
ACADEMICIA
ISSN (online) : 2249-7137
ACADEMICIA
An International Multidisciplinary Research Journal
Published by
South Asian Academic Research Journals
A Publication of CDL College of Education, Jagadhri
(Affiliated to Kurukshetra University, Kurukshetra, India)

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ISSN (online) : 2249 –7137

Editor-in-Chief : Dr. B.S. Rai

Impact Factor	:	SJIF 2018 = 6.152
Frequency	:	Monthly
Country	:	India
Language	:	English
Start Year	:	2011

Indexed/ Abstracted : Indian Citation Index (ICI), Google Scholar, Ulrich's Periodicals Directory, ProQuest, U.S.A. EBSCO Discovery, Summon(ProQuest), U.S.A. CNKI Scholar, ISRA-JIF, GIF, IIJIF

E-mail id: academicia@saarj.com

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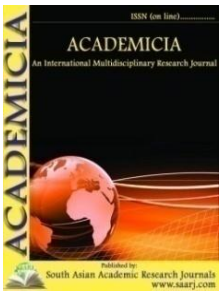

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DOI NUMBER: 10.5958/2249-7137.2019.00068.5

THE IMPACT OF TECHNOLOGY TRANSFER ON THE IMPROVEMENT OF THE COMPETITIVENESS OF THE NATIONAL ECONOMY

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ABSTRACT

The article examines the theoretical and practical aspects of assessing and controlling the impact of technology transfer on improving the competitiveness of the national economy. The current stage of world economic development is characterized by an accelerated pace of scientific and technological progress and the increasing intellectualization of the main factors of production. Only a developed system of technology transfer will create domestic, acquire and adapt foreign developments aimed at improving the country's competitiveness, as the possession of technology is the most obvious reason for the total wealth of wealthy nations. At the state level, these areas are determined based on the primary needs of the state and its innovative potential. State support allows in certain scientific fields not to lose the achieved scientific positions or to influence the change in the technological mode of economic development. In the world there are several models of innovative development. French, for example, provides for the study of technical, technological, economic, environmental, social and other problems of enterprises and the search for scientific teams that can provide an advantageous solution, while improving the competitive position of a particular enterprise. At present, the scientific and technical leadership of the state is determined not only by the high level of development of the newest industries, but also by the ability to quickly and continuously restructure all sectors of the economy to create and distribute new technologies.

KEYWORDS: *Transfer, Innovations, Technologies, National Economy, Competitiveness, Potential.*

INTRODUCTION

Problem statement: At present, in the majority of developed countries of the world, the process of formation of a post-industrial society is under way, an innovation-type economy is actively being formed, the transition of the economy of developed countries to a technological order is under way.

Analysis of recent research and publications. Based on the studied literature of such authors as Saybel N.Yu. and Bertosh EV: Innovations are becoming one of the main economic resources affecting the competitiveness of enterprises. The level of competitiveness of enterprises and firms is influenced by the scientific and technical level and the degree of improvement of production technologies, the use of modern inventions and discoveries, the introduction of modern forms and methods of organizing production and labor. Only a developed system of technology transfer will create domestic, acquire and adapt foreign developments aimed at improving the country's competitiveness, as the possession of technology is the most obvious reason for the total wealth of wealthy nations

Isolation of unresolved early parts of a common problem

At the present stage of development of the entire economic society. Innovations are a strategic tool that can increase the competitiveness of state products and their economic growth. The state should apply a partnership model in innovation policy - create favorable conditions for the economic climate for the entry of the private sector into the sphere of innovation.

Purpose of the article: The purpose of this work is to identify the main aspects of improving the competitiveness of national products in the context of the modernization of the national economy, as well as solving problems concerning the introduction of innovative developments of other countries into the economy of a given country or a particular enterprise.

As the formation of a new efficient economy, innovation increasingly determines the dynamics and quality of economic development. A critical condition for ensuring the competitiveness of the country, industries and companies associated with the production of high-tech products, becomes effective strategic management of innovation, technology transfer and knowledge. As world practice shows, successful innovation activity is impossible without a system of effective state support. One of the most important reasons for the growing role of the state in the transition to a new model of economic development is that the market itself orients private companies towards obtaining predictable business results and high revenues in the short term, striving to retain market leadership, both at the expense of a monopoly on the possession of individual factors of production (raw materials, technologies, etc.), and through the formation of artificial obstacles for other innovative companies.

The task of creating by the state general conditions for the development of entrepreneurship and innovation activity, creating an environment that stimulates innovation risk, helps to attract private and foreign capital to create high-tech products, and stimulates various forms of cooperation between the state, university and business sectors of scientific and industrial activities. It is the partnership of the state and private business that reduces the risks of inefficient decisions in the field of innovation. Therefore, the center of gravity in solving the problem of the relationship between the state and the market is transferred to aspects of their mutual

complementarity, and not opposing one another. In this context, national innovation systems should be formed.

The most important function of state regulation in the conditions of the market is the identification of priority directions of innovation activity and the resource provision of relevant scientific research. At the state level, these areas are determined based on the primary needs of the state and its innovative potential. State support allows in certain scientific fields not to lose the achieved scientific positions or to influence the change in the technological mode of economic development. That is why the concentration of resources on priority areas of development of science and technology should be attributed to the principles of innovation policy.

An important condition for the cooperation of science and production is the market mechanism of interaction and the involvement of young scientists to participate in the most important scientific and innovative developments. In our country, there is still not enough scientific research for all types of human activity, which, moreover, could be classified as innovative. In such cases An important condition for the cooperation of science and production is the market mechanism of interaction and the involvement of young scientists to participate in the most important scientific and innovative developments. In our country, there is still not enough scientific research for all types of human activity, which, moreover, could be classified as innovative. In such cases, in order to revive the economy of enterprises, branches, and human activities that have stopped in their development, they use a multi-stage technology transfer mechanism, i.e. introducing innovative developments of other countries into the economy of a given country or a particular enterprise.

Technology transfer is also applicable when our own innovative developments are more expensive than global ones. Given that the economy of Uzbekistan has moved to the path of innovative development and, therefore, requires flexibility, efficiency, gain in time and money, in the course of updating the production process. Now in the global economy there is a change of epochs, technological structures. The world switched to the fifth technological mode. So that the economy of our country does not lag behind the global one, we need to finance the innovation activity of only the fifth technological order, which means we need to deal more with the transfer. Technology transfer can be applied in one country in the process of adapting the innovation development of one enterprise to another.

In the world there are several models of innovative development. French, for example, provides for the study of technical, technological, economic, environmental, social and other problems of enterprises and the search for scientific teams that can provide an advantageous solution, while improving the competitive position of a particular enterprise. The English model, on the contrary, having a data bank of scientific developments, allows you to select an enterprise in which it is advantageous to realize the results of scientific activity.

For our country, at the stage of the formation of innovation, the best are the study of the problems of enterprises, on the one hand, and the creation of a data bank of scientific research, on the other. For Uzbekistan, achieving innovative and technological development is crucial, since only through this path is it possible to create a modern technological base, produce competitive products, rational use of natural resources, increase agricultural efficiency, and strengthen international competitiveness. In addition, the global, financial and economic crisis

that began in mid-2008 poses new challenges, including to the industry of Uzbekistan. In this regard, the government of Uzbekistan in 2009 adopted a series of measures to reduce costs, search for new, alternative and more efficient production methods in order to increase the level of competitiveness of domestic goods and services in international markets. When solving this problem should proceed from its features.The specificity of such goods as the results of creative work leaves an imprint on the functioning of the technology market, creating significant differences between it and other markets. Thus, the peculiarities of trade on it include: the long and diverse nature of cooperation, frequent use of a combination of several technology carriers (for example, export and rental of industrial equipment, scientific and technical cooperation, joint venture), more complex transaction processing procedures, etc.

Sharing the results of creative activity (especially in science, technology and management) is the most important factor for progress. Therefore, the state controls this area and, creating the prerequisites for developing more effective results, stops the attempts of citizens to use the achievements of the human mind to the detriment of society. In particular, it protects the results of the creative work of citizens and organizations by introducing the legal institution of intellect Interstate and transnational technology transfers are based on developed political, economic, scientific, technical and humanitarian ties between countries. The creation of political, international legal, economic and other conditions for establishing mutually beneficial trade and technology exchanges lies with the federal authorities and institutions, but to a large extent depends on the independent efforts of the regions.

Based on the individual potential of the existing structure of the economy, location, situation in enterprises, for each region a different, complex of measures is needed.

The main trends of state activity in the innovation sphere of developed countries led to the formation of universal, proven international practice and proven recommendations on the content and main objectives of state support for innovation activities, the main of which include:

- Adoption of relevant regulatory decisions in areas that are traditionally assigned to the state;

- Actively promote the transfer of technologies created in areas of traditional state responsibility;

- to play a leading role in cooperation of the partnership of the state and the private sector in all areas of innovation activity, to the extent possible, to participate in various nodes of the “chain” of creation of innovations that have great public benefit and importance for the private sector;

- focusing national efforts on technologies that are critical for enterprises of a steadily growing economy.

The innovation policy can be understood as a set of principles and measures for planning, developing, stimulating, regulating and controlling innovation processes in the scientific, technical and production spheres. Therefore, the main task of state bodies is to define the goal of the innovation policy, the basic principles for its implementation, and the mechanism for its implementation.

At present, the scientific and technical leadership of the state is determined not only by the high level of development of the newest industries, but also by the ability to quickly and continuously restructure all sectors of the economy to create and distribute new technologies.

It is well known that the goal of science and innovation policy of the leading countries of the world is to increase the contribution of science and technology to the development of the country's economy, ensure progressive transformations in the sectors of material production, increase the competitiveness of national products on the world market, ensure the security functions of the state, improve the environmental situation, and create conditions for the development of scientific areas to improve the domestic science.

The object of innovation policy is the resource potential of the country, in which the intellectual potential occupies a central place. This is due to the limited traditional resources and the possibility of unlimited attraction of intellectual potential in economic activity.

Intellectual potential can be characterized through a set of parameters, which include resource support of scientific activities (financing, logistical and organizational support) and the amount of accumulated knowledge (the most important discoveries, inventions). In the conditions of the extensive development of innovation activity, the leading role is played by quantitative indicators that determine the resource supply of intellectual potential. However, with the exhaustion of the possibilities of the extensive development of the economy, the role of the quantitative use of the scientific and technical potential (the potential of accumulated knowledge that has not been in demand) increases.The presence of a powerful scientific and technical potential is a necessary, but insufficient condition for effective economic growth. In the conditions of transition to the market, the determining factor in the development of scientific and technological potential is the mechanism of functioning of the economy, according to which a policy of using intellectual potential is built.

When forming the state innovation policy, the following problems arise: ensuring the interrelation between the economic, social and scientific and technical aspects of development within the framework of a single innovation policy; taking into account the degree of uncertainty of innovation processes; ensuring optimal use of resources based on alternative forecasting.

Innovative activity is a fundamentally new type of human activity that determines the priorities of modern production and consumption. According to analysts who directly study the economic impact of scientific and technical progress on the development of society, it has been established that the degree of influence of this factor on the gross national product ranges from 2/3 (L. Kantorovich) to 87-90% (R. Solow). That is why the development of an effective state science and innovation policy is becoming a defining element of state regulation of the economy.

The vector of development of the country as a whole will depend on the extent to which market resources can solve the problems of increasing the innovative activity of enterprises and the efficiency of their interaction in managing innovations and technology transfer. Technology transfer is the movement of technology using any information channels from one of its individual or collective media to another. All measures that are suitable for improving the competitiveness of products, increasing productivity or performance indicators of an enterprise, taken together, determine the promotion of innovation. From a technological point of view, innovation is defined as an invention introduced in practice, such as, for example, a new type of product or production process.

Technology transfer is thus considered as one of the aspects of the innovation process and represents the transfer of scientific and technical knowledge and experience for the provision of scientific and technical services, the application of technological processes, and the output of

products. The criteria for the presence of the transfer is the active use of the transferred technology for production purposes.

