

Evaluating Information system Impact through IS-Impact Models: a Case study for PMIS

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Abstract— Pakistan has undertaken hundreds of e Government projects, with varying degree of success. Being a developing country there is a need to measure the success of a system for its existence. The proposed research aims to validate Prison management information system (PMIS) deployed in Pakistan's area of Khyber pakhtunkha using IS impact models. This study will discover several to-date plus future possible impacts. The assessment will help in getting a holistic view of overall benefits of IS (PMIS) application. This research tends to benefit in both theoretical and practical ways. This research investigated factors which affect prison management Information System success in Peshawar Prison using DeLone and McLean's IS Success Model. The factors of PMIS used in this research are system quality, information quality, user satisfaction, individual impact, organizational impact and system use. Path analysis technique is applied on data collected by 70 usable questionnaires from PMIS. Except for the link from information quality to user satisfaction, the hypothesized relationships between the six success variables are significantly or marginally supported by the data. The findings provide several important implications for IS research and practice. This paper concludes by discussing limitations of the study which should be addressed in future research

Index Terms—Delone and Mclean IS model (D&M), Information system (IS), Prison management information system (PMIS), Impact evaluation, IS success measures, Testing techniques, Identification Survey, Confirmation survey

1 INTRODUCTION

Information technology has brought a revolutionary change in human life, as it is due to information technology that this world has become a global village. Like developed countries, the developing and under developed countries are also pursuing the information technologies in order to provide better services to the denizens. Effective use of information technology requires understanding the contexts in which information technology will likely be successful and the challenges to successful integration of the technology that can be anticipated [1].

Many organizations in developed and developing countries in both private and public sectors turned to Information Technology/Information Systems to meet the increasing demands on organizations in order to increase their efficiency and effectiveness. Organizations make large investments in Information Systems (IS) expecting positive impacts to the organization as Investments are complex and costly [4].

Thus, the necessity to evaluate the functionality of performances of Information System has emerged. Evaluation of Information System means evaluation of performances in hardware, software, computer networks, data and human resources. The Information System functionality evaluation represents the procedure of assessing how successfully Information System fulfills its objectives [3].

Evaluating the impacts of IT is one of the critical issues in IS literature, as the impacts of IT are often indirect and influenced by human, organizational, and environmental factors. Yet, it is argued "if information systems research is to make a contribution to the world of practice, a well-defined outcome measure (or measures) is essential". However, academics as well as practitioners are still struggling with the question of which constructs best signify IS success [6]. Many researchers

used DeLone and McLean Success Model to measure the success of Information Technology. In addition to this model Seddon and Gable et al also provided us with different frameworks for measuring IS success, but they both were based on Mclean and Delone model [5].

Like other countries, organizations in Pakistan too are aggressively pursuing technologies to upgrade themselves and to provide better services. Many organizations have undertaken hundreds of e-Government projects, with varying degree of success. While IS success models have received much attention among researchers, little research has been conducted to assess the success of Information systems. There is a need to investigate whether traditional information systems success models can be extended to investigating IS success This research aims to highlight the evaluation of success and impact of the information systems by focusing on successfully implemented MIS. For evaluation we will focus on a case study of real e-government project deployed recently in Khyber pakhtun kha area of Pakistan in prison department. This research focuses on the post implementation evaluation of prison automation system (PMIS).

This paper is structured as follows. First, we review the development of IS success models. Second, based on prior studies, a conceptual IS success model and a comprehensive set of hypotheses are proposed. Third, the methods, measures, and results of the study are presented. And, finally, theoretical and managerial implications and directions for future research are discussed.

2 LITERATURE REVIEW

The assessment of information systems (IS) success or efficiency has been extensively investigated all through the IS research community. Theorists, though, are still struggling with the question that which constructs best assesses the Information system success [5]. A number of IS/IT evaluation models and frameworks are identified in literature, which are discussed below.

