IMPORTANCE OF DATA IN MODERN BUSINESSES AND NEED TO DEVELOP NEW SKILL-SETS

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ABSTRACT

Digital data culture is changing globally with a sharp increase in internet users, expansion of social networking media and smart applications on the mobile devices. The extensive availability of data on different open sources is forcing all business segments (pure businesses, political setups, governance tools and various social organizations) to change their methodologies and approaches to doing respective businesses. Decision-making is more analytical and rationale than in the past, where intuition rather than cold logic was the norm. Future-ready organizations cannot ignore data inputs for reengineering their business processes or adding value in the customer delivery chains. Consumer has not only a wide range of choices but also a transparent regime to choose from, thanks to the smart applications. This expansion in data use is driving the demand for data ready analysts and data literate workforce.

The higher education in India must face this revolutionary change in the way business is being transacted. It is not only the information and technology syllabus, but also other syllabi, which need an application oriented knowledge delivery on data management. Management schools require increasing their data handling and data analysis content, in order to groom data analysts and enhance ability of all graduates to understand data language.

KEYWORDS

Digital Data, Decision Making, Management Schools, Skills Set etc.

INTRODUCTION

Digital technologies place numerous data in the hands of all stakeholders, since most activities around us are highly dependent on the way data is generated, stored, accessed and analyzed for its eventual use. The data is streaming-in endlessly on various social media pages and available on various search engines, sensors and government or semi-governments web pages. "Big Data is surely the Gold Rush of the Information Age" (Marshall, 2012, p.213). In India, most of large and medium scale private sectors have aligned businesses with this growing data-dependent phenomenon, at least in management of information. This is also trickling down to medium, small and micro scale enterprises, depending on their understanding and usefulness of the data. Unfortunately, public sector, specially the governance is slow to catch on this and it is evidenced by the un-updated administration web pages and slow responses of various access points. As Mei-Pochtler, Reich and Merey (2013) explained, digital culture removes constraints of time and space and makes all *business segments* scalable, mobile and accessible in a truly democratized manner. It applies to all functions of our activities, both at governance and business levels. Digital technology can provide new ways to enhance the socio-political reach, increase business revenues with greater differentiation and competitiveness, while enhancing and promoting greater consumer engagement.

Athey (2013) in BCG perspective had explained how the proliferation of big data is changing business management in all sectors. This has resulted in an enormous demand for new and different skill sets. Information volume created by big data needs greater number of data analytics, with their different function and skill sets, ranging from data collectors or surveyors, data miners, data codification experts, data handlers to analysis. Every *business segment* needs experts to write the code to pull data from large data sources and aggregate it into a form that is useful for its activities. Data studies start from a simple numerical analysis to complex statistical insight involving machine learning or econometrics. On the World Wide Web, this has translated into various modeling tools that predict clicking or accessing of web page links, thus combining with product offers to the unsuspecting consumers (Athey, 2013). Every *business segment* needs a high-end digital analytics and every manager of this digital age need to be able to understand and evaluate the output from these analysts. This is emerging as core business differentiator for all business segments.

OBJECTIVE OF THE STUDY

This article, prepared through a meta-analysis looks at the way availability of big data is changing the management culture. In the process, it attempts to establish a need for generation of data analytics and a global digital work force for the future.

CHANGES IN THE MANAGEMENT CULTURE

Increased attention to data is already happening in most of the Fortune-500 companies across the globe. Some of these companies have their bases or segments in India, dealing with designing, manufacturing, data processing, and even research and development. Companies are increasingly growing dependent for their decision-making on the available data and its analysis. Google carries out thousands of experiments every year to mine and analyze data for determining future direction of the company.

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There is a constant updating and reconfiguring of the way one looks at *Google* interface or the *g-mail* pages. This is achieved by a constant analysis of users' choices (Athey, 2013). To be of strategic utility these anticipated changes need to be put through the rigours of statistical scrutiny. This invariably involves trained statisticians and analytics in most organizations. Modern businesses need their finance and business planning departments to evaluate inputs from these statisticians and data scientists, before making any strategic commitments on resources.

Many business segments, especially in India, depend on public sector for their data resources. National statistics office at central government level is the usual place to look for the data. The independence of a national statistical system from improper political influence is an important aspect of data quality (Ljones, 2011). Official statistics should be fully independent from political interference as these are often used in making political decisions. Various *business segments* using this data, must evaluate the accuracy of data collected for administrative purposes. It is the case with private enterprises. The Confederation of Indian Industry (CII) had conducted a study on data inaccuracy in product master data of various retailers and suppliers (CII, 2011). The study revealed huge array of inconsistencies where average data match between retailers for the same product was less than 50% across parameters. Inefficient master data sharing among supply chain partners and maintaining different data versions were some of the issues, thus questioning the data integrity. Another aspect was non-availability of expert data handlers at various stages of data storing and analysis.

A decade from now**,** consumers will have a different set of priorities, consumption habits and user values. This is applicable on all business segments - voters' choices, civil society objectives or product or process consumers. Most products of daily necessity like refrigerators, microwaves, air conditioning units, televisions, cars, watches, toys etc. will contain a huge digital component. These are likely to be connected to the internet and will interact with each other. This will facilitate consumers' interaction with these products and services remotely using their smart-phones or tablets. This will generate a massive data from these digital devices, which needs to be captured depending on the permission designs, stored, analyzed and used for better consumer products and services. Most of the business segments are using new-age devices, applications and cloud computing tools, thus becoming familiar with the term of big data. Due to the accumulation of such enormous amount of data, the analysis has become difficult with the traditional tools. To infer usefulness of data, meaningful solutions like predictive analysis is the need of organizations and it depends on the way volume of complex data is managed.

A digital manager will need to go beyond available statistical repositories like the 'National Statistical Survey' and create own repository in the chosen field. While data is available on the internet, it is the mental algorithm of mining and usefully analyzing, which is the real differentiator. Real-time collection of data from monitoring devices or from users' interaction with websites enables machine learning in real time, which can improve a company's performance relative to its competitors. As Akbar (2011) looked at modern workplace and family, and found that both "exist inside overlapping digital bubbles" (p. 11). In both scenarios, digital information is lying out in the open and thus needs to be managed. Most of the digital evidences are stored and remain on the servers of the service providers or organisations. The author estimates that the volume of data from each family nearly equals that from a small business. Almost all family members interect digitally via email, Facebook, Twitter, g-chats, Skype, Whatsapp or Texting.

Setia, Venkatesh and Joglekar (2013) had examined relationship between the information quality of a service provider and its customer service capabilities to sense and respond to customers' needs. The authors established the role of a localized digital design in a firm's customer-side digital business strategy. Customer orientation capability through accurate data analysis represents a culture with customer focus and will always be an invaluable capability for better customer service process (Brady & Cronin, 2001; Desphande et al., 1993 as cited by Setia et al., 2013). Significant impacts of local information quality imply that business strategists need to prioritize initiatives to enhance local digital designs. Applying on local scene, India's internet ecosystem has undergone a vast change. Latest reports suggest that by 2014, India will surpass USA in the number of internet users. Due to multiple service providers, data transfer speeds have moved rapidly. Cost per megabyte downloads and infrastructure set ups have decreased dramatically. Storage capacity, density and costs have also reduced proportionally, thus making India a global player in data handling capability.

STRATEGIES FOR BUSINESS SEGMENTS

Future is about harnessing the massive streams of data for each business segment. Huge mass of data moving across globe has provided unending strategic significance to all the business segments. This transformation is also visible in Indian scene. Data generation and availability across the nation can accelerate and scale up businesses, understand changing needs of Indian customers, fine tune product designs and help in devising strategies to counter competitors. Again, data analysts will undoubtedly play a crucial and central role in this quest. Political entities, social organizations and various service sectors are employing data experts to garner and analyze critical data. Unfortunately, in India, at senior management levels, this is still a no-go area and much is left to an intuitive decision-making or doing business with yesterday's success formulae. Specifically to data usage, three strategies must be inherent in any organization;

- To create a strategy to leverage most important data assets of an organization.
- To utilize advanced-analytical approaches to encounter data based challenges.
- To utilize analysis in transforming business models.

Data is being used for varying purposes, which includes data-driven policing and traffic management, voice recognition, customer services on the move, reservations and booking of tickets on the go. Various global cities are depending on digital policing of streets and avoiding putting police personnel in harm's way. Another fascinating strategy is to use data sensors to monitor the parts of a complex machine, such as a car or an airplane, or medical condition of serious patients. Medical diagnosis is another area emerging out of huge repository of data. Both academics and the financial industry have mined sources such as Google trends, to find specific patterns of search behavior. Use of academic-researcher and industry interface through data sharing is another emerging strategy on product improvement and developing new products or processes.

Lazaroiu (2011) believes that traditional or creative enterprises and research data studies can network as a cultural process. This will lead to a new network identity formation and transformation of all *business segments* in the loop.

Saleh (2013) has postulated that traditional companies might choose to collaborate with so-called digital native enterprises and may not develop such in-house expertise for economic reasons. These companies need mentoring on third-party integration and necessity for a collaboration model. At the basic level, these companies may not "understand the ways digital-ecosystem players form partnerships and the common terms for their deals" (Saleh, 2013). However, this trend will undergo change as more data dependency arises in future.

Setia et al. (2011) had postulated through their paper on customer-side digital business strategy, where they highlighted customer orientation and response capabilies as two localized customer service capabilities to enhance service performance within an organization. Further, the authors' used a coordination perspective to examine the capability-building impacts of the interplay between information quality and customer service process sophistication of the organization.

Technology changes have often been called sustained or disruptive based on "whether they sustain the industry's rate of improvement in product performance or disrupt/redefine that performance trajectory" (Christensen and Bower cited by Cristina et al., 2011, p. 214). It is well known that the companies with new technologies will always have the first-mover advantage from technology leadership perspective. Traditional data is slowly being replaced by new age data from syndicated or impromptu consumer feedback, like, web pages, search engines, social networking sites and automated recorded responses (Saleh, 2013). Many traditional organizations are struggling to operate at a faster pace of product and business model change. This is another area where the companies are finding dearth of skilled manpower to take them across the technology threshold and provide them the agility and responsiveness.

In a fast-paced data integrated environment, customers will demand new levels of experience and service. Customer expectations are changing for 24-hour service, better interface and quicker response with 'always-on' availability. Modern organizations need better data interface to improve their ability to analyze customer needs. A glance at the data availability at the hands of average households explains the importance of this field. A family will maintain desktops, laptops and iPads with multiple email accounts. Many times networks with computers at home may act as servers. We are already witness to texting on various media-formats replacing phone calls and even emails. Most family members are present in social network spaces almost 24x7 (Akbar, 2011). The present data and password regime is looking for security and protection specialists, who understand and can be the protection force behind hapless users.

NEED FOR NEW-AGE MANAGEMENT PRACTITIONERS

MBAs are generalists in India and fixated on the theories, which are western in outlook but dated and unchanged for decades. One often hears complaints of their low employability and lack of practical application. Addition of digital and data sense can create a new deal of management graduates. We need to add good business intuition in the fresh graduates who must be imbibed with the language of statisticians as a part of their new-age skill-sets. All management students must be exposed extensively to the data management, mining and analysis. Future project management or business propositions will be highly dependent on data accuracy and analysis. Practitioners will need to create their own categorization structure or taxonomy for insights. In the digital domain, product development and improvement cycles; as also the marketing tools are significantly more accelerated as compared to the traditional businesses. Having the right technology, analytical skills, and data integrity in place will be critical (Saleh, 2013). MBA graduates need to understand data analysis to be able to communicate with other teams who rely mostly on data.

Mithas, Tafti and Mitchell (2013) predicted that digital strategic posture has a divergent effect on strategy under higher industry turbulence, but convergent effect on the same under industry concentration and growth. The authors further point to the implications of imperfect data information with the managers limiting their foresight on the optimal level, regarding digital strategy. Another facet of data application is risk management and mitigation. Future managers need to be digital fire fighters and face various contingencies, as risk will always be a consequence of dependence on data. In this connection, managers need to study and estimate the effects of internet dependence of a business segment and contingency plans prepared.

CONCLUSION

Many organisations are using new ways to profitability by using data analysis software to measure employee success. Human resources software is used to pull data from the business segments and analysed in the context of high-level corporate goals. Data analysis reveals insights about improvement of worker performance. Various studies by IT industry show a surging demand for

data analysts which is even higher than the demand for programmers and software developers. Data analysis has become an important input mechanism across all industries; a glimpse is visible in the way political parties are using the data and creating tweets or social media messages suited to different demographic groups. This has also benefitted sports industry tremendously as is witnessed from improved performances across the games and sports disciplines. New technology being absorbed by the industry will increase the demand for more data analysts.

The technology has evolved faster than the workforce skills to make sense of it, and organizations across sectors must adapt to this new reality. Traditional methods such as reports and dashboards are running obsolete. Businesses are not only looking at data analysts to only understand and interpret data, but also to work with the organization's leadership teams to facilitate strategic decisions. This is a big change that our academic institutions can leverage and make our young graduates employment ready.

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TECHNOLOGICAL PROGRESS IS DIRECTLY PROPORTIONAL TO RESEARCH & DEVELOPMENT: AN INDIAN PERSPECTIVE

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ABSTRACT

Globalization of Research and Development (R&D) is the outcome of seamless economies providing new opportunities for businesses, to leverage on the local strengths and derive the advantages of specialization on a global scale. While business strategies drive globalization, other factors play a vital role in globalization of R&D. R&D in India is poised for a massive upturn in economic and social growth. The XIth Five Year Plan (FYP) includes a four-fold increase for education over the previous plan. It also targets growth of R&D as a share of GDP from the current levels of 0.9% level to 1.2% by 2012. The present paper seeks to provide a background on development of R&D in India and provide an overall understanding of the how R&D would impact an Indian enterprise primarily in the pharmaceutical, technology hardware and automobile sectors as an impetus to the growth of R&D in India.

KEYWORDS

Multinational Companies, Five Years Plan, Research and Development, Globalization, Technological Progress, Science and Technology, Correlation Coefficient, OECD, ITES, Off shoring etc.

INTRODUCTION

Overview: With the globalization of businesses, corporate innovation strategies tend to be global as well. As in any other field, Globalization of R&D is the outcome of seamless economies providing new opportunities for businesses, to leverage on the local strengths and derive the advantages of specialization on a global scale. Multinational companies are spending a significant and increasing share of their R&D money outside the countries in which they are headquartered. These companies are gaining better returns on their R&D investment than companies that exclusively keep their laboratories at home.

R&D managers in both high and low-R&D effective organizations are found to attach similar importance to the skills and knowledge bases needed to have an impact on overall business performance. However, organizations that were rated by their managers as "high-R&D effective" are significantly more capable than their "low-R&D effective" counterparts in almost all areas. They are especially better prepared in accelerating new-product development, forming strategic R&D and marketing alliances, understanding customer needs, and commercializing technology. High-R&D effective organizations develop these capabilities and excel in performance by building extensive internal and external linkages, by pursuing business-driven R&D while encouraging experimentation and risk-taking, and by learning from their prior new-product development introduction experiences and quickly launching the next generation of products. Senior management in high-R&D effective organizations is more tolerant of failure, perceives R&D to be an important contributor to business performance, and gets involved during the early stages of New Product Development.

The demand for learning quickly from marketplace experiences and incorporating that learning in the next generation of products is forcing corporate leaders to rethink the way industrial R&D is managed. It indicates a considerable mis-match between R&D's capabilities and what R&D perceives as important in affecting future business performance. It is, however, not clear from their study, how those firms that achieve high-R&D effectiveness differ from their low-R&D effective counterparts with respect to the management of R&D. In other words, what do firms that achieve high-R&D effectiveness do differently from those that do not?

High R & D firms in Indian context can be regarded as those, which are technology based like Pharmaceutical, Automobile Industries etc. whereas Low R & D firms in Indian context are relatively lesser technology based like FMCG's and Small and Medium Enterprises who are low on budget to spend on R & D (**Source**: R & D Industry: An Overview, November, 2007, Department of Scientific & Industrial Research, Ministry of Science & Technology, GOI, New Delhi).

This article compares 15 high-R&D effective firms with 12 low-R&D effective firms on three dimensions:

- Importance of certain skills and knowledge domains needed to manage R&D effectively.
- Capabilities of R&D in each skill and knowledge domain needed to manage R&D effectively.
- How R&D is managed in high- and low-R&D effective organizations with respect to: building internal and external linkages, achieving business results, speeding product development, and gaining senior management support.

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The findings are based on a survey of R&D managers in technology-based firms in a variety of industries. The R&D managers were asked about their perceptions of R&D management practices; their organizations' capabilities in performing R&D; and how important some key knowledge domains are to the successful implementation of R&D; e.g., forming R&D strategic alliances, accelerating new product development. One key question was, "How effective is R&D in achieving your firm's performance objectives?" We did not provide the R&D managers with any specific measures of performance objectives or effectiveness because we were interested in their personal perceptions of R&D's effectiveness in influencing the firm's performance.

We also sought to determine: Which activities aid the successful implementation of a firm's R&D policy? How is it that some companies achieve high effectiveness in R&D while others do not? Which R&D activities influence R&D performance / effectiveness? These are some of the major questions addressed in this article.

***Importance of Key Skills / Knowledge Domains*:** To have a positive impact on organizational performance in new product development, R&D needs knowledge and skills in such areas as concurrent engineering, accelerating product development, TQM, understanding customer needs, etc. We wanted to find out from our R&D managers, how important these knowledge domains were to them. A five-point scale was used, ranging from High Importance (5) to Little Importance (1). Each manager was asked to rate each of the knowledge domain areas on its importance to them. The results are presented in Table 1.

Table-1: Importance of Key Skills/Knowledge Domains in Firms Perceived To Have High- and Low-R&D Effectiveness (In Descending Order of Importance to the High-R&D Effective Organizations*)

Importance Ratings (*Mean rating of 5 = high importance and 1 = low importance)			
Importance of the following skills/knowledge areas needed for effective R&D management	**Mean score in high-R&D effective firms (n = 15)**	**Mean score in low-R&D effective firms (n = 12)**	**Is the difference in mean scores significant at 0.05 levels?**
Understanding customer needs	4.72	4.77	No
Monitoring market developments	4.37	4.20	No
Managing multiple R&D projects	4.34	4.10	No
Accelerating new product development	4.32	4.35	No
Technology commercialization capabilities	4.28	4.37	No
Working with other organizational functions	4.22	4.30	No
Capturing and relying upon R&D learning	4.16	4.02	No
Monitoring science & tech developments	4.12	4.02	No
Measuring R&D performance	3.97	4.00	No
Total Quality Management	3.89	3.61	No
Meeting government regulations	3.88	3.94	No
Concurrent engineering	3.78	3.77	No
Securing intellectual property rights	3.70	3.81	No
Forming/participating in strategic alliances	3.69	3.54	No
Conducting R&D on a global basis	3.29	3.53	No
Managing ethnic/cultural differences in R&D teams	2.92	2.78	No

Sources: Authors Compilation

The data indicate that the R&D managers in both high- and low-effectiveness groups attach similar importance to key knowledge areas. They both agree **(Spearman rank correlation coefficient = 0.93)** that understanding customer needs, monitoring market developments, managing multiple R&D projects, accelerating new product development, having technology commercialization capabilities, and building cross-functional teams are among their top priorities. The consensus between the two groups on "what is important to R&D" was remarkable. There were no significant differences in any knowledge areas. What then, if anything, distinguishes these two groups?

Organizational Capabilities: Even though the R&D managers in both high- and low-R&D effective organizations assigned equal importance to the skills and knowledge they need in order to have an impact on the firm's performance, there was a wide gap between their capabilities in almost all of the skills / knowledge domains we studied. Those R&D organizations that were perceived to have a great deal of influence on the firm's performance were simply more capable in each area. The largest gaps (Table 2, Section A) between the capabilities of high- and low-R&D effective organizations were found in: how to accelerate the development and commercialization of new products; how to combat the "Not Invented Here" attitude in order to seek and nurture mutually profitable strategic alliances; how to understand customer needs even before the customer realizes it; how to develop technology commercialization capabilities so that research ideas can be converted into important new products; and how to learn quickly from NPD (New Product Development) experiences and incorporate that learning into next-generation products. High-R&D effective organizations have developed these skills and knowledge bases largely.

Table-2: Key Differences in High- and Low-R&D Effective Organizations (Only Significant Differences Are Presented*)

Importance Ratings (*Mean rating of 5 = High Capability, Great Involvement, Strongly Agree, etc. and 1=Low Capability, Less Involvement, Strongly Disagree, etc.)			
	Mean score in high-R&D effective firms (n = 15)	**Mean score in low-R&D effective firms (n = 12)**	**Level of significance of difference in 2 groups**
A. Capabilities in the following skill/knowledge areas needed for effective R&D management:			
Accelerating new product development.	3.57	2.89	0.000
Forming / participating in strategic alliances.	3.31	2.60	0.000
Understanding customer needs.	3.84	3.26	0.001
Commercializing technology.	3.48	2.86	0.001
Capturing and relying upon R&D learning.	3.57	3.08	0.002
Measuring R&D performance.	3.33	2.73	0.003
Implementing Total Quality Management.	3.50	2.94	0.004
Working with other organizational functions.	3.72	3.22	0.005
Monitoring science & tech developments.	3.60	3.16	0.005
Using concurrent engineering.	3.31	2.77	0.005
Managing multiple R&D projects.	3.85	3.43	0.007
Securing intellectual property rights.	3.66	3.29	0.06
Monitoring market developments.	3.26	2.96	0.06
B. R&D's involvement/interaction with non-R&D groups:			
Customers.	3.88	3.26	0.002
Manufacturing.	3.57	2.89	0.002
Sales.	3.35	2.74	0.006
Service.	2.78	2.28	0.009
Senior management.	4.06	3.58	0.012
Quality assurance.	3.10	2.54	0.012
Marketing.	3.82	3.30	0.014
Strategic planning.	3.85	3.41	0.02
Finance.	2.45	2.04	0.023
C. To establish internal and external linkages, in our organization:			
R&D interacts with customers to a great extent.	3.93	3.22	0.001
We have excellent communication between R&D and marketing.	3.67	3.12	0.006
We have excellent communication between R&D and manufacturing.	3.51	3.04	0.008
We place great importance on developing linkages with other organizations for successful R&D and new product development.	3.71	3.00	0.001
D. Linking technology-business strategies, in our organization:			
We have succeeded in closely linking R&D to our business strategies.	3.93	3.26	0.000
Funding for high-risk basic research is becoming more difficult.	3.91	4.24	0.09
The willingness to pursue truly innovative research has lessened.	3.22	3.61	0.08
Difficulty in measuring R&D payoffs is increasing.	2.72	3.06	0.08
E. To accelerate new product development, in our organization:			
We emphasize learning from our new product development process	3.61	3.21	0.03
F. In our organization, senior management:			
Is troubled by the question: What are we getting for our investment in R&D?	3.15	4.14	0.000
Perceives R&D as a high risk and uncertain activity.	2.82	3.55	0.000
Perceives their role in R&D planning as one of providing money, and not the leadership or discipline demanded for excellence.	2.58	2.98	0.08
Devotes little attention to the early stages of product development.	2.85	3.26	0.09
Encourages "bootlegging" more than before.	2.97	2.50	0.03
Has become more tolerant of failure to encourage innovation, creativity and risk taking.	2.68	2.14	0.008
Sources: Authors Compilation			

The capabilities for which the differences between high- and low-R&D effective organizations were insignificant included areas judged as being low in importance (e.g., conducting R&D on a global basis and managing ethnic/cultural differences in R&D teams) as well as areas in which all organizations were required to do well (e.g., meeting government regulations). How high-R&D effective organizations develop these capabilities is discussed below:

Achieving Excellence in R&D:

Build Internal and External Linkages

Even though the emphasis on cross-functional integration has been increasing, a large number of R&D managers were concerned about their limited involvement with key functional groups and interfaces. Many of the R&D managers recognized that they needed to actively bridge this "involvement gap" to create synergy between their R&D group and the other business functions, both internal and external to their organizations. R&D also needs to increasingly involve non-R&D personnel in developing new products, in determining R&D's priorities, and in helping to plan the organization's technology strategy. Therefore, R&D needs to forge significant, long-term relationships and establish productive linkages with non-R&D groups both within and outside their organizations. Such a shift from unproductive internal functional competition to increased collaboration will increase speed, minimize duplication of effort and reduce opportunities and incentives to hoard information.

Comparison of high and low-R&D effective organizations indicates that the former involve/interact with customers, manufacturing, sales, service, senior management, quality assurance, marketing, strategic planning group, and finance to a significantly greater extent than their low-R&D effective counterparts (Table 2, Section B). Involvement of suppliers and participation in joint venture/strategic alliances in the R&D process also is greater in high-R&D effective organizations. However, it is not significantly different from the low-R&D effective organizations. It seems that organizations in general need to learn how to benefit from supplier involvement and forge successful strategic R&D alliances.

The data also reveal that, although 82 % of the R&D managers agreed, "Open, frequent and early communication between R&D, marketing, manufacturing, customers….is important," there are significant differences in the high- and low-R&D effective firms in terms of what is actually achieved. For example, Table 2, Section C, indicates that high-R&D effective firms have significantly better communication with customers, marketing and manufacturing. They also place great importance on developing linkages with other organizations for successful new product developments. As mean ratings for high-R&D effective firms are all less than 4 on a 5-point scale, there is room for their further improvement in each of the areas.

