PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

BIG DATA AND BUSINESS INTELLIGENCE

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ABSTRACT

Business Intelligence is evolving as an important area of study for practicing managers and innovative researchers of highly dynamic organizations by focusing on the magnitude and impact of data-related problems to be solved by them according to the changing business situations and environment. While big data sounds very recent but its roots, gathering and storing large amounts of data for analytics is ancient. This started gearing up a decade back. For financial service organizations, big data is the fundamental consequence of the new financial landscape – everything online and perfectly mentioned analysis on their platforms of every database management companies! In the light of the above, the current paper focuses on Defining, Classifying, importance of Big data to explaining its importance to data providing business intelligence firms, Challenges faced by them, how financial data insights can be drawn and concluding with the advantages with an illustrative case study.

KEYWORDS

Big Data, Business Intelligence, Significance of Big Data, New Financial Landscape etc.

INTRODUCTION

The business intelligence and data analytics are related to three items: Big Data! Big Data! Big Data! While big data sounds very recent but its roots, gathering and storing huge amounts of data for analytics is ancient. This Big Data started gearing up a two decades back with complementary as Business Intelligence along with analytics. For data providing organizations, big data is the fundamental consequence of the new business landscape. As a data-centric approach, Business Intelligence & Analytics has its roots in the longstanding database field. It relies heavily on various data collection, extraction, and analysis technologies and applications currently adopted in industry, where data are mostly structured, collected by companies through various systems, and often stored in commercial relational database management systems (RDBMS). The analytical techniques commonly used in these systems, popularized in the 1990s, before which usage of statistical methods during 1970s followed by data mining techniques of 1980s.

BIG DATA

Big data as we call is just not "Data" but also comprises the 3Cs - Capabilities to Challenge(s) with Competency. The Big data analytics is expected to support a level of decision making that is more accurate and timely!

The Big data refers to multidimensional information that is based on the following metrics:

- **Ever-escalating Size of the Data:** Data flows from various sources like Industry feeds, Sales Feedbacks, Salesforce Analytics, Daily Transactions, inputs from Social Media etc. Now-a-days, technology has made these tasks easy with tools / technologies like Hadoop.
- **Tempo of Data Flows:** For example, the data movements or speeds in OTC Markets / Exchanges is tremendous and must be dealt in a structured way using algorithms and within a high timely manner. In other industries the Radio Frequency Identifications Tags (RFIDs) and Sensors are driving the need to deal with high currents of data in near-real time.
- **Assortment of Data:** Data flows in all formats raging from FTPs to Text, including but not limited to Numeric, Excel files, Structured or Unstructured, Emails, Audio and Videos, Daily closing data from Stock exchanges to numerous financial transactions.
- **Normal vs Crest / Seasonal Data:** Data flows are highly inconsistent based on the seasonality. Consider market intelligence providers. They have peak months where in receiving enormous data from the exchanges or filing regulators, and off-season for the rest of the year. Data inflow range from Hourly, Daily, Monthly, Quarterly, Semi Annually and Annually. These seasonal data loads and/or event driven data loads are challenging to manage.
- **Concreteness:** Data flows from multiple sources as discussed above. It becomes highly complicated to Cleanse, Sync, Link / Create Hierarchies, Streamline, Correlate and Transform data in a Standardized way across systems.

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BUSINESS INTELLIGENCE AND ANALYTICS

- Data analytics and Business Intelligence are the top priorities of chief information officers (CIOs) and comprise a $120 billion market; according to a study of Gartner. It is forecasted to reach $200 billion market by 2020 across the globe. This fact attracts unique interest and adoption of big data analytics. According to the annual survey results of 850 CEO and other Top-level executives of global organisations, McKinsey (2014) concludes that 45% of executives put "big data and business intelligence analytics" as pivotal strategic priorities.
- How can big data analytics enhance BI?

CLASSIFICATION OF BIG DATA

Having seen how the big data varies from type of industry to industry above, let us categorize the big data:

- The Financial big data category includes but not limited to market intelligence and real time stock market data, and on the other side revenue, profits and other critical data that measure the financial strength and health of the company.
- The Operational category includes target metrics measuring resources deployment, budgetary control, other Asset Management's, and ultimately the quality of marketing operations etc.
- The Customers big data category gets inputs from POS terminals, Survey responses, Website/Page clicks, Social media and other online groups/communities.

What Does BI Do?

Business Intelligence assists in strategic and operational decision-making. The strategic uses of BI will be maximization of performance management by Corporates, customer relations; business operations monitoring, and conventional decision support; Business Intelligence is applied to make smart, specific, and timely decision from huge data set with complex systems, in simple sense it is considered to be beyond Big Data. Most companies collect a large amount of data from their business operations and to keep track of that information, it requires various software has to maintain it. By using various software programs, it is difficult to retrieve information in a timely manner and to do performance analysis. At that time, BI plays an important role. Business intelligence is a basic extension of series of previous systems designed to support decision-making. The emergence of the data warehouse as a repository, the advances in data cleansing that lead to a single truth, the greater capabilities of hardware and software, and the boom of Internet technologies that provided the powerful user interface all combine to create a richer business intelligence environment.

WHY IS BIG DATA IMPORTANT FOR DATABASE MANAGEMENT?

Database Management is very dynamic these days. Now one size does not fit for all those good old days' databases, measuring responses and email blasts. Today investors are expecting greater proximity and personalization on the information they use. Hence, the big data concept comes into picture.

To understand its significance, let us try to compare what we used to do a decade back and now. We were with POS data, Survey Responses, Coupon Campaign data etc. Now in the everything digital scenario- online sales, click-throughs, browsing trends, social media campaigns, Mobile Application Data, and Device usage data, location (GPS) data etc. Now to start comparison strangely there is nothing to compare!

So, mere having big data does not automatically lead to smart decision-making or management. Now it is evident that it is not the data itself that is so important. Rather, it has the insights derived from it actually make all the difference. Hence, the focus ultimately shifts from how much and what data you have to what you actually do with it.

Thus, an integrated Business Intelligence, Analytics management strategy combined with big data enables organizations to:

- React or offer the investors many options based on his/her investing habits,
- Do a root cause analysis,
- Estimate risk product portfolios in no time,
- Detecting loopholes or behaviors that may adversely affect the company,
- Reduce cost and time required,
- Start new products and offerings,
- Finally smart decision making with Big data analytics,
- Engage the investor not by simply knowing the customer. It lets us to know their location need / want, and how and when they want to be contacted, how to retain the loyal customer by knowing what influences them etc.

- Optimize the performance spread across multiple channels and Control effectively through testing, measurement and analysis.

Challenges Faced by Business Intelligence Stream

As most Analytic systems do not focus or aligned to facilitate data base firm's data, processes and decisions, it becomes challenging the data base firm to make effective use of big data. Following are supposed to be biggest challenges are:

- Gathering Required Data: Having large amount of data not necessarily facilitate good analytics and decision-making but what matters is having right data.
- Then starts the Actual Work: Selecting the right analytical tools that can help to aggregate and analyze data.
- Next step is to transform the insights into impacts that positively affect firm is marketing programs there by turning them to yield profits.

Big Data and Database Insights

Big data provides insights into which content is the most effective at each stage of a sales cycle. Data base firms can know how to make an informed investment improving Customer Relationship Management (CRM) systems. Today Big data analytics based on Customer/investor data is making it possible for data base firms to deliver consistent, versatile and single point channel for customer/investor experiences.
The big data analytics is revolutionizing the marketing and sales of data base providing companies. How prices are defined, managed, propagated through selling networks and optimized is an area seeing rapid gains. Pricing analytics is experiencing sophisticated advances using big data algorithms which help the marketing firm to attain price optimization for a given product or service. Today Big data is contributing to sales with increasing the quality of sales leads, location planning, determining wining rates and engaging decision maker strategies.

CONCLUSION

Let us conclude with a case study in the field of market intelligence, which is one of the highly competitive areas in today's world. Many bigwigs operate there, such as Bloomberg, S&P, Thomson Reuters, Factset, IPREO, and many more. These firms deal with huge volumes of data providing market intelligence and analytics to make informed smart decisions in the financial markets. In addition, retain customers is a never-ending challenge for these firms.

We see how big data can help these firms to focus on its customers. Let us assume these firms have an organized process and analytics infrastructure to leverage their data assets, to improve marketing Return on Investments and the customer experience and to drive long-term customer value. In such a case, a customer lifetime value model helps these to begin wring more value from its data.

Institutional and investment banks are usual clients to these firms. In addition, big data analytics projecting how long and loyal a client would be with the firm generating a good profit to the firm? In addition, understanding the dynamics of client needs, the relative value of clients helps differentiate customer service solutions. In addition, it helps the company make decisions that are more informed. In addition, segmenting clients as per their needs and offering suitable and customizable products and services can make the firm more successable.

One last word, Big Data and Business Intelligence are the terms that describe the large volume of data that inundates a business on a day-to-day basis. However, as said, it is not the amount of data that is important. It is what organizations do with the data that matters.

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ISSN (Print): 2319-9016, (Online): 2319-9024
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INTEGRATION OF BIG DATA HADOOP WITH GRID COMPUTING

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ABSTRACT

Day-to-Day data is generated very rapidly from various sources like social media, enterprise contents, transactions, sensors and mobile devices. The generated data might be of different formats like text, audio, video, images, graphics, animations, etc., and in different volumes, which represents Big Data. The Big Data challenges include analysis, captures, search, sharing, storage, transfer, visualization, and querying and information privacy. The organizations like research, defense, banks, railways, airlines, face book, amazon, twitter needs to maintain a huge database of various aspects and need to analyze the data to find the accurate data which is relevant to the current application.

Big Data analytics is the process of examining large data sets to extract hidden patterns, unknown correlations, market trends, customer preferences and useful business information for better decision-making. To store Big Data, huge set of storage devices are required and to evaluate it huge computational systems are required. Hadoop is an open source framework, which set up a cluster of servers with commodity hardware for storing and processing Big Data. Grid computing is a technology used to make use of resources like storage, memory, processing etc., from computers which are idle to solve huge problems which is difficult to compute by a single system due to lack of resources.

This paper highlights the integration of Big Data Hadoop with grid computing technology through GridConnect middleware, helps in processing Big Data applications, which requires many resources for computation.

KEYWORDS

Big Data, Grid Computing, Storage, Big Data Analytics, Hadoop etc.

INTRODUCTION

In the present internet world, the data is generated very rapidly from various sources like emails, chatting, websites, and mobile devices, social Medias, enterprises and many more. Most of the data was generated from last two years. The data generated from various sources are in various formats like text, audio, video, multimedia, animations, etc. The Big Data has the following characteristics: 4 V's – Variety, Volume, Velocity and Veracity.

- **Variety:** This represents data is available in many forms like structured data, unstructured data and semi-structured data. The structured data, which has a proper meaning, are stored in traditional relational databases in case of rows and columns. The unstructured data like text, audio, video, multimedia, social media, animations are very huge in capacity and cannot be stored in traditional relational databases. The semi-structured data like XML are stored in xml files and then they are converted into structured data.

- **Volume:** This represents data in very huge size i.e., from terabytes to petabytes of data waiting for processing, and to store this data a huge storage i.e., data-warehouse is required until the data goes for processing.

- **Velocity:** This represents data is in motion i.e., the data is already in processing and the speed of the data generation, for example social media.

- **Veracity:** This represents uncertainty of data due to inconsistency, ambiguity and incompleteness in data.

Hadoop is an open source framework used to store and process Big Data through cluster of nodes with commodity hardware. The commodity hardware represents the cost of hardware is less and the configuration like memory and storage are low in these systems. Hadoop handles Big Data, split it into small blocks, and distributes it into various servers in the Hadoop cluster for parallel processing MapReduce algorithm for faster execution.

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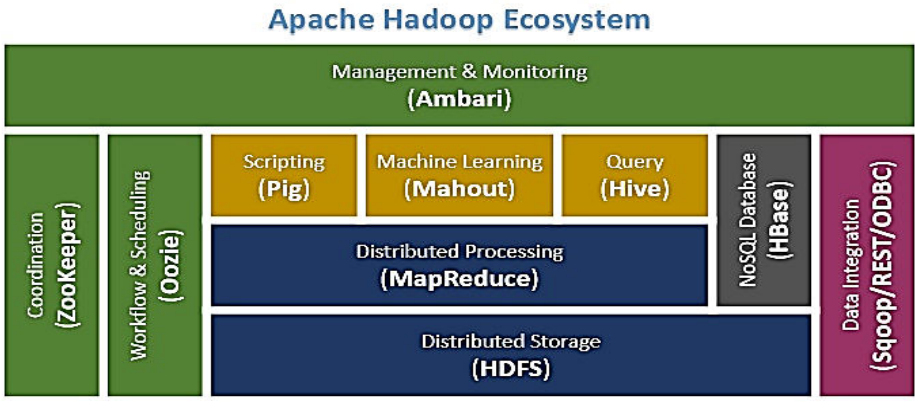
Grid Computing is a technology used to share the resources available on various heterogeneous computers available on various locations to compute very complex and huge problems. In this, the resources can be requested on demand and should pay only for the utilization done for the resources.

LITERATURE SURVEY

Cristian TOMA [1] proposed practical issues using distributed computing environments – Apache Hadoop. This paper presents the results obtained from standard programming language; RMI mechanism and Apached Hadoop programming model with respective to the computation of time that can be used in email-text searching application. The best performance was given by Apache Hadoop, second was RMI mechanism and third was standard programming. Ajay Kumar et al. [2] proposed distributed and Big Data storage management in grid computing. This paper presents a new mechanism to store Big Data and resource discovery mechanisms. Dynamic and Scalable Storage Management architecture is proposed to share both computational cycles and storage space. Any grid user in the domain can access the storage by using the concept of virtual IDs to create virtual space. Swamil Singh et al. [3] presented a review paper on the Big Data analytics with Hadoop. This paper explains about Big Data characteristics and the working nature of Hadoop file system and MapReduce. C. Chandhini et al. [4] proposed Grid Computing – A next level challenge with Big Data. This paper highlights the need of grid computing, distributed caching implementation process in grid computing to solve the problems of Big Data. Lawal Muhammad Aminu [5] has proposed implementing Big Data management on grid computing environment. This paper highlights the incorporation of Hadoop with the grid environments will lead to great benefits of Big Data processing. Zhuming Bi et al. [6] proposed Big Data Analytics with applications. This paper presents the recent developments in Internet of Things (IoT) and its applications and the Big Data Analytics has been identified as a critical technology to support data storage and analytics in modern manufacturing systems.

Apache Hadoop Ecosystem

Figure-1: Apache Hadoop Ecosystem



Sources: Authors Compilation

The figure 1 mentioned above shows various components of apache Hadoop ecosystem. The most important component is Hadoop File System (HDFS) used for distributed storage of Big Data and the other component MapReduce used for distributed processing of Big Data.

HDFS: This file system is based on master-slave fashion and it is highly fault-tolerant, reliable, distributed, and scalable for data storage as mentioned below in figure 2. In Hadoop, cluster one node will be a master node and all other nodes will be slave nodes. The master node needs to be a high-configured system for storage and processing. The slave nodes can be of commodity hardware and there can by many slaves per cluster. The master node will be having a Name Node, Data Node, Job Tracker, Task Tracker components. The Name Node is responsible for storing the metadata i.e., location of Data Node components assigned for various applications. The Data Nodes are used for storing block of data send by the application. The client application approaches the Name Node with an input file and the Name Node gives the address of Data Nodes where the input file blocks need to be stored.

Once after receiving the Data Nodes location the application stores the file blocks into the concerned Data Nodes available on slaves. Every block of input file is replicated into other two slaves i.e., totally three slave nodes will have same block. This replication of data blocks supports the feature of fault-tolerant i.e., any point of time the Data Node might be failed, then from other Data Node the data can be taken for processing in-order to avoid wastage of time.

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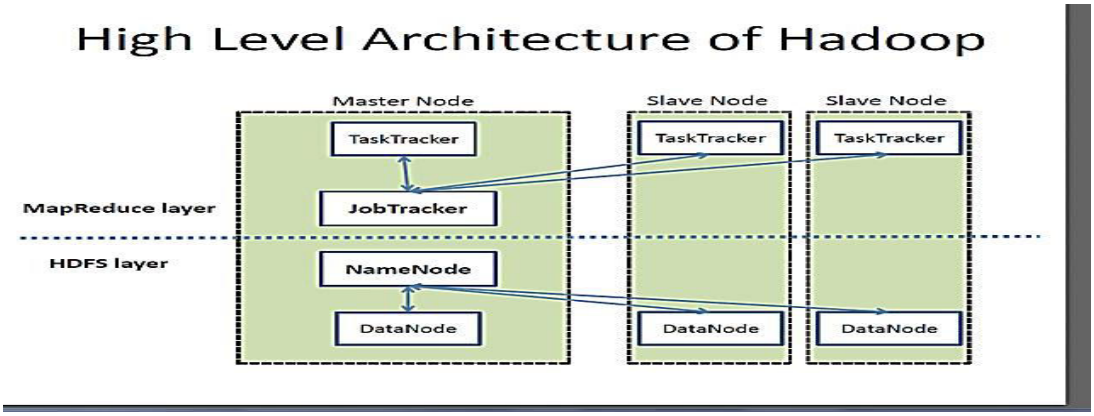
Figure-2: High Level Architecture of Hadoop



Sources: Authors Compilation

MapReduce: It is a programming model used for processing large data sets in parallel by dividing the work into set of independent tasks. This component will work with Job Tracker and Task Tracker components residing in master node. The Job Tracker assigns small tasks to the Task Tracker available in slave nodes for computation. The Job Tracker asks the Name Node to provide the address of Data Nodes to take data for performing computations on that data. The Task Tracker holds two functions called map () and reduce (). The map () is used to transform a piece of data into some number of key/value pairs. Each of these elements will be sorted by their key and reach to the same node, whereas reduce () is used to merge the values of same node into a single result. The result is send back to the client application.

HBase: It is a column-oriented database used to store a huge volume of data built on top of Hadoop ecosystem. It provides random read / write access to data in HDFS.

Hive: It is a data warehouse infrastructure used to run SQL queries called HQL (Hive Query Language) which will be internally converted into MapReduce tasks.

Mahout: This is used to create machine-learning algorithms. It implements techniques like clustering, classification, recommendations. These algorithms are used to gain knowledge from specified data and helps in better decision making.

Pig: This is used to analyze large sets of data written in Pig Latin scripting language. This has a component called Pig Engine that accepts Pig Latin scripts and converts them into MapReduce jobs. This uses multi-query approach helps in reducing the length of code.

Oozie: This component makes all the tasks to be scheduled properly and make them run in sequential or parallel fashion.

Zookeeper: This component provides the coordination service among the nodes available in the cluster for sharing data, identifying nodes by their name, updating the information of nodes joining to and leaving from cluster.

Sqoop: This component is used to transfer data from Hadoop to relational databases and import data from relational databases to Hadoop.

Ambari: This tool is used for monitoring and managing Hadoop clusters.

PROPOSED METHODOLOGY

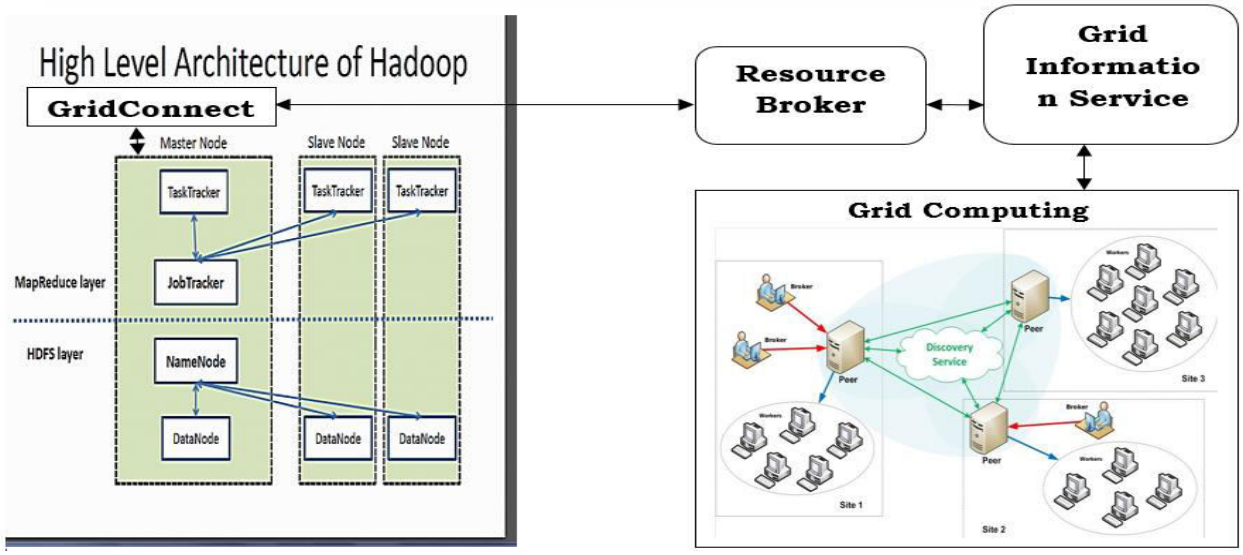
Hadoop is an open source framework used for distributed computing with cluster of nodes. Each node in the cluster is with commodity hardware and it holds storage and processing capacity with minimum configuration. Once the Big Data has accepted by the Hadoop file system, then it will split the tasks into many slave nodes for processing by the Task Tracker component and then the result is returned back to the client application. The best advantage of Hadoop is fault-tolerant because when a node is failed the other node is ready to accept the storage or processing due to replication.

The problem arises when there is an unexpected huge data volume has come at a certain point of time and Hadoop cluster may not be able to support the Big Data for processing. In Hadoop, cluster only equal amount of data is shared among all the nodes to store data.

Suddenly the nodes in the cluster may not scaled-up by an organization at a particular point of time, so we propose a new methodology to integrate Hadoop with grid computing. Grid computing is a technology, which allows sharing the resources from heterogeneous systems, which are idle. When there is a huge volume of data comes into the organization, then the Hadoop cluster can extend its functionality to use the resources from the grid. The organizations should register themselves with the grid computing service providers prior to do any transactions. The master node need to have the capability to check whether the data streaming-in will be processed by the cluster of nodes or not. If it finds that, the nodes available may not be able to do the tasks very faster and in time, then the master node need to immediately connect the grid service providers for resources.

So master node need to have a middleware component called Grid Connect, which helps to connect the grid service providers when the Hadoop cluster is overburden. Resource Broker and Grid Information Service are part of Grid Computing. Grid Connect middleware connects to the Resource Broker for authentication of master node and it also submits the requirements of the master node. Grid Information Service maintains the registered list of service providers ready with resources for usage. Resource Broker connects the Grid Information Service and extracts list of required resources, which are ready to service the master node. Once the resources are available then the communication starts. Once the task is over, again the result is sent back to the master node as mentioned below in figure 3. In this proposed approach, we can handle any volume of data and any type of data by applying scalability functionality of the systems. Big Data Analytics, which helps the organizations to predict their future aspects, uses more number of resources for processing and we suggest grid computing technology integration fetches a lot of advantage for huge computations.

Figure-3: Integration of Hadoop with Grid Computing through Grid Connect



Sources: Authors Compilation

Grid Computing communications are much more secured where the authenticity and authorization of the client and service providers are mandatory and also every transaction being monitored for the usage of resources as per the Service-Level Agreements(SLA) made before the start of transactions.

CONCLUSION

Big Data is generated from various sources and with huge volume. To handle Big Data, Hadoop framework is supporting with its ecosystem to store and process data with low cost systems. Hadoop supports the distributed computing for faster processing of data. The Hadoop cluster has the best feature of scalability to increase slave nodes. The problem arises when the data coming-in is more than the capacity of Hadoop, at these situations Hadoop also may not support for processing. As the organizations are going by rapid competition in the market to predict their future scenarios, Big Data analytics need to be performed where huge computation is required. This paper proposes one middleware component called GridConnect to be embedded with master node of

HDFS, which helps to immediately connect the grid service providers for processing of Big Data. This helps the organizations to be ready for accepting any volume of unstructured data at unexpected time to be processed with the help of grid entities.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

A STUDY ON CRYPTO CURRENCIES & BITCOIN

Rajan Lakshmi A.[5] V. Ashwini[6]

ABSTRACT

This systematic Research study examines cryptocurrencies (CCs) and Bitcoin. Because cryptocurrency research has not gained much attention from Information Systems (IS) researchers and needs a more vivid discussion, this research paper gives the information about introduction of cryptocurrency and Bitcoin, and how it works. Although, cryptocurrency research has not reached IS mainstream yet, there is massive potential for research ranging from protocol development to designing alternative digital currency schemes.

Crypto currencies entail a core digital artifact and present a rich phenomenon based on the intertwining of technological and social contexts .Bitcoin is currently at the stage in its development. We delve into the little bit of detail that we will get to shortly, I want to give an even more basic outline. In some ways, Bitcoin could end up feeling not that different from PayPal or your credit card when making purchases online. You will have some bitcoin, there will be a price of a good or service, and you will spend that much bitcoin to the vendor.

KEYWORDS

Crypto Currency, Bitcoin, Artificial Intelligence, Information Systems, Digital Currency etc.

INTRODUCTION

Money is based on trust, because if anyone could print money it would be worthless. To protect money, governments use different anti-counterfeiting measures Chapter Using cryptography is a way of creating a secure communication channel by using a mathematical formula, usually for the transfer of a message from person to another. This process makes sure that the person sending you a message, is actually who they say they are. Combine the impossible to counterfeit nature of cryptography with money and you get a currency based in math called a cryptocurrency. These cryptocurrencies are decentralized, electronic systems, which use peer-to-peer networking along with digital signatures to create money. While this may not seem possible, all that is needed is the network, an impossible to counterfeit public system that has peoples trust. While Bitcoin is not the only digital crypto currency, it is the starting point for learning about cryptocoins. The next sections will attempt to give the reader a better understanding of Bitcoin so that we can truly explore cryptocoins.

Bitcoin

On November 1st 2008, a mysterious research paper appeared on a cryptography listserv, a place where fellow cryptotography enthusiasts interacted. The man behind the paper was just as mysterious as the paper itself. The man was Satoshi Nakamoto who claimed to be from Japan had an email address from Germany. The proposed system was for an online currency called Bitcoin. The secret to its success would be the creation of a block chain where all users of the currency would each maintain the chain collectively. In the process, users could mine for Bitcoins and Nakamoto mined the first 50 Bitcoins in what is known as the Genesis block on January 3rd 2009. Nakamoto revealed little about himself, limiting his online utterances to technical discussion of his source code. On December 5, 2010, after Bitcoiners started to call for Wiki leaks to accept Bitcoin donations, the normally terse and all-business Nakamoto weighed in with uncharacteristic vehemence. No, do not bring it on, he wrote in a post to the Bitcoin forum. The project needs to grow gradually so the software can be strengthened along the way.

In fact, it is one of several digital currencies that are based on complex cryptographic methods. We'll glaze over those methods for simplicity's sake so you can figure out how Bitcoin works.

Another thing to note is that there are now several "copycat" or otherwise similar digital currencies to Bitcoin, collectively known as cryptocurrencies. These are known as such because they use cryptography to make an all-digital currency viable in terms of its security. While each has its differences, this introduction will teach you enough that you will be well on your way to understanding how other cryptocurrencies work as well.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

ANALYSIS OF CRYPTO CURRENCY

Bitcoin Mining

Figure-1

Bitcoins are discovered using computing power in a process called mining. Computers process an encryption algorithm, specifically the SHA-256 hash. A hash function is simply a mathematical formula used to map data. This algorithm was developed by the NSA and has never been cracked. Bitcoins are stored in blocks and every block contains a hash number. To find the next block, you must find a block header that is lower than or equal to the target, which is a hash of the previous block. If the hash number found is not lower than or equal to the previous hash, the algorithm adds nonce or a string of numbers starting at 0 and incrementing from there. The computer keeps looping this until it discovers a hash value that is mathematically related and lower than or equal to the previous hash, when the number is found, the person or miner, processing the algorithm is rewarded with a new block of bitcoins. We can see this process visualized through Figure-1.1 Each new block is directly related to the previous block, and everyone using the bitcoin network keeps a record of every bitcoin transaction. When the miner finds a new block, he announces it to the entire bitcoin network and is rewarded.

The Absolute Basics

Before the most obvious difference is that, your online purchase would not be a digitalized version of an exchange of bills and/or coins. The "real" currency is what you are exchanging, rather than arranging for an intermediary such as PayPal or your credit card company to make the exchange for you.

With Bitcoin, you cannot go to the bank to withdraw your bitcoins. Now, you could exchange your bitcoins for US Dollars or another currency, but in that case you would no longer own bitcoins but rather you would have sold them for "fiat money," regular money. Some merchants that have recently started accepting Bitcoin like Expedia are using a service that automatically converts the received bitcoins into USD, much like they would do if they accepted Canadian Dollars as payment.

This brings us to another one of the most basic things to know about Bitcoin: nobody "owns" it. There is no chief regulator nor is there a business behind it. It is basically a protocol that was considered attractive enough that people adopted it and its existence is now predicated on the millions of people that use it. It is decentralized, like the Internet. The Internet isn't a place and nobody owns it. It only exists due to the billions of computers that want to communicate with one another.

How do you impersonate someone? You steal their Bitcoin wallet credentials. A wallet is, as you would think, the "place" you keep your money. Each wallet has at least one address, which is a string of letters and numbers that will appear random at first glance. The way you use the wallet is by proving that it belongs to you by providing a private key, which is basically a very strong password that you do not get to choose yourself. This is because your private key is mathematically related to the wallet address.

The brilliance behind the cryptography here is that while your private key is mathematically related to the wallet address, you cannot learn the private key just by knowing the wallet address, which is public. On the other hand, the private key can be used to reproduce the entire wallet addresses associated with it if you were to forget it for some reason. When applying a signature, as I mentioned earlier, you are appending a signal to your Bitcoin transaction that the proper private key was used to authorize the transfer of funds.

What is the challenge related to theft, then? One of the benefits of Bitcoin is that you do not need to associate your real-life identity with your wallet(s). True anonymity is unlikely, at least if you ever plan to exchange to USD or use Bitcoin to have something sent to you, but there is no formal process of verifying a person's identity and attaching it to their Bitcoin wallets. This is why you can create a theoretically limitless amount of wallets and wallet addresses without any issue.

However, that means that the private key is the sole factor in determining access to a given wallet. If the private key is stolen, the victim has no more ability to use the funds than the thief does. A thief will immediately transfer the bitcoins to a different account before the victim will realize what happened. A pickpocket wouldn't walk around with their hand in your pocket, would they?

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

We will certainly see businesses pop up that will insure users against theft and loss by tying real-life identities to accounts. Perhaps we'll even see these businesses put a waiting period on transactions to enable a chargeback-like feature. Of course, when business gets into control of the currency, the key advantages of low fees and decentralization are lost.

Block Chain is the account book of Bitcoins. Whatever transactions are made electronically with Bitcoins, are recorded in the Block chain automatically. All the data gets transferred automatically in blocks in chronological order or liner order. The blocks keep on adding as the new transaction takes place.

Now coming to the primary part of the article, Is Bitcoin really artificial intelligence currency? The simple answer to this is YES. Because it is assured that in future robots are going to make use of Bitcoins. The Robots will take over the enterprises' operations. It is even predicted that in the future, robots are going to own property, assets and do trade with Bitcoins. Let's see what Jeff Garzik says about this:

"There's actually a lot of precedence for that," says Jeff Garzik, Bitcoin developer and CEO of Bloq, enterprise block chain developer with emphasis on networks like Bitcoin. "It's been assumed as inevitable that robots will exist and they will own property."

He clearly mentions it that it's surely going to happen in the near future. Even he firmly believes that Robots are going to be counted as legal persons. He has this problem with the corporate sector that they enjoy person identity. Even he believes that with Robotic system there will be more security in dealing the financial transactions.

Robots will employ people; they will do the financial transaction using Bitcoins and Cryptocurrency. The amusing part here is that it's actually happening in Wall Street. The U.S brokerage and banking company has already kept Robots as advisory agents and even it has substituted the financial analysis team with Robots. This is the reason that Jeff Garzik firmly believes in the Robotic system where Bitcoins and Cryptocurrencies will be used for making financial transactions electronically.

So, now you may have got the answer of this question? Isn't it? When Robots are going to replace humans, own property and assets, and trade with Bitcoins so how it's possible to be human intelligence? It is definitely Artificial Intelligence currency. But yes it's difficult for people to accept this so electronic system which is growing rapidly.

2016 didn't seem to be good for various customers, countries and currencies but, Bitcoin trading showed up a good improvement over three years with high amount of $1020 per Bitcoin. With Bitcoin, Ethereum, Litecoin and Ripple are getting highly famous in North American Countries.

The amusing part here is that, BBC pointed out; however, Bitcoins biggest boost came from China, which experienced a 7 percent decrease in the value of its national currency. Experts suspect that nationals are using crypto alternatives to circumvent government rules that prevent money from leaving the country.

However, as you know, as we all know that everything that everything has its pros and cons. I discussed above the Pros of Bitcoin Currency. Now I will discuss few of the cons of Bitcoin digital currency system.

It is believed that with Bitcoin virtual currency system, the U.S society is going to be affected massively. Not only the society but also it will leave its negative impact on political movements. With this electronic digital system, the people are going to be independent in conducting their financial transactions. They will no longer be dependent on banks and other financial institutions. You can clearly see now how it will influence the prevailing system. Obviously, the banks have certain rules and regulations for financial things, but when people will be conducting all of this electronically so there is a possibility that people misuse it for fraud purposes.

The Government will no longer have control on people regarding fiscal things. Thus, it will be taking Government's power and control over such things, which is definitely not good for the country. Only here Bitcoins virtual currency system saves the government as it decreases the inflation else the government will be dead with the increasing inflation rates.

In India, the investors claim that people do misuse of Bitcoins. India is seriously concerned over the global digital currency system. It has a very valid point, that this system has no registration and no authorization. Any of the leading financial entities of the World has approved this system so how they can use it, although some of the population is using Bitcoin digital currency.

To your surprise, The U.S intelligence agencies are constantly keeping an eye on Bitcoin digital currency system. Many of the U.S experts are unable to understand that how it is possible that Bitcoin can sabotage their long U.S financial systems that have been developed over the years. They are very not agreeing the on the involvement of Bitcoin in their long established system.

Virtual Currencies pose a challenge. It runs contrary to the fundamentals of transparency and accountability that have been built over the last three decades to tackle terrorism, human trafficking, money laundering and many other types of criminal activity (Juan Zarate, senior adviser at the Center for Strategic and International Studies).

The U.S intelligence agencies are constantly keeping an eye on the Bitcoin users' computers. The FBI has the permit to make use of warrants for countless Bitcoin users' computer around the world. The reason behind doing this is that with Bitcoin cryptocurrency the people hide their assets and do not pay taxes of those assets. The ISR is totally against the Bitcoin digital currency system as it believes that fraudsters will use this abstract currency for terrorism and attacks from which they have been taking measures to protect the country from such attacks. It has also a primary concern that the foes will misuse the digital currency and make efforts to turn it into a powerful currency hence taking the power of their leading banks.

Indeed the Bitcoin Currency is an Artificial Intelligence currency but it has its own pros and cons, which I have clearly described. Let us see in the future, which currency holds power, paper currency or digital based electronic currency.

CONCLUSION

Innovations in money have made it possible to make money transactions using virtual currency without any interference from any organisations. The first cryptocurrency created is Bitcoin named "Satoshi Nakamoto" which SHA-256, a cryptographic system designed by the U.S. National Security Agency (Graydon, C.)

Bitcoin the most widely used and known type of digital currency had a total value of $3.069 billion and currently over 13 million total Bitcoins are in circulation. Bitcoin's uniqueness is that it has an association to a specific key or address and the transaction happens and is recorded at the same time when one Bitcoin moves from one address to another.

The supply of cryptocurrency depends on"mining". Each individual Bitcoin is added onto the database through this mining process. Mining cryptocurrency is done using a computer and it is scaled on hashes per second. Every time someone successfully solves a block and mines a coin, a new hash2 is created. Bitcoin exclusively relies on hash functions. Powerful mining computers are required to mine cryptocurrency effectively but the complexity of the algorithm means that the CPU will consume many resources.

Some of the Payments-related aspects of virtual currency schemes:

- Virtual currency schemes introduces the most relevant new avenues of payment which were not their before in the list.
- Inventors create a virtual currency and develop the technical part of its network who can be anonymous or known (e.g. for Bitcoin and most other decentralized VCS.
- Issuers have predetermined limit of generating Virtual currency.
- Miners working as a group makes computer processing available in order to validate a set of transactions which is called as "block" made with a decentralized VCS and adds this to the payment ledger called as a "block chain" and without miners, the decentralized VCS smooth functioning would be difficult.
- Users can purchase virtual or real goods and services using virtual currency from specific merchants.
- Two Types of wallets online wallets (hot storage) and offline wallets (cold storage) are provided which offer a digital wallet to users for storing their virtual currency cryptographic keys and transaction where in authentication codes and initiating transactions provide a clear overview of the individual's transaction history.
- Trading platforms brings together bringing together buyers and sellers of virtual currencies wherein they can offer and bid among themselves.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

BIG DATA: DATA WAREHOUSE AND SECURITY

N. Bhaskar[7] M. V. Ramana Murthy[8]

ABSTRACT

Businesses need technology investments in the data center to drive impactful outcomes: faster IT services, nimble response times, and flexible solutions that balance the desire for automation, greater agility, and efficiency with the need for on-domain control of strategic assets.

Data warehouse is the environment where history of transactions are maintained with subject oriented and integrated. Big data is the process of maintaining huge transactions data for different purposes. Different examples of Big Data and data warehouse are Indian Railways data, Share market data, Government transactions data, ERP software data, Bank data, Supply Chain Management, etc.

Authorized users can do introducing a model that provides better performance and security to the user data and data analysis.

KEYTERMS

RSA – Rivest, Shamir, and Adleman Algorithm
ECC – Elliptic Cure Cryptography
KDC – Key Distribution Centre
HECC / HCC – Hyper Elliptic Curve Cryptography
HECDSA – Hyper Elliptic Curve and Digital Signature Algorithm
ETL – Extract Transform Load
SCM – Supply Chain Management

INTRODUCTION

Now a day's many organizations are going for online operations for their business even customers also. Therefore, there is a need to maintain big data or cloud data for their customer satisfaction apart from the traditional data storage procedures. *Big data* is a term for *data* sets that are so large or complex that traditional *data* processing applications are inadequate to deal with them. Challenges include analysis, capture, search, sharing, *data* curation, storage, transfer, visualization, querying, and updating and information privacy.

In the beginning, data warehouse consists of data of organizations, which was maintained for traditional operations. Now the scenario was changed to big data where data stored in a cloud server and every organization is becoming enterprise. Now it is a great task to maintain Data warehouse of enterprises and provide data mining to organizations or customers. It is complex to maintain huge volume of data, multi dimension data, providing security while accessing and so on.

There are two main challenges on the data warehouse developer while maintaining enterprise data for future access. They are:

Performance

Users now demand not only flexible and more complex analysis but also more timely information. Data must be available 24x7, and many business users demand that data supporting decision making be accessible within a short span of time in some cases, minutes or even seconds of when an event occurs. Organizations also realize that the same data needs to be utilized by many different processes and thus many different workload profiles.

The process of optimizing the data management environment should not be undertaken without understanding the consequences. It is important to remember that if the technology currently, which is in place, cannot support data capture, storage and usage at the lowest level, it would be wise to seriously examine that technology's ability to support the ongoing business needs.

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Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

When optimizing performance, the starting point is having a clear grasp of two aspects of the system. First, what is the unaided performance? The database may be so powerful enough that executing the query against the tables without additional indexes or denormalization gives the required response time. This raises the second aspect.

The Seven Steps of Optimization

- Start with a neutral data model,
- Implement views,
- Add indexes,
- Enforce prioritization,
- Proceed to rational summaries and denormalization,
- Consider irrational summaries and denormalization,
- Expand, explore and export.

Performance Enhancement Techniques

- Communication and Training,
- Help Desk and Problem Management,
- Capacity Planning,
- Data Loading Performance,
- Query Management,
- The Problem Management Process,
- The Problem management Process Development,
- Network Management,
- Software and Hardware Issues,
- Extract, Transform and Load (ETL).

Security

A data warehouse has a lot of moving parts and many opportunities for security issues e.g. data resides in a source system, and can be accessed by authorized users. It is extracted to a staging area and is transformed and possibly moved to a clearinghouse and then loaded to a data warehouse and which is extracted from the data warehouse and loaded into a data mart where the end users can access it for the analytic or reporting purposes. Each stage of the data movement process involves a certain data warehouse security risk.

- Source System Extract,
- Staging Area,
- Data Warehouse,
- Data Marts,
- Authentication,
- Network Data Warehouse Security Requirements,
- Security System Administration,
- Backups, Logs and Audit (Logging),
- Availability and Reliability,
- Third Party Requirements for Data Warehouse Security,
- Outsourced Development Data Warehouse Security.

Different security algorithms used to access warehouse data or cloud data from a secured environment are:

- RSA (Rivest, Shamir, and Adleman),
- ECC (Elliptic Curve Cryptography),
- HECC (Hyperelliptic Curve Cryptography).

RSA (Rivest, Shamir, and Adleman)

Most importantly, RSA implements a public-key cryptosystem, as well as digital signatures. RSA implemented two important ideas:

Public-key Encryption: The idea of public key encryption omits the need for a "courier" to deliver keys to recipients over another secure channel before transmitting the originally-intended message. In **Rivest, Shamir, and Adleman**, encryption keys are public, while the decryption keys are not, so only the person with the correct decryption key can decipher an encrypted message. Everyone has their own encryption and decryption keys. The keys should be made in such a way that the decryption key may not be easily deduced from the public encryption key.

Digital Signatures: The receiver might need to verify that a transmitted message which is actually originated from the sender (signature), and did not just come from there (authentication). This is actually done using the sender's decryption key, and the signature can later be verified by anyone, using the corresponding public encryption key. Signatures therefore cannot be forged. In addition, no signer can later deny having signed the message.

Public-key Cryptosystems: Every user has their own encryption and decryption procedures, E and D, with the former in the public and the latter kept secret. These procedures are related to the keys, which, in **Rivest, Shamir, and Adleman** specifically, are sets of two special numbers. We of course start out with the message itself, symbolized by M, which is to be encrypted". There are four procedures, which are specific and essential to a public-key cryptosystem.

- Deciphering an enciphered message gives you the original message, specifically D (E (M)) = M
- Reversing the procedures still returns M:
- E (D (M)) = M
- E and D are easy to compute.
- The publicity of E does not compromise the secrecy of D, meaning you cannot easily figure out D from E.

It performs the operations with the help of modulo operations.

We must now represent the message numerically, so that we can perform these arithmetic algorithms on it. Now let us represent M by an integer between 0 and n1. If the message is too long, sparse it up and encrypt separately. Let e, d, n be positive integers, with (e, n) as the encryption key, (d, n) the decryption key, n = p.q.

Now, we encrypt the message by raising it to the eth power modulo n to obtain C, the cipher text. We then decrypt C by raising it to the d^{th} power modulo n to obtain M again. Formally, we obtain this encryption and decryption algorithms for E and D:

$C \equiv E(M) \equiv M^e \pmod{n}$
$M \equiv D(C) \equiv C^d \pmod{n}$

ECC (Elliptic Cure Cryptography)

As the smart meters are used to transmit the real-time electricity demands from the customers, the data transmission process would easily suffer from several types of security threats and attacks. To protect transmitted data, which is an efficient authentication scheme should be provided. Compared with the authentication protocols designed for other scenarios such as VoIP and Ad Hoc networks, it is much more challenging to provide a suitable authentication protocol for smart grids due to its complicated architecture and diverse security requirements. On one hand, the authentication protocol should be secure against the various types of possible attacks and provide several security features to satisfy the secure requirements of smart grids. For example, a user's privacy should be fully considered, especially the user's identity protection, to prevent the adverse from obtaining the information about user's daily patterns, which may not that are important in other application environments. On the other hand, smart grid communications are more sensitive to transmission latency, and so existing security approaches with the most intensive computation are impractical in smart grid networks.

The protocol one-time signature-based multicast authentication could provide short authentication delay and low computation cost, their protocol achieved a good performance. However their work focused only on designing a lightweight authentication protocol, remained the key agreement issue is unsolved.

According to the above analysis, protocol was suffered from impersonate attacks and protocols were vulnerable to eavesdropping since these protocols could not provide key agreement to protect the further communications. Moreover, protocol faced some attacks associated with password. Although some of these protocols achieved good performance, they could not provide security at an acceptable level. Furthermore, other protocols such as were secure against several attacks, but the use of expansive exponential operations, the signature generation, and the verification leads to high computational overhead and communication delay. Therefore, these protocols are not suitable for the smart grid. In general, the existing authentication protocols for smart grids, which are mentioned above, are insecure against some cryptographic attacks or not practical due to high computational costs. In addition, not all the protocols discussed above could provide privacy protection, which is very important in smart grids.

Based on such of these, motivations, we proposed a robust and efficient authenticate protocol based on ECC with identity protection for smart grids by using the tamper-resistant attractive security properties. As ECC can achieve the same level security with a smaller key size, it offers better performance when compared with other public key cryptosystems such as RSA or D-H. Thus, we adopted ECC to realize a mitigation authentication device at the smart appliance without involving time-consuming operations.

