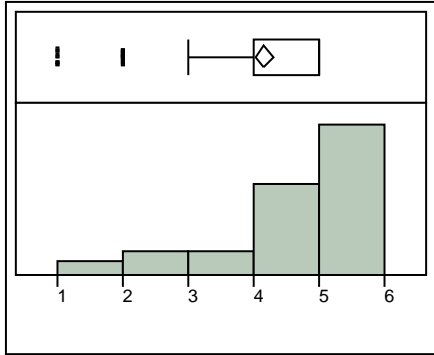
Summary Statistics

Mean	4.167382
Std Dev	1.095587
Skewness	-1.388316
Kurtosis	1.1704451
Median	5

usef_17
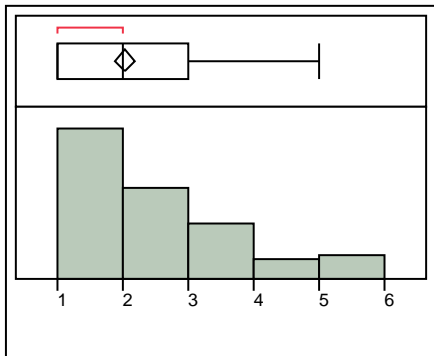
Summary Statistics

Mean	2.0300429
Std Dev	1.2048567
Skewness	1.0903281
Kurtosis	0.2991193
Median	2

usef_18
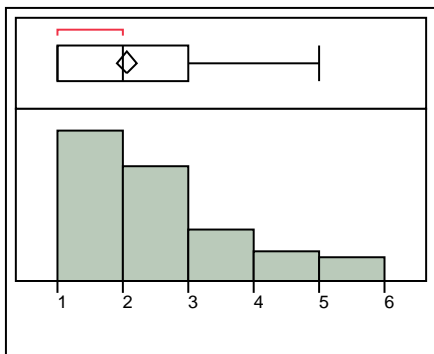
Summary Statistics

Mean	2.0600858
Std Dev	1.1838693
Skewness	1.0463678
Kurtosis	0.2191056
Median	2

usef_19
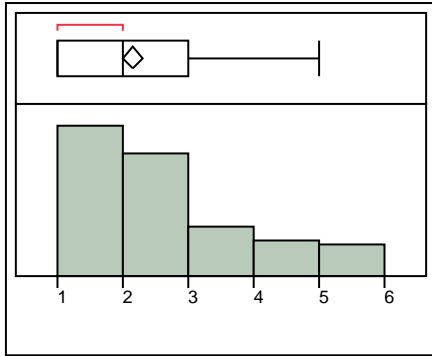
Summary Statistics

Mean	2.1459227
Std Dev	1.2474778
Skewness	0.9702211
Kurtosis	-0.089623
Median	2

usef_20
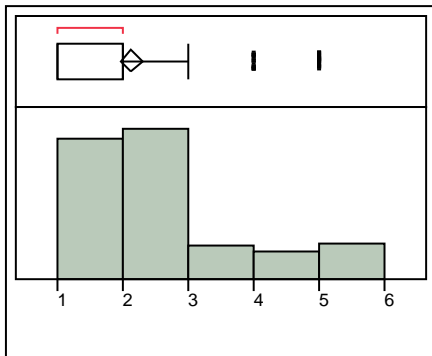
Summary Statistics

Mean	2.1287554
Std Dev	1.2354975
Skewness	1.1358552
Kurtosis	0.3265017
Median	2

usef_21
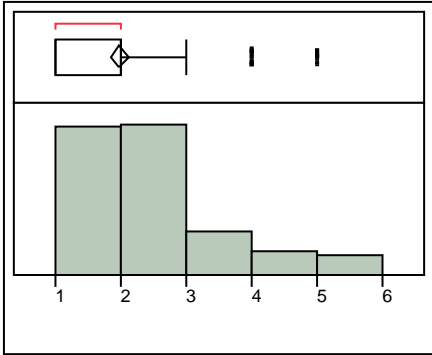
Summary Statistics

Mean	1.9742489
Std Dev	1.0744796
Skewness	1.2501426
Kurtosis	1.1145883
Median	2

usef_22
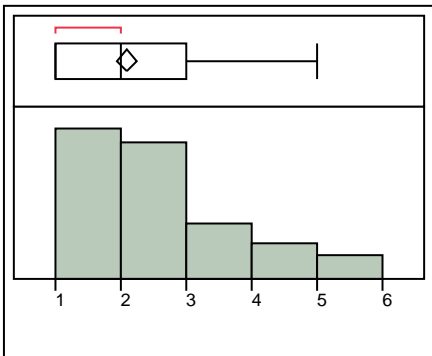
Summary Statistics

Mean	2.0987124
Std Dev	1.1647288
Skewness	0.9948948
Kurtosis	0.1618237
Median	2

usef_23
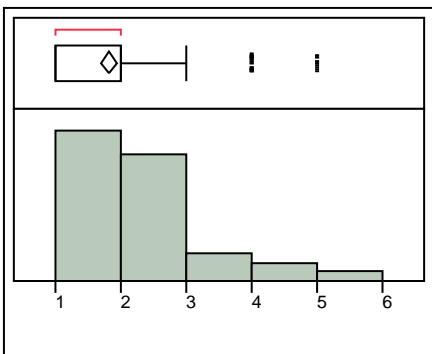
Summary Statistics

Mean	1.806867
Std Dev	0.9700449
Skewness	1.4249299
Kurtosis	1.8810222
Median	2

ease_24
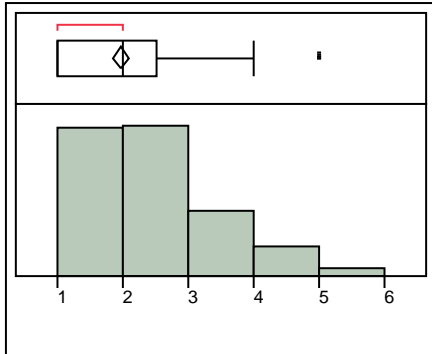
Summary Statistics

Mean	1.9742489
Std Dev	0.9734526
Skewness	0.8718757
Kurtosis	0.2029348
Median	2

ease_25
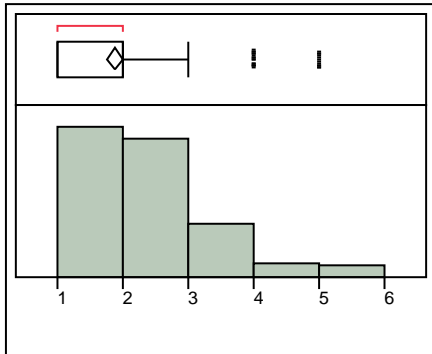
Summary Statistics

Mean	1.8798283
Std Dev	0.9573563
Skewness	1.1944416
Kurtosis	1.3913213
Median	2

ease_26
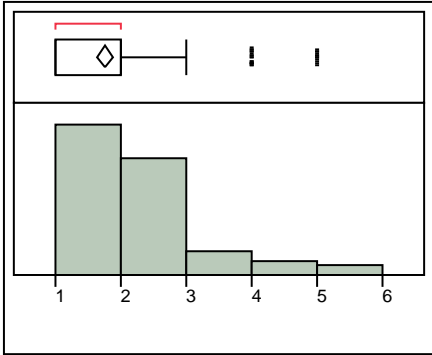
Summary Statistics

Mean	1.7424893
Std Dev	0.9389772
Skewness	1.5754751
Kurtosis	2.5747366
Median	2

ease_27
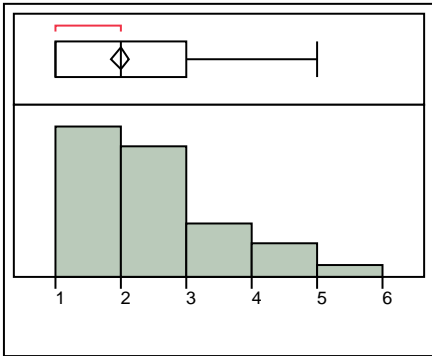
Summary Statistics

Mean	1.9914163
Std Dev	1.0585914
Skewness	0.9847602
Kurtosis	0.2757197
Median	2

aut_28
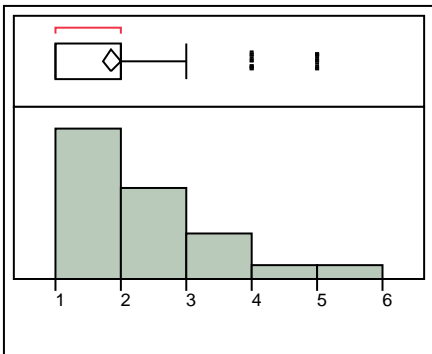
Summary Statistics

Mean	1.8540773
Std Dev	1.0566673
Skewness	1.2902136
Kurtosis	1.1871301
Median	2

aut_29
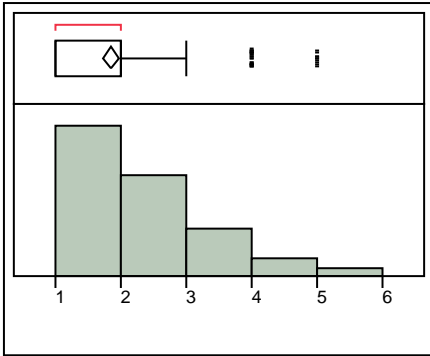
Summary Statistics

Mean	1.8454936
Std Dev	0.9966274
Skewness	1.1580333
Kurtosis	0.8605957
Median	2

aut_30
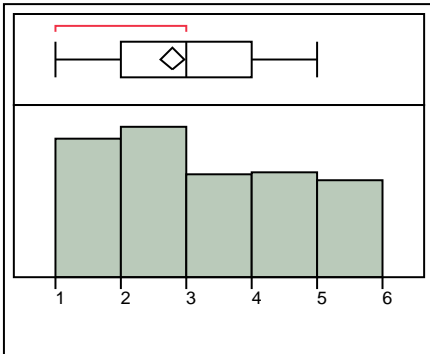
Summary Statistics

Mean	2.776824
Std Dev	1.4087088
Skewness	0.2439166
Kurtosis	-1.253466
Median	3

aut_31
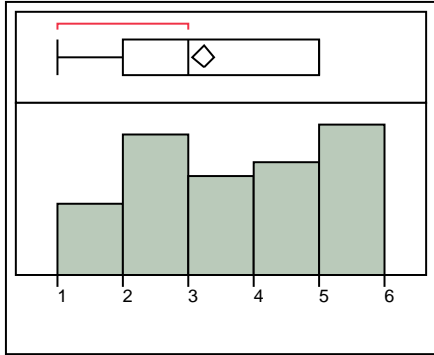
Summary Statistics

Mean	3.2274678
Std Dev	1.3941754
Skewness	-0.105035
Kurtosis	-1.327571
Median	3

aut_32
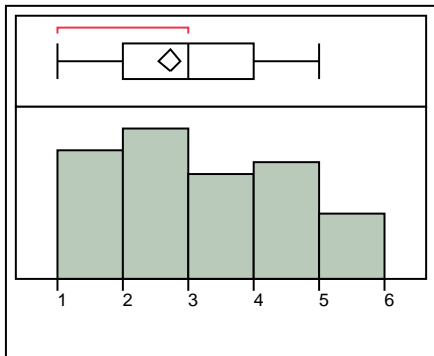
Summary Statistics

Mean	2.7167382
Std Dev	1.3314898
Skewness	0.2446212
Kurtosis	-1.152007
Median	3

aut_33
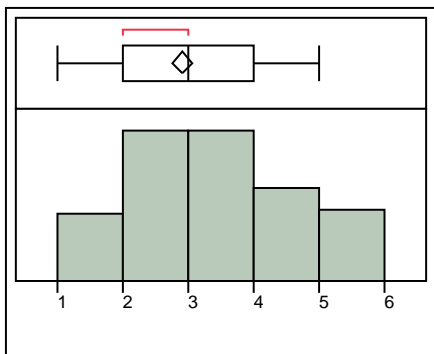
Summary Statistics

Mean	2.9098712
Std Dev	1.219644
Skewness	0.2024535
Kurtosis	-0.87903
Median	3

aut_34
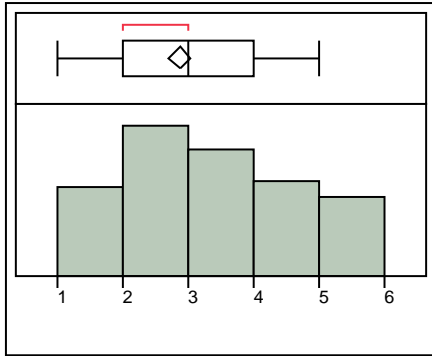
Summary Statistics

Mean	2.8626609
Std Dev	1.2958906
Skewness	0.2100234
Kurtosis	-1.044782
Median	3

res_35