The transfer of technology at the time of its development, i.e. at the beginning of its life cycle, due to the desire of the company to form and maintain monopoly power in the relevant product market. At this stage, interest in the possession of innovation is shown, first of all, by small, newly organized firms for this purpose, usually created by the carriers of the technology being introduced. Another category of new technology buyers are representatives of large businesses who monopolize an already existing market and intend to secure their economic position by preserving or developing it with the acquisition of an innovation. The possession of a unique technology allows its owner to receive super profit from its use for quite legitimate reasons for a certain time.

To refine the technology and bring it to the level when it becomes possible to replicate, providing additional income, we need additional capital investments (both financial and intellectual). Such capital is owned either by representatives of large business (financial resources) or by carriers of knowledge (intellectual capital). According to world statistics, on average, in the total amount of development costs of the technology, the scientific component is 33.5%, patenting and licensing - 4.6%, work in the field of design and manufacturing of design and technological documentation - 24%, market analysis - 6, 6%. To complete the development, additional capital investments are needed in patenting innovations - in the calculation of $ 0.137. on 1 dale. R & D costs, for developing a new product design - $ 0.716, for marketing research - $ 0.197. The forms of implementation of a new technology at this stage of its development are the acquisition of the most complete package of rights to intellectual property in the form of a patent or exclusive license and a strategic alliance in the field of joint research.

Currently, in developed Western countries, the share of new or improved technologies, equipment and other products containing new knowledge or solutions, accounts for 70 to 85% of the gross domestic product growth. They concentrate in themselves more than 90% of the global scientific potential and control 80% of the global high-tech market, the volume of which is currently estimated at 2.5 - 3 trillion. dollars, which exceeds the market of raw materials and energy resources. It is assumed that in 15 years it will reach 4 trillion. Doll.The profit from the sale of high-tech products is huge. Annually, exports of high technology products bring the United States - about $ 700 billion, Germany - 530, Japan - $ 400 billion.

To finance the purchase of technology, enterprises use their own resources or borrowed in the form of loans.

It is theoretically possible to master the borrowed technology of cashless costs at the initial stage by paying the seller on royalties (annual deductions) after mastering the production and receiving the necessary technological equipment, equipment and certain types of materials, components on the terms of leasing, compensation or barter transactions. However, in practice, to finance technology transfer agreements, start-up funds of 20-30% of the total cost of the technology are required.

There is a possibility to use the services of risk capital banks. Such banks are created for the commercialization of innovations and are actively involved in the process of searching and transferring technologies. Recently, their network is actively expanding. For example, in France over 200 such banks are registered, in the USA - over 3000. As a rule, venture capital banks are

more willing to bear the cumulative risk, therefore, to attract their financial resources, it is necessary to use both their own funds and other partners.

A place to find and find sources of financing can be national and international technology exchanges. There are permanent technological exchanges, usually using international data banks on technologies, as well as industry-specific exchanges or dedicated to the pioneering areas of science and technology (bio, nanotechnology, etc.).

To finance technology transfer, interested parties set up joint ventures in which the direct investments of one of the founders are used to commercialize the technological achievements of the other.

The current stage of world economic development is characterized by an accelerated pace of scientific and technological progress and the increasing intellectualization of the main factors of production. Intensive research and development on their basis of new technologies, access to world markets with them and the deployment of international integration in the scientific and production sphere in the framework of the emerging global economy have actually become a strategic model of economic growth for industrialized countries. Moreover, intellectual resources, coupled with the latest technologies, not only determine the prospects for economic growth, but also serve as an indicator of the level of economic independence and welfare of the country, its national status. Their integration into the system of global economic relations is becoming one of the most important factors determining the competitiveness of national economies, the meaning of the interaction of which is increasingly becoming an orientation towards the creation of technological innovations of global use, having promising international sales markets and integrating innovative systems of individual countries and regions

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DOI NUMBER: 10.5958/2249-7137.2019.00069.7

A STUDY ON FINANCIAL PERFORMANCE OF SELECTED PUBLIC SECTOR BANKS IN INDIA USING CAMEL APPROACH

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ABSTRACT

The progression of an economy is significantly dependent upon deployment as well as optimum utilization of resources and most importantly on operational efficiency of the various sectors, of which banking sector plays a very vital role. Banking sector helps in stimulation of capital formation, innovation and monetization in addition to facilitation of monetary policy. It is imperative to carefully evaluate and analyse the performance of banks to ensure a healthy financial system and an efficient economy. The present study attempts to evaluate the performance of public sector banks in India using CAMEL approach for a five year period from 2014 to 2018.The present study evaluate the performance of selected public sector banks are Bank of Baroda , Canara Bank, Indian bank, Punjab national bank, and State bank of India. It is observed that on an average SBI was at the top position followed by Bank of Baroda and Punjab National Bank. It is also noted that Indian bank was at the bottom position in selected CAMELS ratios.

KEYWORDS: *Banking, Financial Performance, Public Sector Banks, Capital Adequacy, Management Efficiency*

INTRODUCTION

Finance is an essential factor for the working of any economy. It is one of the vital ingredients for the development of any country. Financial system of a country plays a very crucial role in functioning of the economy by allowing transfer of resources from depositors to investors. Efficient intermediation of funds from savers to users enables the productive application of available resources. The greater the efficiency of the financial system in resource generation and allocation, the higher is its likely contribution to economic growth. The important role played by the banks in the provision of intermediation services and the capital formation process in an emerging economy like as India hardly needs to be emphasized. The progress and growth of Indian banking is in line with the twin objectives of financial stability and growth. Banking in India has increased its size by capitalizing on all the business opportunities available. The capital adequacy ratio of Indian banks has increased and is now in a much better position in relation to other emerging market economies. The rapid growth of the Indian economy has had its positive impact on banks too. Banking reforms in India had the objectives of improving the

macro economic policy framework for banks and Improvement in the financial health and competitive position of banks. According to Crowther, a bank "collects money from those who have it to spare or saving it out of their incomes and it lends this money to those who require it".

CAMELS are basically a ratio-based model for evaluating the performance of banks. In the1980's CAMEL rating system was first introduced by US supervisory authorities as a system of rating for on-site examinations of banking institution. Under this system each banking institution subject to on site examination is evaluated on the basis of five critical dimensions relating to its operations and performance, which are referred to as the component factors. They are Capital adequacy, Asset quality, Management, Earnings, and Liquidity used to reflect the financial performance, financial condition, operating soundness and regulatory compliance of the banking institution. A sixth component relating to sensitivity to market risk has been added in 1997; hence the acronym was changed to CAMELS.

LITERATURE REVIEW

Siva and Natarajan (2011) empirically tested the applicability of CAMEL norms and its consequential impact on the performance of SBI Groups. The study concluded that annual CAMEL scanning helps the commercial bank to diagnose its financial health and alert the bank to take preventive steps for its sustainability.

Agarwal Pankaj K et al (2011) made an attempt to compare the performance of PSBs with their Private sector counterparts on globally accepted CAMEL model. The study discovered that PSBs have lower capital adequacy than private sector banks, while the asset quality of PSBs is superior to private sector banks which reflected in their gross NPAs and there is no significant difference in the net NPA performance of these Banks. It is further discovered that the management efficiency and the earnings performance of PSBs is similar to that of private sector banks, while on liquidity yardstick, the private sector banks have outperformed the PSBs.

Chaudhry and Singh (2012) analyzed the impact of the financial reforms on the soundness of Indian Banking through its impact on the asset quality. The study identified the key players as risk management, NPA levels, effective cost management and financial inclusion.

Madhurima Lall (2017) analyses the financial performance of selected public sector banks in India using the CAMEL model for the period 2013-2016. It is found that under the CAMELS parameter SBI is at the first position with overall composite ranking average, followed by Bank

of Baroda and Punjab national bank on second and third position respectively. It also observed that Canara Bank was at the bottom most position in selected CAMELS ratios.

Objectives

1. To evaluate the financial performance of selected public sector banks using CAMELS model.

2. To give suggestions for the financial improvement of public sector banks in India.

RESEARCH METHODOLOGY

The present study is a descriptive based analytical research design. Out of 27 public sector banks only five public sector banks are selected for the study. They are Bank of Baroda, Canara Bank, Indian Bank, Punjab National Bank, and State Bank of India. The study had used the secondary data published by the Reserve Bank of India for the period 2014-2018. Seventeen financial ratios have been selected to assess the performance of banks. Five years average has been calculated with the help of arithmetic mean.

Analysis and Discussion Capital Adequacy

Capital Adequacy is an important indicator of the financial health for a banking entity. This indicates the banks capacity to maintain capital commensurate with the nature and extent of all types of risks, as also the ability of the bank's managers to identify measure, monitor and control these risks. It reflects the overall financial condition of the banks and also the ability of management to meet the requirement for additional capital. The following ratios measure the capital adequacy.

(i) Capital Adequacy Ratio (CAR)

This ratio is advocated to ensure that banks can bear a reasonable amount of losses occurring during the operations and to ascertain bank's loss bearing capacity. Higher the ratio reflects that banks are stronger and the investors are more protected. In India, the banks have to maintain a CRAR of 9 percent. Capital to Risk-weighted Assets Ratio (CRAR) is calculated by dividing Tier-I and Tier-II capital with Risk Weighted Assets. Tier 1 capital includes shareholders' equity; perpetual noncumulative preference shares, disclosed reserves and innovative capital instruments. Tier 2 capital includes undisclosed reserves, revaluation reserves of fixed assets and long-term holdings of equity securities, general provisions/general loan loss reserves; hybrid debt capital instruments and subordinated debt.

TABLE -1 CAPITAL ADEQUACY RATIO

Year/Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	12.28	10.63	12.64	11.52	12.44
2015	12.61	10.56	12.86	12.21	12.00
2016	13.18	11.08	9.67	11.28	13.12
2017	12.24	12.86	13.64	11.66	13.11
2018	12.13	13.22	12.55	9.20	12.60

Mean	**12.48**	**11.67**	**12.27**	**11.17**	**12.65**
Rank	**2**	**4**	**3**	**5**	**1**

Source: Secondary Data Available in Statistical Reports of RBI

Table-1 depicts that State Bank of India is ranked first with the highest CRAR of 12.65 percent Followed by Bank of Baroda. Punjab National Bank scored the lowest position with lowest CRAR of 11.17 percent.

(ii) Debt Equity Ratio (D/E)

The debt-equity ratio reflects the degree of leverage of a bank. It expresses the proportion of debt and equity in the total fund structure of the bank. It is computed by dividing total borrowings of the bank with shareholders' net worth. Net worth encompasses equity share capital, and reserves and surpluses. Higher ratio reflects less protection for the depositors and creditors and vice-versa.

TABLE -2 DEBT EQUITY RATIO

Year/Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	102.29	91.93	35.78	133.81	154.82
2015	88.52	80.57	17.52	116.86	159.72
2016	83.26	85.03	21.58	155.97	224.11
2017	75.95	117.27	73.63	97.41	168.72
2018	144.19	108.99	107.11	148.14	165.26
Mean	**98.84**	**96.75**	**51.12**	**130.43**	**174.52**
Rank	**3**	**2**	**1**	**4**	**5**

Source: Secondary Data Available in Statistical Reports of RBI

In the above table-2 Indian Bank is on the top position with least average of 51.12 percent, followed by Canara Bank 96.75 percent. State Bank of India scored the lowest position.

(iii) Total Advance to Total Asset Ratio (Adv/Ast)

This is the ratio of total advance to total asset. This ratio indicates banks aggressiveness in lending which ultimately results in better profitability. Higher ratio of advances of bank deposits (assets) is preferred to a lower one. Total advances also include receivables. The value of total assets is excluding the revolution of all the assets.

TABLE -3 TOTAL ADVANCE TO TOTAL ASSET RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	60.19	61.20	65.27	63.45	67.48
2015	59.87	60.22	65.27	63.07	63.47
2016	57.16	58.72	63.34	61.78	62.08
2017	55.15	58.61	58.51	58.23	58.06
2018	59.36	61.87	61.95	56.63	56.00
Mean	**58.34**	**60.12**	**62.86**	**60.63**	**61.41**
Rank	**5**	**4**	**1**	**3**	**2**

Source: Secondary Data Available in Statistical Reports of RBI

The table -3 shows that the Indian bank is on the top with highest average of 62.86 percent followed by State bank of India 61.41 percent and Punjab National Bank 60.63 percent. Bank of Baroda scored the lowest position with least average of 58.34 percent.