When compared with other security approaches, public key cryptosystems can resist most of the possible attacks and provide much more security properties to achieve a good balance between performance and security. By using **Elliptic Cure Cryptography**, the proposed protocol can achieve the authenticated key agreement with privacy protection at a lower computational cost. Furthermore, according to the characteristics of the smart grid, the control center can be considered fully trustable since it is managed by the government administrators; the substations that have higher computational power are difficult to be compromised than smart appliances; the smart appliances with the limited power are more vulnerable to various attacks, and can be combined with a tamper resist device to protect the stored information. Taking advantage of above features, in the proposed protocol, a tamper-resist device was used to store secret information to help providing privacy protection through the authentication process. In addition, the control center and the substations can cooperate to complete the initialization process of authenticated key agreement protocol.

HECC (Hyper Elliptic Curve Cryptography)

With the rapid development of the information technology, wireless networks are now extensively used to transmit critical information relating to monitoring of real time data. The security mechanisms are essential to ensure integrity, confidentiality and authenticity of the data. Implementation of suitable cryptosystem in this environment is challenging as these networks consist of many tiny and smart devices, which are constrained in terms of memory, computing power and energy supply. While considering the different security threats involved in wireless sensor network, different symmetric / asymmetric algorithms.

Mutual Authentication Protocol: A mutual authentication protocol is necessary to resist the attacks when a malicious user pretends as an authorized one and duplicate, modify, insert or delete the data during transmission. We propose a mutual authentication protocol based on HECDSA in wireless network, which gives authentication and non-repudiation. The novelties of the protocol are as follows:

- Mutual authentication protocol based on HECDSA in wireless network is suitable for constrained devices as it uses genus 2 HEC on 80-bit finite fields, which achieve the same security level as 160-bit ECC.
- Any remote user can obtain service from other users without registering each time with the KDC. They can transfer data after mutual authentication.
- New session key is established for each particular session to protect data, which resists replay attack in wireless network.
- Encryption of transmitted message using asymmetric encryption process saves energy and storage, which is critical for constrained devices [3] [6].

Table-1: Comparative Statement of Few Encryption Algorithms Performance

Element	RSA	DSA	DH	ECC
Algorithm Family	Integer Factorization	Discrete Logarithms	Discrete Logarithms	Elliptic Curves
Security Level (in bits)				
80	1024	1024	1024	160
128	3072	3072	3072	256
192	7680	7680	7680	384
256	15360	15360	15360	512

Sources: Authors Compilation

As shown in the above Table, at all levels of security including 256 bits, ECC has smaller public key sizes than RSA, DSA and DH. Because of its smaller key size, ECC outperforms both RSA and DSA/DH for most routine operations while offering comparable levels of security. The reason is that ECC provides greater efficiency in terms of computational overheads, key sizes and bandwidth. In implementations, these savings mean higher speeds, lower power consumption, and code size reductions. The gap between systems grows as the key sizes increase, which is especially relevant to implementations.

RELATED WORK DONE

Security implementation using ECC / HECC is applied on Supply Chain Management (SCM). It is a data warehouse application, where multiple suppliers, multiple data products, multiple customers and multiple platforms to be integrated. In SCM process, involve the following algorithmic steps:

- Registration of new suppliers,
- Authentication for supplier product details update using HECC,
- Collecting request from customer thru proper authentication,
- Satisfying the customer request by interacting with registered supplier's product details,
- Verifying the status of customer order,
- Feedback on supply process and product.

Development Process: It can be developed using any platform with backend warehouse database. We used .Net as front end. It is found that ECC is effective security algorithm for supplier / customer security to access warehouse data for processing. The response time for security check is also faster. The interfaces designed are herewith.

Interfaces

Figure-1

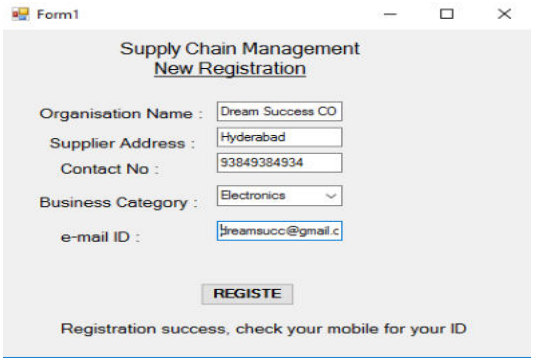
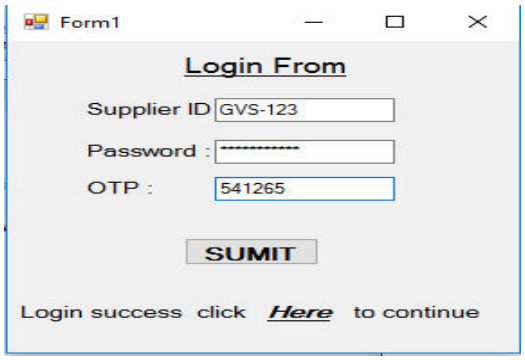
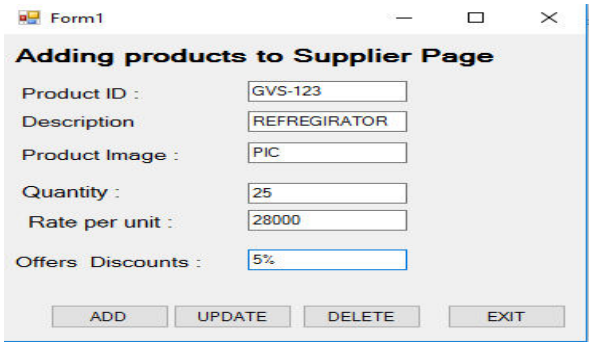


Figure-2



Sources: Authors Compilation

Figure-3



Sources: Authors Compilation

CONCLUSION

Security implementation in Data Mining is important for every warehouse developer. It is also necessary to observe the slow down process by implementing the security issues at different levels of launching. The same security procedure to be adopted and used at different sources of data, User authentication and using query implementation tools. The security procedures adopting for developing the warehouse and mining can also be used in different applications related to Cloud computing or big data environments.

HECC is well suited for secure communication in wireless network for constrained devices as HEC operand size is only a fractional amount of the EC operand size and almost all the standard discrete logarithm based protocols such as the Diffie Hellman and EIGamal can be planted to HEC. It is proposed a mutual authentication protocol based on HECDSA for a secure access in constrained devices, which allows both the entities to verify each other's authenticity. It is seen that the proposed protocol of HECC is efficient as the timings of our signature generation / verification compares favorably with the timings of ECC available in existing literature. As HECC (genus 2) of 80-bit operand lengths provide same security level with ECC of 160-bit, in our view, HECC is more suitable for implementation in the constrained platforms in wireless networks.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

ICT: A TOOL FOR BOOSTING AGRICULTURAL MARKET

K. Kiran Kumar[9]

ABSTRACT

In India, Agriculture is viewed to be an essential occupation for a most section of population. Agriculture is an expertise intensive industry that is spatial in nature. To be successful, farmers ought to be generalists who are usually not most effective well versed within the modern day farming applied sciences but also astute businessperson who are technologically savvy. E-agriculture plays a foremost role in addressing these challenges and uplifting the livelihood of Indian farmers. We aim to center of attention on key motives found out for strong utilization of knowledge verbal exchange technology for agricultural enhance up, at least on the skin, with supportive of evidence herein. E-Agriculture is a rising field specializing in the advance of rural and agricultural progress by way of evolved understanding and conversation tactics. Some excising disorders discussed with agriculture and rural progress. The development of agriculture has been on underneath development for the prior few years because of lack of agriculture potential and environmental changes. The predominant intention of this paper is to arrive farmers for their recognition, utilization and belief in e-Agriculture. This paper explores the potential contribution so far been attempted beneath the aegis of e-agriculture or Information and Communication Technology (ICT) to the livelihoods of farming group in India. E-Agriculture is a platform for helping marketing of agricultural merchandise.

KEYWORDS

E-Agriculture, ICT, Agricultural Products, Market, E-commerce etc.

INTRODUCTION

"E-Agriculture" is a rising area within the intersection of agricultural informatics, agricultural progress and entrepreneurship, referring to agricultural services, technological expertise dissemination, and understanding delivered or more desirable by way of the web and related applied sciences. More specially, it involves the conceptualization, design, progress, evaluation and application of recent (revolutionary) approaches to make use of present or emerging Information and Communication Technologies (ICTs).

E-Agriculture goes beyond technology, to promote the integration of technological know-how with multimedia, advantage and tradition, with the aim of bettering verbal exchange and studying processes between quite a lot of actors in agriculture in the neighborhood, domestically and global. Facilitation, support of requirements and norms, technical aid, potential constructing, education, and extension are all key add-ons to e-Agriculture. There are a few forms of recreation related to e-agriculture purposes, which might be generally well known around the world at present. The supply of agricultural knowledge and expertise services (i.e. Market costs, extension services, and many others) using the web and associated technologies falls beneath the definition of e-Agriculture. More developed purposes of e agriculture in farming exist in the usage of subtle ICTs corresponding to satellite systems, Global Positioning Systems (GPS), evolved computer systems and electronic techniques to strengthen the number and high quality of creation.

In India agriculture is an essential occupation for many a part of populace. Most rural populace is determined by agriculture as their most important occupation. Techno authorized ICT and cyber regulation expert of India and the managing member of "Association for People of India" (AFPOI), the agriculture development characteristics are analyzed maintaining in intellect the advent of E-agriculture in India.

CURRENT SCENARIO OF AGRICULTURE SECTOR

The occupational structure of India is dominated by the "agricultural sector" and the "manufacturing sector" and the "service sector" is lagging a ways in the back of in this context. This shows that India is predominantly an agricultural economic climate and as a result, it requires strongest safety and development of its "agricultural resources". India is dealing with specified "Agricultural Challenges" that need to be resolved as soon as possible. The major challenges to "Agriculture Sector in India" are:

- Insufficient agricultural infrastructure and support facilities,
- Insufficient institutional capacity to deliver farmers specific services,
- Lack of awareness regarding suitable agricultural methods among the farmers,

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- Agricultural content development and its up gradations,
- Ownership issues of the public and government generated data,
- Inadequate use of Public-Private Partnerships in India,
- Lack of "Common Platforms" for the farmers in India,
- Absence of an "Agricultural Think-Tank" in India,
- Insufficient use of ICT for agricultural purposes, etc.

NEED FOR AGRICULTURE MARKET INFORMATION SYSTEM

Nickels (1978) in his study on the Principles of Marketing has acknowledged that expertise is one key to broaden marketing success for every person. A market information system is a predominant device used by today's management to support in main issue fixing and selection making. market information system is a process of gathering, processing, storing and utilizing understanding to make higher advertising and marketing choices and to improve marketing alternate (Amrutha, 2009).

Subrahmanyam and Mruthyunjaya (1978) situated on their be trained on advertising and marketing of fruits and vegetables in Bangalore prompt for suitable dissemination of market intelligence and understanding by means of all feasible method of communication, for bettering the advertising effectively of fruits and vegetables.

Raigar (1988) in his conceptual evaluation of Management Information System (MIS) and management Science opined that although computer systems have of course a role to play in MIS, all computerized techniques do not always mean MIS or does MIS necessarily imply computerized processing of data to create knowledge.

Rahman (2003) suggested that the farmers received low costs in Bangladesh because of lack of market understanding, which resulted in large inter-market price variant. Growth of agricultural market expertise offerings was critical for domestic market efficiency and to combine home agricultural market with regional and global marketplace for sustainable development of agriculture sector and to make certain country's long run food security.

E-AGRICULTURE IN BRIEF

E-Agriculture community is made from man or woman stakeholders akin to expertise and communication authorities, researchers, farmers, pupils, coverage makers, trade persons, law practitioners, and others. More especially, e-Agriculture involves the conceptualization, design, progress, analysis and application of progressive approaches to make use of information and communication technologies (ICT) in the rural domain, with an important focus on agriculture.

E-agriculture is the web platform of this international initiative aimed toward promoting sustainable agricultural progress and food safety via bettering the use of understanding, communication, and related technologies in the sector. Briefly e-Agriculture will connect all involved person concerned starting from farmers to researchers collectively. Farmers can get the preferred understanding at any immediate of time from any a part of world and they can get the aid from professionals viewing their difficulty instantly by way of without relocating at any place.

E-agriculture is a rising field for reinforcing existing agriculture and food security with improved strategies for expertise entry and change utilizing knowledge and conversation technologies. The World Summit on the Information Society (WSIS) Plan of motion comprises e-Agriculture as an area of function of information and communication technologies (ICTs).

GOAL OF THE PLATFORM

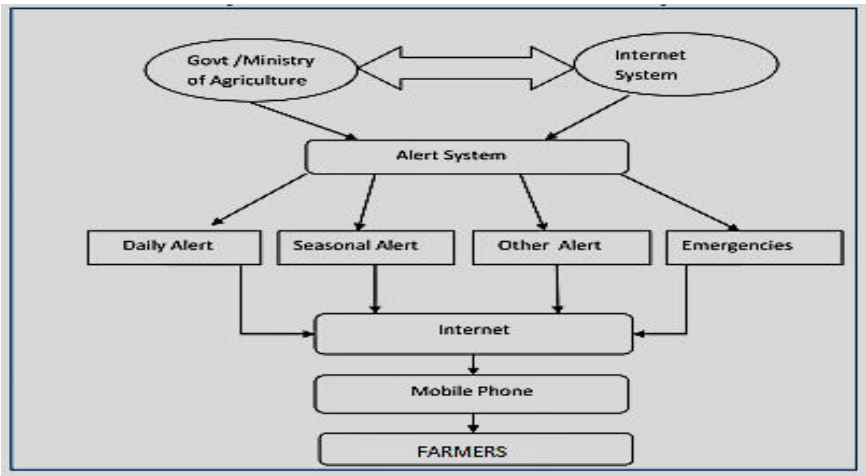
E-agriculture is a slightly contemporary term in the field of agriculture and rural development practices. An emerging field focusing on the enhancement of agricultural and rural progress by way of multiplied information and communication strategies. To permit community participants to trade opinions, experiences, excellent practices and resources concerning e-Agriculture, and to be certain that the potential created is without difficulty shared and used worldwide.

ARCHITECTURE

For improving agricultural productivity, a proficient agricultural advice is given to the farmers each in well-timed and personalized situations. Here, on this approach agricultural experts generate the recommendation by utilizing the latest agriculture which is tremendously knowledge intensive which additionally requires well timed, reliable and correct understanding on usual resource endowments and their utilization patterns at gift and future technological know-how to be had for his or her utilization and different expertise about markets, climate, insurance, subsidy, and many others. The architecture of the trendy system is as follows:

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

Figure-1



Sources: Authors Compilation

The news releases from the government reach the farmers in time and it is also sub categories by the alert system, therefore an alert system is being built for daily releases and for seasonal releases.

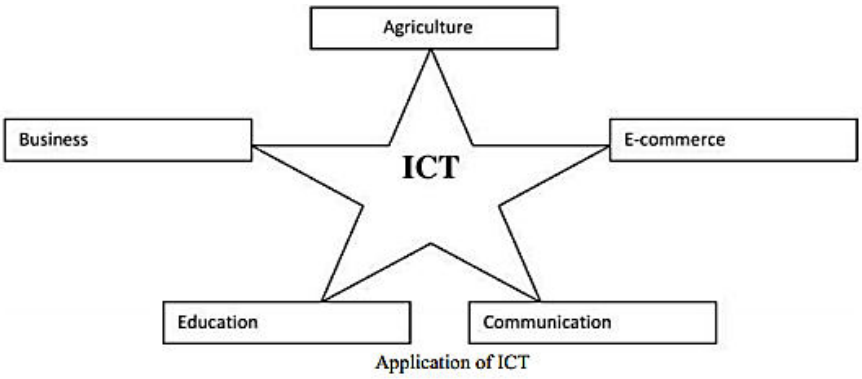
ROLE OF ICT IN E–AGRICULTURE

ICT is an umbrella term that includes any communication device or software, encompassing: radio, television, mobile and fixed telephones, laptop and community hardware and software, satellite techniques and so forth, (as well because the quite a lot of services and applications associated with them, similar to video-conferencing, distance studying, and so forth) crucial for the delivery of information in the form of audio, information, video, image, and so forth from factor A to factor B.

ICT consists of all technical way used to manage expertise and aid communication. A couple of reviews underscore simply how large and special ICT productivity positive aspects are for not only individuals and organizations, however for a nation. A brand new idea about Agricultural informatics that has arisen following the rapid development in information and communication technologies (ICTs) and of the web referred to as e-agriculture, agricultural informatics is an emerging field which mixes the advances in agricultural informatics, agricultural development and entrepreneurship to furnish higher agricultural offerings, superior information and communication technologies, and information supply by way of the advances in ICT and the web.

The dissemination of knowledge to farmers has end up increasingly integrated into ICTs. Rural Tele-centres provide expertise on schooling, agricultural and health disorders and equip rural residents with skills on methods to use desktops and furnish normal literacy. Additionally Radio and TV programmers feature agricultural information. A few of the companies like government, personal, cooperatives, and public have also attempted to facilitate technology transfer within the agricultural sector.

Figure-2



Sources: Authors Compilation

Information and communication technologies (ICTs) are significant in facilitating conversation and entry to expertise for agricultural and rural development. Information and communication technologies are making massive impact on the agricultural economic climate because of its wide software and enchantment. It is going to appear paradoxical that modem lets associated with developed nation markets and capital intensive approaches of construction, has any relevance for country like India the place many millions of men and women lack in common desires. Nonetheless, there are numerous efforts in India and other constructing nations to demonstrate the concrete advantages of ICT for rural populace and to carry out the equal in a manner that makes economic sense.

ADVANTAGES OF ICT IN E-AGRICULTURE

- It might probably provoke new agricultural and rural industry akin to e-commerce, actual estate industry for satellite places of work, rural tourism, and virtual company of small-scale farms.
- It could possibly help coverage making and analysis on optimal farm production, disaster administration, agro-environmental resource management and so forth, utilizing instruments reminiscent of geographic information systems (GIS).
- It will possibly make stronger farm management and farming applied sciences by way of efficient farm management, risk management, effective information or knowledge transfer and so forth, realizing competitive and sustainable farming with trustworthy merchandise. For example, farmer has to make important choices similar to what to plant. When to plant? Finding the best way to control pests? At the same time seeing that off farm motives such as environmental impacts, market entry, and industry requirements. IT-situated decision support system (DSS) can surely help their choices.
- It may well furnish programs and tools to secure food traceability and reliability that has been an emerging obstacle concerning farm products considering the fact that serious contamination corresponding to bird flu used to be detected.
- It may well facilitate rural events and furnish more at ease and safe rural life with similar offerings to these within the urban areas, equivalent to provision of distance schooling, telemedicine, remote public offerings, remote entertainment etc.
- Empowerment of Stakeholders (executive officers, research, schooling & extension scientists, farmers and other service provider equivalent to group expertise centers).
- Progress of potential administration, choice aid and Advisory methods to improve Extension services and likewise used for Farmers Redressal process.
- Efficient management (progress, Conservation, allocation and utilization) of resources.
- Accelerated productiveness and profitability of farmers by better advisory programs.

GLOBAL TRENDS IN E-AGRICULTURE

Technology-based Solutions

Applications of e-Agriculture in intensive agricultural programs in developed international locations are gearing towards utilizing refined technologies to give a boost to the quantity and exceptional of production, as a way to maximize earnings. This is the case in precision agriculture in which farmers are harnessing computer and satellite technologies to cut expenditures, make stronger yields and safeguard the atmosphere; and e-commerce (or e-marketing) wherein the advertising and sale of agricultural merchandise is carried out over digital networks such as the internet and extranets. On the other hand, in lots of developing countries farmers‟ access to understanding is improved by grass root level initiatives of making use of ICTs as good as distance schooling modalities to enhance the competencies base amongst service vendors.

Precision Agriculture

In precision agriculture or website online-distinctive farming, farmers are utilizing ICTs and other applied sciences to obtain extra distinctive understanding about agricultural resources, which permit them to establish, analyze, and manage the spatial and temporal variability of soil and vegetation for choicest profitability, sustainability, and security of the atmosphere. Precision agriculture is described as, "A procedure to control farm resources higher. Precision farming is an expertise science centered management system now feasible due to the fact of several applied sciences currently available to agriculture. These incorporate global positioning systems, geographic information systems, yield monitoring contraptions, soil, plant and pest sensors, remote sensing, and variable rate applied sciences for software of inputs." Precision agriculture is a complicated e-agriculture software. It makes use of five primary components of science:

- Geographical Information Systems (GIS) for analysis and management of spatial data and mapping,
- Remote Sensing (RS) to identify,

- Global Positioning Systems (GPS) to locate and define spatial features or activities that contributes to the quality of site-specific practices,
- Variable Rate Technology (VRT) allowing targeted, site-specific input applications, and
- Yield monitoring for recording crop productivity as an historical database for crop management.

E-COMMERCE IN AGRICULTURE

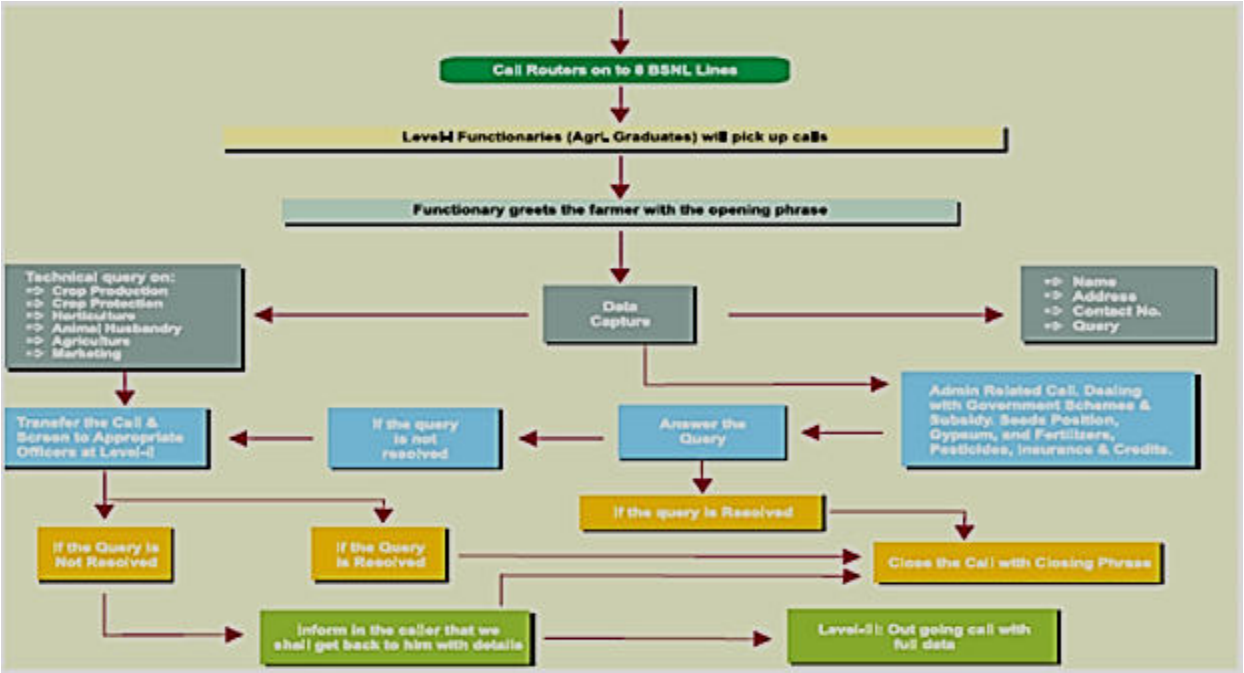
Expanded productions and high yields result in the have to seem for beneficial markets beyond local communities, and digital markets are providing a possibility to farmers to market and sell their produce to shoppers at the world level. Electronic commerce (ecommerce), with no trouble defined as the general trade of items and services by way of the web, is already having a giant influence on agriculture farms had already bought or bought agricultural products on the web and Goldman Sachs had estimated that 12% of all agricultural sales within the U.S. would be conducted over the web in 2004, in comparison with handiest4% in 1999. Further, a gain knowledge of performed with the aid of Rockwood study on internet use by business farmers in the united states observed that farmers were chiefly utilizing the internet to entry information on commodity costs, weather, farm chemical substances, and machinery. The be trained also showed that farmers have been migrating speedily toward internet-situated transactions similar to purchasing seed, crop chemical compounds, and farm apparatus on the Internet.

E-AGRICULTURE IN INDIA

Numerous initiatives have been taken throughout the length and breadth of the country, aiming at extending the benefits of the information revolution to rural and remote areas. These includes the establishments of Kisan call centers, Gyandoot project, Village knowledge centers, AGMARKNET, e-Sagu system, etc.

Kisan call centers (KCCs) were launched on 21st January, 2004 by the Department of Agricultural and Cooperation with the aim to deliver the extension services to the farming community in the local languages. The farmer dials a toll free number 1551, and the agricultural scientists provide the initial enquiry. The cost to the farmers is almost zero and they get the response in their local languages. If the farmers want more information, the call is forwarded to level II and level III executives.

Figure-3



Flow Diagram of Kisan Call Center A Gateway for Farmers
(Sources:http://www.kisancallcenter.net/schematic.htm)

Sources: Authors Compilation

CONCLUSION

E-platform connects all registered wholesale markets across the nation giving farmer a vast option to sell their produce, and this will support them to get higher prices. The state and central government have come collectively to make this a truth, the economic assistance is offered to improve state's knowledge science infrastructure in wholesale markets. It is a digital portal to provide the produce at the first-class price for farmers of India.

E-agriculture conveys the information regarding agricultural details to farmers in SMS by way of SMS gateway and hereby proposes to modify over E-agriculture. The details akin to day-to-day alert, seasonal alert and other further important points may also be dispatched to farmers. The everyday alert can also be dispatched to all farmers in the database. Seasonal alert can also be dispatched to farmers only for chosen farmers situated on clustering effect.

Finally, the other or additional detail, which is announced through agriculture, may also be sent to all farmers. Experimental effect shows better influence when compare with the prevailing work. The potent implementation of E-platform in agriculture sector will particularly make agriculture reform in India.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

BUSINESS INTELLIGENCE & SIX SIGMA COMPLEMENT EACH OTHER

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ABSTRACT

The success of Six Sigma is known to many organizations. Six sigma methodologies have been tried and tested by many organizations to improve the way they function, and produce products or services of high quality. Organizations today are keen to improve their quality standards to be able to be a chosen one in the industry. Additionally, organizations are facing many challenges associated with performance in today's competitive environment. Business Intelligence thus comes into picture which can help managers make informed decisions. However, achieving high quality business intelligence still remains a challenge.

High quality business intelligence can be achieved by Six Sigma. Thus, merging six sigma and business intelligence would result in producing high quality business intelligence product. This is a new method that can be followed to be able to use business intelligence in most appropriate way. Many articles discuss how Six Sigma can enhance business intelligence and play an important role in enhancing performance of an organization. These articles clearly identify six sigma methodologies as data driven proven methodology that can change the way business intelligence has been used thus far. This paper discusses business intelligence and six sigma concepts in detail and also describes how Six Sigma can be an integral part of business intelligence.

KEYWORDS

Six Sigma, Business Intelligence, Managerial Decision Making, Performance etc.

INTRODUCTION

Today, most organizations are constantly challenged for performance. The competition in the industry demands superior performance in every field. This puts significant stress on the business managers in terms of making critical decisions associated with business. Business intelligence in this direction is a good approach that helps business managers to make important decisions. Business Intelligence allows organizations to make informed and intelligent decisions. Business Intelligence has existed for more than two decades now. However, in the recent times organizations have been deeply involved in exploring its concepts and implement strategies that can influence critical decisions.

It is a fact that in 'information' plays an important role in any field. Information technology has thus evolved in the recent past to create more and more new business intelligence applications. With this, there has been growing interest in business intelligence as a path to reduced costs, improved service quality, efficient processes and better decision-making processes in the actual work environment. Organizations began with gathering data and interpret data to derive meaningful conclusions. The reporting and analyzing capabilities have evolved to better suit the changing business environment since then. However, producing high quality business intelligence remains a challenge for many organizations.

Six Sigma is an important step in achieving near perfection business intelligence. It means high standard of quality in many organizations. It is a disciplined, data driven approach and methodology for eliminating defects in a process, product, or a service. It enhances value to customers by clearly having an understanding of what is critical to customers. Critical to quality parameters are identified based on customer's requirements in Six Sigma and it aims at improving them by following systematic methodologies. It focuses on having processes that are error free and reduces opportunity for errors at every stage in a process. One of the key benefits of Six Sigma is that it reduces defects from customer's point of view. It includes data analysis, which can provide meaningful insights into business for future course of action. Its principles have been used in several businesses for years and have often produced significant results. Applying its principles to the business intelligence can result in making meaningful interpretations of available data, which is often reliable for making decisions. The data interpretations keeps customer needs on top of the list and help managers make better decisions. Data measurement, analysis and, control principles of it can provide near perfect interpretations in the area of business intelligence. Thus, the concepts of Six Sigma can play a major role in business intelligence to determine high quality business intelligence product. Thus, Six Sigma and business intelligence complement each other.

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BUSINESS INTELLIGENCE

Business Intelligence (BI) can be define as a combination of "processes, technologies, and methodologies that gather and transform raw data into useful and actionable information for business purposes" (Graves). Business intelligence is thus helpful in developing new and effective strategies that can lead to growth in business.

Components of Business Intelligence

- **OLAP (Online Analytical Processing)**: It is a tool used to interpret data of huge size in order to optimize business processes.
- **Advanced Analytics**: Advanced analytics uses statistical tools to forecast trends and predict.
- **Corporate Performance Management**: CPM gathers data of various types, which can then be correlated to get the holistic picture of an issue.
- **Real Time BI**: Real time BI takes into consideration the real time data for prediction and uses various communication portals.
- **Data Warehousing**: Data warehousing supports the gathering of different types of data.
- **Data Source**: Data sources can be different for different types of data (Graves). In business most often, we use operational data or historic operational data depending on the type of the data required.

The combination of above components leads to Business Intelligence. Business Intelligence tools offer valid, comprehensive views of organizational data and helps users understand "complex processes and relationships by means of easily assimilated, customized visual reports that help users to make timely and informed decisions, take actions that will improve performance, and understand how their actions affect the entire organization" (Ferranti, Langman, Tanaka, McCall, & Ahmad).

SIX SIGMA

Six sigma is a statistical way of measuring the process performance and their by improving them. It provides both the framework and tools to "get better faster" (Lazarus, Fache, & Butler). Six sigma combines statistical tools, project management techniques to help managers clearly define problems, measure critical to quality parameters, analyze them, and come up with improvement plans to overcome key issues with the processes.

Five Steps of Six Sigma

- **Define:** This step helps define problem by clearly identifying the problem. For example, in healthcare we can define who are our customers. What are their expectations?
- **Measure:** This step clearly articulates various metrics that helps meet customer expectations. For instance, in this step the following questions are answered. What data is required to measure current performance? What are critical to quality parameters? What metrics should be measured? How will it be measured?
- **Analyze**: in this step, data is gathered and analyzed using tools that help identify key issues in a process.
- **Improve**: Identify and implement solutions that can address key issues, which results in improving the process.
- **Control:** This step monitors performance after necessary modifications and maintain performance thereafter ("A Look at Six Sigma's Increasing").

INCORPORATING SIX SIGMA IN BUSINESS INTELLIGENCE

The steps of six sigma can be used in any industry as it aims at improvements by eliminating key issues (defects) in a process or a product. Six sigma can be incorporated in the 'Advanced Analytics' stage of business intelligence to approach an issue systematically. The goals of Six Sigma for business intelligence are to improve information product, eliminate defects and variability, and streamline the underlying business intelligence processes. By incorporating, it with business intelligence near perfection processes can be achieved.

APPLICATION OF SIX SIGMA BUSINESS INTELLIGENCE IN VARIOUS INDUSTRIES

Healthcare

Healthcare industry can benefit significantly with six sigma. In healthcare industry, patient care is human based, which calls for more variance when compared to process driven industries. Thus, Six Sigma can play a great role in process improvement in healthcare industry ("A Look at Six Sigma's Increasing"). Using it, near perfection process can be achieved in healthcare. This can be beneficial to the provider organization as processes with less number of defects yield better, which means cost of such

organization goes down. By understanding the patient's needs and expectations, provider organization can deliver services to meet and exceed these expectations ("The Value of Lean Six Sigma"). Thus, Six Sigma can be used in business intelligence to make critical decisions in healthcare industry. There have been many studies conducted in the past that incorporated Six Sigma in healthcare to improve process performance. According to the *Journal of the American Medical Information Association,* the Duke University Health System (DUHS) used six sigma performance improvement methodologies to reduce performance variance in many processes associated with patient healthcare (Ferranti, Langman, Tanaka, McCall, & Ahmad). The journal article states that the use of BI tools along with six sigma tools helped the organization improve on the efficiency of care delivery, patient safety and hospital operation that saved huge amount of money for the organization. The successful implementation of business intelligent tools along with six sigma helped the university prevent 157.8 potential cases of nosocomial acquired C difficile colitis per year with a total savings of $578 968 (Ferranti, Langman, Tanaka, McCall, & Ahmad). It clearly shows how business intelligence along with six sigma tools can benefit healthcare industry. Mt. Carmel Health System is another healthcare organization that has benefitted immensely with the help of implementing six sigma tools. The healthcare organization saved $3.1 million by implementing six sigma tools on operational issues just in two years ("A Look at Six Sigma's Increasing"). The organization had accumulated more than $40 million in savings from various programs using six sigma in four years ("Appendix 2:").

Aviation

Aviation industry needs perfection at all levels. The processes in this industry such as passenger safety, cost savings, flight maintenance and flight timings etc. have to be monitored closely in order to meet the industry demand. Error or defect in any process can cost the organization a significant amount. Thus, the organization in this industry has to maintain defect free processes to be the best in the industry. At the same time, an organization in aviation industry needs to track various performances such as airline performance, market performance and trend, pricing performance and trend, flight performance, competitor analysis, analysis of various programs ("Airline Business Intelligence"). Aviation industry includes huge amount of transactional information at different levels. These information needs to be analysed and interpreted in order to make true business sense. Six-sigma business intelligence can play a huge role by interpreting the data meaningfully, which can lead to business growth. Six sigma tools act as a bridge between the managers and front line workers. It gives "aviation professionals a tool box with best practices" that can help eliminate process flaws and improve overall performance ("How Six Sigma Can"). Marx in his article *Airline Industry – Six Sigma* states that three of the fortune 500 companies use six sigma in their processes for performance improvement (Marx). The six-sigma tools helped Delta Air Lines improve its performance in more than one ways. The airline began to introduce six sigma tools in its maintenance division and used these tools to improve performance in other areas such as airport customer service, in-flight services etc. In one of the six sigma projects undertaken by the airline resulted in "reduced unnecessary transportation of aircraft parts by 45%, by troubleshooting and scheduling of the maintenance events resulted in inventory reduction of 6.2 million ("Delta Air Lines"). This proves the value of six-sigma business intelligence in aviation industry.

Human Resource Management

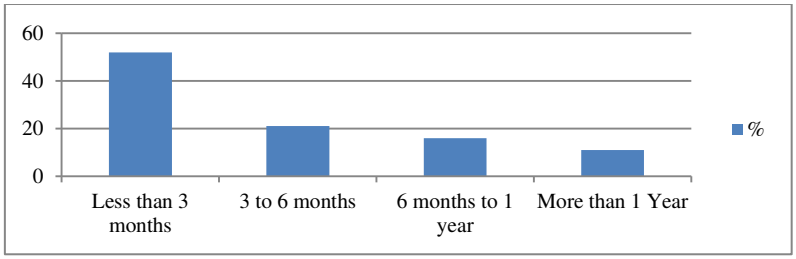
Six-sigma business intelligence plays a vital role in Human Resource Management too. Human resource in any organization is an important process and includes several sub processes such as employee engagement, development, learning and acquisition. Thus, six-sigma business intelligence can be used in all the processes to improve performances. For instance, six-sigma business intelligence can be used to improve employee productivity, reduce employee attrition, provide effective training, and enhance employee acquisition (Kapoor). While many organizations store huge amount of data due to improved technology, there are very few organizations that use the data as "most managers and HR directors have no clue about its importance in their daily activities" (Patten). One of the key indicators for an organization is its ability to engage employees appropriately. Employee engagement is defined as the emotional and functional commitment an employee has to his or her organization (Weinger). Organizations that are able to keep their employees happy outperform other organizations. In addition, it is a fact that problems begin with organization and its employees (Bahreini). Engaged employees are happier, and remain with the organization for longer and are productive (Weinger). To achieve employee engagement is not easy. Organizations often fail because of employees being not committed to the organization. For instance, in one of the organizations that I worked, the attrition rate was very high. As a result, human resource team was constantly under stress to hire new employees and provide necessary training to them to prepare them for the respective jobs. This increased the cost of hiring new employees due to increased attrition. The organization decided to implement a six-sigma project to curb the attrition.

While the organization termed every employee leaving the organization as 'Attrition', the project clearly defined attrition as "employees leaving the organization within 3 months of joining the organization". The data of employees leaving the organization was bucketed in four buckets: Less than three months, five to six months, six to one year, and more than one year. On bucketing the data, the project team understood the fact that, 53% of attrition occurred in the first three months, 21% in the three to six months, 16% in the 6 months to 1 year, and 11% in the more than 1-year buckets. Clearly, the maximum attrition was happening in the first three months category as shown in the picture 1.

Thus, the project team decided to analyse the reasons provided by the employees who have left the organization within three months of joining. This analysis gave some useful insights and helped understand the reasons for employees leaving the organization within the short period as shown in Picture 2. 32 percent of the employees left, as they were not satisfied with the organization, 20 % employees found lack of growth opportunity in the organization, 15% employees were unmarried and were not committed to the organization, Shift timings contributed to 12% of attrition within the organization.

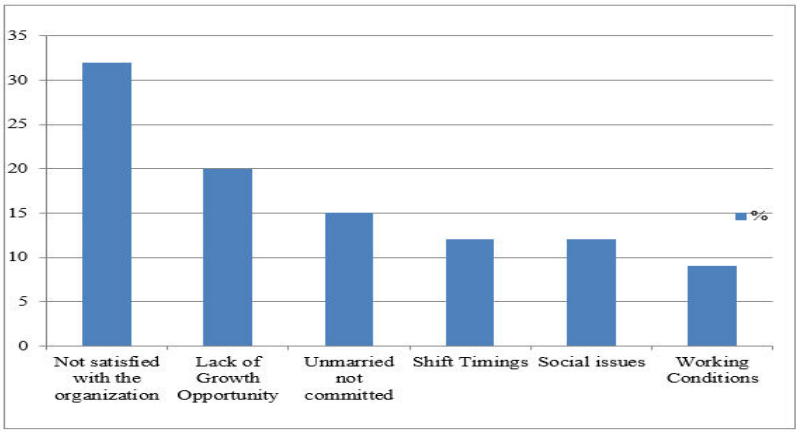
Clearly, it was very important to address the first three reasons that have contributed to higher attrition rate. To address these issues, the project team came up with two solutions: first to implement an induction program, second profiling of potential candidates for the organization. Induction program was essential in terms of setting right expectation for the new employees about the organization and its functions, and set career path for them. Next, while choosing candidates for the organization, the hiring team took into consideration candidate's previous experience, duration of the service in the earlier organizations, marital status, and future goal of the employee as explained by the employee during interview. These changes worked in favour of the organization. After making the changes, the organization tracked the attrition rate and reasons for attrition. The attrition rate of employees within the first three months of joining the organization improved in the next three months saving huge amount of money, time and effort from HR team. The six-sigma methodology being systematic approach helped organization address the issue and improve performance.

Graph-1: Bucketing Employee Data



Sources: Authors Compilation

Graph-2: Reasons for Employees to Leave the Organization within 3 months



Sources: Authors Compilation

CONCLUSION

Six-sigma and business intelligence have a common goal of improving performance, which is possible only by making informed decisions. Thus, the data analytics is an important step in this direction, which allows managers to understand the current situation and make decisions that support their vision. Six sigma being a systematic data analysis method identifies and tests reasons for non-performance, which can then be addressed to improve performance. It can be incorporated successfully in the data analytics stage of business intelligence to make the most informed decisions. It is also proven that Six Sigma business intelligence can be incorporated in any industry in order to deliver performance. The paper thus concludes the fact that six-sigma and business intelligence complement each other.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

A STUDY ON EMPLOYEE SATISFACTION WITH REGARD TO HRIS: SELECT MULTI NATIONAL COMPANIES

Shreya Dixit[12] Ramsai Prashanth K.[13]

ABSTRACT

A HRIS, which is also known as human resource information system, is a combination of human resources and information technology. This allows HR activities and processes to occur electronically. Information technology is expected to drive Human resource (HR) transition a normal Human Resource Management (HRM) to Strategic Human Resource Management (SHRM). This not only adds a good dimension to the human resource function, but also changes the Competencies that define HR professional. A Human Resource Information System offers Payroll, Benefits, Training, Recruiting, compliance Solutions and many more. Most are flexibly designed with integrated databases, array of features, and powerful reporting functions and analysis capabilities that are needed to manage the workforce. This present research is undertaken using a structured questionnaire administered to select multinational companies. The research paper helps to understand the need for HRIS in an organization and the way employees are motivated with the same. The components of HRIS based on which employees are satisfied need to be concentrated. The paper emphasis whether there is a significant relationship between HRIS and employee satisfaction.

KEYWORDS

HRIS, Strategic HRM, Payroll, Competencies etc.

INTRODUCTION

Human Resource Information System (HRIS): An information system or a managed service that provides a centralized view of the data that a Human Resource Management (HRM) or a Human Capital Management (HCM) group require for completing human resource processes. Such processes include Recruiting, Applicant-Tracking, Payroll time and attendance, Performance Appraisals, Benefits Administration, Employee Self Service and perhaps Accounting Functions. With neatly and orderly woven web data of employee, HR executives become proactive in their critical and creative thinking projects. Automation of data helps to hugely reduce the likelihood of entry errors and discrepancies in records. Overall, it is a revolution and HRIS cannot fail to improve the performance of the business operations, dovetailing different HR processes in which company can manage its employees. Hence, there is a dire need to study the implementation of HRIS in an organization. HRIS is a system that helps you to track all information about an employee. It is a database, more often a series of inter-related databases. A process utilizes for effective management of resource functions and all applications. As the technological changes occur, the functional ranges that can undertake in human resources increases. The use of HRIS can provide numerous benefits.

NEED OF STUDY

This research study helps to understand the need for HRIS in an organization and the way employees are motivated with the same. The components of HRIS based on which employees are satisfied need to be concentrated.

RESEARCH OBJECTIVES

- To study the various segments of HRIS implementation in select Multinational Companies.
- To investigate the significant relationship between HRIS and employee satisfaction.

REVIEW OF LITERATURE

Implementation of HRIS helps us to achieve three objectives:

- Cost reduction / efficiency gains,
- Client service improvements,
- Facilitating management and employees and improving strategic orientation.

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Over past two decades; there have been number of studies on human resource information system. Their study mainly focused on various types of applications that are predominate in HRIS (Broderick and Boudreau, 1992). In case of administrative purpose, HRIS is used for employee record keeping, payroll benefits etc., Automation, deletion of repetitive activities, streamlining of tasks helps to achieve the above three objectives. Use of HRIS in development and training, selection recruitment, HR planning was seen as "sophisticated" (Ball, 2001; Martinsons 1994).

Implementation of HRIS shifts HR activities to managers and employees through self-service technology. The studies that were carried out on various applications of HRIS are as follows: Ball, 2001; Cedar Crestone, 2006; De Alwis, 2010; Kinnie and Arthurs, 1996; Lin, 1997; Teo et al., 2001; Jafri, 2012.

A research study in Taiwan found that HRIS is most extensively utilized, followed by the MIS and DSS levels (Lin, 1997). The surveys that revealed the following facts:

- Kinnie and Arthurs (1996) in their survey revealed that the UK companies uses frequently applications of HRIS were in operational areas of pensions (57%) and employment contract administration (48%). employee records (72%) and payroll (66%).
- Another study found that employee record keeping (96.8%), payroll (90.5%) and benefits management (57.1%) were the most common HUMAN RESOURCE INFORMATION SYSTEM applications (Teo et al., 2001).
- Ngai & Wat (2006) found that Hong Kong companies used two major applications of HRIS that are providing general information (86.4 %) and payroll services (84.7%).
- Ngai and Wat (2006) also showed that corporate communication (20%) and recruitment (26.9%) and selection (19.1%) were least used HRIS applications.

RESEARCH METHODOLOGY

The study is based on primary data. For data collection, a structural questionnaire was prepared including variable factors like Application of HRIS in Performance appraisal, Training and Feedback. The sample who responded to the questionnaire were 56. The queries were assessed on Likert's 5-point scale ranging from Strongly Disagree (1) to Strongly Agree (5). Statistical tools like Regression analysis and Analysis of variance (ANOVA) were used to analyses the data collected. The research hypotheses have been formulated, keeping in view the objectives of the study, thus: (b) there is a significant relationship between employee satisfaction and HRIS set up in the organization.

