A Study on Role of Information & Communication Technologies (ICT) and Its Impact on Management Practices of Pharmaceutical Companies in Gujarat

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Thesis Title:

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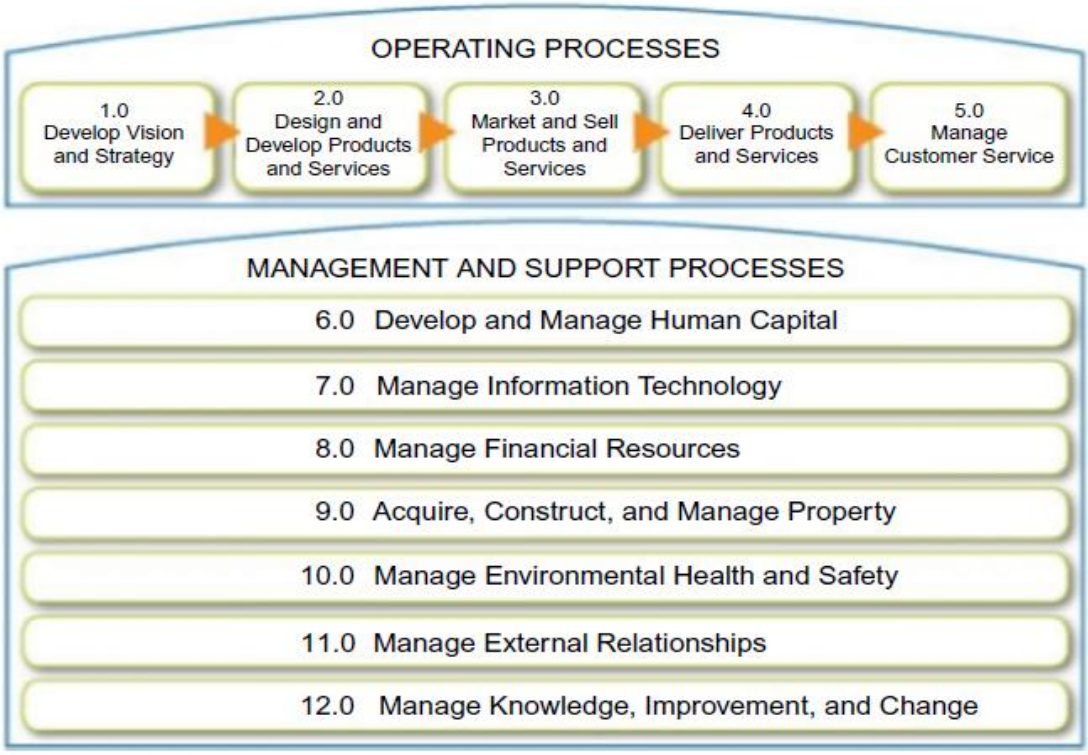
Abstract: Technology changes quickly and continuously, providing capabilities that may be applied for business advantage. Management must understand how well the technology fits the needs of the people for whom it is intended. Various tools like document management, information maps, information guides and groupware are technologies that can help an organization handle the problem of changing information culture, but the change must be encompassing the organization and must originate in management and not in technology. The rate at which ICT grow is much faster than management's ability to learn how to use it. ICT have reinforced a shift in demand from low-skilled to skilled professionals which leads to a demand for further training. Knowledge-sharing, continuous learning, methods of appraising employee performance, project management skills are some of the crucial parameters which have direct impact on managing the organization. Better management practices coupled with effective ICT (Information and Communications Technologies) play a vital role in enhancing business performance.

This dissertation presents research based on the impact on the management practices created by various ICT initiatives taken by pharmaceutical companies across the state of Gujarat. Business Managers are striving to improve their managerial effectiveness using various ICT tools and techniques like Groupware, Cloud Computing, ERP, E-Commerce, ITIL, and ISO. However, the previous literature is uncertain about the capability to use these methodologies and it was the purpose of this study to identify which ICT tools and concepts business managers are aware of and are used by organizations. The survey has tried to capture and analyse perceptions of business managers about important role ICT is playing in managing the tasks in various functions of an organization.

Brief description on the state of the art of the research topic

Study in Management Practices is an exciting and lively field and has made great strides in the last two decades. Cragg 2011 believes that the business process view is useful when studying organizational problems. Garvin (1998,) suggests that processes "provide a powerful lens for understanding organizations and management" and recognises that organisations

have many processes. Davenport, among others, distinguishes between management processes (such as performance monitoring, finance management, human resource management etc) and operational processes (such as product creation, manufacturing, order fulfilment etc). Others, e.g. Sackett et al. (2003), proposed a framework of 52 business processes. One such framework was proposed by the American Productivity and Quality Centre (APQC), called the process classification framework (PCF) (APQC, 2006). The framework consists of a four-level taxonomy of business processes. At the highest level there are 12 enterprise-level processes; the first five are referred to as operating processes and the other seven as management and support services, as shown below.