A – Asset Quality

Asset Quality reflects the magnitude of credit risk prevailing in the bank due to its composition and quality of loans, advances, investments and off- balance sheet activities. The financial soundness of a bank is determined with the quality of assets that the bank possesses. Asset quality defines the financial health of banks against loss of value in the assets, as asset weakening, risks the solvency of the financial institutions especially banks.

(i) Net Non-Performing Assets (NPA) to Net Advances Ratio (NNPA's/ ADV)

Net Nonperforming Assets to Net Advances Ratio is a measure of the overall quality of banks advances. It shows the actual financial burden on the bank. An NPA are those assets for which interest is overdue for more than three months or ninety days. Net NPAs are calculated by reducing cumulative balance of provisions outstanding at the end of the period as well as some other interest adjustments, from gross NPAs. Higher ratio reflects rising bad quality of loans.

TABLE -4 NET NON-PERFORMING ASSETS TO NET ADVANCES RATIO

Year/Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	1.52	1.98	2.26	2.85	2.57
2015	1.89	2.65	2.50	4.06	2.12
2016	5.06	6.42	4.20	8.61	3.81
2017	4.72	6.33	4.39	7.81	3.71
2018	5.49	7.48	3.81	11.24	5.73
Mean	**3.73**	**4.97**	**3.43**	**6.91**	**3.58**
Rank	**3**	**4**	**1**	**5**	**2**

Source: Secondary Data Available in Statistical Reports of RBI

Table - 4 interprets that Indian bank is on top position with least average of 3.43 percent, followed by SBI 3.58 percent and Bank of Baroda 3.73 percent on second and third position respectively . PNB scored the lowest position with highest average of 6.91 percent.

(ii) Total Investment to Total Assets Ratio (Tot INV / Tot ASS Ratio)

This ratio measures the proportion of total assets of the bank that are locked up in investments which does not form a part of the core income of the bank, as against providing advances to the customers. An aggressive bank would have a low investment to asset ratio as a high ratio signifies that the bank has very conventionally kept a high cover of investment to safeguard against the risk of Non-Performing Assets. This adversely affects the profitability of the banks since the interest income generated through investments is much less than interest income earned through granting advances.

TABLE -5 TOTAL INVESTMENT TO TOTAL ASSETS RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	17.60	25.78	25.00	26.12	22.24
2015	16.33	25.92	23.71	24.84	23.52
2016	17.94	25.73	26.06	23.65	24.41
2017	18.65	25.75	30.95	25.92	28.30
2018	22.66	23.35	28.25	26.15	30.71
Mean	**18.63**	**25.30**	**26.79**	**25.33**	**25.83**
Rank	**1**	**2**	**5**	**3**	**4**

Source: Secondary Data Available in Statistical Reports of RBI

The table-5 depicts that Bank of Baroda is on the top position with least average of 18.63 percent, followed by Canara Bank 25.30 percent and Punjab national bank 25.33 percent. Indian Bank scored the lowest position with highest ratio of 26.79 percent.

(iii) Secured Advances to Total Advances

In order to minimize credit risk, banks sanction secured advances. Generally an advance is sanctioned in lieu of a security of asset, the realizable value of which always equal to or greater than the amount of such advance. A higher proportion of secured advances reveal the sound asset quality and low credit default risk.

The below table-6 depicts that Punjab national bank is on the top position with highest average of 90.87 percent, followed by Bank of Baroda 85.60 percent and Canara bank 85.22 percent. State Bank of India scored the lowest position with least ratio of 81.08 percent.

TABLE -6 SECURED ADVANCES TO TOTAL ADVANCES

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	86.29	83.72	82.01	93.46	83.55
2015	87.47	82.81	86.03	94.12	80.07
2016	88.22	86.05	84.89	92.95	78.43
2017	84.27	84.25	81.32	88.59	81.99
2018	81.78	89.29	89.90	85.27	81.38
Mean	**85.60**	**85.22**	**84.83**	**90.87**	**81.08**
Rank	**2**	**3**	**4**	**1**	**5**

Source: Secondary Data Available in Statistical Reports of RBI

Management Efficiency

Management Efficiency is an important element of the CAMEL model. The management of the bank takes crucial decisions depending on its risk perception. It sets vision and goals for the organization and sees that it achieves them. This parameter is used to evaluate management efficiency as to assign premium to better quality banks and discount poorly managed ones.

(i) Total Advance to Total Deposit Ratio (Tot ADV/Tot DEP Ratio)

This ratio measures the efficiency and ability of banks management in converting the deposits available with the bank excluding other funds like equity capital, etc into high earning advances.

Total deposits include demand deposits, savings deposits, term deposits and deposits of other banks, total advances include the receivables.

TABLE -7 TOTAL ADVANCE TO TOTAL DEPOSIT RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	69.79	71.56	75.31	77.38	86.76
2015	69.32	69.65	74.38	75.90	82.45
2016	66.85	67.68	72.38	74.55	84.57
2017	63.70	69.05	69.97	67.47	76.83
2018	72.28	72.74	75.17	67.54	71.49
Mean	**68.38**	**70.13**	**73.44**	**72.56**	**80.42**
Rank	**5**	**4**	**2**	**3**	**1**

Source: Secondary Data Available in Statistical Reports of RBI

Table -7 interprets that State bank of India is on top position with highest average of 80.42 percent followed by Indian Bank 73.44 percent and Punjab national bank 72.56 percent, on second and third position respectively. Bank of Baroda scored the lowest position with least average of 68.38 percent.

(ii)Profit per Employee (PPE)

The ratio indicates the surplus earned per employee. It specifies the average profit generated per person employed. An upright management will inspire and stimulate employee to earn more profit for the bank. A high ratio clearly signifies efficient management. It is calculated by dividing the profit after tax earned by the bank with the total number of employees.

TABLE -8 PROFIT PER EMPLOYEE

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	1.00	0.50	0.60	0.50	0.49
2015	0.70	0.50	0.50	0.50	0.60
2016	-1.00	-0.50	0.35	-0.60	0.47
2017	0.30	0.30	0.70	0.20	0.51
2018	-0.40	-0.70	0.60	-1.70	-0.24
Mean	**0.12**	**0.02**	**0.55**	**-0.22**	**0.36**
Rank	**3**	**4**	**1**	**5**	**2**

Source: Secondary Data Available in Statistical Reports of RBI

Table 8 Interprets that Indian bank is on top position with highest average of 0.55 percent, followed by State Bank of India 0.36 percent and Bank of Baroda 0.12 percent, on second and third position respectively. Punjab national bank scored the lowest position with least average of -0.22 percent.

(iii) Business per Employee (BPE)

Business per employee ratio shows the productivity of employees of the bank and is used as a tool to measure the efficiency of all the employees of a bank in generating business for the bank.

It indicates how much business each employee is producing for the bank. It is calculated by dividing the total business by total number of employees.

TABLE -9 BUSINESS PER EMPLOYEE

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	186.50	143.84	145.30	128.30	106.38
2015	188.90	143.50	144.30	131.90	123.40
2016	168.00	144.46	153.10	135.90	141.10
2017	174.90	144.28	148.80	141.70	162.40
2018	176.60	148.05	185.60	147.40	167.00
Mean	**178.98**	**144.82**	**155.42**	**137.04**	**140.05**
Rank	**1**	**3**	**2**	**5**	**4**

Source: Secondary Data Available in Statistical Reports of RBI

Table -9 explains that Bank of Baroda is on top position with highest average of 178.98 percent, followed by Indian bank 155.42 percent and Bank of Baroda 144.82 percent, on second and third position respectively. Punjab National Bank scored the lowest position with least average of 137.04 percent.

E – Earning quality

The quality of earnings is a very important criterion that determines the ability of a bank to earn consistently. It basically determines the profitability of bank and explains its sustainability and growth in earnings of future. The following ratios explain the quality of income generation.

(i) Return on Asset

Net profit to total asset indicates the efficiency of the banks in utilizing their assets in generating profits. A higher ratio indicates the better income generating capacity of the assets and better efficiency of management in future. This is arrived by dividing the net profit by total asset.

The below table -10 interprets that Indian bank is on top position with highest average of 0.55 percent followed by State Bank of India 0.40 percent and Bank of Baroda 0.06 percent, on second and third position respectively. Punjab national bank scored the lowest position with least average of -0.17 percent.

TABLE -10 RETURN ON ASSET

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	0.75	0.54	0.67	0.64	0.65
2015	0.49	0.55	0.54	0.53	0.68
2016	-0.78	-0.52	0.36	-0.61	0.46
2017	0.20	0.20	0.67	0.19	0.41
2018	-0.34	-0.75	0.53	-1.60	-0.19
Mean	**0.06**	**0.04**	**0.55**	**-0.17**	**0.40**
Rank	**3**	**4**	**1**	**5**	**2**

Source: Secondary Data Available in Statistical Reports of RBI

(ii) Operating Profit to Total Asset Ratio

This ratio indicates how much a bank can perform its operations net on the operating expenses for every rupee spent on total asset. This is arrived at by dividing the operating profit by total asset. The higher the ratio, the better it is. This ratio determines the total operating profit total asset employed. The better utilization of asset will result in higher operating profit. Banks which use their assets efficiently will tend to have a better average than the industry average.

TABLE -11 OPERATING PROFIT TO TOTAL ASSET RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	1.54	1.50	1.66	2.21	1.91
2015	1.44	1.34	1.59	2.07	2.10
2016	1.27	1.30	1.53	1.92	2.01
2017	1.61	1.57	1.90	2.10	2.01
2018	1.70	1.59	2.12	1.39	1.93
Mean	**1.51**	**1.46**	**1.76**	**1.93**	**1.99**
Rank	**4**	**5**	**3**	**2**	**1**

Source: Secondary Data Available in Statistical Reports of RBI

Table -11 explains that State Bank of India is on top position with highest average of 1.99 percent, followed by Punjab National Bank 1.93 percent and Indian Bank 1.76 percent, on second and third position respectively. Canara Bank scored the lowest position with least average of 1.46 percent.

(iii) Interest Income to Total Income

This ratio measures the income from lending operations as a percentage of the total income generated by the bank in a year. Interest income includes income on advances, interest on deposits with the RBI, and dividend income. This ratio is arrived by dividing the interest income by total income.

TABLE -12 INTEREST INCOME TO TOTAL INCOME RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	89.71	90.95	91.74	90.42	88.02
2015	90.70	90.57	92.08	88.71	87.09
2016	91.79	90.29	92.08	90.07	89.81
2017	86.19	84.56	87.88	84.08	83.19
2018	86.76	85.59	87.67	84.38	83.17
Mean	**89.03**	**88.39**	**90.29**	**87.53**	**86.25**
Rank	**2**	**3**	**1**	**4**	**5**

Source: Secondary Data Available in Statistical Reports of RBI

In the table -12 Indian Bank is on the top position with highest average of 90.29 percent, followed by Bank of Baroda 89.03 percent. State Bank of India scored the lowest position.

Liquidity

Liquidity in banks is managed by an effective mechanism called the Asset and Liability Management. It reduces maturity mismatches between assets and liabilities to optimize returns. Risk of liquidity is curse to the image of bank. Bank has to take a proper care to hedge the liquidity risk, at the same time ensuring good percentage of funds are invested in high return generating securities, so that it is in a position to generate profit with provision liquidity to the depositors. The following ratios are required to assess the liquidity.

(i) Liquid Asset to Total Deposit

This ratio measures the ability of bank to meet the demand from depositors in a particular year. To offer higher liquidity for them, bank has to invest these funds in highly liquid form. Total deposits include demand deposits, savings deposits, term deposits and deposits of other financial institutions. Liquid assets include cash in hand, balance with the RBI, and balance with other banks (both in India and abroad), and money at call and short notice. Liquid Asset to Total Deposit is calculated by dividing Liquid Asset to Total Deposit.