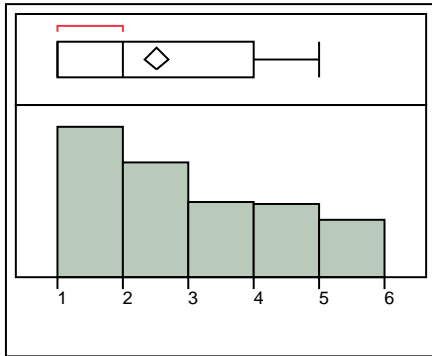
Summary Statistics

Mean	2.5064378
Std Dev	1.3899894
Skewness	0.4771205
Kurtosis	-1.079452
Median	2

res_36
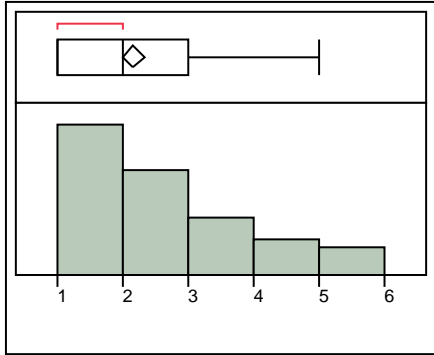
Summary Statistics

Mean	2.1545064
Std Dev	1.2533365
Skewness	0.8970375
Kurtosis	-0.252449
Median	2

res_37
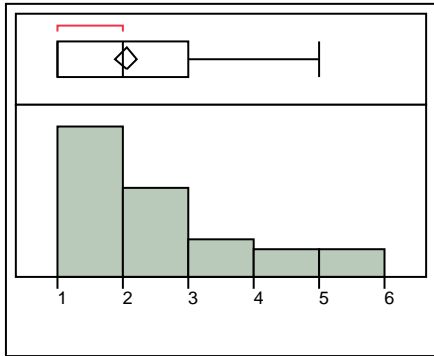
Summary Statistics

Mean	2.0515021
Std Dev	1.2720164
Skewness	1.0941624
Kurtosis	0.0819643
Median	2

res_38

83
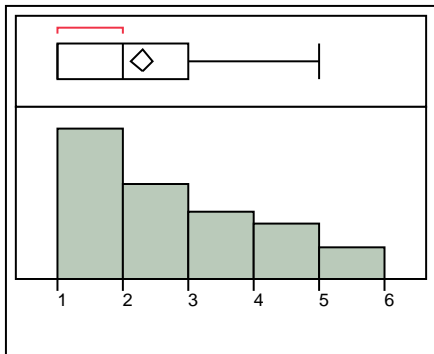
Summary Statistics

Mean	2.2961373
Std Dev	1.3074167
Skewness	0.6510052
Kurtosis	-0.783297
Median	2

res_39
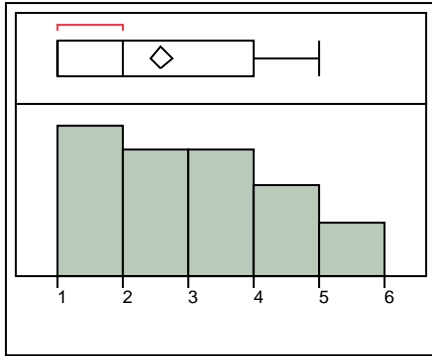
Summary Statistics

Mean	2.5751073
Std Dev	1.3047255
Skewness	0.3333375
Kurtosis	-1.019721
Median	2

dp_40
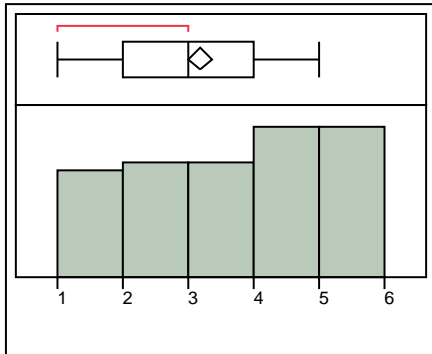
Summary Statistics

Mean	3.193133
Std Dev	1.4146844
Skewness	-0.199165
Kurtosis	-1.275589
Median	3

dp_41
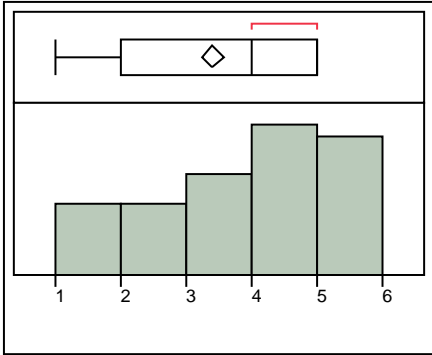
Summary Statistics

Mean	3.4077253
Std Dev	1.3554903
Skewness	-0.457704
Kurtosis	-0.988633
Median	4

dp_42
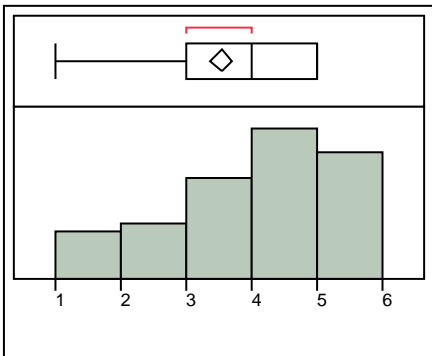
Summary Statistics

Mean	3.5364807
Std Dev	1.2661711
Skewness	-0.590263
Kurtosis	-0.649085
Median	4

dp_43
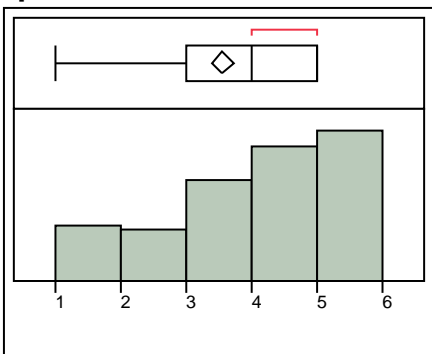
Summary Statistics

Mean	3.5579399
Std Dev	1.3187439
Skewness	-0.598671
Kurtosis	-0.745042
Median	4

pro_44
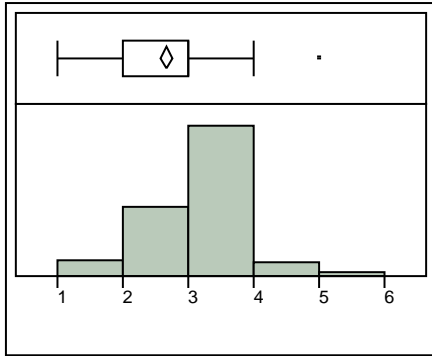
Summary Statistics

Mean	2.6566524
Std Dev	0.6839672
Skewness	-0.499708
Kurtosis	0.709805
Median	3

pro_45
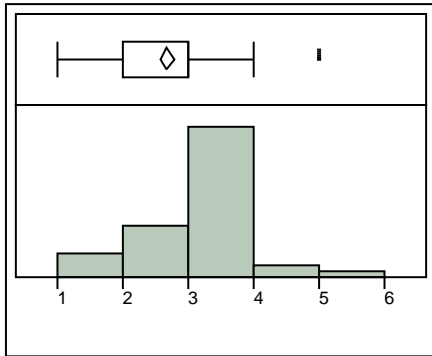
Summary Statistics

Mean	2.6738197
Std Dev	0.7690408
Skewness	-0.398111
Kurtosis	1.126765
Median	3

pro_46
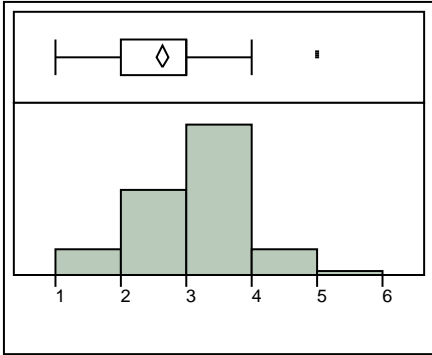
Summary Statistics

Mean	2.6351931
Std Dev	0.7932675
Skewness	-0.190843
Kurtosis	0.1814834
Median	3

sup_47
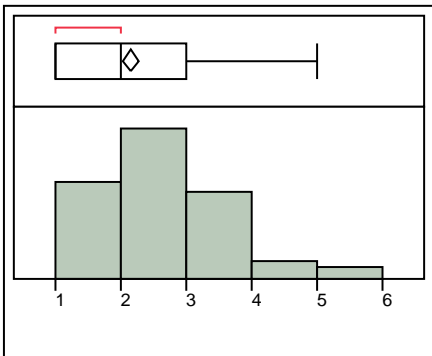
Summary Statistics

Mean	2.1587983
Std Dev	0.9718549
Skewness	0.7847194
Kurtosis	0.5430361
Median	2

sup_48
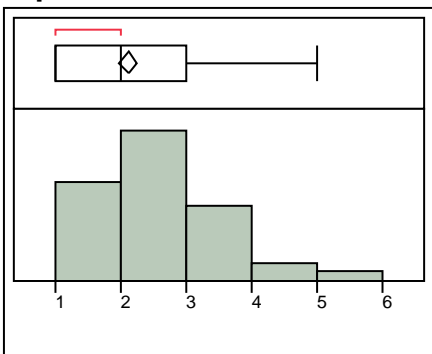
Summary Statistics

Mean	2.1030043
Std Dev	0.9548603
Skewness	0.8408689
Kurtosis	0.6595392
Median	2

gusef_49
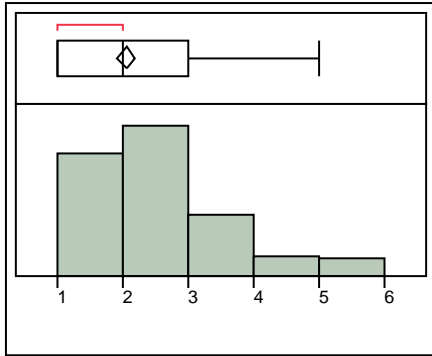
Summary Statistics

Mean	2.0515021
Std Dev	1.0367846
Skewness	1.0901201
Kurtosis	0.9438699
Median	2

gusef_50
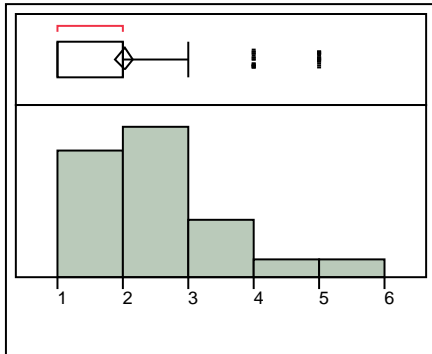
Summary Statistics

Mean	2.0214592
Std Dev	1.0315972
Skewness	1.1449292
Kurtosis	1.1067651
Median	2

gusef_51
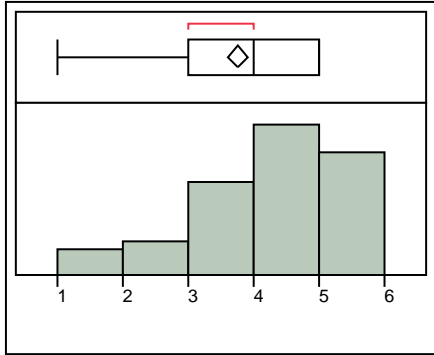
Summary Statistics

Mean	3.751073
Std Dev	1.1248797
Skewness	-0.779441
Kurtosis	-0.011702
Median	4

gusef_52
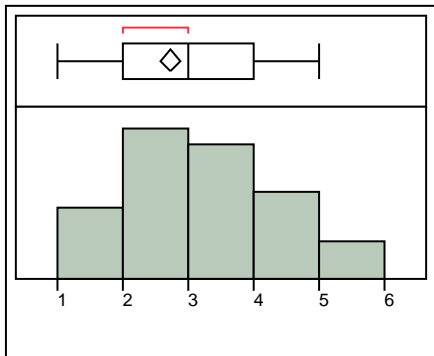
Summary Statistics

Mean	2.7296137
Std Dev	1.1483978
Skewness	0.2692449
Kurtosis	-0.71732
Median	3

gusef_53
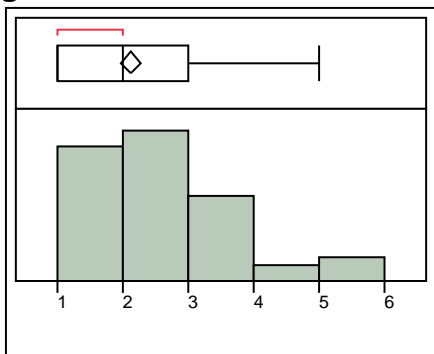
Summary Statistics

Mean   2.1158798
Std Dev   1.0825243
Skewness   1.0011765
Kurtosis   0.6638534
Median   2