Nicholas Bloom and John Van Reenen (2010) have collected comprehensive, qualitative information on 18 management practices from 4000 mid-sized manufacturing companies from 17 different countries from Europe, the US and Asia. According to Bloom et al (2006) "These practices can be grouped into four areas: *operations* (3 practices), *monitoring* (5 practices), *targets* (5 practices) and *incentives* (5 practices). These practices are taken as the basis of this research work. From this list, five Management Practices in the area of Operations (2), Monitoring (1), Target (1) and Incentives (1) are used to develop the research questionnaire.

Definition of the Problem

This research evaluates five management practices, its usage in pharmaceutical companies by various management cadre employees and the impact of various ICT tools and techniques on these practices.

Research Objectives:

- To study the awareness level of ICT Management in business managers of pharmaceutical companies in Gujarat
- To study the extent of usage of different ICT standards in management practices of pharmaceutical companies in Gujarat
- To study the approaches for employee learning through ICT in pharmaceutical companies in Gujarat
- To study the practices of rewarding IT competency in Business managers of pharmaceutical companies in Gujarat
- To study the overall impact of ICT on various Management Practices like manufacturing, documentation, performance tracking, rewarding, and management of human capital in pharmaceutical companies in Gujarat

Scope of work:

This study is restricted to analyse the impact of ICT on management practices of pharmaceutical companies within Gujarat. The internal employees having roles ranging from CEO/VP, General Managers, Department Heads till Managers/Team Leaders from Pharmaceutical companies engaged in the bulk drug, formulations, equipments and Contract Research formed the universe.

Research Questions:

- Research Question 1: What is the level of awareness of IT Management in business managers required to meet the present day challenges?
- Research Question 2: To what extent different standards in management practices are used?
- Research Question 3: What are the approaches taken for employee learning through ICT?
- Research Question 4: What are the methods of rewarding best performance in an organization?

Original Contribution by the thesis

This research is unique and original since similar work has not been carried out previously. This research will:

- Help corporate decision-makers in improving firm performance through better coordination of ICT and management practices.
- Help Industry-associations (specifically MSME) to make their members IT-Enabled
- Support in better implementation of **Digital India** to various industry-segments
- Help policy makers at State and Central government level to formulate industry-specific norms and policies for Human Resources and Information Technology

Methodology of Research, Results / Comparisons

This survey-based study was conducted in the Pharmaceutical Companies in Gujarat, India, during 2014-2016. A questionnaire was developed using a Likert-type scale which measures the level of understanding of various ICT and management practices used for managing the organization. It was assumed that these managerial professionals would have general awareness about ICT tools and techniques to manage their areas of operations. This was supplemented by the author's twenty-five years of executive IT management experience in various other industry verticals like IT, Consumer Durable, Logistics, Textile and Banking.

Sourcing of Respondents:

- ☐ Euromoney Institutional Investor Company Database – IIMA Downloaded on 24-11-2014 – Extracted Gujarat Data
- ☐ OPPI - Organization of Pharmaceutical Producers of India – Directory 2007 – Extracted Gujarat Data
- ☐ IDMA – GSB - Indian Drug Manufacturer Association – Gujarat State Board Member Directory 2011-12
- ☐ Alumni Contacts of Pharmacy colleges – Batches – 2008-10, 09-11, 10-12,11-13
- ☐ GTU Website – List of Companies Participated for Placement of Pharmacy Students - August 2015, April 2016
- ☐ Event Management Companies specializing in Pharma events
- ☐ Social and Personal Network

- A letter of introduction and questionnaire were emailed to 1000 email IDs of pharmaceutical companies in Gujarat.
- Emails were followed up by in person visits to pharma companies in different parts of Gujarat during December 2014 to January 2016.
- 410 respondents allowed the researcher to be contacted in person/by phone or email. Details of the study were explained to them, and initially they gave oral informed consent to participate. Some completed the questionnaires and returned immediately to the researcher while others said they would complete the questionnaire at their convenience.
- To speed up the data collection process, a web based Google doc was created and the link was emailed to potential respondents of pharma companies. 93 people responded to this internet-based questionnaire.
- The typical respondents to the survey had roles ranging from CEO/VP, General Managers, Department Heads till Managers/Team Leaders.
- Anonymity of the respondents was maintained by giving a code to each instrument or web-based response, representing Participant Company and no monetary or other reward was offered for their participation.
- After codification, all responses by way of filled up questionnaire and data captured through web-based Google Doc were keyed IBM SPSS Statistics 20 software to produce quantitative comparisons and further analysis.
- After cleaning for missing value etc. the data was organized and in all, 386 usable responses were collected from 96 companies and used for further analysis.

