Potential of Information and Communication Technology Towards the Success of the Indian IT Software Industry

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Abstract:
        India has also embraced ICT tools for strengthening its economic and technical power. The present research explores the potential of ICT towards the Indian IT Software Industry. This paper embraces modern ICT to explore and examines the potential of ICT towards the Indian Software Sector. In particular, it surveys the impact of Information on Communication Technologies with respect to information on the company's framed policies procedures. Further, it also examines its potential towards the Indian IT software and services sector. Only Primary data is used.Two Structured Questionnaire Modules are set. Cluster sampling and Random sampling is used respectively. Sampling frame is South India. Data collection methods are: Mails, Interviews and Schedules for both modules. Source list comprises of important Indian Software Entrepreneurs/Organizations.. A Pilot Testing is undertaken. To meet objectives, hypothesis test is applied. For statistical analysis, multivariate regression, Analysis of Variance and Factor Analysis is used. Test Statistics F or t is also used. For coding and computations, SPSS and Microsoft Office Excel along with embedded Q1Macros 2012 is used.

Keywords: Entrepreneur /Organization, explore, impact, Indian, Information on Communication Technologies, policies and procedures, potential, Software, Industry.

Overview: This paper comprises of seven sections in all. They are respectively: Introduction to ICT; Objectives of Research; Methods and Tools used; Review of Literature ; Meeting the Objectives; Recommendations and Bibliography.

1. Introduction to ICT

        ICT or Information and Communication Technologies research and applications include areas such as, ICTs towards education, ICT towards health care, ICT towards Pharmacy, ICT in libraries, ICT in Software and Services, ICT in Child Development, ICT in Women Empowering and ICT towards Gender Divide. Modern ICT can be used to for development in these fields. ICT is embraced by most of the countries today, for most modern economies and development.ICT proves to be an essential tool that empowers the poor by developing skills and strengthening governance. Hence, embracing ICT has become a must for any developing country like India. ManySeminars and conferences related to ICT in various disciplines are conducted in India every year. The Government of India has also realized its importance. The success of ICT–enabled development or e-Development is measured technically and also by its own advancement and development. This paper explores the potential of ICT towards the Indian IT Software Sector, including software services sector.

2. Objectives of Research
2.1 Objective A.
        To examine the impact of ICT and its potential towards the Indian Software Sector and explore the role of Information on Communication Technologies with respect to information on the company's framed policies and procedures**.**

2.2 Objective B
        To study the potential of ICT towards the Indian IT Software Sector.

3. Methods and Tools Used
3.1. Types of data used
 3.1.1. Secondary data. This is used only for review purpose. Secondary data is collected through Websites [1], journals, [2], [3], [4], books, e-books, NASSCOM publications[5], working papers, online libraries / journals [6],[7],[8],[9].

3.1.2. Primary data

Table 1. Details of primary data

	MODULE 1	MODULE 2
Data collection Methods	Mailing Interviews Schedules	Mailing, Interviews, Schedules
Sample size	60 (Out of 75 respondents, only 60 responded).	32
Sampling technique	Cluster Sampling.	Random Sampling
Type of universe	Finite Population	Finite Population
Sampling design	Informal experimental design (Before-and-after without control design) Formal experimental designs	Informal experimental design (Before-and-after without control design) Formal experimental designs
Sampling unit	Bangalore	South India
Source list	Important Indian IT/ Software Companies/Entrepreneurs	Important Indian IT/ Software Companies/Entrepreneurs

To meet objectives only primary data is used. Primary data is collected through two different modules of structured questionnaires. A Pilot Testing of the Questionnaire was conducted and thereafter, the required changes were made in the questionnaire, in an organized way, with the assistant of the respondents. Further details about collection of primary data, the sampling methods, sample size, sampling technique, sampling unit and the source list is as described in Table 1.

3.2. Techniques or tools used
The following other statistical tools are used and multivariate analysis is also done .
KMO and Bartlett's Test.
Important statistical measures like Mean, Mode, Standard deviation, variance, Multiple covariance
and Correlation Matrices are used.
Analysis Of Variance.
Regression.
F statistic or **t** statistic is used as test statistic.

3.3. Other materials used
SPSS and Excel is used. Q1 Macros 2012 incorporated/embedded with Microsoft Works (Excel) has also been used for further analysis and computations.

4. Review of Literature
4.1 ICT policies and strategies aimed at implementing the UNMDGS and WSIS objectives
WSIS Follow-up Regional Workshop was conducted at Bangkok during 29-31 May 2006.
It throws light on WSIS Plan of Action Objectives and UN Millennium Development Goals.

