

A LONGITUDINAL STUDY OF FINANCIAL EXECUTIVES' VIEWS ON INFORMATION SYSTEMS RETURNS AND KEY TECHNOLOGY ISSUES

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ABSTRACT

Understanding important information technology issues is essential to improving organizational performance and preparing proper curriculum to educate new IT students. However, key information technology issues have been lightly studied in peer-reviewed literature. This manuscript studies the views of top financial executives over the three year period 2003 to 2006. A large sample of major executives share their views on the returns currently generated from information systems in their organization. Overall a group of approximately 500 executives participated in the survey. Generally, Information Systems (IS) are seen as providing worse than medium returns both in 2003 and 2006. However, it has been determined that there have been returns on information technology investment are seen to have increased. By and large there were many issues that showed significant decline as "very critical" technology issues between 2003 and 2006. The specific issues selected and the implications for practitioners and researchers are explored.

Keywords: Information technology return, Project management, Information systems, Information technology success variables, technology solutions, productivity paradox

INTRODUCTION

There has been considerable debate on returns on information technology (IT) investment. The concept of a productivity paradox in IT has been suggested for decades. The idea is that monies are being spent on information technology but no corresponding increase in overall company productivity has been experienced. Some researchers have supported these concepts, others disagree. Almost all researchers have used corporate or government data in an attempt to determine relationships between investment and returns. An alternative approach is to inquire within an organization itself to see how information technology is viewed within companies. This study reviews the responses to a broad based questionnaire sponsored by the Financial Executives International Organization and Computer Sciences Corporation

and specifically asks top financial executives how much return they are receiving on their information technology investments. This presents a direct approach to determining IT productivity.

In addition, there has been discussion on how well information technology return has progressed over recent years. A major HBR article [5] suggested that IT doesn't matter anymore. Has IT declined as a provider of return either through cost savings or revenue enhancement? This study reviews data from 2003 as well as 2006 to see if significant change took place.

Finally, this study explores detail behind the gross numbers to better understand information technology today. Specifically, both 2003 and 2006 data are analyzed to determine what the critical issues are in IT. These areas are reviewed to determine change over time as well.

As a result, a comprehensive inside look at information technology within top organizations today is presented. The last major peer-reviewed explorations of information technology issues was in 1999 [9] and 1996 [3]. We have sought to determine current levels of return as well as change over time. In addition, what the up-to-date key issues are for IT and how they are evolving are explored.

INTRA-FIRM STUDIES AND IT ISSUES

As noted, there have been very few studies that have looked within a firm. Most studies within a firm examined a specific application such as the Pennsylvania turnpike commission. There are a few articles that examine organizational perception of overall information technology returns. With one of the few, Brynjolfsson and Hitt [4] correlated the Informationweek 500 annual survey and analyzed results from 175 chief information officers.

There are also few studies that examine the top information technology issues that organizations face today. Understanding the current important information technology issues is essential to

improving organizational performance and preparing proper curriculum to educate new IT students.

It has been nearly 15 years since an MISQ article addressed key information issues [3]. Table 1 provides what they considered the most important issues in 1996.

Table 1. Brancheau et al. Issues 1996 [3]

#1 Building a Responsive IT Infrastructure
#2 Facilitating and Managing Business Process Redesign
#3 Developing and Managing Distributed Systems
#4 Developing and Implementing an Information Architecture
#5 Planning and Managing Communication Networks
#6 Improving the Effectiveness of Software Development
#7 Making Effective Use of the Data Resource
#8 Recruiting and Developing IS Human Resources
#9 Aligning the IS Organization Within the Enterprise
#10 Improving IS Strategic Planning

A follow-up study in 1999 [9] surveyed IS practitioners and found the top ten "IS Issues" shown in Table 2.

Table 2. Kim and Kim Issues 1999

Competitive advantage and strategic IS
Telecommunications and Networking
Disaster Recovery
Improving information security and control
Having a responsive IT infrastructure
Software reengineering and maintenance
Developing information architecture
Improving IS strategic planning
Client/server computing
IS Organizational Alignment

There are many issues shown that are included in both the Brancheau and Kim and Kim studies, including IS strategic planning, IT infrastructure, and IT organizational alignment.

One group who has been active recently in trying to determine top information technology issues is the AICPA [1]. They have conducted this survey for several years. The following are the 2006 Top 10 Technologies (and five additional). Those new to the list are noted.