Accordingly, the analysis that follows and all reported statistics are based on a sample of 386 respondents from 96 firms of different types and size in pharmaceutical sector. As Bertrand and Mullainathan, (2001) rightly puts it "As is well known in the surveying literature, a respondent's answer to survey questions is typically biased by the scoring grid, anchored towards those answers that they expect the interviewer thinks is "correct".

Specific demographic information of the sample is shown in tables below:

Company Age	Frequency	Percent
0 to 10 years	99	25.6
11 to 20 years	150	38.9
21 to 30 years	72	18.7
31 to 40 years	42	10.9
Above 40 Years	23	6.0
Total	386	100.0

Total Staff in your Company	Frequency	Percent
0 to 250	185	47.9
251 to 500	55	14.2
501 to 1000	64	16.6
1001 to 1500	29	7.5
Above 1500	53	13.7
Total	386	100.0

Employee Tenure with Company	Frequency	Percent
6 Years or Less	231	59.8
Between 6 to 9 Years	67	17.4
Between 9 to 12 Years	44	11.4
More than 12	44	11.4
Total	386	100.0

Level in the Organization	Frequency	Percent
CEO/VP	18	4.7
General Manager	41	10.6
Department Head	109	28.2
Team Lead/Manager	218	56.5
Total	386	100.0

We have taken qualitative and exploratory approach for this research work. We made rigorous and extensive literature review of top Five[1] Journals from the period 2001 to 2012 on ICT and Management. In particular, the work by Bloom et al was studied in depth on which this thesis is based. It was found that very few researchers had done work on management practices, in particular for pharmaceutical industry which is very high-tech and knowledge intensive.

Achievements with respect to objectives

Some of the observations are tabulated below which conveys the current level of ICT awareness and the extent to which management practices are coupled with ICT.

How is IT Perceived?	Frequency	Percent
It is a cost of doing business	36	9.3
It is used for Product, Process and administrative innovation	197	51.0
It is a fundamental enabler of future business activity	104	26.9
It co-adapts/improvises in bringing value to the firm	49	12.7
Total	386	100.0

Does Company Measure IT Contribution	Frequency	Percent
The value of IT investments are not measured	84	21.8
The value measurements is purely financial	59	15.3
The value measurements is purely technical	63	16.3
The value measurement is multi-dimensional	180	46.6
Total	386	100.0

[1] Communications of the ACM, January 2005, Vol 48.

To What Extent Business Competency in IT Managers is Rewarded	Frequency	Percent
Not Rewarded and Not Valued	103	26.7
Not Rewarded But Valued	127	32.9
Valued and Rewarded	91	23.6
Highly valued and Desired for Most Managerial Positions	65	16.8
Total	386	100.0

To What Extent IT Competency in Business Managers is Rewarded	Frequency	Percent
Not Rewarded and Not Valued	100	25.9
Not Rewarded But Valued	134	34.7
Valued and Rewarded	94	24.4
Highly valued and Desired for Most Managerial Positions	58	15.0
Total	386	100.0

Do you have any formal Degree/ Training / Certification in Leadership & People Skill	Frequency	Percent
Yes	75	19.4
No	311	80.6
Total	386	100.0

Do you have any formal Degree/ Training / Certification in Business Management	Frequency	Percent
Yes	69	17.9
No	317	82.1
Total	386	100.0

Do you have any formal Degree/Training/Certification in Data Analysis Tools/Business Intelligence	Frequency	Percent
Yes	47	12.2
No	339	87.8
Total	386	100.0

Do you have any formal Degree/ Training / Certification in Project Management	Frequency	Percent
Yes	54	14.0
No	332	86.0
Total	386	100.0

Operational performance metrics (efficiency, inventory, quality and output) are tracked & analysed	Frequency	Percent
Not Tracked and Not Analysed	94	24.4
Ad-hoc tracking for some specific tasks at department level but not analysed	96	24.9
Guidelines exists but strict adherence not expected	80	20.7
Strict and Clear guidelines for adherence in every project across the organization	116	30.1
Total	386	100.0

Level of Difficulty in Keeping pace with changing technologies	Frequency	Percent
Very Easy	71	18.4
Easy	79	20.5
Neither Easy nor Difficult	78	20.2
Not So Easy	75	19.4
Very Difficult	83	21.5
Total	386	100.0

Level of Difficulty in Mapping Technology with Business Needs	Frequency	Percent
Very Easy	65	16.8
Easy	48	12.4
Neither Easy nor Difficult	101	26.2
Not So Easy	78	20.2
Very Difficult	94	24.4
Total	386	100.0