2.1 IS Impact Models

2.1.1) Mclean Delone IS impact model (1992)

The most referred model for impact and success evaluation in the area of information systems is the DeLone and McLean (DeLone and McLean 1992, DeLone and McLean, 2002, DeLone and McLean, 2003) model which considered a user centered approach while trying to judge on the whole IS success [39]. D M reviewed and analyzed about 180 studies both and conceptual and empirical and provided us with over 100 measures that can be used for evaluating IS success. The authors came to know that the researchers have concentrated on different aspects of IS success hence making comparison complicated. This indicates that before D&M there was no certain criterion for success assessing measures or no kind of categorization that organizes these measures and make them as parsimonious and as unique possible [5].

D&M (1992) produced a model having six factor categories (constructs) of IS success which included 1) system quality, 2) information quality, 3) use, 4) user satisfaction, 5) organizational impact and 6) individual impact

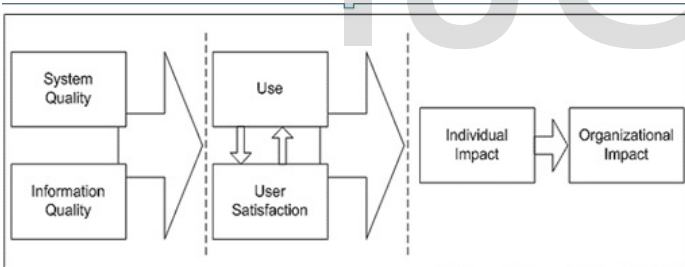


Fig 1 Delone and Mclean Impact Model

The categorization of these constructs implies (1) the interdependence among the constructs and (2) the causal relationship or time flanked by these constructs. The D&M model proposes that Information Quality and System Quality jointly as well as singularly have an effect on both User Satisfaction and System Use. Likewise, the amount of System Use will have an effect on the degree of User Satisfaction, negatively or positively, as well as the degree of User Satisfaction also, influences System Use. Moreover, User Satisfaction and system Use are direct predecessors of Individual Impact. Lastly, the Individual Impact sooner or later will have some effect on the Organizational Impact.

2.1.2) Updated IS Impact Model by Mclean Delone (2003)

Considering different proposed extensions and modifications to their original model, McLean and DeLone made amendments in empirical research that has been conducted since 1992 and presented us with the revisions in the original model. The updated model includes a lot of changes which are:

1. Service quality dimension
2. Intention to use dimension replaces the use dimension
3. Organizational and Individual impacts were replaced by a single dimension named net benefits encompassing measures of both constructs [35].

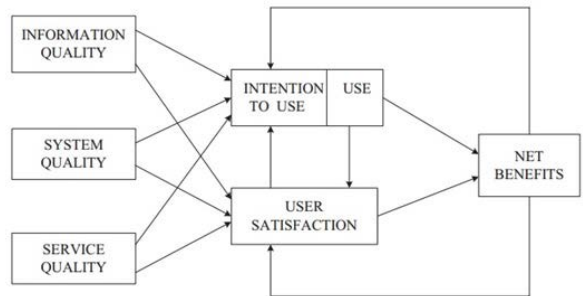


Fig. 2 Updated Delone and Mclean IS Impact model (2003)

2.1.3) Gable Model for Information system Impact

According to Gable et al.(2003), the reason for the study is the deficient standardized, reliable and empirically validated evaluation model for IS success. The DM's work is the basis of this information system Impact model, which overcomes a lot of concerns associated with previous IS Success models. Gable et al.(2003) identified that the IS-Impact Model diverges from the conventional DeLone and McLean model in subsequent ways.

The multi-dimensional and complex, nature of IS success is presented by four constructs.

The four-dimensional IS Impact measurement model is divided into two halves; the quality half includes System-Quality and Information-Quality constructs, this half forecasts the potential impact of the system in the future and the "impact" half includes Organizational-Impact and Individual-Impact constructs, this half measures the up to date impact and benefits that have been realized from the evaluated system.