gusef_54
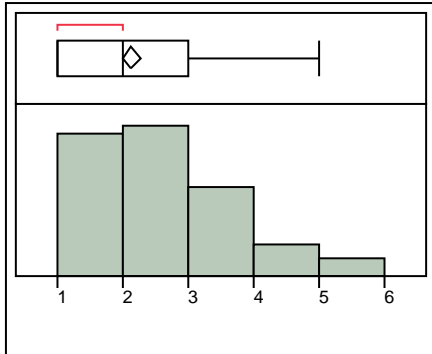
Summary Statistics

Mean   2.1244635
Std Dev   1.0735667
Skewness   0.8457896
Kurtosis   0.1783128
Median   2

orch_55
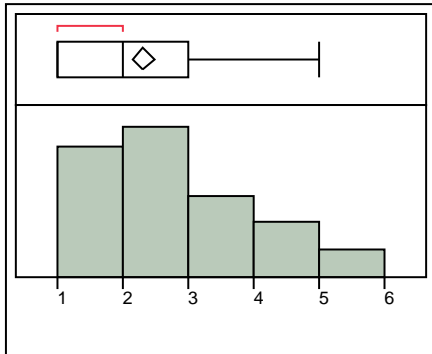
Summary Statistics

Mean   2.3133047
Std Dev   1.1928825
Skewness   0.6801356
Kurtosis   -0.462473
Median   2

orch_56
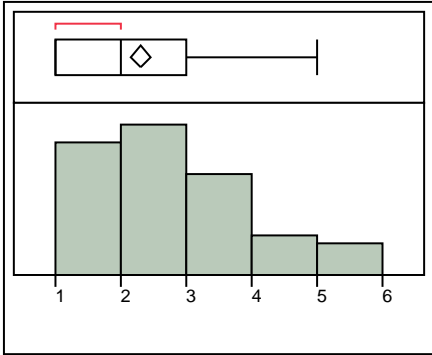
Summary Statistics

Mean	2.3090129
Std Dev	1.1776494
Skewness	0.7210002
Kurtosis	-0.24557
Median	2

orch_57
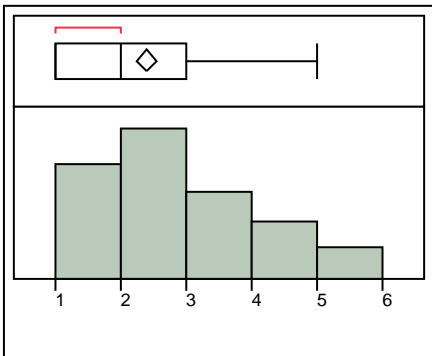
Summary Statistics

Mean	2.3991416
Std Dev	1.1996404
Skewness	0.6103984
Kurtosis	-0.538398
Median	2

acc_58
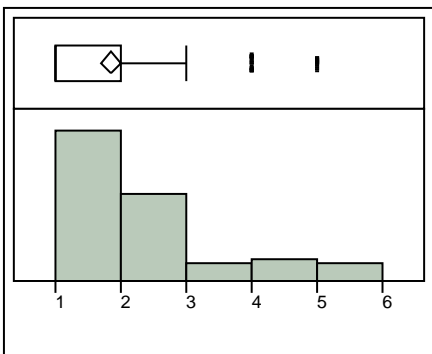
Summary Statistics

Mean   1.8497854
Std Dev   1.1629008
Skewness   1.4408282
Kurtosis   1.1440103
Median   1

acc_59
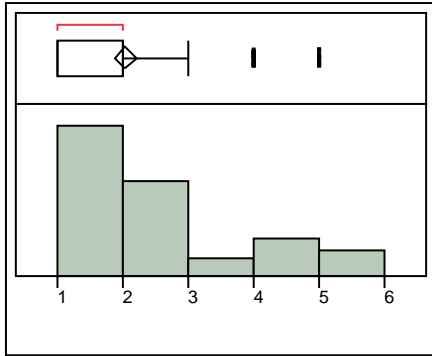
Summary Statistics

Mean   2.0343348
Std Dev   1.289422
Skewness   1.1281008
Kurtosis   0.0249215
Median   2

acc_60
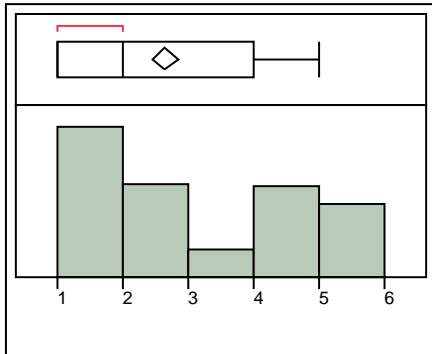
Summary Statistics

Mean   2.6351931
Std Dev   1.5368904
Skewness   0.3282083
Kurtosis   -1.471636
Median   2

acc_61
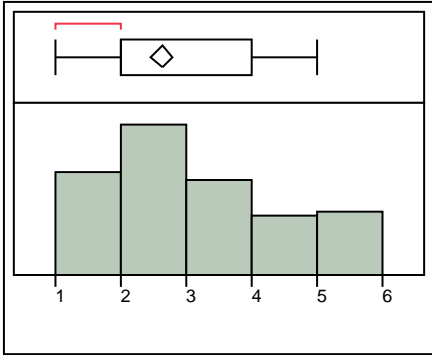
Summary Statistics

Mean	2.6309013
Std Dev	1.3134869
Skewness	0.477571
Kurtosis	-0.881393
Median	2

int_62
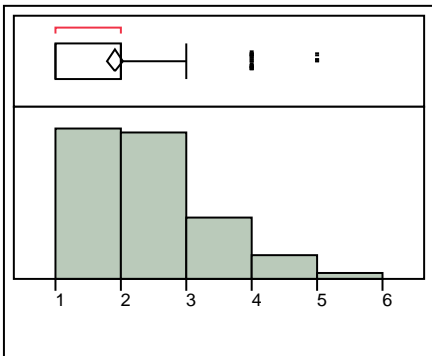
Summary Statistics

Mean	1.9184549
Std Dev	0.9410436
Skewness	0.9463077
Kurtosis	0.5139848
Median	2

int_63
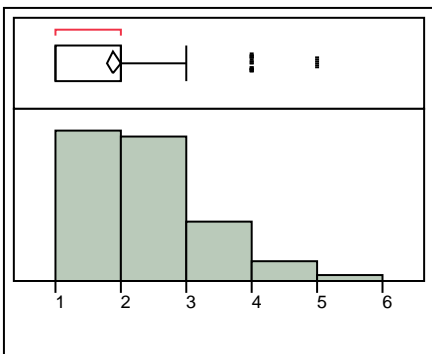
Summary Statistics

Mean   1.888412
Std Dev   0.9217176
Skewness   0.9899801
Kurtosis   0.7164972
Median   2

int_64
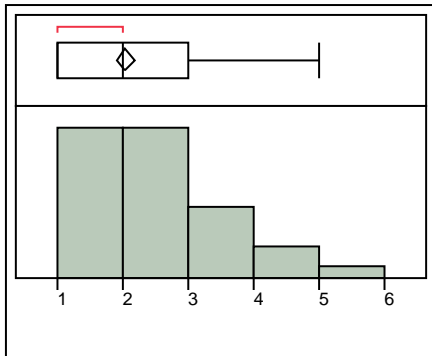
Summary Statistics

Mean   2.0300429
Std Dev   1.0313819
Variance   1.0637487
Skewness   0.9144094
Median   2

att_65
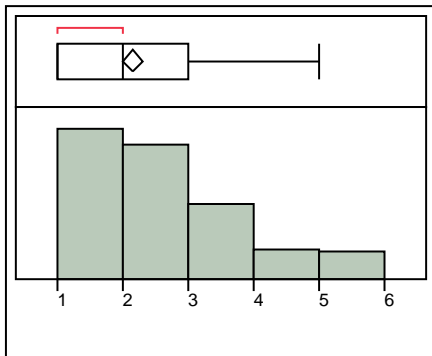
Summary Statistics

Mean   2.1502146
Std Dev   1.1739678
Skewness   0.9300675
Kurtosis   0.0944071
Median   2

att_66
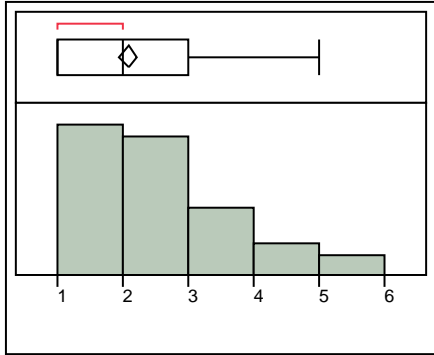
Summary Statistics

Mean	2.0772532
Std Dev	1.1192082
Skewness	0.9816425
Kurtosis	0.2866269
Median	2

att_67
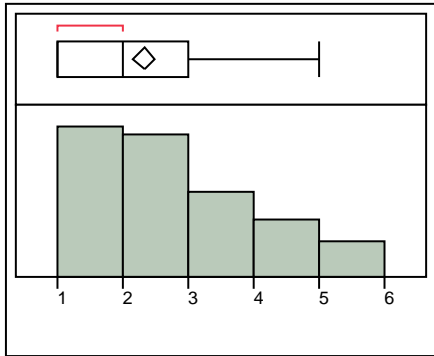
Summary Statistics

Mean	2.3175966
Std Dev	1.2430806
Skewness	0.681194
Kurtosis	-0.556299
Median	2

att_68
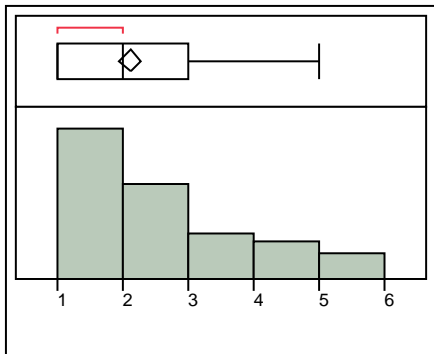
Summary Statistics

Mean   2.111588
Std Dev   1.2579038
Skewness   0.9409663
Kurtosis   -0.229737
Median   2

att_69
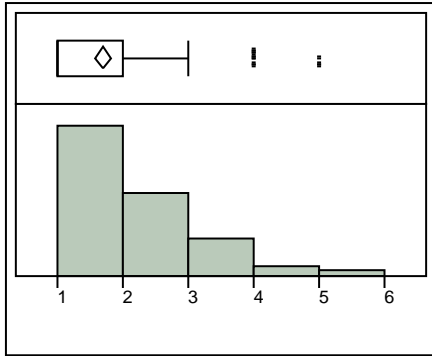
Summary Statistics

Mean   1.6909871
Std Dev   0.8995954
Skewness   1.3313074
Kurtosis   1.5254864
Median   1