RESULTS AND DISCUSSION

Table-1: Regression Summary of HRIS and Employee Satisfaction

Multiple R	0.821583
R Square	0.676366
Adjusted R Square	0.642964
Standard Error	0.396971
Observations	56

Sources: Authors Compilation

Table-2: Anova Results for Employee Satisfaction and HRIS Components

	d.f.	SS	MS	F
Regression	3	11.67376	3.891254	10.91367
Residual	52	18.54052	0.356549	
Total	55	30.21429		

Sources: Authors Compilation

Table-3: Regression Statistics
Coefficients and Test Results for Employee Satisfaction and HRIS Components

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.970955	0.0508075	1.911046	0.041518
Feedback	0.255712	0.09566	2.673148	0.010015
Performance Appraisal	0.061775	0.113534	0.54411	0.588692
Training	0.429927	0.13542	3.174755	0.00252

Sources: Authors Compilation

HRIS and Employee Satisfaction: Having derived the factors that can be considered with regard to HRIS from confirmatory factor analysis, their relationship to satisfaction of the employees is examined here using regression analysis. For the three factors that have been considered, indicating the factors, which influence the satisfaction of the employees with respect to the HRIS. The regression model used takes Employee Satisfaction as the dependent variable and the three factors of HRIS as independent variables viz., Feedback, Performance Appraisal and Training. The output is shown in Tables 1 to 3**.** The value of adjusted R square, given in Table-1 indicates that the predictor or independent variables (Factors of HRIS) which makes the model very explanatory predict 64.2 per cent of the variance in the dependent variable (Employee Satisfaction). When the goodness of fit of the regression model is tested with F statistic, the output given in Table 2 shows the value of F as 10.91 with a level of significance (1.14E-05 for the calculated F) being less than the critical level of significance of 0.05. Thus, we conclude that the regression model is a good fit.

The regression statistics (Table 3) indicate that the p-values are significant at 5 percent level and hence the intercept and the coefficients for feedback and training are interpretable. The p-values for the coefficients of performance appraisal are greater than 0.05 level of significance and hence are omitted.

The regression model is formulated as equation (1) below. Y= 0.97 + 0.26X1 + 0.42X2… (1) Where Y= Employee Satisfaction X1 = Feedback, X2 = Training. Thus, the employee motivation is mostly influenced by feedback and training data provided by HRIS. Hence, the research hypothesis that there is a significant relationship between HRIS and Employee Satisfaction is accepted.

CONCLUSION

Results indicate that Employees in India are satisfied with HRIS in the companies they work in. According to this study, the application of HRIS is in "Training" "Performance Appraisal" and "Feedback". This says that companies in India take "Sophisticated" application of HRIS for decision making related to employees and company. The use of HRIS in the "employee record" followed by "payroll" has been since the birth of HRM. Beginning in the 1960s, personnel management has been an early candidate for office automation in payroll, benefits administration and other processing applications such as record holding of the employee (Ball, 2001; Martinsons, 1994). It was the payroll that gave birth to HRIS (Ball, 2001). Further, these traditional applications of HRIS in HRM were first computerized due to legal obligations. Managers and Employees have perceived that factors of HRIS i.e.; "Training", "Performance Appraisal" and "Feedback" are applied in companies in India. We can conclude with this study that application of HRIS have broadened in India, Although the application of HRIS remains most popular in "employee record" and "Payroll" but there is the slow increase in other sophisticated factors.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

INCUBATING ENTERPRISES: A CASE STUDY OF T-HUB

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ABSTRACT

Incubators and Enterprises are very vital for the economic development. In the era of Make In India, ease for doing business, Startups etc., a study is made to broadly explain about the entrepreneurs, incubators, and the benefits from the incubators and to discuss about the recently set up innovative incubator viz., T-Hub in Hyderabad almost every B-school today houses an incubation center so that great ideas can be nurtured from their very source. As a part of the find out, sample of 50 students, who are currently in their final year of engineering and management courses have been enquired. Most of the students are from engineering colleges or management institutes, which are affiliated to JNTU-H and are NBA accredited. It is understood that these organizations do conduct programmes on entrepreneurship development for their students. Since this study is only an overview study, a small sample of 50 was targeted and the size of sample was reduced to 47 due to non-response from three persons.

For a study of this nature and purpose, the targeted sample of 50 members and final sample of 47 members is considered as sufficiently representative. The aspects on which the opinion of the sample was obtained include awareness of existence of T-Hub as an incubator within their geographical reach, observe or learn from news reports about the success of existing startups in T-Hub, views about the need of such incubators, and finally their aspiration to approach T-Hub and setup a startup therein or in any similar incubator. This research, by way of an enquiry to a designed sample, did find that T-Hub, the incubator studied as a sample, found that being a successful catalyst, T-Hub stood out as an true inspiring / influencing agency for the future entrepreneurs and resultantly will be beneficial to the aspiring entrepreneurs, technology, and the economy.

KEYWORDS

Incubators, Entrepreneurs, Startups, T-Hub etc.

INTRODUCTION

It is no denial that enterprises are the economic units of any economy, which helps the science, technology, commerce, and life of the people in the economy. Worldwide various economies have encouraged incubators for providing onward encouragement to the aspiring entrepreneurs to start enterprises for the holistic economic development. Thus, incubators and enterprises are very vital for the economic development.

The first business incubator, Batavia Industrial Center in a Batavia, New York, was started in US in 1959and as on today it is stated that there are more than 7,000 incubators worldwide, which is a huge growth. Many research studies have found that survival rate of incubated firms can be more than three times higher than non-incubated firms.

Considering the significance of the same, in the era of MAKE IN INDIA, EASE for Doing BUSINESS, START UPS ETC. a brief study is made to broadly explain about the entrepreneurs, incubators, and the benefits from the incubators and finally to discuss about the recently set up innovative incubator viz., T-Hub in Hyderabad.

ENTREPRENEURS

Entrepreneurs create jobs, disperse wealth and encourage regional development. Entrepreneurs are the basis of economic development, because they create new businesses and products separate from large corporations.

Entrepreneurs are essential to economic development. Since entrepreneurs are self-employed and create new businesses, they stimulate the local economy in many ways. Their new businesses create jobs that were not there before, which reduces the unemployment rate and puts more money into circulation. Producing new goods and services also helps stimulate the flow of money. These smaller businesses keep wealth distributed much well than larger corporations.

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Entrepreneurial efforts encourage local development, and the collective force of entrepreneurs has an impact on the overall economy for the country. Entrepreneurs also contribute to local and national happiness due to adding jobs and money to the economy. In addition, the act of starting something new has a significant impact on their own happiness and self-esteem. This positively affects economic development, since people who are happy are more likely to go out and spend money. Entrepreneurs also help improve living standards with locally sourced options that offer lower prices, help form a sense of community due to the localization of the product and encourage people to seek out new types of business and work on their own.

Need of Entrepreneurs

While the role and contribution of entrepreneurs and entrepreneurship cannot be overstated, the mention of the needs for an entrepreneur to turn one cannot be avoided. There are certain specific aspects in which entrepreneur may need significant support at least until he sustains in his pursuit and his venture takes off. The specific aspects include guidance to start a business venture, conducive office space to operate, networking, seed or angel funding, collaborations, administrative infrastructure and support, legal and secretarial assistance, etc. No single consultant or a mentor may be resourceful enough with all these specific aspects to provide the same to aspiring entrepreneurs. The only facility, which will be able to bring all the aspects together, is incubator.

INCUBATOR

An incubator is a facility, which creates an environment that assists and enables startups to grow from infancy. Meant for startups in their earlier stages, incubators may or may not operate on a set schedule. Startups are given a small seed investment, and access to a mentor network, in exchange for a small amount of equity. Incubators aim to assist new entrepreneurs with business start-up. The business incubator helps to fill a void, which is found in many areas. Not everyone has access to resources that can fund a new business effort until it becomes profitable.

Incubators vary in the way they deliver their services, in their organizational structure, and in the types of clients, they serve. Classical incubators are business incubators oriented towards giving support in starting the business through advice, lease of space, and the offer of the administrative infrastructure and other services. They may also have good connections to sources of funding, but they are seldom themselves business investors. Technological incubators support technologically oriented firms mostly as start-up and spin-off firms. They cooperate close with universities, research institutions, science, and technological parks.

Most common incubator services are: help with business basics, networking activities, marketing assistance, help with accounting and financial management, access to bank loans, loan funds and guarantee programs, access to angel investors or venture capital, help with presentation skills, links to higher education resources, links to strategic partners, help with comprehensive business training programs, advisory boards and mentors and technology commercialization assistance. Although most incubators offer their clients office space and shared administrative services, the heart of a true business incubation program are the services it provides to start-up companies.

Incubators do charge for the facilities and resources that they supply, but since nearly all are supported in some manner by government or regional grants, the charges are subsidized and lower than in the market place. An important issue in the functioning of business incubators in a region is the nature of their interaction with institutions of higher education. The support of start-up firms particularly high-technology firms.

SELECT POPULAR INCUBATORS

Almost every other prestigious B-school today houses an incubation center so that great ideas can be nurtured from their very source. Currently there are about 100 incubation centers supported by the ISBA, which is the apex Indian professional body supporting business incubators. Private incubators are a handful, but gradually growing. The number of sector specific and sector agnostic incubators is increasing every year which is a healthy sign but the actual quality and the strength of these incubators also need an evaluation to assess their real contribution.

The following are the Most Popular 10 Incubators in India:

Innovation and Entrepreneurship (SINE), IIT Mumbai

Established in 2004, SINE can incubate an average of 15 companies at a time and has an infrastructure spread over 10,000 sq. ft. Webaroo, Bhugol GIS and SMSGupshup.com, etc., came into existence because they were nurtured and incubated by SINE – the tech incubator housed at IIT Bombay. Think LABS Techno solutions, an educational robotics venture, Myzus Technologies and Elnfinitus are amongst some of the famous businesses that SINE has incubated. These startups have been successful in raising venture capital investment after incubation of up to Rs. 3 crore from the market.

Technology Business Incubator, IIT Delhi

Run by IIT, Delhi, this incubator accepts incubation applications from either IITD students, alumni or one of the members of the Academic staff only. The selection criteria is quite stringent. If external startups want to be a part of it, they can explore having tie-ups with the college professors, which can then enable others entry into TBI.

Technopark Technology Business Incubator (T-TBI), Kerala

Established in 2006 with the support of the Government of Kerala, T-TBI offers fully furnished working spaces spread over 15,000 sq. ft., expert opinions and guidance from the industry, marketing and legal management consultancy and financial assistance. T-TBI has until date successfully incubated about 60 companies and has had a 92 percent success rate. In early 2011, T-TBI was chosen as the world's best software incubating company and the first Indian organization to have achieved this status.

Startup Village

Startup Village is a different kind of incubator, which is a public private enterprise run by Government of Kerala. The Government has earmarked Rs. 100 crore for Startup Village and want to incubate over 1000 startups in 10 years. Interestingly, students/entrepreneurs are offered with various benefits to be part of this incubator including getting attendance at college, grace marks and even tax exemption for business generated by startups incubated within Startup Village premises.

Indian Angel Network (IAN)

IAN in an equity based business incubator center that gives priority to ventures in the areas of healthcare, gaming and animation cloud computing, retail, mobile VAS, media and entertainment, alternative energy, education and clean technology. It has been established with the support of the National Science & Technology Entrepreneurship Development Board and the Department of Science & Technology of the Government of India. In addition to the regular functions of a business incubator, the IAN incubator helps startups to get seed funding and pre angel funding through its tie-up with Small Industries Development Bank of India. The IAN also has strategic alliances with DST supported incubators, corporate, R&D labs and many industry associations. The IAN incubator is particularly famous for the activities it organizes – from its 'Open Saturdays' to angel investors meet to workshops for training entrepreneurs.

Technopark TBI

Technopark Technology Business Incubator (T-TBI) is the India is first Non-Academic Business Incubator, hosted and housed inside the Asia Largest IT Park. Technopark Technology Business Incubator (T-TBI), a joint association of Technopark, Trivandrum and the Department of Science and Technology (DST), Government of India, to help the technology business start-ups. TBI provides startups with fully furnished office spaces, mentoring support in developing business and technology plans, networking of business resources, seed capital assistance, marketing assistance, professional assistance, conference facilities and video conference facilities.

Centre for Innovation, Incubation and Entrepreneurship (CIIE), IIM Ahmedabad

A business incubator housed at India's prime business school simply cannot be left out of the list. Having started incubation initiatives since 2007, CIIE has an interesting perspective on why it does not provide physical space for business incubation. They want entrepreneurs to build their ideas from wherever they are stationed, so that the local economy benefits from its growth**.**

From the time it started, CIIE has incubated more than 50 companies, only a handful of which were owned by IIM students. CIIE has been incubating businesses in the areas of internet and mobile technology, clean technology, social sector startups and healthcare. From mentoring clinics to art exhibitions from global warming initiatives to social enterprise funds, CIIE has evolved as a prestigious business incubation centre in India. Some of the CIIE's incubatees are Colored.by, Biosense, Boond, Croak.it, Flick2Know, Ideophone, amongst a host of others.

NSRCEL, IIM Bangalore

NSRCEL is an incubation center run and managed by IIM, Bangalore. They offer various basic facilities to startups including an office space, desktops, Hi Speed Internet facility, Uninterrupted Power supply etc. The incubator provides mentoring from their eminent faculties and offers seed money support to some of the incubatee companies. The funding is primarily through government grants and its disbursement is in accordance with the guidelines that have been laid down by the primary funding agency. The screening committee does screening before startups can get into NSRCEL.

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

GSF Accelerator

GSF is a private accelerator rather than an incubator. However, many startups from their portfolio have been quite successful. Some of them have been acquired by likes of Facebook or then raised hefty Series a funding after being mentored at GSF and hence we are including them in the list. According to their website, GSF wants to push innovation and entrepreneurship in India through angel and seed investing. Their larger mission is to encourage flow of informed, knowledgeable mentorship capital to the start-ups in India and beyond.

AngelPrime

AngelPrime was launched recently in 2011 in Bengaluru by well-known names in the Indian tech industry like Bala Parathasarathy, Shripati Acharya and Sanjay Swamy. The areas that AngelPrime aims to incubate in are mobile payments, e-commerce and smartphone / tablet apps. It has already begun incubating a mobile payments company and a smartphone and tablet startup. Unlike the CIIE, AngelPrime believes in incubating their ventures at their office space so that they can be closely monitored. AngelPrime has an edge in its services because the founders bring their previous corporate networks and experiences into incubating new ventures.

Business incubators play a large role in reducing the gap between new products / services in stages of ideation to their commercial rollout. It also provides an equal platform to all entrepreneurs so that they can create products and services that will benefit all sections of the society.

T-Hub

T-Hub is the subject case study, which is a distinguished incubator from many angles. T-Hub is India's largest and the fastest-growing startup engine catalyzing Innovation, Scale and Deal Flow. It is set up in 2014 as a unique public/private partnership between the government of Telangana, three of India's premier academic institutes (IIIT-H, ISB and NALSAR) and key private sector leaders. It stands at the intersection of the startup, academic, corporate, research and government sectors.

Incubator in T-Hub

The first phase of T-Hub is housed in a 70,000 square foot building called Catalyst, making it the largest incubator in a single location in India entirely dedicated to entrepreneurship. The building will be used for co-working spaces, meetings, mentoring, networking sessions and conferences. T-Hub provides access to mentors, investors and academia under one roof. It supports and promotes technological innovations occurring in the Hyderabad startup ecosystem. Early stage startups with a minimum viable product (MVP) and with some traction in the market can apply.

The services that startups in Catalyst, T-Hub's incubator, receive include:

- Credits from different service providers (HR, legal, accounting, finance, cloud services), pitch and mentoring sessions etc. totaling up to 50000+ credits.
- Sector-specific programs, which help, accelerate game-changing products to the global markets, scaling their existing businesses. They not only provide startups with resources such as mentoring, financial advice, and domain expertise but also connect them to corporate partners.
- Capacity building workshops such as investor meets, corporate connect sessions, mentorship workshops.

T-Hub is not just an incubator, which supports startups through their journey; it is a startup, which is creating a startup ecosystem in Hyderabad to make the city the startup capital of India.

The role of the government here is simple - it is only a facilitator. The broad framework and policies have been created, and the government allotted capital expenditure of Rs. 40 crore. T-Hub is run by professionals with zero government intervention, and has to become financially sustainable on its own. No handholding by the government. If it fails, it fails. If the startups in the incubator cannot scale up, they will be weeded out.

T-Hub has chosen 6 key sectors from which they would incubate startups, and all of them were chosen based on the strengths of Hyderabad as a city. Health technology, agricultural technology, financial technology, transport and logistics, sustainability and social sector are their key areas. Today, T-Hub supports 200 startups in the co-working space and guide 5 incubatees in which they have a stake. T-Hub has achieved break-even point in the first year itself. T-Hub has multiple revenue streams: rental income from workspace, events and workshops they conduct in the building and divesting stake in companies that they invest in at a later stage. However, their main job is to create a startup ecosystem.

DO INCUBATORS INFLUENCE ENTREPRENEURISM?

There is no denial or lack of evidence to prove that incubators are fostering startups and therefore incubators have become a necessary system to enable new enterprises take birth and succeed for the larger benefit of the economy. However, to add research value to this study, an attempt is made to find out if the very existence of a successful incubator within close vicinity or within regional news-reach influences or inspires youth to tread entrepreneur path.

As a part of the find out, as a sample, about 47 students who are currently in their final year of engineering and management courses have been enquired. Most of the students are from engineering colleges or management institutes, which are affiliated to JNTU-H and are NBA accredited. It is understood that these organizations do conduct programmes on entrepreneurship development for their students. Therefore, the nature of the sample is considered apt. Since this study is only an overview study, a small sample of 50 was targeted and the size of sample was reduced to 47 due to non-response from 3 persons. For a study of this nature and purpose, the targeted sample of 50 members and final sample of 47 members is considered as sufficiently representative. The aspects on which the opinion of the sample was obtained include awareness of existence of T-Hub as an incubator within their geographical reach, observe or learn from news reports about the success of existing startups in T-Hub, views about the need of such incubators, and finally their aspiration to approach T-Hub and setup a startup therein or in any similar incubator.

Outcome of the Enquiry

Of the sample 47 students who were attempted for discussion / enquiry, all of them have participated in the enquiry process and have responded with interest and patiently.

The outcome of the views of the sample is as follows:

Table-1

S. No.	Question / Aspect / Particulars	Number of Persons		
		Enquired	Responded Positively	Responded Negatively
1	Are you aware of incubator concept?	**47**	**46**	**01**
2	Did you know about incubation as a part of Entrepreneurship Development Programme in your institution, etc.	47	29	18
3	Did you know about incubation concept from news items or from discussions?	47	46	01
4	Have you heard about T-Hub?	47	46	01
5	Do you think T-Hub's establishment is required and justified?	47	46	01
6	Are you aware that T-Hub is mostly dominated by IT and related enterprises?	47	17	30
7	Do you find it relatively more interesting to read news about T-Hub in the newspapers whenever they are being published?	47	42	05
8	Do you know the names of some companies / startups operating in T-Hub?	47	09	36
9	Do you know that T-Hub is a public and private partnership and that it has good number and qualitative collaborations?	47	41	06
10	Did you feel inspired / influenced or encouraged to tread entrepreneur path after knowing about T-Hub?	47	46	01

Sources: Authors Compilation

The enquiry / discussion with the sample of students revealed very interesting and corroborating information. Not to surprise that all the students of the sample are aware of T-Hub, most of them are observing or reading news on T-Hub whenever any news item is published in newspapers on T-Hub, and most of them are inspired / influenced by the existence of T-Hub and intend to start an enterprise. Of course, it was a surprise that a majority of them is not aware that as of now, T-Hub is occupied mostly by IT, related firms, and the eco system around and within T-Hub is dominated by IT and related business propositions only.

In addition to the above, most important outcome of this research survey is the influencing factor of T-Hub. In the discussions it was noted that while all the persons interviewed have not confirmed that they would approach T-Hub or for that matter any incubator, it was quite clear that they are able to get influenced towards entrepreneurship and are also evaluating their financial and other resources for trading entrepreneur path, and appear to have been drawing comfort from the fact that a successful

incubator viz., T-Hub is within their reach and they can approach it in case of any need. This establishes that the very existence of T-Hub is itself contributing to the entrepreneurship factor in a big way for a larger benefit of the economy and the entrepreneurs. Ideally, it is such a kind of confidence and support which is very critically required for aspiring entrepreneurs to start their own enterprises

CONCLUSION

Incubators create value by combining the entrepreneurial drive of a startup with resources made available for them. Incubators also help in creating employment opportunities in the local economy and will help ideation, implementation, and commercialization of technologies. The study found that there are several incubators, which have been quite successful in India in promoting startups. This research, by way of an enquiry to a designed sample, did find that T-Hub, the incubator studied as a sample, found that being a successful catalyst, T-Hub stood out as an true inspiring / influencing agency for the future entrepreneurs and resultantly will be beneficial to the aspiring entrepreneurs, technology, and the economy. No wonder, the response and the justified need prompted the proactive government to allocate about Rs. 200 crores for T-Hub 2 for supporting more number of aspiring entrepreneurs.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

TRENDS AND PATTERNS OF FOREIGN DIRECT INVESTMENT IN INDIA: A MACRO LEVEL ANALYSIS

Dr. Honnappa S.[15]

ABSTRACT

Foreign Direct Investment (FDI) plays a very important role in the development of the nation. It is very much vital in the case of underdeveloped and developing countries. Foreign Direct Investment (FDI) has assumed a lot of significance for the emerging economies. India has also learnt a lesson from the experienced of the other Asian economies. During the last decade, there has been a remarkable change in the composition of sources of FDI inflows in India. Due change in FDI regime, many countries have started investing heavily in India. It serves as a link between investment and saving. Many developing countries like India are facing the deficit of savings and capital formation. This problem can be solved with the help of Foreign Direct Investment. It plays an important role in the long-term development of a country not only as a source of capital but also for enhancing competitiveness of the domestic economy through transfer of technology, strengthening infrastructure, raising productivity and generating new employment opportunities. India needs a massive investment to achieve the goals of vision 20-20.

This paper is a general analysis of the trends and patterns (state-wise, sector–wise, country-wise) distribution of FDI Inflows the post liberalization era. The purpose of this paper is to provide an examination of foreign direct investment in various sectors and government policy regarding foreign investment and this paper also tries to investigates the changing scenario and also analyses the inflows of FDI in India, country wise, sector wise and state wise inflow of foreign direct investment in India.

INTRODUCTION

FDI is now regarded as an important driver of growth. Literature on economic growth showed that there are a number of channels through which FDI permanently affects economic growth. FDI will contribute to the process of determining India's position of the next superpower in the east. There is clearly an intense global competition for FDI. India emerged as the most attractive destination for FDI. The same is reflected through the Review of various studies available on FDI. D.N1 (2001) has discussed the factors that account for China's high productivity and competitiveness in the world market. He concluded that factors included the land market, export production, educated labour force, and the higher identification of labourers in a large number of enterprises.Nagaraj2(2000) has studied the growth of India's economy since the reforms began in 1991. His study reveals that in India, there has been a reduction in poverty levels, but there has not been a reduction in unemployment levels, income distribution has changed, and political power has drifted from the center to the states. FDI flows will remain disappointing through 2011 according to the 2010, A.T. Kearney, Foreign Direct Investment Confidence Index4. China remains the top-ranked destination by foreign investors, a title it has held since, 2002. The United States retakes second place from India, which had surpassed it in 2005.India, Brazil and Germany complete the top five favored investment destinations. It is evident from the increased size of FDI flow from Rs 23,295 crores in 2000-2001 to Rs. 6,30,336 crores in 2010-20115. Hence, it is attempted to analyze the trends and pattern of FDI flows into India. The present study is analyses Trends and patterns of foreign direct investment in India in a Macro Level.

METHODOLOGICAL APPROACH OF STUDY

The present study is based on the secondary data. The secondary data pertaining to CSR funding has been collected from the annual reports of the Reserve Bank of India and reputed journals.

Objectives of Study

The present study aims at examining the Trends and patterns of foreign direct investment in India - A Macro Level Analysis. For this purpose, following objectives have been outlined:

- To examines the Trends and patterns of foreign direct investment in India.

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TRENDS PATTERN OF FDI FLOWS IN INDIA

In India, the private foreign capital has allowed in two main forms i.e., the foreign direct investment and portfolio investment. The improvement in FDI flows since 2000's has reflected through initiatives taken to create an enabling environment for FDI and inclusion of technologies and management practices in India. India attracted FDI equity inflows of US$ 2,014 million in December2010. The cumulative amount of FDI equity inflows from April 2000 to December 2010 stood at US$ 186.79 billion, according to the data released by the Department of Industrial Policy and Promotion.

Today the transnational corporations and other investors are more attracted to deploy their tangible and intangible assets in the developing countries with a view to increase their competitiveness and profitability, and the developing countries consider the increased FDI inflow as necessary for strengthening their resource base, technological capability, access to external capability, access to external markets and thus, improve the overall economic performance. India is one of the developing countries, which have introduced liberalization policy from July 1991 and as its past relaxed the FDI regulatory framework on a selective basis. Such a positive and 'open-door' policy of India toward foreign investment.

Table-1: India's Foreign Direct Investment Inflows as Percentage of GDP. (Rs. In Crores)

Year	Amount of FDI Inflows	YOY Growth	% of GDP
2000	01 12645 0.60		2000
2001	02 19361 53.11 0.85		2001
2002	03 14848	23.31 0.60	2002
2003	04 11945	19.55 0.43	2003
2004	05 17138 43.47 0.54		2004
2005	06 24584 43.45 0.69		2005
2006	07 70630 187.30 1.37		2006
2007	08 98642 39.66 2.09		2007
2008	09 123025 24.72 2.31		2008
2009	10 123378 0.29 1.98		2009
2010	11 (up to Dec.) 73177	40.69	2010
CGR 28.08			CGR 28.08
CV 1.32	—		CV 1.32

Sources: Southern Economist, December 15, 2010

The above table-1 explains the trends pattern of FDI flows in India. It may be observed from the table that the maximum growth rate recorded in the year 2006-07 with 186.96 percent growth over the previous year amounting Rs. 70,630 crore. Several factors appear to have contributed to this phenomenon including 100 percent FDI allowed in many industrial sectors and an automatic approval was accorded. As a result, the highest growth rate of FDI inflow was registered during the year 2006-07 in India. This is the most favored year in respect of FDI inflow. It is observed from the table that though there is a fluctuation in the FDI trends the percentage of FDI in GDP has been tremendously increasing over a period of decade i.e., 2000-01 to 2009-10 the reason behind it that only the indigenous market was opened to the world. It is also found that during the periods i.e., 2002-03 and 2003-04 negative growth rate in FDI was observed representing -23.31 and -19.55 per cent respectively.

TREND LINE FOR FOREIGN DIRECT INVESTMENT

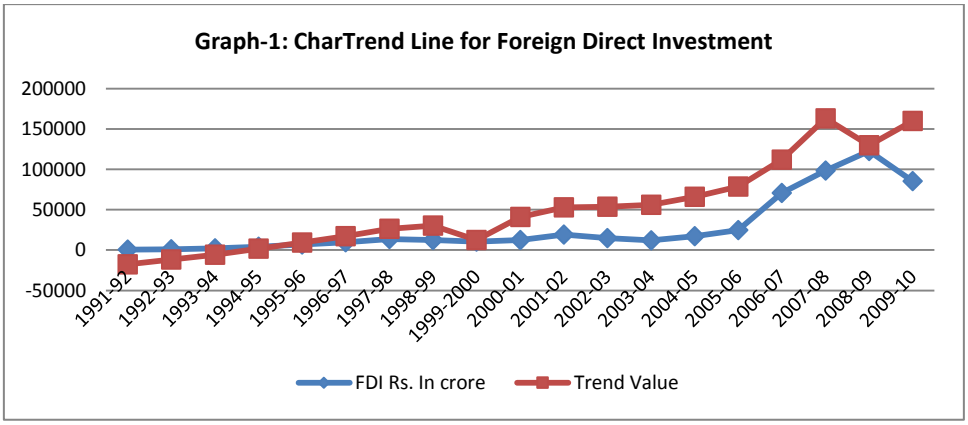
The resurgence in investment flows and technology transfer through FDI to the developing world indicate that developing countries today receive twice as much as the value of world. FDI flows was in mid-eighties. This was possible due to the liberalization of FDI policy by the host countries. Today the transnational corporations and other investors are more attracted to deploy their tangible and intangible assets in the developing countries with a view to increase their competitiveness and profitability, and the developing countries consider the increased FDI inflow as necessary for strengthening their resource base, technological capability, access to external capability, access to external markets and thus, improve the overall economic performance.

Table-2: Trend Line for Foreign Direct Investment

Year Actual Value	FDI Rs. In crore	Trend Value
1991-92	408	-18075.67
1992-93	1094	-12915.88
1993-94	2018	-7756.09
1994-95	4312	-2596.3

1995-96	6916	2563.49
1996-97	9654	7723.28
1997-98	13548	12883.07
1998-99	12343	18042.86
1999-2000	10311	2302.65
2000-01	12645	28362.44
2001-02	19361	33522.23
2002-03	14932	38682.02
2003-04	12117	43841.81
2004-05	17138	49001.6
2005-06	24623	54161.39
2006-07	70630	41321.6
2007-08	98644	64480.97
2008-09	122919	6940.76
2009-10	85273	74800.55

Sources: RBI Bulletin, 2010



Sources: Authors Compilation

In order to understand Trend of FDI, can be calculated from the Least Squared Method, the actual value of FDI inflows and Trend value of FDI inflows are furnished in the above table-2 and graph-1.

SUMMARY AND CONCLUSION

Foreign Direct Investment (FDI) has assumed a lot of significance for the emerging economies. India has also learnt a lesson from the experienced of the other Asian economies. During the last decade, there has been a remarkable change in the composition of sources of FDI inflows in India. Due change in FDI regime, many countries have started investing heavily in India. This paper investigates the changing scenario and analyses the inflows of FDI in India.

It emerges from the foregone analysis that overall inflow of foreign direct investment in India witnessed increasing trends during the study period. The key sectors attracting FDI to the Mumbai-Maharashtra region are energy, transportation services, telecommunications and electrical equipment. Delhi attracts FDI inflows in sectors like telecommunications, transportation, electrical equipment and services. The states of Uttar Pradesh and Haryana have also performed really well in recent years due to its abundance of natural resources; Uttar Pradesh attracts FDI in chemical, pharmaceuticals and minerals whereas Haryana attracts FDI in the electrical equipment, transportation and food processing sectors. Tamil Nadu has done well in sectors related to automotive and auto components. Still there are certain areas, which are untouched by the government, as well as companies, which needs immediate attention in these issues. This study helps for further research in this issue.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN THE SUPPLY CHAIN OF HYPER MARKETS IN BOTSWANA

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ABSTRACT

The paper analyses the use of Information and Communication Technology (ICT) utilization in supply chain integration piloted in real life business network consisting of three hypermarkets operating in the food sector business in Botswana. The study presents how ICT has been integrated in order to sustain an effective and efficient food industry. The information visibility of the new ICT system indicates a great potential for a more performing supply chain network, thus enhancing productivity level of the local economy. The paper also acknowledges several challenges faced by the three companies in implementing information and communication technology.

KEYWORDS

Information, Communication Technologies, Supply Chain, Integration, Hyper Markets/Stores etc.

INTRODUCTION

Supply chain is of great significance in modern economies. Its objective is to get the right materials, at the right place and at the right time by reducing total operating costs and working within budget constraints (Gianpaolo, 2004). This concept is faced by almost every profit making supply chain organization in the world. Since the fast growing competitive markets, make it vital to manage supply chain systems more and more efficiently. In this regard, the research study is based on three Gaborone based hyper markets (Choppies, Super Spar and Pick N' Pay), aims to understand the state of the technology adopted by these companies, in order to simultaneously reduce operational costs and improve service delivery in supply chain systems. The choice of integrating information and communication technology in a firm's daily operations must appreciate the cost associated with the technology itself, but that should not outweigh the need for these firms to properly plan their entire supply chain systems. Realizing the benefits of information and communication technology may enable the firms to have consistent and readily available latest information to help and satisfy the customers.

STATEMENT OF PROBLEM

The exchange or handling of goods and information is central in the process of supply chain management. As such, failure to use modern information and communication technology in supply chain management can attribute to inefficiency in supply chains. Reducing or even closing this gap has always been the part of improvement in the supply chain itself. As such contemporary supply chains demand detailed and latest information about the interrelated fundamental business processes that provide products and services customers and other stakeholders. This is a consequence of increasing the need for transparency: what? When? Where? Which condition? (Gerhausor, Hupp, Efstratiou, & Heppner, 2009). The real power of information and communication technology becomes increasingly evident as ordinary processes, augmented with computing, communications, sensing and interaction are increasingly integrated into everyday activities and environment (Gerhauser, Pflaum, Schmidt, & Wichert, 2008).

OBJECTIVES OF STUDY

- To identify current information and communication technologies supporting supply chain organizations.
- To investigate the fundamental factors that are used to measure efficiency of information and communication technology in supply chain management.
- To establish the use of information and communication technology in supply chain towards organizational benefits.

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SCOPE OF STUDY

The study examines the impact of information and communication technology utilization in the supply chain of three hypermarkets situated in Gaborone, primarily in the food sector business. These enterprises comprise of Choppies, Super Spar and Pick-n-Pay hypermarkets. Although various food sector stores are available, the above were chosen based on their close relationship in size and volume of operations.

LITERATURE REVIEW

Studies indicate that the customer is the principle of today's businesses and as such, a supply chain considers a series of value-adding activities that leads to satisfied customers (Robert, 2010). The end consumers at the retail level of business are only the starting point of this value adding chain. More to this retail stores, there exist a series of manufacturers and distributors, transportation and logistics businesses, warehouses and freight forwarders, all parties trying to avail the right goods and services to consumers, at the right time, place, price, quantity and quality-the main objective of supply chains. In these settings, business-oriented systems such as enterprise resource planning (ERP) systems, executive information systems and decision support systems, are of essence in achieving cost efficiencies and organizational effectiveness through intra-organizational process integration (Kumar, 2000).

Other technological extensions include bar codes, Electronic Data Interchange (EDI), Radio frequency Identification system (RFID), E-mail and Global positioning system (GPS). Supply chain management technologies greatly help in reduce the time spent in shipping, receiving, tracking and compiling order data, which will save both money and time. Radio Frequency Identification is a piece of technology used in products for tracking the inventory easily. RFID's improve the efficiency of supply chain by detecting the order anomalies and enables employees to correct the mistakes immediately and business owners have the maximum control over their products. RFID is the megatrend in logistics.

The speed of the information delivered by RFID is 10 times greater than bar codes. The availability of these systems makes it possible to obtain a clear view of the whole chain hence making it easier to manage and restructure it effectively to meet customer demands. Supply chain management is dynamic and demand driven (Kumar, 2000). Therefore, information and communication technology is needed to facilitate speed in response to unpredictable market changes in supply chain.

Long gone are the days of uncertain forecasting, which signaled false demands of goods and services throughout the supply chain (bullwhip effect), thanks to the ICT utilization in the modern industries. The common factors of all these concepts are that they are more or less focused on producing more value to the customer ,and that they aim at dynamic designs that can be continuously developed and adjusted to changes ,and responding to changes fast (Bovet, 2000). In other words, information sharing and transparency aided by the use of information and communication technology yields faster response to customer needs which builds trust and loyalty. If there are any delays or problems within the chain, such can be detected earlier and the situation ratified quicker hence shorter lead times.

As already indicated by some of the authors, information and communication technology (ICT) plays an important role in transforming customer oriented processes, not only in large but also in small-medium enterprises. In that regard, it is evident that team players in supply chain are well aware of it and its economic benefits. Lack of funding is the reason why some of these supply chain businesses have no or limited technology systems in place (Kushwaha, 2011). This means their ability to exploit information and communication technology available is reduced but otherwise most supply chain firms would be putting it to maximum use. The author insists that to counter the implementation challenges of information and communication technology, supply chain firms should establish appropriate ICT goals through identifying critical ICT needs and allocating financial resources for the same and working in partnership with 3PLs will also help keep these costs down With all these in place, information and communication technology adoption by the companies would be possible.

Supply chain firms need not rely on enterprise resource planning (ERP) only for managing their operation (Koh, S. L., and Sad, S. M., 2006). This is due to its rigid system design and incapability to deal with uncertainty (Koh, A. S., 2004). As such, other technologies such as Radio Frequency Identification, inventory and network optimization tools, sensors and automatic identification, cloud computing and storage, robotics and automation, predictive analysis, wearable and mobile technology, 3D printing, driverless vehicles and drones, wireless technology and electronic data interchange can be used to help improve order, part and product traceability in supply chain (Koh, A. S. 2006). The author recommends these technologies as they have been widely used to transfer information between suppliers and customers in supply chain, the reason being that they are not extremely expensive, so developing firms might as well adopt them to withstand the pressures of today's ever changing.

Tools measuring change and improvement of organizational operations need to be established to promote efficiency. The balance scorecard and the SCOR models have been widely used in measuring the supply chain performance. In this sense, the SCOR model offers a distinctive framework that links business processes and management technologies in an integrated structure to

support communication between partners in the supply chain, improve the effectiveness of management, and supply chain improvement activities (Diaz, 2009).

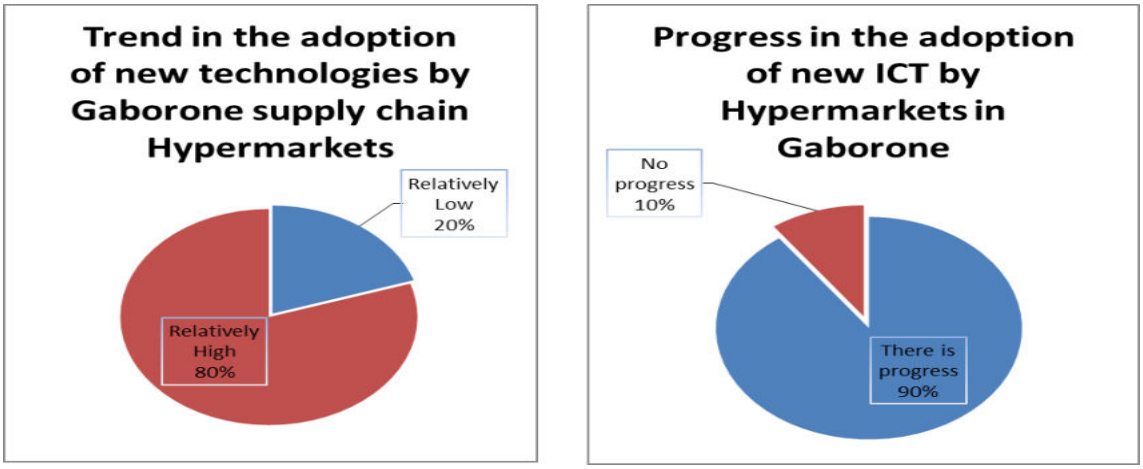
METHODOLOGY

The study is based on survey method by using of a questionnaire. The survey questionnaire was developed in collaboration with the three hypermarkets ensure the questionnaire was suitable for them i.e. testing the questionnaire for comprehension and appropriate language. Both primary and secondary sources of data were used in this research to reach a conclusion on the importance of such technologies on supply chain in organizations.

Primary data was collected for the study from 40 respondents. 50% were from Choppies hypermarkets, 25% were from Pick N Pay and the remaining 25% from Super Spar. The majority of the respondents were females at 52.5%, centered on the age of 30-34. According to Agnrud (2015), the Director of Communications in the Swedish Association of Communication Professionals, this may be because men do not often want to be involved in professional associations or respond to surveys in the way that women do, so the actual figure could be smaller. This could be the reason why majority of the respondents were females from the three hypermarkets understudy.

TRENDS IN USE OF TECHNOLOGY

Figure-1: Trends and Progression in the Adoption of New ICT Technologies in Hypermarkets



Sources: Authors Compilation

The figure-1 shows the trend and how the adoption of the new technologies in the local supply chain service market appears to be in the recent years. Eighty percent (80%) of the respondents highlighted that the adoption of the new technologies in the local supply chain service market is relatively high while only twenty percent (20%) showed otherwise. This is complemented by the ninety percent (90%) mark of the significant adoption of these technologies by the three hypermarkets in Gaborone to enhance their daily operations. Perceived benefits are considered as one of the factors that could affect ICT adoption in these firms (Noor, 2009).

ICT METHODS CURRENTLY USED BY HYPERMARKETS (CHOPPIES, SUPER SPAR AND PICK N PAY)

The survey revealed that a low level of usage of Global Positioning System (GPS), Enterprise Resource planning and Radio Frequency Identification (RFID) among all the three companies. This may be because of the expensive integration of the enterprise resource planning system. However, Electronic Data Interchange (EDI) is moderately used by the hypermarkets as informed by 38 respondents (95%) and all companies use telephone, fax, and barcodes and email largely. Though the adoption of RFID, ERP and GPS technologies is low in all the studied firms, the respondents confirmed that supply chain stores in their operations are slowly integrating them.

MOTIVATION OF INVESTING IN NEW TECHNOLOGY

It was reported that entrepreneurial culture and economic and business matters have a significant influence in the adoption of the new information and communication technology (ICT).55% of the respondents from Pick N Pay and Super Spar each pointed out

that economic and business matters motivate their investment decisions towards ICT, while Choppies was only represented by 45% in that matter. The other 50% motivation of ICT investment to the former firms (Pick N Pay and Super Spar) is due to entrepreneurial culture. The reason behind these figures may be that all motivators are aimed at cutting down costs to be competitive hence all receiving significant recognition and eventually influencing the adoption ICT in daily operations.

IMPORTANCE OF ICT OPPORTUNITY ROLES IN HYPERMARKETS

As per the experience of hypermarkets, the important opportunity role associated with ICT usage is attributed to the following three very important elements:

- Competitive advantage,
- Cost efficiency, and
- Information transparency.

The respondents reported that the most important opportunity role associated with ICT usage is **competitive advantage**, which is rated as very important**,** followed by **cost efficiency** rated as quite important and lastly **information transparency** as important. ICT capabilities can assure the rapid customization of products and maintain competitive lead-times hence its bases is on creating value for customers as many value added activities are directly or indirectly dependent on ICT applications (Evangelista, 2006). Having a competitive edge means providing value at a lower cost and fast pace, as such, the effective use of ICT provides the potential to consecutively reduce costs and improve information transparency, yielding a better customer service to the companies.

EFFECTIVENESS OF CURRENT METHODS OF ICT USED BY THE THREE HYPERMARKETS

The process and the use of ICT methods is left to the consideration of hypermarkets while being cautioned by Competition, cost efficiency, image of the organisation and customer aspirations to name a few. The following factors are discussed and put before the respondents to get the feel of effectiveness of new methods of ICT in hypermarkets:

- Focus on customer service delivery,
- Elimination / error reduction,
- Improvement of quality system,
- Improvement of customer integration.

These results suggest that Choppies, Super Spar and Pick N Pay are enjoying significant benefits of providing improved customer services through ICT, which is reflected by 87.5%. 75% of the respondents felt that there has been a significant elimination of errors since the new technology is adopted. Other areas where significant differences exist are: improvement of quality system at 50% and improvement of customer integration with 40%.This clearly shows that companies should not underestimate the potential value of ICT in improving trade through cutting lead times and enhancing customization of products and services they provide.

IMPORTANCE OF PERFORMANCE MEASUREMENT IN SUPPLY CHAIN

Effective performance measurement of ICT helps a great deal in reducing costs and improving customer service, which is the objective of almost every profit making business. Based on the entire sample, 95% performance is attributed for identifying bottlenecks, wastage, problems and improvement opportunities, followed by 85% performance is attributed for tracking progress, 58% performance is for identifying customer needs and then 43% performance is for facilitating a better understanding of the processes and a more open and transparent communication in the organisation. This suggests that technology measurement is now well reasonably established within the three hypermarkets under study.

Table-1: Measurement of the Efficiency of New Technologies Adopted

Method	Frequency	Percentage	Valid Percentage	Cumulative Percentage
SCOR-Method	1	2.5	2.5	2.5
Balanced scorecard	39	97.5	97.5	100.0
Total	40	100.0	100.0	

Sources: Authors Compilation

From the table above, it is evident that 98% of the respondents use the balance scorecard method in measuring the efficiency of the new technologies in the hypermarkets. Only one respondent chose the SCOR-method, which may have been a mistake due to misunderstanding the question. The balance scorecard method tries to balance or align the company's operations to the

organizational strategy in place and all the three hypermarkets use balance scorecard method in measuring how efficient their adopted information and communication technology.

FACTORS INHIBITING THE ADOPTION OF ICT BY THREE HYPERMARKETS

Various factors inhibit the adoption of ICT by the three hypermarkets. The most salient factors are; high investment and implementation costs, lack of technological skills, difficulties in customer SCM system integration, unclear return on investment, high running costs and updating personnel skills, etc. It was reported that there are no significant differences between these three firms. The most important reasons for non- investment in ICT are related to financial factors. The amount of investment and the implementation costs will have 85% importance, followed by lack of technological skills with 75%. These are most inhibiting factors towards Further, 68% importance was given difficulties in customer SCM system integration. Other factors such as the need to update personnel skills of employees relate to human resource do not represent any problems and unclear return on investment and high running costs do not have a significant negative influence in adopting ICT.