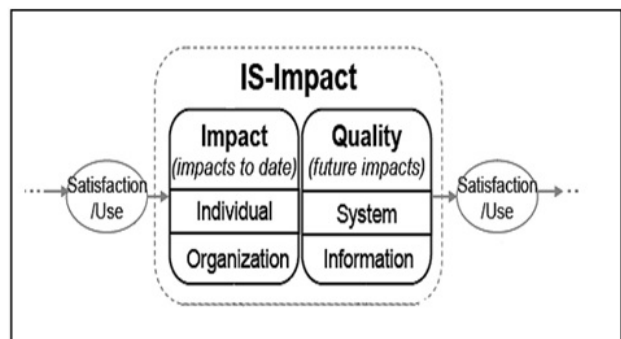


Fig 3 Gable et el IS Impact model (2008)

2.2 Literature survey

This section provides us with the several systems which are evaluated using different IS impact models. The basic idea here is to gather sufficient information about how information systems are being evaluated across world. Moreover this study will also provide us with the view point that which IS impact measurement model is most commonly used for evaluation purpose. Table below provides us with complete literature survey.

TABLE 1
LITERATURE SURVEY TABLE

No	Paper name	Model used	Instrument used	Analysis techniques used
1)	“Assessing e-Government systems success: A validation of the DeLone and McLean model of information systems success”	Delone and Mclean	Questionnaire	Path co-efficient or path analysis technique is used
2)	“Applying a re-specification of the Delone and Mclean’s model to measure the success of accounting information system in Sragen”	Delone and Mclean	Questionnaire	Path analysis techniques were used
3)	“The impact of organizational factors on information Systems success: an empirical investigation in the Malaysian electronic-government agencies”	Delone and Mclean	Questionnaire	Co-relation and regression analysis techniques were used
4)	“Organizational impact of system quality, information quality and service quality”	Delone and Mclean	Online Questionnaire	Partial least square analysis technique
5)	“An Integrated Success Model for Evaluating Information System in Public Sectors”	TAM and Delone and Mclean	Questionnaires and interviews	Person co-relation coefficients were used
6)	“Relationships	Delone	Field sur-	Structural equa-

	among ERP post-implementation success constructs: An analysis at the organizational level”	and Mclean	vey through questionnaire	tion modeling analysis techniques
7)	“Evaluation of a comprehensive EHR based on the DeLone and McLean model for IS success: Approach, results and success factors”	Delone and Mclean	Questionnaires, focus groups, structured interviews, ethnographic observations	Partial least square analysis techniques
8)	“Impact of Information Technology on Organizational Performance: An analysis of Quantitative Performance Indicators of Pakistan’s Banking and Manufacturing Companies”	Constructs from different models	In- depth interviews using questionnaires and field surveys	Linear regression model and ratio analysis techniques
9)	“Post-Implementation Evaluation of healthcare Information Systems in Developing Countries”	Delone and Mclean	General information on health care systems in Jordan and data from survey	Descriptive and factor analysis
10)	“Assessing call centers’ success: A validation of the DeLone and Mclean model for information system”	Delone and Mclean	Interviews and surveys	Linear and weighted performance index analysis techniques
11)	“Development and initial evaluation of the Clinical Information Systems Success Model (CISSM)”	McLean Delone	Online survey	Psychometric testing and factor analysis Regression analysis for rest
12)	“Measuring Online Learning Systems Success: Applying the Updated	McLean and Delone	Questionnaires	Structural equation modeling analysis techniques

	DeLone and McLean Model”			
13)	“Information System Success Model for Customer Relationship Management System in Health Promotion Centers”	Updated Mclean and De-lone	Questionnaires	Path analysis and path correlation analysis techniques
14)	“Learners’ Perspective on Critical Factors to LMS Success in Blended Learning: An Empirical Investigation”	Constructs of Mclean and De-lone mixed with blended learning	Questionnaires	Partial least square analysis techniques
15)	“Hospital information systems success: A study based on the model adjusted DeLone and McLean in UMSU hospitals”	Update Mclean and De-lone	Structured Questionnaire and observations	Partial least square analysis techniques
16)	“An Empirical Test of DeLone and McLean’s Information System Success Model in a Public Organization”	McLean and De-lone	Questionnaire	Partial least square analysis techniques

2.2.1) Findings from Literature Review

In the above table we have done the classification of the gathered literature related to the IS evaluation on different information systems. The basic aim of this classification is to identify and highlight the various aspects of IS evaluation and standards which are followed internationally. From the above table we have categorized the papers on three different criteria’s which includes the model used for evaluation, instrument used and analysis techniques that have been applied.

