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# PERFORMANCE OF AGRICULTURE DEVELOPMENT BANK LIMITED IN NEPAL

**Rishikesh Panthi***

*PhD Scholar,
Faculty of Management,
Tribhuvan University, Kathmandu, NEPAL
Email id: panthi_rishikesh2006@yahoo.com

## ABSTRACT

*For the survival and growth, every organization should be capable to translate its plans and programs enhancing performance. Agriculture Development Bank Limited (ADBL) was incorporated in 1968 through enactment of Agriculture Development Bank of Nepal (ADBN) Act.1967, with mains objective to provide institutional credit for enhancing the production and productivity of the agricultural sector in the country. In this context, this article explores the capacity and performance level of Agriculture Development Bank and discussion about contribution of ADBL in rural credit supply in Nepal. Continuous performance is the objective of any organization because only through performance, organizations are able to grow and progress. For the discussion, about Performance of ADBL, operating status of ADB, financial status of ADBL, total investment Share and loan investment, dividend received, contribution on rural credit transfer, Revenue generation, Shareholder's Fund/net-worth, working capital, administrative and unfunded liabilities of ADBL on the based on PBM theory assumptions, Secondary data are obtain from Ministry of Finances and National planning commission and some of the key personnel of the ADBL are also interviewed. The finding shows that there are still very important roles of ADBL for service delivery system, social and economic development, and the roles of income Tax; value added tax and not taxable-tax collection and social welfare, Employees' generation, curtailing, syndicate and market control, the role of crisis management and emergency situation etc.*

**KEYWORDS**: *Agriculture Development Bank, Performance, Efficiency, Effectiveness, Quality, Service Delivery, Contribution, Rural Credit, Supply Management.*

## INTRODUCTION

### 1. Background of the study

Public Enterprises were created both developed and developing countries of the world to accelerate economic and social development. Specially, After the great depression of 1930 and particularly after the 2nd world-war, numerous State Owned Enterprises (Public Enterprises) were created in both developed and developing countries to address market deficits & capital shortfalls, promote economic development, reduce mass unemployment or ensure national control over the overall direction of the economy(U.N,2005,P.3; Adsanmi,2011;Ogohi,2014,p.24 as cited from Panthi,2019a,p.47 & Panthi,2019b,p.9). Nepal was also not exception for establishing such entities. Nepal establishes more than five dozen of such enterprises up to the late Sixties. Agriculture Development Bank (ADB) was one of these corporations related to Banking sector, which has been established in Nepal with the main objective of providing institutional credit for enhancing the production and productivity of the agriculture sector in the country, the Agriculture Development Bank, Nepal was established in 1968 under the Agriculture Development Bank Nepal Act., 1967,as successor to the cooperative Bank.

The land Reform Savings Corporation was merged with ADBN in 1973. Subsequent amendments to the Act empowered the bank to extend credit to small farmers under group liability and expand the scope of financing to promote cottage industries. The amendments also permitted the bank to engage in commercial banking activities for mobilization of domestic resources. The Agriculture Development Bank Limited (ADBL) is an "A" class autonomous organization largely owned by Government of Nepal. The bank has been working as a premier rural credit institution since last three decades, contributing the more than 67 % of institutional credit supply in the country. Hence, rural finance is the principal operational area of ADBL. Furthermore, the bank has also involved in commercial banking operations since 1984.

The enactment of Bank and Financial Institution Act (BAFIA) abolished all Acts related to financial institutions including the ADBN Act, 1967. In line with the BAFIA, ADBL has been incorporated as a public limited company on july14,2005. Thus, ADBL operates as a "A" category financial institution under the legal framework of BAFIA and the Company Act, 2053.

At present, ADBL has been providing rural credit from 245 branches in the country by core banking system. It is also providing Locker facilities from 29 branches and ATM facilities from 60 destination of the country. Furthermore, ADBL providing C-ASBA from 181 branches on their office and D-MAT facilities from 188branches on their service office and 37 branches have government credit transfer service as well. Furthermore, ADBL providing the connect IPS, Visa Debit Card, Internet, ATM, C-ASBA, D-mat, Electronic Banking etc.