Extent to which Continuous Improvement Practices and Effectiveness Measures are in place	Frequency	Percent
Do not have any continuous improvement practices in place	40	10.4
Have a few continuous improvement practices in place, but no effectiveness measures are in place	116	30.1
Have many continuous improvement practices in place and effectiveness is frequently measured	182	47.2
Have well established continuous improvement practices and effectiveness measures in place	48	12.4
Total	386	100.0

Project Management Guidelines	Frequency	Percent
No guidelines in place and no need felt	39	10.1
Individual Department level guidelines exists	161	41.7
Organization wide guidelines exists but strict adherence not expected	77	19.9
Strict and Clear guidelines adherence for every project across the organization	109	28.2
Total	386	100.0

The extent to which knowledge is shared among various functions of business	Frequency	Percent
No need for Knowledge sharing	33	8.5
Limited and unstructured knowledge sharing among few departments	151	39.1
Formal knowledge sharing at the cross-functional level within the company	117	30.3
Formal sharing within the company and with business partners/alliances	85	22.0
Total	386	100.0

Best Approach in Talent Appreciation	Frequency	Percent
Yearly increments & Promotions	283	73.3
Role Enhancement	58	15.0
Project based incentives	22	5.7
Paid Education or Training in specific functional area	23	6.0
Total	386	100.0

Tracking and Communication of Employee Performance using Various Formal and Informal Management Tools	Frequency	Percent
Tracking is not done/No need Felt	88	22.8
Ad-hoc tracking for some specific assignment/tasks at department level	96	24.9
Formal tracking for some specific assignment/tasks at department level	127	32.9
Complete formal tracking for each employee	75	19.4
Total	386	100.0

Major Findings:

- Top management needs to look at various approaches like E-commerce, ERP, Workflow and Document Management, Customer Relationship Management to strengthen coordination of various internal and external business practices.
- Business Managers at every level are expected to be aware at a greater degree about various latest ICT practices like ICT Governance and Management, Cloud computing, Groupware and other Web Technologies
- This research shows that Training and Certification is still a grey area which very essential at all managerial levels which leads to improved efficiency and bottom line. Most managers at all levels do not have any formal degree or training in the areas of business management, leadership, people skills, project management etc. These are the areas most vital for healthy progress of the organization. Better qualified and trained managers are the most valuable asset for any organization.
- Companies need to deploy more rigorous methods to keep the managers up-to-date in their respective field of work. Some respondents find it difficult. Knowledge sharing and various learning methods are greatly improved with the help of ICT.
- Rewarding ICT competency in Business Managers and Business competency in ICT managers definitely puts a firm ahead of competition. This again is an area of concern for business managers as they find it difficult to measure technical competencies of their team members.
- Keeping pace with changing technologies is also a concern for business managers at all levels.

- Most companies resort to a traditional approach in Talent appreciation. In today's knowledge-intensive environment, particularly in Pharmaceutical industry, it is very essential that companies look at more innovative and constructive approaches to rewards and talent appreciation.
- Greater awareness about ICT Tools and techniques are critical to handle Modern Manufacturing techniques
- Resorting to Process Problem documentation leads to better valuation of contributions made by ICT and other resources. Business Managers can deploy various methods for continuous process improvements. This also leads to a standardised approach to knowledge sharing across the organization.
- Tracking performance of employees and management practices is crucial for any organization as it is said that if you cannot measure, you cannot control. Providing a learning environment is a management responsibility. Encouraging team members to take up knowledge upgrading initiative is very essential job of a manager. Mentoring employees towards more enriching and rewarding career is a responsibility every manager needs to shoulder.
- The study adds to the business improvement literature for SMEs as it provides a new, simple way of evaluation, based on the fit between ICT and Management Practices.
- This contributes to a relatively small body of literature and adds to the set of tools available to practitioners and researchers engaged in business improvement.
- The tool has a number of useful properties. In particular, managers of SMEs can relate to its simple and process-oriented approach as many see IT as functional.
- Another useful attribute is that the tool can be used at the business process level and also at a firm level. For example, the tool could be used to help identify which processes are important to a firm, and which are poorly supported by IT. Thus, it has the potential to help identify strengths and weaknesses of a firm.

Conclusion

The results show that many organizations use standardized ICT methodologies for better managing their organizations, and have in place the control structures required to monitor these methodologies. This in turn strongly suggests that such organizations practice these standardized methodologies.

Copies of Papers Published:

Sr. No.	Title of Paper	Details of Journal / Conference Proceeding	ISSN / ISBN No.	Month & Year of Publication
1	Review of Literature on the Role of ICT in Development of Business Management Practices	International Journal of Advanced Research in Computer Science and Software Engineering	ISSN: 2277 128X. IMPACT FACTOR 2.5	Volume 5, Issue 6, June 2015

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