As table indicates that the Delone and Mclean IS impact model (1992) has been mostly used for evaluating impact/success in both public and private sectors. Thus, The Information system considered by us for this research is deployed in public sector and since it is in use so to evaluate its impact on the organization D&M model is used. After identification of the framework of post implementation evaluation, the question now arises that how this process is conducted internationally? Table also answers that question for us by identifying the most commonly used instruments for conducting such type of research. Questionnaires, surveys, focus groups and interviews are few methods/approaches that are

used frequently. After data has been collected now the main part of evaluation process starts which is the analysis part. Table provides us with the accurate analysis techniques that different authors and researchers have used for finding impact/success of system under consideration

3 RESEARCH MODEL AND HYPOTHESIS

3.1 Research Model and Hypothesis

As we are using IS-Impact model by Mclean and Delone(1992) for measuring the impact so the first step from literature is to develop hypothesis on the basis of that model. In accordance with DeLone and McLean (1992), information quality, system quality, use, user satisfaction ,individual impact and organizational impact are success variables in PMIS system.This study proposes a comprehensive, multidimensional conceptual model of prison management information system(PMIS) based on the Mclean and Delone model,which will help in measuring the sucess and impact of PMIS.six constructs will be used in this research and will be measured by using likert scale. The data of above mentioned six constructs will come from surveys, which then will be analyzed by using path analysis. The schema used in this research is shown below. As DeLone and McLean (1992) note, IS success is a multidimensional and interdependent construct and it is therefore necessary to study the interrelationships among, or to control for, those dimensions. Also, the success model needs further development and validation before it could serve as a basis for the selection of appropriate IS measures

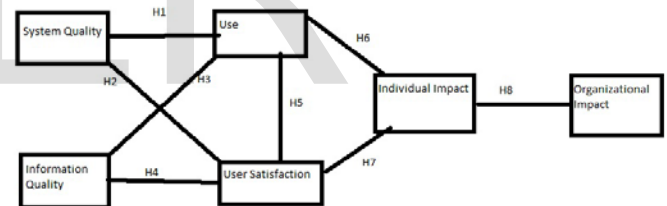


Fig 4 conceptual Model for PMIS

Thus, the following 8 hypotheses will be tested:

- H1.System quality will positively affect use in the PMIS context.
- H2.System quality will positively affect user satisfaction in the PMIS context.
- H3.Information quality will positively Use in the PMIS context.
- H4.Information quality will positively affect user satisfaction in the PMIS context.
- H5.Use will positively affect user satisfaction in the PMIS context.
- H6.Use will positively affect Individual impact in the PMIS context.
- H7.User satisfaction will positively affect Individual impact in the PMIS context
- H8.Individual impact will positively affect Organizational impact in the PMIS context

4. RESEARCH DESIGN AND METHODOLOGY

4.1 Identification of measures and I-survey

As we are following Mclean and Delone’s IS-impact model for our research, so our first task was to gather different measures against the six constructs provided by Mclean and Delone. From the literature we came across that Mclean and Delone has provided us with 114 success measures belonging to six constructs that are used for IS impact evaluation. Given below are the figures showing the construct and the measures included in Mclean and Delone’s model:

TABLE 2
Summary of MIS Success Measures by Category

System Quality	Information Quality	Information Use	User Satisfaction	Individual Impact	Organization Impact
Data accuracy	Importance	Amount of use/ duration of use:	Satisfaction with specifics	Information understanding	Application portfolio:
Data currency	Relevance	Number of inquiries	Overall satisfaction	Learning	Range and scope of application
Database contents	Usefulness	Amount of connect time	Single-item measure	Accurate interpretation	Number of critical applications
Ease of use	Usableness	Number of functions used	Multi-item measure	Information awareness	Operating cost reductions
Ease of learning	Understandability	Number of records accessed	Information satisfaction:	Information recall	Staff reduction
Convenience of access	Readability	Frequency of access	Difference between information needed and received	Problem identification	Overall productivity gains
Human factors	Clarity	Frequency of report requests	Enjoyment	Decision effectiveness:	Increased revenues
Realization of user requirements	Format	Number of reports generated	Software satisfaction	Decision quality	Increased sales
Usefulness of system features and functions	Appearance	Charges for system use	Decision-making satisfaction	Improved decision analysis	Increased market share
System accuracy	Content	Regularity of use		Correctness of decision	Increased profits
System flexibility	Accuracy	Use by whom?		Time to make decision	Return on investment
System reliability	Precision	Direct vs. chauffeured use		Confidence in decision	Return on assets
System sophistication	Conciseness			Decision-making participation	Ratio of net income to operating expenses
Integration of systems	Sufficiency				
System efficiency	Completeness	Binary use:	Improved individual productivity		Cost/benefit ratio
Resource utilization	Reliability	Use vs. nonuse	Change in decision		Stock price
Response time	Timeliness	Actual vs. reported use	Causes		Increased work volume
Turnaround time	Uniqueness	Nature of use:	management action		Product quality
	Comparability	Use for intended purpose	Task performance		Contribution to achieving goals
	Quantitativeness	Appropriate use	Quality of plans		Increased work volume
	Freedom from bias	Type of information used	Individual power or influence		Service effectiveness
		Purpose of use	Personal valuation of I/S		
		Levels of use:	Willingness to pay for information		
		General vs. specific			
		Recurring use			
		Institutionalization/routinization of use			
		Report acceptance			
		Percentage used vs. opportunity for use			
		Voluntariness of use			
		Motivation to use			

Fig 5 Delone and Mclean IS success measures (1992)

As we have the measures with us the next step includes the filtering of these measures according to the IS (PMIS) we are considering. For this purpose as stated in literature review we will conduct an identification survey. Before that survey a small focus group was conducted with the academic group who were involved in requirement gathering of PMIS. In this discussion the measures were filtered out and from 114 measures we are left with 62 measures that fit against our system (PMIS). This focus group discussion contained about 6 members.

4.1.1) Identification survey

The next step was to make an identification survey on the measures we have filtered. This survey has been made using Google document. In this survey the basic idea was to identify the measures that are more relevant to our context and eliminate the ones that are not. For this purpose a questionnaire with three options against each measure has been made. The options are of include, neutral and do not include. This survey was filled by domain experts.

The results of this questionnaire are analyzed on the basis that the measures marked as include are considered as important ones while the neutral and not include are considered as non important ones. The findings from the I-survey are used in the confirmatory phase.

4.2 Confirmatory Phase and C-Survey

The confirmation phase, the last phase of this study entails the conduct of the confirmatory survey also known as C- survey. The basic idea of this survey is to gather the data about PMIS against the measures filtered out in identification phase. C-survey questionnaire has five options of strongly agree, agree, neutral, disagree and strongly disagree. This survey has been measured by using a 5 value likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). This survey was conducted in the Peshawar Prison where PMIS has been deployed and is being used.

4.3 Data Collection

4.3.1) For I-Survey

The basic purpose of I-survey is to identify and filter out the measures that are important for PMIS. For this purpose this study uses primary data from questionnaires which is collected from the Domain Experts. After the distribution of 10 questionnaires and getting 7 usable responses the data is filtered for the confirmatory phase analysis. The data is filtered out on the basis of the rating of the user. The measure is considered for next stage if it has been marked as include, otherwise the measure is not considered.