TABLE-13 LIQUID ASSET TO TOTAL DEPOSIT

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	23.00	10.65	6.46	10.01	9.50
2015	24.02	10.26	7.73	11.15	9.81
2016	23.32	11.82	6.73	13.67	9.67
2017	25.00	11.87	5.50	14.20	8.41
2018	15.71	9.51	6.20	14.86	7.09
Mean	**22.21**	**10.82**	**6.52**	**12.77**	**8.89**
Rank	**1**	**3**	**5**	**2**	**4**

Source: Secondary Data Available in Statistical Reports of RBI

In the table-13 Bank of Baroda is on the top position with highest average of 22.21 percent, followed by Punjab National Bank 12.77 percent. Indian bank scored the lowest position.

(ii) Cash to Deposit Ratio (CD Ratio)

This is an important parameter to measure liquidity as it reveals the availability of average cash balance against total deposits in a bank. It is the proportion of money a bank should have available against the total amount of money deposited by its customers. Cash being liquid of all the assets gives the complete picture of the liquidity of the bank. Banks need to maintain sound cash to deposit ratio so as to ensure that large volume of cash is not maintained, as idle cash does not generate any returns and will subsequently endanger the earnings quality of the bank.

The below table -14 explains that State Bank of India is on top position with highest average of 6.55 percent, followed by Punjab National Bank 4.61 percent and Indian Bank 4.58 percent, on second and third position respectively. Bank of Baroda scored the lowest position with least average of 3.66 percent.

TABLE -14 CASH TO DEPOSIT RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	3.27	5.27	4.78	4.93	6.09
2015	3.64	4.64	4.91	4.83	7.35
2016	3.78	4.31	5.15	4.79	7.49
2017	3.79	4.02	3.06	4.05	6.26
2018	3.84	4.21	5.04	4.48	5.56
Mean	**3.66**	**4.49**	**4.58**	**4.61**	**6.55**
Rank	**5**	**4**	**3**	**2**	**1**

Source: Secondary Data Available in Statistical Reports of RBI

(iii) Liquid Asset to Total Asset

It measures the overall liquidity position of the bank. The liquid asset includes cash in hand, balance with institutions and money at call and short notice. The total assets include the revaluation of all the assets.

TABLE -15 LIQUID ASSET TO TOTAL ASSET

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	19.84	9.11	5.60	8.21	7.39
2015	20.74	8.87	6.78	9.27	7.55
2016	19.94	10.25	5.89	11.33	7.10
2017	21.65	10.08	4.60	12.26	6.35
2018	12.90	8.09	5.11	12.46	5.55
Mean	**19.01**	**9.28**	**5.59**	**10.70**	**6.78**
Rank	**1**	**3**	**5**	**2**	**4**

Source: Secondary Data Available in Statistical Reports of RBI

The Table 15 depicts that Bank of Baroda is on top position with highest average of 19.01 percent followed by Punjab National Bank 10.70 percent and Canara Bank 9.28 percent, on second and third position respectively. Indian bank scored the lowest position with least average of 5.59 percent.

S – Sensitivity to Market Risk

It refers to the risk that changes in market conditions would adversely impact earnings and capital. Market Risk encompasses exposures associated with changes in interest rates, foreign exchange rates, commodity prices, equity prices, etc. While all of these items are important, the primary risk in most banks is interest rate risk (IRR), which will be the focus of this module. The diversified nature of bank operations makes them vulnerable to various kinds of financial risks. Sensitivity analysis reflects institution's exposure to interest rate risk, foreign exchange volatility and equity price risks (these risks are summed in market risk).

(i) Net Interest Income to Total Asset Ratio

In the most simplistic terms, interest rate risk is a balancing act. Banks are trying to balance the quantity of reprising assets with the quantity of re pricing liabilities. The Net Interest Margin (NIM) is calculated by dividing net interest income to total asset.

TABLE -16 NET INTEREST INCOME TO TOTAL ASSET RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	1.98	1.98	2.49	3.14	2.93
2015	1.92	1.86	2.35	2.87	2.86
2016	1.84	1.77	2.24	2.41	2.60
2017	1.98	1.74	2.44	2.16	2.44
2018	2.19	2.03	2.66	2.01	2.43
Mean	**1.98**	**1.87**	**2.43**	**2.51**	**2.65**
Rank	**4**	**5**	**3**	**2**	**1**

Source: Secondary Data Available in Statistical Reports of RBI

In the table-16 State bank of India is on the top position with highest average of 2.65 percent, followed by Punjab National Bank 2.51 percent. Canara bank scored the lowest position.

(ii)Total Securities to Total Assets Ratio

This ratio reflects the risk-taking capability of a bank. It is a bank‘s policy to have high profits, high risk or low profits, low risk. It also suggests information about the accessible alternative investment opportunities. This ratio reveals the correlation between banks’ securities and total assets. It also provides the percentage change of its portfolio with respect to alteration in interest rates. The total security to total asset is calculated by dividing total securities to total asset.

TABLE -17 TOTAL SECURITIES TO TOTAL ASSETS RATIO

Year /Bank	Bank of Baroda	Canara Bank	Indian Bank	Punjab National Bank	State Bank of India
2014	15.52	23.89	23.44	24.22	19.03
2015	14.47	24.54	23.57	23.62	20.42
2016	16.00	24.43	24.67	22.48	21.81
2017	17.09	24.88	30.68	24.70	23.99
2018	21.31	22.64	28.00	24.69	27.42
Mean	**16.87**	**24.07**	**26.07**	**23.94**	**22.53**
Rank	**5**	**2**	**1**	**3**	**4**

Source: Secondary Data Available in Statistical Reports of RBI

The table-17 Indian Bank is on the top position with highest average of 26.07 percent, followed by Canara Bank 24.07 percent. Bank of Baroda scored the lowest position.

In order to assess the overall performance of selected public sector banks, composite rating and results are calculated through ratios for the study period 2014-2018. It is found that under the CAMELS parameter SBI is at the first position with overall composite ranking average followed by Bank of Baroda and Punjab national bank on second and third position respectively. Indian bank at the lowest position.

CONCLUSION

Due to radical changes in the banking sector in the recent years, the commercial banks all around the world have improved their supervision quality and techniques. In evaluating the functioning of the banks, many of the developed countries are now following uniform financial rating system (CAMELS RATING) along with other existing procedures and techniques. The study reveals that State bank of India ranks first having the good performance followed by Bank of Baroda, where as Indian bank has secured the last rank in terms of performance. Also, it can be concluded that the banks with least ranking need to improve their performance to come up to the desired standards.

Suggestions

1. For an effective monitoring system, more standard financial ratios should be established and applied periodically.
2. The evolution of profitability indicators suggest that banks should reduce the higher cost of deposits and concentrate on high yielding advances which will ultimately improve their earnings.

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ACADEMICIA:
An International Multidisciplinary Research Journal
(Double Blind Refereed & Reviewed International Journal)

DOI NUMBER: 10.5958/2249-7137.2019.00070.3

USING DRAG & DROP STRUCTURE FOR ELECTRONIC SHOPPING CART: IN ORDER TO DISTINGUISH ROBOT USERS FROM HUMAN USERS

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ABSTRACT

An electronic shopping cart is one of the key components of an E-commerce website. In designing the components of these websites, especially its shopping cart, there are several apparent and functional factors. One of the factors that can be affected is the ability to prevent the robot from running and detecting it from the human user of the website. Using Drag & Drop design, user behavior can be examined, and then, using the criteria extracted in this process distinguishes the human user from the robot user. In this study, seven criteria were first extracted from the relationship between the data and then for each user the amount of each criterion is calculated. Finally, the final percentage is calculated according to the values obtained for the criteria and is made available to the system or webmaster to React appropriately against the robot user.

KEYWORDS: *E-commerce, Shopping cart, Drag & Drop, Human users, Robot users.*

1. INTRODUCTION

An important part of an e-commerce website is the shopping basket. Shopping baskets in different websites can have different designs, but most of them can be categorized into two categories. The first category in which the user can add the item to the cart by clicking on the item or on the purchase icon, and the second one, which uses graphical features and is based on drag and drops the goods on the shopping cart. In the second category, which is the main topic of this research, it is possible to obtain additional information by modifying and storing some data,

using which the seller or sales website will be able to prevent the performance of bots in the purchase of competitive goods.

In the field of detecting a human user from the robot user, a lot of research has been done and many solutions have been proposed. Some of these studies have provided techniques for identifying robots(Doran &Gokhale, 2011), and others will first examine the parameters that can act as identifiers for human user behavior and differentiate them from the behavior of robotic users (Guerar et al., 2018; Ryu et al., 2017). In the next step, the research deals with the type of system response to the system user according to the values obtained for the criteria, in front of the system user. These responses can be made by various CAPTCHA of varying degrees of difficulty(Brodić et al., 2018; Tang et al., 2018). One of the newest types of these solutions is ReCAPTCHA's solution, which uses a risk analysis engine to examine user behavior (Von Ahn et al., 2008; Sivakorn et al., 2016).

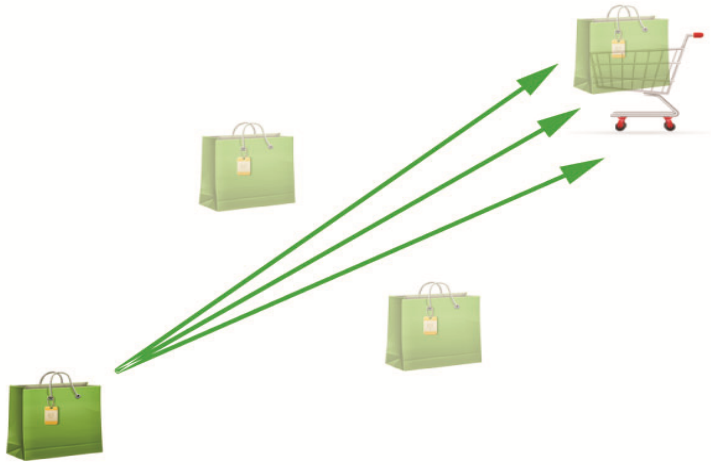
The importance of robot detection from humans on Internet sales websites can be understood from the activities that the robot can have in that environment. A robot can disrupt the sale of a competitive (limited number) merchandise to buyers, and thus a fair purchase opportunity is lost to all users. A robot can interfere with polls**, unrealistic** comments, and unrealistic requests. A robot can create user service disruptions, preventing access to site services and causing problems by sending large requests to the website(Wang et al., 2015). Collaborative information derived from the website on which the robot is active cannot be counted due to unrealistic actions and requests. Finally, by identifying the robot user, the website can prevent its activity and prevent the resulting effects (Lagopoulos et al., 2018).

In this paper, in the materials and methodssection, the method ofDrag & Drop, how it is implemented, and the method for obtaining data are described. In results section, for the purpose of using extracted data and obtaining relationships from them, seven criteria are identified and used as criteria for assessing user behavior. At the end, the percentages for the user's human being are allocated, which can be used to select that percentage in the appropriate reaction.