Table 3. AICPA IT Issues 2006 [1]

1. Information Security.

2. NEW Assurance and Compliance Applications (e.g. SOX 404, ERM).
3. Disaster and Business Continuity Planning.
4. NEW IT Governance.
5. NEW Privacy Management.
6. Digital Identity and Authentication Technologies.
7. Wireless Technologies.
8. Application and Data Integration.
9. Paperless Digital Technologies.
10. NEW Spyware Detection and Removal.
11. E-mail Filtering including Spam and Malware scanning.
12. Outsourcing.
13. Storage & Backup Technologies.
14. Patch & Network Management Tools.
15. Technology Competency & Effective Utilization.

A peer-reviewed literature review of top information technology issues yields very little results. Survey studies within IT firms sometimes take the form of examining the reasons for IT success or failure as Whittaker [12]. Rigby and Bilodeau [11] examined 25 most popular management tools including strategic planning, CRM, and SCM. But these are not directly the most important IT issues.

Perhaps one of the closest studies was prepared by Wilcoxson and Chatham [13]. The authors collected data from IT managers and business counterparts. Though their study focused on the IT/business relationship, there are relevant findings. They found that IT's alignment with business strategy was significantly increased over their 3 year period (1998-2000).

HYPOTHESES

As a result of the literature review, the following hypotheses were developed.

Many studies on the productivity paradox have suggested good returns on information technology investment [6], [10], [2]. In addition, Wilcoxson and Chatham [13] suggested improvement over recent time in information technology alignment. As a result hypothesis one is proposed.

Hypothesis one:

Information technology will show at least moderate return on investment according to top financial executives.

Some authors such as Carr [5] have suggested that IT is not that important anymore. He views it as more of

a commodity or method of doing business. Thus, it is suggested that if there are gains that they will not either improve or decline.

Hypothesis two:

Levels of information technology returns did not significantly change from 2003 to 2006

Early studies of information technology issues have shown many of the same key issues [3], [9], [1]. It is therefore proposed that there will be little change in issues from 2003 to 2006.

Hypothesis three:

There was little or no change in key technology issues facing organizations from 2003 to 2006.

METHODOLOGY

In order to test these hypotheses, specific data were required from actual corporations. We found a rich and robust dataset that was available from Financial Executives International. Financial Executives International is “the preeminent association for CFOs and other senior finance executives.” It has ... CFOs, VPs of Finance, Treasurers, Controllers, Tax Executives, Academics, Audit Committee members [in] companies large and small, public and private, cross-industry [8]. In 2003 the FEI commissioned a large scale study of “technology issues for Financial Executives”. The survey instructions follow.

“Financial Executives International (FEI) and Computer Sciences Corporation (CSC) are conducting the sixth annual survey of Technology Issues for Financial Executives. This initiative explores and reports on information technology from the perspective of the financial executive. Through this survey, we will gain current perspectives on topics such as: the most important financial management issues; the role of technology in enabling (or constraining) decision making and business operations; the impact of technology on business strategy; and the methods used to evaluate technology investments, among others.

- ...
- I. Demographics
- II. Top Financial Management Issues
- III. Information Systems Strategies
- IV. Technology Applications
- V. Managing the IS Function
- ” [7]

As a part of this study, specific information was obtained from top financial executives on IS success, and top information technology issues. This study had been conducted for the last several years

including the data available years 2003 and 2006. The questions and responses were sufficiently detailed and pertinent to our hypotheses to serve as the bases for testing this study’s hypotheses. The main advantages are the large data set and the independent collection from a private membership trade group. The years 2003 and 2006 were selected due to availability of the data as well as a significant enough time gap.

All data has been collected and furnished by the Financial Executives International and Computer Sciences Corporation and remains their property. Use for academic and research purposes was obtained by the author. The author wishes to sincerely thank the organization for their cooperation.

All questions were analyzed using SPSS 15.0 and a variety of statistical techniques. The survey was conducted in 2003 and 2006 and overall results were included and compared accordingly. There were generally 459 usable responses for 2003 and 526 for 2006 or a total of 985.

RESULTS

The first relevant question in the survey relates to top financial executives’ view of return. “What overall return is your organization obtaining on its technology investments? (Mark only one.) High, Medium, Low, Negative, Unknown”

This question is abbreviated as “return” in the tables four and five.