4.3.2) For C-Survey

The basic purpose of C-survey is to gather data for analyzing the impact of PMIS on its organization. For this purpose this study uses primary data from I-Survey which has been collected from the domain experts. Questionnaires are being distributed to about 100 people who are working or operating PMIS, while from some people interviews are conducted based on the questions from the survey. As we know that PMIS is a new management Information system so not all employees know how to operate PMIS. Commonly the users of PMIS in Peshawar Prison will be the police officers and the team of PMIS who has deployed it there and is now maintaining it. But in addition to that operators have also been hired for operating PMIS. So the composition of the respondents are:

TABLE 2

DATA DESCRIPTION FOR C-SURVEY

Classification	Amount	Percentage
Gender		
Male	45	64%
Female	25	35.7%
Job Title		
Legal Advisor	12	17%
Computer Operator	33	47%
Warden	15	21%
Assistant Superintendent jail	6	8.5%
Network Engineer	2	2.8%
Assistant Database Admin	1	1%
Project Manager	1	1%
Working Period		
Less than 1 year	18	25.7%
Less than 2 years	25	35.7%
Less than 3 years	11	15.7%
Less than 4 years	16	22.8%

5. RESULTS

The questionnaire can be measured if the data is reliable and valid. The reliability of the data is measured by cronbach alpha. Construct is reliable when the value of cronbach alpha is >0.60. Overall the reliability of this research construct is reliable because the value of cronbach alpha for every construct is more than 0.60. The value of cronbach alpha of this research constructs can be seen as follows:

System Quality Reliability Testing

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.699	.761	9

Fig 6 system quality reliability test

Information Quality Reliability Testing

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.862	.863	8

Fig 7 information quality reliability test

USE Reliability Testing

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.855	.873	12

Fig 8 use reliability test

User Satisfaction Reliability Testing

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.837	.860	5

Fig 8 User satisfaction reliability test

Individual Impact Reliability Testing

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.784	.846	7

Fig 9 Individual Impact reliability test

Organizational Impact Reliability Testing

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.887	.891	9

Fig 10 organizational Impact reliability test

After calculating cronbach alpha we can see that out of 50 measures we have to remove the 7 measures. Reason for this can be explained that the value of cornbach alpha for these measures was less than 0.05 thus if they are deleted we will have an overall increase in the reliability value of that construct. Keeping this in mind 7 measures from different constructs including system quality, use, user satisfaction, individual and organizational impact have been removed.

After applying the reliability testing all the constructs were found reliable. The next step includes the validity testing of the research questionnaire. The standard of Construct validity is 0.5 which shown by the value of

Kaiser-Meyer Olkin Measure of Sampling Adequacy (KMO MSA). The value of KMO of this research can be seen as follows

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.589
Bartlett's Test of Sphericity	Approx. Chi-Square	4406.841
	df	1225
	Sig.	.000

Fig 11 validity test for PMIS

For finding out the impact of PMIS now we will start testing the hypothesis which we have made. For this purpose our 1st step is to find out the relations between different constructs of our conceptual model. For this purpose we will apply co-relation analysis on our final variables we have after validity and reliability testing with us. Table below provides the pair-wise correlation between the variables of study. Correlation between all the selected variables is positive and significant at 1 percent level which indicates that increase in one variable result in an increase in another variable.

TABLE3
Correlations between constructs against data for PMIS

Variable(s)	System Quality (SQ)	Information Quality (IQ)	USE (U)	User Satisfaction (US)	Individual Impact (II)	Organizational Impact (OI)
(SQ)	1					
(IQ)	0.696**	1				
USE (U)	0.622**	0.707**	1			
(US)	0.620**	0.464**	0.490*	1		
(II)	0.604**	0.673**	0.785*	0.666**	1	
(OI)	0.576**	0.503**	0.712*	0.543**	0.673**	1

Note: ** indicates that correlation is significant at the 1% level of significance. The t-test for the level of significance is two-tailed. Total numbers of observations for each variable are 70.

have high positive relationship with each other. System quality shows a positive 0.622 correlation with system use and it can be inferred that both these attributes have high positive relationship with each other. Thus we can say that hypothesis H1 has been supported. In the same way we can see the other relationships and say that our hypothesis H2 has also been supported. On the other hand information quality shows a positive 0.707 correlation with use supporting H3 while showing a weak correlation with user satisfaction [H4]. In the same manner use is showing a weak correlation of 0.490 with user satisfaction [H5] while we can say that all other hypotheses are strongly supported. Increase in use or user satisfaction will also affect positively on individual impact thus proving our hypothesis H6 and H7. As we can see from the table that there exists a positive 0.673 correlation between organizational and individual impact thus indicating that an increase in individual effect will also increase our organizational impact. As we are using 1 percent level of significance so we cannot say that H4 and H5 are not supported but we will interpret the output as they are showing a weak relationship with each other. However, be cautious as correlation only gives the strength of relationship between two variables and does not provide the direct of causation (which variables causes the other variables). That's why we will be doing regression analysis.