In this background, it is curious that why some of the Nepalese Public Bank are able to perform well and the others are not able to make profits. To What extent the Bank contributing to rural credit supply? What are the major challenges of Banking management in Nepal? Against, this backdrop, this research has been attempted to analyze and review the financial efficiency and operational condition of ADBL. The researcher discussion 5 years trends analysis of Nepalese public bank (ADBL) from different corner i.e. financial efficiency of Government owned Public Bank, government share investment, loan & dividend received from ADBL, ADBL contributions on rural credit supply, revenue & shareholders' fund and also analysis of working capital, administrative expenditure & unfunded liabilities of ADBL. For the purpose of writing this article the financial and operation performance of ADBL has been reviewed. In

addition, some of the key informants were interviewed. The secondary information was triangulated with primary information for substantiating the factual information.

## 2. OBJECTIVES AND METHODOLOGY

The primary objective of this study is to review and analyze the overall performance trends of ADBL in Nepal. In order to achieve the objective, the relevant information and data have been collected from both primary and secondary sources. Primary data was collected through personnel interview with policy makers, academician, CEO, executive committee, key personnel of ADBL and others. The secondary sources was included the various publication of ministry of finance(MOF), National planning commission (NPC) ,Central Bureau of Statistics(CBS), Research and survey reports of various national and internationals institutions, Books, Journals, thesis and dissertation Reports etc.

## 3. The Literature Review and Analytical Framework

In this section, literature related to Performance Based Management (PBM) and Public Bank performance reviewed to provide a background of the study, to identify the relevant variables and to formulate an analytical framework for the study. The concept of organizational performance or effectiveness holds a central position in the management of both public and private organizations as well as in the field of organizational research over the last decades, concerns for efficiency, productivity, excellence and total quality have become increasingly widespread in western organizations (Lewin & Minton, 1986 as cited Morin & Auue brand, 1995, p.1 as cited from Panthi,2019b,p.11). Performance Management (PM) is more than the end of the year appraisal about it translating goals in to results. Performance Management focuses not only on individual employees but also on teams, programs, processes and the organization as a whole. Performance is a multi-dimensional concept. On the most basic level (Borman and Motowidlo, 1993,P.7).

Various studies that have examined in the past issues of the performance evaluation of public enterprises include (Sherpherd,1965; 1976, Pryke,1981, Millward,1982,Fernandes and Kreacic,1982, Short1983,Marchand et al.,1984, Kirkpatrick et al.1984,Rees,1984, Nellis1986:1989, Pestieau,1989).The majority of previous study examine the development of a general framework for performance evaluation of public enterprises, although the determination of the appropriate performance evaluation criteria for evaluation of public enterprises. Performances are directly related to the objectives of each public enterprise (Ree1984; Pestieau,1989.as cited by Anastassiou & Doumpos, 2000,p.13).The others significant determining issue of public enterprises objectives is a social as well as a commercial role so that there is multiple objectives in the operation of PEs including efficiency, profitability, income distribution and contribution to the implementation of macroeconomic policies (Rees,1984, p.11).Organizational Performance may be defined as the transformation of inputs in to outputs for achieving certain outcomes with regard to its content, performance informs about the relationship between minimum effective cost (economy) and outputs (efficiency) or achieved outcome (effectiveness) (Chen &Barnes, 2006).

Organizational performance refers to ability of an enterprise to achieve such objective as high profit, quality product, large market share, good financial results and survival at pre-determined time using relevant strategy for action (Knontz and Donnel, 1993). The current debate on terms like performance, productivity and quality is still confusing, since and adequate and commonly accepted definitions are rarely found within both academic and commercial circles (Tangen, 2005, as cited from Gresty, 2010, p.23). However, performance is the Umbrella term of excellence and includes profitability and productivity as well as other non-cost factors such as quality, speed, delivery and

includes profitability and productivity as well as other non-cost factors such as quality, speed, delivery and flexibility (Tagen, 2005). For instance, Venkatraman & Ramanujan (1986) consider three aspects of performance among them are financial performance, business performance and organizational effectiveness and the later have been subsequently known as organizational performance (Panthi, 2019b, p.12).