Hypothesis one:

Information technology will show at least moderate return on investment according to top financial executives.

Table 4. Return Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Return	985	2.1411	.68475	.02182

To test the hypothesis one, an overall mean for both years was calculated. As seen in table 4 that mean was 2.14 on a one to four scale where one was high, two was medium, three was low, and four was negative. The 2.14 mean suggested that returns were slightly worse than medium and a one sample test showed that returns were significantly different from an overall medium test value of 2.0 at $p < .001$. Therefore hypothesis one was rejected (reject the null hypothesis that there is no significant difference).

Information technology returns are seen as a significantly unfavorable versus medium by financial executives. Neither 2003 nor 2006 showed at least medium returns. Table 5 shows that both 2003 and 2006 returns were worse than 2.0. They were both significantly worse at $p < .001$.

Table 5. Group Statistics 2003 and 2006

	indicator	N	Mean	Std. Dev.	Std. Error Mean
Return	2003.00	459	2.1852	.69190	.0323
	2006.00	526	2.1027	.67677	.0295

Hypothesis two:

Levels of information technology returns did not significantly change from 2003 to 2006.

Though both 2003 and 2006 were significantly below medium in returns, there was some improvement seen between 2003 and 2006. Testing this difference for significance results in finding that the difference is significant at $p < .059$. This level of significance is modest but $p < .10$ is often used for social science research. Hypothesis two was rejected (reject the null hypothesis that there is no significant difference). Levels of information technology return significantly improved between 2003 and 2006.

The next area included in the survey explores key technology issues. They are provided with a list of issues (table 6) and they rank the issue as very critical, somewhat critical, or not a concern. Only very critical issues were included in this analysis so

that KEY issues could be studied. The abbreviations shown in later tables for these issues are also shown in table 6.

Table 6. FEI Issues

Identifying the appropriate level of technology investment	level
Upgrading or replacing legacy systems	uplegacy
Evaluating or measuring the return on technology investments	measRet
Prioritizing technology investments	prioritize
Educating senior management on the value of technology	edSenMgmt
Establishing and maintaining effective dialogue between IT and users	dialogue
Identifying the appropriate level of security for information and electronic applications	security
Identifying how IT can improve or influence business processes	improvProc
Using technology to drive business change	drvBusChg
Training staff in new technologies and upgrades	training
Developing disaster recovery capabilities	disRec
Introducing wireless technologies	wireless
Evaluating the adoption/use of XBRL	xbrl
Using technology to improve the system of internal controls	intCntrl
Aligning business and IT strategy	align

Hypothesis three:

There was little or no change in key technology issues facing organizations from 2003 to 2006.

Table 7. FEI Issues Analysis

	indicator	N	Mean	Std. Deviation	Std. Error Mean	Level of Import.	Sig.
Level	2003	459	0.573	0.49518	0.02311	Down	0.000
	2006	526	0.4411	0.49699	0.02167		0.000
Uplegacy	2003	459	0.3246	0.46874	0.02188	UP	0.740
	2006	526	0.3346	0.4723	0.02059		0.740
measRet	2003	459	0.3159	0.46538	0.02172	Down	0.000
	2006	526	0.1863	0.38973	0.01699		0.000
Prioritize	2003	459	0.5991	0.49061	0.0229	Down	0.000
	2006	526	0.4639	0.49917	0.02176		0.000
edSenMgmt	2003	459	0.2919	0.45515	0.02124	Down	0.001
	2006	526	0.1977	0.39866	0.01738		0.001
Dialogue	2003	459	0.4924	0.50049	0.02336	Down	0.005
	2006	526	0.403	0.49098	0.02141		0.005
Security	2003	459	0.5621	0.49667	0.02318	Down	0.015
	2006	526	0.4848	0.50024	0.02181		0.015
improvProc	2003	459	0.5163	0.50028	0.02335	Down	0.001
	2006	526	0.4144	0.4931	0.0215		0.001
drvBusChg	2003	459	0.3878	0.48778	0.02277	Down	0.390
	2006	526	0.3612	0.48081	0.02096		0.391
Training	2003	459	0.3094	0.46274	0.0216	Down	0.000
	2006	526	0.1901	0.39276	0.01713		0.000
disRec	2003	459	0.3464	0.47634	0.02223	Down	0.033
	2006	526	0.2833	0.45102	0.01967		0.034
Wireless	2003	459	0.0719	0.2586	0.01207	UP	0.720
	2006	526	0.0779	0.26834	0.0117		0.719
Xbrl	2003	459	0.0196	0.1388	0.00648	UP	0.282
	2006	526	0.0304	0.1719	0.0075		0.275
intCntrl	2003	459	0.268	0.44339	0.0207	Down	0.192
	2006	526	0.2319	0.42247	0.01842		0.194
Align	2003	459	0.5251	0.49992	0.02333	Down	0.020
	2006	526	0.4506	0.49802	0.02171		0.020