att_70
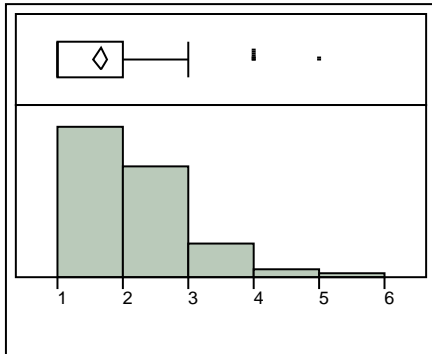
Summary Statistics

Mean   1.6523605
Std Dev   0.7735977
Skewness   1.14184
Kurtosis   1.3081421
Median   1

imp_71
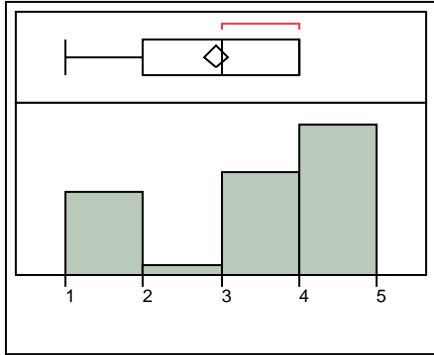
Summary Statistics

N   230

trn_72
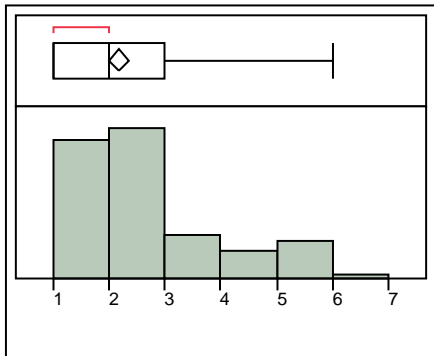
Summary Statistics

N   229

Appendix E. Consent Form in English and Armenian

American University of Armenia

Institutional Review Board #1/Committee On Human Research

Consent form

Hello, my name is Mher Beglaryan. I am a physician and a graduate student of the Master of Public Health program at the American University of Armenia and we are doing a research project to explore barriers to electronic health information system implementation in Armenia.

You are invited to participate in an interview for this project because you are a physician working in this hospital. I am asking you to participate in this study because you can help us a lot with your responses to learn and understand barriers to this national initiative of electronic health information system deployment.

Participating only involves this interview today. It should take no longer than 30 to 35 minutes to complete.

The interview in anonymous; the information you provide will be kept confidential and will be used only for the study. To protect your privacy, we will not collect or report any identifying information such as your name or the name of the health facility where you work. Only aggregated data will be reported in the final presentation/report.

You will be one of approximately 230 physicians who participate in this research project.

Your participation in the interview is voluntary and there will be no negative consequences for refusing to participate. You may refuse to answer any questions in the interview or stop the interview at any time.

There is no financial compensation or other personal benefits from participating in the study and there are no known risks to you resulting from your participation in the study. But there may be indirect benefits as it is possible that based on your opinion decision-makers may address raised concerns and make it more effective the system-wide transition.

If you have any questions regarding this study you can call the principal investigator of this study- Dr. Varduhi Petrosyan. If you feel you have not been treated fairly during this study or think you have been hurt by joining the study you should contact Dr. Hripsime Martirosyan, the Human Subject Protection Administrator of the American University of Armenia (37410) 51 25 61.

Do you agree to participate? Please say YES or NO.

Thank you.

If yes, shall we continue? First I will introduce you to the EHR system and then we will proceed to the questionnaire.

Description of EHR

Electronic health records (EHR) is a complex of information and infrastructures which allows collection, storage and utilization of health related information concerning each member of the society by health professionals in the electronic environment.

It has different components. One of its principal components is centralized medical database containing information in digital format on person's health status, medical history, previous encounters, results of tests, prescriptions and their effects, admission/discharge which is recorded in the healthcare facility during the patient care.

In addition to these data management capabilities EHR includes also computerized physician order entry, e-prescribing, clinical decision support system (based on certain integrated algorithms) and other auxiliary functionality (such as knowledge resources, guidelines, public health reporting and tracking, preventive medicine tracking, creating graphs or flow sheets, etc.) which all become accessible to the users after logging in to the EHR via Internet.

Հայաստանի ամերիկյան համալսարան

Հանրային առողջապահության բաժին

Գիտահետազոտական էթիկայի թիվ 1 հանձնաժողով

Իրազեկ համաձայնության ձև

Բարև Ձեզ, իմ անունը Մհեր Բեգլարյան է: Ես բժիշկ եմ և սովորում եմ Հայաստանի Ամերիկյան Համալսարանում, Հանրային Առողջապահության բաժնի ավարտական կուրսում: Մեր բաժինն իրականացնում է հետազոտություն` ուսումնասիրելու Հայաստանում առողջապահական էլեկտրոնային տեղեկատվական համակարգի գործարկման խոչընդոտները:

Դուք հրավիրված եք մասնակցել այս հարցագրույցին, քանի որ Դուք այս հիվանդանոցում աշխատող բժիշկ եք: Ես խնդրում եմ Ձեզ մասնակցել, քանի որ Դուք Ձեր պատասխաններով կարող եք մեծապես օգնել հասկանալու առողջապահական էլեկտրոնային տեղեկատվական համակարգ ներդնելու ազգային այս նախաձեռնության խոչընդոտները:

Ձեր մասնակցությունը սահմանափակվում է միայն ներկայիս հարցագրույցով, որը կտևի ոչ ավել քան մոտ 20 րոպե:

Հարցագրույցը անանուն է, Ձեր տրամադրած տեղեկությունները գաղտնի կպահվեն և կօգտագործվեն միայն այս հետազոտության շրջանակներում: Ձեր գաղտնիությունը պաշտպանելու համար Ձեր անունը և աշխատանքի վայրը` հիվանդանոցի անվանումը չի նշվի հարցաթերթիկում: Միայն ընդհանրացված տվյալներն են ներկայացվելու զեկույցում:

Դուք լինելու եք այն` շուրջ 230 մասնակիցներից մեկը, ովքեր մասնակցելու են այս հետազոտությանը:

Ձեր մասնակցությունն այս հետազոտությանը կամավոր է: Ձեզ ոչինչ չի սպառնում, եթե Դուք հրաժարվեք մասնակցել այս հետազոտությանը: Դուք կարող եք հրաժարվել պատասխանել ցանկացած հարցի կամ ցանկացած պահի ընդհատել հարցագրույցը:

Դուք չեք ստանալու որևէ պարգևատրում հետազոտությանը մասնակցելու դեպքում: Դուք ոչ մի ռիսկի չեք դիմում մասնակցելով այս հետազոտությանը: Բայց միաժամանակ կարող եք անուղղակի օգուտ ստանալ, քանի որ հավանական է, որ Ձեր կարծիքի հիման վրա պատկան մարմինները կարող են լուծում տալ ծառացող խնդիրներին և ավելի արդյունավետ մոտեցումներ ցուցաբերել բժշկական էլեկտրոնային համակարգ ստեղծելու գործընթացում:

Այս հետազոտության վերաբերյալ հարցեր ունենալու դեպքում կարող եք զանգահարել հետազոտության համակարգող` Վարդուհի Պետրոսյանին (37410) 512592 հեռախոսահամարով: Եթե Դուք կարծում եք, որ այս հետազոտության

ընփացքում Ձեզ լավ չեն վերաբերվել կամ այս հետազոտությանը մասնակցելու դեպքում Ձեզ վնաս է հասցվել, կարող եք զանգահարել Հայաստանի ամերիկյան համալսարանի Էթիկայի հանձնաժողովի համակարգող` Հռիփսիմե Մարտիրոսյանին (37410) 51 25 61 հեռախոսահամարով:

Համաձա՞յն եք մասնակցել (այո կամ ոչ):

Շնորհակալություն:

Կարո՞ղ ենք շարունակել: Ես նախ ընդհանուր գծերով Ձեզ կծանոթացնեմ ԱԷՏՀ-ի հետ և ապա կանցնենք հարցաշարին:

<u>ԱԷՏՀ նկարագրություն</u>

Առողջապահական էլեկտրոնային տեղեկատվական համակարգը (ԱԷՏՀ) տեղեկատվության և ենթակառուցվածքների ամբողջություն է, որն ապահովում է բուժհաստատություններից յուրաքանչյուր օգտվողի` օրինակ հիվանդի վերաբերյալ բժշկական տեղեկատվության հավաքագրումը, արխիվացումը և օգտագործումը առողջապահության ոլորտի մասնագետների կողմից էլեկտրոնային միջավայրում:

Այն ունի տարբեր բաղադրիչներ: Նրա առանցքային բաղադրիչներց է բժշկական տվյալների կենտրոնացված էլեկտրոնային շտեմարանը, որտեղ թվային տեսքով պահվում են անձի առողջական վիճակի, հիվանդության պատմության, նախկին այցերի, բժշկական հետազոտությունների, դեղերի նշանակումների և այլնի մասին տեղեկություններ, որոնք գրանցվում են բժշկական հաստատությունում հիվանդի բուժման ընթացքում:

ԱԷՏՀ-ը կարող է տրամադրել նաև այլ հնարավորություններ (օրինակ հետազոտությունների պատվիրումը, էլեկտրոնային դեղատոմսերի համակարգը, և այլն), որոնք բոլորը հասանելի են դառնում օգտատերին ինտերնետի միջոցով ԱԷՏՀ մուտք գործելուց և նույնականացվելուց հետո:

Appendix F. Hypothesized measurement model: Mplus input

```
MODEL:

    Inov BY inov_6-inov_8 know_9-know_12 anx_13-anx_16  (*1) ;
    Know BY inov_6-inov_8 know_9-know_12 anx_13-anx_16  (*1) ;
    Anx BY inov_6-inov_8 know_9-know_12 anx_13-anx_16  (*1) ;


    Ease BY  ease_24-ease_27 ;


    Aut BY aut_28-aut_34* aut_31@1;
    DP BY dp_40-dp_43* dp_43@1;
    Sup BY sup_47-sup_48;
    Res BY res_35-res_39* res_39@1;


    Pro BY pro_44-pro_46 orch_55-orch_57 acc_58-acc_61 (*3);
    OrCh BY pro_44-pro_46 orch_55-orch_57 acc_58-acc_61 (*3);
    Acc BY pro_44-pro_46 orch_55-orch_57 acc_58-acc_61 (*3);


    Usef BY usef_17-usef_23 gusef_49-gusef_54 int_62-int_64 att_65-att_70 (*2) ;
    GUsef BY usef_17-usef_23 gusef_49-gusef_54 int_62-int_64 att_65-att_70 (*2) ;


    Int BY usef_17-usef_23 gusef_49-gusef_54 int_62-int_64 att_65-att_70 (*2) ;
    Att BY usef_17-usef_23 gusef_49-gusef_54 int_62-int_64 att_65-att_70 (*2) ;
```

Appendix G. Modifications in measurement model

List of dropped variables and reasons for that

Variables	*Reasons for dropping*
Observed variables	
acc_60	No significant loadings on the corresponding factor while demonstrating small but statistically significant loadings on two other factors
acc_61	
acc_59	Small loading
anx_13	Modification indices[1]
att_66	Loads substantially on two factors
att_67	Have significant cross-loadings but their largest loadings are on the Projected group usefulness factor which is not consistent with its interpretation based on other items with salient loadings on it
att_70	
att_68	Didn't show any substantial loadings on any factor
att_69	
aut_30	Modification indices
aut_31	Modification indices
aut_33	Modification indices
dp_40	Significant error covariance between dp_40 and dp_41, after freeing it, loading of dp_40 become small
ease_26	Modification indices
ease_27	Modification indices
gusef_49	Modification indices
gusef_50	Modification indices
gusef_51	Small loadings on Projected group usefulness, Intention and Attitudes factors. Further inspection of modification indices suggested also substantial cross-loadings on Patient-provider relationships and Personal innovativeness

---

[1] Large modification indices with expected parameter changes above chosen cutoff or substantial error covariances.