Continuous performance is the focus of any organization because only through performance, organizations are able to grow and progress. (Gavrea, Lilies and Steger an, 2011). Themain objectives of organizational Performance Evaluation isrefers to ability of an enterprise to achieve such objectives as high profit, quality product, large market share, good financial results and survival at pre-determined time using relevant strategy for action (Koontz &Donnel, 1993 cited as Kehinde et al., 2012, p.315). Performance management is important for an organization, as it helps organizations ensuring employees are working hard to contribute to achieving the organization's mission and objective. Organizational performance can also be used to view how an enterprise is doing in terms of level of profit, market share and product quality in relation to other enterprises in the same industry. Consequently, it is a reflection of productivity of members of an enterprise measured in the terms of revenue, profit, growth, development and expansion of the organization (Kehinde et al., 2012, p.316). Performance measurement is made up of a set of procedures that help government organizations optimize their business performance and it provides a background for organizing, automating and analyzing business (tendency) trend, metric, process and systems that drive business performance.

Furthermore, Sharma (2014) conducted on his research Performance of Public Sector Bank by using CAMEL model analysis. He also comparison the performance of public Bank to others bank as well. The research finding shows that public sector bank gives better performance than others private Banks. The results of Public Bank was satisfactory then private Banks. (Sharma, 2014 as cited from Banerjee and Sharma, 2017).

Similarly, Prasad & Ravinder (2012) were conducted research about the performance of Indian Banks, which was related to the Public sectors. The sample size of banks was 20 & they applied CAMEL model to find out financial performance. After analyzing that each parameters of CAMEL Model. Researchers find outs the comparative study of some Indian banks. Andhra banks was one of the highest best-performed Bank in the India. Which were also followed by the P & S Bank & Bank of Baroda, at last Central Bank of India showed very low performance.(Prasad &Ravinder, 2012).

Furthermore, Hui (2012) tried to find out the factors affecting the performance of Nepalese Commercial Banks By using various camel ratios such as return on asset (ROA), return on equity (ROE), capital adequacy ratio (CAR) etc. As Public sector banks have higher total assets compared to joint venture or domestic private banks, thus ROA was found higher whereas overall performance of public sector was unsound because ROE and CAR of joint venture and private banks was found superior. The financial performance of public sector banks is being eroded by other factors such as poor management, high overhead cost, political intervention, low quality of collateral etc.( Hui, 2012ascited from Kaur et al., 2015, p.4330).

Similarly, Malhotra (2013) measured the financial performance of Indian public sector banks asset by camel model and applying the tests like Anova, f-test and arithmetic test for the data collected for the year 2007-2011. They concluded that the top two performing banks were bank of Baroda and Andhra bank due to high capital adequacy and asset quality and the worst performer wasunited

bank of India because of management inefficiency, low capital adequacy and poor assets and earning quality. Central Bank of India is at last position followed by UCO bank and bank of Maharastra (Malhotra, 2013ascited from Kaur et al., 2015, p.4330).

Chaudhary (2014) conducted a study to measure the right performance of public and private sector banks by the use of secondary data collected from annual reports, periodic plans, website etc. for the year 2009 – 2011. He also found out that in every aspect, private sector bank has performed better than public sector banks and itwas growing at faster than public Banks. (Chaudhary, 2014 as cited from Kaur et al.,2015, p.4330).

**4. Theoretical Considerations**

The study draws upon the theoretical insights of the academic literature on Performance Based Management (PBM) theory. Performance-based management (PBM) theory is a systematic approach to performance improvement through an ongoing process of establishing strategic performance objectives, measuring performance, collecting, analyzing, reviewing and reporting performance data and using that to drive improvement. Performance measurement is the comparison of actual levels of performance to pre-established target level of performance. It is generally indicates inputs, activities, outputs, outcomes and goals. The main objective of this approach is to increase efficiency and effectiveness in terms of organizational performance and service delivery.