MEASURES NEEDED FOR INTEGRATING ICT IN SUPPLY CHAIN

From the reports of the three hypermarkets, there are some important factors that play a role in the integration of ICT in supply chain; financial support, educated and skilled staff, access to vocational education, improved information sharing, better infrastructure, closer cooperation between stakeholders, etc.

It is reported that all the three hypermarkets significantly need more funding and financial support with 90% importance, followed by more educated and skilled staff with 100% importance. Better infrastructure e.g. telecommunications and roads, emerges to be the next important factor that support the three firms' effort in integrating ICT in supply chain and finally the improved information sharing are key for the successful supply chain management.

THE DISCUSSION IN RELATION TO THE OBJECTIVES AND OUTCOME OF THE STUDY

The knowledge of and attitudes towards new and improved information and communication technologies in supply chain organizations

The eighty percent of the respondents emphasized that the adoption of the new technologies in the local supply chain service market is relatively high. They have basic knowledge about the new adopted information and communication technology in their respective hypermarkets. This may be due to positive attitudes they hold in being open to learning new things due to the perceived benefits ICT may yield (Noor, 2009). The twenty percent reveal that not all employees are keen about knowing the benefits of using ICT. Lack of technological skills to operate such technologies may be attributed to their negative attitudes towards the adoption of these technologies.

Current information and communication technologies supporting supply chain organizations

Within the three hypermarkets, there is a low usage of Global Positioning System (GPS), Electronic data interchange and Radio Frequency Identification (RFID). However, enterprise resource planning is to some extent used by the hypermarkets as highlighted by most respondents. Reasons of slow adoption of some of these technologies may be attributed to high costs in integrating them in their operations. All companies use telephone, fax, barcodes and email largely. This is because they are cheaper to acquire and facilitate the day-to-day communication services to deliver satisfactory goods and services to the customers.

Benefits in utilizing information and communication technology

The results suggest that Choppies, Super Spar and Pick N Pay are enjoying significant benefits of providing improved customer services through ICT, which is reflected by the 87.5% of the respondents in the study. 75% of the respondents felt that that there has been a significant elimination of errors since adopting the new technologies. Other areas where significant differences exist since the adoption of ICT are improvement of quality system at 50% and improvement of customer integration with 40%. This clearly shows that companies should not underestimate the potential value of ICT in improving trade and enhancing customization of products and services they provide.

Important factors that are used to measure efficiency of information and communication technology in supply chain management.

Effective performance measurement of ICT helps a great deal in reducing costs and improving customer service, which is the basic objective of all profit making businesses. Based on the entire sample, it surfaces that the measurement of the new adopted

technologies has greatly helped in identifying bottlenecks, waste, problems and improvement opportunities by 95%, followed by tracking progress at 85%, Knowing how effective the technology is helps identify customer needs by 58% and facilitates a better understanding of the processes and a more open and transparent communication by 43%. The 98% response of using a balanced scorecard model proves that technology measurement is now well reasonably established within the three studied hypermarkets. The balance scorecard method tries to balance or align the company's operations to the organizational strategy in place**.** Only one respondent chose the SCOR-method, which may have been a mistake due to misunderstanding the question.

The use of information and communication technology in supply chain towards organizational benefits

There is an increasing role of ICT that attributes to the development of competitive position of the three hypermarkets. Although these companies may not be considered leaders in the adoption of this technological innovation, over the last few years, but these companies have made significant progress in the adoption of new technologies. However, today food sector businesses are able to provide efficient services to customers. The adoption of new ICT has opened up opportunities to play an important role by supply chain, contributing to competitive advantage, information transparency and cost efficiency.

CONCLUSION AND RECOMMENDATIONS

Taking into account the importance and value of information and communication technologies in supply chain management, it is possible to have an improved customer service, cost reduction, an efficient information sharing and transparent chain. It was evident that information and communication technology contributed substantially for the success of the three organizations. The majority of respondents who showed that information supports this and communication technology is of great value to their organizations.

It was also found that information and communication technology has the potential to create effective procedures and systems within the workplace. Information and communication technology can be effectively implemented in Botswana if Information and technology managers and their employees will realize the usefulness of ICT and adopt effective procedures and techniques of information and communication technology. This can also help in creating an overall effective working process in the organizations.

The study reveals that use of exceptional and sophisticated information and communication technologies is not taking place in the three hypermarkets because they are expensive to implement and maintain. Surprisingly, the adoption trend of these technologies shows a significant increase in each of the three companies. Given the value adding nature of these technologies, the positive trend is likely to continue as positive as it is. The factors inhibiting ICT adoption do not significantly vary between the three hypermarkets but the most important inhibiting factor is primarily financial. Further, Human resource implications and ICT skills also have an important role in inhibiting ICT investment. These factors act interdependently as financial constraints usually attribute to less training hence low technological skills in these companies. As the trend of ICT adoption is increasing, its effective adoption has the potential to significantly enhance the competitive capabilities in the local hypermarkets.

It is suggested that more investment should be made towards advanced ICT systems such as Enterprise Resource Planning, which integrates all other systems to support the daily operations of supply chains efficiently. This may greatly leverage the 'hypermarkets' information system assets to market demands.

Education and training should be offered more to users of the ICT in the companies. After all, it is the most essential component for any improvement in the company. For the successful adoption of the new technologies to yield good results, the organisations need the requisite skilled human resource, as technologies alone cannot help to improve the organizational competitiveness.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

THE ROLE OF ENTREPRENEUR IN ECONOMIC DEVELOPMENT: A MACRO LEVEL PERSPECTIVE

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ABSTRACT

Development of the economy in any form is an outcome of human activity. The economic development of a country much depends on the rate of industrialization. Industrialization and entrepreneurship are directly related. It is the entrepreneurship, which link the sociocultural milieu with rate of economic and industrial development. Unless the skills and resources provided by the nature are not fully transformed into efficient production units, the man's labour will remain largely unproductive and keeps his level of consumption low. These considerations focus the attention on the importance of entrepreneurship in the development of any nation. Entrepreneurship and small business are related but not synonymous concepts. On the one hand, entrepreneurship is a type of behavior that concentrates on opportunities rather than resources (Stevenson and Gumpert, 1991). This type of behavior can happen in both small and large businesses but also elsewhere. On the other hand, small businesses can be a vehicle for both Schumpeterian entrepreneurs introducing new products and processes that change the industry and for people who simply run and own a business for a living (Wennekers and Thurik, 1999). Entrepreneurship is a source of innovation and change, and as such spurs improvements in productivity and economic competitiveness. The present paper provides a theoretical framework of the relationship between rate of entrepreneurship and economic development in macro level perspectives.

KEYWORDS

Entrepreneurship, Production Units, Self-Reliance, Innovation, Economic Development etc.

INTRODUCTION

Entrepreneurship is closely associated with knowledge and flexibility, two factors that have gained new significance as a source of competitiveness in an increasingly globalized world economy. The shift in industry structure towards less concentration and more decentralization that OECD countries experienced between the mid-1970s and the early 1990s is only one indicator of this development. With technological change and the intensified global competition brought about by globalization and economic liberalization, the assumption that fostering entrepreneurship means fostering a country's competitiveness today appears more valid than ever. It is striking that the current debate discusses the importance of entrepreneurship mainly with regard to developed countries and that the question of how to foster entrepreneurship seems to be primarily a concern of policy makers in OECD countries. As a key element in securing the competitiveness of developed countries, entrepreneurship is even more central to developing countries trying to attain competitiveness in international markets.

The economic development of a country much depends on the rate of industrialization. Industrialization and entrepreneurship are directly related. It is the entrepreneurship, which link the sociocultural milieu with rate of economic and industrial development. Kingsky Davis appropriately states that, "Vicious circle cannot be broken by agricultural reform alone. It can be broken only by the dues exmachina of industrialization." India is a second largest populated country in the world. Surplus manpower is a great liability to a nation it can become an asset once those with potential are selectively encouraged for self-employment. The entrepreneurship should be spread from a few dominant entrepreneurs to a large number of industrially potential people of varied social strata. The non-business communities and cases should be encouraged through efforts such as training, counseling, appropriate environment and support.

1.1. What is an 'Entrepreneur?

An entrepreneur is an individual who, rather than working as an employee, runs and assumes all the risks and rewards of a given business venture, idea, or good or service offered for sale. The entrepreneur is commonly seen as a business leader and innovator of new ideas and business processes.

Entrepreneurs play a key role in any economy. These people have the skills and initiative necessary to take good new ideas to market and to make the right decisions that lead to profitability. The reward for taking the risk is the potential economic profits the entrepreneur could earn.

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Schumpeter discovered that they:

- Greatly value self-reliance,
- Strive for distinction through excellence,
- Are highly optimistic (otherwise nothing would be undertaken), and
- Always favor challenges of medium risk (neither too easy, nor ruinous).

1.2. Types of Entrepreneurs

In every form of economic activity as well as in other social and cultural activities. They are found amongst artisans, labourers, artists, importers, exporters, engineers, supervisors, bankers, industrialists etc. They are also found among farmers, fisherman, and tribal and so on. According to gender, entrepreneurs are divided into two categories as men entrepreneurs and women entrepreneurs.

- **Men Entrepreneurs:** Enterprise owned and managed by men. He must possess quality of a capacity to assume risk and self-confidence, technical knowledge, alertness to know opportunities, willing to accept change and ability to initiate, ability to Marshall Resources, ability to organize and administer.

- **Women Entrepreneurs:** Women entrepreneurs are the women or a group of women who initiate, organize and operate business enterprise. The Government of India can notes women entrepreneur as "an enterprise owned and controlled by women having minimum financial investment of 51 percent of capital and giving at least 51 percent of the employment generated in the enterprise to women".

METHODOLOGICAL APPROACH OF THE STUDY

The present study is based on the theoretical approach. The secondary information pertaining to Entrepreneur has been collected from the annual reports of the ASI and reputed journals.

Objectives of the Study

The present study aims at examining the Role of Entrepreneur in Economic Development - A Macro Level Analysis For this purpose following objective has been outlined:

- To examine the Role of Entrepreneur in Economic Development in India.

The Role of Entrepreneurs in Economic Development

The entrepreneur therefore plays a key role among the factors of production and has enormous potential to galvanize the other components such as land, labours and capital towards generating increased output, income and employment. The state would be more and more confined itself to public utilities and withdraw from the competitive and commercial activities. The Government will play the role of enabler and facilitator providing infrastructural facilities appropriate to section, region and production line. Who can take advantage of those facilities? The answer is clear only those who have potentiality and propensity. In India, the term entrepreneurship appears to connote much restricted meaning. It covers only a limited sphere of enterprising endeavor i.e. establishment and running of factories and industrial enterprises alone. It has also been viewed as a phenomenon occurring around an individual and benefiting only an individual. India, with a developing economy even after nearly five decades of planning still has a long way to go to catch up with the leading developed economies of the world. The goal may be distant but surely, the time required to reach it can be cut down by accelerating the pace of development. The industrial revolution boosted entrepreneurship in the developed economies. It was not the same with underdeveloped countries like India, as they were under the colonial rule at that time. Immediately after the liberation, the country found itself in poverty and chaos.

The inadequate availability of entrepreneurial talent adversely affected the development of modem small manufacturing and processing enterprises for while large industries can be setup with expatriate, capital, small industries need to have a domestic entrepreneurial base. In the Indian context, an entrepreneur may not necessarily be an "innovator", but an "imitator" who would copy organisation, 11 technology products of innovators from other developed regions. Young underscore the importance of society in shaping the entrepreneurial personality, consider that ingredients in the emergence of entrepreneurs are cultural values, role expectations, and social tensions, and inter group relations in society.

Entrepreneurship has played a vital role both in the take-off stages of the European economy and during the First Industrial Revolution. Entrepreneurial formation also played a crucial role during the Second Industrial Revolution. However, the growth in

scale economies and the managerial revolution that took place in the decades preceding 1970 were forces that not only pushed the rate of business ownership downward, but also suppressed entry of new businesses and other entrepreneurial ventures. In spite of these forces, the economic success of this interim period can however be traced back to individual entrepreneurs of an earlier period. Finally, the present era is sometimes designated as that of the knowledge economy or the third industrial revolution. From the empirical evidence of increasing new business formation and total business ownership in recent decades, and from econometric analysis of these data, it can be concluded that entrepreneurial formation seems to be regaining the economic relevance of previous industrial revolutions.

India and other developing nations viewed this is an effective instruction to combat their many problems. Schumpeterian entrepreneur are necessary in underdeveloped countries for rapid economic development. Entrepreneurs are to be innovators who must change the production function and bring about rapid development. For this purpose, India also made planned efforts to develop entrepreneurship to promote national production, balanced regional development, and dispersal of economic power and provide better employment opportunities.

SUMMARY AND CONCLUSION

The present paper attempts to outline the relationship between entrepreneurship and economic development using a macro perspective: the aim of the present contribution is to identify the consequences of entrepreneurship in economic development. It reviews some recent research on the relationship between entrepreneurship and small business on the one hand and economic growth on the other. It provides a tentative framework linking entrepreneurship and growth at different levels of aggregation. Entrepreneurship has played a vital role both in the take-off stages of the European economy and during the First Industrial Revolutions.

Entrepreneurial formation also played a crucial role during the Second Industrial Revolution. However, the growth in scale economies and the managerial revolution that took place in the decades preceding 1970 were forces that not only pushed the rate of business ownership downward, but also suppressed entry of new businesses and other entrepreneurial ventures. In spite of these forces, the economic success of this interim period can however be traced back to individual entrepreneurs of an earlier period. Finally, the present era is sometimes designated as that of the knowledge economy or the third industrial revolution.

From the empirical evidence of increasing new business formation and total business ownership in recent decades, and from econometric analysis of these data, it can be concluded that entrepreneurial formation seems to be regaining the economic relevance of previous industrial revolutions. Finally conclude that framework of the consequences of entrepreneurship seems to be applicable, although apparently the explanatory power of the various determinants and the weight of the various consequences differ between historical periods. There are certain areas, which are untouched by the government, as well as companies, which needs immediate attention in these issues. This study helps for further research in this issue. However, much needs to be done to explain the links between entrepreneurship and economic growth.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

A STUDY ON EFFECTIVENESS OF DIGITAL MARKETING ON CONSUMER BEHAVIOUR

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ABSTRACT

*"**Digital Marketing** is an umbrella term for the marketing of products or services using digital technologies, mainly on the Internet, but also including mobile phones, display advertising, and any other digital medium". It has a wide spread application across sectors; however, in the current context with proliferation digital and social media have gained enormous popularity and are integral parts of the decision-making. Statistics reveal that we currently have over 350 million internet users in the country and about 80 % of the population is active through their smart phone devices. Based on user base and revenues for most global internet companies India is one of the largest markets. Taking consumers as sample the paper aims to study how digitalization can influence decision making among a certain Target group. The paper also aims to an attempt to reveal the factors influencing the online consumer's behavior.*

KEYWORDS

Decision, Consumer Buying Behaviour, Digital Marketing, Digital Media etc.

INTRODUCTION

Digital marketing is one type of marketing being widely used to promote products or services and to reach consumers using digital channels. Digital marketing extends beyond internet marketing including channels that do not require the use of Internet. It includes mobile phones (both SMS and MMS), social media marketing, display advertising, search engine marketing and many other forms of digital media.

Through digital media, consumers can access information any time and any place where they want. With the presence of digital media, consumers do not just rely on what the company says about their brand but also they can follow what the media, friends, associations, peers, etc., are saying as well. Digital marketing is a broad term that refers to various promotional techniques deployed to reach customers via digital technologies. Digital marketing embodies an extensive selection of service, product and brand marketing tactics, which mainly use Internet as a core promotional medium in addition to mobile and traditional TV and radio. Canon iMage Gateway helps consumers share their digital photos with friends online. L'Oréal's brand Lancôme uses email newsletters to keep in touch with customers and hence tries to strengthen customer brand loyalty (Merisavo et al., 2004). Magazine publishers can activate and drive their customers into Internet with e-mails and SMS messages to improve re-subscription rate (Merisavo et al., 2004).

Indian consumers as a whole spend about 55% of the total consumption expenditure on food items. According to a survey conducted by ORG, the expenditure on non-food items has recorded large growth that the expenditure on food items. Consumers decide whether, what, when, from whom, where and how much to buy. They can avail various mediums to buy the products. However, currently we are living in the age of internet. According to a study, "About 44 percent students use Internet in India and overall 72% of young people access Internet on regular basis. Due to the vast usage of Internet, the buying patterns have been changed. It has changed the way goods are purchased and sold, resulting to the exponential growth in the number of digital shoppers. However, many differences concerning digital buying have been discovered due to the various consumers' characteristics and the types of provided products and services. Attitude toward digital shopping and goal to shop are not only affected by ease of use, usefulness, and enjoyment, but also by other factors like consumer individuality, situational factors, product distinctiveness, previous digital shopping understanding.

Traditional Marketing versus Digital Marketing

Traditional marketing is the most recognizable form of marketing. Traditional marketing is non-digital way used to promote the product or services of business entity. On the other hand, digital marketing is the marketing of products or services using digital channels to reach consumers. Some comparisons are presented below:

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Table-1

Traditional Marketing	Digital Marketing
Traditional marketing includes print, broadcast, direct mail, and telephone.	Digital marketing includes online advertising, email marketing, social media, text messaging, affiliate marketing, search engine optimization, pay per click.
No interaction with the audience.	Interaction with the audience.
Results are easy to measure.	Results are largely easy to measure.
Advertising campaigns are planned over a long period.	Advertising campaigns are planned over short period.
Expensive and time-consuming process.	Reasonably cheap and rapid way to promote the products or services.
Success of traditional marketing strategies can be celebrated if the firm can reach large local audience.	Success of digital marketing strategies can be celebrated if the firm can reach some specific number of local audience.
One campaign prevails for a long time.	Campaigns can be easily changed with ease and innovations can be introduced within any campaign.
Limited reach to the customer due to limited number of customer technology.	Wider reach to the customer because of the use of various customers' technology.
24/7 year-round exposure is not possible.	24/7 year-round exposure is possible.
No ability to go viral.	Ability to go viral.
One-way conversation.	Two ways conversation.
Responses can only occur during work hours.	Response or feedback can occur anytime.

Sources: Authors Compilation

VARIOUS ELEMENTS OF DIGITAL MARKETING

There are various elements by which digital marketing is formed. All forms operate through electronic devices. The most important elements of digital marketing are given below:

Online Advertising

Online advertising is a very important part of digital marketing. It is also called internet advertising through which company can deliver the message about the products or services. Internet-based advertising provides the content and ads that best matches to consumer interests. Publishers put about their products or services on their websites so that consumers or users get free information. Advertisers should place more effective and relevant ads online. Through online advertising, company well controls its budget and it has full control on time.

Email Marketing

When message about the products or services is sent through email to the existing or potential consumer, it is defined as email marketing. Direct digital marketing is used to send ads, to build brand and customer loyalty, to build customer trust and to make brand awareness. Company can promote its products and services by using this element of digital marketing easily. It is relatively low cost comparing to advertising or other forms of media exposure. Company can bring complete attention of the customer by creating attractive mix of graphics, text and links on the products and services.

Social Media

Today, social media marketing is one of the most important digital marketing channels. A computer-based tool allows people to create, exchange ideas, information and pictures about the company's product or services. According to Nielsen, internet users continue to spend more time with social media sites than any other type. Social media marketing networks include Facebook, Twitter, LinkedIn and Google+. Through Facebook, company can promote events concerning product and services, run promotions that comply with the Facebook guidelines and explore new opportunities. Through Twitter, company can increase the awareness and visibility of their brand. It is the best tool for the promotion of company's products and services. In LinkedIn, professionals write their profile and share information with others. Company can develop their profile in LinkedIn so that the professionals can view and can get more information about the company's product and services. Google+ is also social media network that is more effective than other social media like Facebook, Twitter. It is not only simple social media network but also it is an authorship tool that links web-content directly with its owner.

Text Messaging

It is a way to send information about the products and services from cellular and smart phone devices. By using phone devices, company can send information in the form of text (SMS), pictures, video or audio (MMS). Marketing through cellphone, SMS (Short Message Service) became increasingly popular in the early 2000s in Europe and some parts of Asia. One can send order confirmations, shipping alerts using text message. Using SMS for campaigns get faster and more substantial results. Under this technique, companies can send marketing messages to their customers in real-time, any time and can be confident that the message will be seen. Company can create a questionnaire and obtain valuable customer feedback essential to develop their products or services in future.

Affiliate Marketing

Affiliate marketing is a type of performance-based marketing. In this type of marketing, a company rewards affiliates for each visitor or customer they bring by marketing efforts they create on behalf of company. Industry has four core players: the merchant (also known as "retailer" or "brand"), the network, the publisher (also known as "the affiliate") and the customer. The market has grown in such complexity resulting in the emergence of a secondary tier of players including affiliate management agencies, super-affiliates and specialized third party vendors. There are two ways to approach affiliate marketing: Company can offer an affiliate program to others or it can sign up to be another business's affiliate. If company wants to drive an affiliate program, then, the company owner has to pay affiliates a commission fee for every lead or sale they drive to company's website. Company's main goal here is to find affiliates who can reach untapped markets. For example, a company with an e-zine may become a good affiliate because its subscribers are hungry for resources. Therefore, introducing one's offer through "trusted" company can grab the attention of prospects, which might not have otherwise reached.

Search Engine Optimization (SEO)

Search engine optimization (SEO) is the process of affecting the visibility of a website or a web page in a receive from the search engine users. SEO may target different kinds of search including image search, local search, video search, academic search, news search and industry-specific vertical search engines.

Pay Per Click (PPC)

Pay-per-click marketing is a way of using search engine advertising to generate clicks to your website rather than "earning" those clicks organically. Pay per click is good for searchers and advertisers. It is the best way for company's ads since it brings low cost and greater engagement with the products and services.

DETAILED FEATURES OF DIGITAL MARKETING

- It is based on the notion of elastic time.
- It can be accessed from anywhere.
- One can assess numerous digital shopping stores at a time.
- Assessment can be made in real time.
- There is rider of alternate of product if it is not as per the requirement of the customer.

FOUR NEW DIGITAL MARKETING MODELS

Booz & Company has identified four equally successful digital marketing models: Digital Branders, Customer Experience Designers, Demand Generators, and Product Innovators. A company's focal point for marketing venture may have fundamentals of each, but odds are that one of these models represents the right marketing organization for a company.

- Digital Branders are the majority frequent consumer products companies or further marketers that center on structuring and renewing brand equity and concrete consumer commitment. These companies are changing their venture from traditional linear advertising in the direction of more immersive digital multimedia way that can bond consumers to the brand in innovative conduct. They are rethinking on how they employ consumers with the main agenda of attracting new consumers to the brand and motivating loyalty through various encounters with the brand.

- Customer Experience Designers use customer statistics and perception to generate an advanced uninterrupted brand familiarity for their customers. Characteristically, these companies (such as financial-services companies, airlines, hotels, and retailers) fabricate their business models focusing on customer service. By reworking how they interrelate with customers, these companies anticipate to craft a constant exchange of ideas and construct a loyal customer base.

- Demand Generators (typically retailers) center of attention on driving online traffic and transferring a numerous sales as probable across channels to capitalize on marketing competence and produce their share of profits. All essentials of the digital marketing are customized to enhance sales and amplify reliability.

- Product Innovators use digital marketing to facilitate the organization recognizes and grows, and generates proactive digital products and services. These companies utilize digital communications with consumers to gather information that can help profile the innovation.

Consumer Buying Behaviour

The consumers" buying behavior has been always a popular marketing topic, extensively studied and debated over the last decades while no contemporary marketing textbook is complete without a chapter dedicated to this subject. The predominant approach, explaining the fundamentals of consumer behavior, describes the consumer buying process as a learning, information processing and decision-making activity divided in several consequent steps:

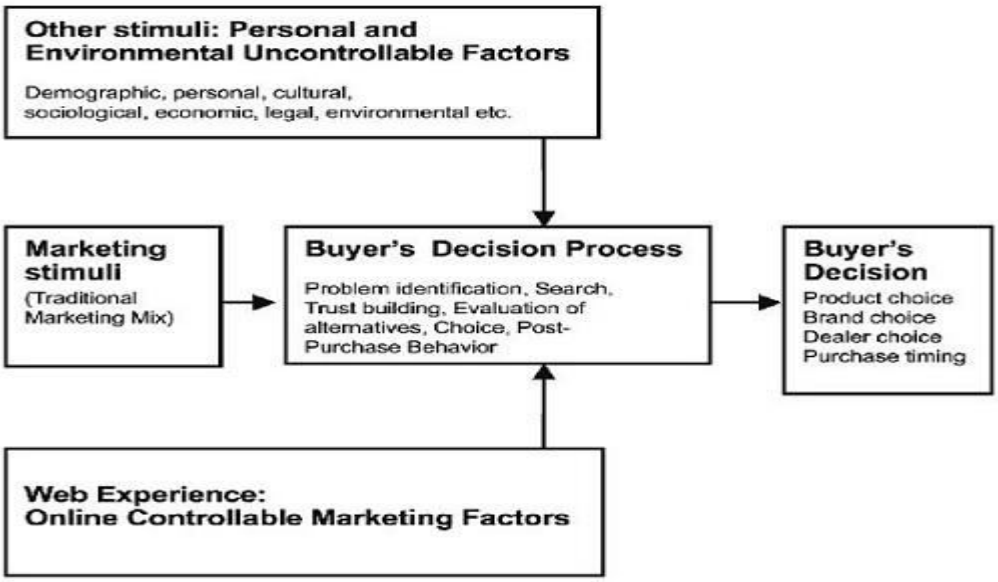
Problem Identification; (2) Information Search; (3) Alternatives Evaluation; (4) Purchasing Decision; (5) Post-Purchase Behavior (Bettman, 1979; Dibb et al., 2001; Jobber, 2001; Boyd et al., 2002; Kotler, 2003; Brassington and Pettitt, 2003). A distinction is frequently made between high and low involvement purchasing, implying that in practice the actual buying activity can be less or more consistent with this model, depending on the buyer has perceived purchasing risks. High or low degree of involvement is also a question of buyer experience; products purchased for the first time, in general, require more involvement than frequently purchased products (Boyd et al., 2002). Next to identifying the steps of the buying process and the potential role of marketing in each stage, marketers are eager to comprehend how purchasing choices and decisions are made, how consumers are likely to react to innovation and how to predict the outcome of the customer vendor interaction (Davis et al., 1989; Ajzen, 1991; Legris et al., 2003). Most academics and practitioners agree that demographic, social, economic, cultural, psychological and other personal factors, largely beyond the control and influence of the marketer, have a major effect on consumer behavior and purchasing decisions (Harrell and Frazier, 1999; Czinkota et al., 2000; Czinkota and Kotabe; 2001; Dibb et al., 2001; Jobber, 2001; Boyd et al., 2002; Solomon and Stuart, 2003). Despite their incapacity to exercise any substantial influence on the above factors, marketers can have some bearing on the outcome of the buying process by engaging different marketing tools, the most prominent being the 4Ps – product, price, place and promotion – also known as the marketing mix (Borden, 1964; McCarthy, 1964). While the value and current standing of the mix as a marketing toolkit is frequently disputed (Dixon and Blois, 1983; Grönroos's, 1994; Gummesson, 1997; Goldsmith, 1999), marketing practitioners nonetheless widely deem the 4Ps as the tools that can influence the consumer's behavior and the outcome of the buyer-seller interaction.

Online Buying Behavior

Understanding the mechanisms of virtual shopping and the behavior of the online consumer is a priority issue for practitioners competing in the fast expanding virtual marketplace. This topic is also increasingly drawing the attention of researchers. Indicative of this is the fact that more than 120 relevant academic papers were published in 2001 alone (Cheung et al., 2003). Given the continuous expansion of the Internet in terms of user numbers, transaction volumes and business penetration, this massive research endeavor is not surprising. More than 20 per cent of Internet users in several countries already buy products and services online (Taylor Nelson Sofres, 2002) while more than 50 per cent of US net users regularly buying online (Forrester Research, 2003). These developments are gradually transforming e-commerce into a mainstream business activity while at the same time, online consumers are maturing and virtual vendors realize the importance and urgency for a professional and customer-oriented approach. Yet the Internet meltdown at the end of the 1990s and plenty of more recent anecdotal and empirical evidence indicate that many online firms still do not completely understand the needs and behavior of the online consumer (Lee, 2002) while many of them "... continue to struggle with how effectively to market and sell products online" (Joines et al., 2003, p. 93). As in the case of traditional marketing in the past, most of the recent research and debate is focused on the identification and analysis of factors that one way or another can influence or even shape the online consumer's behavior; a good deal of research effort is focused on modeling the online buying and decision-making process (Miles et al., 2000; Liu and Arnett, 2000; Cockburn and McKenzie, 2001; Liao and Cheung, 2001; McKnight et al., 2002; Joines et al., 2003; O'Cass and Fenech, 2003). While many researchers do not see any fundamental differences between the traditional and online buying behavior, it is often argued that a new step has been added to the online buying process: the step of building trust or confidence (Lee, 2002; Liebermann and Stashevsky, 2002; McKnight et al., 2002; Suh and Han, 2002; Liang and Lai, 2002). An important contribution in classifying the increasingly growing number of research papers on the subject of the virtual customer's behavior is the study of Cheung et al. (2003). The findings of their comprehensive literature review are summarized in a model depicting the main categories of factors affecting the online consumer. The study identifies two groups of uncontrollable factors–consumer characteristics and environmental influences – as well as three groups of controllable ones.

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

Figure-1: Factors Affecting the Online Consumer's Behavior



Sources: Authors Compilation

METHODOLOGY OF STUDY

Methodology comes from systematic and theoretical analysis of the methods to evaluate suitability of one specific method to apply to a field of study. It typically encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. This study is conducted based on both primary and secondary data sources.

Data Collection Methods

Both the primary and secondary data collection methods were considered. The primary data was collected through a questionnaire designed exclusively for the study. Secondary data was taken from Research papers, Journals, Magazines and Websites.

OBJECTIVES OF STUDY

The main objective of this paper is to identify the impact of digital marketing on the consumer behaviour in the competitive market. The supportive objectives are following:

- To find out whether income has an impact on the elements of digital marketing;
- To focus on whether gender plays a role on the effect of digital marketing on consumer behaviour;
- To discuss the effects of education on the various forms of digital marketing and consumers opinion on digital marketing;
- To show the major factors that influence the impact of digital marketing on the customers.

DATA ANALYSIS

H_{01}: There is no significant association between gender and their opinions on prefer those brands advertised by digital marketing.

Table-2: Chi Square Values of Gender on Digital Marketing

	Value	d.f.	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.882[a]	4	.001
Likelihood Ratio	19.631	4	.001
Linear-by-Linear Association	4.111	1	.043
N of Valid Cases	868		

Note: a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.31.
Sources: Authors Compilation

From the above table chi square is significant (sig. value is < 0.05), reject null hypothesis. It means that there is a significant association between gender and their opinions on prefer those brands advertised by digital marketing. It means consumer opinion and preference of products highly advertised by digital marketing is not dependent on gender.

H_{02}: There is no significant association between education and their opinions on online shopping.

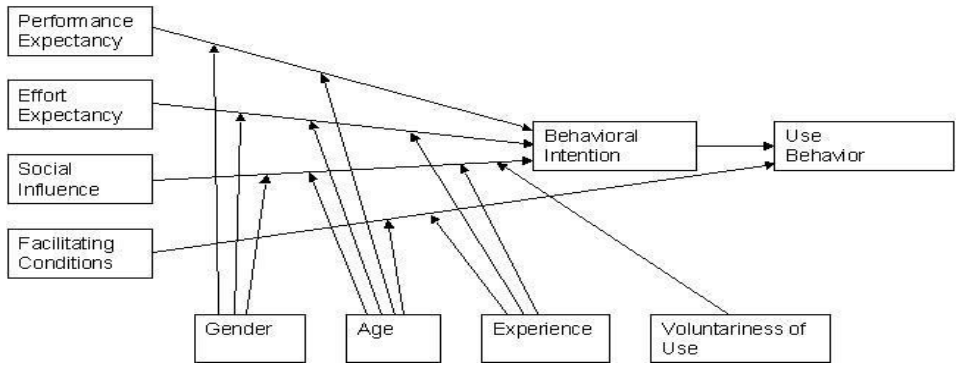
Table-3: Chi Square Values of Education and Opinion on Online Shopping

	Value	d.f.	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.954[a]	12	.000
Likelihood Ratio	36.119	12	.000
Linear-by-Linear Association	1.827	1	.177
N of Valid Cases	872		

Note: a. 2 cells (10.0%) have expected count less than 5. The minimum expected count is 3.85
Sources: Authors Compilation

From the above table chi square is significant (sig. value is < 0.05), reject null hypothesis. It means that there is a significant association between education and their opinions on the online shopping. It means opinions on online shopping is highly dependent on education.

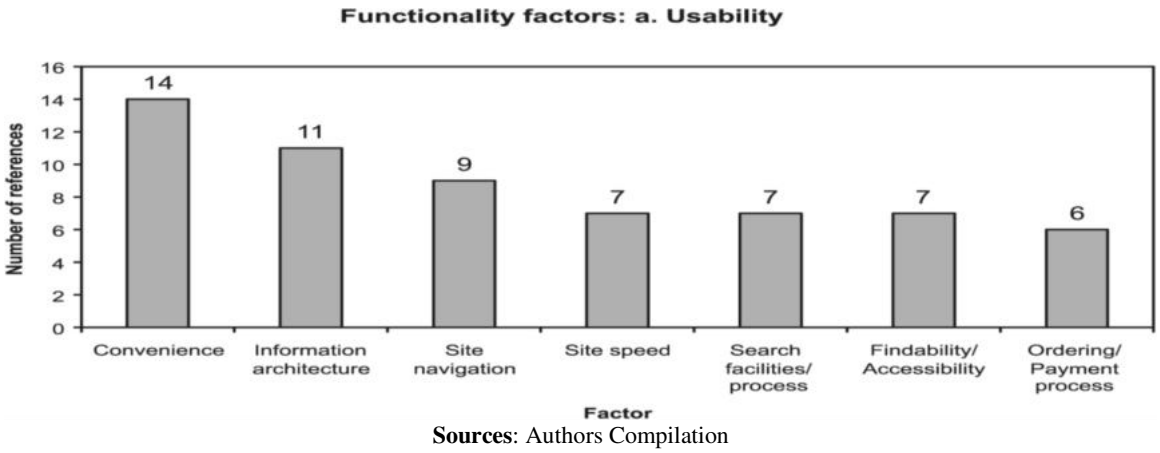
Figure-2



Sources: Authors Compilation

Factor Analysis is a data reduction technique. It also helps in structure detection among the variables and further helps in studying the underlying crucial factors that cause the maximum variation. Before we proceed for factor analysis, first the researcher tested the eligibility of the data by checking KMO- Bartlett's test, which is a measure of sampling adequacy. The KMO value is 0.826 >0.5 (indicates meritorious).

Figure-3



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Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
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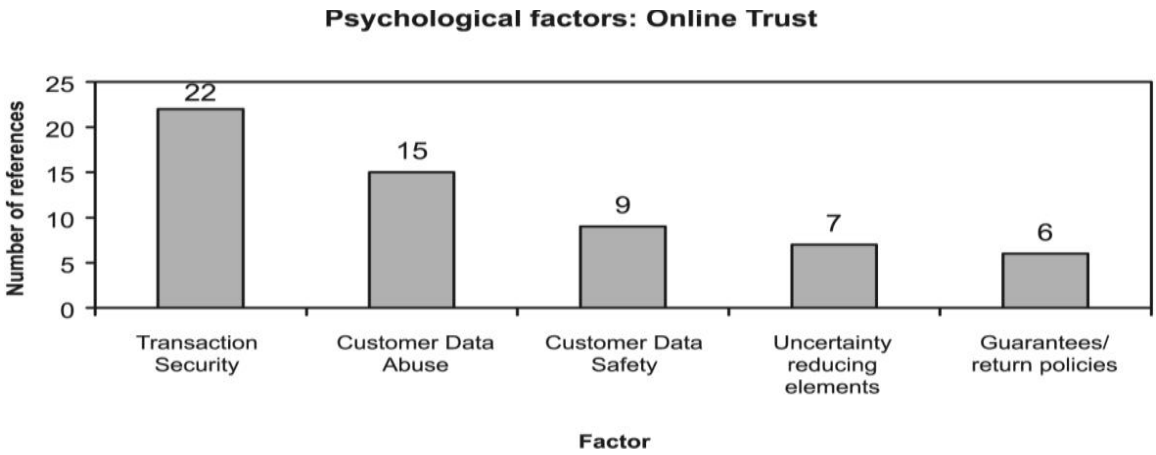
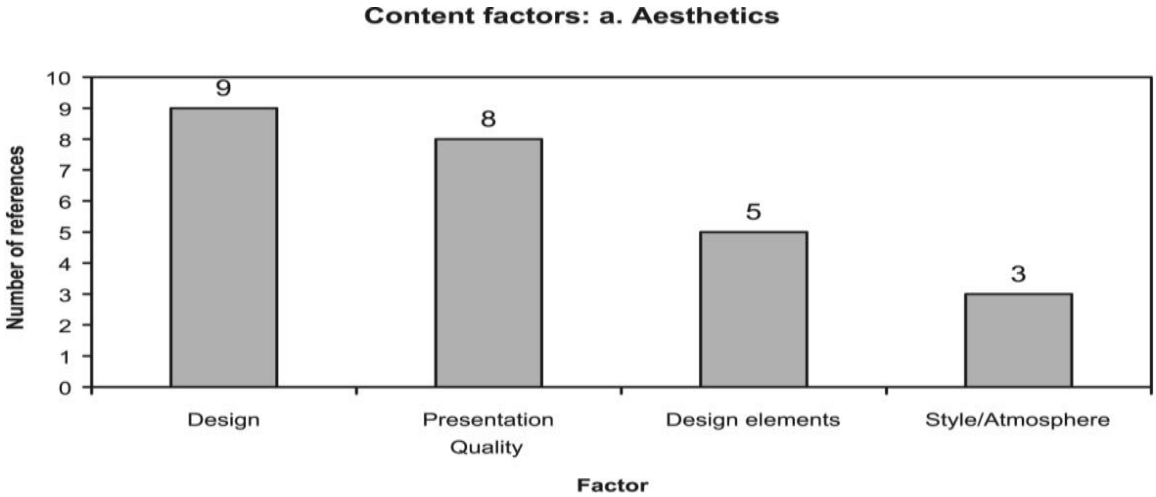
Figure-4



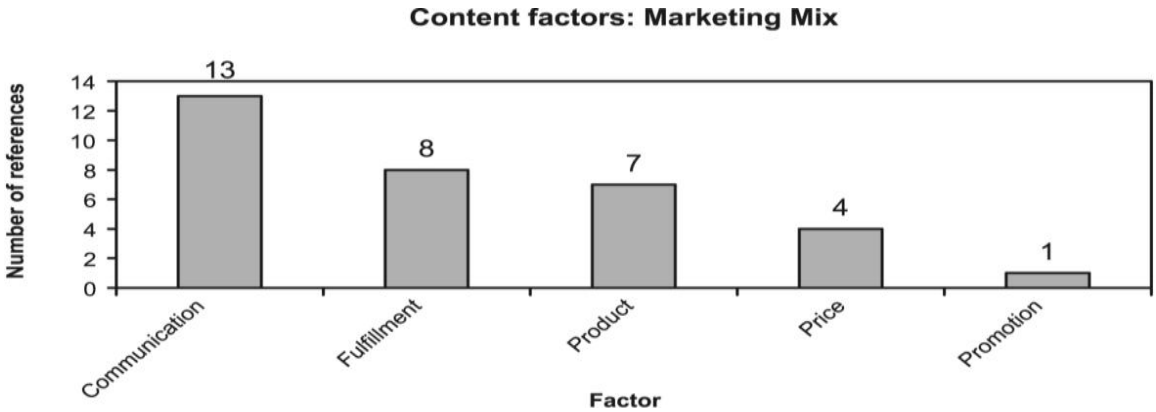
Sources: Authors Compilation

Figure-5



Sources: Authors Compilation

Figure-6



Sources: Authors Compilation

From the above analysis, it is evident that the convenience in the usability and the aesthetics play a major role in influencing the consumer behavior. Companies, which use digital marketing tools, should focus on these factors to achieve success.

CONCLUSIONS AND IMPLICATIONS

Research on the buying behavior and the factors influencing the decision-making process of online consumers has revealed similarities as well as differences between them and the traditional customers. The uncontrollable factors (external and personal ones) affecting consumer behavior are similar for both types of consumers. The tools however used by traditional and online marketers in order to influence the buying behavior of their customers are not quite the same. In the case of traditional consumers, the 4Ps of the marketing mix are considered as the main controllable tools influencing the buying behavior. Research indicates that in the case of the Web consumer a set of elements experienced during the virtual interaction are indeed the controllable factors affecting the online buyer.

The most significant fact revealed by this study is that there is not much significant difference in the shopping criteria between male and female customers. In other words, Indian (male and female) have almost common behaviour in digital shopping. With this information, e-retailers should not over emphasize, and rely on, the gender factor as a strategy in their efforts to attract customers.

Finally, digital marketers should realize that the nature of competition in the Indian digital sector is changing .The success and survival of individual player is therefore depends on the manager's ability to understand customer's needs and to find effective ways to satisfy these needs irrespective of their gender.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

APPLICATION OF MULTI-AGENT SYSTEMS IN ORGAN TRANSPLANT CO-ORDINATION

Vani Chakraborty[21]

ABSTRACT

Organ transplantation is considered one of the greatest invention of the 20th century. It lists in the top five medical marvels. However, it is a very complex activity, which requires coordination of many people and hospitals. There are legal, ethical, and organizational issues involving many different parties. It is compounded by the fact that a national repository for organ donation is at a nasal stage in India. Since organ transplant coordination involves lot of decision making in a distributed environment, a multi agent system can be developed to help in the organ transplant coordination. A multi agent system would help the transplant coordinator take a quick decision saving time. This paper proposes a multi agent system choosing an appropriate recipient for a transplant. The software agent would be developed using JADE and expert reasoning will be implemented using JESS.

KEYWORDS

Multi-Agent Systems, Organ Transplantation, JADE, JESS etc.

INTRODUCTION TO SOFTWARE AGENTS

Software agents differ from traditional programs in many ways. Software agents are personalized, social, continuously running and semi-autonomous. Soham, describes a software agent as a software entity, which functions continuously and autonomously in a particular environment often inhabited, by other agents and processes. In general, software agents must possess the following characteristics [1].

- *Reactivity*: The ability to selectively sense and act.
- *Autonomy*: Goal-directedness, proactive and self-starting behaviour.
- *Collaborative behaviour* can work in collaboration with other agent to achieve a common goal. *"Knowledge-level" communication ability* the ability to communicate with human and other agents with language more resembling human-like speech than symbol-level protocols.
- *Inferential capability* can act on abstract task specification using prior knowledge of general goals and preferred methods to achieve flexibility.
- *Temporal continuity* persistence of identity and state over long periods.
- *Personality* is the capability of manifesting the attributes of a believable character such as emotion.
- *Adaptively* being able to learn and improve with experience.
- *Mobility* being able to migrate in a self-directed way from one host platform to another.

GENERAL ARCHITECTURE OF THE MULTI-AGENT SYSTEM

Organ transplant procedure has given a new lease of life to innumerable patients. Still there is a lot of gap between demand and supply. Every year there are around one-lakh corneal transplants required, but only 25000 transplants are done. Organ transplant requires the coordination of many different organisations, hospitals, donors, receivers, their relatives, and availability of expert staff. The use of multi agent system in such a complex scenario, will help save time and increase the transplant results. In addition, it helps the transplant coordinator make a right decision in a short span of time.

In this paper, we propose the structure of a multi-agent system. The architecture has been proposed taking into account Indian context. Guidelines has been taken from the success of the Spanish Organ Transplant coordination, which is considered one of the best in the world.

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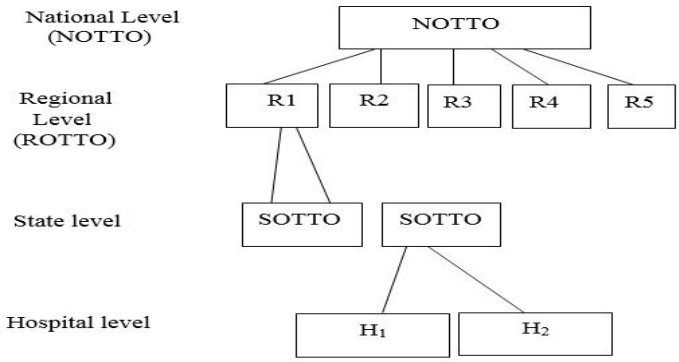
Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

Figure-1: Multi Agent System Hierarchy



Sources: Authors Compilation

The National Organ and Tissue Transplant Organisation (NOTTO) has been set up by the Government of India to take care of all organ transplant related issues. NOTTO has identified five regional centres termed as ROTTO (Regional Organ and Tissue Transplant Organisation) in the following states of Tamil Nadu, Maharashtra, Assam, West Bengal, and Chandigarh in India. They in turn interact with SOTTO(State Organ and Tissue Transplant Organisation) standing for the state wise unit, which in turn has to be in touch with the hospitals which do organ transplant in every state. The multi agent system proposed takes into account such a hierarchy.