2. MATERIALS AND METHODS

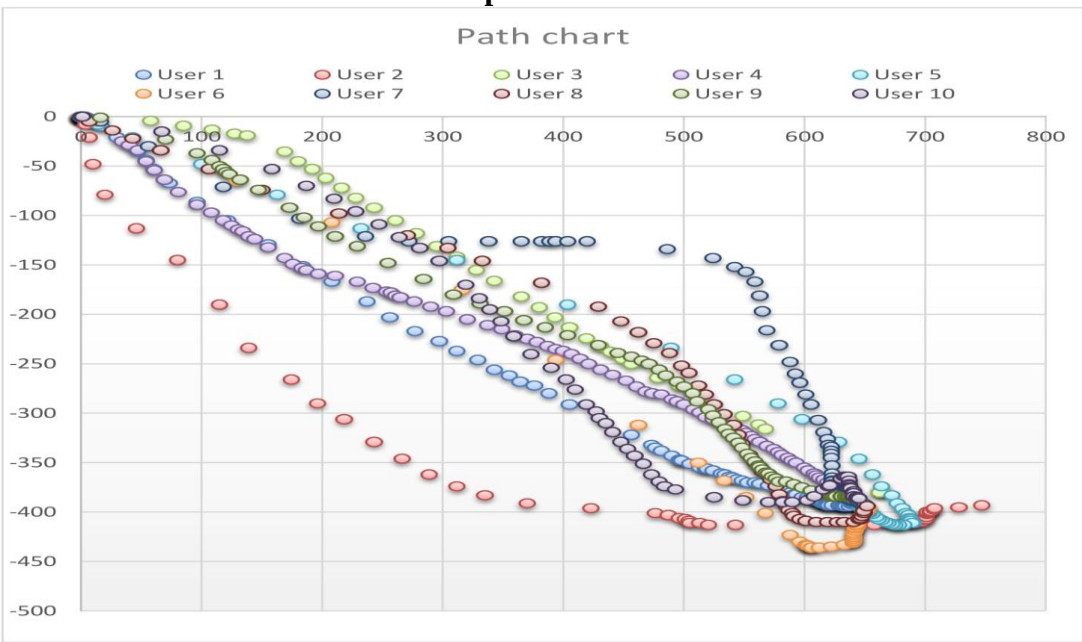
In order to simulate a basket-based structure based on drag and drop, there is a need for a web page with two main elements. An item indicating the goods that it intends to buy is located at a certain distance from the second element that represents the shopping cart. The function of these two elements is set by jQuery code. After grabbing, dragging and dropping the first element onto the shopping cart item(shown in Figure 1), information about the path and time of movement of the element at any time (by default, jQuery codes) are stored in a JSON file. Each stored point has two components of time and location, which in addition to extracting relationships from these data, we can extract other data, including the velocity of motion of the element (Zammetti, 2007).

Figure 1. Drag and Drop Scenario, Transfer Purchase Item to Shopping Cart.



In the scenario, several users aged between 10 and 60 years old were asked to drop the consumer item and leave it at the basket item and repeat this for several steps. Finally, among the number of users who have done this, randomly selected ten users, and a function was randomly selected among their functions. Therefore, there are ten paths of human factors (shown in Figure 2)that are used in calculating and discovering relationships.

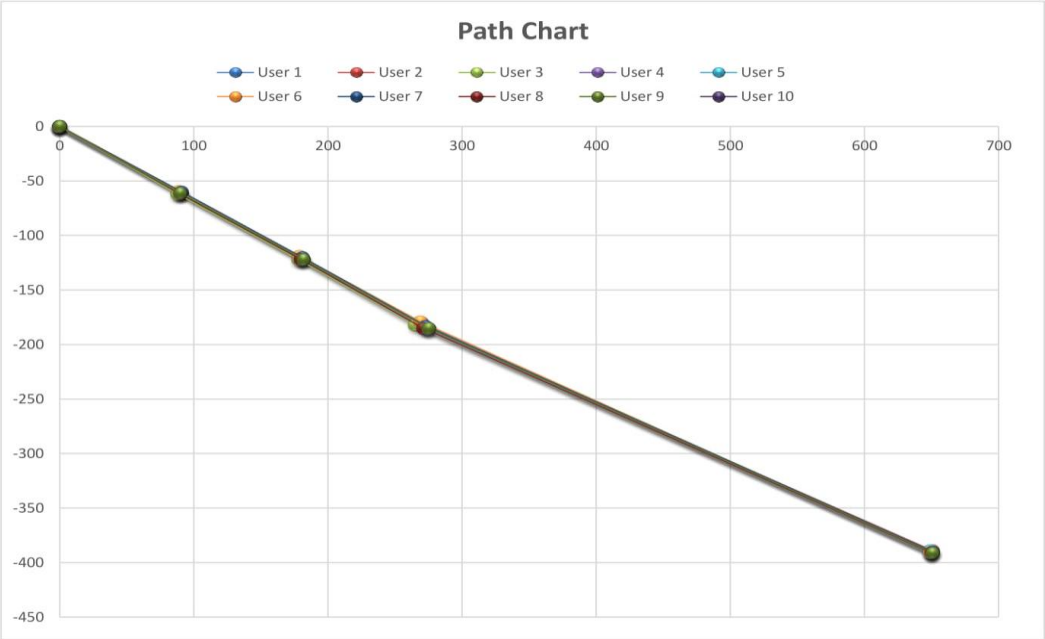
Figure 2. Paths of human agents.In this chart, the path of the movement of 10 human users who performed the scenario is shown.



In order to easily extract all relationships, the robot agent is simply considered. The robot path has 7 fixed points along the path between the product element and the shopping cart element,

which is repeated by the virtual user simulation software WPLT (Web Performance Load Testing) and 10 paths are randomly selected as the robot's performance(shown in Figure 3).

Figure 3. Paths of robot agents.In this chart, the path of the movement of 10 robot users is shown.



3. Results

Many criteria, such as the amount of deviation from the direct path, the distance, speed of movement, and the time of completion of the operation, are calculated and compared with the factors obtained from the robot agent. By comparing these factors, we can extract differences that allow the robot to be detected from a human.

3.1. Path of Movement of Agents

The two distinctions between human and robot factors, based on the relationships extracted between the data, are: a) the location difference of the points of the path of two different human factors; b) the difference in the number of points in the human factor paths.

3.2. Percentage of Points Matching

To determine the location difference parameter, it is necessary to know the number of matching points in the path of moving an agent with other agents.The fourth user's route has 89 points, which according to the calculations and taking into account 10 pixels of offsets, the paths maximally intersect at two points (The starting point is not considered.). Therefore, the percentage of the user's adaptation is calculated by the formula.

(Number of matching points÷Total number of points)× 100 = 2.4%

Then, according to Table 1, the percentage of being human will also be determined.

Table 1. Use points matching parameter in order to obtain the percentage of human being.

Percentage of matching points with 10 pixel offsets	Percentage of being human
Number obtained from the user's function	100 - Number
2.4	100 – 2.4 = 97.6

In order to reduce the decision error, 10 offset pixels are considered for matching points. By doing this, the points close together (at intervals of less than 10 pixels) are thought to fit together.

3.2.1. The difference in the number of points

According to this parameter, the difference in the number of operator points (at least two operators) can be used as a benchmark for robot detection from humans.The greater the difference in the number of points in the paths of motion, the more likely the factors are to humanity. In the human factors of this research, the maximum difference is the number of points of 40 points, and in the robot agents, there is no difference between the number of points. So we can count the whole range from zero to 40.

With respect to the number of other user's path points and the number of user points 4, the maximum difference in the number of points for this user can be obtained through the formula.

D = MAX (|number of user points 4 - number of user points 1,2, ... |)

S = Maximum difference in the number of points of all paths

D/S ×100 =Difference in the number of points

User Number 4 = 50/50 × 100 = 100%

According to Table 2, the percentage of being human will also be determined.

Table 2. Use the difference in the number of points parameter.

The difference in the number of points obtained for two routes	Percentage of being human
Percentage difference obtained for a user	The same percentage obtained for the user
100%	100%

3.3. The movement speed of the element

The second criterion under consideration is the variation in the velocity of the element along the path to the target. There are two determinants for this factor: a) The average speed difference in the first half of the route interval with the second half of the path b) the maximum speed of the element.

3.3.1. The average speed difference

Determine the probability of being human beings using the mean particle velocity parameter Given the data relationships, in human factors: during the first half of the time, the speed of the element is high, and the second half the speed decreases gradually(Figure 4 shows this). But in robot factors, in the first half of the time, the speed is low and in the second half, and especially in the latter stage, the speed increases with a higher slope(Figure 5 shows this).

Figure 4. The speed chart of human factors.

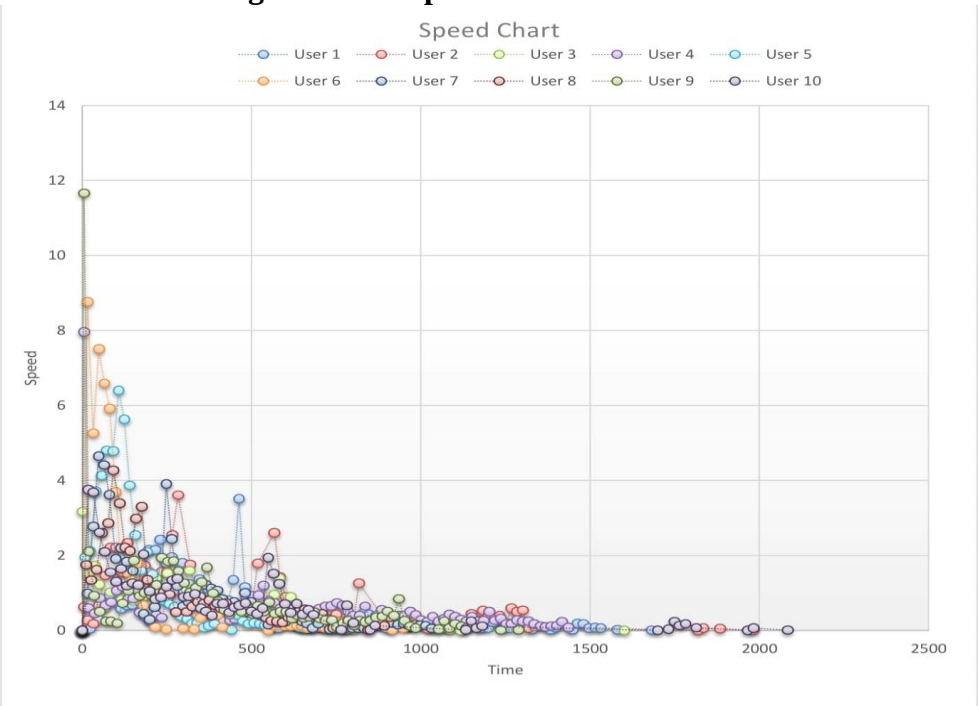
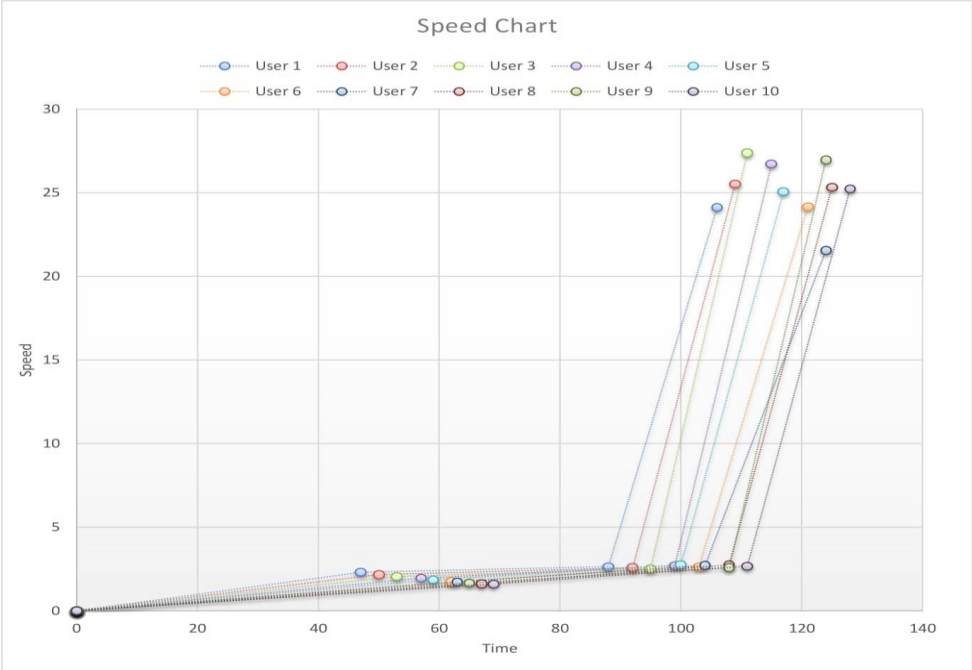


Figure 5. The speed chart of robot factors.



It can be done in such a way that when the user moves out, the average speed is extracted in both the first and second half times. Table 3 describes how to determine the percentage of human being using this criterion.

T = time of scenario

T/2 = length of the half time interval

M1 = Average speed in the first half

M2 = Average speed in the second half

The percentage of being human will be achieved according to the equation1.

$$\left(\frac{|M_1 - M_2|}{MAX(M_1, M_2)}\right) \times 100 \qquad (1)$$

Table 3. Use the average speed difference parameter.