**5. Indicators of Performance Evaluation/Measurement**

Organizational performance evaluation technique and methods used to measure and manage it have been a current debate in both management theory and practice. Performance evaluation process of organization generally involves in both implementation and monitoring strategy of the organization that sets of standard ratio between the goals purposed and the results obtained (Simon, 2000 as cited from Panthi, 2019b). Performance measurement as the sets of metrics used to quantify both the efficiency and effectiveness of actions (Neely,1994).Hancott, point out that, a number of indicators have been adopted to measure organizational performance since mid-1900, such as profit growth rate, net or total assets growth rate, return on sales, shareholder's return, growth in market share, number of new products, return on net assets etc.(Hancott,2005). A number of studies have applied in different ways to evaluate organizational performance (Schiuma &Lerro, 2008; Garett, et al.,2008; Green & Inman,2007;Chung & Lo,2007;Chung & Lo,1975) review 17 organizational effectiveness models, integrate these measurement of organizational performance from various studies and generalize these measurement in to three dimensions: financial performance, business performance and organizational effectiveness. In addition, Delaney and Huselid (1996) suggest two ways to assess organizational performance there are organizational performance and marketing performance.

Later, Tippins and Sohi (2003) purpose organizational performance is measured on four dimensions. These are relative profitability, return on investment, customer retention, and total sales growth. The Economic Advisory council in its report titled "PEs in India: Some current issues" Suggests different parameters of performance evaluation Indicators such as financial, production, investment efficiency, productivity and social audit. Furthermore, Victor Powell (1987, p. 37) has explained that there are several indicators for measuring PEs performance such as General performance, management performance, Investment performance, costs break down (input co-efficient and physical performance (i.e. resource use). Previous research had used many indicators to measure organizational performance such as profitability, gross profit, return on asset

(RoA), return on investment (RoI), return on equity (RoE), return on sale (RoS), revenue growth, market share, sales growth and operational efficiency (Fuentes – Fuents et al., 2004&Curkovic etal., 2000).

There are various indicator of organizational performance evaluation of public Bank but in this study focused to analyze and review the financial efficiency and operational condition of ADBL. The researcher discussion 5 years trends analysis of Nepalese Public Bank ADBL from different corner i. e., operating status of Nepalese Bank in different fiscal year, financial efficiency of Government owned Public Bank ADBL, government share investment, loan & dividend received from ADBL, Agriculture Development Bank Limited contributions on rural credit supply, contribution on revenue generations& shareholders' fund and also analysis of working capital, administrative expenditure & unfunded liabilities of ADBL.

## 6. Analysis and Discussion

### I. The financial status of Agriculture Development Bank Limited.

The corporate from ADBL in Nepal existed only in 1968 when the government of Nepal decided to go for providing institutional credit for enhancing the production and productivity of the agriculture sector in the country. Only the first Agriculture development Bank in the country of Nepal. Financial performance measure of public Bank depend upon the economic viability, including directing cost comparison, ignore both of the non-cash element and the time of value of money. Bank investment out of general revenue to support overall economic development rather than produce profit so that ADBL performance focused on Net capital investment, overall net profit/loss, total operating income, total operating profit/ loss, operating profit to net capital investment percentage and cumulative profit/loss were taken important financial indicator of ADBL performance evaluation which was details given in table-1

**TABLE 1 FINANCIAL EFFICIENCY (PROFIT/LOSS) OF GOVERNMENT OWNED PUBLIC ENTERPRISES**

| S.N. | Fiscal Year (FY) | Net Capital Investment (in millions) | Total operating income (in millions) | Total operating Cost (in millions) | Total operating profit/Loss(in millions) | Overall Net Profit/Loss(in millions) | Cumulative Profit/ Loss (millions) | Operating Profit to Net Capital Investment (%) |
|---|---|---|---|---|---|---|---|---|
| 1. | 2013/14 | 96368 | 81788 | 70504 | NA | 22896 | 11924 | 23.76 |
| 2. | 2014/15 | NA | 93030 | 93030 | NA | 14918 | 14750 | NA |
| 3. | 2015/16 | 187337 | 97784 | 82748 | 15036 | 43212 | NA | 23.07 |
| 4. | 2016/17 | 23084 | 107821 | 51611.01 | NA | 25314 | 2366 | 109.66 |
| 5. | 2017/18 | 125204 | 124094 | 103082 | 2565 | 25652 | 3479 | 20.49 |