According to the guidelines laid down by NOTTO, allocation will be done first based on city waiting list. If no recipient eligible in city waiting list, then allocation will be done to state and then to other states in the ROTTO and then to other ROTTO and then nationally. Most donated organs should be allocated within the city or at the most state, where retrieval has been done. Let the agent for the donor's hospital be represented by H_1. They have a list of possible receptors of the organ. H_1 must perform the following process. H_1 will start a reasoning process to choose the most appropriate patient, according to the characteristics of the organ and the potential receptors. This process can involve the use of a standard rule-based expert system. Interaction with a human transplant coordinator would also be required. After choosing the potential receptor, information must be sent to the receiving hospital and the required logistics need to be arranged.

INTRA-HOSPITAL MULTI AGENT SYSTEM

Here, a hierarchical MAS for finding the most appropriate receipt of an organ is proposed. Each hospital has its own repository with the information of the local patients who are waiting for a transplant. We propose the construction of MAS in each hospital that can link these data with the national coordination transplant process described in the previous section. The proposed agents are as follows. There are three agents in this multi agent system.

1. **Interface Agent:** To manage the communication between the whole coordination system and the hospital staff. It is possible for the authorized personnel to perform operations on the local patient's database like additions, removal, modifications, and queries and add data of new available organs.

2. **Transplant Coordinator Agent**: Receives from interface agent information about new organs that are available at the hospital. Search for a possible receiver is initiated. TC agent will have sub agents to perform the search and report the result. The allocation criterion for each of the organs are different and so each of the subagents does the job independently.

3. **Database Agent**, which receives messages from interface, and TC agents with requests to perform operations on the hospital databases, translating queries into database query language.

CONCLUSION AND FUTURE WORK

The above paper proposes a multi agent architecture for handling the organ transplant. In addition, an intra hospital multi agent system, which will take care of all the activities of a single hospital, is proposed. It can be expanded to run in other ROTTO and NOTTO centers as well. Other applications of multi agent system can also be considered. Multi agent system can be developed for determining the fastest transport route for the organ. In addition, a multi-agent system for scheduling the human / material resources needed to perform the transplant operation can also be designed.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

IMPACT OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) ON EDUCATION SECTOR

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ABSTRACT

Information and communication technologies (ICT) are extremely influencing every discipline under the sun including Education. It is affecting every aspect of education from teaching learning to assessment and evaluation. It improves the effectiveness of education. It aids literacy movements. It enhances scope of education by facilitating mobile learning and inclusive education. It facilitates research and scholarly communication. Impact of ICT and its potential for the education field is manifold. It positively affects all the stakeholders of the education field. The current papers discuss the same along with the discussion of what factors which motivate and preventing in the use of ICT in educational field. In many countries, information and communication technology (ICT) has a lucid impact on the development of educational curriculum. This is the era of Information Communication Technology, so to perk up educational planning it is indispensable to implement the ICT in Education sector. Student can perform well throughout the usage of ICT. ICT helps the students to augment their knowledge skills as well as to improve their learning skills. For this purpose, I undertook study to know the impact of ICT on students' achievement and students' motivation. Based on the results of the study suggestions are given to educational institution and government.

KEYWORDS

ICT, Impact on Student, Factors Motivates, Prevents ICT, Learning Skills etc.

INTRODUCTION

ICT can be defined as the use of hardware and software for efficient management of information. ICT refers to the forms of technology that are used to transmit, store, create, share or exchange particular task. ICT has become a part of life. The discoveries and inventions in science and technology have improved the speed of communication. By making use of available tools, ICT is helping common person to fulfill his needs. It has become integral part of new era.

There is widespread belief that ICTs can and will empower teachers and learners, transforming teaching and learning processes from being highly teacher-dominated to student-centered, and that this transformation will result in increased learning gains for students, creating and allowing for opportunities for learners to develop their creativity, problem-solving abilities, informational reasoning skills, communication skills, and other higher-order thinking skills. However, there are currently very limited, unequivocally compelling data to support this belief.

Even in the most advanced schools in OECD countries, ICTs are generally not considered central to the teaching and learning process. Many ICT in education initiatives in LDCs seek (at least in their rhetoric) to place ICTs as central to teaching and learning.

OBJECTIVES OF THE STUDY

- To know the scope of ICT in education.
- To know the factors motivate or prevent teachers from using ICT in classroom teaching.
- To know the impact of ICT on students' achievement.
- To know the impact of ICT on students' motivation.
- To provide some findings and suggestions based on study.

RESEARCH METHODOLOGY

The study is based on secondary data consist of books, journals, websites etc.

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LIMITATIONS OF STUDY

- Time limitation,
- Used only secondary data for study.

MEANING OF ICT

Information and communications technology (ICT) is an extended term for information technology (IT) which stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

Scope of ICT in Education

- A person from village also can refer the latest information and research every day.
- Television broadcast is one of the best communication media to educate students, farmers, and sportsman.
- The difficult experiments, advance surgery for medical students etc. can be viewed.
- LCD projectors can be used for effective training.
- The manpower problem, the human mistakes can be avoided by on-line examination.

"What Factors Support or Prevent Teachers from Using ICT in their Classrooms?"

Over the past 25 years, alongside a series of national and local programmes for the development of ICT in education, there have been research studies of the uptake of ICT in education. Many of these studies have shown that inspite of teacher training programmes, an increase in ICT resources and the requirements of national curricula there has been a disappointingly slow uptake of ICT in schools by the majority of teachers.

FACTORS PREVENTING TO USING ICT IN THE CLASSROOM

Understanding the Need for Change: One of the most fundamental problems in education reform is that people do not have a clear and coherent sense of the reasons for educational change, what it is and how to proceed. Thus, there is much faddism, superficiality, confusion, failure of a change programme, unwarranted and misdirected resistance and misunderstood reform. They maintain that teachers who resist change are not rejecting the need for change but they are often the people who are expected to lead developments when they lack the necessary education in the management of change and are given insufficient long-term opportunities to make sense of the new technologies for themselves.

Questioning Professional Practice: There are many studies, which have shown that teachers are "not given to questioning their professional practice" (Underwood, 1997). Once they have finished their initial training they do not expect to need much further training therefore do not take the initiative to improve their practice and learn new skills. It is found that "many teachers are perfectly well satisfied with their practices and are unlikely to question prevailing educational processes". Therefore, if teachers see no need to change or question their current professional practice they may not accept the use of ICT in their teaching.

Pedagogical Practice versus Technical Skills: It is found that until recently the majority of courses offered to train teachers in the uses of ICT have focused on the technical aspects of ICT with little training about the pedagogical practices required and how to incorporate ICT in the curriculum. In many ICT professional development courses, teachers are not often taught how to revise their pedagogical practices, how to replace other traditional lessons without depleting the curriculum coverage and so on. This means that after teachers had attended a course they still did not know how to use ICT for teaching pupils, they only knew how to run certain software packages and to fix the printer. There were many such courses offered all round the UK, which had very little long-term impact on the uptake of ICT in schools.

Support from the Whole School: It is found that the most effective way to bring about the adoption of an innovation in schools is to engage the whole school in a democratic process of planning change. This means that all the teachers are involved in the decision to adopt ICT in the school and are supportive of any individual teacher going on a course and willing to learn from their new knowledge and skills when they return. If the school, and particularly the head teacher, are not committed to adopting change and particularly ICT, then if one teacher goes on a course, the rest of the school sets up antibodies to any new ideas which the unfortunate teacher brings back into the school. The last thing the other teachers will then do is to change their practice.

Losing Control of the Learning: The majority of teachers' first priority is to maintain order in the classroom and to have a controlled learning environment. Any suggestion of adopting very innovative teaching techniques such as using ICT is therefore

seen as threatening this orderly pattern and therefore not desirable. There is a genuine fear amongst many teachers about ICT and skepticism of its value to their pupils.

Inadequate Resources: Even if the above problems are overcome, there is often a difficulty for teachers who have had some training to be able to use ICT because there are insufficient ICT resources in the school or there is not enough time to review then and plan lessons incorporating their use.

FACTORS CONTRIBUTING TO USING ICT IN THE CLASSROOM

External Factors

The external factors represent the many influences on teachers, which come from outside their sphere of control. These will include:

- The changes in society with the rapid growth in the uses of the Internet and ICT in general,
- School policies on using ICT,
- Opinions of colleagues,
- Responsibilities of the teacher,
- Pressure from parents and pupils.

Perceived Ease of Use

There are a number of factors, which have been identified which relate to the perceived ease of use of ICT, which in our case is for experienced practicing ICT/IT users. It is identified a wide range of skills and competencies which teachers felt they needed in order to find ICT easy to use, they are:

- Regular use and experience of ICT outside the classroom,
- Ownership of a computer,
- Confidence in using ICT,
- Easy to control the class,
- Easy to think of new lesson ideas,
- Can get help and advice from colleagues.

Perceived Usefulness

If teachers see no need to question or change their professional practice then they are unlikely to adopt the use of ICT. However, if they perceive ICT to be useful to them, their teaching and their pupils' learning, then they are more likely to have a positive attitude to the use of ICT in the classroom. There are number of factors, which will contribute to teachers' perceived usefulness of ICT. Some of these factors are given below:

- Makes my lessons more interesting,
- Makes my lessons more diverse,
- Has improved the presentation of materials for my lessons,
- Gives me more prestige,
- Makes my administration more efficient,
- Gives me more confidence,
- Makes the lessons more fun,
- Enhances my career prospects,
- Help(s) me to discuss teaching ideas.

IMPACT OF ICT ON STUDENTS' ACHIEVEMENT

The positive impact of ICT use in education has not been proven: In general, and despite thousands of impact studies, the impact of ICT use on student achievement remains difficult to measure and open to much reasonable debate.

Positive impact more likely when linked to pedagogy: It is believed that specific uses of ICT can have positive effects on student achievement when ICTs are used appropriately to complement a teacher's existing pedagogical philosophies.

'Computer Aided Instruction' has been seen to slightly improve student performance on multiple choice, standardized testing in some areas: Computer Aided (or Assisted) Instruction (CAI), which refers generally to student self-study or tutorials on PCs, has been shown to slightly improve student test scores on some reading and math skills, although whether such improvement correlates to real improvement in student learning is debatable.

Need for clear goals: ICTs are seen to be less effective (or ineffective) when the goals for their use are not clear. While such a statement would appear to be self-evident, the specific goals for ICT use in education are, in practice, are often only very broadly or rather loosely defined.

There is an important tension between traditional versus 'new' pedagogies and standardized testing: Traditional, transmission-type pedagogies are seen as more effective in preparation for standardized testing, which tends to measure the results of such teaching practices, than are more 'constructivist' pedagogical styles.

Mismatch between methods used to measure effects and type of learning promoted: In many studies, there may be a mismatch between the methods used to measure effects and the nature of the learning promoted by the specific uses of ICT. For example, some studies have looked only for improvements in traditional teaching and learning processes and knowledge mastery instead of looking for new processes and knowledge related to the use of ICTs. It may be that more useful analyses of the impact of ICT can only emerge when the methods used to measure achievement and outcomes are more closely related to the learning activities and processes promoted by the use of ICTs.

ICTs are used differently in different school subjects: Uses of ICTs for simulations and modeling in science and math have been shown to be effective, as have word processing and communication software (e-mail) in the development of student language and communication skills.

Access outside of school affects impact: The relationships between in-class student computer use, out of class student computer use and student achievement are unclear. However, students in OECD countries reporting the greatest amount of computer use outside school are seen in some studies to have lower than average achievement (the presumption is that high computer use outside of school is disproportionately devoted to computer gaming).

Users believe that ICTs make a positive difference: In studies that rely largely on self-reporting, most users feel that using ICTs make them learners that are more effective.

IMPACT ON STUDENT MOTIVATION

ICTs motivate teachers and students: There appears to be consensus that both teachers and students feel ICT use greatly contributes to student motivation for learning.

Access outside of school affects user confidence: (Not surprisingly) Students who use a computer at home also use them in school more frequently and with more confidence than pupils who have no home access.

Where to place computers has an impact: Placing computers in classrooms enables much greater use of ICTs for 'higher order' skills than placing computers in separate computer laboratories (indeed, fewer computers in classrooms may enable even more use than greater numbers of computers located in separate computer labs). Related to this is an **i**ncreasing attention given to the use of laptops by both teachers and students (and in some places, 'computers-on-wheels'), as well as, to a much lesser extent, to the use of personal digital assistants and other mobile devices.

Models for successfully integrating ICT use in school and after school hours are still emerging: There are few successful models for the integration of student computer use at home or in other 'informal settings' outside of school facilities with use in school.

The appropriate ages for introducing computers to students are hotly debated: On a general level, appropriate ages for student ICT use in general are unclear. However, it is clear that certain uses are more or less appropriate, given student ages and abilities. Emerging research cautions against widespread use at younger ages.

ICTs can promote learner autonomy: Evidence exists that use of ICTs can increase learner autonomy for certain learners.

Gender affects impact: Uses of ICTs in education in many cases to be affected by the gender of the learner.

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
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The 'pilot effect' can be an important driver for positive impact: Dedicated ICT-related interventions in education that introduce a new tool for teaching and learning may show improvements merely because the efforts surrounding such interventions lead teachers and students to do 'more' (potentially diverting energies and resources from other activities).

FINDINGS

From the study, it is found that the major impact of ICT on education can be classified as follows:

Impact on the Curriculum

- Traditional closed curriculum,
- Based on fixed content which students are required to learn and reproduce,
- Focuses on the skills needed to build and communicate knowledge,
- Goal oriented curricula and syllabuses can be changed according to learner's needs.

Impact on Teaching / Learning Process

- Motivates learner,
- Learning process can be anywhere and anytime,
- Students use interactive whiteboard in classroom.
-

Impact on Teacher's Role: Teacher access to:

- Lesson plans,
- Network of teachers,
- Pedagogical techniques,
- Information resources.

Impact on Assessment / Evaluation

- Student accepts more responsibility for his or her own learning and its assessment, developing expertise in the process.
- Teacher application of curriculum can be monitored by analyzing test results. Teachers for assessing and improving their own performance meeting state and national standards can use this.

SUGGESTIONS

- Promote the development of e-learning resources;
- Facilitate public-private partnerships to mobilize resources in order to support e-learning initiatives;
- Promote the development of an integrated e-learning curriculum to support ICT in education;
- Promote distance education and virtual institutions, particularly in higher education and training;
- Promote the establishment of a national ICT center of excellence;
- Provide affordable infrastructure to facilitate dissemination of knowledge and skills through e-learning platforms;
- Promote the development of content to address the educational needs of primary, secondary, and tertiary institutions;
- Create awareness of the opportunities offered by ICT as an educational tool to the education sector;
- Facilitate sharing of e-learning resources between institutions.

CONCLUSION

The major finding of this research is that availability and usage of ICT is very essential to improve the educational efficiency of students. This indicates that availability of ICT in Education is supportive for the students to improve their learning skills, as well as latest technologies of ICT are helpful for the students to better prepare their assignments and projects. Results also show that ICT can helpful to produce the productive knowledge of students related to their studies. Our findings suggest that more the availability and usage of ICT in education sector will increase then as a result, more the efficiency of students will increase. Students were agree that ICT provides vast knowledge to students through internet and digital libraries, so it can helpful to enhance the educational efficiency at local, regional and national level. After analyzing all the results, we conclude that ICT brings a positive impact on Education sector.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

ROLE OF E-COMMERCE IN THE CONTEMPORARY BUSINESS

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ABSTRACT

The present article emphasizes the role of e-commerce in the contemporary business management based on an extensive review of literature. The e-commerce, which has been limited to a number of specified companies, is entering a new era where many unspecified persons, including general consumers, are involved on the networks. The e-commerce and electronic business (e-business) have become an essential component of business strategy for economic development. The e-commerce has also significantly contributed to overall capital deepening and therefore, helped in increasing labour productivity. The e-commerce enables developing country producers to overcome traditional limitations associated with restricted aces to information, high market-entry costs, and isolation from potential markets. Thus, e- commerce reshapes competitive dynamics in the traditional producer-driven and buyer-driven value chains such as automobiles, coffee and a host of other commodities and services. E-commerce forms part of a broader process of social change, characterized by the globalization of markets, the shift towards an economy based on knowledge and Information, and the growing dominance of technology. The e-commerce focuses primarily on enterprise's customers and e-business enlarges the connectivity of the enterprises to include their suppliers, employees and potential investors or partners. The rapid growth in e-business around the world has prompted many to look for better ways of measuring the phenomenon.

PROLOGUE

The electronic commerce is an act of buying and selling of goods and services, or the transmitting of funds or data over an electronic network primarily the Internet. In modern times, e-commerce facilitates the business transactions such as business-to-business, business-to-consumer, consumer-to-consumer or consumer-to-business. The terms e-commerce and e-business are often used interchangeably. The e-commerce has also grown remarkably in India. It is the second-largest user base in world, only behind China. It is growing at an unprecedented rate in India. Applications for electronic and mobile commerce are, however, developed sufficiently to cover all aspects of the market. Smartphone applications are implemented on different operating systems based on the installation of a Spree application, which allows partial web services to function because not all applications may work with these web services. The role of e-commerce in the contemporary business is primarily examined in this article, which is based on qualitative research methodology.

CONCEPT OF E-COMMERCE

Technological breakthrough in such areas as fax machines, telephone, video player, audio devices and televisions took many years to commercialize and measure their impacts on business. Compared to these breakthroughs, telecommunications, information communication technology, miniaturization, computers and Internet went through shorter product life styles, achieved widespread diffusion, reformed the nature of business operation, and enhanced competitive business environment instantly. This technological advancement has resulted in evolution and innovation of many products, services and business processes. One of them is the emergence of e-commerce or electronic commerce (Talha, 2011:17).

THE PRACTICE OF ELECTRONIC COMMERCE

Many of the implicit and explicit definitions of e-commerce rely on experience rather than on possible futures. There are various ways to define ecommerce by different people, different books or different parties. E-commerce is a general term for any type of business, or commercial electronic transaction that involves the transfer of information across the Internet. Electronic commerce is defined as the use of computers and electronic networks to conduct business with other businesses or with customers over the Internet or another electronic network. Electronic commerce consists of the buying and selling of products or services over electronic system such as internet and other computer network. Electronic commerce offers easier ways to access companies and individuals at very low cost in order to carry out day-to-day business transactions. Modern companies practice e-commerce to promote their products and services on search engine results pages, effective use of search engine advertisements and other forms. The United Nations Conference on Trade and Development has summarized the descriptive definitions of electronic commerce as stated below:

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E-commerce is commercial interaction over the internet, which can lower costs dramatically and facilitating new types of commercial transactions. As the Internet empowers citizens and democratizes societies, it is also changing classic economic paradigms. New models of commercial interaction are developing as businesses and consumers participate in an electronic marketplace and reap the resultant benefits. The Internet has the potential to revolutionize commerce and other areas. The Internet will revolutionize retail marketing. Commerce on the Internet could total tens of billions of dollars by the turn of the century (U.S. Executive Office of the President).

Electronic commerce is the carrying out of business activities that lead to an exchange of value across telecommunication networks (European Information Technology Observatory). E-commerce refers generally to all forms of transactions relating to commercial activities, including both organizations and individuals that are based upon the processing and transmission of digitized data, including text, sound, and visual images (Organization for Economic Co-operation and Development).

Electronic commerce or e-commerce has been defined as the ability to perform transactions involving the exchange of goods or services between two or more parties using electronic tools and techniques. It encompasses many diverse activities, including electronic trading of goods and services, online delivery of digital content, electronic fund transfers, electronic share trading, electronic bills of lading, commercial auctions, collaborative design and engineering, online sourcing, public procurement, direct consumer marketing, and after sales service (European Commission, 1998).

Electronic commerce, which has been limited to a number of specified companies, is entering a new era where many unspecified persons, including general consumers, are involved on the networks. In addition, its contents have come to include not only simple transactions of data concerning placement of orders or order acceptance but also to general commercial acts such as publicity, advertisements, negotiations, contracts, and fund settlements)International Trade and Industry, Japan). Electronic Commerce White Paper Electronic commerce, defined simply, is the commercial transaction of services in an electronic format (Transatlantic Business Dialogue). E-commerce builds on the structures of traditional commerce by adding more flexibility with computerized business transactions using the Internet, networks, and other digital technologies. E-commerce is commerce that is transacted electronically over the Internet, such as transact or facilitate the selling of products or services online (Malaysian International Chamber of Commerce and Industry).

Electronic commerce is about doing business electronically. It is based on the electronic processing and transmission of data, including text, sound, and video (UNCTAD, 2000). Electronic commerce or e-commerce refers to a wide range of online business activities for products and services. It also pertains to any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact. E-commerce is usually associated with buying and selling over the Internet, or con ducting any transaction involving the transfer of ownership or rights to use goods or services through a computer-mediated network. E-commerce is the use of electronic communications and digital information processing technology in business transactions to create, transform, and redefine relationships for value creation between or among organizations, and between organizations and individuals (Euro Info Correspondence Centre, 2002:09).

Electronic commerce involves the conduction of business communication and transactions over networks and through computers. It is an act of buying and selling of goods and services and the transfer of funds, through digital communications. It primarily includes all inter-company and intra-company functions (such as marketing, finance, manufacturing, selling, and negotiation) that enable commerce and use electronic mail, EDI, file transfer, fax, video conferencing, workflow, or interaction with a remote computer. Electronic commerce also includes buying and selling over the Web, electronic funds transfer smart cards, digital cash and all other ways of doing business over digital networks (Ardissono et. al, 2004:04).

Electronic commerce, or e-commerce, refers to economic activity that occurs online. E-commerce includes all types of business activity, such as retail shopping, banking, investing and rentals. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems. The buying and selling of products, services by business and consumers through an electronic medium, without using any paper documents constitute e-commerce (Niranjanamurthy et. al, 2013:14).

Electronic commerce or e-commerce refers to a wide range of online business activities for products and services. It also pertains to "any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact. E-commerce is usually associated with buying and selling over the Internet, or conducting any transaction involving the transfer of ownership or rights to use goods or services through a computer-mediated network. Though popular, this definition is not comprehensive enough to capture recent developments in this new and revolutionary business phenomenon. A more complete definition is E-commerce is the use of electronic communications and digital information processing technology in business transactions to create, transform, and redefine relationships for value creation between or among organizations, and between organizations and individuals (Gupta, 2014:10).

Electronic commerce refers to the purchase and sale of goods and/or services via electronic channels such as the Internet. E-commerce was first introduced in the 1960s via an electronic data interchange (EDI) on value-added networks (VANs). The medium grew with the increased availability of Internet access and the advent of popular online sellers in the 1990s and early 2000s. Like any digital technology or consumer-based purchasing market, e-commerce has evolved over the years. As mobile devices became more popular, mobile commerce has become its own market. With the rise of sites like Facebook and Pinterest, social media has become an important driver of e-commerce. The changing market represents a vast opportunity for businesses to improve their relevance and expand their market in the online world (Arline, 2015:05).

The e-commerce concept relates to business or financial transactions that facilitate electronic payments of items purchased from online stores and service vendors. E-commerce covers a broad range of business activities, from digital content used for online consumption to conventional orders of online merchandise. Online banking is another form of e-commerce. E-commerce transactions are conducted between businesses, businesses and consumers, businesses and government, businesses and employees and consumers and businesses. E-commerce is an interactive collaboration between a consumer and merchant. In online shopping, there is no intermediary - just the interaction between the online buyer and store/service provider. E-commerce involves electronic financial transactions, which are conducted securely. E-commerce also describes the exchange of data between the financing, billing and payment aspects of electronic business transactions (Beal, 2016:06).

E-commerce refers to business over the Internet. Web sites such as Amazon.com, Buy.com, and eBay are all e-commerce sites. The two major forms of e-commerce are Business-to-Consumer (B2C) and Business-to-Business (B2B). E-commerce is the buying and selling of goods and services on the Internet or other computer network. Any brick and mortar store can become an e-commerce business by adding a virtual storefront with an online catalog. In most cases, e-business refers exclusively to Internet businesses, but it may also refer to any business that uses Internet technology to improve productivity and profitability (Tech Terms, 2016:18).

E-commerce and electronic business (e-business) have become an essential component of business strategy for economic development. E-commerce trading practically supports the users with complete information and comments on the products and vendors in global business. E-commerce is the transaction of goods and services over the Internet**.** E-Commerce practitioners have long tried to promote the technological characteristics of the Internet to support better information seeking and decision making by consumers online. Continual innovations and achievements in enabling technologies are necessary for developed countries to sustain their leading positions in the global economy. Technological, organizational, and environmental contextual factors adapt the ability of e-businesses. Emerging e-commerce systems are anticipated to be available anytime, anywhere, and utilizing various official or personal computing devices. E-commerce trading practically supports the users with complete information and comments on the products and vendors in global business.

The various definitions of e-commerce given above suggest that e-commerce can be defined both in the narrow and broader sense. In narrow terms, e-commerce covers all transactions conducted on closed or open network using non-proprietary protocols, like the Internet, or over proprietary networks like intranet or extranet. While this definition excludes discrete sales (sporadic sales that do not involve substantial amounts) and transactions involving the use of electronic data interchange (EDI) and electronic funds transfer (EFT) and other electronic networks that were extensively used prior to the 1990's, it does not exclude electronically based transactions of the pre-internet era and includes the new possibilities of the future mode of transactions. In broader terms, it includes all those communication applications that support commercial activities. This definition focuses on e- commerce as a strategy or business model, rather than on e-commerce as an application or technology. In brief, the broader term encompasses e-commerce business activity and the narrower definition covers e-commerce transactions only. Various definitions given by the same organization have also changed over time. This points to the fact that an e-commerce definition is dynamic and varies with the objective one wants to measure. It is also important to note that e-commerce is more than a technology; it is a business model built around the application of information and communication technologies to any aspect of the value chain for products and services.

PROCESS OF E-COMMERCE

E-commerce involves a multiplicity of transactions and a large number of chains to complete the cycle of transactions. E-commerce begins with the customer who accesses the Internet by dialing a local phone number or using a direct connection. The customer surfs the Internet using a web browser to locate the company's cybermall and then browses through the cybermall itself. Upon selection of the products to be purchased, he can click on a payment icon that provides the necessary credit (or debit) card information to consummate the sale. The company permits the customer to download the products or services in digital form after the payment is complete. The customer can contact the service provider through a video conference in respect of procuring services. The company also makes shipping arrangements and the customer may download the payment receipt and the shipping information. This form of e-commerce gives the customer's credit facilities but is typified by the 'cash' trade cycle where a 'cash' payment is taken to include settlement at the time of purchase by a credit card or some form of e-cash. The first stage of the trade cycle involves 'search' and the facilities of the Internet can be used to locate sites offering or advertising, appropriate goods or

services; a function, as already mentioned, that is similar to an electronic market. In many instances, Internet sites offer only information and any further steps down the trade cycle are conducted on the telephone or at a conventional shop outlet. The delivery may be in electronic form or by a home delivery service depending upon the nature of the goods or service being offered. The final chain of the e-commerce transaction involves after-sales service (Whiteley, 2000:21).

E-COMMERCE AND ECONOMIC DEVELOPMENT

E-commerce has generated new dimensions in economic growth and has helped many countries to prosper economically in recent years. It has affected the investment climate for furthering development. The studies have revealed different effects on productivity and growth. The e-commerce has also significantly contributed to overall capital deepening and therefore, helped in increasing labour productivity. The rapid technological progress in the production of ICT goods and services has also contributed to higher multi-factor productivity growth in the ICT-producing sector. The lower transaction costs and more rapid innovation have considerably improved the overall efficiency of the national economy.

It is generally believed that e-commerce enables developing country producers to overcome traditional limitations associated with restricted aces to information, high market-entry costs, and isolation from potential markets (April and Cradock, 2000:03). The e-commerce has affected the global economy but the developing countries fall further technologically behind the industrialized world. The new information and communication technologies would deliver ever-higher rates of inflation-free growth. The e-commerce clearly has a positive impact on the business sector and enhanced the macroeconomic growth and productivity growth across the globe. However, there will be no productivity growth for many developing countries if they fail to catch up technologically with the industrialized world (United Nations Conference on Trade and Development, 2001:19). It is now widely accepted that information and communications technologies (ICT) and e-commerce are at the center of an economic and social transformation that is affecting all countries (Chan and Lee, 2001:08).

The revolution of e-commerce presents micro- and macro- economic challenges, not only for organizations, but also for governments (Callioni, 2004:07). The business processes have improved considerably due to application of e-commerce technology in modern times. The e-commerce has brought about a new age of innovation led development. The link between ICT and development is represented by access to networks, information and knowledge. ICT reduces market imperfections, as buyers and sellers are aware of the present market situations and can improve their business prospects tremendously. Thus, e- commerce reshapes competitive dynamics in the traditional producer-driven and buyer-driven value chains such as automobiles, coffee and a host of other commodities and services (Purohit and Purohit, 2005:16).

Organizations that are going to adopt e-commerce need to consider restructuring their entire business and create new strategies. They also need to implement new management processes, change their business culture, follow different procedures for managing their employees and build a well-structured and secure payment system (Well, 2005:20). Faster rates of economic growth can be achieved using IT as the driving factor in the economic policies of the worldwide economies. However, developing countries do not have appropriate infrastructure to support the development of IT. Most commonly, some of the major concerns with the advent of IT in such countries are the inability to invest in the IT field due to poor financial infrastructure and inadequate human power having knowledge of IT (Kodakanchi et al., 2006:12).

E-commerce forms part of a broader process of social change, characterized by the globalization of markets, the shift towards an economy based on knowledge and Information, and the growing dominance of technology. In order to allow a smooth transition to e-commerce, investments are required in the social infrastructure and skills to allow the use of the technology in a way that is compatible with the local circumstances, cultures and abilities of users in developing countries. E-commerce provides developing country producers with opportunities for accessing new international markets at low cost and minimal capital investment, for improving competiveness and customer services, and for reducing transaction costs and overheads. It also enables producers to overcome traditional limitations associated with restricted aces to information, high market-entry costs, and isolation from potential markets (Hamed, 2009:11).

The Internet has resulted in the emergence of virtual markets with four primary distinctive characteristics, which are real time, shared, open and global. The application of Internet is divided in to three major activities that are publishing corporate information, conducting electronic commerce and business transformation. The greatest feature of the Internet is the absence of intermediaries; the manufacturers are able to sell their product relatively easier to buyers via Internet. E-commerce today is no longer technological issue, but is also a business issue. E-commerce involves a number of forms, varying level of cost and complexity, depending on business need. For the past few years, across a globe, e-commerce has improved significantly, but some issues remain elusive (Talha, 2011:17).

EU's agenda is focused in the raise of efforts for profit from utilization of information technology like a fast way for overcome the crisis. The utilization of information technology would be a good way for businesses that operate in Albania to better overcome the crisis and to continue successful their activity. The economy of Albania would improve commendably based on adoption of e-

commerce technique (Acka, 2012:01). Along with the substantial and rapid development of ICT, e-commerce technologies have emerged as an important type of knowledge capital for operating a business. Information and communication affect to both the supply and demand sides. ICT have effects on the economic behavior of consumers through the utility function on the demand side, and it is influential on the producer treatment on the supply side. The relationship between ICT and economic growth and efficiency on the supply side of the economy is determined by some complementary factors including organization and management experience, organizational and legislative part, and communications structure as an output on the supply side of the economy, among other factors entering into the capital, thereby leading to the improvement of the production process through capital deepening, advances in technology, and the quality of the labor force. The governments should adopt appropriate policies and provide the necessary conditions for the development and promotion of ICT. The government should also pay further attention to economic planning in order to improve e-commerce indicators, so that the total government measurements could eventually lead to economic development in the country. Our empirical results provided a good reference for other developing countries (Anvari and Norouzi, 2016:02).

The e-commerce has positive impact on macroeconomic variables as GDP, welfare, wages and terms of trade. Studies have reported that e-commerce would become an important tool for national development by reducing costs, increasing efficiency, reducing time and distances. The e-commerce would actually work in favour of developing countries, as most of them rely heavily on such taxes for their government budgets and will be net importers of e-commerce in the medium term. The e-commerce has also brought about greater business consolidation, the formation of strategic alliances and greater focus on the provision of differentiated and specialized products and services across the globe.

ROLE OF E-COMMERCE IN THE NEW MILLENNIUM

E-commerce encompasses many areas, which include electronic catalogues that refers to means whereby sellers can communicate their offerings to potential buyers. In addition, electronic data interchange that refers to a particular family of standards for expressing the structured data that represent E-commerce transactions; and electronic auctions, which is a particular set of mechanisms that help in the setting of prices. E-commerce can be understood as a system designed as an online storefront that manages orders and inventory, processing transactions, where people can buy and sell goods and services, including sports, computers, hobbies, antiques, electronics, books, music, automobiles, holidays and much more, all around the world. The goods and services available through E-commerce can be finished goods as well as raw materials for the manufacture of other goods or services that are provided for the same reason.

E-commerce is known to use some tools such as electronic commerce service and a particular payment system, to make its use easier for customers and to secure transactions. Modern electronic commerce typically uses the World Wide Web for at least one part of the transaction's life cycle, although it may also use other technologies such as e-mail. A Smartphone is a mobile phone with an advanced mobile operating system that combines features of a computer operating system with other features useful for mobile or handheld use. They typically combine the features of a cell phone with those of other popular mobile devices, such as personal digital assistant (PDA), media player and GPS navigation unit. Most smart phones can access the Internet, have a touch screen user interface, can run third-party apps, music players and are camera phones. Most smart phones produced from 2012 onwards also have high-speed mobile broadband 4G LTE internet, motion sensors, and mobile payment. Smart phone applications for e-commerce have become a new way of life in the present times.

The e-commerce has become an integral part of everyday life since it is a necessity for most people, particularly in the urban areas. This was the predecessor of online commerce, which started in India post 2000. The e-commerce offers greatest opportunities in the retail sector since it provides a dramatic change from brick and mortar establishments to virtual shops, which could operate for a fraction of the cost. An in-depth understanding of the legal regime and the possible issues that an e-commerce business would face coupled with effective risk management strategies has been the need of the hour for e-commerce businesses to thrive in this industry (Nishith Desai Associates, 2015:15).

E-commerce can be an extraordinary job and economic development tool in the new millennium. The e-commerce has become most common especially in the developed world. It is in the stage of infancy in India and other developing nations. The US, Europe and other nations have not capitalized on e-commerce as an avenue for a full participation in global trade by their SMEs. Very little has been done to develop the trade finance structure and capital goods trade settlement infrastructure of e-commerce platforms so that these provide the full array of financial alternatives for SMEs wishing to engage in importing, exporting and investing (Laraque, 2016:13).

CONCLUSION

The explosion of e-commerce has created new phenomena in our lifestyle especially in shopping activities. Consumers can easily buy products or services like magazines and airlines tickets via Internet. The e-commerce focuses primarily on enterprise's customers and e-business enlarges the connectivity of the enterprises to include their suppliers, employees and potential investors

or partners. The security aspect is expected to improve such as introduction of new protocol like Ipv6 and it is within enterprise control, tax and legal aspect beyond enterprise's discretion as it involves government intervention and global commitments for more standardize definition and regimes. The rapid growth in e-business around the world has prompted many to look for better ways of measuring the phenomenon.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

IMPLEMENTING DATA STORAGE SECURITY IN CLOUD COMPUTING USING OPTIMIZED FISHER-YATES ALGORITHM

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ABSTRACT

In distributed computing information stockpiling is a huge issue because the whole information live over a set of interconnected asset pools that empowers the information to be gotten to through virtual machines. It moves the application programming and databases to the vast server farms where the administration of information is really done. As the asset pools are arranged over different corners of the world, the administration of information and administrations may not be completely dependable. In this way, there are different issues that need to be tended to regarding the administration of information, administration of information, security of information, security of information and so on. Nevertheless, the protection and security of information is very difficult. To guarantee protection and security of information very still in distributed computing, we have proposed a compelling and a novel methodology to guarantee information security in distributed computing by method for concealing information inside pictures emulating is the idea of Image Shuffling using Optimized Fisher-Yates Algorithm. The fundamental objective of this paper is to keep information access from cloud information stock piling focuses by unapproved clients. This plan perfectly stores information to cloud database and information stock piling focuses and recovers information from it when it is required.

KEYWORDS

Cloud Computing, Data Storage Security, Steganography and Image Shuffling, Fisher-Yates Algorithm etc.

INTRODUCTION

Cloud computing is available over the internet to share data, applications and hardware. Cloud computing provides unlimited infrastructure to store data and execute the applications. The customers do not need to own the infrastructure. One of the main problems with cloud based computing services, is that the uncertainty about the level of information security offered by these services. Infrastructure-as-a-service (IaaS) of cloud computing system is seen as providing all access control security. In the clouds, data are sent to and processed in the environment that is not under the user or data owner control. Therefore, it could potentially be compromised either by clouds insiders or by other users sharing the same resource. Data must be secured during all processing stages including: Uploading, processing, storing, streaming and/or visualizing. Policies and security requirements must be bound to the data. To enforce these policies, the corresponding security mechanisms should be in place.

1. DATA SECURITY ISSUES IN THE CLOUD DATA BASE

Privacy and Confidentiality

Once the client host data to the cloud database there should be some guarantee that access to that data will only be limited to the authorized access. Inappropriate access to customer sensitive data by cloud personnel is another risk that can pose potential threat to cloud data. Assurances should be provided to the clients and proper practices and privacy policies and procedures should be in place to assure the cloud users of the data safety. The cloud seeker should be assured that data hosted on the cloud database would be confidential.

Data Integrity

With providing the security of data, cloud service providers should implement mechanisms to ensure data integrity and be able to tell what happened to a certain dataset and at what point. The cloud provider should make the client aware of what particular data is hosted on the cloud, the origin and the integrity mechanisms put in place. Cloud computing acting as a hot topic in IT industry. Cloud computing is internet based development and is used in computer technology. Cloud computing manages and schedules the computing resources through network, and constitutes a large computing resources pool which can provide service to users on their demand.

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The network is called "cloud". Resources in cloud is seems that can be extended unlimitedly, got anytime, used on-demand and paid according to apply. It dynamically delivers everything as a service over the internet based on user demand, such as network, operating system, storage, hardware, software, and resources.

These services are classified into three types: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).

There are Four main Types of Cloud

Public Cloud: The cloud computing resources are shared outside, anyone can use it and some payment maybe required.

Private Cloud: It is opposite to public cloud, private cloud's resources are limited to a group of people or a single person, like a staff of a company or an individual etc.

Hybrid Cloud: This is a mixture of previous two clouds, some cloud computing resources are shared outside but some do not which depends on requirement.

Community Cloud: This is a special cloud to make use of cloud computing features. More than one community shares a cloud to share and reduce the cost of computing system.

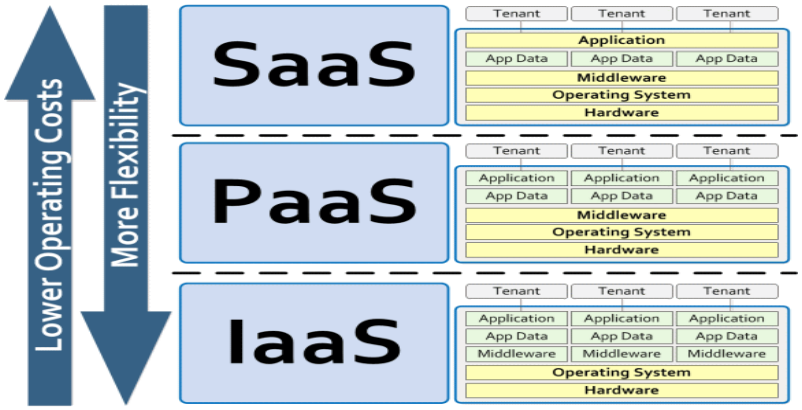
Data storage in Cloud offers so Many Benefits to Users

- It provides unlimited data storage space for storing user's data.
- Users can access the data from the cloud provider via internet anywhere in the world and by using the different kind of client devices.

We do not buy any storage device for storing our data and have no responsibility for local machines to maintain data.

Each service delivery model has different possible implementations, as in Figure 1, which complicates the development of standard security model for each service delivery model. Moreover, these service delivery models may coexist in one cloud platform the security management process.

Figure-1: Cloud Service Delivery Model



Sources: http://www.ibm.com

It is clear that the security issue has played the most important role in hindering cloud-computing acceptance. Without doubt, putting your data, running your software on someone else's hard disk using someone else's CPU appears daunting to many. Well-known security issues such as data loss, phishing, and botnet (running remotely on a collection of machines) pose serious threats to organization's data and software. Moreover, the multi-tenancy model and the pooled computing resources in cloud computing has introduced new security challenges that require novel techniques to tackle with. For example, hackers can use cloud to organize botnet as cloud often provides more reliable infrastructure services at a relatively cheaper price for them to start an attack.

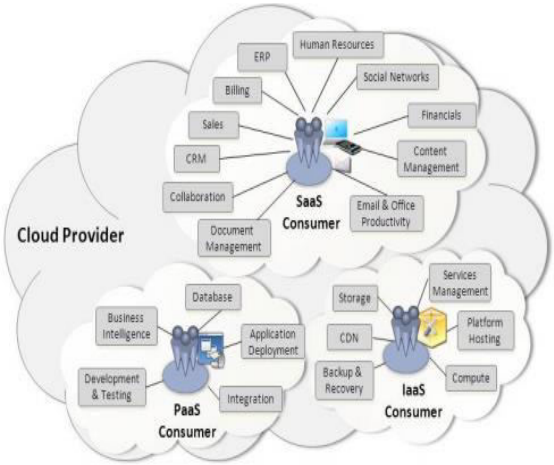
Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

2. PROBLEM STATEMENT

Managing data-when sending to the cloud database and when retrieving the data from the cloud database plays a crucial role in cloud computing. The main issue with data- in cloud, computing is providing security and unauthorized user may have access the data in a shared environment. However, now a-days storage devices are powered by encryption methodologies, which restrict unauthorized access to data to share extents. If the encryption and decryption keys are accessible to malicious users encryption methodologies fails to provide authorized access. Another approach to provide security in data-at-rest is to hide data behind images, following the concept of stenography. This paper aims to provide a better security through steganography.

System Architecture: Schematic network architecture for our proposed model for cloud data storage is illustrated in Figure 2. In this architecture, we have different network entities, which can be identified as follows:

Figure-2: Architecture of Cloud Data Security Model



Sources: Authors Compilation

Users or organizations who have their data for storage in the cloud and rely on the cloud for data computation.

A cloud service provider , which have significant resources of grayscale image of various sizes, a database that maintains records of file names, number of characters present etc. Security Model our proposed model aims to secure data of cloud database. Not by physically storing the data, instead of the data transferring over the network. This underlining concept is known as steganography.

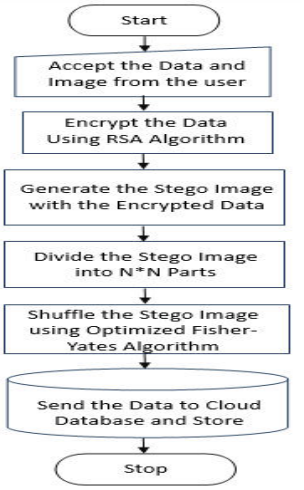
3. PROPOSED SYSTEM

The proposed system is improving the security of the data sending to the cloud database by Image Shuffling using Optimized method of Fisher-Yates algorithm, in this method the data will be encrypted and a stego image is generated which is shuffled using the Optimized method of Fisher-Yates algorithm and sent to the cloud database.

The shuffled and stego image will be retrieved from the cloud database in which original data is available, from which the image is unshuffled and data is retrieved from stego image then decrypted then displayed to the user.
When sending the data to the cloud database use the following steps.

Step1: Accept the data from the user including the image.
Step2: Encrypt the data using RSA algorithm.
Step3: Hide the data in to the image and generate the '*Stego Image'*.
Step4: Divide the *Stego Image* into the N*N Parts.
Step5: Shuffle the parts of created in Step4 using Optimized Fisher-Yates algorithm.
Step6: Send tis data to the Cloud Database.

Figure-3: Flow Chart Represents Sending the Data to the Cloud Database



Sources: Authors Compilation

4. FISHER YATES ALGORITHM

The Fisher–Yates shuffle is an algorithm for generating a random permutation of a finite set—in plain terms, the algorithm shuffles the set of given values using random generator. The Fisher–Yates shuffle, in its original form, was described in 1938 by Ronald Fisher and Frank Yates in their book Statistical tables for biological, agricultural and medical research. Their description of the algorithm used pencil and paper a table of random numbers provided the randomness. The basic method given for generating a random permutation of the numbers 1 through N goes as follows:

Algorithm1: Original Fisher-Yates Algorithm

```
Input: n: The Number of Blocks, SourceArray[n]
Output: Shuffle Order Pattern, ShuffleArray[n]
Start ← The Start value of the Shuffle
Stop ← The Stop value of the Shuffle and is equal to n
for i = 0 to Stop do
        Rand=Generate a RandomValue(0, n)
        Initialize Count=0
        for j=0 to Count-1
         if ShuffleArray[j] == Rand
                bool check=true;
                break;
         else
                Count++
         End if
        End for
        If(!check)
                ShuffleArray[i]=Rand;
End for
```

Drawbacks in Fisher – Yates algorithm

- Takes more time for large number of shuffles.
- There are many possibilities for generating duplicate values, which is frustrating.

To overcome the above drawbacks we propose a new binomial method to optimize the Fisher-Yates algorithm:

- Divide the total count into 2 sets.
- Use Fisher – Yates algorithm to generate the first half of the permutations.