High-effective firms also need to work on involving suppliers in the new product development process. The involvement with suppliers, customers and outside R&D resources, and participation in joint ventures and alliances needs to be perceived as important. "With resources more limited than ever before, R&D leadership must now contend with entrepreneurial considerations--such things as how to leverage partnerships with suppliers and customers and how to utilize outside R&D resources". Thus, to cite one example, partnerships with suppliers helped Cipla to improve its market share and profitability significantly by speeding up product development (by 40 percent), lowering development costs (by 24 percent) and reducing procurement costs (by reducing number of buyers by 30 percent).

Achieve Business Results

Both high- and low-effective R&D organizations recognize the increasing pressures to produce short-term incremental business results rather than wait for breakthroughs. Launching research projects with technology transfer in view is still a problem for both groups (mean ratings are close to neutral = 3) and they are working toward making R&D accountable to line divisions (mean ratings close to 3.5--slightly above neutral). However, the success of high-R&D effective organizations lies in developing R&D and technology strategies in line with business strategies (Table 2, Section D).

"Researcher as businessperson" also is increasingly viewed as a key to creating a high-performing R&D group. While maintaining a business-driven R&D culture, high-R&D effective organizations also often encourage high-risk basic research projects and provide incentives to pursue truly innovative research that may not have immediate business applicability. The high-R&D effective organization also has less difficulty measuring R&D performance than its low-effective counterpart.

Learn To Speed Product Development

"Today's market-entry barriers are no longer financial or intellectual, but the ability to very quickly turn technology into the right products. Business success is now determined by how long a firm can maintain a 'monopolistic' position with a product or service and, to do that, speed to market is absolutely essential." Although speed of commercialization is important, our study indicates that, overall, only 34 percent of R&D managers agreed that they emphasize speed over budgets in their product development efforts. Both high- and low-R&D effective organizations give a less-than-average rating (under 3 on a 5-point scale) to emphasizing speed over budget.

Both groups also use tools and technologies such as computer-aided design (CAD), computer models, simulation tools, and software to make their product development processes more efficient. However, what differentiates high-R&D effective

organizations from low-R&D effective organizations is the emphasis they place on learning from their prior new product introduction experiences (Table 2, Section E). They use this learning to quickly launch the next generation of products. Overall, only 50 percent of our R&D managers indicated practicing the launch-learn-launch mode.

R&D in India is poised for a massive upturn in economic and social growth. It is also on a path to becoming a technology driven superpower in the coming years. For India to derive maximum growth centric advantage through Science & Technology (S&T), its S&T fundamentals have to be strong and excellent.

Technological progress is an important contributor to economic growth and plays a vital role in the advancement of modern economy. Undoubtedly, companies, which persistently invest in R&D, outperform others. The pace of technology is accelerating, specialization and systems requirements are ever increasing, newer technologies are rapidly becoming important, companies therefore need to focus heavily on R&D. It is a crucial factor in determining the competitiveness of companies in the marketplace, nationally and internationally.

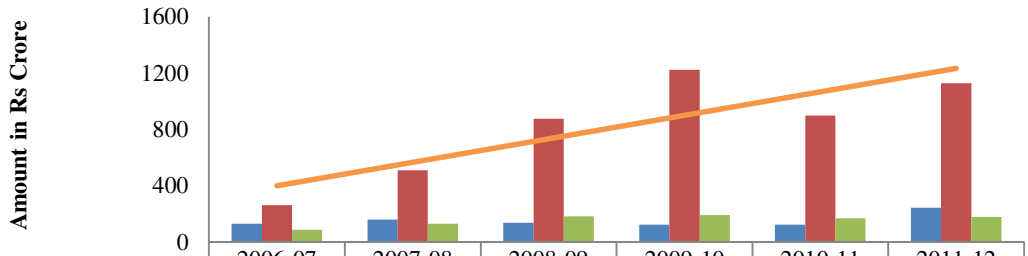
The extent of R & D undertaken generally depends upon the Industry, the technological field in which the company is based and the extent of competition. The industry, academia as well as the government generally undertake R & D. Although businesses have traditionally developed research capabilities in house, they have also established collaborative links with other organizations, such as universities, and acquired technology from other enterprises through licensing or takeovers.

R & D in specific areas can yield significant benefit to the nation as a whole, however may not be cost effective for investment by the private sector. Hence, there is a necessity for the government to step in and support R&D efforts. Rationale for government participation in R&D may include the following:

- Innovations resulting in cost reduction across all consumers: R&D in this area is in the interest of the society, however may not be pursued by the industry since there are no direct benefits to the industry.
- Innovations enhancing the value of assets not reflected in the financials of the industry, for instance, national defense.
- Innovations affecting environmental and other externalities may not be pursued by the industry unless regulations, emission charges, or other policies mandate such requirements, e.g. innovations for eco-friendly products/ processes, use of non-conventional energy etc.
- Research that is costly and has a high chance of failure may exceed the risk threshold of the private sector, even though, from a societal point of view, having a certain number of such projects in the national R&D portfolio is worthwhile because occasional successes can bring very high gains.
- Research that has a long gestation period is likely to fall short of the private sector's requirement for a rate of return attractive to investors, even if confidence of success is high.

These factors therefore necessitate considerable investment and intervention from the Government in the field of R&D. The pace of technological progress is directly proportional to the efforts on R&D. The expenditure levels on R&D could therefore act as reliable indicators of innovative capacity. For example, the following R&D expenditure related data of a leading automobile company (Graph-1) of the country, for the last 6 years, clearly portrays the above stated statement.

Graph-1: R & D Expenditure of Tata Motors



	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Expenditure charged to profit and loss account	130	159.57	135.26	123.61	121.86	243.3
Expenditure capitalised during the year	261.75	508.36	875.04	1,223.23	897.16	1,127.86
Fixed Assets	87.04	129.95	182.6	190.52	168.19	177.53

Sources: Tata Motors Annual Report 2011-12

Globalization of R&D

While business strategies drive globalization, other factors such as lower cost, access to new markets, availability of knowledge-oriented manpower, favorable regulatory environment including IP regulations, tax benefits etc. play a vital role in globalization of R&D. Availability of cost effective and talented manpower makes countries such as China and India attractive locations for business R&D. MNCs look at expanding their overseas R&D activities through collaborative projects, JV's and amalgamations. Companies supplement their in-house capabilities through outsourcing and subcontracting of R&D. The benefits are also enhanced through relationships and tie-ups with academic groups, commercial laboratories and other companies.

Total R&D spend in India doubled since 2007 and is now estimated at $40 billion, says a recent study by Roland Berger Strategy Consultants. Besides, the number of patents filed in the US and Europe by Indian companies has registered a significant jump. Until very recently, innovation was almost exclusively the preserve of advanced economies. That is no longer the case.

Emerging markets such as India and China are advancing from production sites and work benches to become important innovation hubs. India's standalone contribution to the global pie has improved from 2% to nearly 3%, while US has declined 3% to 24%, according to the same report. Europe has declined about 2% to 24% while Japan declined 2.3% to 11%, it said.

India and China now account for nearly 20% of global R&D spending, with China today the most prominent emerging R&D hub with a global share of 14% of the total worldwide R&D spending. While there is little doubt this will only accelerate, the key aspect is the rise of the two emerging markets on the evolution curve.

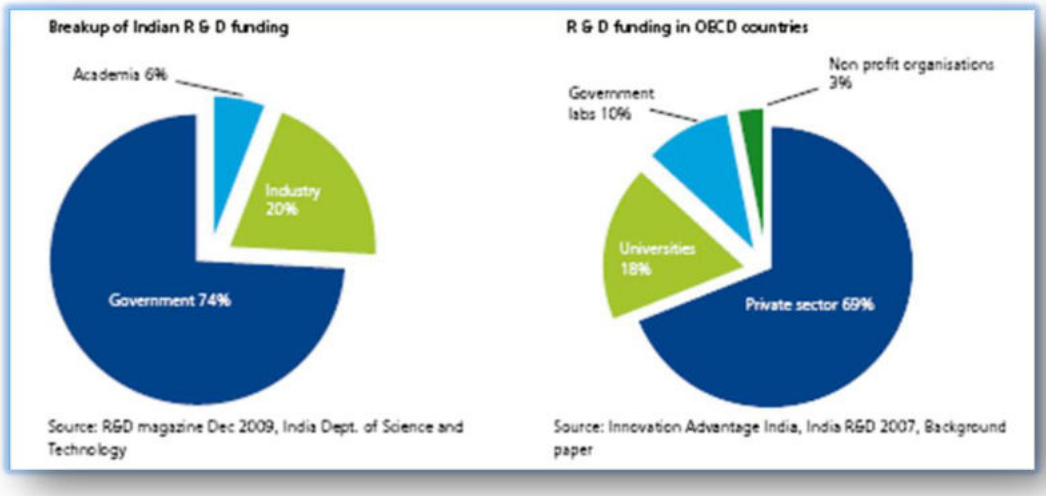
Patent registrations in the US from India grew from 94 in 2000 to 465 in 2010, according to the report. While those filed from China grew from 112 to 1,652. In Europe, patent registrations from India grew from merely seven in 2000 to 200 in 2010, while those from China grew from 11 to 587.

Investments in research, until recently, lagged behind that of China, the European Union and the U.S. The Indian government has made concerted efforts to drive investments in S&T and this is reflected in the FYPs. The XIth FYP (2007-12) has ambitious programs and covers:

- Substantial stepping up of support to basic research,
- Enlarging the pool of scientific manpower,
- Strengthening S&T infrastructure,
- Implementing selected national flagship programmes which have a direct bearing on the technological competitiveness,
- Establish globally competitive research facility and centers of excellence.

Domestic R&D investment is considered one of the most critical inputs for innovation in any country. As the Indian innovation system is still in its nascent stage, 75-80 present of the domestic R&D is taken by the public sector, 20-25% by private enterprises and around 3% by universities. On the contrary, the typical R&D expenditure break-up in countries belonging by OECD is as follows: 69% by private enterprises, 18 % by universities, 10% by government R&D labs and 3% nonprofit institutions (Graph-2).

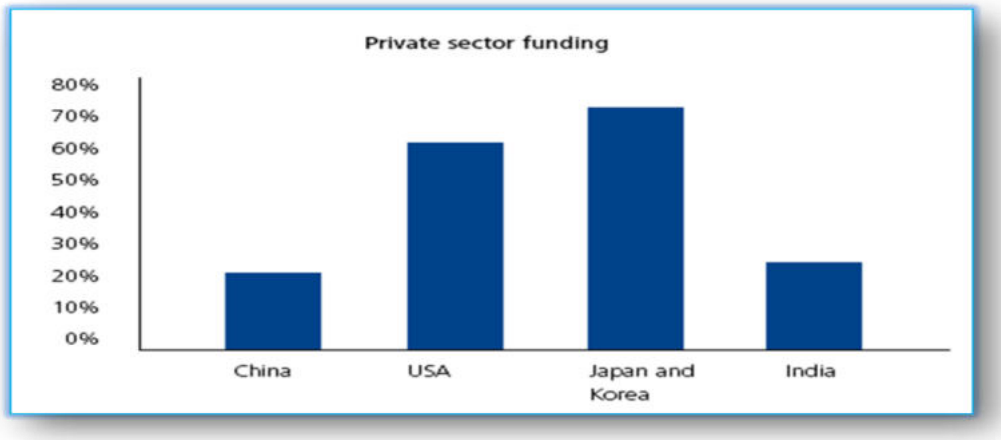
Graph-2: Comparison of the funding pattern in India and OECD countries



Sources: R&D magazine Dec 2009, DST, India and Innovation Advantage India, India R&D 2007, Background paper

With globalization, outsourcing, and increased investments in R&D in the area of ICT (information and communications technologies) there has been a spread of R&D to new geographies. Technology organizations can now outsource the development of new technology-based products to various countries. As per graph3, between 2004 and 2007, global multinationals increased their total R&D sites by 6 percent, and of those new sites, 83 percent were in China and India. They also increased R&D staff by 22 percent; 91 percent of that, increase was in China and India. This suggests a changing landscape favoring the Asian countries. It is interesting to understand the R & D funding pattern in various countries. Private sector finances 70% of total R&D spending in China; this is up sharply from 58% in 2000. 65% of total R&D spending in the United States and approximately 75% of total R&D spending in Korea and Japan is sponsored by the Private Sector. India is a notable exception, with government sources financing more than 75% - 80% of total R&D expenditure.

Graph-3: Global R&D funding in Private Sector

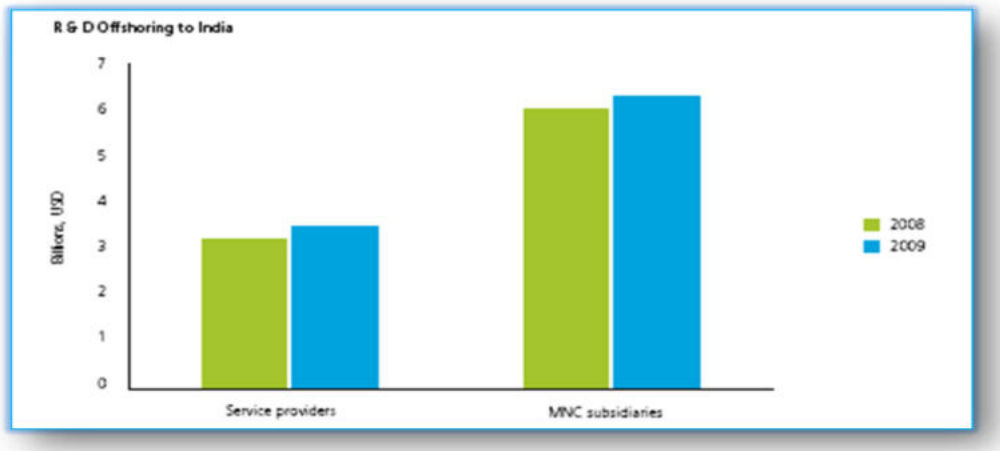


Sources: R&D Magazine, Featured Article 2009 on 'Emerging Nations Gain R&D ground'

India has become the destination for outsourcing in the areas of IT, ITES and other business processes. India has also evolved into areas of knowledge processing which requires application of specialized domain knowledge. More recently, India is emerging as a major center for cutting-edge R&D projects for global multinationals. The country's large talent pool of engineers and scientists is the driving force behind this. Comparative lower cost of the talent pool is perceived as an added advantage.

The above equation in India is therefore expected to change with increasing investments by MNCs into India. MNCs are setting up dedicated and independent R&D centers for taking up R&D activities in new and emerging research in high tech areas. These are generally set up as captive R & D center's for the entities overseas. This is a major driving force behind India becoming an R&D powerhouse. The flow of foreign R&D is mainly concentrated in areas such as electronics and telecommunication, software development, auto design, drug design and pharmaceuticals, hardware and product design. More than 300 MNCs have setup their R&D centers in India. Graph4 below provides an understanding of the R & D off shoring to India.

Graph-4: R & D Off shoring to India



Sources: R&D magazine Dec 2009, Zinnov

Senior Management Support

Senior management plays a critical role in the innovation process, and how it views R&D and its role in influencing business performance is particularly important.

In our study, significant differences were observed in the roles of senior management and their perceptions of innovation process in high-and low-R&D effective organizations (Table 2, Section F). We found that in the high-R&D effective organizations, senior managers better understood that R&D is a risky, uncertain activity, but they still desired to make significant investments in R&D. In high-R&D effective organizations, senior management perceive their role in R&D planning not merely as a provider of resources but as providing strategic direction, vision, leadership, commitment, and discipline to the innovation process.

The role of senior management in the early phases of the innovation process is crucial if R&D is to remain focused and not waste valuable time pursuing efforts that are unlikely to have significant impact on business performance. Senior management pays significantly greater attention to the early stages of the innovation processes in high-R&D effective organizations than in the low-R&D effective organizations. An environment for risk taking is not as problematic in the high-R&D effective organizations. Although senior management in high-R&D effective organizations is more tolerant of failures and encourages "bootlegging" activities largely than the low-R&D effective organizations, there is a great deal of room for improvement. The mean scores on both of these items were less than 3 (a rating of neutral).

SUMMING UP

Based on the reported perceptions of their R&D managers, both high-and low-R&D effective organizations assign equal importance to the skills and knowledge base needed to have an impact on overall business performance. However, organizations that consider themselves "high-R&D effective" are significantly more capable than their low-R&D effective counterparts in almost all areas. They are especially better prepared in accelerating new product development, forming strategic R&D and marketing alliances, understanding customer needs, having technology commercialization capabilities, and capturing and using R&D learning from prior product launch experiences.

Although both high- and low-R&D effective firms realize that open, frequent and early communication among R&D, marketing, manufacturing, and customers is important for successful new product development, the R&D managers of high-R&D effective firms believe they do a much better job of building internal and external linkages than the low-R&D effective firms. High-R&D effective organizations involve customers, manufacturing, sales, marketing, service, senior management, strategic planning, quality assurance, and finance largely than the low-R&D effective organizations. However, both high- and low-R&D effective organizations need to learn to benefit from supplier involvement.

Both high and low-R&D effective organizations perceive increasing pressure on R&D to produce short-term, incremental results; to make R&D more accountable to business needs; and to launch projects with technology transfer in mind. However, high-R&D effective organizations have succeeded in closely linking their R&D to business strategies. Even though R&D is focusing more on producing short-term incremental results, funding for basic research and pursuit of truly innovative research continues in high-R&D effective organizations largely than their low-R&D effective counterparts. Another area where high-R&D effective organizations outshine the low-R&D effective group is in their ability to learn from their previous new product launch experiences in reducing product development cycle-time.

Significant differences exist in the roles of senior management and their perceptions of the innovation process in high and low-R&D effective organizations. Senior managers in high R&D effective organizations perceive R&D to be an important contributor to business performance. They are more tolerant of failure, and they encourage experimentation and pursuit of creative efforts through "bootlegging" activities. Senior management gets involved largely during the early stages of the new product development process in high-R&D effective organizations. Also, in high R&D effective organizations, senior management perceives its role to be one of providing direction to the R&D efforts and demanding excellence by setting tough goals rather than just allocating funds for R&D and then leaving it alone.

Table-3: Identification of High and Low R&D Firms

High R&D Firms		**Low R&D Firms**	
Cipla	TVS Motors	Dabur India Ltd.	Harnik General Foods
Glaxo	Swaraj Mazda Ltd.	Amul	Marico Industries
Cadila Healthcare	Tafe Tractors	Parle Agro	P & G
Dr. Reddy's Laboratories	SAS Motors Ltd.	Haldiram's	Godrej Group
Bajaj Auto	Sun Pharmaceutical	Eureka Forbes	HUL
Piramal Healthcare	Eicher Motors	Britannia Industries	ITC
Ranbaxy Laboratories	Fortis Healthcare		
Tata Motors			

Sources: Authors Compilation

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WEB USAGE MINING TECHNIQUES FOR E-COMMERCE SITES

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ABSTRACT

The trend of online shopping is growing in India, Mainly the urban city users are doing online shopping through various e-commerce websites like ebay.com. With the extensive expansion in the number of E-commerce websites, a lot of online user data is available on web logs of these sites, this paper discuss how we can use Web Usage Mining techniques to find out hidden patterns to improve business ideas. In addition, employee as well as online user satisfaction is important for an e-commerce based enterprise.

KEYWORDS

E-commerce, Web Mining, Web Logs, B2B, Search Space etc.

ENTERPRISE SEARCH

Enterprise search may be interpreted as search of textual materials owned by an organization, including search of their external Website, company's intranet, and any other textual document that they hold such as email, database records and shared documents by the use of information retrieval tools. This information may be structured or unstructured. Documents are produced by a variety of sources, perhaps in many different languages, and generally without formatting standards. Because of these complexity of the typical enterprise information spaces, only a few of the search engines available on the market are able to work with the wide range of databases, email formats, document formats, typical of medium scale enterprises.

Most enterprise search also includes other searches done by the employees of that enterprise. Employees usually have access to a "desktop search" facility. Dumais report an extension of this type to include search of all the documents previously viewed by the user. In general, we can include all the searches done by employees under this label i.e. "workplace search". This label covers not only search of enterprise information, information held on the desktop, and information previously viewed, but also search of information held external to the organization, such as the WWW. Illustrates the diversity of sources accessed by employees.

Major Problems of enterprise search

- No specified search set i.e.: data can be from enterprise's intranet, database, user's hard disk or WWW.
- Different formats and no effective and relevant ranking of the heterogeneous collection of data are required.
- Searching the conversions that took place within emails.
- Different privileges for employees.

Architecture of Enterprise Search

***Gathering*:** Company's intranet, databases, emails or IMs used by the organization etc. Publication of multiple copies of the same content at different locations, difficulty of identifying content that has changed recently and duplicate detection are some of the problems faced.

***Extraction*:** The use of XML formats by different office suites is potentially a major step for ease and accuracy of filtering, as it helps in provided a homogenous set of data.

***Indexing*:** Indexing for enterprise search is usually no different from indexing done for web data. Use of hyperlinking with anchor text is sometimes done.

***Software*:** Companies like Fast Search and Transfer, Autonomy are known for their software for enterprise search. In addition, IBM, Oracle and Google have also developed products similar and intended for this market.

Need: The basic and most important need is that- the Best Possible Answer at Rank One i.e. if we query a current Web search engine for the name of a institute, such as "VIPS" or a mathematical term, then the best answer page is the Institute's homepage or the definition of the concept should appear in the at least the top five search sets.

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ENTERPRISE SEARCH FOR E-COMMERCE WEBSITES

Some businesses such as catering suppliers, retailers and travel agents etc. rely on e- commerce websites for part or most of their revenue. A typical e-commerce site provides product search, coupled with query suggestions i.e. in the search field and automatic generation of recommendations. E-commerce sites are sometimes custom-built database applications (like Google and Microsoft) but they may also be built on enterprise search tools with the relevant capabilities. Autonomy and FAST are well known.

WEB MINING ON E- COMMERCE SITES

Web usage mining is focused on learning about Web users and their interactions with Web sites by studying the web server logs (i.e. Access logs, web logs, and agent logs), client-side cookies, user profiles and/or user ratings as well as other sources. The motive of this type of mining is to find users' access models automatically and efficiently such as frequent access paths, frequent access page groups etc. Web usage mining provides the support for the web site design and helps in improving customer relationships and other business decision. The use of artificial intelligence techniques has provided useful methods.

Data Collection

Data from Web Usage mining is mostly collected from Web server logs, client data and middle data (agent server data and packet detecting). Previous searches done by the employee, user profiles etc. also need to be collected along with information about the employees who previously did the same query or worked on the project that is being searched.

Data Cleaning

Eliminating irrelevant items and filtering of raw data is the primary purpose of this. Irrelevant records in web access log should be eliminated during data cleaning. Since the main motive for WUM is to gather user's travel patterns, therefore data cleaning can be performed such as: The records of graphics, videos and the format information have filename suffixes of GIF, JPEG, CSS, and so on, which can found in the URI field of the every record. For websites that are built dynamically, the URLs should be considered as they provide information about the type of file, document it corresponds too.

User Identification

User's identification is to identify who and which pages are accessed in the website. A session is the series of web pages accessed by the user in a single access. The visitor through an IP address, which has a corresponding domain name, accesses every website and these are linked through the Domain Name System (DNS). Using DNS a corresponding IP address can be found. Some information can be discovered by this method, but this solely cannot be used for mining. A visitor's IP address can be converted into a domain name by using the DNS system in reverse, which is called reverse DNS lookup.

The difficulties to accomplish this step are introduced by using proxy servers, e.g. different users may have same IP address in the log, or the same user may have different IP addresses. To identify a user, different approaches are taken. To distinguish user sessions, following measures could be undertaken:

- Use of cookies: cookies usually are randomly assigned IDs that a Web server gives to a Web browser the first time that the browser connects to a Web site. Cookies are independent of IP addresses, and work well on sites with a substantial number of visitors from ISPs.
- On subsequent visits, the Web browser sends this same ID back to the Web server, effectively telling the Web site that a specific user has returned.
- The different IP address distinguishes different users; many different cases for this are provided.

Pattern Analysis

Web site administrators and company heads are extremely interested in questions like "How are people using the site?" "Which pages are being accessed most frequently?" "Which pages are accessed by returning customers" etc. These questions require the analysis of the contents of the pages and the hyperlinking. This analysis might include:

- The frequency of visits per page i.e. product or web page,
- Most recent visit per page,
- Who is visiting which pages?
- Frequency of use of each hyperlink,
- Which documents or webpages are accessed in a session?
- Which pages are accessed by the user after a purchase?

The common techniques used for pattern analysis are visualization techniques, OLAP techniques, Data & Knowledge Querying, and Usability Analysis.

Path Completion

There are some reasons that result in path's incompletion that can result in some accesses not recorded in the access log file, and the number of URLs recorded in the logs may be less than the real ones because of local and agent cache, "post" technique in the 'form' part of the website and browser's "back" button. Using proxy servers also produces the difficulties for path completion because users can access the pages in the proxy servers caching without leaving any record in server's access log.

Techniques: These include Association Rules, Sequential Patterns and Clustering Techniques.

FOR E-COMMERCE WEBSITE ADMINISTRATORS

- Track the product i.e. the number of times the product is displayed jpeg, links or text.
- Times user clicks on a product in a specific session.
- Watch the shopping carts: add/remove or changes in features of that product.
- Separate the web pages (can be done when designing the website) into specific categories and then search on the basis of the URL- forms, info, products of same genre, by using classification.
- Post advertisements of items on the website of the same category that user purchased recently. If user dismisses the ad a specific number of times, ask him/her before removing it permanently.
- Create widgets of accessories or products, dynamically on a product's page, that other customers also bought after buying that specific product.