Hypothesis testing will be analyzed by using path analysis technique. Path coefficients (representing the relationships between variables) are going to be estimated by standardizing the regression weights coefficients (Yuen 2007). Residual or error terms (represented by e) are exogenous independent variables that are not directly measured and reflect unspecified causes of variability in the outcome or unexplained variance plus any error due to measurement (Lleras 2005). The hypotheses will be accepted when the probability value is < 0.05 (Ghozali 2008). The relationship between the variables in the path model can be stated as five equations, which are as follows

<p>Direct Effects</p> $Y_4 = \beta_1 X_1 + \beta_3 X_2 + e_1$ $Y_3 = \beta_2 X_1 + \beta_4 X_2 + \beta_5 Y_4 + e_2$ $Y_2 = \beta_6 Y_4 + \beta_7 Y_3 + e_3$ $Y_1 = \beta_8 Y_2 + e_4$ <p>Indirect Effects</p> $Y_1 = \beta_6 Y_4 + \beta_7 Y_3 + \beta_8 Y_2 + e_2$

System quality shows a positive 0.696 correlation with information quality and it can be inferred that both these attributes

- Y1 = Organizational Impact
- Y2 = Individual Impact

- Y3 = User Satisfaction
- Y4 = Use
- X1 = System Quality
- X2 = Information Quality
- e= error terms

Thus, we could proceed to examine the path coefficients of the structural model. Properties of the causal paths, including standardized path coefficients, p-values and variance explained for each equation in the hypothesized model is shown below

TABLE4

The impact of variables on Organizational Impact

Independent Variables	Dependent variables			
	U	US	II	OI
SQ	0.252**	0.530*		
IQ	0.531*	-0.037		
U		0.166	0.604*	
US			0.370*	
II				0.673*
R Square	0.532	0.403	0.720	0.453
Adj. R Square	0.518	0.376	0.712	0.445
F-Statistics	38.04 [0.00]	14.85 [0.00]	86.28 [0.00]	56.38 [0.00]

Note: ** & * indicate significance at 5% and 1% level of significance. The reported values are standardized coefficients. Values in brackets are p-values of F test.

I have reported R square and adjusted R square values for the each equation. When we use multiple regression analysis, we quote adjusted R square values. But we compare R Square and adj. R square values to check whether there was a problem of multi-co linearity. This is to be checked because the correlation metrics have shown high correlation between the independent variables. When we use highly correlated independent variables in a regression there is a possibility of multi-co linearity if the difference between R square and adj. R square is high. In our case as both R square and adj. R square values are close to each other in all 5 equations therefore we can say that there is no issue of multi-co linearity. F statistics examines the overall fit of the model (is a Goodness of fit test). As all the p-values shown in [] are less than 1 percent therefore we can say that all 5 regression models are good fit.

6. DISCUSSION

This study presents and validates a model of IS systems success based on the DeLone and McLean (1992) IS success model, which captures the multidimensional and interdependent nature of prison management information system success. The results indicate that information quality, system quality, indi-

vidual impact, use, user satisfaction, and organizational impact are valid measures of IS system success. Apart from that the hypothesized relationships between the six success variables are significantly or marginally supported

