

IS Evaluation

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1 REVIEW (INFORMATION TECHNOLOGY EVALUATION: ISSUES AND CHALLENGES)

In this article the authors describe the issues and challenges of Information Technology (IT) evaluation. Marthandan & Tang (2010) mention that "[h]ow fast a processor runs or how many pages a printer prints might not interest business managers. Instead, business managers are interested in the strategic advantages that IT brings". This means that the perspective of IT evaluation will shift from the technical side more to the financial side and organizations look more for strategic long-term benefits instead of short-term operational benefits. Measuring executive Information System (IS) success is difficult because the evaluators can have different viewpoints and thus a "one-for-all evaluation framework is not available".

The authors, Marthandan & Tang (2010) have reviewed and analyzed many journal papers. There are eight issues and challenges that they take into consideration. The first one is the evaluation scope. Since IT covers a broad range of elements like hardware, software, telecommunications and people it is necessary to define the IT scope specifically. Another issue and challenge is the evaluation of timing. It is sometimes good to evaluate the system "in individual phases of the system development cycle" because a "new IT implementation does not necessarily bring immediate benefits". In addition the unit of analysis is also an issue and challenge. In many IT productivity studies the nations play a remarkable role when it comes to the overall examination of IT contribution. Marthandan & Tang (2010) mention that firm

strategy and best practises should be involved in the evaluation process. The level of analysis is an additional issue and challenge. Apart from the end user different levels of analysis such as group, organization etc. should be taken into account. For example, a system could be evaluated based on four different levels: system, user, organizational, and strategic. Different perspectives play also an essential role in the issues and challenges in IS evaluation. Many evaluators have "different individual opinions, views, and background". A further issue and challenge are different dimensions where "IS success should be evaluated as a multidimensional construct, represented by measures from the usage, satisfaction and decision performance dimensions". Different measures are a further issue and challenge where different evaluation measures, like user satisfaction, decision quality, profit performance and stock prize have been tried in order to "justify why organizations should make investment in IT". The last issue and challenge are the underpinning of theoretical frameworks. Business Managers follow more their instincts or conduct some simple analysis when making IT investments instead of using validated measures.

Table 1. Summary of IT evaluation issues and challenges. (Marthandan & Tang 2010.)

Authors	Issues and challenges							
	1	2	3	4	5	6	7	8
Agourram (2009)	✓				✓	✓		✓
Anandarajan and Wen (1999)					✓		✓	
Bajwa <i>et al.</i> (1998)					✓	✓		
Bernroider (2008)		✓			✓	✓		
Chou <i>et al.</i> (2006)					✓		✓	
Devaraj and Kohli (2000)		✓		✓			✓	
Devaraj and Kohli (2003)	✓			✓			✓	
Gable <i>et al.</i> (2008)					✓	✓	✓	✓
Grover <i>et al.</i> (1996)	✓		✓		✓			
Gunasekaran <i>et al.</i> (2006)							✓	✓
Hakkinen and Hilmola (2008)				✓	✓	✓		
Hamilton and Chervany (1981a)	✓				✓	✓	✓	
Hamilton and Chervany (1981b)					✓			
Irani <i>et al.</i> (2006)					✓	✓		
Jurison (1996)		✓	✓		✓		✓	
Klecun and Cornford (2005)	✓				✓		✓	
Mirani and Lederer (1998)				✓	✓	✓		
Mohd. Yusof <i>et al.</i> (2008)	✓	✓			✓	✓		✓
Mukhopadhyay <i>et al.</i> (1995)							✓	✓
Palvia <i>et al.</i> (2001)	✓				✓	✓		✓
Skok <i>et al.</i> (2001)	✓	✓					✓	✓
Stockdale <i>et al.</i> (2006)	✓	✓			✓	✓	✓	✓
Weill (1992)	✓		✓				✓	✓

Note: 1 – evaluation scope; 2 – evaluation timing; 3 – unit of analysis; 4 – level of analysis; 5 – different perspectives; 6 – different dimensions; 7 – different measures; 8 – underpinning theoretical frameworks

Table 1 shows several authors that have written journal papers regarding to IT evaluation and challenges.