4.2 Nature of liberalisation, government support or other policy changes required
The development of stronger national and international protection for intelligence for intellectual property rights was also seen as essential to the development of the software industry. Foreign software firms that might send work to India were hesitant to do so if they could not be sure of the protection of their proprietary rights. A comprehensive analysis of the Indian Software industry with special emphasis on the software exports can be summarized as follows: The domestic as well as the

software industry has shown consistently high growth rates in the 90s although our share in the global export market is miniscule. About 73% of our export cargo consists of Professional Services, Consultancy and Training. However, there has been a visible shift of our software exports   towards off shore project development, which also includes off shore package development. Indian companies have exported software to more than forty countries but   there has been a heavy reliance on the US market. India's software export   trade has been characterized contracts, which allocate only the less-skilled   coding and testing stages to Indian professionals. Indian software export industry is heavily concentrated. It can be evidenced by the fact that only top 20 of the 400 exporting firms generate 70% of the   exports.

4.3 Evidence from Bangalore in India
ICT Sector, Globalization and Urban Economic Growth Evidence from Bangalore, India, is a   present working research paper (Working Paper No. 2010/80) by M. R. Narayana. This paper aims at economic analysis of economic globalization and urban growth of Bangalore, the *Silicon Valley of India*, as they are related to ICT sector.

4.4 Lessons from the Indian software sector
Economic Adversity and Entrepreneurship-led Growth Lessons from the Indian Software Sector is a research
 Paper (Working Paper No. 2010/04) by Suma Athreye. This paper argues that the business models chosen by Indian firms were those that best aligned the country's abundant labour resources and advantages to global demand. The paper also shows that the presence of growth opportunities and the success of firms stimulated institutional evolution to promote entrepreneurial growth.

4.5 National software industry development: considerations for government planners and software development India services
The research paper [10] jointly by Umesh Sehgal, Kuljeet Kaur & Pawan Kumar discusses on National Software Industry Development: Considerations for Government Planners[11]. Webdhoom [12] is a Software development India company who is dedicated to deliver the services as expected with due care and we fill proud our self to deliver the best approach to the customers. The Indian government has given complete support to the IT and ITES industry in India. The Indian government has even permitted 100% foreign equity [13]. From the foregoing analysis, it is clear that software is an area which will work as a catalyst to make India a 'Global IT Super Power' [14] . In India, the IT sector has not only grown in size but also complexity. Indian States resemble little nations. So, it is important to take regular stock of e-Readiness [15].

4.6 Review of Indian software industry
The Indian software industry has a unique distinction in that most of its output is [16] exported**.** Despite the high growth rates, India's share in the world software market is very low, but India still enjoys an   advantage over some of the other nations, which are trying to promote software exports. Coupled with the fact that the quality of Indian software is good and manpower cost is relatively low, it provides India a very good opportunity in the world market.

Location of Software Companies and Growth Rate. The industry is mainly concentrated around metros: Mumbai, Bangalore, Delhi, Hyderabad, Chennai, Calcutta, Pune and few other cities. Lately, Hyderabad, Chennai, Pune and Gurgaon and Noida have emerged as fast growing Software cities. At the same time Bangalore and Mumbai continue to attract investment in software sector With the amendments to the copyright Act and its rigorous enforcement, it is expected that in the coming years, piracy would be brought under further control. Also, the government has announced zero import duty on software.

Software Export Industry Growth and Revenue and Future. Interestingly, most of the export is in the form of providing software services, that is developing or helping develop software for organizations overseas. Most of domestic turnover comes through selling of software products developed primarily in other countries. That is, the overseas revenue is earned by providing services while the domestic revenue comes mostly through trading.[17].

Type of Services. On-Site Services, Offshore Services and Offshore Packages.

Software Activity for Domestic Software Export. Professional Services, Products & Packages, Turnkey, Consultancy & Training, Data Processing and Other.

Destination of Indian Software Exports. India exports almost of its total software exports of USA and to Europe. The six OECD countries (USA, Japan, UK, Germany, France and Italy) together have a good percentage of the market share of the world-wide software market. Interestingly, India's exports to these countries are yet higher. In the coming years, India is expected to strike many joint ventures and strategic alliances in Europe. The trade with European nations is growing rapidly.

There have been alliances to create more co-operation between Indian and European software companies [18].