- Use Fisher – Yates algorithm to generate the second half of the permutations.

Modified algorithm is like

Algorithm2: Optimized Binomial Split of Fisher-Yates Algorithm

```
Input: n: The Number of Blocks, SourceArray[n]
Output: Shuffle Order Pattern, ShuffleArray1[n/2], ShuffleArray2[n/2] ShuffleArray[n]
Start1 ← The Start value of the First Shuffle
Stop1 ← The Stop value of the First Shuffle and is equal to n/2
Start2 ← The Start value of the Second Shuffle and is equal to n/2
Stop2 ← The Stop value of the Second Shuffle and is equal to n
        for i = 0 to Stop1 do
                Rand=Generate a RandomValue(0, n)
                Initialize Count=0
                for j=0 to Count-1
                if ShuffleArray1[j] == Rand
                        bool check=true;
                        break;
                else
                        Count++
                End if
                End for
                 If(!check)
                        ShuffleArray1[i]=Rand;
                        check=false
                 End if
                End for
      for i = Stop1+1 to Stop2 do
                Rand=Generate a RandomValue(n/2 +1, n)
                Initialize Count=0
                for j=0 to Count-1
                if ShuffleArray2[j] == Rand
                        bool check=true;
                        break;
                else
                        Count++
                End if
                End for
                 If(!check)
                        ShuffleArray2[i]=Rand;
                        check=false
                 End if
       End for
      Merge ShuffleArray1 and ShuffleArray2 into ShuffleArray
```

Still to improve the performance we propose a new quadruple spilt method to the Fisher-Yates algorithm:

- Divide the total count into 4 sets.
- Use Fisher – Yates algorithm to generate the first half of the permutations.
- Use Fisher – Yates algorithm to generate the second half of the permutations.

Modified algorithm is like

Algorithm3: Optimized Quadruple Split of Fisher-Yates Algorithm

```
Input: n: The Number of Blocks, SourceArray[n]
Output: Shuffle Order Pattern, ShuffleArray1[n/4], ShuffleArray2[n/4], ShuffleArray3[n/4], ShuffleArray4[n/4]
ShuffleArray[n]
```

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
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```
Start1 ← The Start value of the First Shuffle
Stop1 ← The Stop value of the First Shuffle and is equal to n/4
Stop2 ← The Stop value of the Second Shuffle and is equal to n/2
Stop3 ← The Stop value of the Third Shuffle and is equal to 3n/4
Stop4 ← The Stop value of the Fourth Shuffle and is equal to n
        for i = 0 to Stop1 do
                Rand=Generate a RandomValue(0, n/4)
                Initialize Count=0
                for j=0 to Count-1
                if ShuffleArray1[j] == Rand
                        bool check=true;
                        break;
                else
                        Count++
                End if
                End for
                 If(!check)
                        ShuffleArray1[i]=Rand;
                        check=false;
                 End if
                End for

        for i = Stop1+1 to Stop2 do
                Rand=Generate a RandomValue(n/2 +1, n)
                Initialize Count=0
                for j=0 to Count-1
                if ShuffleArray2[j] == Rand
                        bool check=true;
                        break;
                else
                        Count++
                End if
                End for
                If(!check)
                        ShuffleArray2[i]=Rand;
                        check=false
                End if
        End for
        for i = Stop2+1 to Stop3 do
                Rand=Generate a RandomValue(n/2 +1, 3n/4)
                Initialize Count=0
                for j=0 to Count-1
                if ShuffleArray3[j] == Rand
                        bool check=true;
                        break;
                else
                        Count++
                End if
                End for
                If(!check)
                        ShuffleArray3[i]=Rand;
                        check=false;
                end if
        End for
        for i = Stop3+1 to Stop4 do
                Rand=Generate a RandomValue(3n/4, n)
                Initialize Count=0
                for j=0 to Count-1
                if ShuffleArray4[j] == Rand
                        bool check=true;
```