PROPOSED SYSTEM FOR ENTERPRISE SEARCH PROBLEM

Using the system, improved version of page rank algorithm i.e. using the web dictionary method and some additions to it like the search domain as WWW, enterprise's intranet, emails, databases, previous searched items etc., and applying it for the enterprise search:

Module 1- Create a Search Domain

Using the architecture of enterprise search i.e.: gathering, extracting and indexing, we get a search set. This also includes the previous search results from the previous queries made by the employee along with the employees' location, context and profile.

Module-2: Implementation of Web Dictionary

This module splits user search string into various words. It then counts the length of each of the word to find the minimum (MIN) and maximum (MAX) number of characters among various keywords of search string. It will implement web dictionary by allowing only those words having length in between to that of MIN and MAX.

Module-3: Find relevancy of Web Page Using the Content

This module will determine relevancy of document from its content. It will count frequency of various keywords of the search string to determine the value of FOUND, which represents the total frequency of all the keywords within the web dictionary and NFOUND, which determines the number of keywords, not found in the web dictionary. The difference between these values will determine the relevancy of web page.

Module-4: Check the relevancy of Search Results Using Time Spent Statistic

This module will determine relevancy of web page using previously spent time statistic by retrieving its value from database. It will calculate new value of time statistic by calculating average of previous value and new value.

Module-5: Priority Calculation Module

This module will determine priority of web page by first calling Module3 at first and then Module4 so overall priority is determined by judging candidate web page twice, using two different modules.

CONCLUSION

With the extensive growth of E-Commerce websites, application of web mining techniques and tools is imperative. It not only helps in improving the business but also helps in increasing customer satisfaction. In addition, the major motive of enterprise is employee satisfaction, and this satisfaction is usually based on the quality and efficiency to search documents and information. In this paper, we provide a solution to the enterprise search problem by using a web dictionary method and using a search domain in which the system is applied. In addition, for E-commerce website developers and administrators some pointers are provided in order to help their business to excel.

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AN ANALYSIS OF PERCEPTION ON INFORMATION SOURCES AND ITS DEPENDENCY UPON AGE OF USERS IN NORTH EASTERN UTTAR PRADESH

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ABSTRACT

Fast and being First for updated and live Information today has been considered as a vital need of today's society. To maintain the pace with this highly moving and fast changing world, updating in the news and knowledge is the need of the hour. It takes now a single day to become outdated rather updated. Updating with the world with its news, development, creativity, social issues, national and international problems, social causes, community, learning, knowledge sharing is becoming important to everyone. Media, especially Digital media has seen tremendous growth in past decades.

There are many tools now a days, one can update them. Latest news and sharing ideas helps us to learn a lot about the world around us. Latest news and information helps us to ensure that we hold the direct compatibility with current trends, weather it is world of fashion, economics, sports or various other areas.

KEYWORDS

Information Age, Perception, Information Sources, Digital Media Networks, Social Media Habits, Modern Information Channels etc.

INTRODUCTION

Today is the age of Technology. History has experience a massive transformation in the past decades. Everything has changed. Turbulence is seen everywhere, from life-style to working culture. Weather a person is a professional, student, a housewife or child; people are always busy, always on the move. Whether they are working, or on the move, going to school, shopping or doing their own work, people nowadays are always busy 24/7 with all that we now face. It is a story when anyone still had the time to sit back, relax and enjoy. The troubles and stresses of daily life have changed everything. Then this question arises that if we are so busy then when to update ourselves? To hold the compatibility with this fast changing world, being updated is the need of the hour. It takes now a single day to become outdated rather updated. Updated with what? Updating with the world, with its events, its troubles and problems.

There are many tools now days we can update ourselves. Sharing daily news and information is one way of being updated with the world. Latest news and sharing ideas helps us to learn a lot about the world around us. Latest news and information helps us to ensure that we hold the direct compatibility with current trends, weather it is world of fashion, economics, sports or various other areas.

For a student of any professional course, daily News and information plays a vital role in their successful career and it may also led them keep with the current corporate trends. It will also help a fresher to decide on what career stream to choose.

Every day, we tune in the television to the news channel, we read newspapers to know more about the business and finance news, political news articles, current trends and general news, we surf websites that have news articles so that we are updated with the world around us.

Information today has been considered as a vital component of today's society. Organizations, which keeps information source in their primary development agenda, they are very competitive in nature and well organized with their ongoing experience and expertise. These organizations focus upon day-today business challenges and increase customer awareness by serving with innovative products or services; they excel in maintaining and managing customer relationships with their loyal customers, partners and suppliers. Information assists an organization in accurate decision making and delivering competitive advantage to the organization.

Dissemination of information and knowledge and creating reliable channels among the sources and receivers of the information is much important. Relying upon the traditional channels of information sources until past decade, the management of electronic resources has been an important aspect of the people today. We need resource experts who collect, analyze, evaluate, package and disseminate information to facilitate accurate decision-making processes.

Knowledge professionals have become the dominant force behind the developed organizations. It is the responsibility today entrusted upon all organizations to cuddle this need for managing knowledge. Because of the tremendous advances in technology,

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Cyber-world has completely transformed the today's world. Massive information is disseminated to people having different geographic location and culture.

Today various sources of information are available. It can be newspapers, people, magazines, books, films, tapes etc. Sources are very important to disseminate reports, events, or issues and explain the world to your audience.

SOURCES OF INFORMATION

From a knowledge management perspective, the available resources today create complexity for a student to think differently about the manner in which they learn whether it is inside or outside of the classroom. People get the information through various sources available. They are traditional sources as Newspaper, magazines, Television, radio etc., as well as modern channels viz. Facebook.

Internet as Mass Media

The Internet has become the largest mass medium worldwide. It is ubiquitous. The traditional media's have also transformed themselves onto internet mostly newspaper and magazines are available over internet today. Not only does the Internet available between media and people but also established an easy channel for interpersonal communication. It offers a variety of free e-mail sites, portals, chat rooms and social networking sites.

Mobile Phones

Differing from the internet, mobile as the mass media channel has also emerged as the new channel for information dissemination. SMS and other services have benefit to the Telecom Media. More importantly from the people's point-of-view, mobile phones are easily available than computers and can be used comfortably.

Social Media as Information Source

Social media is the use of web-based and mobile technologies to turn communication into interactive dialogue. Social networking links people with common interests. It is a way for individuals to interact and share information, knowledge and ideas with other people that share these common interests. Some of these interactions include e-mail, discussion groups, blogs, instant messaging, P2P networking and real time chat.

A social network service essentially consists of a representation of each user (often a profile), his / her social links, and a variety of additional services. Popular social networking sites are Facebook, Twitter, Bebo, Hi5, Sky rock, Orkut, Friendster, and LinkedIn etc.

The purpose of this research is to find out the importance of various information sources among the students, professionals, housewives, retired person, knowledge-workers and organizations.

OBJECTIVE OF STUDY

Objective of this study is to test the perception of various users and knowledge seekers who belongs to various demographic groups towards different source of information. The study focuses upon the user's opinion upon various sources of information.

RESEARCH METHODOLOGY

The study was descriptive in nature. All the dimensions are measured on Likert scale. Convenient sampling method was adopted for administering the questionnaires.

Methods of Data Collection

Primary data was collected with the help of structured questionnaire circulated among 168 respondents in various part of North Eastern part of Uttar Pradesh viz. Lucknow, Barabanki, Gorakhpur, Faizabad city, through which 100 fully furnished and reliable questionnaire has been selected for research purpose.

Study was carried out in month of January this year. Chi Square test and frequency analysis were carried out by using SPSS. Chi-square test was advocated to find out relations among the gender, qualification, age with users perception on various sources of information.

Areas of Data Collection

The Data has been collected from various areas in Lucknow viz. students and faculty members from Sherwood Educational Campus, and other residential areas in Lucknow city.

DATA REPRESENATATION & ANALYSIS

Frequency Tables

Table-1: Demographic Detail of Respondents

Age of Respondents					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	18-26	36	36.0	36.0	36.0
	26-40	44	44.0	44.0	80.0
	40+	20	20.0	20.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-2: Gender of Respondents

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	F	42	42.0	42.0	42.0
	M	58	58.0	58.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-3: Qualification of Respondents

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	PG	43	43.0	43.0	43.0
	U-12	27	27.0	27.0	70.0
	UG	30	30.0	30.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-4: Internet Usage Hrs.

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	>4	26	26.0	26.0	26.0
	1-2	26	26.0	26.0	52.0
	2-4	29	29.0	29.0	81.0
	< 1 Hr.	19	19.0	19.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-5: Time spent reading News Papers

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	30-60	41	41.0	41.0	41.0
	<15	22	22.0	22.0	63.0
	>60	18	18.0	18.0	81.0
	15-30	19	19.0	19.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-6: News Paper

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	16	16.0	16.0	16.0
	Disagree	14	14.0	14.0	30.0
	Neutral	14	14.0	14.0	44.0
	Strongly agree	27	27.0	27.0	71.0
	Strongly Disagree	29	29.0	29.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-7: E-Mail

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	21	21.0	21.0	21.0
	Disagree	25	25.0	25.0	46.0
	Neutral	21	21.0	21.0	67.0
	Strongly agree	13	13.0	13.0	80.0
	Strongly Disagree	20	20.0	20.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-8: Internet Portals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	34	34.0	34.0	34.0
	Disagree	19	19.0	19.0	53.0
	Neutral	21	21.0	21.0	74.0
	Strongly agree	15	15.0	15.0	89.0
	Strongly Disagree	11	11.0	11.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-9: SMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	25	25.0	25.0	25.0
	Disagree	16	16.0	16.0	41.0
	Neutral	17	17.0	17.0	58.0
	Strongly agree	33	33.0	33.0	91.0
	Strongly Disagree	9	9.0	9.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-10: Social Networking Sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	35	35.0	35.0	35.0
	Disagree	18	18.0	18.0	53.0
	Neutral	25	25.0	25.0	78.0
	Strongly agree	17	17.0	17.0	95.0
	Strongly Disagree	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-11: Television

		Frequency	Percent	Valid Percent	**Cumulative Percent**
Valid	Agree	31	31.0	31.0	31.0
	Disagree	7	7.0	7.0	38.0
	Neutral	20	20.0	20.0	58.0
	Strongly agree	40	40.0	40.0	98.0
	Strongly Disagree	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-12: Radio

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Agree	39	39.0	39.0	39.0
	Disagree	7	7.0	7.0	46.0
	Neutral	31	31.0	31.0	77.0
	Strongly agree	23	23.0	23.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-13: Social Gathering

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Agree	28	28.0	28.0	28.0
	Disagree	19	19.0	19.0	47.0
	Neutral	18	18.0	18.0	65.0
	Strongly agree	17	17.0	17.0	82.0
	Strongly Disagree	18	18.0	18.0	100.0
	Total	100	100.0	100.0	

Sources: Authors Compilation

Table-14: Hypothesis Testing

S. No.	**Dimension**	**H_o= Null Hypothesis**	**χ^2**	**DF**	**Result at 10 % significance level**
1	Age * Internet Usage Hrs.	Perception of users towards internet usage hours is independent of age	3.68	6	Accept And Independent
2	Age * Time spent reading News Paper	Perception of users towards Time spent reading News Paper is independent of age	25.615	6	Reject And Dependent
3	Age * News paper	Perception of users towards News paper is independent of age	11.169	8	Accept And Independent
4	Age * E-Mail	Perception of users towards usage of E-Mail is independent of age	10.891	8	Accept And Independent
5	Age * Internet Portals	Perception of users towards usage of Internet Portals is independent of age	8.486	8	Accept And Independent
6	Age * SMS	Perception of users towards usage of SMS hours is independent of age	5.519	8	Accept And Independent
7	Age * Social Networking sites	Perception of users towards usage of Social Networking sites is independent of age	7.118	8	Accept And Independent
8	Age * Television	Perception of users towards usage of Television is independent of age	7.951	8	Accept And Independent
9	Age * Radio	Perception of users towards usage of Radio is independent of age	3.705	8	Accept And Independent
10	Age * Social Gathering	Perception of users towards Social Gathering is independent of age	6.944	8	Accept And Independent

11	Gender * Internet Usage Hrs.	Perception of users towards internet usage hours is independent of Gender	4.26	3	Accept And Independent
12	Gender * Time spent reading News Paper	Perception of users towards Time spent reading News Paper is independent of Gender	1.992	3	Accept And Independent
13	Gender * News paper	Perception of users towards Newspaper is independent of Gender	3.383	4	Accept And Independent
14	Gender * E-Mail	Perception of users towards usage of E-Mail is independent of Gender	6.966	4	Accept And Independent
15	Gender * Internet Portals	Perception of users towards usage of Internet Portals is independent of Gender	2.151	4	Accept And Independent
16	Gender * SMS	Perception of users towards usage of SMS hours is independent of Gender	0.915	4	Accept And Independent
17	Gender * Social Networking sites	Perception of users towards usage of Social Networking sites is independent of Gender	1.762	4	Accept And Independent
18	Gender * Television	Perception of users towards usage of Television is independent of Gender	8.757	4	Reject And Dependent
19	Gender * Radio	Perception of users towards usage of Radio is independent of Gender	2.516	4	Accept And Independent
20	Gender * Social Gathering	Perception of users towards Social Gathering is independent of Gender	5.228	4	Accept And Independent
21	Qualification * Internet Usage Hrs.	Perception of users towards internet usage hours is independent of Qualification	11.714	6	Reject And Dependent
22	Qualification * Time spent reading News Paper	Perception of users towards internet usage hours is independent of Qualification	9.135	6	Accept And Independent
23	Qualification * News paper	Perception of users towards internet usage hours is independent of Qualification	8.293	8	Accept And Independent
24	Qualification * E-Mail	Perception of users towards internet usage hours is independent of Qualification	16.85	8	Reject And Dependent
25	Qualification * Internet Portals	Perception of users towards internet usage hours is independent of Qualification	8.49	8	Accept And Independent
26	Qualification * SMS	Perception of users towards internet usage hours is independent of Qualification	9.03	8	Accept And Independent
27	Qualification * Social Networking sites	Perception of users towards internet usage hours is independent of Qualification	8.89	8	Accept And Independent
28	Qualification * Television	Perception of users towards internet usage hours is independent of Qualification	9.373	8	Accept And Independent
29	Qualification * Radio	Perception of users towards internet usage hours is independent of Qualification	3.345	8	Accept And Independent
30	Qualification * Social Gathering	Perception of users towards internet usage hours is independent of Qualification	4.098	8	Accept And Independent

Sources: Authors Compilation

FINDINGS

Today popularity of internet and its usage is increasing for various purposes and been used by everyone based upon their requirement. Newspaper still is the best source of information and mostly popular among the old ages. New generation is adopting new sources for information dissemination, which is fast and reliable viz., SMS and social networking sites. Social networking sites are becoming popular among every individual.

Popularity of social networking sites has been increased among all the age groups and being used for various information purposes. Presence over social networking sites is independent of age, gender and location. New technological advances are becoming popular among all the groups of society. Social networking sites are the most useful tool to get in touch with friends and community.

CONCLUSION

Today, Social networking sites are getting more popular among all the ages and groups and its becoming a good source of information sharing beyond other digital and print media resources. People are becoming habituated towards usage of these new technologies for the dialogues while on the move. These technologies have given greater flexibility to the users to disseminate information among their group.

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A STUDY ON INDIVIDUAL AND INTERPERSONAL STRESS LEVELS AMONG SOFTWARE EMPLOYEES

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ABSTRACT

Stress is inevitable in any types of occupation and career. The study throws light on the wide spread silent problem by name 'Stress', which gave raise to acute dysfunctions and are called many diseases, increase divorce rates, and other harassments. The work stress is found in all professions. IT professionals are very stressed because they are highly target driven and highly pressured on results.

This study aims to determine the impact of stress at individual level and at their interpersonal behavior among IT professionals in India. A national survey of 485 IT employees was conducted to find significant stress levels based on their demographic characteristics. The hypotheses were tested using ANOVA and found significant differences in stress levels among gender, age, marital status and work experience.

KEYWORDS

Individual, Interpersonal, Stress Levels, Software, Employees etc.

INTRODUCTION

In the current lifestyle of utmost complexities, the stress level is raising at a phenomenal rate. Stress, simply put, is the way you react both physically and emotionally to a change. There are as many different ideas about stress as they are people who experience change in their life. In addition, unlike change, stress can be either positive or negative. Stress can refer to physical effort as well as mental tension. All individuals feel stress, but each one feels it in different amounts and reacts indifferent ways.

Today, we know much more about stress than ever before. Yet we seem to be making a little headway in solving out stress related problems. The question is why? We have heard of Workplace stress. Today there is talk of trauma at the workplace. To appreciate its ramifications, we require an in-depth analysis of the phenomenon of stress. It was with this in mind, that is research is taken up and planned accordingly.

IT industry in India got tremendous boost in the past decade due to factors like liberalization and globalization of the Indian economy coupled with favourable government policies. Service providers characterized this sector by adhering to strict deadlines set by their customers, working in different time zones, interdependency in teams, multitasking, increased interaction with offshore clients and extended work hours. IT professionals are constantly under pressure to deliver the services efficiently as well as to remain cost effective. At times IT professionals are forced to change the entire paradigms amidst constant uncertainty and high risk. These working conditions lead to high stress in the professionals.

LITERATURE REVIEW

Lehnert (2002) described stress as a complex, dynamic process of interaction between a person and his or her life. He explained further that it is the way we react physically, mentally and emotionally to the various conditions, changes and demands of life. In medical terms stress is described as, *"a physical or psychological stimulus that can produce mental tension or physiological reactions that may lead to illness."* When under stress, the adrenal gland releases corticosteroids, which are converted to Cortisol in the blood stream. Cortisol has an immune suppressive effect on the human body. There are several definitions of stress available in the literature. To *Douglas (1980),* Stress is defined as any action or situation that places special physical or psychological demands upon a person.

Generally, stress was grouped as physical or psychological. This was further explained that the physical stress is the one that irritate or brings immediate or long-term negative effect on your physical or bodily health. This may not necessarily affect your psychological (or mental) state. Whereas the psychological stress brings immediate or long-term irritation or negative effect on your psychological or mental state. This may not necessarily have any immediate effect on your physical state. However, these two groups can be very interactive i.e. your physical state can affect your psychological state and vice versa.

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Lehnert (2002) also categorized stress as acute (immediate) which can be one-time incident that usually comes and goes quickly. Its effect he described can last from minutes or hours to days or weeks. Whereas the chronic (long-term) which can be caused by a continuing string of stressful incidence of an ongoing situation.

Physical stress was described as the negative effect of physical exertion on the physical health of software employees on the job. Due to sitting in front of computer for a long hour, working in an air-conditioned environment etc., have resulted in the physical stress and illness. This is a times triggered by overwork, lack of rest and poor diet. Mental stress is traced to a persons' mental state of mind, which involves expectation, fears, regrets etc.

Nawe (1995) explained that role conflict could cause stress because information professionals have various supervisors who do not agree on what the employee should be doing. Whereas stress is also caused by role ambiguity, which is present when an employee does not know that for, which he or she is responsible? She explained also that when employees do not use their skills, it could be as stressful as being overworked.

Van Fleet & Griffin (1988) agreed that working long hours is among those things that can induce stress. In addition to causing problems at work, stress also can result in physical problems. They have found that stress can cause many health problems. For the executive driven to reach the top, the cost can often be less time with the family. This can produce feelings of guilt and stress.

Shailendra Singh (1990), the author of 'Organizational Stress and Executive Behaviour' identifies ten dimensions of stress. The severest intensity is inadequacy of role authority, experience of inequity and job difficulty. In the moderate category are included role ambiguity, lack of leadership support and lack of cohesiveness. Role conflict, overload, job requirement – capability mismatch and constraints of change receive lowest ranking in terms of intensity of stress. Regarding the predictors of each of the ten dimensions of Organizational stress, no single variable found to be a common predictor of all ten dimensions of stress. Status, as defined by education and salary, reveals a negative relationship with seven of 10 dimensions of stress. Age is another variable that appears as a negative contributor to three of the 10 dimensions of stress. Regarding Organizational factors, professional management and concern for welfare are major preventive aspects of stress. Overall, no coherent picture emerges; while some factors minimize some kinds of organizational stress, these same factors increase other kinds of stress.

Deshmukh N. H. (2009), (as cited by Uma Devi, 2011) studied stress and life satisfaction among working and non-working women from similar levels of socio economic status of the society. Results indicate that there was no significant difference in physical and family stress among working and non-workers. Role stress was significantly higher among working than non-working women. Life satisfaction was better in working women than non-working women.

Sahana Charan (2007), High work pressure, long hours in front of the computer and a fast-paced lifestyle, if these factors team up to weaken your physical health, here is one more strong reason why they are simply unhealthy: mental health professionals are now convinced that an increasing number of persons working in the IT and IT-enabled services sector fall prey to depression, because of the high stress they undergo.

Murali Raj (2009), Depression is usually related to work and stress these people undergo because of the pressure to perform better, compete with other colleagues and meet tight deadlines. Most of their work is target-oriented and if targets are not met, it can lead to anxiety. Peers are supportive as they also competing in the same field. Moreover, insecurity about the job may lead to feelings of expression**.**

NEED OF STUDY

The inevitable phenomenon of stress is wide spread in all most all working professionals and very high especially for IT (Information Technology) professionals. The IT companies are wide spread in many places, but the notable are there in the metros and other cities.

Skill Soft (2006) described IT related job as the first on the world top-ten most stressful jobs. The employees are stressed because of their high-pressure workload, continuous targets, short deadlines, night shifts, lack of role clarity, pressure from clients, etc. Because of this stress, which is unknown for them in many cases, the consequences that they face and the cost for this stress is very high in nature, they are affected both physically and psychologically. Thus, the present study aims in analyzing how the IT professionals are prone to stress and measuring their stress levels by considering their individual and interpersonal perspective.

RESEARCH METHODOLOGY

Any individual has the potential to cause and experience stress. Some psychological and behavioural theories indicate that "perception" is an important variable. Other studies mentioned on the theories of "locus of control", "Self – efficacy" and "affective disposition" major impact on perceived stressors and resultant stress. Any of these factors that go through the perceived control or emotional response will cause the person to be under stress or strain.

The individual may emotionally feel anxious, tense, angry, confused and unmotivated. Their behavioural signs will lead them to make mistakes, snapping at others, being anxious or eating, drinking, smoking more than usual. At some point, most people

encounter stressful events that can have a major impact on the course and direction of their lives. Stress has emerged as a thrust area in organizational behaviour research.

The type of research that is adopted in this study is Descriptive in nature. Descriptive research design is the one that simply describes something such as demographic characteristics of respondents.

The present study aims at understanding the stress levels of the IT professionals and how does this impact on the individual behaviour, and on their interpersonal behaviour. Based on the extensive literature review the present study framed the following hypothesis:

H_1: There is significant difference between male and female IT professionals with respect to their individual stress levels
H_2: There are significant differences among different age group of IT professionals and their individual stress levels
H_3: There are significant differences among marital status of IT professionals and their individual stress levels
H_4: There is significant difference between IT professional with different experience with respect to their individual stress levels.

OBJECTIVES OF RESEARCH

- To understand the variations in levels of stress and its impact based on their demographic profile.
- To identify the individual stress levels at different categories of IT professionals.

Questionnaire

Structured Questionnaire is considered as the research instrument for collection of primary data from the respondents. The questionnaire comprises with more of Likert scale pattern, and apart from that of closed ended, dichotomous, multiple choice, rating and ranking questions. For developing the structured questionnaire, an extensive review of articles was carried out in the areas of Stress, interpersonal behaviour and individual behaviour in organizations from related Journals, magazines, and Internet Websites.

The initial format of the questionnaire prepared was pretested in the pilot study on 50 Computer Science (MCA) students from Sri Venkateswara University, Tirupati, in the first stage. Modifications were made based on the subjects' feedback to improve the clarity and presentation of questionnaire items, and the filled-in questionnaires were later examined for scale reliability and validity which is shown in table 1

Table-1: Reliability Analysis based on Pilot Study

Scales used in the study	No. of Items	Cronbach's Alpha
Stress level based on Individual behaviour	15	0.828
Stress level based on Interpersonal Behaviour	8	0.816

Sources: Authors Compilation

The final questionnaire framed consists of three major sections. First section deals with the demographic characteristics and job related information of the respondents, second section has a set of 15 items that reflect their stress level based on their individual behaviour. Finally, the third section deals with eights statements that gives a picture of their stress level from their interpersonal behaviour.

Sampling

Over 1000 invitations were sent using Internet to software employees working in Bangalore, Chennai, Mumbai, Ahmedabad and Pune, which were referred as the important IT hubs in India.

The present study has adapted a convenience sampling method. With the help of social networking sites and other references, invitations were sent to software employees that consist of a special link to a web survey requesting the respondents to answer the questionnaire.

Out of which 502 has filled the questionnaire. Removing the semi filled and inconsistently answered questionnaires; the present study has a sample size of 485.

ANALYSIS AND FINDINGS

The demographic characteristics of the respondents include gender, age, work experience, and marital status. Distribution of respondents based on their demographic characteristics, is shown in the **table 2**. Analytical aspects of these characteristics are worth noting.