Percentage of being human	Average speed difference
$\left(\frac{\lvert M_1 - M_2 \rvert}{M_1} \times 100\right)$	$M_1 > M_2$
50%	$M_1 = M_2$
$100 - \left(\frac{\lvert M_1 - M_2 \rvert}{M_1} \times 100\right)$	$M_1 < M_2$
57%	For user 4: $M_1 > M_2$

3.3.2. maximum speed of the element

Determine the probability of being human by factor using the maximum velocity parameter of the element. According to the data obtained from human and robot factors in the scenario of this research, the maximum speed of human factors is in the range of 4 to 12 pixels per millisecond while this range for robot agents is 20 to 30 pixels per millisecond. According to this point, the range from 0 to 30 pixels per milliseconds is considered as the maximum speed range. Table 4 describes how to determine the percentage of human being using this criterion.

Ra= 30 pixels per millisecond

MS =Maximum user speed during the scenario

The percentage of human being is also derived from equation2.

$100 - ((MS \div Ra) \times 100)$ (2)

Table 4. Use maximum speed of the element parameter.

Percentage of being human	Maximum speed / length ratio
100 - ((MS ÷ Ra) × 100)	(MS ÷ Ra) × 100
74%	For user 4

3.4. Difficulty Index

According to the obtained relationships, in terms of the difficulty index in human factors, there is a greater dispersion than robot agents (MacKenzie, 1992). In human factors, the numbers obtained are in the range of 2.35 to 2.39, while in the robot agents it is 2.38. To determine the human factor of the factor based on this parameter, it is sufficient to focus on the number of equal numbers. In other words, if the difficulty index for two users (with a precision of 0.01) is equal, the number of repetitions will be equal to two. Table 5 describes how to determine the percentage of human being using this criterion.

The values that are required in calculating the percentage of human being are:

S = number of scenarios performed by users

RID = Maximum number of duplicate difficulty indexes, with a precision of 0.01.

In order to calculate the percentage of human being, the agent will act according to equation 3.

$$100 - \left(\frac{RID}{S} \times 100\right) \quad (3)$$

Table 5. Use difficulty index parameter.

Percentage of being human	Number of repetitions of difficulty indexes
$100 - \left(\frac{RID}{S} \times 100\right)$	$\boldsymbol{\frac{RID}{S}}$
60%	For user 4

3.5. Criterion difference timeout

In human factors, the finishing time is between 690 and 2098 milliseconds. While in robot agents, this range is from 106 to 124 milliseconds (Table 6 shows these ranges).To determine the human factor based on this criterion, we can focus on two general parameters. a)Parameter of the length of the range of completion time, b) The range of numbers obtained for the completion time.

3.5.1. length of the range of completion time

In order to obtain the percentage of human being, it is necessary to obtain information that is:

TF = Schedule completion time

LP = The probable interval length of the completion time

LF = time length of completion time = MAX (TF) - MIN (TF)

To get the user's Percentage of human being, the following formula is used.

Percentage of human being = (Percentage assumed with respect to the length of the interval + ((LF / LP) × 25))

Table 6. Use length of the range of completion time parameter.

Percentage of being human	Range Length
75 + ((LF/LP) × 25)	Range 700 to 1400 milliseconds and more
50+ ((LF/LP) × 25)	Range 130 to 700 milliseconds
25+ ((LF/LP) × 25)	Range 18 to 130 milliseconds
((LF/LP) × 25)	Range 0 to 18 milliseconds
86.8%	For user 4

3.5.2. range of completion time

In order to obtain the percentage of the user's humanity with regard to the parameter of the period of completion of the scenario, the variables are similar to the parameter of the difference in the completion time, but the range varies.Table 7 shows these ranges.

Table 7. Use range of numbers obtained for the completion time parameter.

Percentage of being human	Range Length
75 + ((LF/LP) × 25)	Range 700 to 2098 milliseconds and more
50+ ((LF/LP) × 25)	Range 350 to 700 milliseconds
25+ ((LF/LP) × 25)	Range 130 to 350 milliseconds
((LF/LP) × 25)	Range 0 to 130 milliseconds
88.1%	For user 4

4. CONCLUSIONS

Each of the parameters is assigned a percentage as the percentage of the agent's human being, in the end, by averaging of all percentages; a final percentage is obtained (Equation 4). The percentage achieved is indicative of the user's level of humanity and the system can take action in this regard.

$$\frac{p_1 + p_2 + \cdots + p_n}{n} \qquad (4)$$

For example, here are seven parameters that can be assigned to each of them a numerical percentage and eventually averaged the final percentage.As shown in Table8; the final percentages are used to select the appropriate action.

Table 8. Selection of appropriate system response.

Proper response	Percentage of being human
No need to respond	75 to 100 percent
Low hardening reaction	50 to 75 percent
Medium hardening reaction	25 to 50 percent
High hardening reaction	0 to 25 percent

For User 4, according to the percentages received during the description of each parameter for the user 4 and according to the formula of the averaging of percent is:

Final Percentage of user 4 = (97.6 + 100 + 57 +74 + 60 + 86.8 + 88.1) / 7 = 80.5%.

So, according to the percentage obtained for user 4, the percentage of human being is greater than 75% and does not require reaction from the site.

In the process of identifying a human agent from a robot agent, which is one of the important needs of a sales website, Given the proposed scenario (dragging and dropping the product element onto the website basket element) and the seven extracted criteria of the relationships between the data obtained from the users' performance, For each user, a numerical value (percent) was extracted for each criterion.The final percentage extracted for each user (the average of seven values obtained for a user action) is used to select the appropriate reaction type (the reaction can be specified by the webmaster or web server as desired.).

These seven criteria are only part of the criteria that can be evaluated.There are many criteria that can be identified by proper examination and calculation. We can extract various methods and criteria by changing the scenario or looking at other parts of a website. This list of criteria can always be extended and upgraded.

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ACADEMICIA:
An International Multidisciplinary Research Journal
(Double Blind Refereed & Reviewed International Journal)

DOI NUMBER: 10.5958/2249-7137.2019.00071.5

AN ANALYSIS OF TELECOM INDUSTRY AND IMPACT OF PRIVATIZATION ON IT

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ABSTRACT

The current paper sheds light on the analysis of the Indian Telecom Industry and the impact of privatization on it. The telecommunication industry of India is one of the vast and leading industries in the world connecting different parts of the country through various modes like telephone, radio, TV, satellite and internet. The telecom Regulatory Authority of India governs this industry by providing a regulatory framework and favourable environment for its efficient operations. The telecom industry stands as the second largest in the world due to its rapid advancement and is in cut- throat competition with the telecom industries of the other developed countries. On the other hand privatisation is the process of switching the authority from the government to the private sector. Privatization is the process that has huge impact on the telecom sector in India. Data for the paper is the secondary data which is obtained from different annual reports of Telecom Regulatory Authority of India (TRAI) and from Google.

KEYWORDS: *Privatisation, Telecommunication, Growth, Service Providers.*

INTRODUCTION

The Indian telecom industry is considered to be a vital tool for the development of the country on the whole by contributing towards the immense growth, quick expansion and up gradation of various sectors of the nation. India's telecommunication network is the second largest in the world by number of telephones (both fixed and mobiles) users with 1.179 billion subscribers as on 31 July 2018.Development of telecommunication is significant in inducing the economic process of the states. It has been observed in India that the telecommunication sector is monopolized since the process of independence. Telecommunication sector of India has witnessed a huge growth after it had opened to the personal sector. The developments within the

telecommunication have helped in the alternate sectors in their operations. The privatization of the telecom industry helped India to grow in all aspects.

OBJECTIVES: The main objectives of the papers are as follows:

- To analyze the history and evolution of Indian Telecom Industry.
- To review the Government Telecom policies.
- To identify the present trends in the Indian Telecom Industry and its growth.
- To study the impact of privatisation on the Indian TelecomIndustry.

METHODOLOGY

The data for the paper is the secondary data which is obtained from various annual reports of Telecom Regulatory Authority of India and the reports of Department of Telecom and from other sites. Different telecom magazines, newspapers and journals were consulted for gathering of information.

ANALYSIS

The study has been conducted to depict the history and evaluation, present trends and privatisation in the telecom industry of India. The government telecom policies that govern this industry, growth of telephones (fixed and mobiles both), Tele-density in Rural and Urban areas, wireless and wireline communication, public and private sector telecom operators, has been also discussed and presented in detail.

HISTORY

1. Indian Telecommunication industry is the third largest telecommunication network in the world and the second largest in terms of number of wireless connections.
2. In 1850, the first experimental electric telegraph Line was started between Kolkata and Diamond Harbor.
3. In 1851, it was opened for the British East India Company. The Posts and Telegraphs department occupied a small corner of the Public Works Department, at that time.
4. Construction of 4,000 miles (6,400 km) of telegraph lines connecting Kolkata (Calcutta) and Peshawar in the north via Agra, Mumbai (Bombay) through Sindwa Ghats, and Chennai in the south, as well as Ootacamund and Bangalore was started in November 1853.
5. Dr. William O'Shaughnessy, who pioneered telegraph and telephone in India, belonged to the Public Works Department. He tried his level best for the development of telecom throughout this period.
6. A separate department was opened in 1854 when telegraph facilities were opened to the public.
7. In 1880, two telephone companies namely The Oriental Telephone Company Ltd. and The Anglo-Indian Telephone Company Ltd. approached the Government of India to establish telephone exchanges in India. The permission was refused on the grounds that the establishment of telephones was a Government monopoly and that the Government itself would undertake the work.

8. By 1881, the Government changed its earlier decision and a licence was granted to the Oriental Telephone Company Limited of England for opening telephone exchanges at Kolkata, Mumbai, Chennai (Madras) and Ahmedabad.

9. On 28 January 1882, Major E. Baring, Member of the Governor General of India's Council declared open the Telephone Exchange in Kolkata, Chennai and Mumbai. The exchange at Kolkata named "Central Exchange" was opened at third floor of the building at 7, Council House Street. The Central Telephone Exchange had 93 number of subscribers.

10. Bombay also witnessed the opening of Telephone Exchange in 1882.

11. First Central Battery of telephones introduced in Kanpur in 1907.

12. First Automatic Exchange installed in Shimla in 1913-1914.

13. Radio-telegraph system between the UK and India, with beam stations at Khadki and Daund, inaugurated by Lord Irwin by exchanging greetings with the King of England on 23 July 1927.

14. Radiotelephone system inaugurated between the UK and India in 1933.

15. First subscriber trunk dialing route commissioned between Kanpur and Lucknow in 1960.

16. First PCM system commissioned between Mumbai City and Andheri telephone exchanges in 1975

17. First digital microwave junction introduced in 1976.

18. First optical fibre system for local junction commissioned at Pune in 1979.

19. First satellite earth station for domestic communications established at Secunderabad, A.P. 1980.

20. First analog Stored Program Control exchange for trunk lines commissioned at Mumbai in 1983.

21. C-DOT established for indigenous development and production of digital exchanges in 1984.

22. First mobile telephone service started on non-commercial basis in Delhi 1985.

23. The Telecom Regulatory Authority of India TRAI was established by the Government of India Indian Telegraph Act, 1885 in 1997 as independent regulator to regulate the telecommunications business in India.

24. The Telecom Commission was set up by the Government of India vide Notification dated 11th April, 1989 with administrative and financial powers of the Government of India to deal with various aspects of Telecommunications.

25. National Telecommunication Policy was announced on March 26, 1999. This policy came into force on April 1,1999. With this the telecommunication policy of 1994 came to an end. Participation of the private sector was emphasized in this policy.

26. Bharat Sanchar Nigam Ltd. formed in October, 2000, is World's 7th largest Telecommunications Company providing comprehensive range of telecom services in India: Wireline, CDMA mobile, GSM Mobile, Internet, Broadband, Carrier service, MPLS-VPN,

VSAT, VoIP services, IN Services etc. Presently it is one of the largest & leading public sector unit in India.