The results of this table illustrate that most of the authors have paid attention to different perspectives in the IT evaluation process. Different perspectives are also the biggest challenges to conquer due to several opinions of the evaluators. Thirteen out of twenty-three authors considered different measures as essential. It is sometimes hard to "justify why organizations should make investment in IT". Also a lot of attention was paid on different dimensions, the evaluation scope and on underpinning theoretical frameworks. Less considerations were given to evaluation timing, the unit of analysis and to the level of analysis. (Marthandan & Tang 2010.)

2 REVIEW (ROLE OF COMPUTERIZED PHYSICIAN ORDER ENTRY SYSTEMS IN FACILITATING MEDICATION ERRORS)

This article describes the role of a Computerized Physician Order Entry (CPOE) system and its side effects. In comparison to paper-based systems, CPOE systems have the following advantages:

- Free of handwriting identification problems
- Faster to reach the pharmacy
- Less subject to error associated with similar drug names
- More easily integrated into medical records and decision-support systems
- Able to avoid specification errors, such as trailing zeros
- Reduce underprescribing and overprescribing
- Reduce incorrect drug choices

The CPOE system has also its weak points. Koppel, Metlay, Cohen, Abaluck, Localio, Kimmel & Strom (2005) have analyzed medication errors by doing a "comprehensive, multithreaded study of CPOE-related factors that enhance risk of prescription errors". Several methods were used to find out how often these errors occur. In the "design" method a quantitative and qualitative study with house staff (pharmacists, nurses, physicians etc.) have been done. The "setting" method describes that the study was focused on a "major urban tertiary-care teaching hospital with 750 beds, 39000 annual discharges, and a widely used CPOE system operational there from 1997 to 2004". In order to determine medication errors caused by using CPOE systems, it is necessary to interview the working staff. In the "data collection"

method an intensive One-on-One house staff interview was taken. Besides that five groups were interviewed that work on sources of stress and prescribing errors. In addition experts like the surgery chair, pharmacy and technology directors, nursing director etc. were interviewed. During a time period of four months several employees have been observed that were involved in patient care and CPOE use. After all data have been collected the information errors and the human-machine interface flaws were determined.

Information errors are "generated by fragmentation of data and failure to integrate the hospital's several computer and information systems". One of these information errors is the so called "assumed dose information" error where dosages of pharmacy's warehousing and purchasing decisions are listed instead of dosages required by the clinical guideline. It happened that the house staff ordered 10mg doses as the usual dose instead of the required usual dose of 20 or 30mg. A further information error appeared by adding a new but duplicative or a conflicting medication, known as medication discontinuation failure. Furthermore an allergy information delay error was discovered. The reason for this information error is, that the CPOE system provides the feedback on drug allergies after the medications have been ordered.

Besides the information errors there are human-machine interface flaws that are "machine rules that do not correspond to work organization or usual behaviors". One of the flaws is patient selection where it could be possible to select the wrong patient file because names and drugs are too close to each other or the font size is too small. Another flaw can occur when the wrong medication is selected due to the use of a too small screen where not all the patient's information can be displayed at once. It is also possible that a CPOE system crashes and the orders that have been done during this time are lost. Furthermore, no data can be entered during the downtime of the CPOE system which can lead to the situation where medications are sent to the wrong room when the patient has been moved to another room during that time. (Koppel et al. 2005.)

3 CONCLUSION

In this report two articles have been reviewed. The objective of the first article "Information technology evaluation: issues and challenges" explains how the authors Marthandan & Tang (2010) have analyzed several reviewed journal papers about IT evaluation issues and challenges. It could be recognized that different evaluators

have different viewpoints for certain considerations. For that reason it seems to be quite difficult to evaluate an IS. The second reviewed article "Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors" contains information of how "[t]o identify and quantify the role of CPOE in facilitating prescription error risks". By reviewing this paper it was found out that CPOE systems facilitate medication error risks, that must be carefully attended by the clinicians and hospitals.

4 BIBLIOGRAPHY

- Marthandan, Govindan & Chun Meng Tang (2010). Information technology evaluation: issues and challenges. *Journal of Systems and Information Technology* Vol. 12 No. 1, 2010 pp. 37-55. ©Emerald Group Publishing Limited 1328-7265.
- Koppel, Ross, Joshua P. Metlay, Abigail Cohen, Brian Abaluck, A. Russel Localio, Stephen E. Kimmel & Brian L. Strom (2005). *Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors*. ©2005 American Medical Association.