gusef_52	No any substantial loadings on any factor
inov_7	Small loading on the pertaining factor and substantial cross-loading on the Related knowledge factor
know_10	Modification indices
res_35	Modification indices
res_39	Modification indices
usef_20	Usef_20 is the only item in the 2nd exploratory set with a significant cross-loading. To allow structural relationships between latent variables of this set, they should not be included in the same exploratory set. Therefore usef_20 is dropped to not affect parameter estimates after separation of the latent variables from the exploratory set [67].
usef_23	Modification indices
Latent variables	
Acc	All observed variables of this latent variable have been dropped
Att	The Attitude construct is dissolved and only att_65 is left which loads on Projected group usefulness so the latent variable Attitude is dropped.
Aut	Has been broken into 2 latent variables: Mon and Sec
Know	Dropped from the structural model because it has no significant path to endogenous variables

Appendix H. Selected output for final measurement model

```
Mplus VERSION 7


MUTHEN & MUTHEN
10/15/2013 13:41


INPUT INSTRUCTIONS


   MODEL:

        Inov BY inov_6-inov_8 know_9-know_12 anx_14-anx_16  (*1) ;
        Know BY inov_6-inov_8 know_9-know_12 anx_14-anx_16  (*1) ;
        Anx BY inov_6-inov_8 know_9-know_12 anx_14-anx_16  (*1) ;


        Ease BY  ease_24 ease_25 ;
        Sec BY aut_32-aut_34;
        Mon BY aut_28-aut_29;
        DP BY dp_41-dp_43* dp_43@1;
        Sup BY sup_47-sup_48;
        Res BY res_36-res_38;


        Pro BY pro_44-pro_46 orch_55-orch_57  (*3);
        OrCh BY pro_44-pro_46 orch_55-orch_57  (*3);


        Usef BY usef_17-usef_22 gusef_53-gusef_54 int_62-int_64 att_65 (*2);

        GUsef BY usef_17-usef_22 gusef_53-gusef_54 int_62-int_64 att_65 (*2);

        Int BY usef_17-usef_22 gusef_53-gusef_54 int_62-int_64 att_65 (*2);




SUMMARY OF ANALYSIS


Number of groups                                                1
Number of observations                                        233
```

```
Number of dependent variables                               39
Number of independent variables                              0
Number of continuous latent variables                       14


Observed dependent variables

  Binary and ordered categorical (ordinal)
    INOV_6       INOV_8       KNOW_9       KNOW_11      KNOW_12      ANX_14
    ANX_15       ANX_16       USEF_17      USEF_18      USEF_19      USEF_21
    USEF_22      EASE_24      EASE_25      AUT_28       AUT_29       AUT_32
    AUT_34       RES_36       RES_37       RES_38       DP_41        DP_42
    DP_43        PRO_44       PRO_45       PRO_46       SUP_47       SUP_48
    GUSEF_53     GUSEF_54     ORCH_55      ORCH_56      ORCH_57      INT_62
    INT_63       INT_64       ATT_65


Continuous latent variables
    EASE         SEC          MON
    DP           SUP          RES


  EFA factors
  *1:  INOV         KNOW         ANX
  *3:  PRO          ORCH
  *2:  USEF
   GUSEF        INT



Estimator                                                 WLSMV
Rotation                                                 GEOMIN
Row standardization                                 CORRELATION
Type of rotation                                        OBLIQUE
Epsilon value                                             Varies
Maximum number of iterations                               5000
Convergence criterion                                 0.500D-04
Maximum number of steepest descent iterations               20
Optimization Specifications for the Exploratory Factor Analysis
Rotation Algorithm
  Number of random starts                                   30
```

```
   Maximum number of iterations                              10000
   Derivative convergence criterion                        0.100D-04
Parameterization                                             THETA


Input data file(s)
  EHR-Q72_redct_for_Mplus.csv


Input data format  FREE




        THE MODEL ESTIMATION TERMINATED NORMALLY




        MODEL FIT INFORMATION



Number of Free Parameters                        160


Chi-Square Test of Model Fit


        Value                            763.012*
        Degrees of Freedom                   581
        P-Value                           0.0000


*   The chi-square value for MLM, MLMV, MLR, ULSMV, WLSM and WLSMV cannot be used
    for chi-square difference testing in the regular way.  MLM, MLR and WLSM
    chi-square difference testing is described on the Mplus website.  MLMV, WLSMV,
    and ULSMV difference testing is done using the DIFFTEST option.


RMSEA (Root Mean Square Error Of Approximation)


        Estimate                         0.037
        90 Percent C.I.                  0.029  0.044
        Probability RMSEA <= .05         0.999
```

CFI/TLI

CFI	0.988	
TLI	0.985	

Chi-Square Test of Model Fit for the Baseline Model

Value	16265.102
Degrees of Freedom	741
P-Value	0.0000

SRMR (Standardized Root Mean Square Residual)

Value	0.043

WRMR (Weighted Root Mean Square Residual)

Value	0.710

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
INOV BY				
INOV_6	1.405	0.317	4.427	0.000
INOV_8	1.392	0.351	3.960	0.000
KNOW_9	0.032	0.083	0.383	0.702
KNOW_11	-0.296	0.169	-1.752	0.080
KNOW_12	0.016	0.104	0.158	0.874
ANX_14	0.008	0.038	0.202	0.840
ANX_15	-0.241	0.231	-1.042	0.298
ANX_16	0.042	0.150	0.278	0.781
KNOW BY				
INOV_6	-0.007	0.009	-0.760	0.447

INOV_8	0.605	0.179	3.386	0.001
KNOW_9	2.255	0.323	6.980	0.000
KNOW_11	1.962	0.257	7.638	0.000
KNOW_12	3.294	0.762	4.320	0.000
ANX_14	-0.153	0.118	-1.299	0.194
ANX_15	0.023	0.075	0.306	0.760
ANX_16	-0.003	0.093	-0.037	0.970
ANX BY				
INOV_6	-0.088	0.146	-0.608	0.543
INOV_8	0.010	0.005	2.052	0.040
KNOW_9	-0.123	0.161	-0.762	0.446
KNOW_11	0.001	0.035	0.021	0.983
KNOW_12	0.030	0.171	0.176	0.860
ANX_14	1.346	0.150	8.969	0.000
ANX_15	2.936	0.743	3.953	0.000
ANX_16	2.208	0.357	6.190	0.000
EASE BY				
EASE_24	1.000	0.000	999.000	999.000
EASE_25	0.849	0.188	4.522	0.000
SEC BY				
AUT_32	1.000	0.000	999.000	999.000
AUT_34	1.289	0.453	2.848	0.004
MON BY				
AUT_28	1.000	0.000	999.000	999.000
AUT_29	0.558	0.225	2.483	0.013
DP BY				
DP_41	0.422	0.127	3.324	0.001
DP_42	0.396	0.120	3.306	0.001
DP_43	1.000	0.000	999.000	999.000
SUP BY				
SUP_47	1.000	0.000	999.000	999.000

SUP_48	0.435	0.241	1.804	0.071

RES   BY

RES_36	1.000	0.000	999.000	999.000
RES_37	1.582	0.784	2.019	0.044
RES_38	0.604	0.147	4.106	0.000

PRO   BY

PRO_44	1.656	0.308	5.381	0.000
PRO_45	0.931	0.131	7.117	0.000
PRO_46	1.375	0.223	6.176	0.000
ORCH_55	-0.147	0.116	-1.270	0.204
ORCH_56	0.011	0.004	2.811	0.005
ORCH_57	0.045	0.102	0.441	0.659

ORCH   BY

PRO_44	0.001	0.036	0.040	0.968
PRO_45	0.069	0.090	0.768	0.442
PRO_46	-0.016	0.088	-0.183	0.855
ORCH_55	1.509	0.169	8.951	0.000
ORCH_56	1.934	0.258	7.499	0.000
ORCH_57	0.842	0.097	8.659	0.000

USEF   BY

USEF_17	1.457	0.180	8.087	0.000
USEF_18	2.592	0.319	8.115	0.000
USEF_19	2.255	0.305	7.397	0.000
USEF_21	1.815	0.238	7.637	0.000
USEF_22	2.221	0.316	7.032	0.000
GUSEF_53	-0.061	0.119	-0.507	0.612
GUSEF_54	0.010	0.065	0.160	0.873
INT_62	0.248	0.213	1.165	0.244
INT_63	-0.238	0.240	-0.995	0.320
INT_64	0.025	0.020	1.250	0.211
ATT_65	0.103	0.115	0.897	0.370

GUSEF   BY

USEF_17	0.085	0.170	0.501	0.616
USEF_18	-0.041	0.115	-0.357	0.721
USEF_19	0.103	0.139	0.744	0.457
USEF_21	0.153	0.216	0.708	0.479
USEF_22	-0.090	0.173	-0.520	0.603
GUSEF_53	2.673	0.432	6.190	0.000
GUSEF_54	2.553	0.410	6.230	0.000
INT_62	-0.030	0.091	-0.336	0.737
INT_63	0.051	0.144	0.354	0.723
INT_64	0.189	0.184	1.030	0.303
ATT_65	1.078	0.170	6.345	0.000

INT   BY

USEF_17	0.033	0.117	0.283	0.777
USEF_18	-0.137	0.319	-0.430	0.668
USEF_19	-0.205	0.247	-0.831	0.406
USEF_21	0.138	0.257	0.537	0.591
USEF_22	0.388	0.276	1.405	0.160
GUSEF_53	-0.088	0.192	-0.460	0.646
GUSEF_54	0.068	0.158	0.430	0.667
INT_62	2.216	0.242	9.151	0.000
INT_63	3.440	0.592	5.806	0.000
INT_64	2.249	0.269	8.347	0.000
ATT_65	0.204	0.170	1.203	0.229

KNOW   WITH

INOV	0.309	0.104	2.976	0.003

ANX   WITH

INOV	-0.226	0.107	-2.113	0.035
KNOW	-0.424	0.071	-5.989	0.000

EASE   WITH

INOV	0.457	0.144	3.174	0.002
KNOW	0.543	0.146	3.728	0.000
ANX	-0.934	0.184	-5.077	0.000

```
SEC       WITH
    INOV              -0.129      0.123     -1.052      0.293
    KNOW               0.050      0.118      0.428      0.669
    ANX                0.280      0.124      2.265      0.024
    EASE              -0.734      0.240     -3.054      0.002

MON       WITH
    INOV               0.483      0.322      1.500      0.134
    KNOW               0.374      0.302      1.237      0.216
    ANX               -0.939      0.384     -2.446      0.014
    EASE               3.485      1.242      2.806      0.005
    SEC               -1.548      0.606     -2.554      0.011

DP        WITH
    INOV              -0.348      0.314     -1.109      0.267
    KNOW              -1.105      0.383     -2.884      0.004
    ANX                1.672      0.497      3.362      0.001
    EASE              -3.295      1.065     -3.093      0.002
    SEC                2.545      0.909      2.799      0.005
    MON               -5.654      2.322     -2.435      0.015

SUP       WITH
    INOV               0.735      0.388      1.893      0.058
    KNOW               0.220      0.261      0.844      0.399
    ANX               -0.786      0.402     -1.955      0.051
    EASE               2.274      1.097      2.073      0.038
    SEC               -1.994      1.019     -1.957      0.050
    MON                6.200      3.184      1.947      0.051
    DP                -4.525      2.399     -1.886      0.059

RES       WITH
    INOV               0.029      0.134      0.217      0.828
    KNOW              -0.027      0.126     -0.216      0.829
    ANX                0.284      0.125      2.275      0.023
    EASE              -0.167      0.202     -0.826      0.409
    SEC                0.546      0.233      2.343      0.019
    MON               -0.230      0.452     -0.510      0.610
```

DP	1.436	0.652	2.202	0.028
SUP	-0.310	0.403	-0.768	0.443

PRO   WITH

INOV	0.267	0.079	3.364	0.001
KNOW	0.022	0.084	0.263	0.793
ANX	-0.160	0.069	-2.311	0.021
EASE	0.717	0.162	4.414	0.000
SEC	-0.703	0.154	-4.570	0.000
MON	1.800	0.580	3.102	0.002
DP	-1.437	0.441	-3.259	0.001
SUP	1.474	0.661	2.231	0.026
RES	-0.520	0.162	-3.213	0.001