Activity And Structure of Software Exports. There has been a shift towards offshore services in the software export cargo of India. The bulk of Indian software exports have been in the form of professional services. A detailed analysis indicates that majority of software exports are in the areas classified as "customized" or "professional consultancy". However, since last two years, there has been a visible shift towards off shore project development, which also includes offshore package development has increased to over a good extent during the year. Reasons attributed for this growth are increasing number of Software Technology Parks, liberalized economic policy and unnatural visa restrictions by U.S. and some Western European countries The degree of on-site development is still very high. It is expected to decrease further in the coming years with improved data communication links.

5.Meeting the Objectives
5.1. Objective A
To examines the impact of ICT and its potential towards the Indian Software Sector and explores the role of Information on Communication Technologies with respect to Work Culture Satisfaction of the respondents based on information of the company's framed policies and procedures. We now construct a regression model with Work Culture Satisfaction (X24) of the Indian IT Organizations as, the dependent variable. The test checks if the Indian IT Software Entrepreneurs are capable of implementing good policies and procedures so as to result in a good work culture satisfaction.
The independent variables X26, X28, X29,X30, X31 and X32 are respectively; Well informed about company's policies and procedures, Feel free to suggest changes for Dept. Improvement, Receive proper training to perform job effectively, Treated as a Valuable member of Company, Employees problems and complaints are resolved fairly & promptly, Job duties and responsibilities are clearly defined[a] Factor analysis is performed, and the Correlation Matrix of the variables prove to be 0.002.

5.1.1 Test1. We now construct a regression model with Work Culture Satisfaction (X24) of the Indian IT Organizations as, the dependent variable. The test checks if the Indian IT Software Entrepreneurs are capable of implementing good policies and procedures so as to result in a good work culture satisfaction. The independent variables X26, X28, X29, X30, X31 and X32 are respectively; Well informed about company's policies and procedures, Feel free to suggest changes for Dept. Improvement, Receive proper training to perform job effectively, Treated as a Valuable member of Company, Employees problems and complaints are resolved fairly & promptly, Job duties and responsibilities are clearly defined[a]
Factor analysis is performed, and the Correlation Matrix of the variables prove to be 0.002.

5.1.2 KMO and Bartlett's test

Table 2. KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.721
Bartlett's Test of Sphericity	Approx. Chi-Square	355.367
	df	28
	Sig.	.000

The KMO coefficient is .721, which is a good indicator of acceptance.

5.1.3 Syntax
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS R ANOVA
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT X24
 /METHOD=ENTER X26 X28 X29 X30 X31 X32.

5.1.4 Output:Regression
Table 3. Variables entered /removed

Model	Variables Entered	Variables Removed	Method

| | Well informed about company's policies and procedures, Feel free to suggest changes for Dept. Improvement, Receive proper training to perform job effectively, Treated as a Valuable member of Company, Employees problems and complaints are resolved fairly & promptly, Job duties and responsibilities are clearly defined[a] . | | . Enter |

a. All requested variables entered.

Table 4.   Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.955[a]	.912	.902	.157

Table 5. ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	13.623	6	2.271	91.873	.000[a]
Residual	1.310	53	.025		
Total	14.933	59			

a. Predictors: (Constant), Well informed about company's policies and procedures, Feel free to suggest changes for Dept. Improvement, Receive proper training to perform job effectively, Treated as a Valuable member of Company, Employees problems and complaints are resolved fairly & promptly, Job duties and responsibilities are clearly defined.
b. Dependent Variable: WORK CULTURE SATISFACTION.

Table 6. Coefficients[a]

Model	Un standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.058	.094		-.619	.538
Treated as a Valuable member of Company	.087	.042	.108	2.061	.044
Feel free to suggest changes for Dept. Improvement	-.013	.035	-.016	-.380	.705
Job duties and responsibilities are clearly defined	.521	.087	.565	5.999	.000
Receive proper training to perform job effectively	.015	.050	.019	.305	.761
Employees problems and complaints are resolved fairly & promptly	-.107	.066	-.131	-1.622	.111
Well informed about company's policies and procedures	.456	.080	.495	5.681	.000

a. Dependent Variable: WORK CULTURE SATISFACTION

Result of Test1. The computed value of F is too high compared to the table value of $F_{(6,59)}$
That is, the Indian IT Entrepreneurs are successful in providing   an excellent work culture satisfaction, based on its policies and procedures.

Note. Yet, the required and necessary positive improvements or changes can be studied from the Table 6.