Table-2: Demographics of the Respondents (N = 485)

Demographics	Characteristics	Number	Percentage
Gender	Male	350	72.2
	Female	135	27.8
Age Group (in years)	< 25	51	10.5
	25 – 35	333	68.7
	35 – 45	91	18.8
	> 45	10	2.0
Work Experience	< 1	167	34.4
	1 - 3	132	27.2
	3 - 6	61	12.6
	6 - 10	89	18.4
	> 10	36	7.4
Marital Status	Single	269	55.5
	Married, without children	161	33.2
	Married with children	55	11.3

Sources: Authors Compilation

Table 3: The present study found significant difference among the gender of the respondents and their individual stress levels. The normal prevalence of stress is moderate among male and female, but the high level of stress is faced by female that is 65(48.1%) out of 135 total female respondents, whereas the male has 107 (30.6%) out of 350 male respondents, who have high level of stress among the respondents who have scored 60-69 point in their assessment.

Table-3: ANOVA Test between Gender and Stress Levels

Gender	Stress Levels				
	Very high (80-100)	**High (60-79)**	**Moderate (45-59)**	**Low (30-44)**	**Total**
Male	9	107	195	39	350
Female	2	65	58	10	135
Total	11	172	253	49	485
ANOVA Test Result					
	Sum of squares	**Degree of freedom**	**Mean Square**	**F**	**Sig.**
Between Groups	3.566	1	3.566	7.898	.005
Within Groups	218.083	483	.452		
Total	221.649	484			

Sources: Authors Compilation

From the table 3, it is clear that there is significant difference among the Gender and the Individual stress level of the respondents. Hence H_1 is accepted. "Stress is high among men than in women in the Information Technology profession" - It becomes evident that Stress is high among women than in men among the surveyed respondent who are information technology professionals. As the overall percentage of men prone to stress are 88.9% and the women are higher with 92.6%.

Table 4: The survey reveals that there is significant difference among the age group of the respondents and their individual stress levels. The normal prevalence of stress is moderate in all the levels, but the high level of stress is in the age group of 25 – 35 years of the respondents who are scored 60-69 point in their assessment.

Table-4: ANOVA test between Age and Stress levels

Age Groups	Stress Levels				
	Very high (80-100)	**High (60-79)**	**Moderate (45-59)**	**Low (30-44)**	**Total**
< 25 years	0	37	11	3	51
25 – 35 years	5	80	212	36	333
35 – 45 years	6	50	25	10	91
> 45 years	0	5	5	0	10
Total	11	172	253	49	485
ANOVA Test Result					
	Sum of squares	Degree of freedom	Mean Square	F	Sig.
Between Groups	21.359	3	5.340	12.797	0.001
Within Groups	200.291	480	0.417		
Total	221.649	484			

Sources: Authors Compilation

Table 5: The survey revealed significant difference among marital status of the respondents and their stress levels. The high level of stress is on the married people which is 71 (44.1%) of the total married respondents of 16, which is closely followed by the unmarried, who has 66 (24.5%) respondents out of the total unmarried respondents of 269. "Stress is high among married people": it becomes evident that among the respondents who are married have got high stress when compared with the unmarried respondents.

Table-5: ANOVA test results between Marital Status and Stress Levels

Marital Status	Stress Levels				
	Very high (80-100)	**High (60-79)**	**Moderate (45-59)**	**Low (30-44)**	**Total**
Single	2	66	174	27	269
Married	9	71	62	19	161
Married + Children	0	35	17	3	55
Total	11	172	253	49	485
ANOVA Test Result					
	Sum of squares	Degree of freedom	Mean Square	F	Sig.
Between Groups	13.607	2	4.536	10.486	.001
Within Groups	208.043	481	.433		
Total	221.649	484			

Sources: Authors Compilation

Table 6: Finally, the present study found significant difference among the total years of experience of the respondents and their individual stress levels. The high level of stress is on the category of respondents who have 9-12 years of experience with 47 (52.8%) respondents out of 89 respondents who are under this category of total experience, and with this experience the respondent is likely to be in the project manager cadre as it is proved that project managers too have high level of stress.

Table-6: ANOVA test result on Work Experience and Stress Levels

Work Experience	Stress Levels				
	Very high (80-100)	**High (60-79)**	**Moderate (45-59)**	**Low (30-44)**	**Total**
<1 years	0	49	98	20	167
1 – 3 years	5	31	83	13	132
3 - 6 years	0	30	21	10	61
6 -10 years	0	47	39	3	89
>10 years	6	15	12	3	36
Total	11	172	253	49	485
ANOVA Test Result					
	Sum of squares	Degree of freedom	Mean Square	F	Sig.
Between Groups	11.935	4	2.984	6.829	0.001
Within Groups	209.714	480	0.437		
Total	221.649	484			

Sources: Authors Compilation

"Stress levels vary based on their Experience" - it becomes evident that among the respondents who are with 6 - 10 years of experience have got high stress and forms 52.8% when compared with the others.

LIMITATIONS OF STUDY

Any study based on consumer survey through a pre-designed schedule suffers from the basic limitation of the possibility of difference between what is recorded and what is the truth, no matter how carefully the schedule has been designed and field investigation conducted. This limitation is due to the respondents' values, emotions, profiles, expectations, and filters of communication process. Every effort is made to minimize these limitations by pre-testing the questionnaire in the pilot study. Further, the data was collected using convenience sampling method which may resulted in sampling biases. These limitations hamper the generalization of the results of the study.

CONCLUSION

From the present survey, it is clear that there are variations in the levels of stress based on age, gender, marital status, income, designation, experience and educational qualification. As for the impact of stress is concerned, at the individual, and interpersonal levels, the demographic variables like the Age of the respondents, Marital status of the respondents, and Experience of the respondents has got the direct impact on the stress.

Given the Indian scenario of competitive market, over population and scarcity of good jobs, runs on the theory of "Survival of the Fittest", no profession is exempted from stress. The degree and depth may vary from one another, whereas in Information Technology sector is quite clear with the presence of stress. Both employer and employee must understand that work should be valued and not excessive. As a general rule, actions to reduce stress should be given top priority in the process of organizational change to improve working conditions and to avert the situation of brain drain.

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CLOUD COMPUTING SUPPORTED E-GOVERNANCE FRAMEWORK

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ABSTRACT

In this paper, we have discussed the cloud-based implementation of future e-Governance services. We also discuss how cloud works and what are the benefits of using cloud-computing model in e-governance services and applications. Cloud is used as an umbrella term to describe a category of sophisticated on-demand computing services offered by some commercial providers. Through cloud on-demand, computing experience can be given to citizens based services of e-Governance. This gives numerous benefits to the user and provides various facilities under one roof. Cloud can also be integrated in ongoing e-governance projects and enlarge them by incorporating various cloud services. This, feature makes cloud best choice for all professionals.

KEYWORDS

Citizen Charter, Cloud Computing, E- Citizen, E-Governance, Government to Citizen, ICT etc.

INTRODUCTION

The end of the first decade of the 21st Century has been described as both a 'historical turning point' in the development of e-Government and its 'coming of age.'[1] These statements, contained in a 2009 working document by the European Commission's e-Government Sub-group, are corroborated by both the increase of policy measures in this field and the changes in the availability and use of Information and Communication Technologies (ICT) for public service provision. At the launch of the 2011-2015 e-Government Action Plan for Europe,[2] Digital Agenda Commissioner Neelie Kroes outlined its aim to "help public authorities to use ICT to offer better services at lower cost, while making life easier and better for citizens and businesses".[3]

Cloud computing is the future of next generation of computing. It is a very new and emerging concept in the field of computing. There are many concepts involve in cloud computing but the major are Software, Hardware and Network. The basic idea behind cloud computing is that anything that could be done in computing – whether on an individual PC or in a corporate data center – from storing data to communicating via email to collaborating on documents or crunching numbers on large data sets – can be shifted to the cloud. As can be seen in Table 1, cloud computing encompasses a wide variety of offerings, including: SaaS (Software as a Service), PaaS (Platform as a Service), and IaaS (Infrastructure as a Service).

Cloud computing has now become "shorthand" for the larger trend of computing services delivered over the Internet. From the perspective of the market analyst, IDC, cloud computing represents "an emerging IT development, deployment and delivery model, enabling real-time delivery of products, services and solutions over the Internet." [13]. According to the Cloud Computing Manifesto: "The key characteristics of the cloud are the ability to scale and provision computing power dynamically in a cost efficient way and the ability of the consumer (end user, organization or IT staff) to make the most of that power without having to manage the underlying complexity of the technology." The role of cloud computing for business is more and more prominent. Indeed, cloud computing is probably the most buzzed tech today. The cloud has proven that it can help small businesses to cut costs, while improving productivity [12].Cloud computing is a new paradigm that involves the online delivery of computing and network resources as scalable, elastic and available on-demand services hosted in vendors' powerful datacenters.

With increasing recognition of information technology in catalyzing economic activity and efficient governance, countries have benefited through e-Governance [10]. E-Government is a way for governments to use the new technologies to provide people with more convenient access to government information and services, to improve the quality of the services and to provide greater opportunities to participate in our democratic institutions and processes [14]. "For good governance of any nation, it is necessary that all decision makers are sensitive and transparent to the needs of the common man. This can be achieved by the use of cloud computing in e-governance for the meaningful and sustainable inclusive growth", said Shankar Aggarwal, Joint Secretary, Department of Information Technology, Ministry of Communications & Information Technology, at a CII Conference on Cloud Computing "Concurrent Technologies 2011 – Reaping Through the Clouds"[18].

As existing e-Governance, projects in India are facing many challenges, from development to implementation. In India most of the states are willing to adopt the e-Governance model to offer government services online up to last level, some major barriers are unavailability of required infrastructure, unavailability of e-Governance application, unavailability of trained workforce in IT and unavailability of required funds. They can use the power of cloud computing to offer some urgently required e-Governance service within short time. In future they can use all the models of cloud computing to offer more complex service like e-commerce, e-procurement etc.

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CLOUD IN INDIAN E-GOVERNANCE SECTOR

Cloud computing can be used to facilitate "real-time e-governance" across the length and breadth of the country. For cities or towns lacking technological infrastructure, cloud computing can be a major boon because it enables quick project execution. Current internet penetration in India is eight percent and cloud computing if used strategically, can aid internet proliferation substantially. In addition, because of its ability to handle large number of transactions, citizens can look forward to better response times for the transaction.

With increase in the economic growth, and all round development, and ever-demanding citizens, governments are severely challenged in delivering key citizen services such as healthcare, education, public safety, transportation and utilities. Cloud computing can contribute in a variety of ways to deliver citizen services efficiently and enable IT resources to be provided on demand, at scale in a multi-tenant, yet secured environment. Today's citizens expect services to be delivered along with a secure user experience. As a result, governments are under pressure to provide more efficient and effective citizen-centric applications and services, while also improving inter-departmental and cross-agency collaboration. To better serve their people, government's world over are being asked to transform costly and inflexible legacy infrastructures to increase workforce productivity and improve organizational agility. Balancing economic pressures and security, is another ask.

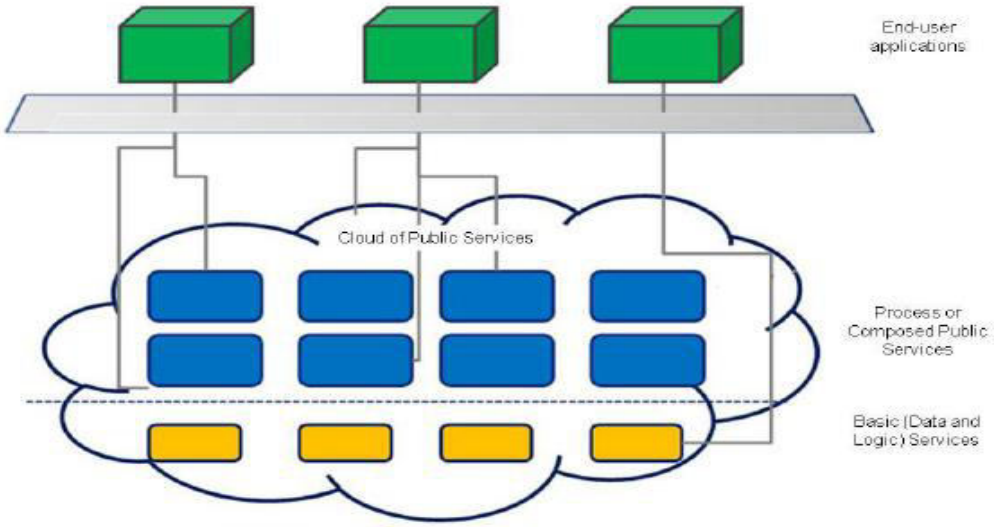
A CONCEPTUAL MODEL OF A 'CLOUD OF PUBLIC SERVICES'

A conceptual model was developed to analyze the key elements in a 'cloud of public services.' These include:

- End-user (client or web) applications which allow the end-user to use the service and interact with the service provider;
- The collection of public services serving as building blocks, which can be offered in an open and interoperable way and reused.
- The different categories of public services - Process, Composed, or Basic (data and Logic), Services - as defined by the service taxonomy.

The conceptual model of the 'cloud of public services' reflects the public services (as also identified in 'service mazes' in the case studies) by structuring these in layers as illustrated by figure given below :

Figure-1: The Conceptual Model of the 'Cloud of Public Services



Sources: Authors Compilation

CONCLUSION

Cloud computing will become more pronounced in developed as well as emerging economies where the Governments adoption of Cloud Computing will progress through varying phases of Datacenter Consolidation, Virtualization, Automation, and leading to adoption of Hybrid, and Community Clouds, and ultimately leading to Cloud based deployments as and when the technology, and business practices mature, and security & trust become pervasive. As adoption of cloud computing continues, and as several success stories emerge, the Cloud based consumption of ICT, can help the Public Sector, and Enterprises at large, unravel and deliver next generation citizen services, and further accelerate the economic growth of a country. Emerging cloud computing models and services will represent enterprise ICT finally reaching the point of sophistication and flexibility required to realize their objectives leading to more efficient, effective public sector information management.

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CLOUD SUPPORTED E-LEARNING SERVICES DELIVERY MODEL

Sonia Duggal[10] Dr. M. K. Sharma[11]

ABSTRACT

Ever since the term e-Learning became popular a few years back, governments around the world are trying to introduce technology into how they function and deliver services to citizens. While the Internet really accelerated the use of e-Learning services like on line banking in India, the ultimate vision of e-Learning is to offer government services online to a common man in a quick and cost effective manner, here this paper advocate how we can use power of "cloud computing" to offer many government services without having costly infrastructure on user end, by its compelling cost-benefits and quick-and-easy adoption. E-Cloud (E-Learning using cloud) concept of this paper will help to make a huge difference, how governments may deliver e-Learning services in towns and villages of India.

KEYWORDS

e-Learning, G2C, E-Cloud, SOA, Public Cloud, Private Cloud etc.

INTRODUCTION

For better and cost effective delivery of e-Learning services, cloud and hosted government to citizen (G2C) services can be attractive solutions for governments of developing countries. For a successful e-government [1] model implementation there is a need to design a G-Cloud model that has the benefits of cost consolidation, little or no capital expense, increased maintenances savings, and a single point of contact for end users. Advances in computing technology have introduced new concept in e-business and e-commerce. The new evolutionary wave in the space was Service Oriented Architecture (SOA). Because of Service Oriented Architecture, the establishing and running of business functions were outsourced to online services [2]. Cloud Computing [3] is the realization of Service Oriented Architecture.

CLOUD FOR LESS EXPENCES

Developing and delivery of e-Learning services online to the citizen and business entities always has the potential that some expense will be overlooked or left out on purpose, The migration towards G-cloud service model can be a new experience for the government IT policy makers and lower staff. If some government department or IT staff already has some cloud services implemented, then there is less chance for surprise expenses. If however the use of cloud services is new in e-Learning sector for the IT staff, then a number of initial costs need to be calculated and included.

Even before the decision to use cloud services in e-Learning, the departments has to perform a needs assessment, plus site surveys, and system design. Most cloud services support a limited number of online services in present time and there is a need for upgraded user endpoints to access the services like virtual terminals PCs, mobile handsets to take advantage of future G-cloud model. The endpoints of departments will be connected over the intranet based private cloud and the users will be connected by a public cloud.

There should be a phased in approach to offer cloud based e-Learning services. Finally, there may be one-time costs for assigning IT staff to the cloud implementation. There will also be training costs, most likely train the trainer classes for the IT staff and for the help desk personnel. The enterprise may purchase or publish their own documentation, in either paper or electronic form, for the ultimate end users.

Recurring Expenses

The G-cloud model has to cover some recurring costs like:

- The cloud service itself, which is based on the number of users and the services they consume,
- Management of the cloud service if it is performed by a third party and not by the IT staff,
- WAN or SWAN access upgrades for the connection(s) and the increased bandwidth that will be consumed,
- Probably G2C services shall be offered in phase one,
- Loss of discounts / cost increases / shortfall charges on existing communications arrangements that are modified or eliminated by the move to the cloud platform.

The cost of recurring expenses should be predictable and fixed for at least 5 years.

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SERVICE AGREEMENT ISSUES

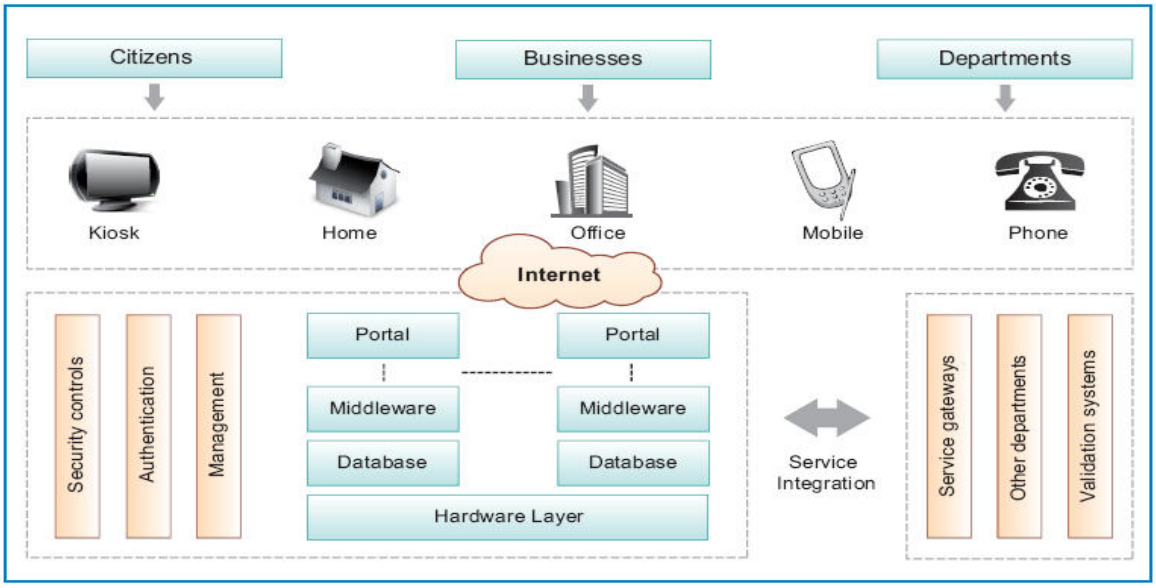
Cloud service removes most of infrastructure like Smart terminals with CPU and hard disk, good RAM from the government departments. The cloud service providers will work as data centers, it will help to become asset and cost light. This leads the cloud service provider to push for longer contracts, for the provider to recoup their costs. The penalty for the enterprise may be that the service agreement has many inflexible terms included in the agreement.

- The selected features and functions selected by IT staff or departments, as they need.
- The selected feature and function mix changes, either increased or decreased.
- The enterprise has a reduction in force, is acquired, or experiences a business downturn leading to fewer users and possibly the elimination of some features and functions? Will this affect discounts producing a higher per user cost for the service?
- The technologies offered do not meet the enterprise needs as the enterprise matures in its use of UC?

TRADITIONAL OR CLOUD BASED

The performance of cloud based e-Learning systems is better than the traditional e-Learning model. The cloud based e-Learning provides several benefits over the traditional e-Governance. Since information and applications are hosted online in cloud computing that is why they are available and accessible from anywhere and at any time. In the light of current economic situation where governments around the world are under pressure to cut extra spending and they are shrinking the ICT budget as well. In this situation, cloud based e-government is a good option in which governments do not need to purchase ICT equipment. In fact, they lease ICT resources and services according to their need instead of investing huge amount of money in buying equipment. In short, capital costs are replaced by operational costs for the resources used by government organizations. Trust and security are also playing an important role in the success of e-government. One of the important stakeholders of the e-government is the citizens therefore; they should have trust in e-government systems. In cloud computing data is stored and processed at third party premises therefore, citizens and businesses are concerned about the confidentiality and security of their sensitive data and information. Similarly, data leakage can also affect the trust of citizens and businesses because in some cases the data loss can be irreplaceable. Still the cloud based e-government system is providing more benefits in the form of efficiency, scalability, flexibility and cost effectiveness as compared to traditional e-government system.

Figure-1: E-Learning Working Framework Using Traditional Model



Sources: Authors Compilation

CONCLUSION

Given that governments, at least in well-urbanized places, use ample information technology to conduct various functions (such as procurement, loan sanctions, metering, etc.), but in most of the rural and semi urban areas lacks IT support; so the cloud would greatly benefit their attempt to meet the demands of citizen living in rural areas. This is because, essentially, cloud technology standardizes and pools IT resources and automates many of the maintenance tasks done manually under traditional or client/server model of computing. By adopting the cloud model, governments can free up a lot of time and human resources to focus on increasing their roster of services or devising even better delivery mechanisms.

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WEB MINING METHODS FOR FACT FINDINGS

Deepti Juneja Thakral[12] Dr. M. K. Sharma[13]

ABSTRACT

Web mining is a very broad research area emerging to solve the issues that arise due to the WWW phenomenon. The Web mining research is a converging research area from several research communities, such as Databases, IR and AI. In this paper, we will try to overview the some important methods of Web mining and Web usage mining. We also try to make a prediction concerning the future of Web mining, which is the combination of the methods used in all three categories of Web mining.

KEYWORDS

WWW, Web Mining, Data Fusion, Pagerank etc.

INTRODUCTION

Web mining is a very hot research topic, which combines two of the activated research areas: Data Mining and World Wide Web. User patterns on web or web sites are item sets, subsequences, or substructures that appear in a data set with frequency no less than a user-specified threshold. For example, a set of items, such as milk and bread that appear frequently together in a transaction data set is a *frequent item set*. A subsequence, such as buying first a Mobile phone, then a digital tab, and then a memory card, if it occurs frequently in a shopping history database, is a (*frequent*) *sequential pattern*. A *substructure* can refer to different structural forms, such as sub graphs, sub trees, or sub lattices, which may be combined with item sets or subsequences. If a substructure occurs frequently in a graph database, it is called a (*frequent*) *structural pattern*.

Finding frequent patterns on web plays an essential role in mining associations, correlations, and many other interesting relationships among data. Moreover, it helps in data indexing, classification, clustering, and other data mining tasks as well. Thus, frequent web mining has become an important data-mining task and a focused theme in data mining research.

Frequent pattern mining was first proposed by Agarwal et al., [1] formarket basket analysis in the form of association rule mining. Web mining is the term of applying data mining techniques to automatically discover and extract useful information from the World Wide Web documents and services [2]. Although Web mining puts down the roots deeply in data mining, it is not equivalent to data mining.

The unstructured feature of Web data triggers more complexity of Web mining. Web mining research is actually a converging area from several research communities, such as Database, Information Retrieval, Artificial Intelligence [3], and also psychology and statistics as well.

GRAPH THEORY APPROACH

A web site can be abstractly viewed as a set of web documents connected with hypertext links. The site can be represented by a simple un-weighted directed graph, which is a finite set of vertices and arcs. A vertex corresponds to a document and an arc to a link. Each arc joins an ordered pair of vertices. The graph contains no loops (i.e. arcs joining a vertex with itself), no parallel arcs (i.e. arcs joining the same ordered pair of vertices), whereas no weight (e.g. distance, cost,) is associated with any arc. First, we need to store the graph in a main memory data structure. Although several approaches for the representation of graphs in secondary storage have been reported [8,11], however, we assume that the graph size is such that the graph can _t in main memory. The reason is that for the typical example of a web site, the total number of graph vertices is less than a few thousands.

DATA FUSION

Data fusion is the process of integrating multiple sources of information such that their combination yields better results than if the data sources are used individually. The idea of data fusion is used to find feature location, the process of identifying the source code that implements functionality in software. A data fusion model for feature location is presented which defines new feature location techniques based on combining information from textual, dynamic, and web mining analyses applied to software.

The idea of integrating data from multiple sources is known as *data fusion*. The sources of data have their individual benefits and limitations, but when they are combined, their drawbacks can be minimized and better results can be achieved. Data fusion is used heavily in sensor networks and geospatial applications to attain better results in terms of accuracy, completeness, or dependability. As an example, the position of an object can be calculated using an inertial navigation system (INS) or global positioning system (GPS).

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LINK ANALYSIS

Link analysis has close ties to social networks and citation analysis, the study of the co-citations occurring between scientific papers. The best-known measure of a publication's importance is the "impact factor" [7], developed by Eugene Garfield.

This metric takes into account the number of citations received by a publication. The impact factor is proportional to the number of citations a publication has. This measure, counts all references equally. However, it is evident that some "important" citations should be given additional weight. On the Web, the notion of citations corresponds to the links pointing to a Webpage. The most simplified ranking of a Web page could be accomplished by summing up the number of links pointing to it. However, this approach favors the most popular Web sites, such as universally known portals, news pages etc. Moreover, the diversity of the content and its quality in the Web should also be taken into consideration.

In scientific literature, all publications have a certain standard and their value is measured by their impact to the scientific community. Usually the co-citations are between closed networks of knowledge. On the other hand, in the Web there exist amounts of information, serving different purposes. What is more, a phenomenon usually noticed is that there not exist links between competitors, i.e. Web pages referring to the same subject with conflicting goals.