**Source: Original data from MOF: 2013/14/15/16/17/18**

In above table No. 1, the wholly and majority Government owned Agriculture Development Bank Limited's Net Capital Investment has reached Rs.96368 million in FY 2013/14. At the same duration, the total operating income was Rs. 81788 million and overall Net profit was reachedRs.22896 million and cumulative profit was only Rs.11924 million whereas the same FY operating profit to Net Capital Investment percentage was 23.76%. Similarly, fiscal year 2015/16, the overall Net Capital investment of ADBL had reached Rs.187337 million, total operating profit

Rs.15036 million, overall net profit Rs.43212 million and operating profit to the next capital investment percentage was positive 23.07 %. Furthermore, fiscal year 2016/17, the Net Capital investment had reached Rs. 23084 million, total operating profit is not available, and overall net profit Rs. 25314 million and operating profit to Net-capital investment percentage was 109.66%.

Furthermore, FY 2017/18 the total net capital investment of ADBL had reached Rs. 125204million, total operating income was Rs.124094 and net profit was Rs. 25652 million. The operating profit to the net capital investment had reached 20.49 %.

In above analysis shows that the amount of net capital investment of Public Bank ADBL form government of Nepal whereas the operating to net capital percentage ratio was satisfactory than other public institutions of Nepal, which was upper than the current interest rate of market price. Hence, the ADBL significantly earning profit but improvement is required to maintain their fiscal discipline for their sustainable development.

**II. Government Share, Loan Investment & Dividend received from ADBL.**

The total share and loan investment of Government of Nepal and dividend received from ADBL is very important indicator for measuring performance of public Bank so that in this research also find out the total share and loan investment of Government of Nepal and dividend received from ADBL in different fiscal year, which is given in table No.-2.

**TABLE 2 GOVERNMENT SHARE INVESTMENT, LOAN& DIVIDEND RECEIVED FROM AGRICULTURE DEVELOPMENT BANK**

| S.N. | Fiscal Year (FY) | Total Investment of GONs | | Dividend received (in million) | Return on Equity (%) |
|---|---|---|---|---|---|
| | | Share Investment (in million) | Loan Investment (in million) | | |
| 1. | 2013/14 | 80688 | 30641.40 | NA | 23.76 |
| 2. | 2014/15 | 80688 | 6198 | NA | 46.62 |
| 3. | 2015/16 | 80698 | 25253 | 4937 | 43.07 |
| 4. | 2016/17 | 81398 | 17820 | 9158 | 21.9 |
| 5. | 2017/18 | 81398 | 11680 | 3862 | 11.27 |

**Source: Original data from MOF: 2013/14/15/16/17/18**

In above table No.2 shows that, according to the office of the financial controller General/Ministry of finance records, the loan and share investment of Government of Nepal in Agriculture Development Bank Limited has reached to Rs. 80688 billion and Rs. 6198 billion respectively in a fiscal year 2014/15, which was Rs. 80688 billion and Rs. 30641.40 billion respectively in the previous fiscal year 2013/14. The Government of Nepal had received 46.62% of return on equity in fiscal year 2014/15, which was 23.76% in previous FY 2013/14. Another fiscal year 2015/16, the government share and loan investment has reached Rs.80698 billion and Rs.25253 billion respectively and Rs.4937 billion dividend had been received from ADBL. The return on equity ratio was found 43.07% of total equity investment. Similarly, fiscal year 2016/17, the total loan and share investment of government of Nepal in ADBL has reached to Rs. 81398 billion and Rs. 17820 billion respectively and Government had received Rs. 9158 billion dividend in the same fiscal year. The return on equity (ROE) received percentage was 21.9%. Another, fiscal year 2017/18, the loan and share investment of Government had reached Rs. 81398 billion and Rs. 11680 billion respectively and Government had received Rs. 3862 million dividend as a same fiscal year which was only 11.27% of return on equity.