27. National Long Distance Service NLD was opened from August 13, 2002

28. The National Internet Backbone of BSNL consists of 432 Point of Presence(POP) that gives it the capability of transporting IP traffic from every hook and corner of the country. This network provides internet services to more than 1 million dial-up customers including about 3.5 lakh customers on CLI basis.

29. The guidelines for Unified Access Service License regime were issued on November 11, 2003.

30. India is currently under the Calling Party Pays regime which was implemented in 2001 after being presented by the Telecom Regulatory Authority of India (TRAI) after first being presented in their second consultation paper on Telecom Pricing in 1998. India switched to this regime to be in line with what was seen as a 'global practice' because 90% of the world's telecom regimes are on CPP.

31. The Universal Service Support Policy came into effect from 01.04.2002. The guidelines for universal service support policy were issued by DoT and were placed on the DoT website www.dot.gov.in on 27th March 2002. Subsequently, the Indian Telegraph (Amendment) Act, 2003 giving statutory status to the Universal Service Obligation Fund (USOF) was passed in December 2003. The Fund is to be utilized exclusively for meeting the Universal Service Obligation by providing access to telegraph services to people in the rural and remote areas at affordable and reasonable prices. The USO Fund was established with the fundamental objective of providing access to 'basic' telegraph services.

32. Subsequently, an Act has been passed on 29.12.2006 as the Indian Telegraph (Amendment) Act 2006 to amend the Indian Telegraph Act, 1885 to enable provision of all types of telegraph services.

33. The total number of telephones in the country crossed the 100 million mark in April 2005 and the total numbers of telephone subscribers have reached 218.05 million at the end of May 2007 as compared to 211.76 million in April 2007.

Major Milestones of The Indian Telecom Industry

The Indian Telecom Industry comprises of various segments that are an indicator of its growth and development. It is broadly divided into two segments, Fixed Communication and Mobile Communication. Nowadays, there is a rapid growth in the field of mobile communication as compared to fixed communication due to an increasing demand for cellular phones . The technologies like GSM and CDMA are adopted by the Indian Telecom Industry. Different service providers offer both fixed as well as mobile communication while operating in various service areas of India.

Wireless Communication and Wireline Communication

The Wireless Communication is the fastest growing segment of the Indian Telecom Industry. Through the development of wireless communication, it has become easier to transmit information between two or more points that cannot be connected by an electrical conductor. The

wireless technologies being employed presently by the Indian Telecom Industry are Cellular (mobile) phones, Television, Radio etc. The private telecom operators now dominate the wireless market . However, this was not the case in the beginning. The changes in the market structure were mainly due to the changes in the National Telecom Policy of 1999. The Government of India is providing benefits to private players to grow in this sector. Mobile phone communication is one of the best known examples of wireless technology and is also known as cellular phone communication. The major operators in the wireless field are Bharti Airtel, Vodafone, Reliance Communications, Idea Cellular, Tata Indicom and BSNL/MTNL. The Wireline Communication focuses mainly on landlines. Fixed telephones are facing stiff competition from mobile phones. The fixed telephones network quality has presently improved a lot and these phones are now available even in high density urban areas on demand. The public telecom operators like BSNL and MTNL dominate the wireline market followed by the private operators. India has the world's second- largest telecom network after China in terms of both fixed as well as mobile communication. India had a subscriber base of 1.179 billion till the end of March'18 in terms of fixed and mobile communication.

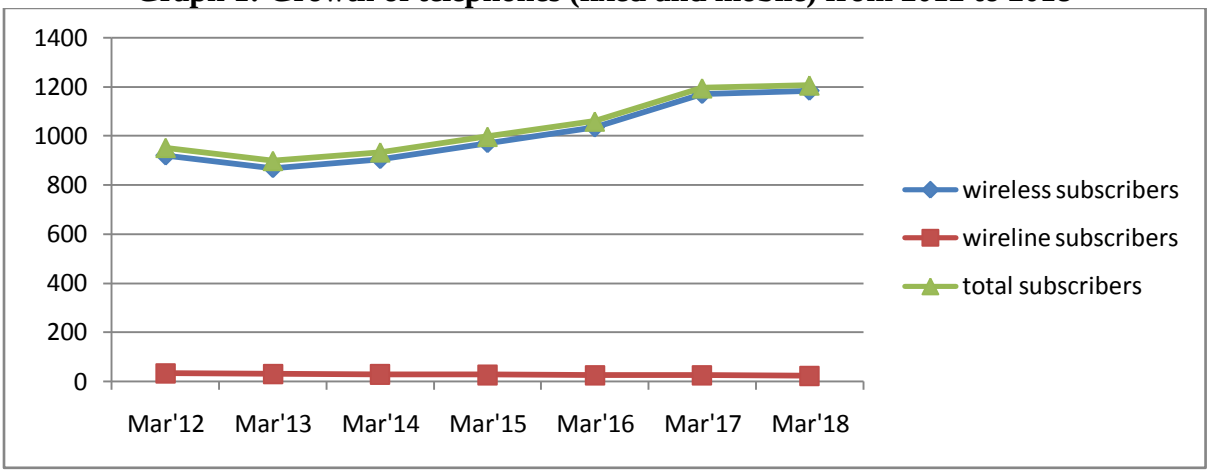
TABLE 1: GROWTH OF TELEPHONES OVER THE YEARS (IN MILLION)

YEAR	WIRELESS SUBSCRIBERS	WIRELINE SUBSCRIBERS	TOTAL SUBSCRIERS	ANNUAL GROWTH %
2012	919.17	32.17	951.34	12
2013	867.80	30.21	898.01	-6
2014	904.52	28.50	933.02	4
2015	969.90	26.59	996.49	7
2016	1033.63	25.22	1058.85	6.26
2017	1170.18	24.40	1194.58	12.82
2018	1183.41	22.81	1206.22	0.97

Source: TRAI Annual Reports from 2012- 2018, Press Releases of TRAI

The above table indicates that over the years, the number of wireless subscribers has increased whereas there has been a decline in the number of wireline subscribers due to an increasing demand for wireless phones as compared to fixed telephones.

Graph 1: Growth of telephones (fixed and mobile) from 2012 to 2018



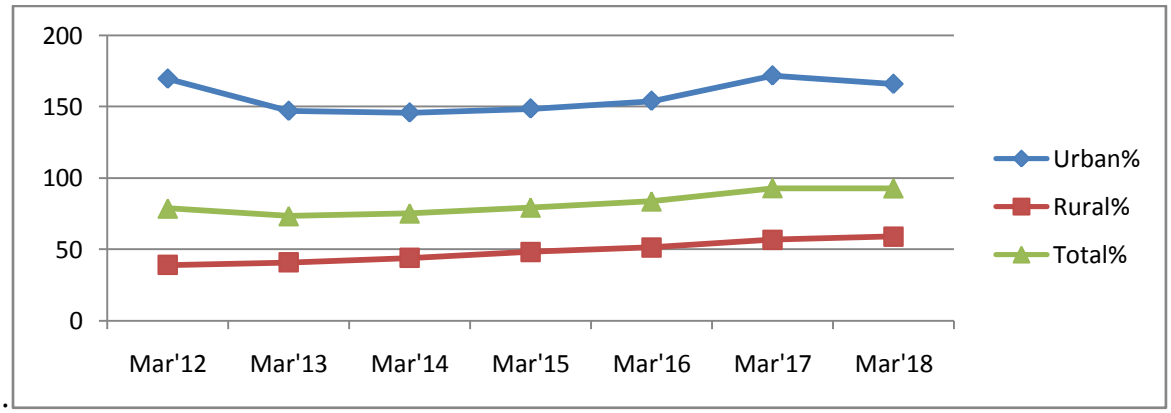
Source: TRAI Press Releases and Annual Reports from 2012-2018

The above line graph clearly depicts that there has been a positive percentage growth in the number of total telephones during the previous years, except in the year 2012-13 which had been due to the removal of inactive mobile phone connections by the service providers. TRAI's annual reports indicate that the total number of wireless subscribers have reached 1206.22 million at the end of Mar'18 from 951.34 million at the end of Mar'12.

Tele- density

Tele- density indicates the number of telephone connections per hundred people. It is a significant indicator of telecom penetration in the country. There is an exponential growth of tele-density in India due to the evolution of hi-tech wireless technologies.

Graph 2: Trends in Tele- density from 2012 to 2018



Source: TRAI Annual Reports from 2012 to 2018

According to TRAI's annual reports of various years, India's tele- density has increased from 70.89% at the end of March 2012 to 92.84% at the end of March 2018. However, tele- density declined from 78.66% at the end of March 2012 to 73.32% at the end of March 2013. This is also indicated in the above graph. The graph also depicts that the Urban Tele- density has decreased from 169.55% at the end of March 2012 to 146.96% at the end of March 2013. But Rural Tele-density has increased during this interval. There is a large disparity between the urban tele-density and rural tele-density. The slow growth in tele-density in the rural areas is due to these areas being less attractive for the telecom service providers to invest in. Furthermore, providing telecom services in the remote and rural areas also requires massive investment. Rapid increase in rural tele- density is very important for the economic and social development of rural areas, which will help in the overall development of the whole country. The Government of India has employed several measures for spreading up of mobile network in distant rural areas. Private telecom operators are trying their best to expand their services in rural areas by providing them good services.

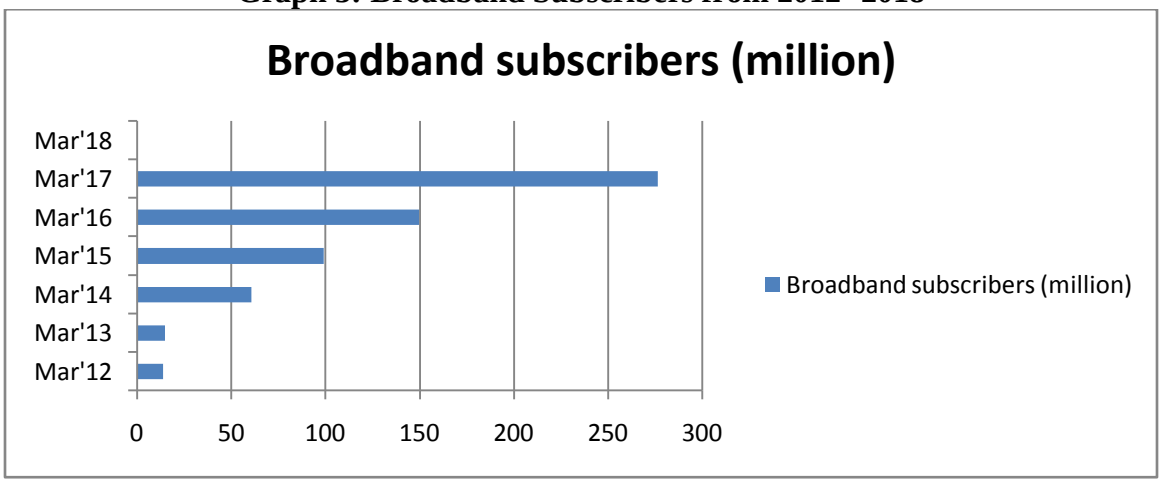
TABLE 2: OVERALL TELE- DENSITY IN VARIOUS SERVICE AREAS AT THE END OF MARCH 2018

S.No.	Service Area	Tele- density (%)
1.	Total	92.84
2.	Bihar	63.12
3.	Madhya Pradesh	66.99
4.	Uttar Pradesh	71.21

5.	**Assam**	**74.63**
6.	**Odisha**	**80.22**
7.	**Rajasthan**	**86.67**
8.	**West Bengal**	**91.02**
9.	**Haryana**	**94.38**
10.	**Andra Pradesh**	**97.07**
11.	**Maharashtra**	**108.46**
12.	**J&K**	**108.63**
13.	**Karnataka**	**109.01**
14.	**Gujrat**	**112.44**
15.	**Kerala**	**121.61**
16.	**Punjab**	**123.3**

As depicted in the table, the Metro cities have high tele-density as compared to other service areas.

Graph 3: Broadband Subscribers from 2012- 2018



Source: TRAI Annual Reports from 2012-2018

The above graph clearly reflects that the number of broadband subscribers have increased considerably from 2012 to 2018 owing to an increased demand for broadband connectivity.