PAGERANK

PageRank was developed by Brin and Page during their PhD in Stanford University. This algorithm is influenced by citation analysis, considering the incoming links as citations to the Web pages. However, by simply applying citation analysis techniques to the diverse set of Web documents would not result in as good outcomes. Therefore, PageRank provides a more sophisticated way to compute the importance of a Web page than simply counting the number of pages that have a link pointing to it (named as "backlinks"). If a backlink comes from an "important" Web page, then it weighs more than others that come from minor pages. Intuitively, "a page has high rank if the sum of the ranks of its backlinks is high. This covers both the case when a page has many backlinks and when a page has few highly ranked backlinks" [8]. In other words, we may consider that links from a page to another as a vote. However, not only the number of votes a page receives is considered important, but the "importance" of the ones that cast these votes as well.

CONCLUSION

In this paper, we discussed about the term web mining and explore some popular methods for web mining approaches in present time.

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AWARENESS AND ADOPTION FOR E-GOVERNANCE IN INDIA

Shalabh Shukla[14]

ABSTRACT

E-Government services have been implemented in many countries over the past decades. Developing countries like India have problems in implementing the successful e-Government services and there is lack of practical studies on the issues of implementing e-Government services. One of the issues involving on successful implementation of e-Government services is the adoption of the services. This paper surveys the various factors involves for the awareness and adoption of e-Governance in India.

KEYWORDS

Government, e-Governance, Internet, NeGP, Government Services, e-Governance Projects, Survey, Citizens etc.

INTRODUCTION

According to WEF Global Information Technology Report [3], India ranks 24th out of 134 countries with 5.38 score in accessing and overall priority of ICT. Therefore, there is tremendous potential for e- Governance to provide exponentially benefits to their citizens and maximize return on government investment. Which represents the growth of e-Governance in India is quite encouraging. NeGP comprises 31 mission mode projects (MMPs), which are further classified as state, central or integrated projects. Each state government can also define five MMPs specific to its individual needs [4].

The number of Internet users in India has reached 205 million in October 2013, registering a year on year growth of 40% over last year. By December 2013, it is expected to reach 213 million [I-Cube 2013 report, released by the Internet and Mobile Association of India (IAMAI) and IMRB International] [1]. In addition, India is now world's third largest Internet user after U.S. & China [2]. So it is benefited to see that through which device user generally access internet, so that e-governance services can be given a better framework. There are various factors important for any government services are Trustworthy, Transparent, Timely service delivery, speed of service delivery, and 24*7 availability. Paper shows how citizens think about the importance of various factors.

RESEARCH METHODOLOGY

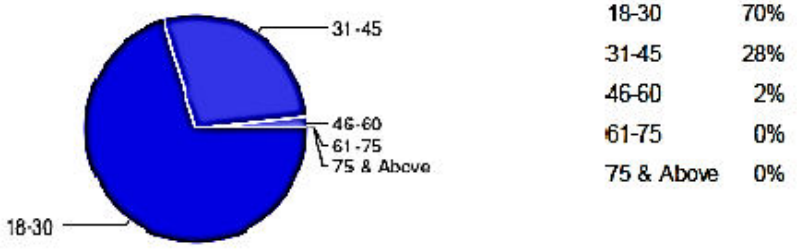
Author designed online surveys about e-governance in order to collect information about security, trust, cost, and issues involved in the deployment of e-Governance services. The survey comprised of three different types of questions i.e. open ended, closed ended and scaling questions. They were designed to get the different and solid views of the responders'. The survey was done in the period May 2013 to July 2013. This survey was sent to 500 different pupils from which 270 respondents' shows interest and filled the desired survey.

The information in this paper is based on the results of surveying almost 270 different pupils, which includes IT-architects, business development manager, executive consultant, chief technical officer, programmers, business consultant, CEO and other persons who are either linked/aware e-Governance.

Respondent's breakdown as follows:

Age group of respondent: 70% of respondent are of age 18-30 Years. 28% are of 31-45 years and rest 2% belongs to 46-60 years age group.

Graph-1

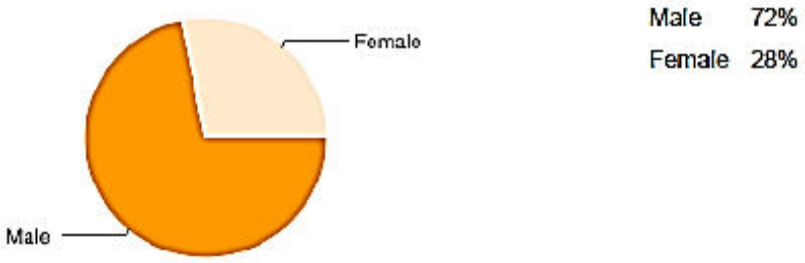


Sources: Authors Compilation

[14]Assistant Professor, Department of Computer Application, Lal Bahadur Shastri Institute of Management & Studies, Uttar Pradesh, India, shukla918@gmail.com

Gender ratio: 72% male respondents register their responses in comparison to 28% female respondent.

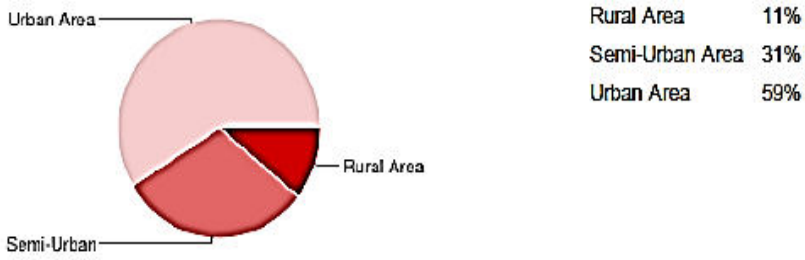
Graph-2



Sources: Authors Compilation

Living habitat: 59% of respondent are from urban area, 11% are from rural, whereas 31% are from semi-urban area, which shows that the data is collected from all habitat.

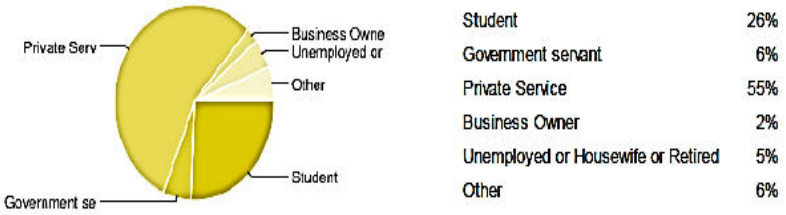
Graph-3



Sources: Authors Compilation

Working Ability: The survey has been given to almost all the sectors of economy. 55% private sector respondent records their responses in comparison to 6% government sector. Student shows high interest and 26% responded to the survey. Business Owner, Housewife, Unemployed, Retired and others shares 2%, 5% & 6% responses.

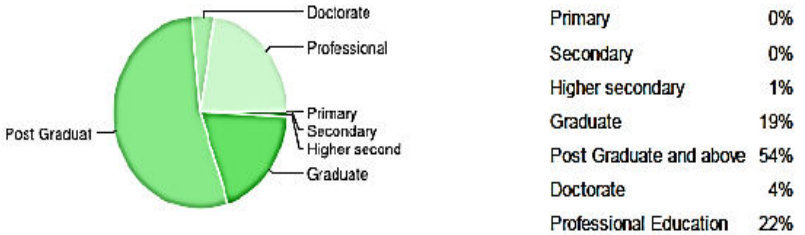
Graph-4



Sources: Authors Compilation

Thinking level of Respondents: Thinking level of any person can be decided with its education. Maximum of our respondent (54%) are post-graduate and above & 4% are doctorate which means that we have an assurance of correctness of data. 22% have passed Professional education and 19% are Graduate. Only 1 % of our respondents are of higher secondary.

Graph-5



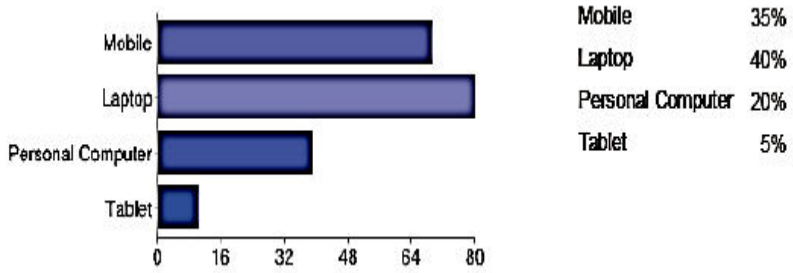
Sources: Authors Compilation

DATA ANALYSIS

Internet Access

Q1. You access Internet through:

Graph-6



Sources: Authors Compilation

60% pupils uses internet on either laptop (40%) or PC (20%). 35% of the respondents uses their mobile while accessing internet and 5% uses tablet.

Q2. How frequently you access Internet.

Graph-7

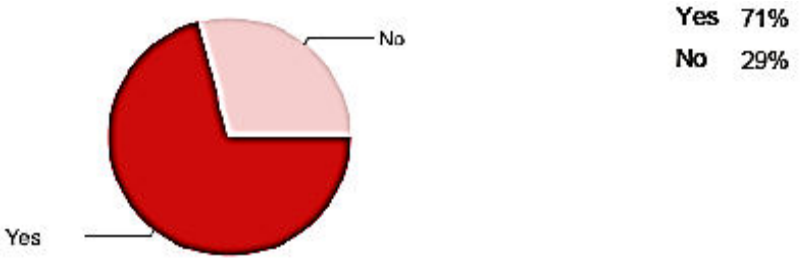
Sources: Authors Compilation

A very important fact comes through a question that almost all (90%) pupils use internet daily. 6% uses twice in a week, 3% monthly and 1% fortnightly, these are the persons like housewife/unemployed.

E-Governance Awareness and Adoption

Q3. E governance means online government, Are you aware that Indian Government is also offering many E-governance project?

Graph-8

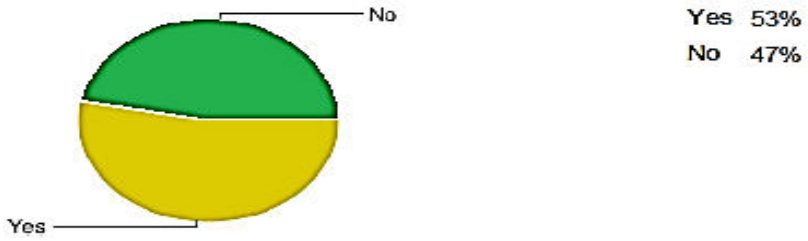


Sources: Authors Compilation

Almost 71% of the candidates are aware of the e-Government projects, & 29% are unaware.

Q4. Are you aware about National E-governance Plan?

Graph-9

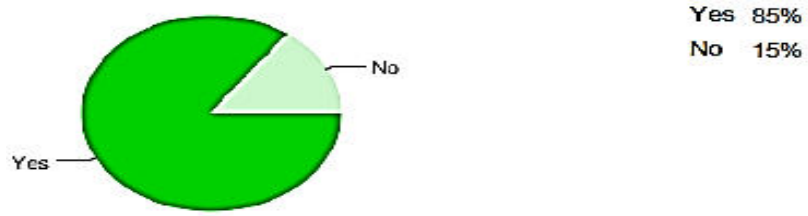


Sources: Authors Compilation

53% of the total respondents are aware of the NeGP (National e-Governance Plan), while 47 % are unaware.

Q5. Do you trust online services?

Graph-10

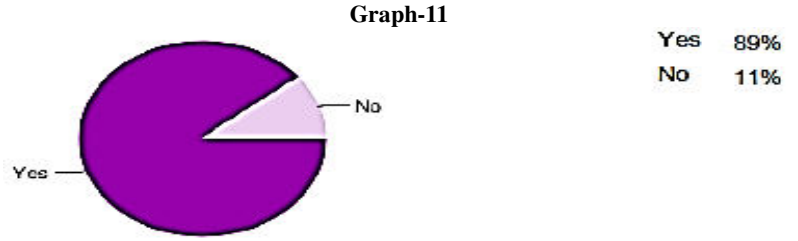


Sources: Authors Compilation

85% pupils trust online services and 15% says they do not trust.

Q6. Do you believe that old government processes should be re-designed as there are some problems?

Graph-11

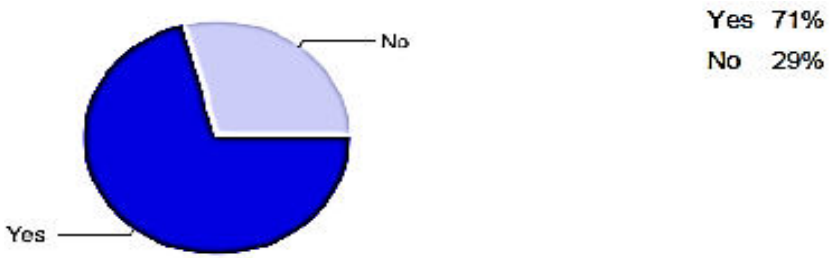


Sources: Authors Compilation

89% respondent agrees that old government process should be re-designed because of problems. Whereas, 11% does not think like that.

Q7. Before obtaining any government services, do you check website of concern department?

Graph-12

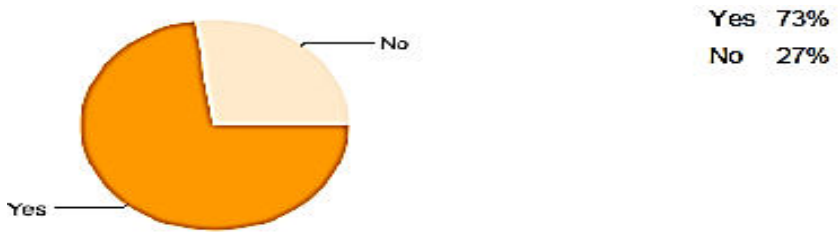


Sources: Authors Compilation

71% checks the website of concern department before using any government service and 29% do not.

Q8. E-governance has reduced corruption.

Graph-13

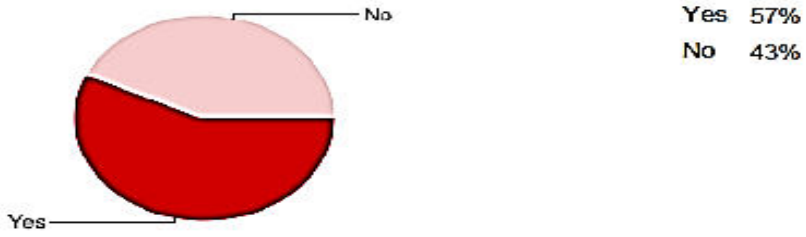


Sources: Authors Compilation

This is the main reason why citizens want to use e-governance. 73% respondents think that e-Governance has reduced corruption. While 27% are against.

Q9. E-governance offers Error free transaction.

Graph-14

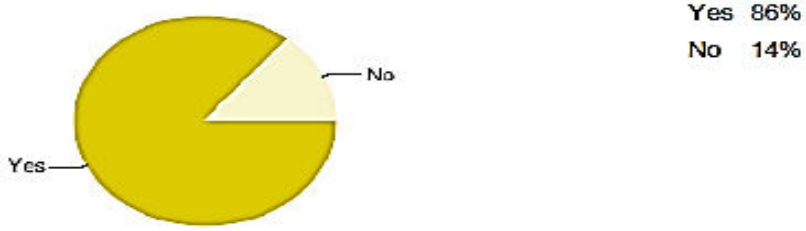


Sources: Authors Compilation

57% pupils support that e-governance offers error-free transaction. 43% thinks there are errors in the e-Governance transactions.

Q10. E-governance reduces visits in government offices.

Graph-15



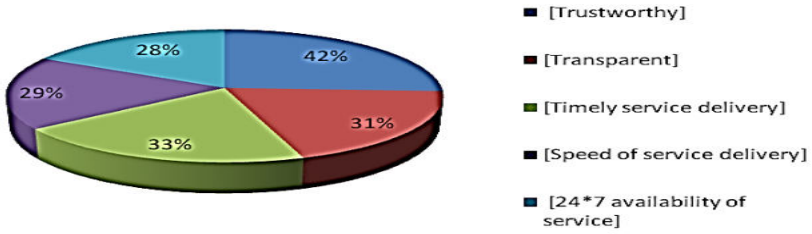
Sources: Authors Compilation

E-Governance services provide doorstep facility to its citizens. 86% of our respondents agree that e-governance reduces visits in government offices. 14% denies the fact.

E-Governance Factors

Q11. What is the most important factor according to you when you think of any government services?

Graph-16



Sources: Authors Compilation

We found that 42% of pupil gives rank 1 to trustworthy, 33% gives rank 1 to Timely service delivery, 31% gives rank 1 to transparency. 29% Respondent thinks that Speed of service delivery should be first factor before thinking of any government service, whereas 28% gives their first choice to 24*7 availability of service.

From this summary, we find that all the above factors are almost comparative to each other.

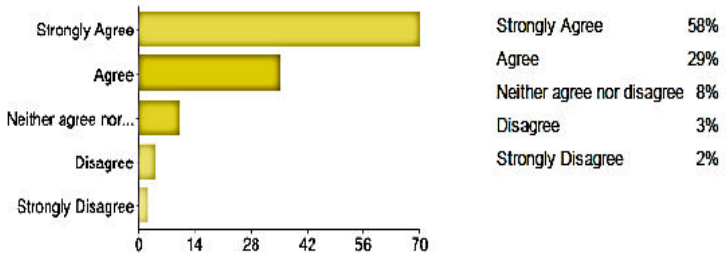
Expectations of Citizens from Government Service

There is an overwhelming perception among the public that public services need to improve. This research review shows citizen satisfaction is a powerful driver of change.

Q12 A) Please select appropriate for measuring effectiveness of any government services Citizen Expectations for Government services.

1. Quality of Service is required

Graph-17

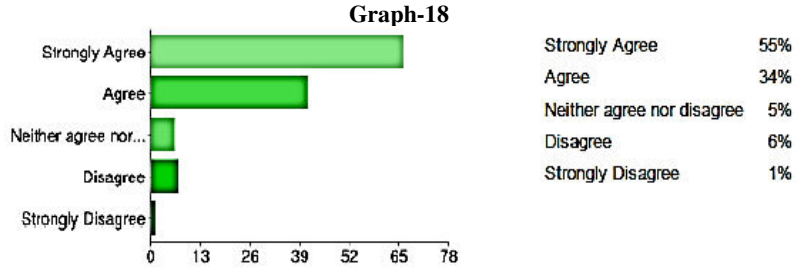


Sources: Authors Compilation

Quality of services is the overall performance of the service, particularly the performance seen at user level. It is also a comparison of expectation with performance [5]. 58% strongly agree and 29% agree that quality of service is required in a government service.

2. Transparency in Operations is necessary.

Graph-18

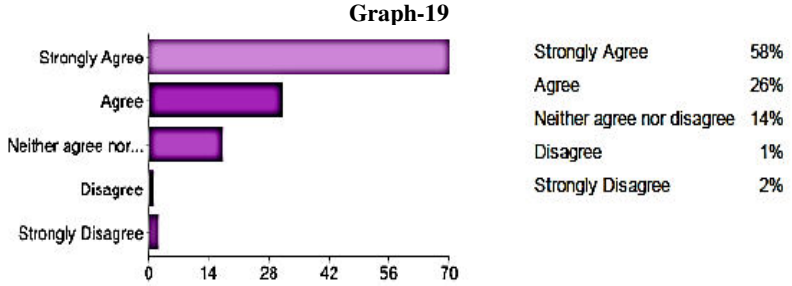


Sources: Authors Compilation

Transparency, however, may be defined as not only the disclosure of government information, but also the access, comprehension, and use of it by the public [6]. 89% of total responses either strongly agree (55%) or agree (34%) that there must be transparency in operation of any government service.

3. Government services should be trustworthy if it is online service

Graph-19

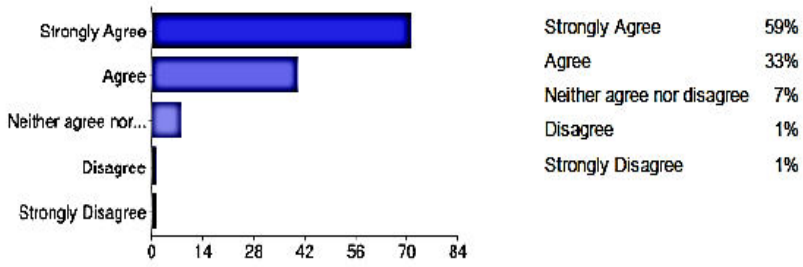


Sources: Authors Compilation

Trustworthiness is "the perception of confidence in the electronic marketer's reliability and integrity" [7]. Lack of trust prevents users for adopting e-Governance services. 84% of citizens either strongly agrees (58%) or agree (26%) with this factor, whereas 14% neither agree nor disagree (neutral).

4. Speed of delivery of service is important

Graph-20

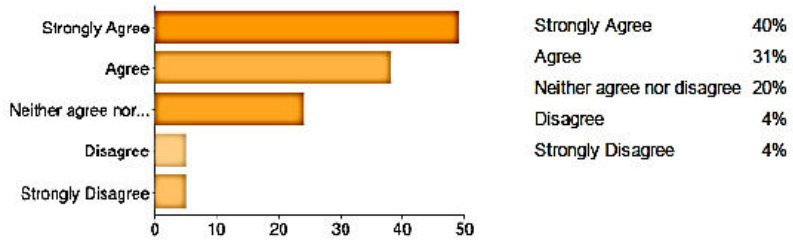


Sources: Authors Compilation

Speed of delivery is also one of the main criterions in judging quality of service. 92% of respondent strongly agree (59%) or agree (33%) with this factor.

5. All services form one person / table is more convenient

Graph-21

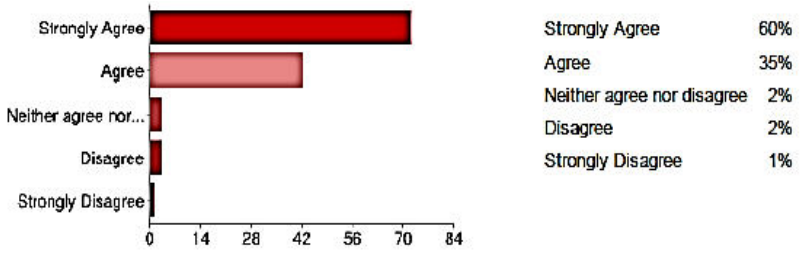


Sources: Authors Compilation

Under the one person/table paradigm, all of a customer's service can be completed in a single window. One-stop customers do not have to hunt around, call back, or repeatedly explain their situation. One-stop customer service is convenient, accessible, and personalized. 71% of our respondents agree (31%) or strongly agree (40%) with this factor of government service. 20% becomes neutral and rest (7%) disagree with this factor.

6. Service should be easily accessible

Graph-22

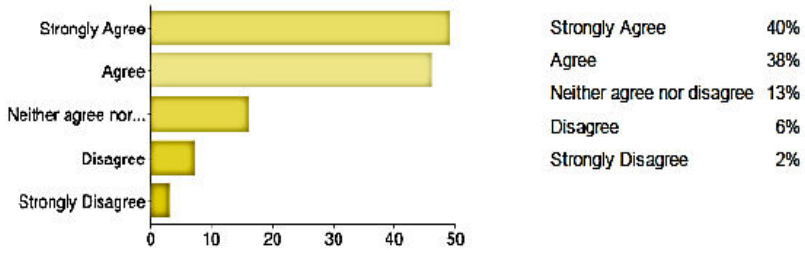


Sources: Authors Compilation

The objective of this factor is to provide an easy-to-reach and access of government services and information by citizens. The goal is that information resources are widely accessible to the general public so that they promote innovation and research activities, the development of digital products, services and markets, the efficiency, impact and transparency of public administration and citizens' participation in decision-making [8]. 95% of respondent agree (35%) or strongly agree (60%) to this factor. This shows that all citizens think that government services should be easily accessible.

7. E-governance project reduces cost of obtaining service

Graph-23

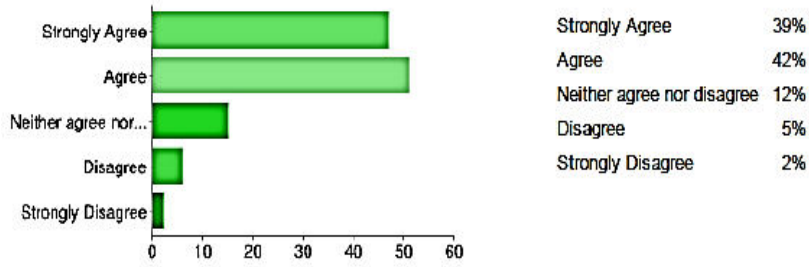


Sources: Authors Compilation

The involvement of technologies like virtualization, consolidation and cloud computing and adoption of free and open source software in designing & deploying e-governance will lead towards reduction in total cost associated with both hardware as well as software. Therefore it reduces the financial burden abide by the state and central governments [9]. 78% pupils strongly agree [40%] or agree [38%] with this factor. 13% of respondent neither agree nor disagree with this factor.