```
                    break;
            else
                    Count++
            End if
            End for
            If(!check)
                    ShuffleArray4[i]=Rand;
                    check=false;
            end if
End for
```

Merge ShuffleArray1, ShuffleArray2, ShuffleArray3 and ShuffleArray4 into ShuffleArray

4.1 Metrics calculated for Image Shuffling Algorithm

We have checked the following metrics for the Image Shuffling algorithm:

- Execution Time of Algorithm,
- NPCR (Number of Pixels Chang Rate),
- UACI (Unified Average Changing Intensity),
- Image Histograms,
- PSNR (Peak Signal-to-Noise Ratio).

4.1.1 Execution Time Comparisons

Below table shows the execution time comparisons for the Fisher-Yates algorithm and our proposed algorithm by dividing the total count of values into 2sets and 4sets.

Table-1: Shows Execution Time Calculations of Our Algorithm Compared with Fisher-Yates Original Algorithm

S. No.	N Value (n =N*N Number of Blocks)	Fisher-Yates Algorithm	Binomial Split of Fisher-Yates Algorithm	Quadruple Split of Fisher-Yates Algorithm
		Time in Seconds	Time in Seconds	Time in Seconds
1	40	0.12	0.09	0.059
2	50	0.24	0.118	0.082
3	60	0.341	0.175	0.142
4	70	0.529	0.268	0.258
5	80	0.738	0.384	0.315
6	90	1.113	0.773	0.432
7	100	2.564	0.833	0.55
8	110	2.685	1.232	0.763
9	120	2.947	1.631	0.985
10	130	5.537	2.144	1.346
11	140	6.3	2.984	1.628
12	150	9.621	3.805	2.282
13	160	10.306	4.732	3.013
14	170	14.545	6.559	3.881
15	180	23.144	8.476	4.436
16	190	31.548	12.24	5.393
17	200	36.95	15.821	7.465
18	250	73.445	30.582	16.603
19	300	173.721	63.518	30.271
20	350	265.664	137.896	59.404
21	400	399.235	229.561	109.288
22	450	723.374	377.851	173.187
23	500	1130.636	554.427	292.587

Sources: Authors Compilation

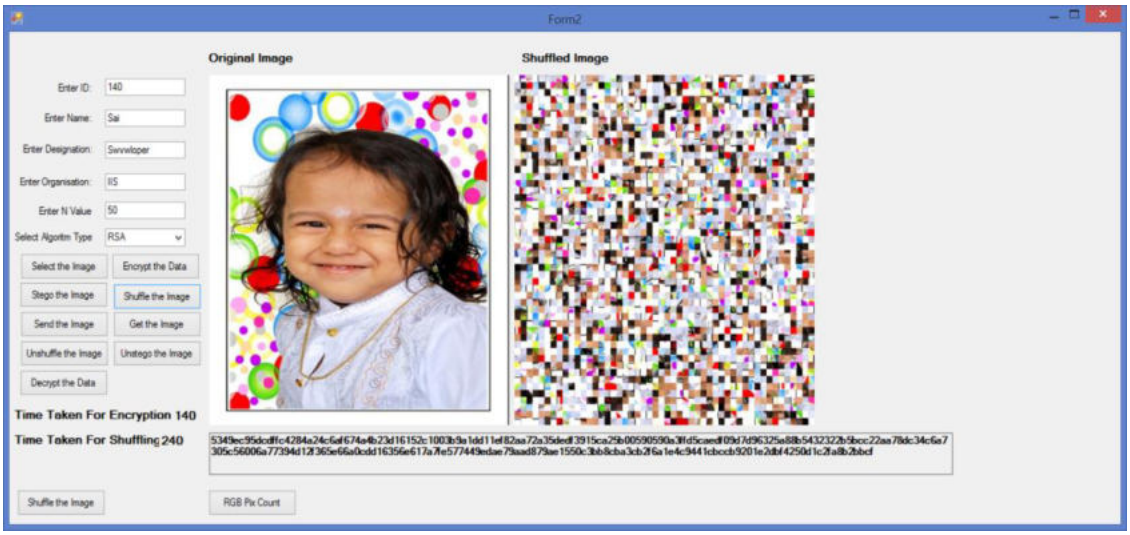
From this execution, we have found that our algorithm with 2sets is taking half of the time and with 4sets is taking one-fourth of the time as compared with the original Fisher-Yates algorithm; by this, we have proved that our proposed algorithm for shuffling is efficient as compared with the original Fisher-Yates algorithm.

The time complexity of the Fisher-Yates algorithm is n logn and we can say that time complexity of Fisher-Yates algorithm with Binomial split is (n logn)/2 and time complexity of Fisher-Yates algorithm with Binomial split is (n logn)/4.

Results Screens to Show the above Time Comparisons

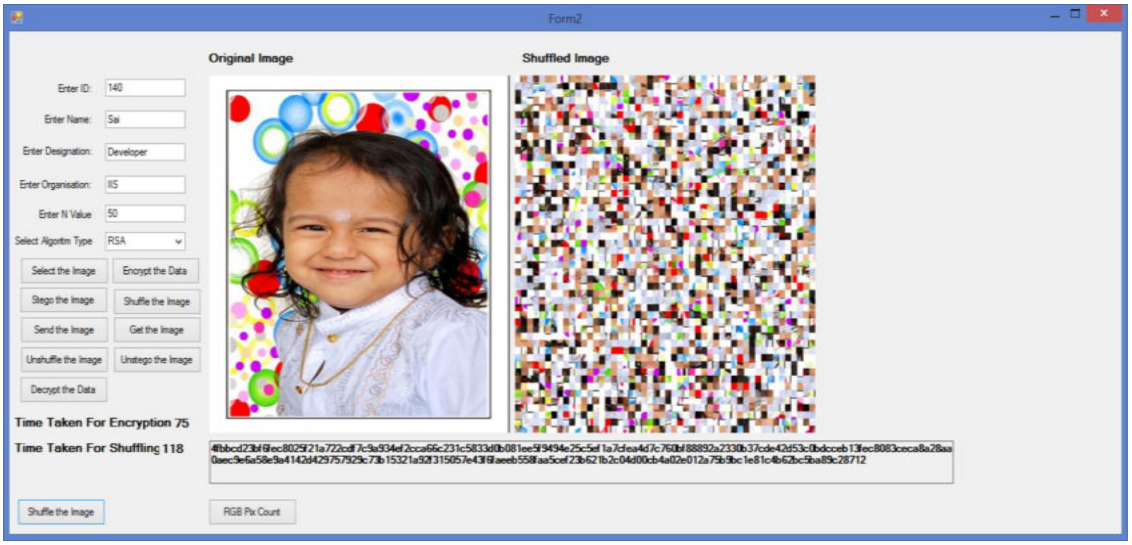
In a method we have used C# programming language for coding, Visual Studio as the Ide to develop the application, Microsoft Azure Data services cloud to store and retrieve the data. Below we have included some of the results and screen shots of the implementation.

Figure-4: Image shuffled with 50X50 parts using the Fisher-Yates Original Algorithm



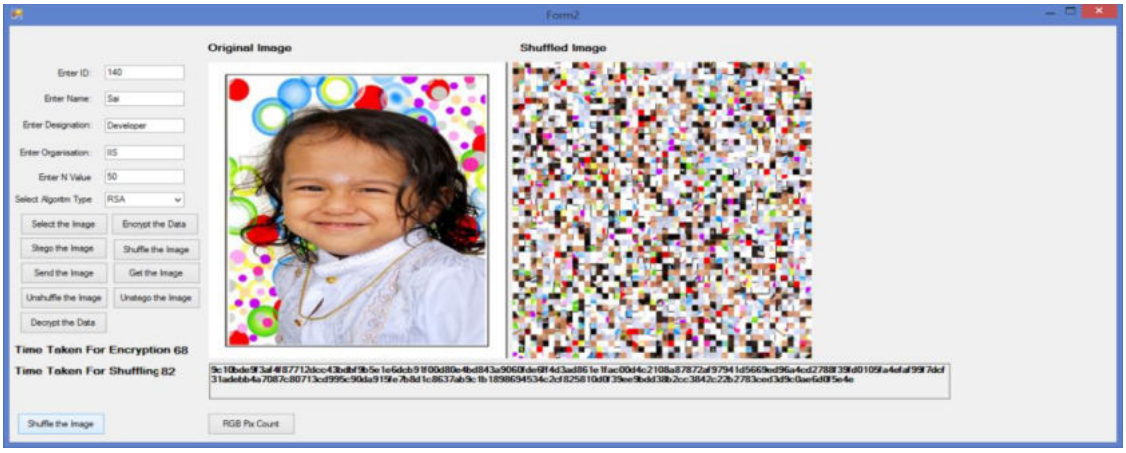
Sources: Authors Compilation

Figure-5: Image shuffled with 50X50 parts with Binomial Split of Fisher Yates Algorithm



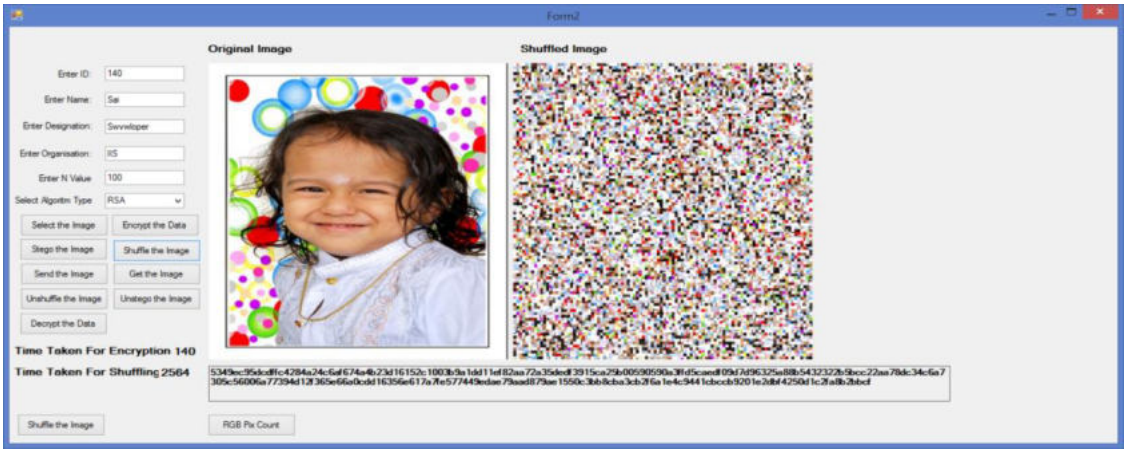
Sources: Authors Compilation

Figure-6: Image shuffled with 50X50 parts with Quadruple Split of Fisher Yates Algorithm



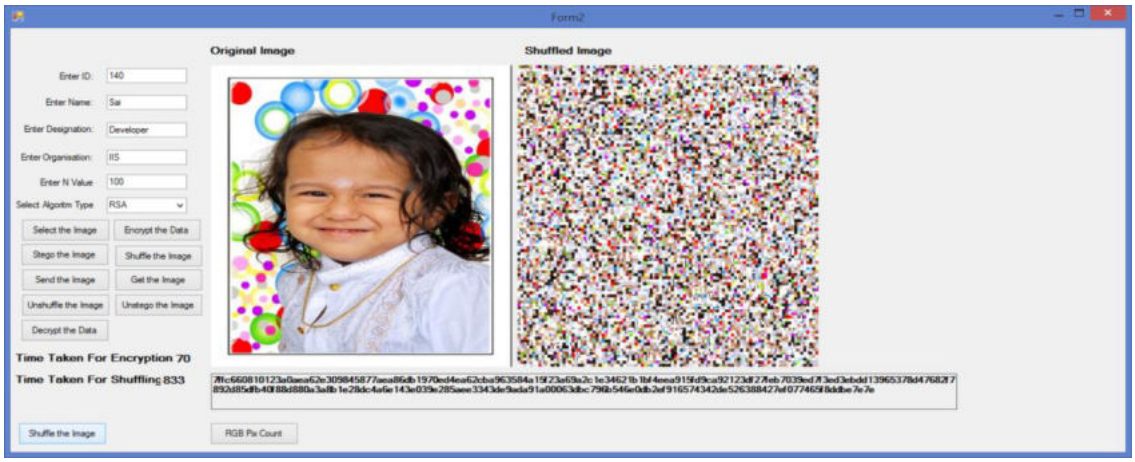
Sources: Authors Compilation

Figure-7: Image shuffled with 100X100 parts with original Fisher-Yates Algorithm



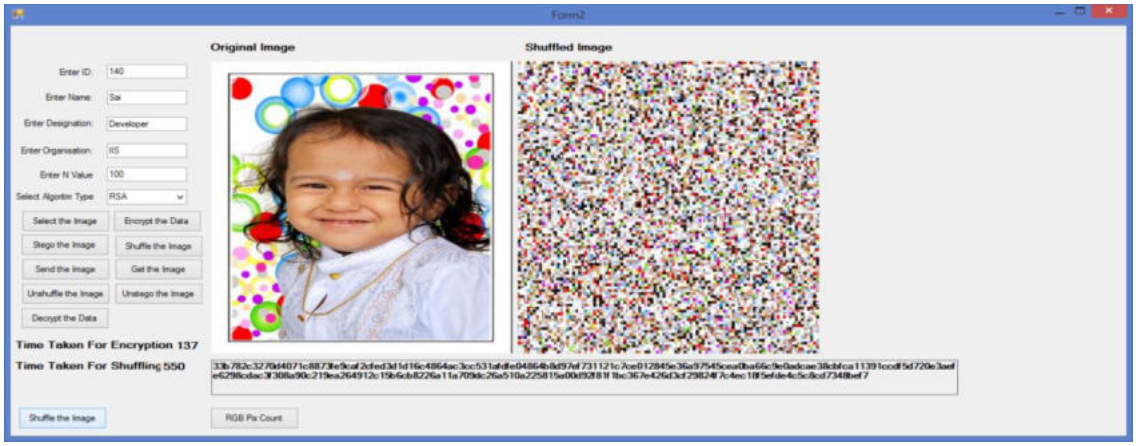
Sources: Authors Compilation

Figure-8: Image shuffled with 100X100 parts with Binomial Split of Fisher Yates Algorithm



Sources: Authors Compilation

Figure-9: Image shuffled with 100X100 parts with Quadruple Split of Fisher Yates Algorithm



Sources: Authors Compilation

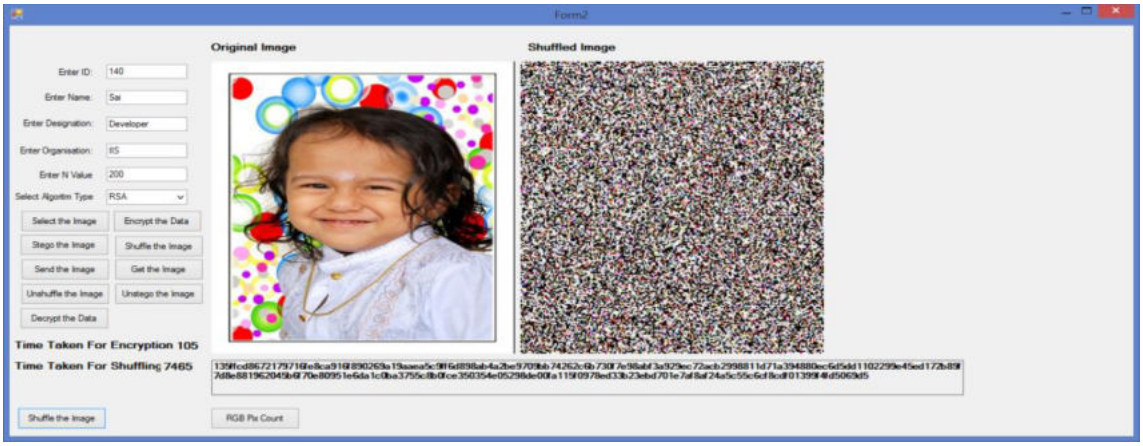
Figure-10: Image shuffled with 200X200 parts with original Fisher-Yates Algorithm

Sources: Authors Compilation

Figure-11: Image shuffled with 200X200 parts with Binomial Split of Fisher Yates Algorithm

Sources: Authors Compilation

Figure-12: Image shuffled with 200X200 parts with Quadruple Split of Fisher Yates Algorithm



Sources: Authors Compilation

4.1.2 NPCR (Number of Pixels Change Rate)

Consider two images, whose corresponding plain image and encrypted image, be denoted by IMG(o) and IMG(enc). A bipolar array, D with the same size as images IMGo and IMG(enc) is defined. Then, D(i,j) is determined by IMG(o) and IMG(enc), namely, if IMGo(i,j) = IMGenc(i,j) then D(i,j) = 0; otherwise, D(i,j) = 1. Then NPCR is defined as:

$$NPCR = \sum_{i=1}^{m} \sum_{j=1}^{n} D(i,j) * \frac{100\%}{M * N}$$

Where D(I,j) = $\begin{Bmatrix} 0 \; if \; \mathrm{IMGo(i,j)} = \mathrm{IMGenc(i,j)} \\ 1 \; if \; \mathrm{IMGo(i,j)} \neq \mathrm{IMGenc(i,j)} \end{Bmatrix}$

For the Image size 512 X 512 we have calculated NPCR value for different blocks and comparison is made in the below table.

Table-2: Shows NPCR Calculations of Our Algorithm Compared with Fisher-Yates Original Algorithm

	Fisher-Yates Algorithm			Our Algorithm with 2sets			Our Algorithm with 4sets		
Blocks	**R**	**G**	**B**	**R**	**G**	**B**	**R**	**G**	**B**
50X50	73.49	87.47	94.35	72.73	87.30	94.75	74.33	87.45	94.40
100X100	73.71	87.45	94.96	73.40	88.20	96.24	72.88	87.54	94.89
150X150	63.14	73.32	79.85	63.54	73.94	80.40	62.77	73.34	79.70
200X200	79.21	83.83	87.25	78.85	83.32	86.6	78.64	83.56	86.98
250X250	73.60	87.77	95.36	73.86	87.85	95.24	73.60	87.87	95.69
300X300	78.80	83.48	87.01	78.30	83.00	86.40	78.59	83.48	87.12
350x350	37.24	43.69	47.86	37.31	43.64	47.87	37.18	43.57	47.67
400X400	50.19	58.14	63.33	49.98	58.04	63.21	50.08	58.12	63.36
450X450	63.00	73.70	80.33	63.12	73.62	80.12	62.89	73.59	80.07
500X500	73.78	87.74	95.55	73.69	87.81	95.56	73.77	87.57	95.43

Sources: Authors Compilation

From the *Table2* values we can see that our algorithm is giving >=99% Quality of the RGB Values for the cypher image as compared with original Fisher-Yates algorithm with the less execution time as discussed in section 4.1.1.

4.1.3 UACI (Unified Average Changing Intensity)

Consider two images, whose corresponding plain image and encrypted image, be denoted by IMGo and IMGenc. A bipolar array, D with the same size as images IMGo and IMGenc is defined. Then, D(i,j) is determined by IMG(o) and IMG(enc), Then UACI is defined as:

$$UACI = \left[\left[\sum_{i=1}^{m}\sum_{j=1}^{n}\left|\frac{\mathrm{IMGo(i,j)} - \mathrm{IMGenc(i,j)}}{255}\right|\right] * \frac{100\%}{M * N}\right]$$

For the Image size 512 X 512 we have calculated UACI values for different blocks and comparison is made in the below table.

Table-3: Shows UACI Calculations of Our Algorithm Compared with Fisher-Yates Original Algorithm

	Fisher-Yates Algorithm			Our Algorithm with 2sets			Our Algorithm with 4sets		
Blocks	**R**	**G**	**B**	**R**	**G**	**B**	**R**	**G**	**B**
50X50	24.50	29.16	31.45	24.24	29.10	31.58	24.78	29.14	31.47
100X100	24.57	29.15	31.65	24.47	29.40	32.08	24.30	29.18	31.63
150X150	21.05	24.44	26.62	21.18	24.65	26.80	20.92	24.46	26.56
200X200	26.40	27.95	29.09	26.28	27.77	28.87	26.22	27.85	29.00
250X250	24.53	29.26	31.80	24.62	29.28	31.75	24.53	29.29	31.90
300X300	26.26	27.83	29.00	26.10	27.67	28.80	26.12	27.83	29.04
350x350	12.41	14.56	15.95	12.43	14.55	15.96	12.39	14.52	15.89
400X400	16.73	19.38	21.11	16.66	19.35	21.07	16.69	19.37	21.12
450X450	21.00	24.57	26.78	21.03	24.54	26.70	20.96	24.53	26.69
500X500	24.59	29.24	31.85	24.56	29.27	31.85	24.59	29.19	31.80

Sources: Authors Compilation

From the *Table3* values we can see that our algorithm is giving >=99.5% Quality of the RGB Values for the cypher image as compared with original Fisher-Yates algorithm with the less execution time as discussed in section 4.1.1

4.1.4 Comparisons of Image Histograms

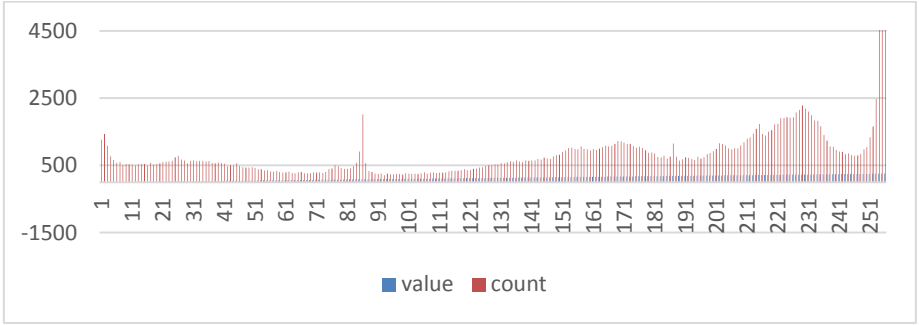
An **image histogram** is a graphical representation of the number of pixels in an image as a function of their intensity.

An image histogram is a type of histogram that acts as a graphical representation of the tonal distribution in a digital image. It plots the number of pixels for each tonal value. By looking at the histogram for a specific image, a viewer will be able to judge the entire tonal distribution at a glance.

Histograms are made up of *bins*, each bin representing a certain intensity value range. The histogram is computed by examining all pixels in the image and assigning each to a bin depending on the pixel intensity. The final value of a bin is the number of pixels assigned to it. The number of bins in which the whole intensity range is divided is usually in the order of the square root of the number of pixels.

The horizontal axis of the graph represents the tonal variations, while the vertical axis represents the number of pixels in that particular tone. In the field of computer vision, image histograms can be useful tools for thresholding. Because the information contained in the graph is a representation of pixel distribution as a function of tonal variation, image histograms can be analyzed for peaks and/or valleys.

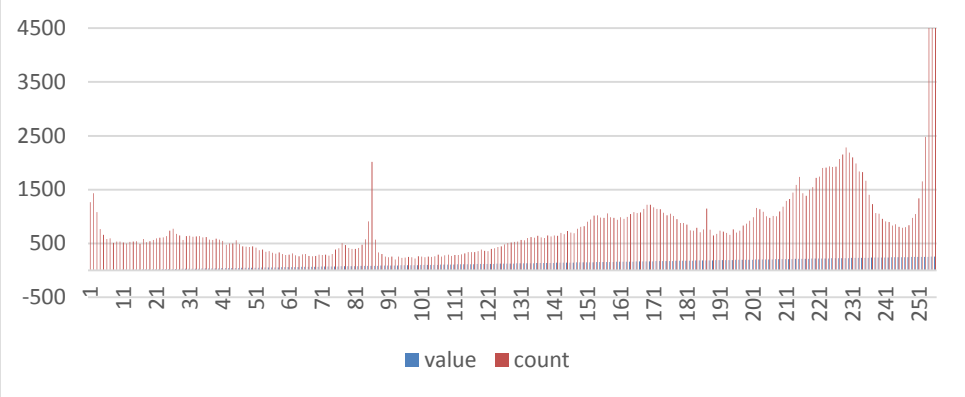
Figure-13: Image Histogram for 50X50 Blocks using Fisher-Yates Algorithm



Sources: Authors Compilation

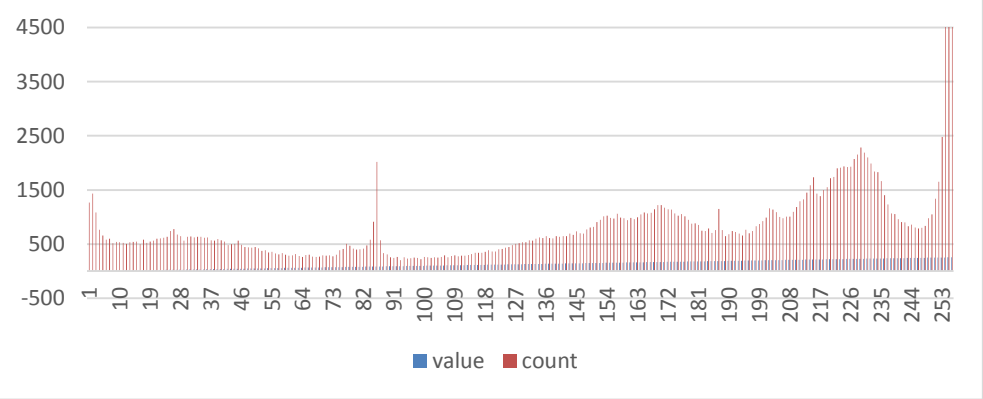
Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

Figure-14: Image Histogram for 50X50 Blocks using Binomial Fisher-Yates Algorithm



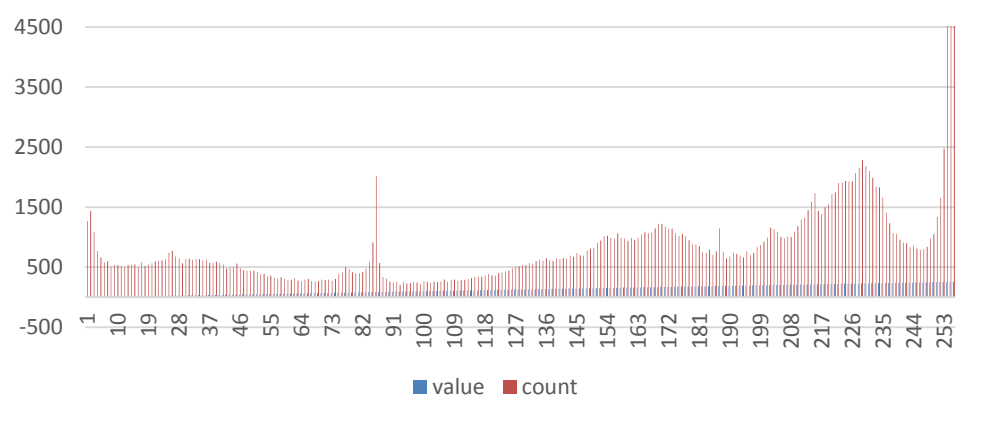
Sources: Authors Compilation

Figure-15: Image Histogram for 50X50 Blocks using Quadruple Fisher-Yates Algorithm



Sources: Authors Compilation

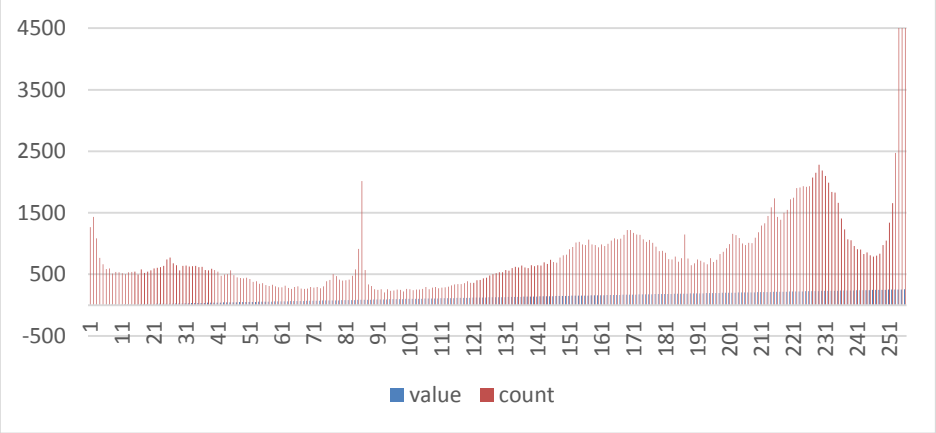
Figure-16: Image Histogram for 100X100 Blocks using Fisher-Yates Algorithm



Sources: Authors Compilation

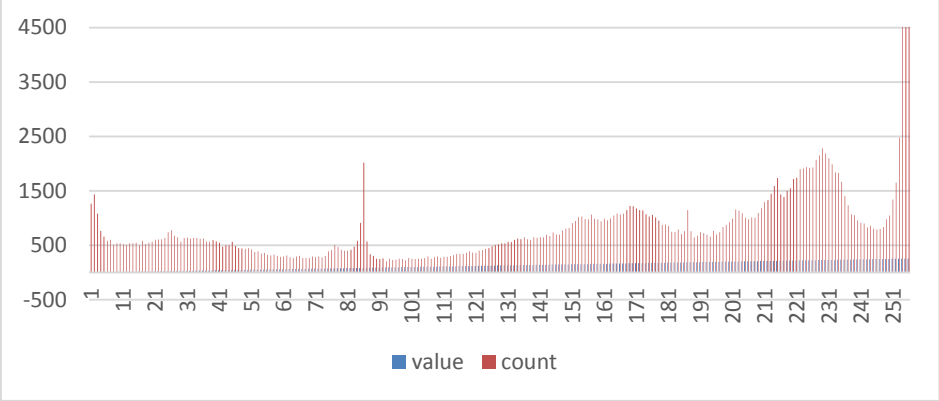
Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

Figure-17: Image Histogram for 100X100 Blocks using Binomial Fisher-Yates Algorithm



Sources: Authors Compilation

Figure-18: Image Histogram for 100X100 Blocks using Quadruple Fisher-Yates Algorithm



Sources: Authors Compilation

From the above histograms we can observe that the histograms of the Fisher-Yates algorithm and Our Algorithm with 2sets and 4 sets are Identical and we can say that there is >=99% Identical as compared our algorithm with Fisher-Yates algorithm and which takes less tie for execution as discussed in section 4.1.1.

4.1.5 Comparisons of PSNR (Peak Signal-to-Noise Ratio)

A very useful measure of the performance of the decryption procedure is the Peak Signal-to-Noise Ratio (PSNR). The PSNR of a given color component is the ratio of the mean square difference of the component for the two images to the maximum mean square difference that can exist between any two images. It is expressed as a decibel value. The greater PSNR value (>30dB), the better the image quality recovered. For encrypted image, smaller value of PSNR is expected preferably (<=10dB). Let P and P' being a plain image and cipher image respectively, the PSNR for the each color component (RGB) is defined as:

$$\text{MSE} = \frac{\sum_{i=1}^{m} \sum_{j=1}^{n} [\text{IMGo}(i,j) - \text{IMGenc}(i,j)]^2}{M * N}$$

PSNR = 20*log10 (255/sqrt(MSE))

Here MSE stands for Mean Square Error, The MSE assesses the quality of an **estimator** (i.e., a mathematical function mapping a sample of data to a parameter of the given values from which the data is sampled) or a **predictor** (i.e., a function mapping

arbitrary inputs to a sample of values of some random variable). Definition of an MSE differs according to whether one is describing an estimator or a predictor.

For the Image size 512 X 512 we have calculated UACI values for different blocks and comparison is made in the below table.

Table-4: Shows PSNR Calculations of Our Algorithm Compared with Fisher-Yates Original Algorithm

	Fisher-Yates Algorithm			Our Algorithm with 2sets			Our Algorithm with 4sets		
Blocks	**R**	**G**	**B**	**R**	**G**	**B**	**R**	**G**	**B**
50X50	7.89	6.78	6.11	7.95	6.82	6.11	7.81	6.78	6.12
100X100	7.87	6.80	6.10	7.90	6.74	6.02	7.93	6.78	6.09
150X150	8.46	7.58	6.86	8.43	7.52	6.84	8.51	7.58	6.90
200X200	6.54	6.28	5.92	6.57	6.32	5.96	6.58	6.30	5.94
250X250	7.88	6.76	6.06	7.86	6.76	6.07	7.87	6.77	6.04
300X300	6.57	6.31	5.94	6.61	6.34	5.98	6.60	6.31	5.95
350x350	10.97	10.034	9.27	10.96	10.03	9.28	10.98	10.05	9.30
400X400	9.54	8.69	7.99	9.57	8.70	7.99	9.57	8.70	7.98
450X450	8.49	7.55	6.85	8.48	7.56	6.86	8.50	7.56	6.87
500X500	7.87	6.78	6.06	7.87	6.77	6.05	7.87	6.80	6.07

Sources: Authors Compilation

From the above table *Table4* of PSNR there is not even 0.5 difference of values between Fisher-Yates algorithm and Our proposed algorithm so here also we are getting >=99.5% efficiency as compared with Fisher – Yates Algorithm.

4.6 Summary of the above Metrics

As compared with Fishers-Yates Algorithm Our Proposed algorithm is summarized in the below table.

Table-5: Shows Compares the Metrics of Fisher-Yates Algorithm with Our Proposed Algorithm

Metric	Our Algorithm with 2sets	Our Algorithm with4sets
Execution Time	50% of Fisher-Yates Algorithm Execution Time	25% of Fisher-Yates Algorithm Execution Time
NPCR	>=99%	>=99%
UACI	>=99.5%	>=99.5%
Image Histogram	>=99%	>=99%
PSNR	>=99.5%	>=99.5%

Sources: Authors Compilation

From all these implemented metrics, we say that our algorithm is efficient as compared with Fisher-Yates Shuffling Algorithm. By this study we conclude that if number of parts i.e. N value is increased to 20 then it becomes impossible to any hacker or intruder to steal the original data that is being sent to the cloud database refer *table1 for the calculations*.

CONCLUSION

In this paper, we have investigated the problem of security in cloud computing, which is essentially a distributed storage system. To ensure the security of user' data in cloud database storage, we proposed an effective and efficient Steganographic and Image Shuffling using Optimized Fisher-Yates Algorithm for enhancing security on data-at-rest and data transferring over the network. Therefore, when these images are stored in the cloud data center and transferring over the network, no one can view the original content of the data without any proper identification. Through detailed security and performance analysis, we have seen that our scheme almost guarantees the security of data when it is residing on the data center of any Cloud Service Provider (CSP). The concept we have discussed here, will help to build a strong architecture for security in the field of cloud computation. This kind of structure of security will also be able to improve customer satisfaction largely and we will attract more investor in this cloud computation concept for industrial as well as future research farms. Security in a very large-scale cross-cloud environment is an active issue. This present scheme is able to handle only a limited number of security threats in a small environment. We need further simulations to verify the performance. In the future, we will extend our research by providing security through steganography in RGB images by including multiple blocks into a single block. In addition, if the raw data is encrypted and the steganographic issues are employed then the protection will be a bit enhanced. The protections can also be enhanced if we can change the pixel positions after steganography. Until now, we are working on it to get better performance.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

SMARTPHONE APPLICATION IN STRATEGIC TOURISM MANAGEMENT

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ABSTRACT

The present article primarily deals with the use of Smartphone in strategic tourism management. The Smartphone usually includes common computer programmes used in office settings. The users can create, read and edit these types of files. In the present times, most of the people in the developed countries use Smartphone for a variety of purposes. The Smartphone has several advantages as a prominent means of interactive communication in modern times. The Smartphone application has come to stay in tourism sector. The Smartphone applications add value to the tourism experience and to the visitor destinations. The Smartphones enable convenient and secure mobile commerce services such as electronic wallet, electronic payment, 3G broadband Internet access, and multimedia contents. The foreign tourists make use of Smartphone for their convenient travel, stay and hospitality management purposes. Smartphone shapes the tourist experience. The mobile technologies and applications have brought about the development of tourism sector, which is recognized as information-based and information-intensive industry. Empirical evidence reveals that the preferences and behavior of tourists have shifted away from standardized packages, designed by tour operators, to individual products, specifically tailored to customer needs and interests. The tourism has emerged as one of the well-suited sector for Smartphone applications.

PREAMBLE

Strategic tourism management has emerged as an important aspect of research in modern times. It is based on the perfect understanding of stakeholder needs and expectations, which are paramount in the development, implementation and success of tourism industry's strategy. Smartphone application is being used in mobile phone under mobile environment. It is being materialized in portable personal digital assistant (PDA) and Smartphone application refers as program, which has been designed to be operated in Smartphone, and it can be installed by downloading in specific application sales outlet. Smartphone application field is being extended since it has become a core communication factor in the process of strategic tourism management. The present investigation was carried out in South India to understand the use of Smartphone in strategic tourism management.

FEATURES AND FUNCTIONS OF SMARTPHONES

A Smartphone is a new form of mobile Internet device that combines the traditional features of a phone and a personal digital assistant (PDA). Smartphone is a mobile phone that offers more advanced computing ability and connectivity than a basic current mobile phone does. Smartphone technology adoption is seen as being influenced by perceived usefulness, ease of use and the potential for risk, without any appreciation of how that adoption takes place over time.

The first Smartphone, IBM Simon and Nokia Communicator 9000 were released in 1994 and 1996 respectively. These both are indeed much larger than regular phones and facilitate interactive communication in all occupations. The first real Smartphone, the Ericson R380 was released in 2000. In the new millennium, many other types of Smartphone were made available to the users. In 2007, Apple released the i-Phone, which eschewed hardware buttons for full touch screen control. There are many models of Smartphone. The major manufacturers include – Apple, Samsung, LG, HTC, Nokia, Sony Ericson, Motorola, RIM, Palm and others. There are physical differences in terms of weight and the screen size. There are also performance differences and software differences.

The Smartphone includes a digital camera for taking high to extremely high quality digital photographs, which can be shared with others directly from the phone (i.e. email, social media, text messaging etc.). The Smartphone provides video recording capabilities with sound. A calendar/scheduler is included in the Smartphone. Appointments can be entered and edited directly on the Smartphone. Changes made to the online calendar or also synchronized back to the Smartphone's calendar.

The Smartphone enables the user to add all the contacts. The user can also delete and edit the details just like on a computer. The Smartphone has very clear viewing screens and can play many video formats with sound, as well as record video with sound. The Smartphone also incorporates the same features of a digital music player, which enables the users to store music files on it. The

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Smartphone provides for text messaging just as most cellular phones do. The built in keyboard or software keyboard can be displayed on the phone's screen. It is easier to type with than cellular phones. The Smartphone acts very much like a desktop or laptop computer. It includes a web browser programme just like a conventional computer.

The users can browse the World Wide Web just as a computer can. The Smartphone is able to hear the voice and follow predesigned commands. The Bluetooth is a wireless connection technology used to connect Bluetooth capable hardware over short distances. A Global Positioning System enabled Smartphone makes it possible for the phone to detect its specific location on the globe by latitude and longitude coordinates provided by certain satellites. The GPS can be turned on and off easily and quickly on the phone.

The Smartphone usually includes common computer programmes used in office settings. The users can create, read and edit these types of files. The Smartphone includes a full keyboard, which is physical, either covering the lower half of the front of the phone or sliding out from under the phone. There are many 'Apps' available for free and for cost for all the Smartphone brands and models. Smartphone service providers offer free phones. The fee paid each month for a Smartphone includes data charges beyond what a regular cell phone user pays.

All over the world, the Smartphone sales have exceeded the expectations with approaching the point where one in five mobile phones are smart (Doughty, 2011:09). Smartphones and Smartphone proxy systems using simpler phones, equipped with the capabilities to identify location/time and link to the web are excellent platform to support healthcare self-management, delivery, quality and supervision. Smart phones allow information to be delivered by voice, texts, pictures, and videos as well as be triggered by location and date. The policy makers should encourage substantial investment to create mobile health platforms that serve the public good, by promoting health service innovations while attending to the need for the individual to control access and sharing of their personal data stream (Rotheram-Borus et. al. 2012:19). Smartphone is not only a communication device but also a continuation of their personality and definition of who they are as a human being (Persaud and Azhar, 2012:17).

In the present times, most of the people in the developed countries use Smartphone for a variety of purposes. Today in Finland, mobile phone has become more common also for the elderly people. The portable nature of Smartphones and tablets has led researchers to investigate pre-trip, during trip and post-trip traveler behaviors (Miller, 2014:13). Smartphones have transformed behaviors, information needs, decision-making, experiences, documenting and sharing (Lamsfus et al., 2014:12).

The Smartphone's features such as search bar, library hours, my account, room reservation, and floor maps are all custom web applications that were written in-house and are fully integrated into the responsive web design. The users had preferred web applications that were written in-house and are fully integrated into the responsive web design in the libraries. Further investigation into the least used Smartphone features should take place in order to determine ways to improve integration with the rest of the website (Rennick et. al. 2015:18).

The Smartphone has several advantages as a prominent means of interactive communication in modern times. The brand loyalty led consumers to reveal the advantages of this brand and recommend the purchase. The customers' perceived value, brand experience, trust, satisfaction, service quality and commitment, which are key influencing factors of brand loyalty (Chen et. al. 2016:07). Smartphones are indeed wearable computing systems which can be used anywhere by the people for variety of purposes. A Smartphone is an interpersonal communication device to a multimedia machine, which functions as instant messaging, downloading applications and utilizing information services. The application stores for Smartphone are increasing in all occupations. Smartphones are devices, which can be used anywhere and for many causes.

SMARTPHONE APPLICATION AND STRATEGIC TOURISM MANAGEMENT

Tourism is an information intensive activity and the information has been called the lifeblood of the industry (Sheldon, 1997:21). The mobile travel application can be downloaded into Smartphones and can travel anywhere with the consumers. Smartphone application demands proper knowledge and experience among the users in order to ensure easy and convenient travelling. The Smartphone application has come to stay in tourism sector. Smartphone use had made it possible to avail various services and facilities in tourism sector. Using technology throughout all phases of the trip indicates that consumers are not only well informed but also more engaged to the outcome of their customer journey. Smartphones are the newest phenomenon in tourism business, which needs serious consideration.

Intuitively, location-based mobile Internet applications serve a number of purposes. Smartphone ownership rates generally reflect the current level of adoption in modern times. Current users are early adopters and their use of Smartphone technology is consistent with their high usage of the Internet and social media in their daily lives. The potential for mobile digital applications to completely transform tourist experiences in the future needs scientific evaluation to develop appropriate strategies of Smartphone application in tourism sector (Eriksson, 2002:10).

The 3G has become a significant factor to tourism services, since it offers both mobile online access and various services that aim directly to facilitate and enhance mobility. Tourism destinations can also take advantage of the new technologies and enhance their position in the market. Joint action taken by public tourism organizations and private sector companies could lead towards the development of services for tourist usage. Moreover, until the inevitable entire technology convergence, destinations would most benefit from formulating diverse business models (Flouri and Buhalis, 2004:11). The Smartphone applications add value to the tourism experience and to the visitor destinations. This kind of mobile tourist service poses certain challenges in terms of content development, technology and tourism industry (Nielsen, 2004:14).

SMARTPHONE APPLICATION FOR STRATEGIC TOURISM MANAGEMENT

Tourism offers a prime context in which to explore the application of mobile technology, there have been numerous studies that have investigated the role of mobile information, and other PDA based systems in tourism through technology acceptance or diffusion of innovations. The attitude towards Smartphone application and mobile Internet is the most significant factor in predicting the behavioral intention to use new technologies in tourism sector. The positive causal relationships of perceived contents quality – perceived usefulness matter most from the point of view of Smartphone application (Cheong and Park, 2005:08).

The number of Wi-Fi access providers like trains, airlines, busses, cities etc. is growing every day, which makes Smartphone usage also easier to get access into the applications that work when connected to Internet. Smartphone application has ensured the information access and communication possibilities in the tourism sector. Smartphone technology has enabled the travelers to manage their tour plan efficiently before, during and after a trip. The tourism consumption can be divided into three communication and information needs of a consumer. These stages can be also used in the usability of a Smartphone application. In the pre-consumption phase, the user wants to plan, format the expectations of the upcoming trip, make decisions, transactions and make their own personal anticipations of the journey. Consumption phase happens on a trip where the important factors for a tourist are the connection, navigation, short-term decision-making process of for example in finding a decent restaurant and the on-site transactions of events around the destination etc. Lastly is the phase of post-consumption, which happens after the trip is made. The needs of a tourist are to share and document the experiences, activate the external memory and re-experience the trip again and also to make attachments to the visited sights and places to re-experience the trip once again (Buhalis and Costa, 2006:03).

The Smartphones enable the users to get security in times of travel. The Smartphone application makers the customers remain in forefront of the marketing tactics because they are telling the companies what they want to get for their money. Money has a bigger value now than ever before (Castaneda et al. 2007: 05). The Smartphone application introduces a rich source of information, which is considered as a moving object in an environment with variable contexts. The tourist guide applications and services are taken into account as an application area for the context-aware systems. A framework for personal tourist guide (PTG) system based on service-oriented architecture (SOA) is required to avail the right services in the right time (Abbaspour and Samadzadegan, 2008:01). The Smartphones enable convenient and secure mobile commerce services such as electronic wallet, electronic payment, 3G broadband Internet access, and multimedia contents. The payer-centric payment architecture is advocated to facilitate the adoption of smart phones for mobile commerce applications in tourism and other sectors of life (Chang et. al. 2009:06).

The contemporary customers are the ones who produce their own products and services to fit their own needs and desires or depending on what other people have said about it. Today's tourists have become the producers of information for tourism suppliers and destinations. They no longer only accept the information that is given to them and consume the tourism services, as they are (Tsiotsou and Ratten 2010:25). The customers also guide other customers on their decisions (Ruiz-Molina et al. 2010:20).

Application stores for Smartphones have been rising in the past few years Doughty (2011:09). Smartphones are devices, which can be used anywhere and for many causes. At any time and any place for the convenience of the users are these portable little devices. Smartphones are smart to have in a pocket to access work information, to communicate with people, to relax example by listening to music or play games, to search information to travel and many more. In the current mobile revolution, a location set workstation is not an issue anymore when Smartphone is portable to everywhere the person goes. (Ting et al. 2011:23).

The need for customized information is expected to keep pace with change in the IT environment. The impetus for the expansion of the Smartphone market was the release of Apple's innovative i-Phone in 2008. The salient features of Smartphone like cutting-edge technologies of multitasking, high-resolution screens, wide screens, and customized web browsing, based on its own software technology have enabled the users to actively participate in public and private affairs. The Smartphone market continued its rapid growth in the new millennium. A striking point is that it was predicted that the Smartphone market would make up nearly 50% of the entire cell phone market in 2010 in terms of total sales. The newly formed competitive structure of the Smartphone market can be divided into three market segments: (1) hardware manufacturing, (2) operating systems, and (3) content. The development of the Smartphone, which combines the traditional phone and access to the Internet, is also influencing related

markets that incorporate Internet technology (Song, 2011:22). The Smartphone is no longer the exclusive property of early adopter. Streamlining mobile Internet and 3G mobile communications has opened up boundless possibility for the Smartphone and the innovative idea toward the mobile Internet world leads this generation to the genuine ubiquitous world by the innovativeness of the Smartphone.

There are several different user groups who use Smartphone in a variety of different ways, from business users to media junkies. The literature review shows that the main customers are young men, who use these applications especially to plan their travel during the information phase. However, Smartphone applications cannot only support tourists' information processing activities such as connection and navigation in the tourism consumption stage, but also the activities in the pre-consumption and post-consumption stages. For a successful usage, tourism companies should therefore focus on aspects like secure and efficient mobile services who give tourists feel like accompanied with a reliable and personal travel guide during their whole trip. Only by improving these aspects, Smartphone applications will have a successful growth on the tourism market (Torun, 2011:24).

Cao and Nguyen (2012:04) have implemented a system called the Semantic Tourist information Access and Recommending (STAAR), which helps tourists to find relevant information aimed for them to plan their itineraries and trips using web and Smartphones. This helps the user to make their trip personalized and individualized because of the system asking for specific preferences of the user. The application system asks for wants and needs of a user and where they can pin point only the services or places they want to experience on a trip. After this, the application makes the search and guides the user through its travel. There are 48% who are using their Smartphone to plan their trip, 44% who are dreaming of their next trip and 44% Smartphone users who research their travel while traveling. The foreign tourists make use of Smartphone for their convenient travel, stay and hospitality management purposes. The dual-use of laptop and mobile phone as a Smartphone makes many consumers think about their consuming patterns. Some new buyers of Smartphones have bypassed the usage of laptops and ended their Internet broadband connection to save money and have it as a mobile broadband connection only. It is said that by 2015 more users will access the Internet through their mobile de-vices than anything else will (New Media Trend Watch 2012).

Mobile world has broadened the tourism sector since the travelers have the possibilities for sharing their experiences in real-time. The travelers make use of Smartphones, which can not only inform but also educate them of their trips. The mobile travel business faces the challenge to stay in the pace of needs and wants of the customers who matter most in modern business world (Parro, 2013:16).

The everyday use of Smartphones spills over to the tourist experience. Smartphone shapes the tourist experience. Increased communication with family and friends, the filling of all downtime, increased information search activities, greater interest in exploring technology and the partial replacement of laptops/desktops are the major advantages of Smartphone application in tourism sector (Wang et. al. 2014:26). The proliferation of Smartphone ownership and apps, and the growth of mobile travel bookings drive hoteliers to understand and develop mobile strategies to satisfy customers' needs. Hoteliers cannot compete with OTA apps or social apps and should focus on improving the features and functions of hotel apps developed by hotel chains (Chen et. al. 2016:07).

Smartphones, tablets, laptops, and other mobile devices have not only changed the way customers research and book their travel arrangements, but they've also fundamentally shifted the way travel companies view devices as tools for continued interaction and communication with would-be travelers. The Smartphones have become a way of customer engagement and transaction. The travel companies are leveraging mobile apps to create lasting dialogues with customers and position themselves for success in an increasing digitized marketplace. The **potential for a travel company's engagement efforts to become 'white noise' has increased the mobile apps, especially those with a focus on the user, provide travel companies a path to cut through that white noise and reach customers in a medium where they're not only experienced, but spending an increasing majority of their time (**Ostdick, 2016:15).

The usability of Smartphones depends mostly on an access to Wireless Internet called Wi-Fi. The Smartphone application is the program that synchronizes the entire trip into the mobile device. These applications can be divided into travel agencies, hotels, car rental, airlines etc. separate applications or into one completely mobile travel tour operator application. It can help the user when planning a trip, on a trip and after a trip. A good number of travelers use Smartphone to make their trip purposeful since it can be used anywhere and for many causes. The dual-use of laptop and mobile phone as a Smartphone makes many consumers think about their consuming patterns. The travelers are more secure and confident at planning, researching and booking trips on the move.

The Smartphone applications are used in a range or contexts, in terms of information search and trip planning, in the context of destinations to find out directions and information in situ, and in terms of sharing information and experiences online through social networks in post trip evaluation stages. The Smartphone application has become popular among educated younger audience. The Smartphones and apps can translate words live on screen, give real-time transportation advice, and locate the where about of the travelers anywhere in the world, act as the boarding pass, book the dinner reservation and even help the travelers to

find out suitable accommodation. The mobile world has broadened the meaning of tourism business where consumers share their experiences in real time. Tourism has become one of the major businesses in the global economy. Marketing information in the tourism sector is also intangible because of the fact that the consumers are not able to see, touch or feel a purchased trip in advance. They need detailed information of the destination, service or product. New technologies in tourism field enable the customers to avail customized services. The mobile technologies and applications have brought about the development of tourism sector, which is recognized as information-based and information-intensive industry. Empirical evidence reveals that the preferences and behavior of tourists have shifted away from standardized packages, designed by tour operators, to individual products, specifically tailored to customer needs and interests. The tourism has emerged as one of the well-suited sector for Smartphone applications.

CONCLUSION

The consumers demand quick action in the service providers' site since they demand individual travelling packages which results in more segmented marketing tactics. Customer satisfaction is dependent on the exactness and comprehensiveness of valid information, which concerns destination accessibility, services and attractions. The Smartphone has become the most widely used device for strategic tourism management in modern times. The most downloaded Smartphone apps are recommendation pages and hotel and flight search engines. The Smartphone enables the tourism companies to improve their positioning. They also facilitate efficient and effective communication between the service providers and users. Smartphone has created a paradigm shift in strategic tourism management as a prominent tool of marketing communication. Mobile phones have changed the tourism landscape and the modus operandi of destinations. They have catered to the needs of the users who demand high-speed access to relevant information and media content. Amongst the proliferation of mobile phones, the Smartphone in particular offers advanced capabilities, comparable with PC like functionality, often equipped with features such as keyboards or touch screens. The challenge for future Smartphone application makers for strategic tourism management is to make it more convenient and trustworthy for the future users in the mobile world.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

A STUDY ON OPINION DIFFERENCES IN RESPONDENTS EMOTIONAL DISSONANCE, WORK EXHAUSTION, JOB SATISFACTION AND TURNOVER INTENTION AMONG INFORMATION TECHNOLOGY PROFESSIONALS WITH SPECIAL REFERENCE TO COIMBATORE DISTRICT

M. Vennila[31] Dr. K. Vivekanandan[32]

ABSTRACT

Emotional dissonance is defined as "the conflict between expressed and experienced emotions" (Abraham, 1998a). It arises when an employee's displayed emotions represent the obeying organizational rules, but do not represent his or her actual feelings (Rafaeli & Sutton, 1987). This study examines whether there is any opinion differences in Emotional Dissonance, Work Exhaustion, Job Satisfaction and Turnover Intention among Information Technology (IT) Professionals. Data were collected from 246 IT professionals within Coimbatore District. Results shows that there is significant difference found in respondent's opinion on Negative Emotional dissonance with respect to their Age and Educational Qualification and there is significant difference found in respondent's opinion on Job Satisfaction and Turnover Intention with respect to their Monthly Income.

KEYWORDS

Emotional Dissonance, Role Conflict, Work Exhaustion, Job Satisfaction, Turnover Intention etc.

INTRODUCTION

Emotion is a feeling, psychological arousal and plays a powerful and central role in our lives; they influence our beliefs and attitudes and they help and guide our thinking, decision-making, and actions (Gratch and Marsella 2004; Lazarus and Folkman 1984; Loewenstein *et al*. 2001). Emotions and emotional displays have become an important attention of organizational research (Rafaeli and Sutton, 1987; Sutton, 1991; Sutton and Rafaeli, 1988; Van Maanen and Kunda, 1989). Essentially, employees need to engage in a certain degree of emotion in order to generate the appropriate feelings (Conger and Kanungo, 1988, Lashley, 1999) and to follow the required display rules (Hochschild, 1983; Ashforth and Humprey, 1993; Morris and Feldman, 1996a; Grandey, 2000). It is expected that Flight attendants and sales clerks to be cheerful, police officers to be authoritative, and nurses to be compassionate in work place. Although no one has studied display rules in an IT context, one can infer emotional display expectations from the nature of the IT function. For example, as business partners, IT personnel need to show concern for business, rather than just technical, functions. A technically focused IT professional who conveys an attitude of indifference toward business outcomes may suffer a lack of credibility in the eyes of IT user and management (Markus and Benjamin 1996). While systems development often involves conflict (Barki and Hartwick, 2001), IT professionals may feel they should not display anger when conflict arises. Computer support personnel may be expected to display concern for those seeking technical assistance rather than frustration for their technical inexperience. IT managers and project leaders may be expected to display neutrality when making work assignments or sternness when dealing with underperforming subordinates. These examples illustrate a few possible IT-related display rule expectations. Information technology professional is often expected to work with colleagues in both IT and other areas of the organization. During these interactions, the IT employee is expected to conform to occupational or organizational norms regarding the display of emotions. How do these display norms affect the IT professionals? Therefore, this study examines an IT professional's emotional dissonance, the conflict between norms of emotional display and an employee has felt emotion. Emotional dissonance is studied as a factor of IT professionals' work exhaustion, job satisfaction, and turnover intention. Therefore, there arises a need for this study.

Today's information technology professionals shoulder a heavy load. Spending cuts and changes in IT implementation have forced these employees to work longer hours and take on expanded organizational roles (Hoffman 2003). IT workers are experiencing increased complexity in both the underlying technology and its creative use. Hence, firms today demand not only technical skills but also problem solving and customer service expertise (Pawlowski and Robey 2004; Thibodeau 2004). A byproduct of these demands may be increased levels of exhaustion and burnout (Moore 2000a). IT professionals are also being asked to expend more interpersonal effort at work. The importance of business and interpersonal skills for IT professionals is well established. Many stakeholders, including IT customers (Bostrom 1984; Nelson and Cooprider 1996), IT managers (Leitheiser 1992; Lee et al. 1995), and other IT professionals (Bailey and Stefaniak 1999; Green 1989; Khan and Kukalis 1990; Yen et al.

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2001) prescribe that IT people must understand the business and communicate effectively with organizational counterparts. The impact of these added expectations of the IT professionals is not well understood. This study begins to address this issue by examining whether Opinion Differences in Respondent Characteristics on Their Emotional Dissonance, Work Exhaustion, Job Satisfaction and Turnover Intention.

THE RECOGNITION OF EMOTIONS IN WORK ENVIRONMENT

Research into emotions is directed towards the changing nature of the work environment and tends to link motivation and job satisfaction into the way work is considered and structured (Robbins and Judge, 2010). Emotions are not associated with the work place, and the concept of 'emotion' is not typically spoken about, or disclosed in this environment. But it can also be said that in all organizations in which human interaction is part of the job, rules apply as to when and which emotions should be expressed (Hochschild, 1983).Since the end of 19th century, the rise of scientific management organisations has been associated with the objective of trying to control emotions (Hunt, 1997). A well run organisation has been seen as one that successfully eliminates frustration, fear, anger, love, hate, joy, grief and similar feelings. In reality, this is not the case. Grandey (2000) conveys that organisations manifest, produce, and represent emotions more than ever before. Reason and cognition were viewed as suited to the bureaucratic process inherent in most organisations, and emotions in large part, remained undiscussable at work. The central ideology surrounding emotions in organisations is that they are irrational, peculiar disturbances that are best controlled and kept under cover (Stearns & Stearns, 1986).Our thoughts and emotions are intertwined and emotions give us insight into the impact of work situations at the deepest level. Hence, there is a need to recognize both the wholeness and humanity of workers within the organizational context, because people cannot help but bring themselves into the work context. (Fineman,1996).The growing interest in this area of organizational studies generated an expansion in the field of emotions, which was first prompted by Arlie Hochschild in 1983, who opened up the never ending possibilities and significance that emotions contributed to understanding how organisations function. Hochschild introduced the idea of 'emotional labour', which articulated a further level of insight into how emotion is related to self- identity, and work performance. This then led to further discoveries of emotional dissonance.

EMOTIONAL LABOUR AND IT'S CONSEQUENCES

Researchers have identified deep and surface acting as the two most commonly-used emotional strategies for coping with display rule requirements, defined as 'emotional labour' (Hochschild, 1983; Kruml & Geddes, 2000; Zapf, 2002). In deep acting, employees attempt to modify their felt emotions so that a genuine, organizationally desired emotional display can follow (Hochschild, 1983). She illustrated the deep acting by using flight attendants as a prime example, as they cope with angry and annoying passengers by thinking of them as frightened first-time fliers, therefore changing their inner feelings from annoyance to acceptance, pity and empathy. When employees engage in deep acting, they endeavor to express authentic emotions, and though not every attempt succeeds, emotions expressed as a result of deep acting are more likely to be authentic than those expressed through surface acting, which occurs when employees only change their outward emotion without genuinely altering how they actually feel. In surface acting, frustrated employees may suppress their frustration and simply smile at an annoying customer, thus "putting on a mask" without actually changing their feelings and expressing feigned rather than genuine emotion (Grandey, 2003).

VARIANTS OF EMOTIONAL DISPLAYS

There are three types of emotions associated with different display rules (Mann, 1997). Firstly, integrative emotions are classified as those that combine groups together, such as love, loyalty and pride; secondly, differentiating emotions are those that trigger group differences, such as fear, anger and contempt (Kemper, 1984). Thirdly, a possible type of emotional display is emotional masking which refers to displays of emotional neutrality and restraint. Each will be discussed in turn.

Integrative Emotions

Integrative emotions such as friendliness are often highlighted in service roles or public contact encounters in which the services are intangible, consisting of services provided rather than objects that are possessed (Wharton & Erickson, 1993, p. 466). In a study of McDonald's it was found that the fast-food workers were told to be "cheerful and polite at all times" and that "crew people were often scolded for not smiling" (Leidner, 1991). Because the "emotional style of offering the service is part of the service itself", display rules are concerned towards emotions that instill a sense of well-being, good will or satisfaction in customers (Hochschild, 1983, p. 5).

Differentiating Emotions

Work roles requiring emotional displays oriented towards negative emotions, or what Hochschild (1983) called "positive bad will" are less understood. These are roles in which workers are encouraged to display mistrust, irritation or hostility towards others for infusing in them unease, worry or fear. (Ritzer 1992) calls these displays "the McDonaldization of society" whereby

society has come to expect McDonald-style courtesy and friendliness typified by the "have a nice day" sentiment (even if such sentiments are considered un-genuine). As a result, differentiating display norms are likely to govern fewer and fewer authentic work based emotions such as trust and team co-operation. So far, it has been argued that, despite the view held by many in organisations that emotions play no role in organisation life, the management and control of emotional displays continue to be an important part of the formal or informal organizational culture. Societal, occupational and organizational norms give rise to display rules that govern the expression of emotion in the workplace. These display rules can lead to the display of integrative emotions that bind groups together or differentiating emotions that cause group differences. Alternatively, display rules can lead to emotional masking whereby emotional displays are suppressed altogether.

Masking Emotions

Masking of emotion is "an aspect of all work roles to some degree", but that it is a more salient display norm in some work roles than others and is particularly noticeable in middle management and most professions (Stearns and Stearns, 1986). For example, the pressures on middle managers "to exercise iron self-control and to have the ability to mask all emotion and intention behind bland, smiling, agreeable public faces" (Jackal 1988). Other researchers also note how professionals are encouraged to mask emotion, a norm or display rule expressed as "detached concern" (Hochschild, 1983) or the avoidance of "too much liking or disliking" (Lief and Fox, 1963).

THE ROLE OF EMOTIONAL DISSONANCE AMONGST IT PROFESSIONALS

The IT industry has become one of the most popular industries in the world and it is in the phase of transforming the world to the next generation from a slow moving bureaucratic economy to a land of innovation. The transformation has been so drastic that no other field in the world is independent without the help of information technology. Today's Information Technology professionals are required to be multitalented with knowledge in more than one specific skill. IT workers need to be in frequent touch with their customers and has to think from the customer's point of views. IT professionals are expected to manage their emotions to obtain a facial and physical expression that is neutral, solid, and controlled. For IT sector increasing work exhaustion, percentage of turnover is among the basic challenges they face today (Aşkun, 2007). Recent studies have differentiated various dimensions of emotion work while most of them comprise the frequency of emotion expression and emotional dissonance (Brotheridge & Grandey, 2002; Bussing & Glaser, 1999). Due to these reasons, pressurized deadlines, personal conflicts, etc. they are susceptible to emotional dissonance. Emotions and emotional displays have become an important focus of organizational research. IT Employees need to engage in a certain degree of emotion in order to generate the appropriate feelings (Conger and Kanungo, 1988, Lashley, 1999) and to follow the required display rules (Hochschild, 1983; Ashforth and Humphrey, 1993; Morris and Feldman, 1996a; Grandey, 2000).

METHODOLOGY

The data were collected from four IT companies located in Coimbatore district. The questionnaire is distributed to different levels of IT professionals. In order to distribute the sample equally, every 6th employee in the middle level, every 2nd employee in the junior level and senior level were selected to respond to the instruments. A total number of 270 IT professionals were contacted for this study, out of which a total of 246 responses were found usable for the final analysis. Multi - stage sampling was the sampling technique used for this study. Different measurement scales were utilized to measure individual perception of emotional dissonance, work exhaustion, job satisfaction and turnover intention. The variables used in the study are based on standardized scales available in the literature. All the variables were measured using a 5- point Likert scale.

Table-1: Variables' Measure

Measurement Items	
Constructs	**Source of Measures**
Negative emotional dissonance	Schaubroeck and Jones scale (2000)
Positive emotional dissonance	Schaubroeck and Jones scale (2000)
Perceived workload	Kirmeyer and Dougherty 1988 Moore 2000a
Role ambiguity	Rizzo, House, and Lirtzman 1970 Moore 2000a
Role conflict	Rizzo, House, and Lirtzman 1970 Moore 2000a
Autonomy	McKnight 1997
Fairness of rewards	Niehoff and Moorman 1993 Moore 2000a
Work exhaustion	Schaufeli, Leither, and Kalimo 1995 Moore 2000a
Job satisfaction	McKnight 1997
Turnover intention	Moore 2000a

Sources: Authors Compilation

DATA ANALYSIS

Table-2: Respondents Characteristics

Demographic Variables	Criterion	Frequency	Percentage
Gender	Male	144	58.5
	Female	102	41.5
Age	Below 25	33	13.4
	26 – 30	53	21.5
	31 – 35	105	42.7
	36 – 40	28	11.4
	Above 41	27	11
Educational Background	Diploma	42	17.1
	Under Graduate	65	26.4
	Post Graduate	101	41.1
	Others	38	15.4
Designation	Senior Level	76	30.9
	Middle Level	110	44.7
	Junior Level	60	24.4
Experience (in years)	Below 1 year	36	14.6
	1 – 3	38	15.4
	4 – 6	85	34.6
	7 – 9	46	18.7
	Above 10	41	16.7

Sources: Authors Compilation

Table 2 represents respondent's characteristics. The average of respondents was 58.5% male, and which is dominated by 31 - 35 years old. Furthermore, 41.1 % respondent was undergraduate degree, and 44.7 % respondents was Middle level. The respondents have been experienced with the companies for 4 - 6 years.

Table-3: Independent Samples t- Test between Gender and the Factors used in Study

Factors	Gender					
	Levene's Test for Equality of Variances		t-test for Equality of Means			
	F	Sig.	t	d.f.	Sig.	Mean Difference
Positive Emotional Dissonance	0.125	0.724	-1.574	244	0.117	-0.72222
Negative Emotional Dissonance	2.551	0.112	-0.884	244	0.378	-0.62745
Work Exhaustion	0.294	0.588	0.297	244	0.767	0.13685
Job Satisfaction	0.942	0.333	1.967	244	0.500	0.62296
Turnover Intention	0.000	0.986	0.337	244	0.736	0.06822

Note: *Significant at 5 percent level
Sources: Authors Compilation

Table-3 shows that Independent samples T test between Gender of the respondents and IT professionals' Positive emotional dissonance, negative emotional dissonance, work exhaustion, job satisfaction and turnover intention. The Levene's *F*- test for equality of variances and the probability values are not statistically significant at the 5% confidence level. Therefore, the variance of the Gender from which the samples were drawn is equal.

The independent samples *t*-test for the difference between two groups probability value is not significant. From this statistical result, it is evident that there is no significant difference in respondent's opinion on Positive emotional dissonance, negative emotional dissonance, work exhaustion, job satisfaction, and turnover intention. The respondents do not differ in their emotional dissonance; Work Exhaustion seems to be common with both male and female IT professionals irrespective of their gender.

Table-4: One Way ANOVA between the Demographic Variables and the Factors used in the Study

Factors		Age	Educational Qualification	Monthly Income	Designation	Work Experience
Positive Emotional Dissonance	**F**	1.095	1.711	1.166	0.946	0.293
	Sig.	0.360	0.165	0.327	0.390	0.882
Negative Emotional Dissonance	**F**	**2.762**	**3.283**	0.963	0.404	2.000
	Sig.	**0.028***	**0.022***	0.428	0.668	0.095
Work Exhaustion	**F**	0.916	0.240	0.634	0.803	0.742
	Sig.	0.455	0.868	0.639	0.525	0.564
Job Satisfaction	**F**	0.803	0.946	**2.775**	1.201	1.685
	Sig.	0.524	0.419	**0.028***	0.311	0.154
Turnover Intention	**F**	0.670	0.197	**3.783**	0.990	1.287
	Sig.	0.614	0.899	**0.005***	0.414	0.276

Note: *Significant at 5 percent level
Sources: Authors Compilation

Table 4 shows that One-way ANOVA result between the demographic variables of the respondents and the emotional dissonance, work exhaustion, job satisfaction and turnover intention of Information technology professionals. One-way ANOVA was used to determine whether the respondents' opinion on positive and negative emotional dissonance differ among the age category of the respondents. It could be inferred from the table there is significant difference found in respondent's opinion on Negative Emotional dissonance with respect to their Age and Educational Qualification and there is significant difference found in respondent's opinion on Job Satisfaction and Turnover Intention with respect to their Monthly Income.

FINDINGS

Independent samples t-test was run as test of the statistical significance of the means of the responses between the gender of the respondents and Emotional dissonance of IT Professionals. There is no difference in Gender of the respondents for Emotional dissonance. All are affected equally by Emotional dissonance irrespective of the gender.

Independent samples t-test was run as test of the statistical significance of the means of the responses between Gender of the respondents and Work Exhaustion. There is no difference in Gender of the respondents for Work Exhaustion. Work Exhaustion seems to be common with both male IT professionals and female IT professionals irrespective of their gender.

Independent samples t-test was run as test of the statistical significance of the means of the responses between Gender of the respondents and Job Satisfaction. There is no difference in Gender of the respondents for their job satisfaction. Job Satisfaction plays the common role in both male and female employees with no regard to their gender.

Independent samples t-test was run as test of the statistical significance of the means of the responses between Gender of the respondents and Turnover Intention. The independent samples *t*-test for the difference between two groups, probability value is not significant. Collected data proves that Turnover Intention seems to occur approximately at the same time irrespective of the gender of the IT workers.

One way ANOVA was run between all the other demographic variables (age, educational background, monthly income, designation, and experience) and emotional dissonance in order to assess the difference in opinion among the respondents.

It was found that there exists a significant difference on respondent's opinion on Negative emotional dissonance based on their age. It is also clear that the Positive Emotional Dissonance is not significant with the age of the respondents.

It was found that there exists a significant difference on respondent's opinion on Negative emotional dissonance based on their educational levels. The Positive Emotional Dissonance is not significant with Educational Qualification proving that education of the respondents give them almost equal positive emotion with regard to any educational stream they may belong.

It was found that there exists no difference on respondent's opinion on positive and negative emotional dissonance based on their monthly income.

By performing one way ANOVA, it is evident that there exists a significant difference on respondents' opinion on Negative emotional dissonance based on their age and education. Whereas Negative emotional dissonance is not significant with their monthly income, designation, and experience. With regard to Positive Emotional Dissonance, there is no significant difference with the Age, Educational qualification, monthly income, designation and work experience.

It was found that there exists no difference about respondents' opinion on work exhaustion based on their Age, Educational qualification, monthly income, designation and work experience.

SUGGESTIONS

Information technology professionals have unique attitudes, interests, sense of identity, and work consciousness that significantly differ from workers in other professions. On a particular note, scientists observe that IT professionals must continually learn new skills over their entire career in order to adapt to new technological developments and ever-changing business requirements. The learning demands would add to the exhaustion already created by conventional job characteristics inherited in the IT work environment. Following are the few suggestions that would help the IT professionals relieve themselves from the stress factor and emotional dissonance.