ORCH   WITH

INOV	0.122	0.083	1.469	0.142
KNOW	-0.060	0.080	-0.748	0.454
ANX	-0.093	0.074	-1.248	0.212
EASE	0.460	0.139	3.312	0.001
SEC	-0.283	0.115	-2.459	0.014
MON	0.879	0.350	2.508	0.012
DP	-0.067	0.236	-0.284	0.776
SUP	0.678	0.340	1.995	0.046
RES	0.037	0.117	0.314	0.753
PRO	0.288	0.080	3.616	0.000

USEF   WITH

INOV	0.351	0.079	4.454	0.000
KNOW	0.195	0.078	2.495	0.013
ANX	-0.366	0.064	-5.720	0.000
EASE	1.176	0.192	6.111	0.000
SEC	-0.700	0.154	-4.552	0.000
MON	2.362	0.721	3.276	0.001
DP	-1.717	0.509	-3.375	0.001
SUP	1.670	0.724	2.307	0.021
RES	-0.383	0.138	-2.776	0.006
PRO	0.503	0.060	8.360	0.000

ORCH	0.321	0.063	5.130	0.000

GUSEF   WITH

INOV	0.337	0.070	4.847	0.000
KNOW	0.011	0.079	0.135	0.893
ANX	-0.257	0.068	-3.800	0.000
EASE	1.082	0.176	6.154	0.000
SEC	-0.820	0.161	-5.081	0.000
MON	2.263	0.691	3.274	0.001
DP	-2.149	0.603	-3.565	0.000
SUP	1.923	0.840	2.289	0.022
RES	-0.366	0.128	-2.868	0.004
PRO	0.646	0.053	12.226	0.000
ORCH	0.467	0.057	8.170	0.000
USEF	0.740	0.047	15.893	0.000

INT   WITH

INOV	0.536	0.066	8.078	0.000
KNOW	0.360	0.072	5.018	0.000
ANX	-0.438	0.067	-6.577	0.000
EASE	1.155	0.176	6.575	0.000
SEC	-0.591	0.141	-4.203	0.000
MON	1.907	0.587	3.246	0.001
DP	-2.331	0.643	-3.626	0.000
SUP	1.606	0.708	2.267	0.023
RES	-0.436	0.148	-2.941	0.003
PRO	0.522	0.059	8.850	0.000
ORCH	0.258	0.070	3.714	0.000
USEF	0.699	0.074	9.436	0.000
GUSEF	0.767	0.042	18.348	0.000

Variances

INOV	1.000	0.000	999.000	999.000
KNOW	1.000	0.000	999.000	999.000
ANX	1.000	0.000	999.000	999.000
EASE	2.872	0.875	3.283	0.001
SEC	2.350	0.703	3.345	0.001

MON	12.258	7.332	1.672	0.095
DP	12.595	6.867	1.834	0.067
SUP	10.363	9.128	1.135	0.256
RES	2.746	1.080	2.542	0.011
PRO	1.000	0.000	999.000	999.000
ORCH	1.000	0.000	999.000	999.000
USEF	1.000	0.000	999.000	999.000
GUSEF	1.000	0.000	999.000	999.000
INT	1.000	0.000	999.000	999.000

STANDARDIZED MODEL RESULTS

STDYX Standardization

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
INOV BY				
INOV_6	0.807	0.064	12.576	0.000
INOV_8	0.713	0.073	9.765	0.000
KNOW_9	0.013	0.033	0.382	0.703
KNOW_11	-0.138	0.074	-1.867	0.062
KNOW_12	0.005	0.030	0.157	0.875
ANX_14	0.004	0.022	0.202	0.840
ANX_15	-0.076	0.066	-1.162	0.245
ANX_16	0.017	0.062	0.277	0.782
KNOW BY				
INOV_6	-0.004	0.005	-0.749	0.454
INOV_8	0.310	0.084	3.697	0.000
KNOW_9	0.893	0.035	25.868	0.000
KNOW_11	0.917	0.039	23.329	0.000
KNOW_12	0.959	0.031	31.052	0.000
ANX_14	-0.089	0.068	-1.298	0.194
ANX_15	0.007	0.023	0.316	0.752

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   ANX_16            -0.001      0.038      -0.037      0.970


ANX       BY
   INOV_6            -0.051      0.083      -0.610      0.542
   INOV_8             0.005      0.003       1.902      0.057
   KNOW_9            -0.049      0.063      -0.768      0.443
   KNOW_11            0.000      0.016       0.021      0.983
   KNOW_12            0.009      0.050       0.177      0.860
   ANX_14             0.777      0.042      18.581      0.000
   ANX_15             0.931      0.031      30.517      0.000
   ANX_16             0.914      0.036      25.278      0.000


EASE      BY
   EASE_24            0.861      0.034      25.422      0.000
   EASE_25            0.821      0.032      25.396      0.000


SEC       BY
   AUT_32             0.838      0.037      22.414      0.000
   AUT_34             0.892      0.042      21.044      0.000


MON       BY
   AUT_28             0.962      0.022      44.330      0.000
   AUT_29             0.890      0.026      33.759      0.000


DP        BY
   DP_41              0.831      0.026      32.023      0.000
   DP_42              0.815      0.029      28.137      0.000
   DP_43              0.963      0.019      49.865      0.000


SUP       BY
   SUP_47             0.955      0.037      25.802      0.000
   SUP_48             0.814      0.038      21.146      0.000


RES       BY
   RES_36             0.856      0.045      19.045      0.000
   RES_37             0.934      0.041      22.958      0.000
   RES_38             0.708      0.046      15.342      0.000
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PRO       BY
   PRO_44              0.856      0.043     19.724      0.000
   PRO_45              0.674      0.052     12.946      0.000
   PRO_46              0.810      0.048     16.951      0.000
   ORCH_55            -0.083      0.063     -1.304      0.192
   ORCH_56             0.005      0.002      2.602      0.009
   ORCH_57             0.034      0.077      0.442      0.658


ORCH      BY
   PRO_44              0.001      0.018      0.040      0.968
   PRO_45              0.050      0.064      0.775      0.438
   PRO_46             -0.009      0.052     -0.183      0.855
   ORCH_55             0.847      0.035     24.126      0.000
   ORCH_56             0.887      0.025     35.307      0.000
   ORCH_57             0.640      0.047     13.673      0.000


USEF      BY
   USEF_17             0.792      0.067     11.898      0.000
   USEF_18             0.973      0.074     13.211      0.000
   USEF_19             0.936      0.090     10.438      0.000
   USEF_21             0.801      0.075     10.699      0.000
   USEF_22             0.843      0.082     10.288      0.000
   GUSEF_53           -0.022      0.043     -0.509      0.610
   GUSEF_54            0.004      0.023      0.160      0.873
   INT_62              0.096      0.082      1.180      0.238
   INT_63             -0.069      0.065     -1.058      0.290
   INT_64              0.010      0.008      1.240      0.215
   ATT_65              0.062      0.069      0.903      0.367


GUSEF     BY
   USEF_17             0.046      0.092      0.502      0.616
   USEF_18            -0.015      0.043     -0.357      0.721
   USEF_19             0.043      0.058      0.742      0.458
   USEF_21             0.068      0.095      0.710      0.478
   USEF_22            -0.034      0.065     -0.522      0.601
   GUSEF_53            0.972      0.056     17.333      0.000
```

GUSEF_54	0.912	0.062	14.801	0.000
INT_62	-0.012	0.035	-0.337	0.736
INT_63	0.015	0.041	0.356	0.722
INT_64	0.072	0.070	1.030	0.303
ATT_65	0.651	0.083	7.852	0.000

INT   BY

USEF_17	0.018	0.063	0.283	0.777
USEF_18	-0.052	0.120	-0.430	0.667
USEF_19	-0.085	0.102	-0.835	0.403
USEF_21	0.061	0.113	0.538	0.590
USEF_22	0.147	0.104	1.411	0.158
GUSEF_53	-0.032	0.068	-0.471	0.637
GUSEF_54	0.024	0.058	0.422	0.673
INT_62	0.861	0.058	14.806	0.000
INT_63	0.993	0.062	16.039	0.000
INT_64	0.860	0.057	15.095	0.000
ATT_65	0.123	0.103	1.196	0.232

KNOW   WITH

INOV	0.309	0.104	2.976	0.003

ANX   WITH

INOV	-0.226	0.107	-2.113	0.035
KNOW	-0.424	0.071	-5.989	0.000

EASE   WITH

INOV	0.270	0.074	3.622	0.000
KNOW	0.320	0.075	4.277	0.000
ANX	-0.551	0.062	-8.876	0.000

SEC   WITH

INOV	-0.084	0.078	-1.075	0.282
KNOW	0.033	0.077	0.428	0.668
ANX	0.183	0.073	2.490	0.013
EASE	-0.282	0.066	-4.247	0.000

```
MON      WITH

   INOV           0.138      0.086      1.603      0.109

   KNOW           0.107      0.080      1.333      0.182

   ANX           -0.268      0.073     -3.663      0.000

   EASE           0.587      0.054     10.951      0.000

   SEC           -0.288      0.070     -4.143      0.000


DP       WITH

   INOV          -0.098      0.086     -1.138      0.255

   KNOW          -0.311      0.069     -4.507      0.000

   ANX            0.471      0.059      8.029      0.000

   EASE          -0.548      0.057     -9.688      0.000

   SEC            0.468      0.053      8.791      0.000

   MON           -0.455      0.059     -7.761      0.000


SUP      WITH

   INOV           0.228      0.075      3.052      0.002

   KNOW           0.068      0.079      0.866      0.387

   ANX           -0.244      0.071     -3.461      0.001

   EASE           0.417      0.056      7.474      0.000

   SEC           -0.404      0.061     -6.602      0.000

   MON            0.550      0.042     13.169      0.000

   DP            -0.396      0.057     -6.995      0.000


RES      WITH

   INOV           0.018      0.080      0.218      0.828

   KNOW          -0.016      0.076     -0.216      0.829

   ANX            0.172      0.065      2.635      0.008

   EASE          -0.059      0.071     -0.834      0.404

   SEC            0.215      0.065      3.304      0.001

   MON           -0.040      0.077     -0.518      0.604

   DP             0.244      0.064      3.820      0.000

   SUP           -0.058      0.071     -0.814      0.416


PRO      WITH

   INOV           0.267      0.079      3.364      0.001

   KNOW           0.022      0.084      0.263      0.793
```

```
ANX             -0.160    0.069    -2.311    0.021
EASE             0.423    0.073     5.807    0.000
SEC             -0.458    0.064    -7.113    0.000
MON              0.514    0.066     7.776    0.000
DP              -0.405    0.065    -6.199    0.000
SUP              0.458    0.067     6.881    0.000
RES             -0.314    0.074    -4.245    0.000


ORCH     WITH

INOV             0.122    0.083     1.469    0.142
KNOW            -0.060    0.080    -0.748    0.454
ANX             -0.093    0.074    -1.248    0.212
EASE             0.272    0.067     4.041    0.000
SEC             -0.185    0.067    -2.741    0.006
MON              0.251    0.064     3.945    0.000
DP              -0.019    0.067    -0.282    0.778
SUP              0.211    0.063     3.328    0.001
RES              0.022    0.071     0.314    0.753
PRO              0.288    0.080     3.616    0.000


USEF     WITH

INOV             0.351    0.079     4.454    0.000
KNOW             0.195    0.078     2.495    0.013
ANX             -0.366    0.064    -5.720    0.000
EASE             0.694    0.050    13.862    0.000
SEC             -0.456    0.062    -7.314    0.000
MON              0.675    0.040    16.767    0.000
DP              -0.484    0.066    -7.329    0.000
SUP              0.519    0.056     9.290    0.000
RES             -0.231    0.069    -3.349    0.001
PRO              0.503    0.060     8.360    0.000
ORCH             0.321    0.063     5.130    0.000