5.2. Objective B

To study potential of ICT towards the Indian IT Software and Services Sector.

5.2.1 Association With Various Stages of Software Development

Table 7. Type of participation of respondents in various stages of software development

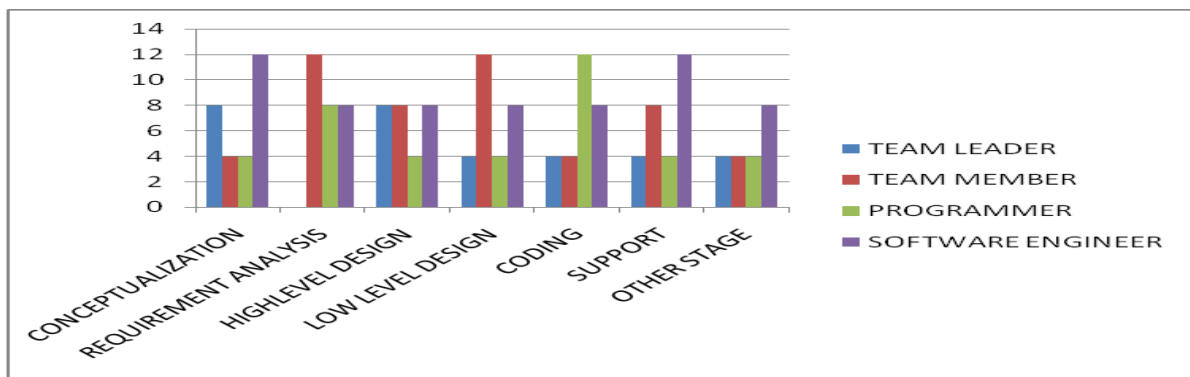| Frequency	Team leader	Team member	Programmer	Software engineer
Conceptualization	8	4	4	12
Requirement analysis	0	12	8	8
High level design	8	8	4	8
Low level design	4	12	4	8
Coding	4	4	12	8
Support	4	8	4	12
Other stage	4	4	4	8
Total	32	52	40	64

Figure 5. 1 Type of participation of respondents in various stages of software development

Result. Share of the respondents as Software Engineer is Highest (and equal) in Conceptualization and Support Stages; lesser (and equal) in all other stages Share of respondents as Programmer is highest in coding level, lesser in Requirement Analysis. In all other levels this share is equal. It is equal to one- third of coding level contribution. Share of Team members is highest and equal in Requirement Analysis and Low level Design; followed by a lesser contribution but equal in both high level design and support level; equal and yet half of this in other levels. Share of Team Leader is highest and equal in Conceptualization and High Level Design; half of it and equal in other levels.

5.2.2. Partnership with global IT leaders

Table 8. Partnership with global IT leaders

| Column1	Frequency
YES	28
NO	4
TOTAL	32
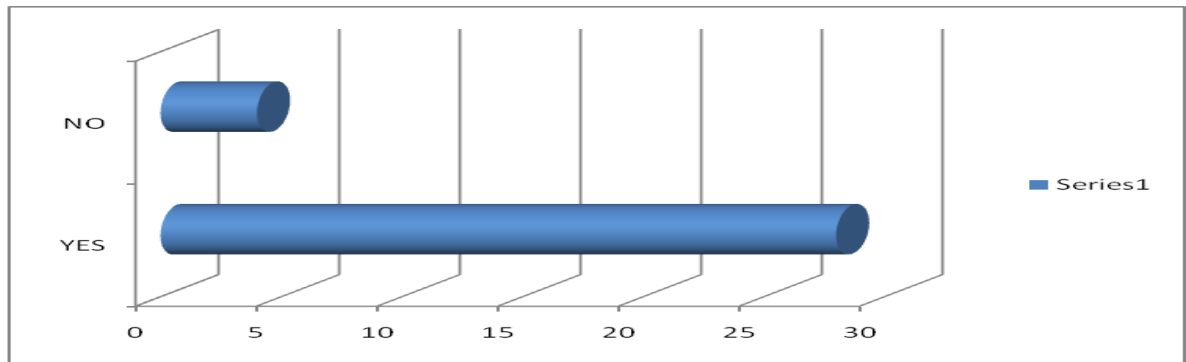
Figure 5. 2 Partnership with global IT leaders

Result. 87. 5% of the Indian IT Companies under this study report to have partnership with Global IT Leaders. This is an excellent indicator of the positive Impact of ICT on the Globalization with Indian IT Software Companies / Entrepreneurs.