8. E-governance Improves quality of services

Graph-24

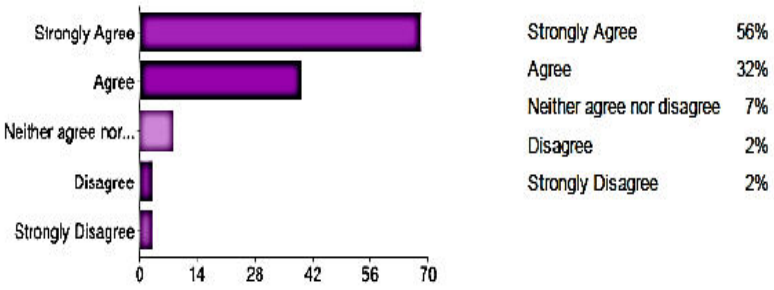


Sources: Authors Compilation

E-Governance acts a strategic tool for transforming Governance and improving the quality of services provided by the government to its people. Information technology has been found to be very useful in reinvigorating the government administrative systems by enhancing their capacity and efficiency [10]. 81% support (strongly agrees (39%) & agree (42%)) that e-governance improves quality of services, whereas, 12 % becomes neutral at this factor. 7% respondents disagree with this factor.

9. Government should conduct awareness programs for various E-governance services offered

Graph-25

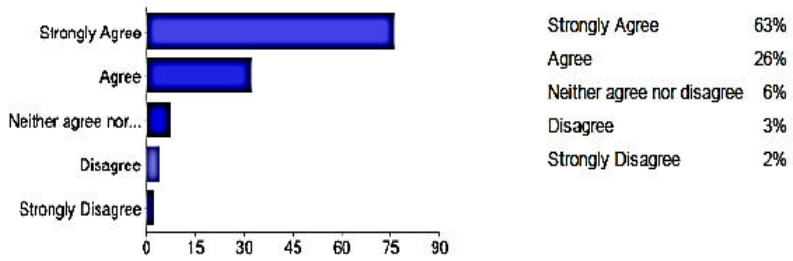


Sources: Authors Compilation

Apart from building capabilities within the government, there is need for generating widespread awareness among the public at large. The success of e-Governance lies in increasing the number of electronic interactions between citizens and the government and not merely in building the infrastructure of e-Governance [11]. 88% respondents agree (32%) and strongly agree (56%) that government should conduct awareness programs for e-governance services. 7% neither agree nor disagree with this factor.

10. It is good to have 24*7 service availability online

Graph-26



Sources: Authors Compilation

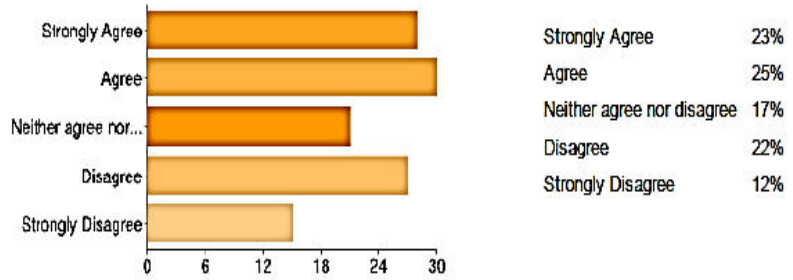
24/7 service is a service that is available regardless of time or day. E-Governance services should be available 24/7 so that it helps citizens to regulate their relations with government in a faster, more reliable manner and without wasting time. 89% pupils strongly agree (63%) and agree (26%) about 24*7 availability of e-governance services. 6% respondents becomes neutral about this factor, whereas 5% disagree.

Effectiveness of Government Services

12. B) Please select appropriate for measuring effectiveness of any government services (Infrastructure Related)

1. Government staff has enough knowledge about software of service

Graph-27

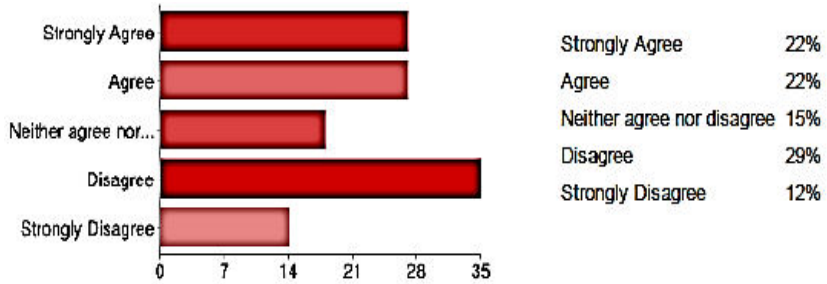


Sources: Authors Compilation

48% of respondents agrees / strongly agrees that government staff have enough knowledge about software. 34% totally disagrees about the above criteria. Whereas 17% neither agree nor disagree.

2. Government websites are working properly and updated timely

Graph-28

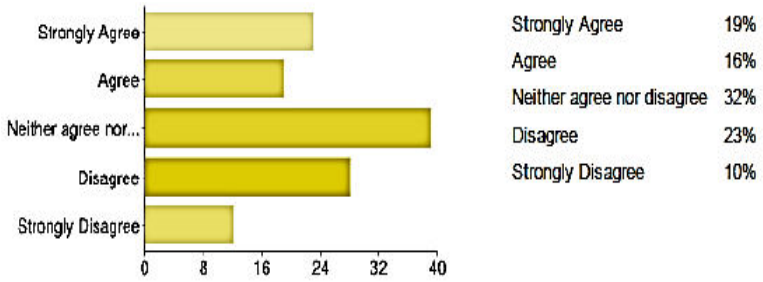


Sources: Authors Compilation

About 44% of total respondents agree (22%) / strongly agree (22%). 41% totally disagrees that Government websites are working properly and updated timely. 15% of respondent becomes neutral in this question.

3. Computers are working well in government offices

Graph-29

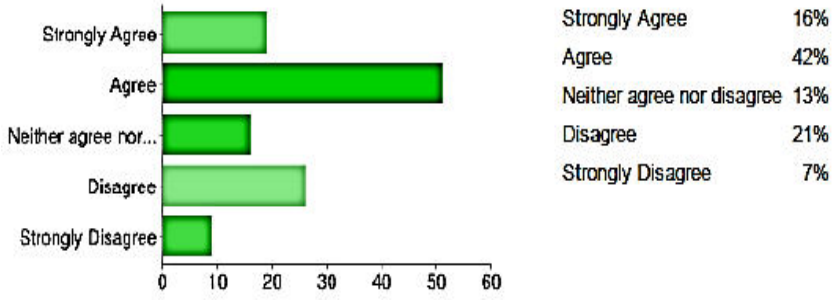


Sources: Authors Compilation

About 35% of total respondents agree (16%) / strongly agree (19%). 33% totally disagrees that computers are working well in government offices. 32% of respondent becomes neutral in this question.

4. Government offices are now better in terms of IT hardware n software

Graph-30



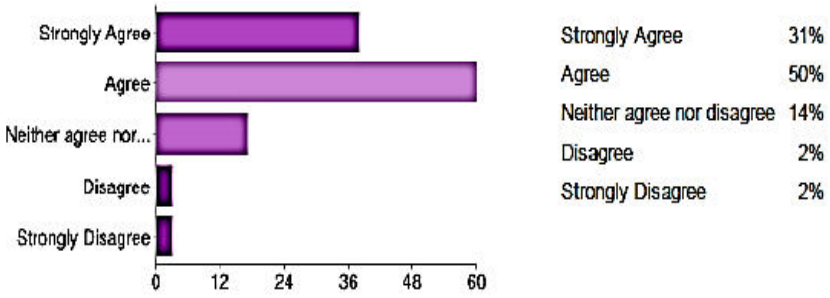
Sources: Authors Compilation

About 58% of total respondents agree (42%) / strongly agree (16%). 28% totally disagrees that Government offices are now better in terms of IT hardware n software. 13% of respondent becomes neutral in this question.

12. C) Please select appropriate for measuring effectiveness of any government services (Government and E-governance)

1. E-governance Projects ensures security of transaction

Graph-31

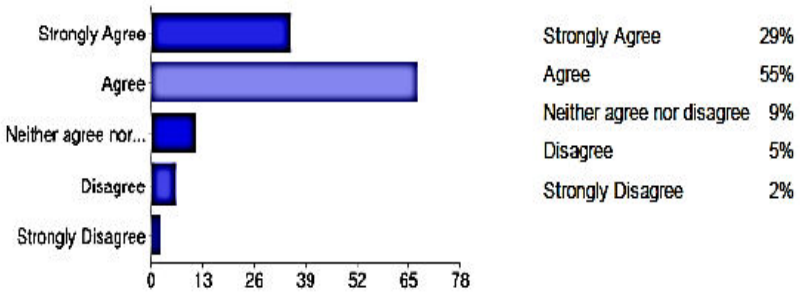


Sources: Authors Compilation

At the transaction stage, the public would be able to carry out (financial) transactions with the government. This would require higher levels of processing capability, as well as payment gateways and security implementation [12]. 81% pupils agrees (50%)/ strongly agrees (31%) that e-governance Projects ensures security of transaction. 14% neither agree nor disagree with this factor.

2. E-governance Increases citizen empowerment

Graph-32

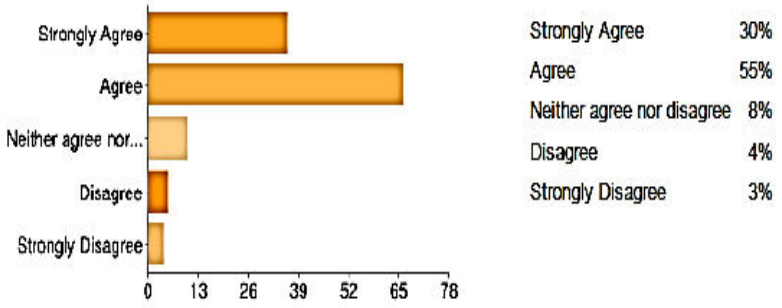


Sources: Authors Compilation

Empowerment will be understood as participation in those decision-making processes that impacts the social, political and economic conditions of society. 84% respondents strongly agree (29%) / agree (55%) that e-governance increases citizen empowerment. 9% becomes neutral and 7% disagree.

3. E-governance increases efficiency in government services

Graph-33

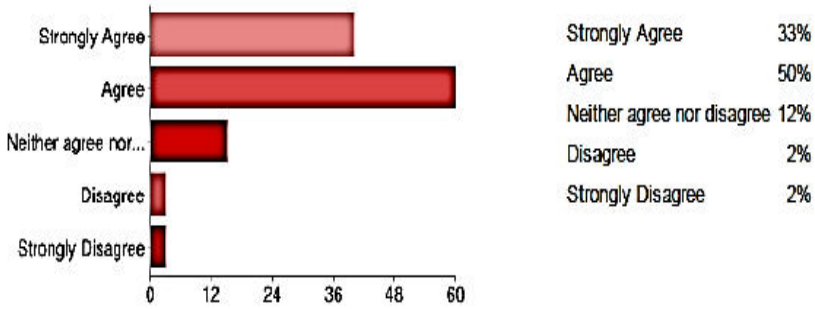


Sources: Authors Compilation

The government has undertaken several e-Government initiatives to provide convenient and transparent services to citizens and to promote greater efficiency within the government department [13]. 85% citizens accepts (Strongly agree (30%) & agree (55%)) that E-governance increases efficiency in government services, whereas, 8% neither agree nor disagree and 7% totally disagree.

4. E-governance project reduces cost of delivering service

Graph-34

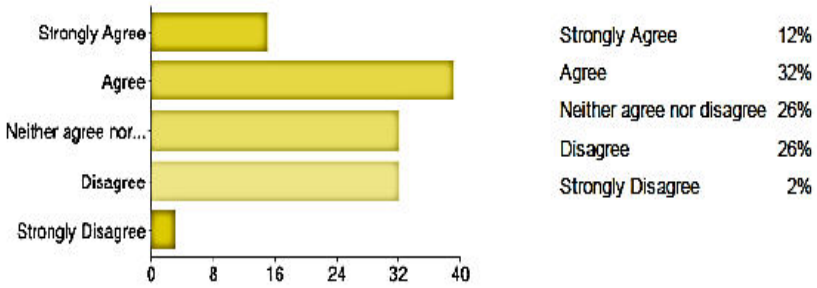


Sources: Authors Compilation

One of the main benefits of e-Governance is that it reduces cost of delivering service, almost 83% agrees (50%) / strongly agrees (33%) at this factor. 12% neither agree nor disagree while 4% disagree with this factor.

5. E-governance involves huge cost

Graph-35

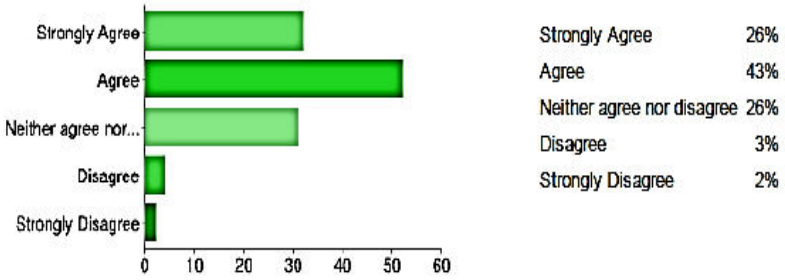


Sources: Authors Compilation

44% agrees with this factor whereas 28% disagree that e-governance involves huge cost. 26% respondents neither agree nor disagree.

6. PPP (Public Private Partnership) is preferable for E-governance

Graph-36

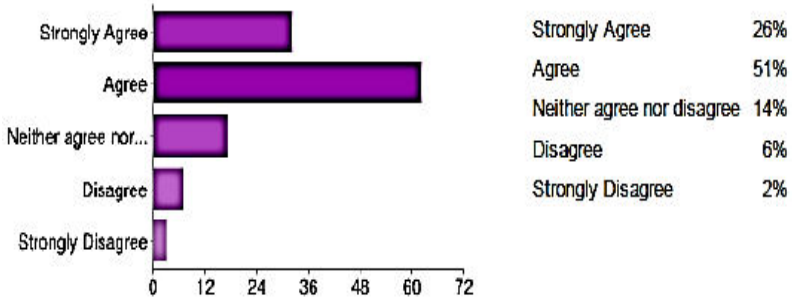


Sources: Authors Compilation

Public-Private Partnerships (PPP's) are contracts between a private sector entity and a government body that call for the private partner to deliver a desired service and assume the associated risks [14]. 69% strongly agrees (26%) / agrees (43%) that PPP is preferable for e-governance. Whereas 26% becomes neutral at this factor and 5% disagree at this.

7. E-governance Reduces administrative burdens

Graph-37

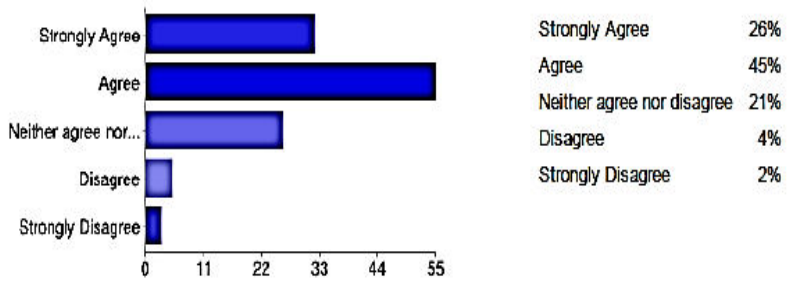


Sources: Authors Compilation

Administrative simplification broadly refers to reviewing and simplifying unnecessary paperwork and formalities that governments impose on citizens [15]. 77% of total respondent simply agrees (51%) / strongly agrees (26%), & 14% neither agree nor disagree, whereas, 8% of respondents disagree / strongly disagree with this criteria.

8. E-governance projects increases revenue of government

Graph-38

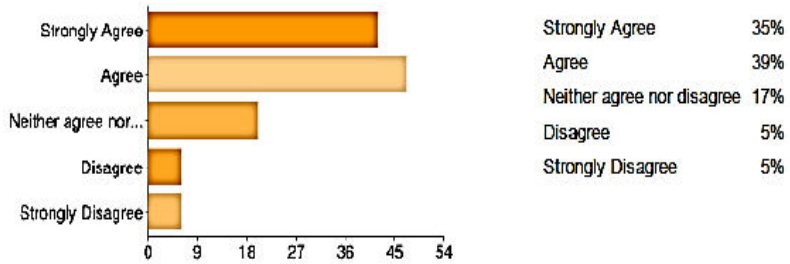


Sources: Authors Compilation

The broader objective of e-Governance projects is to enhance the base of citizens who pay taxes, by simplifying procedures and improving the accessibility of collection centers, so that the revenues collected can be utilized for better maintenance of civic amenities and for developmental activities [16]. 71% strongly agrees / agrees that e-governance projects increases revenue of government, 21% neither agree nor disagree, & 6% disagree with the criteria.

9. E-government has helped to improve the image of government

Graph-39



Sources: Authors Compilation

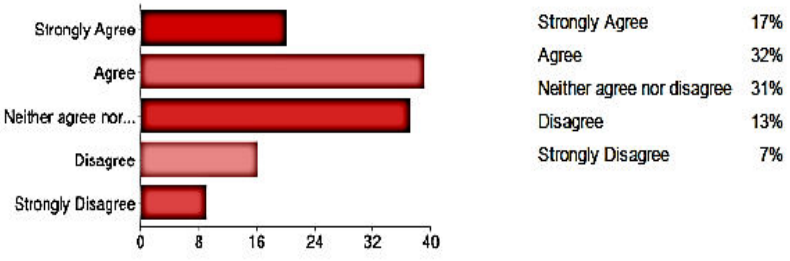
Digital government has attracted attention as one way of improving citizen interactions with government and a possible remedy to the dilemma that citizen apathy and distrust pose for democracy [17]. 35% strongly agree / 39% agree with this criteria, 17% becomes neutral and 10% totally disagree that e-government has helped to improve the image of the government.

Who will be benefited of Government Services?

12. D) Please select appropriate for measuring effectiveness of any government services E-governance advantageous to whom

1. E-government services put the poor at disadvantage

Graph-40

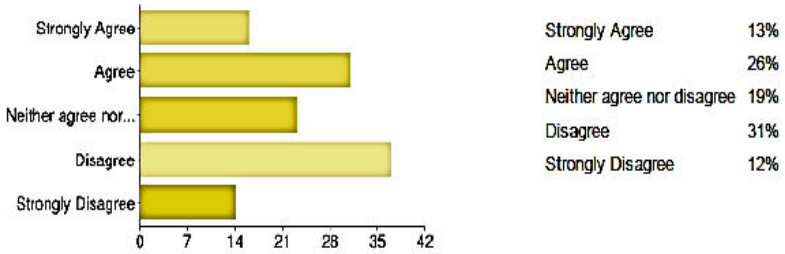


Sources: Authors Compilation

49% people agree (32%) / strongly agree (17%) with this factor, 31% neither agree nor disagree & 20% of respondent did not thinks that E-government services put the poor at disadvantage.

2. E-government services benefit only the rich and influential

Graph-41

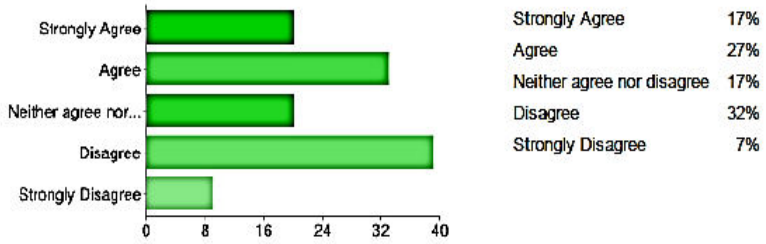


Sources: Authors Compilation

Only 26% agrees and 13% respondents strongly agree that E-government services benefit only the rich and influential, whereas, 43% disagree about this factor. 19% neither agree nor disagree.

3. E-government services benefit only the urban people

Graph-42

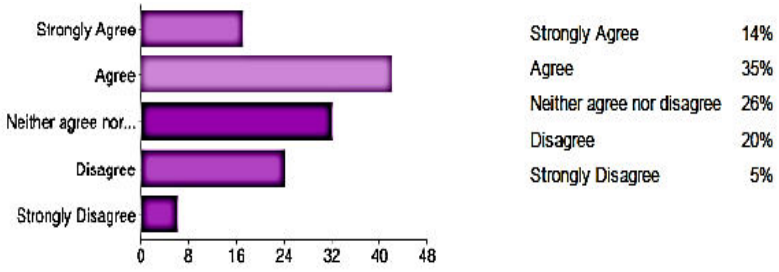


Sources: Authors Compilation

Only 27% agrees and 17% respondents strongly agree that E-government services benefit only the urban people, whereas, 39% disagree about this factor. 17% neither agree nor disagree

4. Rural citizens benefit greatly from e-government services

Graph-43



Sources: Authors Compilation

35% agrees and 14% respondents strongly agree that E-government services benefit only the rural people greatly, whereas, 25% disagree about this factor. 26% neither agree nor disagree.

CONCLUSION

Various categories of results have been collected from the above survey. After analyzing the survey result, we found the following conclusion. Almost 90% citizens uses internet on daily basis in their mobiles, laptops, personal computer & tablets. So, e-Governance services can be easily provided to them at their devices. 71% of total respondents are aware of e-government projects, whereas, only 53% are aware of national e-Governance plan (NeGP). Therefore, all measures should be taken to provide the information about various projects and NeGP to citizens. Today nearly all citizens use e-Governance services in one-form or another and 83% trust online services, which is a very good sign for e-Governance. 73% also thinks that e-governance also

reduced corruption and government becomes more transparent. Various important factors of e-Governance like Trustworthy, Transparent, Timely service delivery, Speed of service delivery, 24*7 availability of service.

It has been observed in survey that citizen thinks that there are infrastructure related issues in e-government, like, government staffs are not trained, and government's websites are not working properly, computers in government offices are not working properly etc. Therefore, government so take care of this as it results in lack of trust in pupil's mind.

People also think that implementing e-governance services will benefit to all citizen, whether, they are rich or poor, from rural or urban etc.

LIMITATION

This survey is conducted only on those pupils who are either linked/aware of e-Governance and its services. That means that these results only show the opinions of e-governance literate peoples. Those people not having knowledge of e-governance may have different opinion. Therefore, future scope of this paper is to conduct survey for these e-governance illiterate pupils. After this survey, we can predict the actual result and comparison.

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TECHNOLOGY AND ARCHITECTURE DESIGN OF WEB BASED OPERATING SYSTEM

Sadhna Rana[15]

ABSTRACT

A Web OS is a user interface (UI) that allows people to access applications stored completely or in part on the Web. It might mimic the user interface of traditional computer operating systems like Windows, but it does not interact directly with the computer's hardware. The user must still have a traditional OS on his or her computer. While there are not many computer operating systems to choose from, the same cannot be said of Web operating systems. There are dozens of Web operating systems available. Some of them offer a wide range of services, while others are still in development and only provide limited functionality. This paper discuss about WebOS, technology used to develop WebOS and architecture of a WebOS.

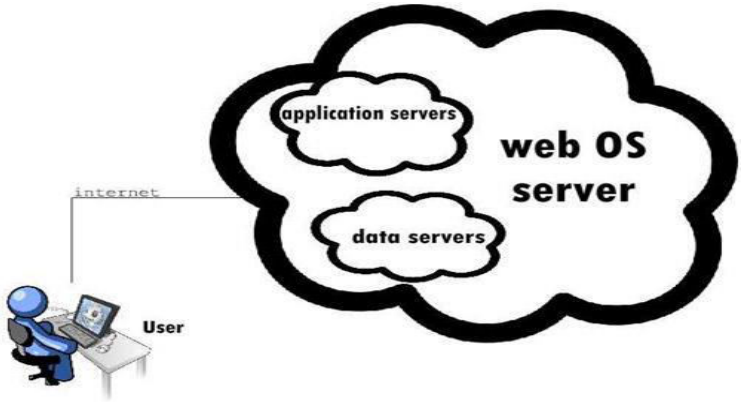
KEYWORDS

WebOS , UI , Webtop , AJAX , CSS , Core OS, Technology, Architecture etc.

INTRODUCTION

WebOS is the name of a project that the University of California, Berkeley began in 1996. The project is dedicated to building wide area applications. It is not the same thing as a Web operating system. Other people object to using the words "operating system" at all and instead prefer to call such applications "Web Desktop" or "Webtop" software. That is because Web OSs tends to mimic traditional computer desktop applications.

Chart-1: An Abstract View of Web Operating System



Sources: Authors Compilation

THE TECHNOLOGY OF WEB OPERATING SYSTEMS

With so many different Web operating systems either currently available or in development, it should come as no surprise that programmers use different approaches to achieve the same effect. While the goal of a Web OS is to provide an experience similar to using a desktop OS, there are no hard and fast rules for how to make that happen. The two most popular approaches rely on **Flash** technologies or **Asynchronous JavaScript and XML** (AJAX) technologies.

Flash is a set of technologies that enable programmers to create interactive Web pages. It is a technology that uses **vector graphics**. Vector graphics record image data as a collection of shapes and lines rather than individual **pixels**, which allows computers to load Flash images and animation faster than pixel-based graphics.

AJAX technologies rely on **hypertext markup language** (**HTML**), the **JavaScript** programming language, **Cascading Style Sheets** (**CSS**) and **eXtensible Markup Language** (**XML**). It is a browser technology. The HTML language is a collection of markup tags programmers uses on text files that tell Web browsers how to display the text file as a Web page. CSS is a tool that gives programmers more options when tweaking a Web site's appearance. Programmers can create a **style sheet** with certain attributes such as font style and color, and then apply those styles across several Web pages at once. JavaScript is a programming language that allows applications to send information back and forth between servers and browsers. XML is a markup language, which means programmers use it to describe the structure of information within a file and how it relates to other information.