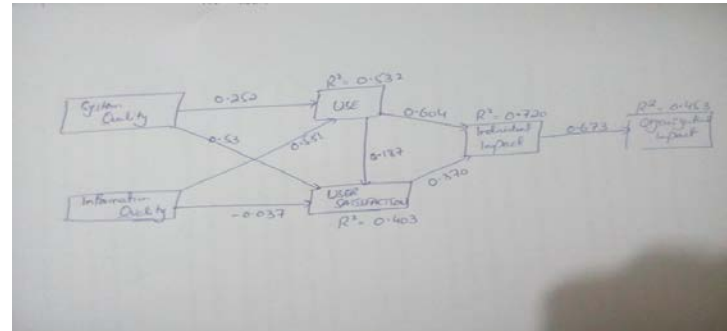


Fig 12 Hypothesis testing results

This research provides several important implications for Prison management system success research and management. According to the proposed model, organizational impact is considered to be a closer measure of Prison management system success than the other five success measures. Organizational impact should develop if the formation of system quality, system use, and user satisfaction is appropriately managed. In this model, system use is having the strongest direct and total effect on individual impact, indicating the importance of system use in promoting individual impact. Simply saying that increased use will yield more benefits, without considering the nature of this use, is insufficient (DeLone McLean, 2003), as system use is a necessary condition of yielding benefits to citizens. The findings clearly indicate that the total effects of system quality on use, user satisfaction, and individual impact are substantially greater than those of information quality. That is, in the context of PMIS, we believe that Government authorities should pay much more attention to promoting the System quality of IS.

This research also confirms that use, user satisfaction, and individual and organizational impacts are complementary yet distinct constructs. It is worth noting that the effect of information quality on user satisfaction is not significant. This may be because citizens have no interest in the reports format and their increased generation after the deployment of PMIS. Thus, respondents showed more concern about system quality (e.g., availability) and individual impact than on information quality (e.g., format, clarity). Moreover another important result is that use have a significant effect on user satisfaction thus indicating that the use of PMIS is related to the satisfaction of the user. The above table summarizes that individual impact will strongly effect the impact of PMIS on organization as the users of organization will be satisfied and will prefer to use the deployed IS then we can say that our IS has a positive effect on organization where it has been deployed. This empirical result also emphasizes the importance of assuming a multidimensional, interdependent analytical approach.

Information quality, system quality, belong to the system development level; while system use, user satisfaction, individu-

al impact and organizational impact belong to the effectiveness-influence level (DeLone McLean, 2003). Establishing strategies to improve only one success variable is therefore an incomplete strategy if the effects of the others are not considered. The results of this study encourage authorities to include measures for information quality, system quality, individual impact, system use, user satisfaction, and organization impact in their valuation techniques for management system success. This study has provided reliable and valid measures for these constructs.

7. CONCLUSION AND LIMITATIONS

This research investigates factors which affect the success of Prison management Information System using DeLone and McLeans IS Success Model. The measurement model has six constructs: system quality, information quality, user satisfaction, organizational impact, individual impact and system use. Seven out of eight hypotheses are significant. The empirical results showed that system quality, and use had a significantly positive influence on individual impact which in turn has a positive effect on organizational impact. It can be interpreted as the factors which influence organizational impact: they use PMIS because it has high system quality they are satisfied with PMIS. The information quality of PMIS did not have a significantly direct influence on User satisfaction. It means that the users perception tends to consider on the system performance and its functions of PMIS rather than the quality of the contents and outputs . The researcher found that use had a positive influence on user satisfaction and the user satisfaction had a direct positive effect on individual impact that will had significantly positive effect on organizational impacts. Thus we conclude that when people are satisfied and will use PMIS it will increase the individual impact which in turn will increase the organizational impact on the organization.

This study identifies several determinants that can reasonably predict factors which affect the success of PMIS using DeLone and McLean's IS Success Model. However, the study has several shortcomings.

- 1) The results of the study cannot be generalized because the researcher has limited sample. Employees and officers of PMIS has limited knowledge about PMIS; it's only few officers who know PMIS, so the respondents are not exceeding 100. As we know that PMIS is new information system in Peshawar prison, so not all employee know about PMIS. It's only few officers who know PMIS, because they got training about PMIS.
- 2) Researcher only examines the PMIS not the other application in Peshawar prison. So, this research cannot be generalized to know the success model of the other application in Peshawar Prison

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