Table 8. FEI Issues Ranked

	2003	2006

Security	0.5621	0.4848
Prioritize	0.5991	0.4639
Align	0.5251	0.4506
Level	0.573	0.4411
improvProc	0.5163	0.4144
Dialogue	0.4924	0.403
drvBusChg	0.3878	0.3612
Uplegacy	0.3246	0.3346
disRec	0.3464	0.2833
intCntrl	0.268	0.2319
edSenMgmt	0.2919	0.1977
Training	0.3094	0.1901
measRet	0.3159	0.1863
Wireless	0.0719	0.0779
Xbrl	0.0196	0.0304

The top issues facing organizations in 2006 were in order of priority security, prioritizing technology investments, and aligning business and information technology strategy (table 8). The same issues were near the top of the latest in 2003 as well. In 2003, identifying the appropriate level of technology investment was higher in priority than in 2006. This suggests that information technology spending may be under better control in 2006. As noted, nearly all items showed an overall decrease in the level of importance and criticality between 2003 and 2006. Of the fifteen issues there were significant decreases in criticality in twelve (table 7). Hypothesis three was rejected. There was significant change in key technology issues facing the organizations between 2003 and 2006. Twelve of the fifteen issues showed significant decline in importance. Though some items may have changed significance in more recent years, the analysis presents areas that require examination.

CONCLUSION AND IMPLICATIONS

This manuscript studied the views of top financial executives over the three year period 2003 to 2006. A large sample of major executives shared their views on the returns currently generated from information systems in their organization. In addition, they rated the key technology issues facing their companies. Overall a group of about 500 executives participated in the survey. The sample and findings are therefore fairly robust. Generally, Information Systems (IS) are seen as providing below medium returns both in 2003 and 2006. But statistically it has been determined that there has been an improvement in returns on information technology investment. There

was little change in issues seen as critical or not between 2003 and 2006. Overall, there were many issues that showed significant decline as “very critical” technology issues, Critical issues that were significantly less important in 2006 compared to 2003 included identifying the appropriate level of technology investment, evaluating or measuring the return on technology investment, educating senior management, establishing and maintaining effective dialogue between IT and users, identifying the appropriate level of security, identifying how IT affects business process, training staff, developing disaster recovery, and aligning business and IT strategy. This study has interesting implications for practitioners and researchers.

Practitioners can benchmark the consensus view of top financial executives on how well their information technology returns measure up to others. Those who are below norm should consider methods of addressing the shortfall. Those who believe they are above norm should carefully review how they achieved these results and take steps to continue and improve these practices. Specific issues which have been shown to be important can be used as a guide to prioritizing projects within individual organizations. Though there may be some variation across industries and company size, the list of issues should be able to be used to improve IT performance. It is interesting to note the decline in criticality of importance in many issues between 2003 and 2006. This suggests that many issues are being addressed more appropriately and the IT is performing better, though returns are still below medium.

Researchers can expand on these preliminary findings and develop new surveys and research approaches that review IT productivity from the inside out. Though these results only view top financial executives perceptions, they can be used as a starting point for detailed exploration into organizational IT performance as well as areas for attention and improvement. A limitation of the study is that the results only reflect the views of only top financial executives. There is opportunity to replicate the study with other groups to confirm findings. As an example, CEOs may have different criteria than CFOs.

Overall, this study has presented an up-to-date review of current insider views on information technology return, issues, and areas for improvement. The study updates the MISQ 1996 and IRMJ 1999 review and provides a fresh perspective on the performance of IT and its issues. In general, performance is seen as slightly below medium and improving. There appears

to be room for further improvement. Particular attention should be paid to security, IT prioritization, and IT alignment as suggested in the survey results (table 8).

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