Emotional dissonance creates employee strain, low self-esteem, alienation from work and depression. This study proves and suggests that both male and female employees undergo the same level of stress and emotional dissonance. Therefore, the IT organizations should treat both equally and conduct individual counseling to overcome their emotions and to lead a healthy work environment.

In IT organizations employees are present in different age categories. It was found that there exists a significant difference on respondents' opinion on Negative emotional dissonance based on their age. The manager can play a key role in helping the employee identify the cause of exhaustion. IT managers can take the responsibilities to understand the emotional dissonances faced by his subordinates irrespective of their age and act accordingly towards them.

CONCLUSION

It can be concluded that there is significant difference found in respondents' opinion on Negative Emotional dissonance with respect to their Age and Educational Qualification and there is significant difference found in respondent's opinion on Job Satisfaction and Turnover Intention with respect to their Monthly Income. There is no difference in Gender of the respondent's opinion on Emotional dissonance, work exhaustion, job satisfaction and Turnover intention. Both male IT professionals and female IT professionals are affected equally by Emotional dissonance, work Exhaustion, job satisfaction and turnover intention irrespective of their gender. Negative and positive emotional dissonance increased IT professionals' work exhaustion, which reduced job satisfaction and ultimately increased turnover intention. IT professionals become exhausted due to work overload like pressurized targets, day-to-day task completion and organization-critical systems. Unless adequate steps are taken to safeguard the IT professionals from this pressure-filled job, it could affect their emotions and suppress them. Higher-level authorities in IT field should be aware of not only role stressors like role conflict and role ambiguity, but also the incremental tension that emotional dissonance can produce. This study unveils the importance of emotional dissonance in understanding the work exhaustion and turnover intention of IT professionals.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

SMARTPHONE APPLICATION FOR E-COMMERCE IN MODERN TIMES

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ABSTRACT

Smartphone application for e-commerce has been discussed in this article based on qualitative research methodology. The businesses in India, especially e-commerce firms, are waking up to the potential that mobiles offer in this country and are pushing their mobile applications to Smartphone users. The adoption of Smartphone and growth in mobile internet traffic has made a significant impact of app installation. India has been on the verge of something spectacular in e-commerce due to increasing number of owners of Smartphones. More shoppers visit the e-commerce sites especially from Smartphone to do business in modern times. The Smartphones have become important means of web shopping and constitute about 60 percent of e-commerce visits in modern times. The rise of Smartphone shopping provides retailers with an opportunity to reach customers any time and any place. The service providers are more dependent on Smartphone applications, which are very well connected to the various devices including the computer, laptop, or cell phone. They are conducting their business smoothly with the help of mobile applications. The e-commerce sector has grown commendably because of revolutionary changes in information and communication technologies including Smartphone application. The growth of Internet connection has also boosted e-commerce in modern times. The Smartphone could account for most e-Commerce transactions by 2018. It is definitely the age of Smartphone application for e-Commerce.

PREAMBLE

The e-commerce has grown remarkably all over the world based on the greatest use of new technologies including Smartphone applications. The e-commerce has changed the lives of the people. There has been a rise in the number of companies' taking up e-commerce in the recent past. Major Indian portal sites have also shifted towards e-commerce instead of depending on advertising revenue. Many sites are now selling a diverse range of products and services from flowers, greeting cards and movie tickets to groceries, electronic gadgets, and computers, etc. With stock exchanges, coming online the time for true e-commerce in India has finally arrived. The real value lies in the ever-expanding range of capabilities Smartphones possess and the services they can access. Smartphone application for e-commerce has been evaluated in this article based on qualitative research methodology.

Salient Features of Smartphones

The Smartphone enables the user to add all the contacts. The user can also delete and edit the details just like on a computer. The Smartphone has very clear viewing screens and can play many video formats with sound, as well as record video with sound. The Smartphone also incorporates the same features of a digital music player, which enables the users to store music files on it. The Smartphone provides for text messaging just as most cellular phones do. The built in keyboard or software keyboard can be displayed on the phone's screen. It is easier to type with than cellular phones. The Smartphone acts very much like a desktop or laptop computer. It includes a web browser programme just like a conventional computer.

The users can browse the World Wide Web just as a computer can. The Smartphone is able to hear the voice and follow predesigned commands. The Bluetooth is a wireless connection technology used to connect Bluetooth capable hardware over short distances. A Global Positioning System enabled Smartphone makes it possible for the phone to detect its specific location on the globe by latitude and longitude coordinates provided by certain satellites. The GPS can be turned on and off easily and quickly on the phone.

The Smartphone usually includes common computer programmes used in office settings. The users can create, read and edit these types of files. The Smartphone includes a full keyboard, which is physical, either covering the lower half of the front of the phone or sliding out from under the phone. There are many 'Apps' available for free and for cost for all the Smartphone brands and models. Smartphone service providers offer free phones. The fee paid each month for a Smartphone includes data charges beyond what a regular cell phone user pays.

All over the world, the Smartphone sales have exceeded the expectations with approaching the point where one in five mobile phones are smart (Doughty, 2011:05). Smartphones and Smartphone proxy systems using simpler phones, equipped with the

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capabilities to identify location/time and link to the web are excellent platform to support healthcare self-management, delivery, quality and supervision. Smart phones allow information to be delivered by voice, texts, pictures, and videos as well as be triggered by location and date. The policy makers should encourage substantial investment to create mobile health platforms that serve the public good, by promoting health service innovations while attending to the need for the individual to control access and sharing of their personal data stream (Rotheram-Borus et. al. 2012:13). Smartphone is not only a communication device but also a continuation of their personality and definition of who they are as a human being (Persaud and Azhar, 2012:12).

In the present times, most of the people in the developed countries use Smartphone for a variety of purposes. Today in Finland, mobile phone has become more common also for the elderly people. The portable nature of Smartphones and tablets has led researchers to investigate pre-trip, during trip and post-trip traveler behaviors (Miller, 2014:11). Smartphones have transformed behaviors, information needs, decision-making, experiences, documenting and sharing (Lamsfus et al., 2014:09).

The phenomenal growth in Internet and in the number of Smartphone users has resulted in an unparalleled growth in mobile – commerce. Internet accessibility and Smartphone proximity are reasons for mobile retail use. With the increase of Smartphone users, it has also been embraced as overarching theory for mobile commerce adoption. In contrast, mobile devices such as Smartphones are closely connected to users' personal lives. The strong mobility of Smartphone technology brings great convenience to users lives with which they can conduct commerce anywhere and at any time (Mathew et. al. 2004:10). The Smartphone application for e-commerce has practically turned the miniature window to the virtual world into a fully-fledged shopping catalogue. The Smartphone application has facilitated constant customization as per the needs of the business. There are lot of core applications in an e-commerce business, which need to be integrated with the mobile app in order to ensure smooth business operations and transactions.

The mobile phones such as Android-based Smartphones, iPad and iPhones were appropriate for promoting e-commerce in modern times since mobility of people and technologies were the key factors in contemporary economy. Mobile applications are of utmost importance when companies market their products or services. Mobile phones have generated an incredible opportunity for accessing the Internet, while m-commerce has increased the level of using a mobile phone for business. The Smartphone applications have allowed users to change the web services' URLs. The application should allow the user to add multiple sources for the same web server by cell phone so that the user can code flex, which means that a user can develop and deploy cross-platform Internet applications being run on cell phones. This implies that a mobile application should be able to locate a list of products from different remote applications, which provide the same web services being supported by a mobile application (Alqahtani and Goodwin, 2012:02). The Smartphone applications have become the core of the e-commerce environment in the present times. The online retailers are able to position themselves well in the market and uniquely tap into the vast opportunities of mobile commerce. The users make use of Smartphone to search for products, compare prices and look for the best deals that are available online. The modern customers are increasingly searching for products online using the mobile shopping apps.

Smartphone Application for E-Commerce

Mobile has become an increasingly important driver of growth in ecommerce. The mobile visits account for one-third of the traffic on top ecommerce sites. The retail outlets are also getting more and more visitors who do their research-using mobile before visiting or during shopping. The mobile apps are used widely in the e-commerce sector because the users prefer apps to mobile browser, the apps have push notifications, the users have good experience and the mobile apps encourage brand loyalty. The mobile apps have provided a seamless and personalized experience to the customers (Saeed, 2014:14). The modern customers who own Smartphones want product information on their phones when shopping in store. They make large purchases through their phones and preferred to have a mobile wallet-style program to be able to pay for purchases.

Businesses in India, especially e-commerce firms, are waking up to the potential that mobiles offer in this country and are pushing their mobile applications to Smartphone users. 'There has been a massive shift in mobile usage patterns. The next generation might well skip desktops and laptops for mobiles. The mobile is a fascinating way of creating a personalized communication channel with the customer. The frequency of engagement is also higher with mobiles. The user interface is much better in a mobile application than on a mobile site. The Today, every business is dependent on Smartphone application for electronic commerce (Sarkar, 2014:15). The mobile applications have been on a steady rise in modern times. The buyers who perform searches via mobile apps have a greater propensity to purchase those products that they are researching. There is a steady and very consistent drift towards the usage of mobile phone apps such as e-commerce magneto i-phone app and android app in e-commerce.

The adoption of Smartphone and growth in mobile internet traffic has made a significant impact of app installation. The mobile phone users are slowly moving from mobile web to mobile app usage and this is evident with the changing traffic to few top e-Commerce Stores in India. The Indian enterprise mobility market is driven by the three major factors such as Smartphones shipment, growth of Smartphone market, and India's position at the global Smartphone market. The Smartphone application would boost the e-commerce in India due to its customer – friendly characteristics (Swathi, 2015:16). E-commerce is an optimal

way to bring a product and the opportunity to make a deal with it close to the consumer. In the present times, the process of e-commerce has been strengthened because of new media applications including smart phones.

India has been on the verge of something spectacular in e-commerce due to increasing number of owners of Smartphones. The merchants use their Smartphones to convey inventory updates; meanwhile dispatchers rely on cell phones to keep track of couriers and to improvise last-minute substitutions or refunds if available goods and customers' requests do not quite align. Some e-commerce entrepreneurs in India originally tried to create separate warehouses and logistics systems in the way that Amazon.com has done in the U.S. and Europe (Anders, 2015:03). Mobile commerce has been heavily on the minds of retailers lately as usage and sales continue to rise. Smartphone applications have benefit to e-commerce and provide tremendous opportunity to boost customer experience, engagement and loyalty in ways not possible with mobile browsers.

More shoppers visit the e-commerce sites especially from Smartphone to do business in modern times. The e-commerce has grown remarkably based on Smartphone application over a period. The dramatic increase in shopping attraction highlights a fundamental shift that retailers are dealing with: buyers are making more visits, and doing so across multiple devices. The Smartphones accounted for 49% of traffic in the USA according to the latest statistics (Demandware Shopping Index report, 2016:04). The online shopping and selling experiences changed in a way that it became less time consuming and much less of a hassle for the customers, as well as for sellers who do not have to incur in many costs as they did before, such as the cost of a selling force, extensive paper work, and eventually the cost of installing or refurbishing a selling point.

The modern customers in urban areas use Smartphones to make digital purchases than any other device according to recent survey conducted by Intage Group in India. The male Smartphone users in India prefer to use an app to their female counterparts. The women in India do prefer to use an app to a mobile browser; the gap between the two is much smaller than the male platform gap. The Indian e-commerce sites are moving from mobile websites to mobile apps. Major companies like Flipkart, Mynthra, Snapdeal, Ola, Reach CRM, and Makemytrip have come out with their own Mobile Apps since the Smartphone users in India are constantly increasing. The Mobile App is a conscious decision made by the companies rather than the users since they wanted to streamline their cost in technology. During a normal working day a shopper does not find much time to browse his laptop / desktop to do the shopping. Naturally, the Mobile App benefits the companies and customers to undertake e-commerce anytime and anywhere. The Smartphone application has become crucial from e-commerce point of view in India.

The Smartphones have become important means of web shopping and constitute about 60 percent of e-commerce visits in modern times. The rise of Smartphone shopping provides retailers with an opportunity to reach customers any time and any place. The e-commerce has become popular with the adoption of mobile shopping across the globe. The larger phone screens and better mobile web-browsing capabilities have enabled the easier shopping experience for the customers. Smartphone is the only computing device, which is known for the universality in e-commerce sector (Harty, 2016:07).

The dramatic increase in shopping attraction highlights a fundamental shift that retailers are dealing with: buyers are making more visits, and doing so across multiple devices. About 47% of all traffic to these sites worldwide had come from Smartphones, higher than the 44% of traffic to desktop sites and 9% of traffic from tablets. The Smartphones accounted for 39% of traffic, according to the Q2 2015 report (Ali, 2016:01). E-commerce has grown in India because of the increasing penetration of Smartphones and Internets. The 'Digital India' project which aims to offer a one-stop shop for Government services will definitely boost this sector by introducing the internet to remote corners of India. After taking a holistic view of the industry trends, it is seen e-commerce is emerging as an important tool to ensure exploding growth of Indian economy. With a rapidly growing internet, penetration e-commerce offers an attractive option for the retailers to expand (Kalita, 2016:08).

Tens of millions of Smartphone owners attached their bankcards to the app - thereby opening the door for purchasing rides, meals, and other goods. The Chinese e-commerce market is already the largest in the world, having overtaken the United States, with an estimated 400 million Chinese consumers already buying online. China's online retail ecosystem is evolving quickly. Today, not just people's purchasing habits are going digital. The e-commerce is increasingly going mobile and the use of devices as Smartphone is to make purchases is significantly higher than average compared to other countries surveyed. The Smartphone penetration is expanding rapidly in Asia as brands release lower-priced handsets into the market. The growing penetration of Smartphones has led to a boost in e-commerce throughout the region (Wilson, 2016:17).

The consumers are already using the Smartphones, which have become central part of the shopping experience. The shoppers want to use Smartphones to buy online but find the process flunky and confusing. The social media gets retailer and opportunity to recreate that shopping with friendly experience, which has become increasingly important. The global mobile wallet market is predicted to reach one thousand sic hundred billion dollars by 2018. The e-commerce is the next great retail opportunity and it is the start of the journey. The Smartphone applications have transformed costumer's lives by providing a smarter, richer and more boarding reality. The most popular social media networks are present on Smartphones and even on the most basic cell phone, which is best for today's business (Haroon, 2016:06).

The Smartphone has become the go-to shopping device, especially after features like fingerprint recognition make transactions effortless. According to the recent statistics, more than 80 percent of mobile transactions took place on a Smartphone in Southeast Asia significantly more than the US and the UK, where at least 30 percent of retail mobile transactions took place on tablets. Smartphone application offers the delightful experience to the customers in the field of e-commerce. Smartphone application is also highly dependable means of communication. The e-commerce is highly convenient for the customers who are fully preoccupied with various responsibilities. They naturally choose an app over physical shopping.

The service providers are more dependent on Smartphone applications, which are very well connected to the various devices including the computer, laptop, or cell phone. They are conducting their business smoothly with the help of mobile applications. There are about 25 best mobile applications for e-commerce, which are more productive and profitable. They include - Evernote, Google Keep, IFTTT, Slack, Trello, GoToMeeting, Buffer or Hootsuite, All of Your Social Networks, Facebook Pages, Snapseed, Over, Mention, Chromecast, BoxMeUp, DocuSign, CamScanner, Mint, Expensify, Pocket, Feedly, CRM, Live Chat, Google Analytics and Your e-Commerce Platform's Mobile App.

CONCLUSION

The Smartphone applications have effectively changed the scenario of the e-commerce industry in India. The marketing strategies of small and large companies have shifted to become more mobile-focused as customers have rapidly adopted mobile shopping. The modern business owners have entered into the mobile market by introducing their own Smartphone app. The e-commerce organizations are striving hard to enhance the user experience on Smartphones with a reliable tech infrastructure using mobile apps. The e-commerce has attracted the lion's share of venture capital investment in India. The mobile commerce has been ranked as the fourth in terms of general commerce. The larger screen size of tablets offers an unparalleled convenience for users when browsing and shopping for products via apps. The Indian users opt for apps over websites when it comes to accessing the Internet. The e-commerce sector has grown commendably because of revolutionary changes in information and communication technologies including Smartphone application. The growth of Internet connection has also boosted e-commerce in modern times. The number of Smartphones has nearly reached 400 million units as of now. Their acceptance as not only a mobile phone, but also as an internet portal, is increasing dramatically. The Smartphone could account for most e-Commerce transactions by 2018. It is definitely the age of Smartphone application for e-Commerce.

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

DYNAMIC SOURCE ROUTING PROTOCOL (DSR) STUDY OF EVALUATION OF PERFORMANCE ON WSN

Suresh Chandra Wariyal[35] Dr. Manoj Kumar Pandey[36]

ABSTRACT

Wireless Sensor Network (WSN) has been viewed as a well-known Ad Hoc Network that can be used for a particular application. In view of the fact that a WSN consists of small size, low cost and sensor nodes that are battery powered, it is more useful than other types of Ad Hoc networks to be positioned in lots of promising fields. To route the packets in these types of networks a number of routing protocols have been put into practice. Dynamic Source Routing protocol (DSR) is one of the best routing protocols.

To evaluate the performance of DSR routing protocol, an attempt has been made in this paper using some simulation network models. For the purpose of investigation, NS-2 simulator is used in mobile and static environments under the WSNs. Network density and network size are factor for performance study. In this paper, we have used the performance metrics like packet delivery fraction, average end-to-end delay, average energy consumption per delivered packet and routing overheads.

KEYWORDS

Wireless Sensor Networks, Adhoc Networks, DSR Protocol, Performance Study etc.

INTRODUCTION

Wireless sensor network is a wireless type of network that consists of number of nodes with computation, sensing and wireless communications capabilities [1]. The sensors determine ambient situation in the environment and then transfer data into signals that be able to be processed to disclose some characteristics about fact located in the area in the region of sensors [2].

Constraints like bandwidth and energy supply, combined with a typical deployment of sensor nodes that are of huge number, have faced lots of challenge to the plan and design of sensor networks [2]. The wireless sensor networks contains unique behavior, for example, high density of node employment, sensor nodes that are unreliable, and severe different types of constraints like storage, energy and computation constraints [3], which have several innovative challenges in the development of WSNs.

There might be various remarkable feature of WSN including multi-hop routing, self-organization and dynamic network topology. These features are very much important for many real world applications like disaster management, protection, combat field surveillance, and any place where humans cannot easily access or unsafe to human life [4].

Although both MANETs and WSNs are same in nature in some extent, equally both WSNs and MANETs belong to networks that are Ad Hoc type; to forward packets for others each and every node serves as a router; number of node can communicate with each other through multi-hop associations; and the various nodes are resource-constrained and generally batteries are used to power these nodes. As well as they are fundamentally dissimilar in various phases. The differences comprise of: the sensor nodes are typically tightly and densely installed in a field of interest and most of the nodes can be several orders of level which is much higher than MANET; WSNs also fulfill the constraints like storage, energy and computation constraints; sensor networks are generally designed and deployed for a particular application because sensor network are application specific; due to damaged or failure of node, network topology changes frequently; there can be number of sources for a particular sink after sensing the data sensed by sensor nodes, revealing a many -to- one traffic pattern[1, 2, 3, 4].

There are number of routing protocol for Ad Hoc networks. The protocols are as follows Include: Ad hoc on Demand Distance Vector (AODV), Destination Sequenced Distance Vector (DSDV), Dynamic Source Routing (DSR), Optimized Link State Routing (OLSR) and Temporally Ordered Routing Algorithm TORA.

In this research, a study of performance is accomplished for DSR protocol and the parameters for evaluating DSR routing protocol are: network density, network size are measured and investigated. To bring out a systematic and orderly performance study on DSR is the objective of this research. The DSR protocol was initially developed and designed to be used in MANETs but later on its capability to be used as a routing protocol on WSNs.

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RELATED WORKS

Z. Zhang and et. al., [4] explored that the way in which Ad Hoc routing protocols work on WSNs with a dissimilar amount of sources. Different parameters were tested for different routing protocol namely AODV, DSR, DSDV, TORA and OLSR. The examination of 50 nodes in (1500×300) m^2 was done under the Parameters like Average end-to-end delay, packet delivery fraction and routing overheads. Using different situations, the simulation study carried out for these routing protocols, and concluded some merits and demerits. The AODV protocol was among the best while doing performance comparison of these WSN routing protocols with single and multiple sources and the DSDV is second WSN protocol, which is better performer in the context of low packet delivery fraction.

M. N. Jambli et. al., [5] assessed the ability of AODV by investigating the metrics of performance that is energy consumption and packet loss. For 9 nodes in (100×100) m^2 network, mobile nodes with various route update interval (RUI), speed and density have been implemented. Which results was reduction in total network energy consumption and packet loss.

For diverse simulation time and mobility situation, the analytical research and development of the average jitter of AODV Routing M. Pandey et al [6] present protocol in WSN. Various performance measurement conditions were carried out for the AODV routing protocol for various simulation times and network topologies. M. Pandey et al are investigating the performance of 105 nodes in (500×500) m2 of various mobility models of WSN.

DYNAMIC SOURCE ROUTING PROTOCOL (DSR)

Dynamic source routing protocol indicates that the source end had the complete knowledge of the entire hop-by-hop route information to the destination end. Various features of the DSR includes reduced infrastructure cost, very less network overhead and the use of source routing. Two major method of DSR protocol is of Route Discovery and Route Maintenance. There is a route cache of each node in which routes are normally stored. Whenever a node wants to make communication with the destination, then first it inspects for the entire route for that particular destination in the route cache. If the particular path find, the packets are sent with all the source route header information to the destination end. A route discovery method is used to find the route if the route is not available at the route cache. The route detection method will flood the network with route request (RREQ) packets, and in response to that the neighbors will take delivery of RREQ packets as well as check for the path to destination end in their route cache and if the route is not available in caches then the network need to be broadcast again, otherwise route reply (RREP) packet will be used to replies to the originator. Since RREQ and RREP packets both are source routed, usually source can acquire the route and add to its route cache. During the communication if the link on a source route is broken down, route error (RERR) packet is used in response to the source node. The route detection procedure is again initiated once the RERR is received as well as the source end discards the route from cache [13].

SIMULATION ENVIRONMENT & SETUP

Simulation Model

In this research version 2.32 of NS-2 simulator is used. NS2 is a distinct event simulator extensively used in the community of networking research. NS2 is used as a flexible tool for researcher of networking to inspect how a variety of routing protocols carry out with dissimilar network configurations and topologies [14]. Mobile and static are two cases. The WSN application under consideration in this work is environmental data collection wireless sensor network, i.e. is one of WSN applications [1]. In such type of application, huge numbers of sensors are installed in the area to determine different parameters like speed, temperature, humidity and direction. The sensor node stay sleep majority of the instance and report measurements very frequently to the source station in data collection applications. The employment of large size sensors in such applications either mobile or static and they possibly will be operational with effective power searching techniques [1]. In a number of other applications, sensors are installed on moving objects like animal, robots and animals that can gather and sense and appropriate data and information [5]. The source end initiates number of data packets that are routed to destination end in the center of the WSN, in the case of simulation.

We have used 512 byte data packets and CBR traffic, for allowing comparison with other experiments [4, 5, 6, 7, 8]. We simulate populations of 100, 200, 300, 400, and 450 nodes in regions of 2121m×425m, 3000m×600m, 3675m×735m, 4250m×850m, and 5000m×900m for 200s of simulation time with 10 CBR sources for the impact of network size. We have selected variety of nodes involved to work with around the similar node density and simulation area proportions. A noticeably lesser density might cause the network to be very much often detached, and subsequently a study and investigation of the efficiency of varied routing protocols is still more complex. In addition to that, we simulate 10%, 20%, 30%, 40%, and 50% CBR traffic sources for 2121m × 425m network size with 100 nodes.

All source-to-sink connections are started at times uniformly distributed between 0 and 100s. The number of unique traffic sources is 70% of the total number of sources. The chosen sending rate is 4packets/s. Each data point presented in this paper is an average of five runs, each lasting for 200s of simulated time. The IEEE 802.11 Distributed Coordination Function (DCF) is used as the Medium Access Control Protocol with the suggested parameters to model 914MHzLucentWaveLAN DSSS radio interface at a 2 Mb/s data rate. The adjusted parameters in the simulation are given in Table.1.

Performance Metrics

The evaluation of DSR routing protocol is completed by following metrics:

Packet Delivery Fraction (PDF): PDF deal with the percentage of data packets generated by various nodes, and the data packet are successfully delivered from source end to the destination end, articulated as:

(Total number of data packets successfully delivered) / (Total number of data packets sent) ×100%

Average End-to-End Delay: End-to- End delay computed the mean time it takes to way a data packet from the starting nodes to the destination, articulated as:

(∑ Individual data packet latency) / (∑ Total number of data packets delivered)

Routing Overheads (ROH): Routing Overheads consider the average amount of control packets, which is produced per sensor node. There are three types of control packets having route request, reply and error message.

Energy Consumption per Delivered Packet: This measure the energy expended per delivered data packet. It is expressed as:

(∑ Energy expended by each node)/ (Total number of delivered data packets)

Table-1: Parameters Used in the Simulation

Parameter	Mobile Scenario	Static Scenario
Maximum Number of Nodes (N)	450 nodes	450 nodes
MAC Type	IEEE 802.11/ DCF	IEEE 802.11/ DCF
Propagation Model	Two Ray Ground	Two Ray Ground
Traffic Type	Constant Bit Rate	Constant Bit Rate
Agent	UDP	UDP
Queue Length	50 Packets	50 Packets
Connection Rate	4 pkts/sec	4 pkts/sec
Tx Power	0.2818 W	0.2818 W
Transmission Range	250 m	250 m
Initial Energy	200J	200J
Simulation Time	200 Seconds	200 Seconds
Node Mobility	Random Waypoint	NA
Pause Time	50 sec	NA
Max Speed of Mobile Node	5 m/sec	NA

Sources: Authors Compilation

SIMULATION RESULTS

Impact of the Number of Nodes

The high number of nodes expected to have a significant influence on the DSR performance. In comparison to the high-density node, the low-density node may affect the network to be frequently detached. As the node becomes denser, it will increase the contention. This trial demonstrates the effect of altering of the node density by changing the number of nodes inside the network and how it will effect on the performance of the DSR protocol. The Figure 1 shows the Packet delivery fraction, average end-to-end delay, ROH, and average energy consumption for each transported packets measured to 100, 200, 300, 400, and 450 nodes for deployment in mobile and static and mobile environments. The performance of the DSR is somewhat degraded at less node density, in terms of Packet delivery fraction. It is observed that the PDF for static node gives better result as the density of node enhance, as well as the network reliability is improved with the increase in the number of nodes as shown in Figure 1-(a).

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ISSN (Print): 2319-9016, (Online): 2319-9024
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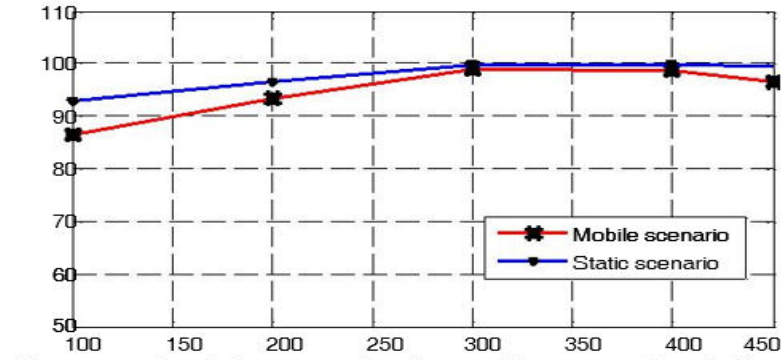
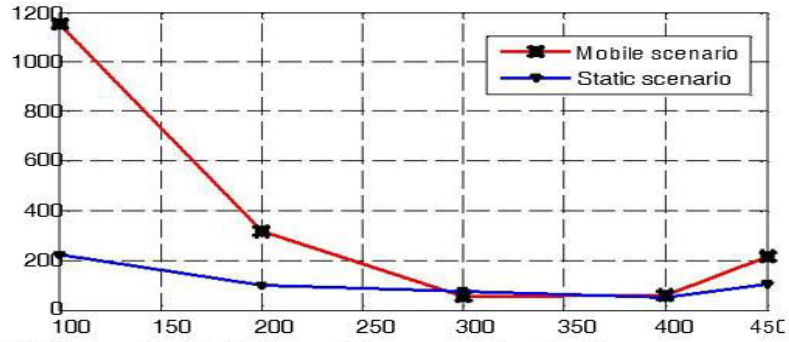
From Figure 1-(b), it is noticed that, for both static and mobile deployments, the best average end-to-end delay exhibited by DSR when the number of nodes within the network are between 300 and 400; it is almost less than 0.1 s. However, the average end-to-end delay is found to be degraded as the node density decreases, especially for mobile node deployment case.

In terms of ROH, as shown in Figure 1-(c), it is noticed that the DSR protocol generates a higher routing load for mobile nodes deployment. There is minor increase in the routing overheads as the number of nodes increases. As shown in Figure 1-(d), the Average energy consumption increases as the number of nodes within the network increases.

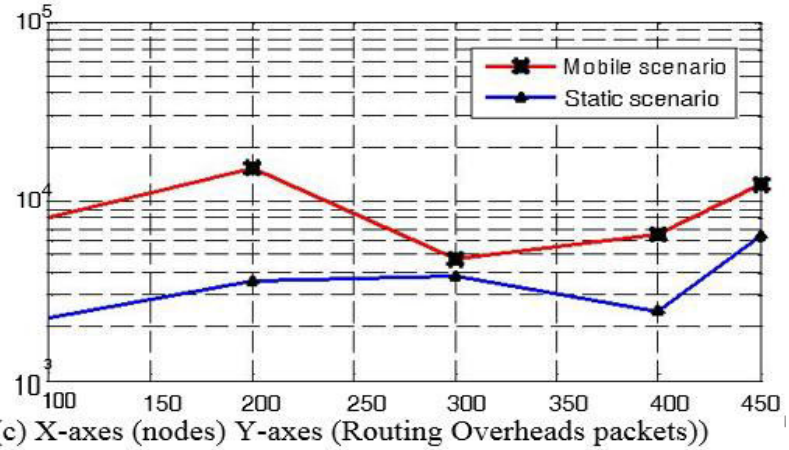
Figure-1: Impact of the Number of Nodes



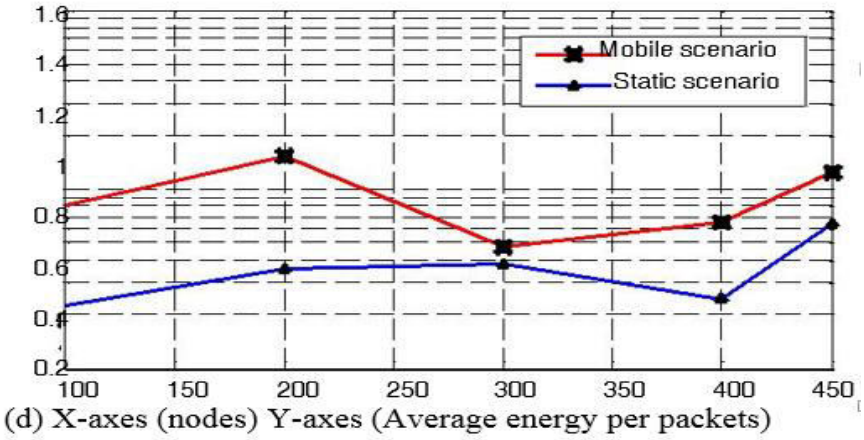
(a) X-axes (nodes) Y-axes (Packet Delivery Fraction (%))



(b) X-axes (nodes) Y-axes (Average delay (ms))



(c) X-axes (nodes) Y-axes (Routing Overheads packets))



Sources: Authors Compilation

Impact of the Network Size

The evaluation and performance of the DSR protocol in region 2121m × 425m, 3000m × 600m, 3675m × 735m, 4250m × 850m, and 5000m × 900m inhabited by 100, 200, 300, 400, and 450 nodes, correspondingly. The number of nodes is kept stable for all the above arrangement of areas and nodes. The outcomes of simulation for this test shows in Figure 2. While using the PDF, the DSR work excellent with the amendment made in the size of network, as shown in Figure 2-(a). However, for more than 200 nodes with mobile situation the performance turns down. The DSR is capable of managing the node most of the time (about 95%) with less than 200 nodes. Therefore, we have reached to the conclusion that as the density of nodes increases or we can say network size increases, the PDF stares decline.

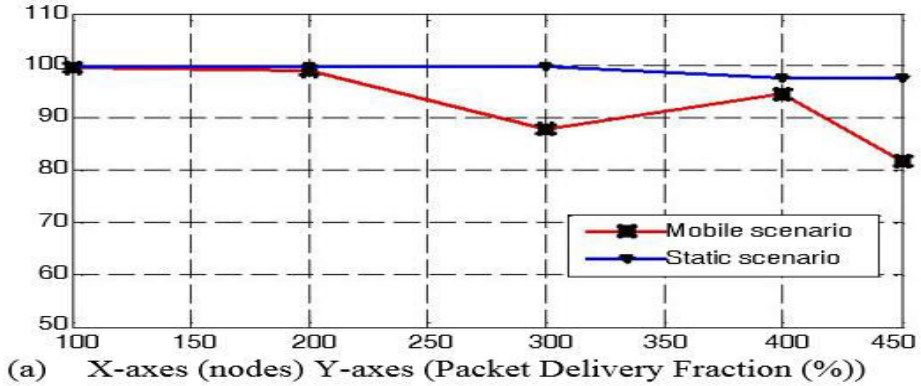
The criteria end-to-end delay for mobile as well as static situations likely to be same for small size of networks, as depicted in Figure 2-(b). However, as in the PDF when the density of nodes increases i.e. for bigger networks (more than 200 nodes), there will be a noticeable degradation in the end-to-end delay performance, particularly for the mobile scenario.

In comparison to the mobile scenario, the static scenario gives lower routing overheads, shows in the DSR protocol has demonstrated in Figure 2-(c).

According to the outcome shows in Figure 2-(d), for the average consumed energy per packet, it is noticed that the DSR protocol has shown a significant performance with lesser energy consumption for network of small sized. As the size of network increases, the consumed energy also increases.

In all the above experiments the DSR protocol shows that as the number of connection in the network increases, the performance of WSN degrades.[11][12]

Figure-2: Impact of the Network Size



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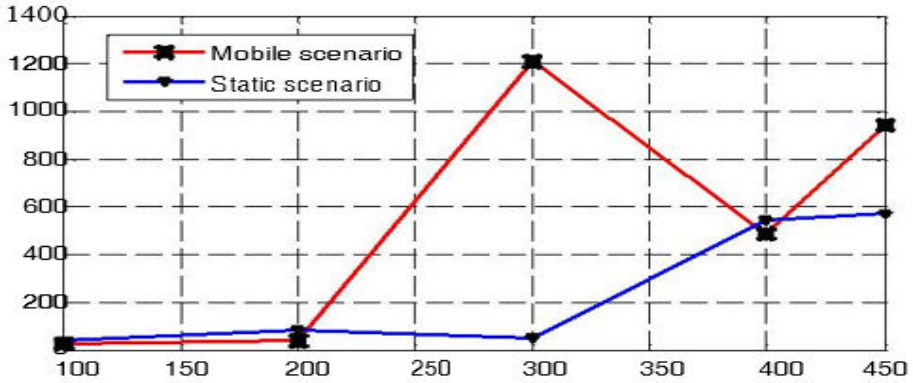
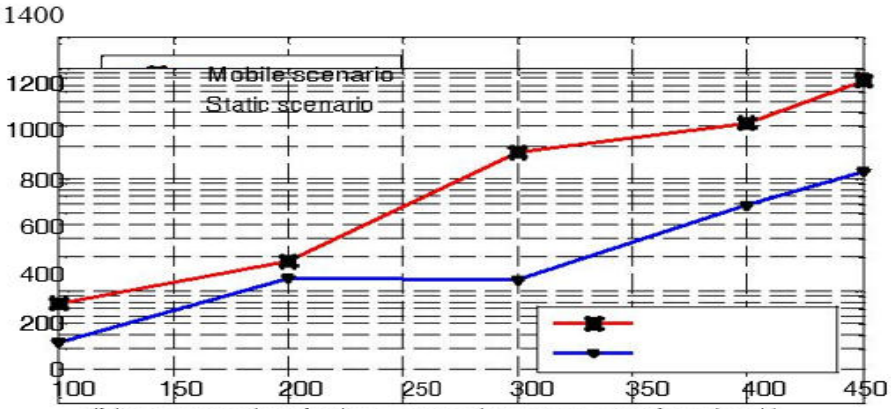
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

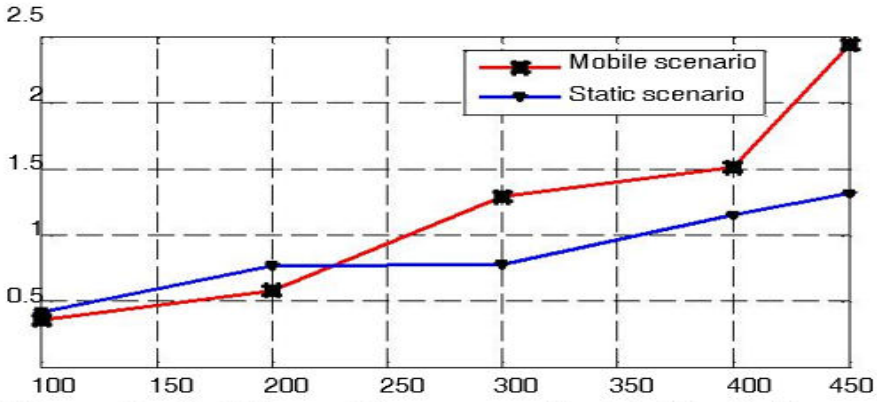


(b) X-axes (nodes) Y-axes (Average Delay (ms))



(b) X-axes (nodes) Y-axes (Average Delay (ms))

(c) X-axes (nodes) Y-axes (Routing Overheads (packets))



(d) X-axes (nodes) Y-axes (Average per Packet (J/packet)

Sources: Authors Compilation

CONCLUSIONS

In this paper, all the factors like average end-to-end delay, packet delivery fraction, routing overhead and the average energy consumption per delivered packet with the effect of the number of nodes (density) of network and size of network is presented. Numbers of scenarios have been tested, in which DSR carry out very well and in static scenario case, the DSR performance is better than the mobile scenario. An excellent level of reliability and stability is provided by the network in the case of multiple paths that are registered earlier and kept in the route cache of the nodes. The DSR protocol shows low latency, high Packet

Delivery Fraction, and energy consumption in which under heavy load conditions, most of experiments shows that there is degradation of performance, in the case of delay and PDF. The work presented here aims to find out the effect of different parameters on the performance of the DSR routing protocol in WSN. The results though do not present a steep comparative orientation of the results towards a specific routing protocol, but the comparative study leads towards some interesting results. Further research is needed to find out the most suitable protocol for each application. [9][10]

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PEZZOTTAITE JOURNALS

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

THE ANALYSIS OF IMPACT OF FINANCING DECISION BY ISSUE OF GREEN BOND

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ABSTRACT

As the world is moving towards globalisation, the sustainability is taking back seat. Profit motive has become key to growth and expansion. "Business of Business is Business". This dictum is the bottom line of the global companies. In this whole process environment is hit badly. Green Bonds are one hope in this direction that balances Battle of Profit & Sustainability.

The researchers try to understand and analysed the impact of Green Bonds.

GREEN BONDS

Green Bonds are any type of bond instruments whose proceeds will be exclusively applied to finance or re-finance, in part or in full, new or existing eligible projects that will promote progress on environmentally sustainable activities.

TYPES OF GREEN BONDS

- High-Yield Green Bonds,
- Corporate Green Bonds,
- Municipal Green Bonds,
- Commercial Bank Green Bonds,
- Asset- Backed Securities (ABS),
- Labelled Green Covered Bond.

GENESIS AND EVOLUTION OF GREEN BONDS

- The first green bond was issued in 2007 and was initially characterized as a niche product.
- The European Investment Bank (EIB) issued the "Climate Awareness Bond" in 2007.
- $81 billion worth of Green Bonds were sold worldwide in 2016, dominated by the Asian countries (India & China mostly).

Potential projects explicitly recognized by the Green Bonds Principles (GBP) include:

- Renewable energy.
- Sustainable waste management.
- Biodiversity conservation.
- Clean transportation.
- Sustainable water management (including clean and/or drinking water).
- Climate change adaptation.

REVIEW OF LITERATURE

Khouri, Christina (2015) reports that there has been no spike in the Asian green bond this year in the use of the instrument by the borrowers in the Asean region, where the challenges with the conventional debt markets is faced as they develop. Khouri also mentions that the facility could also end up doing the same for the other countries that are eyeing green issuance as well. CGIF told Global Capital Asia that it hoped to back a green bond as part of its efforts to introduce new types of notes in the region.

Vijaya Kumar, et. al; (2016) has reported that higher interest rates and unattractive terms under which debt is available in India raise the cost of renewable energy by 24-32 per cent compared to the U.S. and Europe. Green Bonds are issued by multilateral agencies such as the World Bank, corporations, government agencies and municipalities. Institutional investors and pension funds

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also have appetite for such bonds. "India has big goals in terms of renewable energy installations, but a big hurdle has been financing and the cost of financing," says Raj Prabhu, CEO and Co-founder of Mercom Capital Group. In addition, many notable CEO's have given their opinions about the matter.

Kim (2015) has analyzed about the birth of the green bond boom in India through IDBI's dollar denominated Green Bonds issue in 2015, Kim analyses the boom with the help of personal interviews of market experts and bankers in his article. Kim also found out that since there are not yet many dedicated funds in the Asian markets like the ones in the European market there is no pricing advantage for the issuer in the Asian markets.

Hui, Rev (2016) informs about the development in the green bond framework in India with SEBI given a formal framework for India's green bond market. SEBI also came up with guidelines that revolve around the Green Bonds use of proceeds & management of the same, project evaluation, selection and reporting standards. He has mentioned that India plans to build 175 gigawatt of renewable energy capacity by 2022, which requires an estimated funding of $200bn.

Prasad, Rachita (2016) has analyzed the CLP India Private Limited (herein after referred as CLP for ease) wind energy arm issue of Rs 600 crore worth Green Bonds and also issued unlisted, redeemable non-convertible debentures with tenure of three, four and five years at a coupon of 9.15 per cent.

Palma, Stefania (2015) has analyzed about the masala bonds impact on India's green energy projects in the article ' Masala bond' to fuel India's green energy ambitions**.** This article puts a spotlight on the ambitious green investments in the country. Palma concludes telling that The IFC bond was also testament to the incredible growth of the green bond market.

Kim (2016) focuses on the initial impact on the investors and the issuers by issue of Green Bonds in the Indian market. The researcher feels that the atmosphere is right for the boom of Green Bonds. With all the above observations the researcher concludes that though on the outside it may feel like the government is backing the issue it is the asset class is which is going to set a trend and leave a mark in the market.

Kumar, Rashmi (2016) has analyzed how the Green Bond market has blossomed from being a minnow a couple of years back to a strong dominant position now in the Asian Markets, however there are numerous challenges needed to overcome in the Asian region to reach the status of green bond markets in the United Kingdom. Kumar concludes with a view telling that though the market has blossomed it needs more architecture to make a mark for itself in the Asian markets.

Gilbert has written this research article stating whether standardization is required or not when it comes to issue of Green Bonds and will it affect the market and its growth The people who are for standardization agree with the move of Mexican Stock Exchange which has released its own set of rules relating to the issue of Green Bonds and also the rules set by People's Republic of China. While the other side argues that standardizing makes the growing market to go down and it will be curbed before the market reaches greater heights. In the end it what is best for the growth should only be done instead of taking unnecessary steps by making the process more difficult.

Hui (2015) has researched about the problems faced during the issue of Green Bonds and has provided some suitable solutions for the problem. The researcher has also suggested a few solutions to overcome these problems like listing the bonds in an exchange to lower the risk and provide liquidity and government guarantee on these types of bonds would secure the investors' interest and thus helping in the growth of the market.

Kim (2016) has expressed views about how financial institutions are driving the Indian Green bond market with reference to the latest Axis Bank issue Even though Axis Bank had issued Green Bonds successfully there were problems which were to be overcome like the pricing of the bonds. Thus this is how the researcher has measured, analyzed the success of Green Bonds issued by Axis Bank.

Khouri (2015) has researched about the emergence of markets in Asia specifically in China & India. The researcher has analyzed on the number of transactions over the years related to Green Bonds. The researcher has also mentioned about how the green bond market has already been developed in western counties like USA and the European Union. Overall, the research paper has given a full view about the green bond market and how the Asian market should strive upon developing the market to reach the western standards.

STATEMENT OF PROBLEM

This study is to illustrate how Green Bonds have an impact on the Investing Pattern in the market and how the bonds are facilitating the company and the investors to grow.

OBJECTIVES

- To enumerate the gains from issue of green bond (**Tax Shield**).
- To understand and analyze Green Bond impact with the help of financing decision / Capital Budgeting Technique.

PROCESS TO CALCULATE WITH VARIOUS FINANCING DECISION TECHNIQUE

Internal Rate of Return (IRR)

$$IRR = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t} - C_0 = 0$$

Where, r = the internal rate of return, C_t = Cumulative cash flow at the end of t years, C_0 = Initial Outlay.

Pay Back Period (PBP)

$$DPBP = (A-1) + \frac{C - Cumulative\ Present\ Value\ of\ Cash\ Flow^{(A-1)}}{(Present\ Value\ of\ Cash\ Flow)^A}$$

Where,
A= Year in which the cumulative present value of cash flows from investment exceed the initial cost.
A-1 = the year prior to A.
Present Value of Cash Flow ^{A}= Present Value of Net Cash Flow in year A.
Cost = the initial cost of investment

Net Present Value (NPV)

$$NPV = \sum_{t-1}^{n} \frac{A_1}{(1+K)^t} - C$$

Where,
A1 = represents the stream of benefits expected to occur if a course of action is adopted,
C is the cost of that action.
K is the appropriate discount rate to measure the quality of A's.

LIMITATIONS

- The data mainly used in study is secondary in nature.
- The research is time and rate specific.
- The findings cannot be generalized as it deals with specific companies.
- The predictions made are based on past trends, which may vary due to different situations and circumstances.

DATA ANALYSIS

CLP India Private Limited (CLP)

CLP entered the Indian Power Sector in the year 2002 with the acquisition of a 655 MW gas fired power plant, which is located in Bharuch, Gujarat.CLP India is the wholly owned subsidiary of CLP Holdings Ltd, which is listed on the Hong Kong Stock Exchange and is one of the leading investor-owned power businesses in Asia. Entering the Indian power sector in 2002, it has become one of the largest foreign investors in the Indian power sector with a total committed investment of over INR 14,500 Crores. CLP India is one of the largest renewable energy producers in India with operational and committed capacity of around 1100 MW across wind and solar.

Greenko Energies Private Limited (Greenko)

Greenko is a mainstream participant in the Indian energy industry and a market-leading owner and operator of clean energy projects in India. This group is building a portfolio for wind, solar, hydropower, natural gas and biomass asset within India and

Volume 6, Number 1, January – March' 2017
ISSN (Print): 2319-9016, (Online): 2319-9024
SJIF (2015): 6.717, SJIF (2016): 7.368

intends to increase the installed capacity it operates by developing new Greenfield assets. Right now, Greenko has 1.5 GW of operating capacity and it plans to achieve 3.0 GW capacity by 2018.

Ascertainment of Capital Cost of Wind Power (1 MW)

Table-1

Particulars	Capital Cost of Wind Power (Rs. In Crores)	% of Total Cost
Wind Turbine	384	64%
Foundation	96	16%
Planning & Miscellaneous	54	9%
Grid Connection	66	11%
Total	**600**	**100%**

Sources: Authors Compilation

Tax Incentives for Wind Energy

- 80% accelerated depreciation on specified Non-conventional Renewable energy (including wind power requirement) devices/systems in the first year of installation of projects.
- 10-year Tax Holiday on Wind Power projects.

Table-2: Ascertainment of Cost of Solar Power [1 Mega Watt (MW)]

Particulars	Capital Cost for Solar PV projects (Rs. In Crores)	% of Total Cost
PV Module	340	55.74%
Land Cost	31	5.08%
General & Civil Works	50	8.20%
Mounting Structure	50	8.20%
Power Conditioning Unit	39	6.38%
Evacuation Cost	50	8.20%
Preliminary Cost	50	8.20%
Total	**610**	**100%**

Sources: Authors Compilation

Tax Incentives for Solar Energy

- A 10-year tax holiday for the solar power projects.
- Guaranteed market through solar power purchase obligation for states.
- Special incentives for exports from India in renewable energy, which is produced from an SEZ.
- A payment security mechanism to cover the risk of default by state utilities/discoms.
- A subsidy of 30% of the project cost for off-grid Photovoltaics and solar thermals projects.
- Loans at concessional rates for off-grid projects.

Assumptions

- All Indirect Taxes & Minimum Alternate Tax has been ignored.
- Direct Tax @ 30% is assumed throughout for all the projects.
- Machine rates & cost are based on documents published by Central Electricity Regulatory Commission.
- Interest of the year 2016, is added to the initial outlay as capital expense since the projects were not operational.
- It is assumed that new equity shares are issued at the time of maturity of bonds (i.e., on 2020 & 2023).
- Depreciation is provided at Straight Line Method according to several relevant laws and is calculated based on the cost ascertainments mentioned above.
- The cost, sales and production has been based on previous trends and market conditions.

Various Calculations to Ascertain Cash Flows of the Relevant Projects

Table-3

	CLP WIND FARMS (101 MW)				
Particulars	**2017**	**2018**	**2019-2026**	**2027-2036**	**2037-2041**
Efficiency	**65%**	**68%**	**72%**	**75%**	**80%**
Cost (Rupees) (Rs.) / Unit	4.6	4.6	4.6	4.6	4.6
Production (MW)	561600	587520	622080	648000	691200
Total Cost (Rs. in Cr)	**258.336**	**270.2592**	**286.1568**	**298.08**	**317.952**
Sale Price (Rs.)	7	7	7	7.5	7.5
Total Revenue (Rs. in Cr.)	**393.12**	**411.264**	**435.456**	**466.56**	**518.4**

Sources: Authors Compilation

Table-4

	GREENKO (150 MW)			
Particulars	**2017-2021**	**2022-2026**	**2027-2036**	**2037-2041**
Efficiency	**60%**	**65%**	**70%**	**75%**
Cost (Rupees) (Rs.) / Unit	5	4	4	4
Production (MW)	777600	842400	907200	972000
Total Cost (Rs. in Cr)	**388.8**	**336.96**	**362.88**	**388.8**
Sale Price (Rs.)	8.25	8.25	8.25	8.75
Total Revenue (Rs. in Cr.)	**641.52**	**694.98**	**793.8**	**850.5**

Sources: Authors Compilation

Table-5

	GREENKO (200 MW)				
Particulars	**2017-2021**	**2022-2026**	**2027-2029**	**2030-2033**	**2034-2041**
Efficiency	**60%**	**65%**	**70%**	**70%**	**75%**
Cost (Rupees) (Rs.) / Unit	5	5	5	4.5	4.5
Production (MW)	1036800	1123200	1209600	1209600	1296000
Total Cost (Rs. in Cr)	**518.4**	**561.6**	**604.8**	**544.32**	**583.2**
Sale Price (Rs.)	7	7	7.5	7.5	7.5
Total Revenue (Rs. in Cr.)	**725.76**	**786.24**	**907.2**	**907.2**	**907.2**

Sources: Authors Compilation

Table-6

	GREENKO (300 MW)				
Particulars	**2017-2021**	**2022-2026**	**2027-2031**	**2032-2036**	**2037-2041**
Efficiency	**60%**	**65%**	**70%**	**70%**	**75%**
Cost (Rupees) (Rs.) / Unit	5	5	5	4.5	4.5
Production (MW)	1555200	1684800	1814400	1814400	1944000
Total Cost (Rs. in Cr)	**777.6**	**842.4**	**907.2**	**816.48**	**874.8**
Sale Price (Rs.)	8	8	8.5	8.5	8.5
Total Revenue (Rs. in Cr.)	**124.416**	**134.784**	**154.224**	**154.224**	**165.24**

Sources: Authors Compilation

Table-7: Income Statements for the Various Projects to Get the Required Cash Flows for Further Calculations
YEAR

Particulars	**2017**	**2017**	**2017**	**2017**
Efficiency	65%	60%	60%	60%
	CLP(101MW)	**GREENKO(150)**	**GREENKO(200)**	**GREENKO(300)**
	Amount (Rs.)	**Amount (Rs.)**	**Amount(Rs.)**	**Amount (Rs.)**
Sales	3931200000	6415200000	7257600000	12441600000

Less:- Cost	2583360000	3888000000	5184000000	7776000000
EBITDA	**1347840000**	**2527200000**	**2073600000**	**4665600000**
LESS:- Depreciation	339360000	409500000	546000000	819000000
EBIT	**1008480000**	**2117700000**	**1527600000**	**3846600000**
Less:- Interest	549000000	376837500	502125000	754162500
EBT	**459480000**	**1740862500**	**1025475000**	**3092437500**
Less:- Tax	NIL	NIL	NIL	NIL
EAT	**459480000**	**1740862500**	**1025475000**	**3092437500**
Less:-Dividend	90000000	100000000	50000000	150000000
	369480000	**1640862500**	**975475000**	2942437500
Add:- Depreciation	339360000	409500000	546000000	819000000
Net Cash Flow	**708840000**	**2050362500**	**1521475000**	**3761437500**

Sources: Authors Compilation

Based on the above Figures we can calculate the Various Cash Flows of a Project Taking into Consideration of all the Above-Mentioned Assumptions.

Table-8

Years / Particulars	CLP 101 MW(Rs.)	GREENKO 150 MW(Rs.)	GREENKO 200 MW(Rs.)	GREENKO 300 MW(Rs.)
2017	708840000	2050362500	1521475000	3761437500
2018	761048000	2030362500	1511475000	3731437500
2019	833992000	2010362500	1491475000	3711437500
2020	833992000	1990362500	1471475000	3691437500
2021	1042992000	1970362500	1451475000	3661437500
2022	1032992000	3003362500	1604275000	4020237500
2023	1022992000	2983362500	1584275000	4000237500
2024	1012992000	2830200000	1996400000	4734400000
2025	1002992000	2810200000	1966400000	4704400000
2026	992992000	2780200000	1946400000	4674400000
2027	914630400	2041770000	1930600000	4290980000
2028	934630400	2021770000	1900600000	4270980000
2029	964630400	2001770000	1880600000	4240980000
2030	994630400	1981770000	2283960000	4210980000
2031	1067248000	1971770000	2253960000	4190980000
2032	1077248000	2259290000	2223960000	4806020000
2033	1077248000	2239290000	2203960000	4776020000
2034	1077248000	2219290000	2365400000	4746020000
2035	1077248000	2189290000	2335400000	4726020000
2036	1077248000	2159290000	2305400000	4706020000
2037	1688784000	2354750000	2285400000	5068900000
2038	1688784000	2334750000	2265400000	5038900000
2039	1688784000	2305750000	2235400000	5008900000
2040	1688784000	2274750000	2205400000	4988900000
2041	1688784000	2254750000	2185400000	4938900000

Sources: Authors Compilation

Calculation of NPV, IRR&DPBP of Various Projects to Draw Conclusions

Table-9

	CLP 101 MW	
INITIAL OUTLAY	Rs.6569000000	
NPV@13%	**6940555129-6569000000 = Rs.371555129**	
INTERNAL RATE OF RETURN		
	7713189642-6569000000=**1144189642**	

	7713189642-6018500326=**1694689316**	
IRR	10%+1144189642/1694689316	
RESULT	**10.68%**	
DISCOUNTED PBP@13%		
DISCOUNTED PBP@13%		21+14163136/114837312
		21.12 YEARS
RESULT		**21 YEAR 1 MONTH 14 DAYS**
	GREENKO 150 MW	
INITIAL OUTLAY	Rs.9526837500	
NPV@15%	**11107330053-9526837500=Rs.1580492553**	
INTERNAL RATE OF RETURN		
	14640981300-9526837500=**8062739200**	
	14640981300-8856076390=**5784904910**	
IRR	15%+8062739200/5784904910	
RESULT	**16.39%**	
DISCOUNTED PBP@20%		
DISCOUNTED PBP@20%		10+2743252/274822242
		10.009 Years
RESULT		**10 YEARS 0 MONTHS 3 DAYS**
	GREENKO 200 MW	
INITIAL OUTLAY	Rs.12702125000	
NPV@13%	12743133196-12702125000=Rs.**41008196**	
INTERNAL RATE OF RETURN		
	16192506903-12702125000=**3490381903**	
	16192506903-11062631556=**5129875347**	
IRR	10%+3490381903/5129875347	
RESULT	**10.68%**	
DISCOUNTED PBP@10%		
DISCOUNTED PBP@10%		13+601366668/982164997
		13.62 YEARS
RESULT		**13 YEARS 7 MONTHS 9 DAYS**
	GREENKO 300 MW	
INITIAL OUTLAY	Rs.19054162500	
NPV@15%	**26249078428-19054162500=Rs.7194915928**	
INTERNAL RATE OF RETURN		
	37759570301-19054162500=**18705407801**	
	37759570301-21323172927=**16436397374**	
IRR	10%+18705407801/16436397374	
RESULT	**11.14%**	
DISCOUNTED PBP@15%		
DISCOUNTED PBP@15%		9+465183356/1155511680
		9.40 Years
RESULT		**9 Years 4 Months 24 Days**

Sources: Authors Compilation

FINDINGS & SUGGESTION

The project has been computed for a time scale of 25 years to analyze the full-fledged benefit of Green Bonds on a company, hence for the same the companies CLP Wind Farms Limited & Greenko Energies Private Limited.

CLP India Private Limited

CLP Limited has issued Green Bonds for Rupees 600 crores at a coupon rate of 9.15% maturing after four years of issue. It has utilized this issue in a wind farm project. CLP had got the first mover advantage by issuing high yield corporate Green Bonds and also as the bonds had been issued in Rupees so no Hedging cost were incurred. CLP also got higher international rankings in the bond issue market due to Green Bonds. The higher interest rates were only the negative aspect of the issue from the viewpoint of the company.

Greenko Energies Private Limited

Greenko has issued dollar denominated Green Bonds valued at $550 million for a coupon rate of 4.875% maturing after 8years of issue. Greenko has diversely invested in three different solar projects at different capacities and capital cost. The bond issue had an advantage of lower coupon rate but it had to incur hedging cost due to dollar denomination. As the rates were lower, Greenko had better opportunities to get its investment back. The company's international rankings went up after the issue of Green Bonds.

Performance Analysis

CLP and Greenko had their own different and unique strategies to utilize the funds and they both were successful in getting positive returns, which can be seen in above table. This rate of return could not be expected from both the companies if they had used any other debt instruments in same projects. However, Greenko was a clear winner when it comes to utilization of funds and earning returns in a better manner.

Table-10

Particulars	CLP	Greenko 150	Greenko 200	Greenko 300
Net Present Value	Rs.371555129	Rs.1580492553	Rs.41008196	Rs.7194915928
Discounted Payback Period	21.12 years	10.009 years	13.62 years	9.40 years
Internal Rate of Return	10.68%	16.39%	10.68%	11.14%

Sources: Authors Compilation

SUGGESTIONS

The green bond market is still evolving and is in its infant stage in India, so it needs a lot of support from the Government and other institutions. The main reasons to use Green Bonds are:

- It comparatively lowers the Cost of Capital, thus releasing the stress on companies.
- It helps in the growth of renewable energy in the country.
- It could also help achieve the country's renewable energy target mentioned in the Paris Climate Summit.
- Green Bonds also helps in getting tax incentives or Holidays for both Investor and Issuers.
- The organization gains International recognition and higher rankings in the Bond Market.
- Given the nature of Green Bonds, there is a need for defining what all constitutes under Green Bonds by Securities and Exchange Board of India.
- There is a need for specific disclosure requirements about management of proceeds, reporting requirements etc.
- Any renewable projects in India require certification by Independent Third Party certifiers, which should be made available in-house.

CONCLUSION

After putting in a lot of effort into gathering accurate information about the subject matter, it is reported objectively and conveyed in an appropriate language. According to this study, we can get insights that the companies issuing Green Bonds have more benefits when compared to companies issuing other debt instruments.

Here we have taken two companies as subject matter to study, i.e. Greenko and CLP where both the companies proved to be effective in terms of earning good rate of return to the investments made by the investors. However, when compared Greenko has been in the front in terms of utilization of funds and getting positive returns.

By estimating all the risks & gains involved in Green Bonds along with the help of various statistical tools, we have achieved all the stated objectives for the projects. Hence, we can conclude that Green Bonds have a significant influence on the financing decision of a renewable energy company.

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