5.2.2   Financial Resources

Table 9. Financial resources

Column1	FREQUENCY
Personal funds	8
Equity funds	16
Bank loan	16
Private loan	8
Total	48
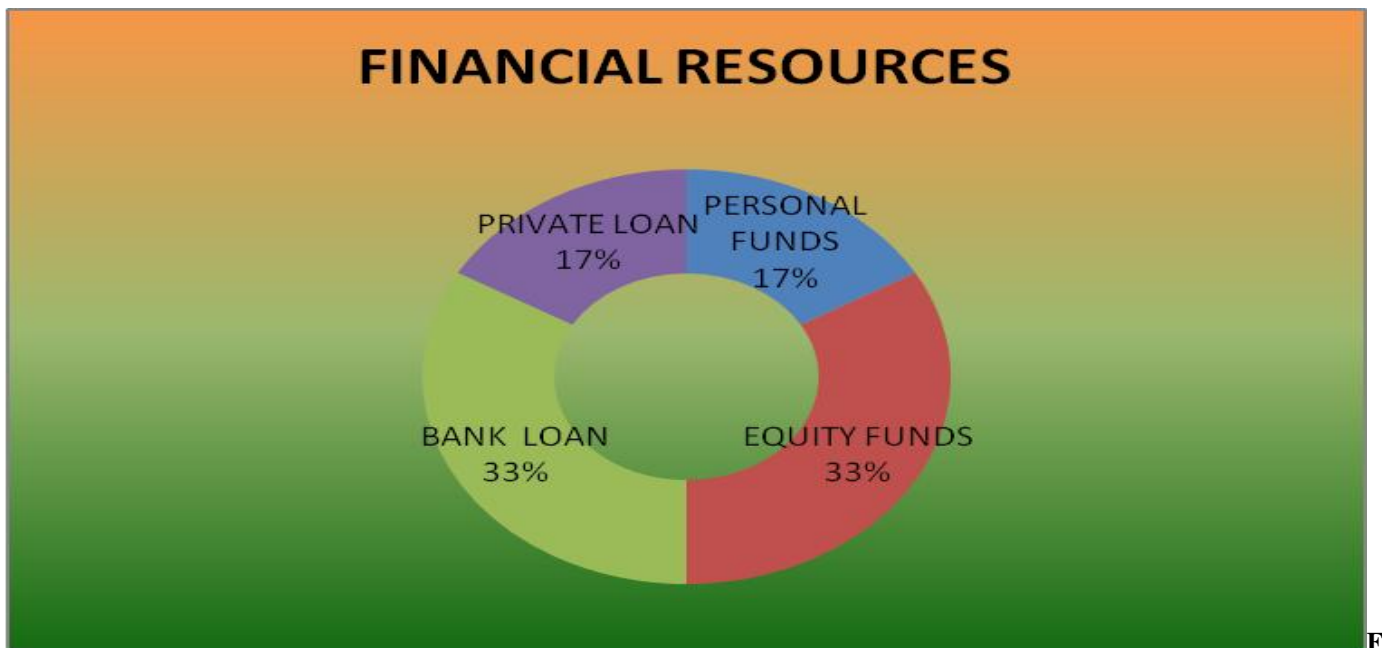
igure 5.3   Financial resources

Result. Among the financial sources, both Equity Funds and Bank Loans contribute equal share of 33.3% **.**

6. Recommendations

Software reuse and related area is another related demanding research area, which can prove to be fruitful. Structural equation Model can also be used for statistical analysis purpose.

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▪ Department of Information Technology, Govt. of India
▪ Software Technology Parks of India, HQ, New Delhi
▪ National Taskforce on Information Technology & Software Development
▪ National Association of Software and Service Companies (NASSCOM)
▪ National Informatics Centre (NIC)
▪ National Centre for Software Technology (NCST)
▪ Centre for Development of Advanced Computing (CDAC)
▪ Centre for Materials for Electronics Technology (C-MET)
▪ Computer Maintenance Corporation Ltd. (CMC)
▪ ERNET India
▪ Standardisation, Testing & Quality Certification (STQC)
▪ MIT Accreditation of Computer Courses (DOEACC)
▪ IT & Communication Dept., Govt. of AP, AP Technology Services (APTS), Govt. of AP
▪ AP Online, Govt. of Andhra Pradesh Institute of Electronic Governance HITEC City, Hyderabad
▪ International Institute of Information Technology (IIIT), Hyderabad
▪ Hyderabad Software Exporters Association (HYSEA)

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