Telecom Service Providers

The Indian Telecom Industry comprises of both public and private sector service providers. The public sector telecom operators occupy a major share in the wireline segment as compared to the wireless segment. The private telecom operators dominate the wireless market. Their share is very less in the fixed line segment. BSNL and MTNL are the two major public sector service providers. The major private sector service providers are Bharti Airtel, Vodafone, Reliance Communications, Idea Cellular, Tata Indicom.

TABLE 3: MARKET SHARE OF DIFFERENT SERVICE PROVIDERS IN THE WIRELESS AND WIRELINE SEGMENT (%) FROM 2015 TO 2018

Year/ service providers	2015		2016		2017		2018	
	Wireless	Wireline	Wireless	Wireline	Wireless	Wireline	Wireless	Wireline
BSNL	7.96	61.71	8.35	58.52	8.63	56.10	9.44	53.78
MTNL	0.36	13.35	---	13.89	0.31	14.19	0.30	14.67
Bharti Airtel	23.03	12.83	24.31	14.52	23.39	15.84	25.70	17.24
Vodafone	18.95	0.30	19.15	0.36	17.87	0.57	18.82	0.97
Reliance comm.	11.29	4.45	9.91	4.64	7.14	4.81	0.02	4.05
Idea	16.27	---	16.94	---	16.70	---	17.85	1.07
Tata Indicom	6.81	6.29	5.81	6.83	4.19	7.17	2.64	8.22

Source: TRAI Annual Reports from 2015-2018

As depicted in the table above, the public sector operators BSNL and MTNL have a larger share in the wireline segment as compared to the wireless segment. BSNL's share is much larger in the wireline sector in comparison to MTNL because it covers whole India whereas MTNL operates only in Delhi and Mumbai. Over the years, the wireline market share has declined due to an increased demand for wireless phones by subscribers. Amongst all the private sector operators, Bharti's share is higher in the wireless as well as wireline segment. The private service providers namely Bharti Airtel, Vodafone, Idea, Reliance Communications and Tata Indicom secured 1st, 2nd, 3rd, 4th and 5th rank respectively according to their market share at the end of March'18.

Revenue of major access telecom service provider in FY16, FY17 and Q2 18

Service providers	**FY16 (In crore)**	**FY17 (in crore)**	**Q2 18(in crore)**
Bharti	**48880**	**36922**	**---**
Vodafone	**34680**	**26308**	**8226.80**
Idea	**29436**	**22616**	
BSNL	**13110**	**10564**	**2273.58**
Reliance Jio	**-303**	**7466**	**7125.69**
Tata	**9957**	**6478**	**553.98**
Aircel	**11164**	**5082**	**---**
Relience Comm.	**4734**	**2680**	**149.12**
MTNL	**2867**	**1985**	**440.24**
Videocon	**4712**	**--**	**---**

Source: TRAI annual reports from 16 to 18.

Airtal, Vodafone, Idea cellular, BSNL and Reliance Jio are the top five telecom operators in India based on their annual Revenue in 2017.

Foreign Direct Investments

Foreign Direct Investment has been one of the major contributors in the growth of the Indian economy and therefore, the need for higher FDI is felt across sectors in the Indian economy. The telecom sector has played a crucial role in attracting FDI in India. The telecom industry of India requires huge investments for its expansion as it is capital- intensive and FDI plays a vital role in meeting the fund requirements for its expansion. The relaxation in FDI norms has attracted many

foreign telecom majors to this industry. The presence of foreign players has not only encouraged faster infrastructure development and up gradation but also has opened up the telecom industry to foreign competition. The rise in FDI has also enabled technology transfer, market access and has improved organizational skills. FDI is also used for providing telecom services to rural areas, where tele-density is still very low.

During August 2013, the Telecom Commission raised the FDI cap from 74% to 100% in order to encourage foreign investors to invest in the Indian Telecom industry. This has made telecom one of the major sectors attracting FDI inflows in India. According to the report of telecom minister Manoj Sinha, FDI in the telecom sector has jumped nearly five times in the last three years- from $1.3 billion in 2015-16 to $6.2 billion in 2017-18.

TELECOM INDUSTRY AND PRIVATIZATION

The term 'privatization' has a variety of meanings, but they all involve a degree of entry of private capital and entrepreneurship into the telecommunications business. The main constraint for developed economies is the underdevelopment of local capital markets unless they are willing to see foreign capital enter on a grand scale. There can be many advantages in doing so, but local political considerations and priorities may dictate otherwise, in which case the costs of foregoing foreign capital need to be offset, and therefore to some extent justified, by local reforms. There are various stages privatization can take, and many forms, but equally many interest groups to lobby for and against. The principal stakeholders on the supply side are government and the employees, where government can be motivated by different considerations such as raising funds from an IPO or promoting structural reform and investment in telecommunications, and employees by safeguarding jobs, salary structures, pension rights and other fringe benefits. Clearly many policy trade-offs are involved if the process is to be successful and these need to be clearly identified and made public before privatization is carried out. Restructuring after the event leads to uncertainty and capital flight. Efficiency is a dangerous word because it can mask all kinds of bad things, such as declining quality, standards of health and safety, choice, which do not get measured in the econometrics. Studies do tend to show that output (fixed lines per capita) rises along with profitability, but evidence on prices is rather lacking, and complicated by tariff rebalancing where it takes place and which is associated with efficiency. So overall, as Megginson and Netter (2001) also conclude, 'there is little empirical evidence on how privatization affects consumers.' (p.47) Most studies find that employment falls in the incumbent firm as a result of privatization, although there is no consensus whether this is by a large amount or small amount. Where competition is robust jobs tend to be created, and the market grows, the one tendency canceling out the other. There is evidence that where a strong independent regulator is established these effects are greater. Market growth also implies capital investment and this in turn results in rising labour productivity, which some studies find stronger in developed than developing economies.

These results also mean the effects of privatization are either complemented or overwhelmed by the effects of market structure (competition) and/or regulation. Separating out the effects is difficult, but the evidence suggests that competition is the more significant element in driving telecommunications investment and output than privatization. It also suggests that privatization without strong regulatory support is less effective.

Non-econometric research has turned up important lessons as to the process of privatization or divestiture. The nature of the state and its relation to civil society, and how open it is to manipulation by interest groups has important consequences for the success or failure of the reform process. Three key issues that need addressing when planning to privatize are price regulation, how prices are to be governed, network growth targets including universal service targets and how to pay for them, and quality of service targets, how to measure consumer benefits. The lessons from new institutional economics suggest that incentives, including property rights issues, need to go into the design of reforms, and transactions cost theory raises useful guidelines for working out the costs and benefits of different designs of policy reform, to see just what it takes and costs to create successful reform.

Share of private and public sector in wireless and wireline services in 2018

Sector/ service	Private sector (%)	Public sector (%)
Wireline share	**31.55%**	**68.45%**
Wireless share	**90.55%**	**9.45%**

Source: TRAI annual report of 2018.

How growth of telecommunication sector contributed to other industries in India

It has been widely accepted that development of telecom has positively influenced socio economic parameters of a nation (IBEF, 2015). Indian telecom industry has grown leaps and bounds for the liberal government policies. With the support of the telecommunication the other sectors have also grown enormously.

Telecom and Banking and Financial services

The challenges of time and distance have been solved with the help of digital communication in the banking system. This has not only saved time but also money by reducing transaction costs. The banking system changed with the emergence of ATM machine. These machines helped customers to do transactions outside bank premises and at convenient locations. Next the facility of phone banking with which transaction could be done through ordinary phones (Komal, 2012). These developments helped the banks to serve their customers effectively and efficiently. The usage of debit cards and credit cards has also increased for the developed telecommunication. The growth of telecom services in India has brought a huge wave of change among the Indian consumers' process of banking. There have been changes in the basic payments and financial services. With the development of the mobile technology and increase in internet penetration consumers are increasingly using the digital platform for basic funds transfer, bill payment and balance check transactions (PWC, 2015). This had given easy accessibility to the customers to the banking and other financial services. The recent trend in banking is mobile banking. The use of this digital channel is serving as a catalyst to financial inclusion (PWC, 2010). Very soon the telecom service providers would be providing the basic baking services to its consumers. With this consumers with ordinary handset without internet connection would be able to do fund transfer, balance inquiry in savings account, change of PIN, mini statement, cheque book request, etc, with simple text messages (Ghosh & Guha, 2014).

Telecom and Agriculture

E-Choupal is the first of its kind initiative of internet based intervention in agricultural sector to the rural farmers of India. It was launched by ITC's Agri Business Division in 2000. This

initiative helped the farmers to learn new agricultural tactics, make informed decision, understand market demand and directly deal with the company without middleman to earn more revenue. Another initiative called Nokia Life provides localized information including weather conditions, advice about crop cycles, general tips and techniques, as well as market prices for crops to the farmers through SMS (Sivakumar, 2013). Another pioneering initiative is Reuters Market Light which provides customized information in local language through SMS on mobile phone about different aspects of agriculture (Sivakumar, 2013). Also there are farmers who are making their own portals and selling their products successfully (Mukhtar, 2015). The government has targeted to connect 10 million farmers through their mobile phones for whether and crop forecasting information to be provided by the Agromet Advisory Service (CGIAR & CCAFS, 2012).

Telecom and Transportation

The major mode of transportation of India is the railways. Online ticketing service IRCTC (Indian Railway Catering and Tourism Corporation) has helped reduction of 96% of the passenger reservation workload. National train Enquiry System helps passengers to get updated train running information. Freight Operations Information System (FOIS) is also facilitating the travelers (Ministry of Railways, 2014). Online travel portals have made air ticketing easier than before due to which the online travel segment forms 70% of the ecommerce business (IMRBI & IMAI, 2013). E-ticketing for bus services is also coming up big way. There are many online travel companies which provide bus tickets through their portals. Most modern feature of online bus ticketing is themTicketing where consumers can purchase the bus tickets on their mobile phones (Thomas, Pathak, & Vyas, 2014). In most cities of India Radio Taxi services are becoming indispensable mode of commute. The service use GPS to locate the customer and the available cabs so that they can serve the customer in the shortest time. Many IT firms are proving the solution to the radio taxi firms (Singh, 2007). The consumers can now use mobile application (App) to book their taxis and also make payments online (Julka & Chanchan, 2014).

Telecom and ecommerce & M commerce

E-commerce and M-commerce refers to electronic commerce and mobile commerce respectively. Any economic activity that occurs online is electronic commerce. Indian ecommerce market is soon expected to be the largest among Asia Pacific countries (Agarwal, 2014). It is said that e-commerce would be soon taken over by m-commerce (PTI, 2015). Mobile commerce is the transactions done through the mobile phone applications with the help of internet. The industry of digital commerce is experiencing exponential growth in India for rising smartphone sale and affordable data plans. The private internet service providers like Bharti Airtel Ltd, Idea Cellular Ltd and Vodafone Group Plc have been slashing the mobile internet charges for increasing revenues from data services. Indian consumers are transacting online for travel, e-tail, banking, etc.

CONCLUSION

It can be concluded that the Indian Telecom Industry contributes significantly to the overall socio- economic development of India. It is an essential tool for the growth of the nation. The various telecom service providers offer voice and data services to the customers across different regions of the country including both urban and rural areas thereby facilitating the growth of this industry. Government monopolized Indian telecom sector was opened to private players post

liberalization of the economy. Privatization of the sector helped the growth of telecommunication by improvement of teledensity, increase in revenue and heavy inflow of FDI. With more of manufacturing units and many service providers there have been huge employment opportunity for various people. The cut throat competition made the telecom services affordable to the common man. With the growth of this sector, banking and financial services, agricultural sector, transportation industry and digital commerce were tremendously benefitted. It is often over that the Indian telecommunication trade contributes considerably to the socioeconomic development of India. It's an important tool for the expansion of the state. The assorted telecommunication service suppliers provide voice and knowledge services to the purchasers across completely different regions of the country as well as each urban and rural areas thereby facilitating the expansion of this trade. As a result of the fast advancement in technologies, the telecommunication operators of India area unit operating actively so as to adapt themselves to the ever-changing technology to continue existing within the market.

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