GUSEF    WITH

INOV             0.337    0.070     4.847    0.000
KNOW             0.011    0.079     0.135    0.893
ANX             -0.257    0.068    -3.800    0.000
```

EASE	0.638	0.043	14.757	0.000
SEC	-0.535	0.055	-9.762	0.000
MON	0.646	0.042	15.444	0.000
DP	-0.606	0.041	-14.851	0.000
SUP	0.597	0.043	13.912	0.000
RES	-0.221	0.061	-3.616	0.000
PRO	0.646	0.053	12.226	0.000
ORCH	0.467	0.057	8.170	0.000
USEF	0.740	0.047	15.893	0.000

INT   WITH

INOV	0.536	0.066	8.078	0.000
KNOW	0.360	0.072	5.018	0.000
ANX	-0.438	0.067	-6.577	0.000
EASE	0.682	0.038	17.742	0.000
SEC	-0.386	0.065	-5.924	0.000
MON	0.545	0.043	12.699	0.000
DP	-0.657	0.043	-15.172	0.000
SUP	0.499	0.052	9.506	0.000
RES	-0.263	0.072	-3.639	0.000
PRO	0.522	0.059	8.850	0.000
ORCH	0.258	0.070	3.714	0.000
USEF	0.699	0.074	9.436	0.000
GUSEF	0.767	0.042	18.348	0.000

Variances

INOV	1.000	0.000	999.000	999.000
KNOW	1.000	0.000	999.000	999.000
ANX	1.000	0.000	999.000	999.000
EASE	1.000	0.000	999.000	999.000
SEC	1.000	0.000	999.000	999.000
MON	1.000	0.000	999.000	999.000
DP	1.000	0.000	999.000	999.000
SUP	1.000	0.000	999.000	999.000
RES	1.000	0.000	999.000	999.000
PRO	1.000	0.000	999.000	999.000
ORCH	1.000	0.000	999.000	999.000

	1.000	0.000	999.000	999.000
USEF	1.000	0.000	999.000	999.000
GUSEF	1.000	0.000	999.000	999.000
INT	1.000	0.000	999.000	999.000

R-SQUARE

Observed Variable	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value	Scale Factors
INOV_6	0.670	0.099	6.789	0.000	0.574
INOV_8	0.738	0.085	8.633	0.000	0.512
KNOW_9	0.843	0.037	22.840	0.000	0.396
KNOW_11	0.781	0.041	18.948	0.000	0.467
KNOW_12	0.915	0.035	25.887	0.000	0.291
ANX_14	0.667	0.045	14.778	0.000	0.577
ANX_15	0.899	0.046	19.569	0.000	0.317
ANX_16	0.829	0.043	19.067	0.000	0.414
USEF_17	0.705	0.039	18.083	0.000	0.543
USEF_18	0.859	0.024	36.405	0.000	0.375
USEF_19	0.828	0.026	31.843	0.000	0.415
USEF_21	0.805	0.030	26.807	0.000	0.441
USEF_22	0.856	0.025	34.433	0.000	0.379
EASE_24	0.742	0.058	12.711	0.000	0.508
EASE_25	0.674	0.053	12.698	0.000	0.571
AUT_28	0.925	0.042	22.165	0.000	0.275
AUT_29	0.792	0.047	16.880	0.000	0.456
AUT_32	0.702	0.063	11.207	0.000	0.546
AUT_34	0.796	0.076	10.522	0.000	0.451
RES_36	0.733	0.077	9.522	0.000	0.517
RES_37	0.873	0.076	11.479	0.000	0.356
RES_38	0.501	0.065	7.671	0.000	0.707
DP_41	0.691	0.043	16.012	0.000	0.556
DP_42	0.664	0.047	14.069	0.000	0.580
DP_43	0.926	0.037	24.933	0.000	0.271
PRO_44	0.733	0.072	10.133	0.000	0.517
PRO_45	0.476	0.070	6.810	0.000	0.724

PRO_46	0.652	0.073	8.966	0.000	0.590
SUP_47	0.912	0.071	12.901	0.000	0.297
SUP_48	0.662	0.063	10.573	0.000	0.581
GUSEF_53	0.868	0.030	28.799	0.000	0.364
GUSEF_54	0.872	0.028	31.490	0.000	0.357
ORCH_55	0.685	0.046	14.840	0.000	0.562
ORCH_56	0.790	0.044	17.874	0.000	0.459
ORCH_57	0.423	0.054	7.821	0.000	0.760
INT_62	0.849	0.023	36.801	0.000	0.388
INT_63	0.917	0.023	40.187	0.000	0.289
INT_64	0.854	0.024	35.053	0.000	0.382
ATT_65	0.636	0.042	15.024	0.000	0.604

Appendix I. Hypothesized structural paths

Structural paths between exogenous and endogenous variables[1]	Reference for similar paths
Inov → Ease	[26]
Know → Ease	[57]
Anx → Ease	[56]
DP → Ease	[45]
DP → Usef	[45]
DP → GUsef	Current study
Res → Ease	[57]
Res → Usef	[57]
Res → GUsef	Current study
Sup → Ease	[45]
Sup → Usef	[58]
Sup → GUsef	Current study
Sec → Ease	[58]
Sec → Usef	[58]
Sec → GUsef	Current study
Mon → Ease	Current study
Mon → Usef	Current study
Mon → GUsef	Current study
Pro → Usef	Current study
Pro → GUsef	Current study

---

[1] Arrows represent directional relationships pointing from the predictor/exogenous variable to the dependent/endogenous variable.

OrCh → Usef	Current study
OrCh → GUsef	Current study
Ease → Usef	[56]
Ease → Int	[56]
Ease → GUsef	Current study
Usef → Int	[56]
Usef → GUsef	Current study
GUsef → Int	Current study
Also all remaining direct effects to the Intention.	

Appendix J: Selected outputs for the final structural model

```
Mplus VERSION 7
MUTHEN & MUTHEN


INPUT INSTRUCTIONS



  MODEL:
!BY
      Inov BY inov_6-inov_8  anx_14-anx_16 (*1);
      Anx BY   inov_6-inov_8  anx_14-anx_16 (*1);
      Sup BY sup_47-sup_48;
      DP BY dp_41-dp_43* dp_43@1;
      Ease BY ease_24 ease_25 ;
      Res BY res_36-res_38 ;
      Mon BY aut_28 aut_29 ; !
      OrCh BY pro_44-pro_46 orch_55-orch_57 (*2);
      Pro BY pro_44-pro_46 orch_55-orch_57 (*2);
      Usef BY usef_17-usef_22 ;
      GUsef BY gusef_53-gusef_54 att_65 ;
      Int BY int_62-int_64  ;


!ON/BY
      Int ON Usef GUsef Ease Res OrCh Pro DP
      Sup  Inov  Anx Mon ;

      GUsef ON Usef Ease DP  Pro OrCh Res Mon Sup ;
      Usef ON Ease   DP   Pro OrCh Res Mon Sup ;
      Ease ON Inov Anx Sup  Res   DP;
 !ON
      Usef Gusef Ease ON sex_2 age_1
      s_surg s_anest s_obgyn s_rad s_else;



SUMMARY OF ANALYSIS

Number of groups                                         1
Number of observations                                 231


Number of dependent variables                           34
Number of independent variables                          7
Number of continuous latent variables                   12


Observed dependent variables

  Binary and ordered categorical (ordinal)
    INOV_6      INOV_8      ANX_14      ANX_15      ANX_16      USEF_17
    USEF_18     USEF_19     USEF_21     USEF_22     EASE_24     EASE_25
    AUT_28      AUT_29      RES_36      RES_37      RES_38      DP_41
```

```
     DP_42         DP_43         PRO_44        PRO_45        PRO_46        SUP_47
     SUP_48        GUSEF_53      GUSEF_54      ORCH_55       ORCH_56       ORCH_57
     INT_62        INT_63        INT_64        ATT_65


Observed independent variables
     AGE_1         SEX_2         S_SURG        S_ANEST       S_OBGYN       S_RAD
     S_ELSE


Continuous latent variables
     SUP           DP            EASE          RES
     MON           USEF          GUSEF         INT


  EFA factors
  *1:   INOV         ANX
  *2:   ORCH         PRO



Estimator                                                       WLSMV
Rotation                                                       GEOMIN
Row standardization                                       CORRELATION
Type of rotation                                              OBLIQUE
Epsilon value                                                  Varies
Maximum number of iterations                                    50000
Convergence criterion                                      0.500D-04
Maximum number of steepest descent iterations                      20
Optimization Specifications for the Exploratory Factor Analysis
Rotation Algorithm
  Number of random starts                                          30
  Maximum number of iterations                                  10000
  Derivative convergence criterion                          0.100D-04
Parameterization                                                DELTA



MODEL FIT INFORMATION

Number of Free Parameters                     121

Chi-Square Test of Model Fit

          Value                           888.763*
          Degrees of Freedom                  678
          P-Value                          0.0000

*   The chi-square value for MLM, MLMV, MLR, ULSMV, WLSM and WLSMV cannot be
used
    for chi-square difference testing in the regular way.  MLM, MLR and WLSM
    chi-square difference testing is described on the Mplus website.  MLMV,
WLSMV,
    and ULSMV difference testing is done using the DIFFTEST option.


RMSEA (Root Mean Square Error Of Approximation)
```

```
              Estimate                      0.037
              90 Percent C.I.               0.030  0.043
              Probability RMSEA <= .05      1.000


CFI/TLI


              CFI                           0.985
              TLI                           0.983


Chi-Square Test of Model Fit for the Baseline Model


              Value                     14995.477
              Degrees of Freedom              799
              P-Value                      0.0000


WRMR (Weighted Root Mean Square Residual)


              Value                         0.914




MODEL RESULTS


                                                     Two-Tailed
                       Estimate       S.E.   Est./S.E.    P-Value


 INOV     BY
    INOV_6              0.816       0.065     12.558       0.000
    INOV_8              0.768       0.077      9.923       0.000
    ANX_14              0.001       0.005      0.158       0.875
    ANX_15             -0.039       0.065     -0.602       0.547
    ANX_16              0.026       0.065      0.400       0.689


 ANX      BY
    INOV_6              0.015       0.016      0.922       0.357
    INOV_8             -0.096       0.082     -1.175       0.240
    ANX_14              0.817       0.030     27.162       0.000
    ANX_15              0.945       0.025     37.969       0.000
    ANX_16              0.914       0.028     33.100       0.000


 SUP      BY
    SUP_47              1.000       0.000    999.000     999.000
    SUP_48              0.857       0.070     12.329       0.000


 DP       BY
    DP_41               0.861       0.035     24.294       0.000
    DP_42               0.848       0.036     23.480       0.000
    DP_43               1.000       0.000    999.000     999.000


 EASE     BY
    EASE_24             1.000       0.000    999.000     999.000
    EASE_25             0.954       0.054     17.652       0.000
```

```
RES      BY
   RES_36          1.000      0.000    999.000    999.000
   RES_37          1.135      0.094     12.038      0.000
   RES_38          0.829      0.069     12.078      0.000

MON      BY
   AUT_28          1.000      0.000    999.000    999.000
   AUT_29          0.908      0.045     19.974      0.000

ORCH     BY
   PRO_44          0.844      0.047     17.919      0.000
   PRO_45          0.665      0.055     12.054      0.000
   PRO_46          0.791      0.048     16.400      0.000
   ORCH_55        -0.060      0.057     -1.048      0.295
   ORCH_56         0.005      0.002      2.690      0.007
   ORCH_57         0.081      0.071      1.142      0.254

PRO      BY
   PRO_44          0.002      0.010      0.194      0.846
   PRO_45          0.034      0.068      0.492      0.623
   PRO_46         -0.015      0.061     -0.251      0.802
   ORCH_55         0.848      0.037     22.848      0.000
   ORCH_56         0.899      0.031     29.401      0.000
   ORCH_57         0.627      0.048     12.962      0.000

USEF     BY
   USEF_17         1.000      0.000    999.000    999.000
   USEF_18         1.097      0.038     29.049      0.000
   USEF_19         1.097      0.036     30.712      0.000
   USEF_21         1.101      0.039     27.886      0.000
   USEF_22         1.139      0.037     30.868      0.000

GUSEF    BY
   GUSEF_53        1.000      0.000    999.000    999.000
   GUSEF_54        1.036      0.031     33.424      0.000
   ATT_65          0.894      0.036     24.798      0.000

INT      BY
   INT_62          1.000      0.000    999.000    999.000
   INT_63          0.994      0.019     51.669      0.000
   INT_64          0.981      0.026     38.293      0.000