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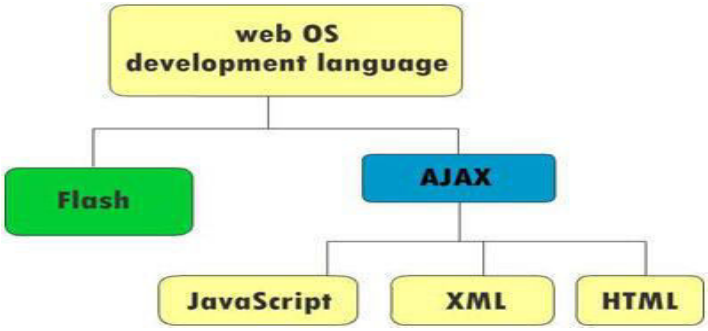
DEVELOPING A WEB OS

The major concern for a web OS either online or application based, it should have a light weighted user interface in the sense it should take less space, load quickly and provide a user-friendly interface. These concerns have been resolved by applications like Flash and XML scripts. Flash is a very popular web development tool. The fact that it is so popular is because it offers user to make interactive applications using JavaScript and it let user to make animations. Flash utilizes vector graphics to construct any application or animation. Vector graphics in take any picture or image in the form of shapes rather than the pixel by pixel due to which they require very less space on the system as well as on the internet. The effective use of flash can be seen on any video streaming websites where browser uses flash player to play the video. Because of these interactive capabilities of flash, it is being utilized in making interface for the web OS.

Another approach for the making of web OS is through XML coding or in more technical terms it is termed as AJAX which stands for "Asynchronous JavaScript and XML" this is a very effective alternate for the Flash. Actually, the AJAX is a pack of different languages used for web development like HTML (Hyper Text Markup Language), JavaScript coding, CSS (cascading style sheets) and eXtensible Markup language.

Chart-2: Popular Web Development Tool



Sources: Authors Compilation

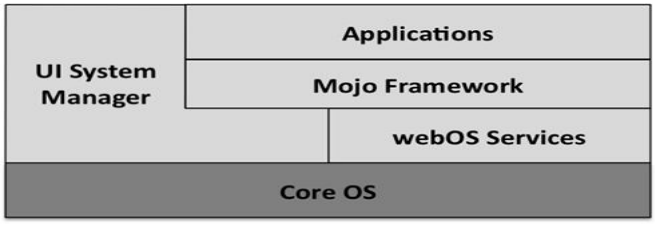
HTML is not a coding language; it is a Markup language where different tags are utilized for different needs. The browser than read these tags and gives out the appropriate result. Once the interface is developed using HTML it should be good looking too, hence to bring upon tweaks in the HTML coded web OS, CSS is used which stands for "cascading style sheets" it boost up the appearance of the web page. Now as our very user friendly interface has been molded, it needs to get communicate with the servers. To fulfill a vacancy JavaScript is used which is a language used for communicating with the servers.

An application installed on the computer connects to the server using JavaScript. It also allows bouncing the particular information to the particular servers. Now as we have successfully established the communication between application and server there exist one more problem i.e. nobody knows that which file is related to which type of information i.e. application file should be related to the application server and data should relate itself with the data server, to solve this problem XML is used. This keeps the files and information related to it in its virtual box systematically. The best feature of AJAX is its asynchronous communication. By the virtue of this, information can be send and receive between computer and server in small packets whenever needed thus utilizing the resources.

ARCHITECTURE OF WEBOS

A webOS mostly based on the Linux 2.6 kernel, with a combination of open source and Palm components providing user space services, referred to as the Core OS.Users interact with the various applications and the UI System Manager, which is responsible for the System UI. Collectively this is known as the Application Environment. Figure 1.3 shows a simplified view of the webOS architecture.

Chart-3: Simplified webOS Architecture



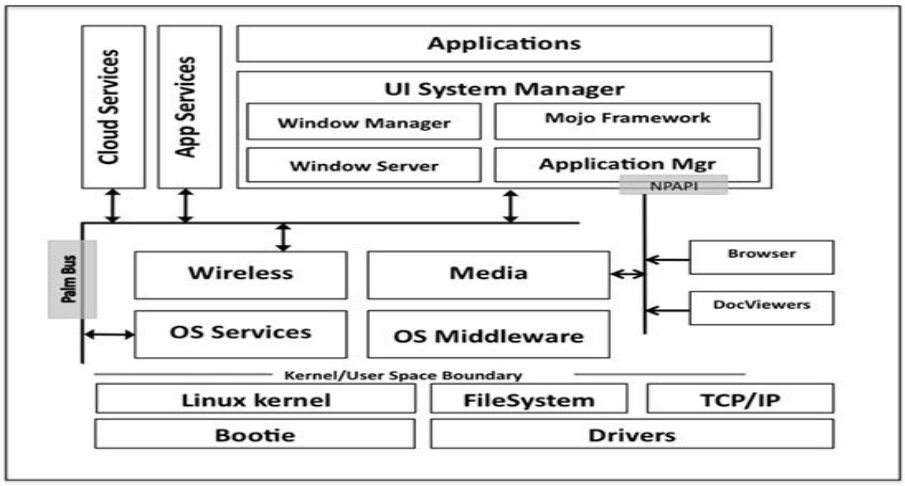
Sources: Authors Compilation

APPLICATION ENVIRONMENT

The application runtime environment is managed by the UI system manager, which also presents the System UI manipulated by the user. The framework provides access to the UI Widgets and the Palm Services. Supporting this environment is the Core OS environment, an embedded Linux OS with some custom sub-systems handling telephony, touch and keyboard input, power management, storage and audio routing. All these Core OS capabilities are managed by the Application Environment and exposed to the end user as System UI and to the developer through Mojo APIs. Taking a deeper look at the webOS Architecture, Figure 1.3 describes the major components within the Application Environment and the Core OS.

The Application Environment refers to the System User Experience and the feature set that is exposed to the application developer, as represented by the Mojo Framework and the Palm Services. The Core OS covers everything else: from the Linux kernel and drivers, up through the OS Services, Middleware, Wireless and Media sub-systems. Let us take a brief look at how this all works together. The UI System Manager or UI SysMgr, is responsible for almost everything in the system that is user visible. The application runtime is provided by the Application Manager, which loads the individual applications, and hosts the built-in framework and some special system apps, the status bar and the Launcher. The Application Manager runs in a single process, schedules and manages each of the running applications, and handles all rendering through interfaces to the Graphics sub-system and on-device storage through interfaces to SQLite. Applications rely on the framework for their UI features set and for services access. The UI features are built into the framework and handled by the Application Manager directly but the service requests are routed over the Palm Bus to the appropriate service handler.

Chart-4: webOS System Architecture



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USING AUDIO-VISUAL AIDS FOR LANGUAGE DEVELOPMENT

Rajesh Lankapalli[16]

ABSTRACT

In this paper, I have discussed the meaning and various types of audio-visual aids. The need for using such aids has also been discussed. Audio-visual aids help in communication, retention and providing more information in less time. I have also discussed the importance of audio aids, visual aids and audio-visual aids separately. In preparation of visual aids, the teacher's effort is desirable. In audio aids, although teachers prepare some audio programmes, yet most of the programmes are developed by educational organizations. I have also given a few suggestions to guide and in choosing the right teaching aid.

Audio visual aids bridge the gap between the different types of learners just by adding audio/visual aids to our teaching techniques. Since most people are visual learners, it is important to go beyond "spoken words" when educating students. Students are also more likely to learn material as they are exposed to it in a variety of ways. Always we need to look over our lesson plans to find ways to inject different teaching styles. It implements "show and tell" sessions to promote student involvement. This will also help you to assess each student's overall understanding of the desired learning objectives. There are many ways to use show and tell sessions such as asking students to bring in modern items that still demonstrate colonial values. It provides audio/visual aides to demonstrate mathematical concepts to students. This will help students learn to think of complicated material in a practical way. For example, concepts like fractions and proportions can be better visualized by audio / visual aids such as marble representations and pizza models. Students can watch videos and movies that reinforce lesson plans. Authors such as Shakespeare may be easier to understand when the material is seen as well as read. Use film clips to highlight historical events and to provide expert analysis of current situations.

KEYWORDS

Audio-Visual Aids, Language, Communication, Educational Organization etc.

INTRODUCTION

Education in every country needs to be a high-priority situation, including new changes and ideals to its process. The disposition to acquire and add technology to it, it is necessary to encourage teachers and students to have better contact with this technology, to reinforce, practice and increase knowledge in different areas. The advent of the new technologies in schools has introduced new words in the pedagogic language such as computer-based learning, CALL, integrating audio-visual aids, digital classroom systems, web assisted language learning, e and techno schools etc.

English became an important area in educative programs and promises to be a helpful tool for this generation, even though; it is not possible to admit an impact in the English Language teaching learning process yet, nowadays taken as a second Language. Teaching and learning English has faced changes in methodologies as well as in techniques, with the advances of technology. Besides, it is necessary to introduce in the classroom not only blackboard as visual resource, but also other audio-visual resources, to obtain the efficient development of the basic Linguistic macro-abilities of the English Language.

Teaching is Communication. In a good communication, there are three important aspects-The person giving the information, the message/information that is to be passed and the receiver. For effective communication, the message must be decoded rightly. If, not the message becomes distorted. To avoid distortion the sender of the information/ message must make him/her explicit and present the information as best as possible. Oral reports require research writing and speaking skills as well as effective use of audio visual aids improvisation. It is therefore, important that **teachers of English** use **teaching aids** (or) improvise to make learning easy enjoyable and permanent.

An effective learning situation will require the use of teaching aids. **Froebel Frederich (1782-1852)** formulated the theory of play and activity as being the young child's most powerful learning tool in all areas. Most advanced countries, societies and even many classy private schools here in India have incorporated this method (play activity) in their educational curricula and are deriving many benefits by doing so. While the aids are very adequate for the younger learners, it is not as relevant to advance learners because their ability to create construct, comprehend, make deduction and make value judgment are required. The audio-visual resources help in great way teachers to obtain students relationship with the process of teaching and learning and to develop the projected objectives, including activities to allow a great joint with the English.

English became an important language and it is considered and applied as international language. Since then it is very popular and have been spoken and learnt by almost all people in the world. Language learning is very easier if only followed by the appropriate and suitable method. As there are number of techniques and methods for language teaching, I strongly feel that the

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most effective and update method would be audio-visual method. This method is suitable almost all the classroom situation and easily grabs the attention of the learners and makes the learners to practice in an enjoyable way. Hence, this paper will be discussing about the role of audio-visual aids in language learning.

The integration of information technology in teaching is a central matter in ensuring quality in the educational system. There are two equally important reasons for integrating information technology in teaching. Pupils must become familiar with the use of information technology, since all jobs in the society of the future will be dependent on it, and information technology must be used in teaching in order to improve its quality and make it more effective.

MEANING AND DEFINITION OF AUDIO-VISUAL AIDS

Meaning:

Audio-visuals :(adj.)

1. Both audible and visible.

2. *Abbr.* audio-visual or relating to materials, such as films and tape recordings that present information in audible and pictorial form: a corporation's audio-visual department.

Noun:

An aid, other than printed matter, that uses sight or sound to present information: language tapes, videocassettes, and other audio-visuals.

Audiovisual: (*adj.)* (esp. of teaching aids) involving or directed at both hearing and sight the language class had new audiovisual equipment.

Definitions:

- ***According to Kinder S. James***: Audio visual aids are any device, which can be used to make the learning experience more concrete, more realistic and more dynamic.
- ***According to Burton***: audio visual aids are those sensory objects or images, which initiate or stimulate and reinforce learning.
- ***According to Carter .V:*** Audio-Visual aids are those aids, which help in completing the triangular process of learning that is motivation, classification and stimulation.
- ***According to good's dictionary of education***: audio visual aids are anything by means of which learning process may be encouraged or carried on through the sense of hearing or sense of sight.
- ***According to Edger Dale:*** Audio-visual aids are those devices by the use of which communication of ideas between persons and groups in various teaching and training situations is helped. These are also termed as multi-sensory materials.
- ***According to McKean and Roberts***: Audio-visual aids are supplementary devices by which the teacher, through the utilization of more than one sensory channel is able to clarify, establish and correlate concepts, interpretations and appreciations.
- ***According to K. P. Nerada***: An audio visual aid is an instructional device in which the message can be heard as well as seen.

BACKDROP AND THEORETICAL BACKGROUND

A number of reviews or summaries of audio-visual research have been published during the past ten years as articles, monographs, or chapters in books. English teaching in India (in Andhra Pradesh) was first taught in class VI for Telugu medium students in government schools. There were various changes and now English is taught from standard I, and indeed in primary / elementary level. In teaching English to young learners at tender age, it is essential to consider how children learn. There are recognized stages of cognitive development that every child passes through, and teaching materials should take account of this. There is also very great need of the motivation to learn English for both the pupils and the teachers. The majority of primary school teachers have an insufficient command of English to be able to teach it effectively. Teachers with insufficient subject knowledge have very little if any confidence. Without subject knowledge then subject application cannot takes place, and it is unfair to place expectations on primary school teachers of child-centered learning (or) participatory practices. Where should they

start if they do not understand the materials and their own knowledge of the language is so weak? Lack of subject knowledge is one of the main causes of the present problems in Teaching English in primary schools.

PIAGET'S STAGES OF COGNITIVE DEVELOPMENT

The Child develops cognitively through active involvement with the environment, and each new step in development builds on and becomes integrated with previous steps. Because three of the four stages in development normally occur during primary school years, it is important for language teachers working with children to keep the characteristics of each cognitive stage in mind (Piaget 1963). They are as follows:

- The stage of sensory-motor intelligence (0-2 years): During this stage, behavior is primarily motor. The child does not yet internally represent events and think conceptually through cognitive development is seen as schemata's are constructed.

- The stage of pre-operational thought (2-7 years): This stage is characterized by the development of language and other forms of representation and rapid conceptual development. Reasoning during this stage is pre-logical (or) semi logical and children tend to be very egocentric. Children often focus on a single feature of a situation at a time-for example, they may be able to sort by size (or) colour but not by both Characteristics at once.

- The stage of concrete operations (7-11 years): During these years, the child develops the ability to apply logical thought to concrete problems. Hands-on, concrete experiences help children to understand new concepts and ideas. Using language to exchange information becomes much more important than in earlier stages, as children become more social and less egocentric.

- The stage of formal operations (11-15 years): During this stage, the child's cognitive structures research their highest level of development. The child becomes able to apply logical reasoning to all classes of problems, including abstract problems not coming out of direct experiences (or) without concrete referents.

The thinking skills of the majority of children in primary school are at the concrete operations stage, and experience plays a major role in all learning. Piaget points out those children are not simply miniature adults who have less experience and thus less knowledge to work with as they approach problems and new situations. They do not think like adults, because their minds are not like adult minds.

Educational technology in way could be traced back to the emergence of very early tools, e.g., paintings on cave walls. However, usually its history is made to start with educational film (1900's) or Sidney Pressey's mechanical teaching machines in the 1920'.

First large scale usage of new technologies can be traced to US World War-II training of soldiers through training films and other mediated materials. Today, presentation-based technology, based on the idea that people can learn contents trough aural and visual reception, exists in many forms, e.g., streaming audio and video, PowerPoint presentations + voice-over.

The 1950's led to two major still popular designs. Skinners work led to "programmed instruction" focusing on the formulation of behavioral objectives, breaking instructional content into small units and rewarding correct responses early and often. Advocating a mastery approach to learning based on his taxonomy of intellectual behaviors, Bloom endorsed instructional techniques that varied both instruction and time according to learner requirements. Models based on these designs were usually referred to as computer-based training (CBT), Computer-aided instruction or computer-assisted instruction (CAI) in the 1970's through the 1990's. In a more simplified form, they correspond to today's "e-contents" that often form the core of "e-learning" set-ups, sometimes also referred to as web-based training (WBT) or e-instruction. The course designer divides learning contents into smaller chunks of text augmented with graphics and multimedia presentation. Frequent Multiple Choice questions with immediate feedback are added for self-assessment and guidance.

The 1980's and 1990's produced a variety of schools that can be put under the umbrella of the label Computer-based learning (CBL). Frequently based on constructivist and cognitive learning theories, these environments focused on teaching both abstract and domain-specific problem solving. Preferred technologies were micro-worlds (computer environments were learners could explore and build), simulations (computer environments where learner can play with parameters of dynamic systems) and hypertext.

Digitized communication and networking in education started in the mid-80s and became popular by the mid-90, in particular through the World-Wide Web (WWW), email and Forums. There is a difference between two major forms of online learning. The earlier type, based on either Computer Based Training (CBT) or Computer-based learning (CBL), focused on the interaction between the student and computer drills plus tutorials on one hand or micro-worlds and simulations on the other. Both can be delivered today over the WWW. Today, the prevailing paradigm in the regular school system is Computer-mediated communication (CMC), where the primary form of interaction is between students and instructors, mediated by the computer. CBT/CBL usually means individualized (self-study) learning, while CMC involves teacher/tutor facilitation and requires

scenarization of flexible learning activities. In addition, modern CMC provides education with tools for sustaining learning communities and associated knowledge management tasks. It also provides tools for student and curriculum management.

In addition to classroom enhancement, learning technologies also play a major role in full-time distance teaching. While most quality offers still rely on paper, videos and occasional CBT/CBL materials, there is increased use of e-tutoring through forums, instant messaging, video-conferencing etc. Courses addressed to smaller groups frequently use blended or hybrid designs that mix presence courses (usually in the beginning and at the end of a module) with distance activities and use various pedagogical styles (e.g., drill & practice, exercises, projects, etc.).

The 2000's emergence of multiple mobile and ubiquitous (ever-present) technologies gave a new impulse to situated learning theories favoring *learning-in-context* scenarios. Some literature uses the concept of *integrated learning* to describe blended learning scenarios that integrate both school and authentic (e.g., workplace) settings.

Researchers in educational technology adopt different stances of what it means to practice academic research. One may initially distinguish a series of levels going from the conceptual to the technical:

1. Fundamental research: Many researchers in the field choose to adopt a more fundamental research stance focusing on small well-defined problems such as "under which conditions can multimedia animations be effective".

2. Technology-supported instructional design applied to various domains of education; major categories are distance teaching, blended teaching, computer-enhanced classroom teaching, industrial training. Other specializations may concern subject matters (e.g. science or language teaching) or approaches (direct instruction vs. project-oriented learning for example).

3. Research on the design and application of technologies. Researcher may specialize on subjects like the use of computer simulations in education or more technically, how to build authoring and learning environments for simulations.

Some researchers may combine a fundamental research perspective with a particular kind of instructional design and a particular kind of technology. Depending upon these options, research interests and research methodology will not be the same. From the possible combinations, there are probably two major strands of thought that can be identified:

- Educational technology as part of the learning sciences. Research is inspired by and contributes to modern learning theory. This strand includes research communities like computer-supported collaborative learning, intelligent tutoring systems, ubiquitous computing.

- Educational technology as instructional technology. It is inspired by and contributes to instructional design theory and methodology. This strand includes research communities on e-learning, distance teaching, multimedia design.

Educational technology can be considered as a design science and as such, it has developed some specific research methodology like "Design-based research". However, since it addresses also all fundamental issues of learning, teaching and social organization, educational technology makes use of the full range of modern social science and life sciences methodology. Globally speaking, research methodology for educational technology relies on general research methodology, in particular on approaches of the social sciences.

SIGNIFICANCE AND BASIC PRINCIPLES IN USING AUDIO-VISUALS IN CLASSROOM TEACHING

In traditional way, some tools had been given more importance, which includes direct experience like visits and expeditions, real things like specimens in nature and in museums. However, in current modern teaching, optically projected materials, audio aids, authentic materials, moving pictures are used. This change is inevitable in teaching especially in language teaching because, visual perception contributes about 90% to all human learning. Visual aids help children to reach objectives and theories by providing emphasis to whatever is being taught. Clear pictures multiply the students' level of understanding of the materials presented, and they are used to reinforce the learned theories, learning techniques, clarifying points, and create excitement.

Visual aids involve students and require a change from one activity to another: from hearing to seeing. Whoever uses audio-visual aids they should encourage interaction, self-learning and learning by doing, thereby increasing the audience's understanding and retention level. With pictures, the concepts or ideas teachers present no longer simply words - but words plus images. People tend to eye-minded, and the impacts visual aids bring to a presentation are, indeed, significant.

In many studies, experimental psychologists and educators have found that retention of information three days after a meeting or other event is six times greater when information is presented by visual and oral means than when the information is presented by the spoken word alone. Studies by educational researchers suggest that approximately 83% of human learning occurs visually, and the remaining 17% through the other senses - 11% through hearing, 3.5% through smell, 1% through taste, and 1.5% through touch. According to Hilga 94% of knowledge comes to us through the sense of sight and the sense of hearing. The studies suggest

that three days after an event, people retain 10% of what they heard from an oral presentation, 35% from a visual presentation, and 65% from a visual and oral presentation.

The use of visual aids, then, is essential to all presentations. Therefore, the following lines will be appropriate for the visual perception.
I hear, I forget,

I see, I remember,

I do, I understand (Edwards and Mercer)

THE USE OF AUDIO-VISUALS FOR ENGLISH LANGUAGE TEACHING AND LEARNING

Need for Audio-Visual Aids

So far, I have discussed the meaning of audio-visual aids and their types. Now I will explain which ways audio-visual aids are helpful. Audio-visual aids are both complementary and supplementary by nature. Sometimes, these aids extend the scope of a topic and sometimes they enrich or strengthen the presentation of the content made by a teacher. Now I will be discussing in detail the three major needs of audio-visual aids especially in language classroom.

a) Audio-Visual Aids as a Means of Communication

Simply words whether written or spoken by a teacher cannot and will not provide adequate learning experience. We need to supplement the teacher's words. Visual aids are very helpful in this regard in the form of pictures, flash cards, posters, etc. Again, in language, listening is a very important skill. If we do not get an opportunity to listen to a language, we cannot speak it properly. Hence, there is a need for audio cassettes, which contain recitation of poems, narration of stories etc. Such material will not only be interesting but also be motivating for the learner. Apart from these, we have video cassettes also. These cassettes present a wide variety of information along with detailed descriptions, songs, and other dramatic effects. Cartoon films are also a very useful medium for developing writing skills. We can show these films and ask the children to write about them. With the use of these audio-visual aids classroom teaching can be converted into a very joyful learning experience. The advent of technology has made education especially language classroom more convenient to learners with the help of computer, animations, internet etc.

b) Audio-Visual Aids as a Means for Retention

We have seen that audio-visual aids make a lesson more enjoyable and more effective. The use of audio-visual aids also helps in better retention of the content. Usually when we hear something, we tend to forget it within a specific time span. When we see it with our eyes, we remember it for a longer time and when we perform an activity with our own hands, we understand its process. This is because of the fact that the more the senses are stimulated and involved the more will be the learning and retention among children.

It is, therefore, very important that we provide a number of opportunities for listening, speaking, seeing, smelling and touching things and objects. This will give the students first hand experiences. We need to remember, the richer the experience, the greater is the incentive for speaking, reading or writing about them.

c) Audio-Visual Aids as a Means to Save Time

In this age of knowledge explosion, we want to tell the students a number of things in a very short time. The use of audio-visual aids can be very helpful in this. Through such aids we can say much in a short time and in a short form what otherwise would take a lot of time and space. We can provide our children much more matter for thinking and acquiring information in a very short time through activities like "a thought for the day" written on the black-board and "today's news" selected from the newspapers and displayed on a notice board. Indicating the time of sunrise and sunset on the day along with today's news will make it more informative and interesting. Similarly, activities like presenting a conversation between a customer and a shopkeeper or between the host and his guest on audio tape saves a lot of time apart from providing learners with a model for real life conversation. In case of video presentation teacher need not to explain the order of things, climatic conditions, people outward appearances etc., in order to make the student to understand the situation before making a conversation (speaking) or writing about the situation because learner will be understating the situation or conversation with the help of video in short span of time comparatively much less and clear understanding from the teacher's verbal or chalk and talk method. Thus, a well-developed language program supported by suitable, relevant and effective aids provides a number of enriching experiences. These ultimately lead to the development of language skills in the learner.

HOW OTHERS USED THIS METHOD IN THEIR LANGUAGE TEACHING

Audio Visual aids are materials using sight or sound to present informing. To use Audio/Visual Aids in teaching we have to bridge the gap between the different types of learners by adding audio/visual aides to our teaching techniques. We need to

implement 'show and tell' sessions to promote students involvement. Teachers should encourage the students to watch TV, listen radio and accessing internet to reinforce subject knowledge across the world. In addition, teachers also have to utilize audio-visual aids to prepare and present the lesson effectively in their classrooms.

Students taught by television had an average gain score of 9.8 as compared to the slight average loss of 0.4 for students taught by their own teachers. Research studies backup what has been reported from the trials by Schramm. For example, Japan tested a course in English by radio in the seventh grade and found that the classes taught in part by radio were significantly superior to the conventionally taught classes.

In Thailand, large groups of second and third-grade pupils, and sixth-and seventh- grade pupils, were tested with and without enrichment broadcasts in music and in English language, respectively. The students of English who were assisted by the broadcasts scored significantly well in aural tests as, and better in tests of reading and writing than, those who did not have the broadcasts.

In New Delhi, over 30,000 students are receiving enrichment lessons in language and science by the use of about 500 television sets placed in the school. Reports are encouraging. Both teachers and administrators are quoted as saying that the television lessons, and in particular the lessons in Hindi, provide as much learning for the teachers as for the students.

In Morocco radio broadcasted lessons in Arabic and French three times a day, for teachers. The Director of the Services reports: 'Some broadcast, for example how to teach languages orally. They have contributed notably to the success of reforms in the teaching of French. I see, many teachers have had to change their methods, completely. They were accustomed to teaching in literary language. Now they have to teach utilitarian one, where the part played by oral exercises, has become much more important. Moreover, these model lessons in French have enabled them to improve their pronunciation, while at the same time showing them how to conduct language courses properly and efficiently'.