INT      ON
   USEF            0.060      0.117      0.510      0.610
   GUSEF           0.559      0.116      4.814      0.000
   EASE            0.097      0.109      0.891      0.373
   RES            -0.166      0.075     -2.224      0.026
   ORCH           -0.147      0.100     -1.475      0.140
   PRO            -0.035      0.057     -0.613      0.540
   DP             -0.269      0.078     -3.433      0.001
   SUP             0.053      0.067      0.789      0.430
```

INOV	0.325	0.061	5.345	0.000
ANX	0.019	0.062	0.309	0.758
MON	-0.028	0.087	-0.317	0.751

GUSEF   ON

USEF	0.327	0.112	2.907	0.004
EASE	0.120	0.111	1.083	0.279
DP	-0.192	0.059	-3.234	0.001
PRO	0.216	0.048	4.512	0.000
ORCH	0.232	0.068	3.412	0.001
RES	-0.003	0.068	-0.051	0.959
MON	0.065	0.072	0.900	0.368
SUP	0.062	0.055	1.129	0.259

USEF   ON

EASE	0.578	0.097	5.987	0.000
DP	0.108	0.073	1.486	0.137
PRO	0.117	0.046	2.534	0.011
ORCH	0.064	0.054	1.176	0.240
RES	-0.226	0.063	-3.601	0.000
MON	0.350	0.061	5.728	0.000
SUP	-0.088	0.066	-1.331	0.183

EASE   ON

INOV	0.232	0.056	4.133	0.000
ANX	-0.191	0.059	-3.257	0.001
SUP	0.288	0.060	4.818	0.000
RES	0.101	0.063	1.600	0.110
DP	-0.359	0.069	-5.185	0.000

USEF   ON

SEX_2	0.226	0.119	1.897	0.058
AGE_1	-0.014	0.004	-3.277	0.001
S_SURG	0.154	0.137	1.122	0.262
S_ANEST	0.664	0.262	2.536	0.011
S_OBGYN	0.005	0.160	0.029	0.977
S_RAD	0.109	0.234	0.466	0.641
S_ELSE	-0.143	0.241	-0.595	0.552

GUSEF   ON

SEX_2	0.540	0.134	4.020	0.000
AGE_1	-0.016	0.006	-2.874	0.004
S_SURG	0.144	0.150	0.956	0.339
S_ANEST	-0.223	0.303	-0.737	0.461
S_OBGYN	-0.467	0.198	-2.363	0.018
S_RAD	-0.140	0.195	-0.717	0.474
S_ELSE	-0.589	0.338	-1.744	0.081

EASE   ON

SEX_2	0.162	0.170	0.953	0.340
AGE_1	0.004	0.006	0.728	0.467
S_SURG	0.188	0.194	0.968	0.333

```
        S_ANEST          -0.228      0.310     -0.734      0.463
        S_OBGYN          -0.208      0.298     -0.697      0.486
        S_RAD            -0.228      0.283     -0.804      0.421
        S_ELSE            0.351      0.337      1.040      0.299


ANX       WITH
    INOV                 -0.263      0.099     -2.648      0.008


SUP       WITH
    INOV                  0.126      0.073      1.722      0.085
    ANX                  -0.245      0.065     -3.775      0.000


DP        WITH
    INOV                 -0.059      0.076     -0.775      0.438
    ANX                   0.430      0.056      7.655      0.000
    SUP                  -0.309      0.054     -5.673      0.000


RES       WITH
    INOV                  0.000      0.064     -0.001      0.999
    ANX                   0.103      0.055      1.868      0.062
    SUP                  -0.059      0.058     -1.002      0.317
    DP                    0.174      0.054      3.250      0.001


MON       WITH
    INOV                  0.176      0.075      2.337      0.019
    ANX                  -0.298      0.063     -4.727      0.000
    SUP                   0.523      0.045     11.690      0.000
    DP                   -0.467      0.053     -8.730      0.000
    RES                  -0.035      0.063     -0.553      0.580


ORCH      WITH
    INOV                  0.255      0.072      3.556      0.000
    ANX                  -0.142      0.062     -2.290      0.022
    SUP                   0.431      0.056      7.636      0.000
    DP                   -0.399      0.057     -6.969      0.000
    RES                  -0.270      0.063     -4.308      0.000
    MON                   0.489      0.058      8.499      0.000


PRO       WITH
    INOV                  0.174      0.072      2.427      0.015
    ANX                  -0.093      0.068     -1.362      0.173
    SUP                   0.210      0.057      3.713      0.000
    DP                   -0.028      0.063     -0.453      0.650
    RES                   0.036      0.057      0.629      0.529
    MON                   0.241      0.057      4.199      0.000
    ORCH                  0.279      0.079      3.519      0.000


Variances
    INOV                  1.000      0.000    999.000    999.000
    ANX                   1.000      0.000    999.000    999.000
    SUP                   0.884      0.072     12.245      0.000
    DP                    0.922      0.038     24.418      0.000
```

```
         RES              0.706      0.071      9.897      0.000
         MON              0.942      0.045     20.966      0.000
         ORCH             1.000      0.000    999.000    999.000
         PRO              1.000      0.000    999.000    999.000

    Residual Variances
         EASE             0.271      0.045      6.037      0.000
         USEF             0.167      0.037      4.564      0.000
         GUSEF            0.157      0.030      5.312      0.000
         INT              0.142      0.042      3.365      0.001


 STANDARDIZED MODEL RESULTS

                         StdYX        Std
                        Estimate    Estimate


 INOV     BY
    INOV_6               0.816      0.816
    INOV_8               0.768      0.768
    ANX_14               0.001      0.001
    ANX_15              -0.039     -0.039
    ANX_16               0.026      0.026

 ANX      BY
    INOV_6               0.015      0.015
    INOV_8              -0.096     -0.096
    ANX_14               0.817      0.817
    ANX_15               0.945      0.945
    ANX_16               0.914      0.914

 SUP      BY
    SUP_47               0.940      0.940
    SUP_48               0.806      0.806

 DP       BY
    DP_41                0.826      0.826
    DP_42                0.815      0.815
    DP_43                0.960      0.960

 EASE     BY
    EASE_24              0.865      0.876
    EASE_25              0.826      0.836

 RES      BY
    RES_36               0.841      0.841
    RES_37               0.954      0.954
    RES_38               0.697      0.697

 MON      BY
    AUT_28               0.971      0.971
    AUT_29               0.881      0.881
```

```
ORCH     BY
  PRO_44              0.844        0.844
  PRO_45              0.665        0.665
  PRO_46              0.791        0.791
  ORCH_55            -0.060       -0.060
  ORCH_56             0.005        0.005
  ORCH_57             0.081        0.081

PRO      BY
  PRO_44              0.002        0.002
  PRO_45              0.034        0.034
  PRO_46             -0.015       -0.015
  ORCH_55             0.848        0.848
  ORCH_56             0.899        0.899
  ORCH_57             0.627        0.627

USEF     BY
  USEF_17             0.835        0.857
  USEF_18             0.911        0.939
  USEF_19             0.911        0.940
  USEF_21             0.914        0.943
  USEF_22             0.944        0.976

GUSEF    BY
  GUSEF_53            0.912        0.982
  GUSEF_54            0.941        1.017
  ATT_65              0.827        0.878

INT      BY
  INT_62              0.947        0.974
  INT_63              0.941        0.967
  INT_64              0.930        0.955

INT      ON
  USEF                0.053        0.053
  GUSEF               0.564        0.564
  EASE                0.087        0.087
  RES                -0.144       -0.144
  ORCH               -0.151       -0.151
  PRO                -0.036       -0.036
  DP                 -0.265       -0.265
  SUP                 0.051        0.051
  INOV                0.333        0.333
  ANX                 0.020        0.020
  MON                -0.028       -0.028

GUSEF    ON
  USEF                0.285        0.285
  EASE                0.107        0.107
  DP                 -0.188       -0.188
  PRO                 0.220        0.220
```

```
       ORCH                0.236        0.236
       RES                -0.003       -0.003
       MON                 0.064        0.064
       SUP                 0.060        0.060


USEF       ON
       EASE                0.591        0.591
       DP                  0.121        0.121
       PRO                 0.137        0.137
       ORCH                0.075        0.075
       RES                -0.222       -0.222
       MON                 0.396        0.396
       SUP                -0.097       -0.097


EASE       ON
       INOV                0.265        0.265
       ANX                -0.218       -0.218
       SUP                 0.309        0.309
       RES                 0.097        0.097
       DP                 -0.393       -0.393


USEF       ON
       SEX_2               0.131        0.263
       AGE_1              -0.216       -0.017
       S_SURG              0.085        0.180
       S_ANEST             0.179        0.775
       S_OBGYN             0.001        0.005
       S_RAD               0.037        0.127
       S_ELSE             -0.034       -0.167


GUSEF      ON
       SEX_2               0.274        0.550
       AGE_1              -0.209       -0.016
       S_SURG              0.069        0.146
       S_ANEST            -0.052       -0.227
       S_OBGYN            -0.118       -0.476
       S_RAD              -0.042       -0.142
       S_ELSE             -0.122       -0.600


EASE       ON
       SEX_2               0.092        0.185
       AGE_1               0.061        0.005
       S_SURG              0.101        0.215
       S_ANEST            -0.060       -0.260
       S_OBGYN            -0.059       -0.237
       S_RAD              -0.076       -0.260
       S_ELSE              0.082        0.400


ANX        WITH
       INOV               -0.263       -0.263


SUP        WITH
```

```
   INOV               0.134      0.134
   ANX               -0.261     -0.261

DP        WITH
   INOV              -0.062     -0.062
   ANX                0.448      0.448
   SUP               -0.342     -0.342

RES       WITH
   INOV               0.000      0.000
   ANX                0.122      0.122
   SUP               -0.074     -0.074
   DP                 0.216      0.216

MON       WITH
   INOV               0.181      0.181
   ANX               -0.307     -0.307
   SUP                0.573      0.573
   DP                -0.501     -0.501
   RES               -0.042     -0.042

ORCH      WITH
   INOV               0.255      0.255
   ANX               -0.142     -0.142
   SUP                0.459      0.459
   DP                -0.415     -0.415
   RES               -0.321     -0.321
   MON                0.504      0.504

PRO       WITH
   INOV               0.174      0.174
   ANX               -0.093     -0.093
   SUP                0.223      0.223
   DP                -0.030     -0.030
   RES                0.042      0.042
   MON                0.248      0.248
   ORCH               0.279      0.279

Variances
   INOV               1.000      1.000
   ANX                1.000      1.000
   SUP                1.000      1.000
   DP                 1.000      1.000
   RES                1.000      1.000
   MON                1.000      1.000
   ORCH               1.000      1.000
   PRO                1.000      1.000

Residual Variances
   EASE               0.353      0.353
   USEF               0.228      0.228
   GUSEF              0.163      0.163
```

```
INT                  0.150      0.150


R-SQUARE

    Observed                    Residual
    Variable      Estimate      Variance

    INOV_6          0.659        0.341
    INOV_8          0.637        0.363
    ANX_14          0.667        0.333
    ANX_15          0.914        0.086
    ANX_16          0.823        0.177
    USEF_17         0.697        0.320
    USEF_18         0.829        0.182
    USEF_19         0.830        0.181
    USEF_21         0.836        0.175
    USEF_22         0.890        0.117
    EASE_24         0.748        0.259
    EASE_25         0.682        0.326
    AUT_28          0.942        0.058
    AUT_29          0.776        0.224
    RES_36          0.706        0.294
    RES_37          0.910        0.090
    RES_38          0.486        0.514
    DP_41           0.683        0.317
    DP_42           0.664        0.336
    DP_43           0.922        0.078
    PRO_44          0.713        0.287
    PRO_45          0.456        0.544
    PRO_46          0.619        0.381
    SUP_47          0.884        0.116
    SUP_48          0.650        0.350
    GUSEF_53        0.832        0.194
    GUSEF_54        0.885        0.135
    ORCH_55         0.695        0.305
    ORCH_56         0.810        0.190
    ORCH_57         0.428        0.572
    INT_62          0.897        0.109
    INT_63          0.886        0.120
    INT_64          0.864        0.143
    ATT_65          0.685        0.355

    Latent
    Variable      Estimate

    EASE            0.647
    USEF            0.772
    GUSEF           0.837
    INT             0.850
```