Gorden (1960) as cited by Siraj, in his experiment of Language teaching through television, has shown some difference between television teaching and face-to-face teaching by the regular teachers. The students of Hawaiian schools who had pronunciation problems were taught remedial speech by either television or by their own teacher's traditional way of teaching. The student's performances were recorded through tape recorder before and after and the result is favorable to the audio-visual aid students.

Even in distance learning many of the techniques are developed (Brown 1999; Bates, 1979) were adapted to the learning of languages. Support systems were designed and applied. Much of the work with support systems took place abroad where distances and small populations made wide scale class-based learning impractical. Looms, 1980, Willen, 1975, Malmin, 1977, found and quoted by Hill that at a national level, the Scandinavian governments made considerable progress in integrating radio, television, audio cassettes together with study centers and short courses.

Media technology as mentioned by Hill was constantly under pressure to develop new directions. For example, a major feature of new series in Europe at least was their internationalization. According to Fitz Patrick, 1980, an English course 'Follow-Me' was produced by a consortium comprising of broadcasting stations from different regions in Germany and BBC's English by Radio and Television department. It was broadcast in most countries in Europe, Scandinavia and the Middle East.

After 1983, this multinational experience increased substantially when European Satellites were in a position enabling listeners and viewers in many parts of Central Europe to tune directly to another country's program as mentioned by Hawkerand cited by Hill.

It was noticeable that broadcasts proved particularly valuable to less able learners and many programs were particularly geared to their needs. Radio Programs are examples of this. Such as 'Meet the French' (BBC, 1974-1980). Certain other initiatives were taken at national level, such as teacher training by broadcasters themselves. They were running language courses i.e. (teaching French with television, Thames, 1978), Teaching languages (BBC, 1976). However, Looms, quoted by Hill, discovered that teaching learning situation was more professional in Germany, Austria, Switzerland and Scandinavia than Britain. In short, Hill found the role of television as compared to radio more remarkable to influence learners. He hoped that new technology in future would prove as catalysts to communicative activity such as computer assisted projects in Britain.

To achieve the proficiency in a language it was realized that there was a need to focus more on listening skills and on the development of oral proficiency, which pointed to the vital role, which radio and television, sound and video tape had to play. Kontakte (1974), Ensemble (1975) Follow Me (1979), were among the generators of multimedia courses, which have been outstanding in turning the theory of communicative syllabuses into practice. One reason for its success was found to be the steady increase in understanding of media as language learning tools mentioned by Hill. Since 1960, when the impact of educational television began to be seriously considered (Schramm) several commentators analyzed the essential potential of the media in different ways and debated on it.

Hill found an encouraging response of the debaters especially on the use of media and the willingness of the producers of language programs to argue through their communicative aims and objectives and the way in which they attempted to realize them in practice. According to Hill, the use of media in general and multimedia courses in particular contributed by radio was

frequently over shadowing by its more glamorous part television. However, the unique role of radio was recognized in number of papers produced by the Open University. As quoted by Hill, Barrington 1979: Bates 1979, Brown 1980, and many teachers have commented on the widespread uses to which it can be put for teaching languages. Local radio seemed an appropriate vehicle for exploiting special opportunities.

WHEN MAN FELT THE NECESSITY OF TEACHING

Since time immemorial man felt the necessity of learning various things for a better living. Man, being the most intelligent creature on the Earth, used his thinking power and he used it to learn various things from Mother Nature and thus his started fulfilling his basic needs. Man, as always, passed on the acquired knowledge / information to his next generations for the benefit and welfare of the humanity instead of keeping the knowledge within himself. In this way, man felt the process of transferring of information from one generation to the other lead to the Teaching–Learning process and thus the necessity of teaching. Thus, the whole process of teaching and learning, lead to a very important system in the society, which came to be known as the education system. In this process, the teacher and the taught are involved. A teacher is a person who transfers the acquired knowledge to other person while a taught is a person who acquires knowledge from the teacher. In addition, since ages Mother Nature has been considered the best teacher of man.

TEACHING WITH TEACHING AIDS

In olden days, mostly, the process of knowledge transfer was verbal. The knowledge or information thus acquired by a person memorized and recollected and thus it was generally transferred to the taught verbally. In addition, for generations the people followed this process of education. In addition, such a system of learning process was known as Sravanam and Smararam (listening and memorizing). Later man found it difficult to memorize, recollect and pass on the information thus acquired verbally to the next generations. In addition, for teaching the skills like archery, war techniques and the like were learnt practically with the help of the equipment's. As some information or knowledge during the process could not be recollected and passed on to the next generation. Due to such a difficulty in memorizing and recollecting, man felt the need of keeping records of what he learnt and preserve these records for the future generations and this gave rise to the one of the foremost teaching aids. Moreover, in the process of learning, man felt the difficulty in conceptualizing things that he was learning and this has eventually given rise to the use of aids in the process of learning.

Hence, man started to keep records of his learning by inscribing the same on rocks and on the leaves particularly palm leaves and preserved these for future generations. Thus, there came the palm leave records of the teachings of various great teachers some of which are still available to the present day. However, these leaves being biodegradable in nature could not be preserved properly due to degradation. Much later, after the invention of paper, it became much easier for man to record, preserves the teachings on papers, and thus came the use of books into existence. These books are the most user-friendly teaching aids, which gained much importance and popularity as well. In addition, the books have become so popular that no other modern or sophisticated teaching aid could take its place.

INCORPORATION AND RELEVANCE OF TEACHINGS AIDS

In the modern age, the methodology of teaching started shifting gradually from passive flow of information to interactive way of learning and thus the importance of teaching aids in the learning process started increasing steadily. Teaching aids are the tools that used by the teachers for facilitating the process of learning. Blackboards, instructional materials like the books are the simplest forms of aids that have gained much popularity and are used extensively. Examples of such teaching aids are charts, models, newspaper / magazine cuttings, flash cards / flip cards, CDs, televisions and the like.

Any tool, object, or material that is used in a classroom, which helps in explaining a concept effectively to students, is known as a teaching aid. Hence, there is no specific list of teaching aids as every material that helps in providing concept to the students can be termed as a teaching aid. However, these teaching aids that help in integrating classroom teaching with the day-to-day situations of life and students could find these quite relevant to their academic learning. Teaching aids generally help in drawing the attention of the students and thus brings a distracted class back to attention and focus on the subject. Yet, the effective of the teaching aids depends upon the way these are used by the instructor.

Advantages of audio-visual aids

- It helps the pupil in understanding languages by bringing him in direct contact with objects and things, by bringing the distant things near, by bringing the world into the classroom. They help the student in understanding different cultural backgrounds.
- Audio-visual aids promote remembering by involving the many senses of the learners, by arousing their curiosity, by making use of pictorial content and by providing variety in teaching.
- They make teaching effective by creating situations for presentation and practice of language items and by reducing dependence on the mother tongue.
- They help in formation of language habits by drill, repetition and constant practice.

- They increase the pupil's experience of language by providing rich variety and better quality.
- They promote teacher's efficiency by saving time and energy.
- They provide recreation to the learners.

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IMPLEMENTATION OF DIGITAL FILTER USING CSD AND MSD REPRESENTATIONS

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ABSTRACT

Recent efforts in the design of wireless RF transceivers focus on high integration and multi-standard operation. At the back of a wide-dynamic range sigma-delta modulator, a decimation filter can select a desired channel in the presence of both strong adjacent channel interference and quantization noise from the digitization process. The decimation filters are important block in devices to establish communication using different standards. This paper addresses usage of Cascaded Integrated Comb Filter (CIC) and Half Band Filter (HB) as the decimation filter to reduce the implementation step to realize the design in hardware. Low power design for CIC filter and HB filter will be implemented. Unlike the existing decimation filters, the filter architecture is designed using Canonical Signed Digit representation (CSD) and Minimum Signed Digit representation (MSD). It is suitable for common sub expression elimination, and it significantly reduces the number of adders required for the filter synthesis. The proposed architecture fulfills the requirements of three standards: Wi-max, UMTS and GSM

KEYWORDS

Sigma-Delta Modulator, Cascaded Integrated Comb Filter (CIC), Half Band Filter (HB), Decimation Filter, Canonical Signed Digit (CSD), Minimum Signed Digit (MSD) etc.

INTRODUCTION

Sigma-delta (ΣΔ) modulation has received a great interest during the past decades mostly due to its possibility to realize high-resolution analog-to-digital conversion without the need for high-precision analog components [1]. One of the key features of ΣΔ analog-to-digital converter (ADCs) is that the modulator is over sampled compared to the output sample rate. Hence, a decimation filter is required. Another key feature is that the data word length is small compared to the output precision. Many different decimation filter architectures have been proposed aiming at minimizing different cost measures. Decimation is often performed in several stages. This allows for simpler decimation filters at each stage, so that the overall complexity is reduced. However, the word length differs between the stages. This is especially important for ΣΔ ADCs, as the input to the decimator may be only one bit, while the output precision can be, say, 16 bits. This leads to that the decimation factor in the first filter stage often is higher compared with decimation filters with similar input and output data word lengths [2].

The diversity of networks and the different standards of communications make impossible the use of a single device to commune among them. However, a multi-standard device will take advantages of this diversity by using the services that different networks provide. Digital receivers are an important part of any mobile device or base station. Digital receivers must be capable of receiving data from each standard. Multi-standard wireless receivers are more and more required because they support different communication standards like GSM, UMTS etc. [3]. The multi-standard wireless receivers handle different frequency band and bandwidth, and thus have to be configurable.

Multiple contributions are proposed in previous works for multi-standard digital filters for decimation and channel selection. The Cascade of Integrators-Comb filter (CIC) is largely used as first stage of the channel selector filter post sigma-delta conversion. In fact, in its recursive form, the CIC filter is multiplier less and presents low complexity properties [4]. In addition, this form allows high configurability of the filter. The main drawback of the recursive form is however, it is higher power consumption.

The CSD of a given number is unique, and the filters are implemented using hardware efficient CSD multipliers. The hardware complexity is further reduced by searching for a common sub-expression among multiple constants in applications requiring multiple constant multiplications (MCMs) [5], [6], and [7]. The sub-expression is implemented into one hardware block in order to share the result of the sub-expression in evaluating all the constants. Many approaches have been proposed for the implementation of MCMs. Many of these approaches have tried to select the common sub expressions after representing the constants in the CSD representation. The MSD representation has the same number of non-zero digits as the CSD representation but provides multiple representations for a constant [8]. Hence, it is more efficient to use the MSD representation for MCMs.

The rest of this paper is organized as follows. In Section II, multi-standard filter design and digital implementation are discussed. In Section III, the CSD and MSD representations are introduced and compared in more detail. Results are given in Section IV. Finally, the paper concludes in Section V.

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DECIMATION FILTER

A. Architecture

The decimation filter is a block that reduces the data rate from IF to base band domain. Different communication standards require large factor of decimation resulting in large orders of filters. Multistage decimation reduces the overall complexity of system, by decomposing the decimation factor in to several sub factors. Thus, each stage requires lower order filters. However, the use of several stages will increase hardware complexity. Moreover, after four to five stages the filter complexity is not further reduced. Therefore, a tradeoff between number of stages and complexity must be achieved. FIR filter are used in down converters because some modulation schemes requires linear phase. In wireless communication devices, the battery life must be maximized. Therefore, high performance blocks with low power consumption and small area are required.

The implementation of decimation filter for each standard on a single device is very demanding in terms of area and power. With an efficient decomposition of decimation factor considering common blocks between communication standards, it is possible to have an efficient design. Thus, few different blocks could be implemented in a configurable fashion.

The specifications of the multi-standard receiver are summarized in the table I.

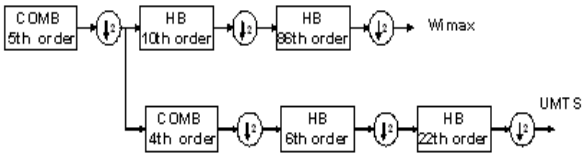
Table-1: Multi-Standard Specifications and Decimation Filter Design Parameters

Standards	Channel Spacing (MHz)	OSR	Pass Band Edge (MHz)	Stop Band Edge (MHz)	Stop Band Attenuation (dB)
WiMAX	20	8	8	10	39
UMTS	5	8	7	12	65

Sources: Authors Compilation

The aim of this work is to propose an architecture that uses the minimum multiplication operations. To reach this goal, we have used comb filters for the first stages. Relying on the simulations, we noticed that the two last stages of each standard cannot be comb ones because they do not reduce the noise level sufficiently. That is why, we decided to use half band filters for the two last stages. They exhibited good results and excellent out-of-band signals attenuation. The proposed cascade decimation chain is illustrated in Fig. 1.

Figure-1: Architecture of Multistandard Decimation Filter



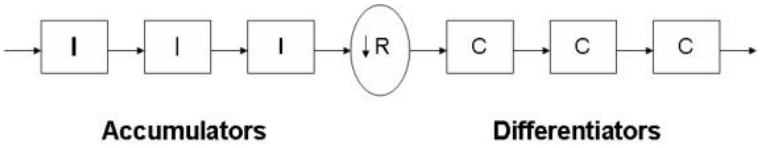
Sources: Authors Compilation

As shown in Fig. 1, the proposed architecture has three comb filters, which are multiplier-free, and six symmetric half band filters. Each standard has two half band filters. Their orders are 10 and 86 for Wi-max, 6 and 22 for UMTS. Thus, the number of multiplications is minimized. Hence, this architecture guarantees an efficient channel selection for the standards Wimax and UMTS. Besides, we notice that some filters are in common. This may reduce the area of the receiver.

B. CIC Filter

The CIC filter design approach is to cascade three stages of accumulator, followed by a decimator and another three stages of differentiator. It is obvious that the cascade of accumulator and differentiator is a beter approach in designing low power CIC filter.

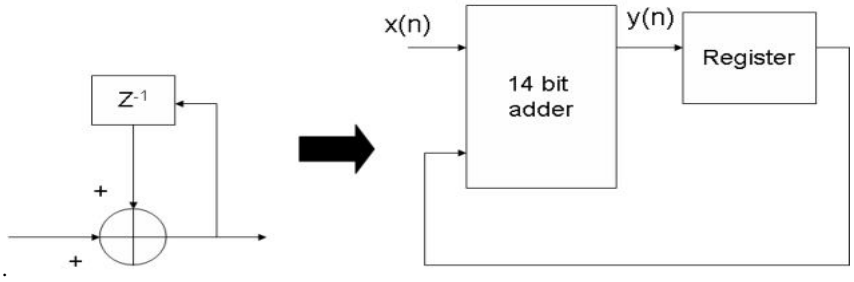
Figure-2: CIC filter With Cascade of Accumulators and Differentiators



Sources: Authors Compilation

Figure 2 shows the structure of the CIC filter using accumulator and differentiator. Block I represents the accumulator, R represents the decimator in the design and C represents the differentiator. Fig. 3 shows the basic accumulator (Integrator) in z transforms and the digital circuit representation.

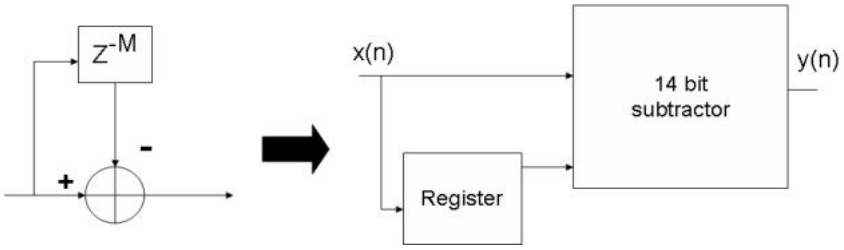
Figure-3: Accumulator in Z-transform and Digital Circuit Implementation



Sources: Authors Compilation

Figure 4 shows the basic differentiator (Comb) in z-transforms and the digital circuit representation. M in the figure is the differential delay, which is 1 in this design.

Figure-4: Differentiator in Z-transform and Digital Circuit Implementation

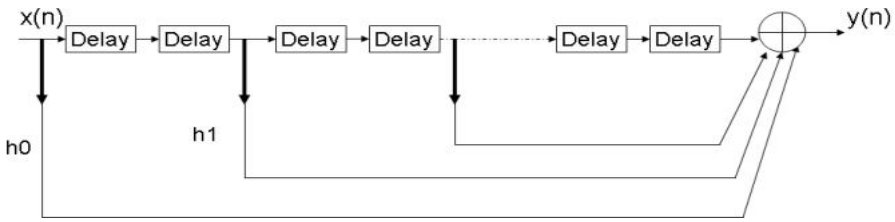


Sources: Authors Compilation

C. Halfband Filter

Usually the CIC is followed by an FIR filter for further down-sampling. The FIR is needed instead of another CIC because there are imperfections in the pass band of CIC, and the FIR can be designed such that its pass band response compensates for the distortions. When down sampling by 2, a special form of FIR that is the half-band filter can be used. The half-band filter has symmetric coefficients, meaning that the coefficients of an odd Ntap (N-1 order) half band FIR can be represented by *ceil {(N-1)/4] +1* numbers. This fact is significant when considering the hardware resource needed. An example of a half band filter is in Fig. 5. The half band filter used in the design is of order 14 (15 taps), with the coefficient implemented quantized for 8-bit precision.

Figure-5: Structure of the HB Filter



Sources: Authors Compilation

CSD AND MSD REPRESENTATIONS

The CSD representation is a radix-2 signed digit system with the digit set (1; 0; _1}. Given constant, the corresponding CSD representation is unique and has two properties; the first is that the number of non-zero digits is minimal and the second is that the product of adjacent two digits is zero, that is, two nonzero digits are not adjacent. Due to the first property, the CSD representation is widely used in implementing MCMs because it guarantees the least number of additions for a given constant. The second property is called "property M" in. If a signed digit representation of a constant satisfies property M, it is the CSD representation.

If the second property is relaxed, it is called the MSD representation. Although the CSD representation is optimal for one constant, it is difficult to consider the other constants in case of multiple constants because a number is uniquely represented in the CSD representation. Since the MSD representation is a superset of the CSD representation and provides a number of forms, the MSD representation is more appropriate in finding common sub expressions for multiple constants if a proper MSD representation is selected for each constant to be synthesized. Since the representation method affects the number of additions (or subtractions) in the decomposed multiplication block and the number of common sub expressions that can be eliminated, it has significant influence on the resulting area and power consumption.

Glossary of Terms

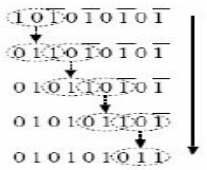
M = array of MSD representations.
N = n bit number to find all MSD representations.
Z = stores the current value of MSD representation.
mset = set of MSD representations.
mtotal = number of MSD representations in mset.
mnew = MSD representation where the new one is being searched.
c(i) = digit position where the transformation is applied to generate the ith MSD representation.
cx = digit position where the search is being done.

The modified Algorithm

Step 1: Convert N into the CSD representation. Z stores this value.
Initialize mnew=1, mtotal =1, M {mtotal}=Z, mset =Z and c(1) =1.
Step 2: Initialize cx=c{mnew}.
Step 3: If cx > n, increment mnew =1. If not, go to Step 5.
Step 4: If mnew = mtotal , end.
Step 5: If the digits from positions cx to cx+2 in mset are 10 1
or -1 01, make a new MSD by transforming 10 -1 to 011
and -1 01 to 0 -1 -1 respectively.
Step 6: Z gets the new value of the MSD representation. Store this new value in the array M.
Step 7: Increment mtotal by 1 and cx by 2.
Step 8: Loop Steps 5, 6 and 7 as long as the value of cx is less
than the total number of bits.

Fig.6. shows the MSD conversion done on the decimal number 171. After applying the algorithm, we get 5 MSD representations for the same number. This set also includes the CSD representation.

Figure-6: Conversion of CSD to MSD number



Sources: Authors Compilation

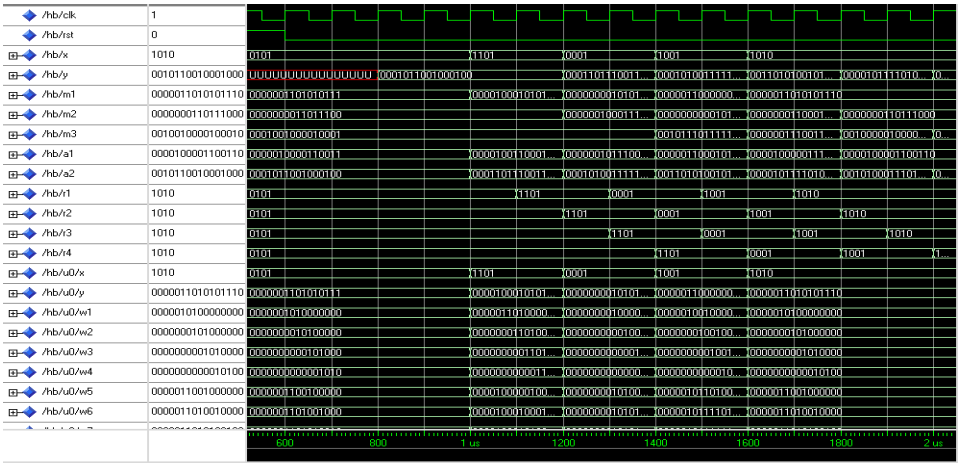
As the CSD representation is unique, it has received much attention and there have been many methods of converting a given binary number into the CSD representation. The uniqueness is important in terms of mathematics, but not in implementing hardware units. In general, the MSD representation providing multiple representations that yield the same value is more flexible than the CSD representation. This redundancy can result in smaller hardware units than those generated from the CSD representation, if an appropriate MSD representation is selected for each constant. Even better results could be obtained by using all signed digit representations including no minimal signed digit representations. The search space, however, becomes so large that the exploration time becomes unreasonably long. Each digit in the signed digit representation can have one of three values, -1, 0 and 1. In n-digit representation, 3n combination represents 2n+1 - 1 numbers. Therefore, the average number of representations per number is (3=2) n=2 approximately, growing exponentially as n increases.

SIMULATION RESULTS

The results presented focus on the communication standards showed in the Table I. The architecture considered using efficient special FIR filters. CIC filters still used on the architectures because reduce complexity and are common block between standards. Table I shows the different factors of decimation required for each communication standard to be considered.

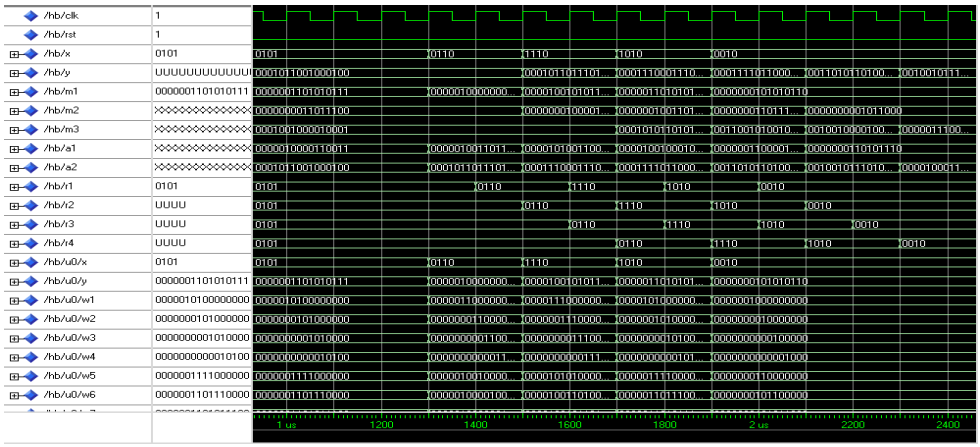
The simulated waveforms are obtained by assigning the input values to x and the designed coefficients of the corresponding standards. Fig. 6 and Fig. 7 shows the simulation results of decimation filter implementation using CSD and MSD representations respectively.

Figure-7: Simulation Results using CSD Representation



Sources: Authors Compilation

Figure-8: Simulation results using MSD representation



Sources: Authors Compilation

The power consumption of decimation filter using MSD representation is better than that of the CSD representation is shown in the Fig. 9 and Fig.10.

Figure-9: Power Analysis of Decimation Filter using CSD representation

	Voltage (V)	Current (mA	Power (mW
Vccint	1.8		
Dynamic		52.53	94.56
Quiescent		15.00	27.00
Vcco33	3.3		
Dynamic		0.00	0.00
Quiescent		2.00	6.60
Total Powe			128.16
Startup Curre		500.00	
Battery Capacity (mA Hours)			0.00
Battery Life (Hours)			0.00

Sources: Authors Compilation

Figure-10: Power Analysis of Decimation Filter Using MSD representation

	Voltage (V)	Current (mA	Power (mW
Vccint	1.8		
Dynamic		46.91	84.44
Quiescent		15.00	27.00
Vcco33	3.3		
Dynamic		0.00	0.00
Quiescent		2.00	6.60
Total Powe			118.04
Startup Curre		500.00	
Battery Capacity (mA Hours)			0.00
Battery Life (Hours)			0.00

Sources: Authors Compilation

CONCLUSION

This paper discusses the design and implementation of a decimation filter for use in the sigma-delta analog to digital-converter (SD-A/D). The decimation filters down-samples the data at the rate of 128:1, with 4 KHz cut-off frequency. The architecture designed is based on a CIC filter connected to 2-stage half-band filters. The coefficients of half band filter are implemented using CSD and MSD representations. The power consumption of decimation filter using MSD representation is better than that of the CSD representation

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