The above phenomenon shows that, the rate of government share investment is increasing tendency and loan has slightly decreasing tendency but to some extend the return on equity (ROE) and dividend-received ratio percentage is decreasing tendency. The rate of return from ADBL in Nepal is getting greater than the current interest rate. The role of ADBL is very important for rural credit transfer or supply, income tax; value added tax and not taxable tax, revenue collection and the role of public welfare and service delivery point of view.

**III. Assets Management of Agriculture Development Bank Limited.**

Assets Management and shareholder's fund / Net-worth determine the overall performance of Bank. The role of Shareholder's fund is also very important variable of performance measurement so that the assets performance status of ADBL and shareholder's fund /net-worth are given details in table No.-3.

**TABLE 3 PERFORMANCE STATUS OF PES CONTRIBUTIONS ON GDP/REVENUE& SHAREHOLDER'S FUND**

| S.N. | Fiscal Year (FY) | Net Fixed Asset | Current Asset | Loan Investment | Cash and Bank Balance | Shareholder found/Net-worth (in million) |
|---|---|---|---|---|---|---|
| 1. | 2013/14 | 14528 | NA | 92754 | 8896 | 142229 |
| 2. | 2014/15 | NA | NA | 705025 | 61935 | 150472 |
| 3. | 2015/16 | 12216 | 115707 | 826500 | 84655 | 168937 |
| 4. | 2016/17 | 11761 | 127677 | 935798 | 33279.11 | 181940 |
| 5. | 2017/18 | 11118 | 19919 | 882065 | 136227 | 217967 |

**Source: Original data from MOF: 2013/14/15/16/17/18**

The table No.3 shows that according to the Ministry of Finance/The Financial control General, the total net fixed asset was Rs.14528 and total investment was Rs.92754 million in fiscal year 2013/14. The shareholder's fund has reached Rs 142229 in same fiscal year. The net fixed assets and current asset of ADBL in fiscal year 2016/17, has reached Rs.11761 million and Rs.127677 million respectively, which was subsequently Rs 12216 million andRs.115707 million in previous FY2015/16.The amount of investment Rs.935798 million and bank balance Rs.33279.11 million in FY 2016/17, which was only Rs. 826500 million and Rs.84655 million in previous fiscal year 2015/16. The share holder found has reached Rs. 181940 million in FY2016/17, which was only Rs. 168937 million in FY 2015/16. Furthermore, the total net fixed asset and current asset of ADBL has reached Rs.11118 million and Rs. 19919 million in FY 2017/18.The total investment and Bank balance has reached Rs.882065 and Rs.136227 million respectively in FY2017/18. The shareholder found has reached Rs. 217967 million in last fiscal year 2017/18.

In above situation analysis, the current asset, loan investment, bank balance, shareholders fund was increasing trends but fixed asset was only decreasing trends. Which was indicate that the rate of investment and rural credit supply rate was increasing which is help to determinant the overall performance of Agriculture Development Bank Limited.

**IV. Working Capital, Administrative expenditure & unfunded Liabilities of PEs.**

Employee's generation possibility, administrative expenditure & unfunded liabilities also impact to determine on ADBL performance so that these all of above variables are given in table no.-4.

**TABLE 4 WORKING CAPITAL, ADMINISTRATIVE EXPENDITURE& UNFUNDED LIABILITIES OF PES**

| S.N. | Fiscal Year (FY) | No. of Employees | Administrative expenditure (In millions) | Ratio of Administrative expenditure on Operational Income | Unfunded Liabilities of PEs. (In millions) |
|---|---|---|---|---|---|
| 1. | 2013/14 | 3026 | 27369 | 38.82 | 0 |
| 2. | 2014/15 | 3292 | 40302 | 45.43 | 0 |
| 3. | 2015/16 | 2584 | 36347 | NA | 0 |
| 4. | 2016/17 | 2751 | 35606 | 43.07 | 0 |
| 5. | 2017/18 | 2632 | 41555 | 33.49 | 0 |

**Source: Original data from MOF:2013/14/15/16/17/18**

In above table No. 4shows that, all together 3292 no. of employees were working in FY 2014/15 which was 3026 in previous FY 2013/14. The Administrative Expenditure has reached Rs. 40302 million in 2014/15, which was also Rs. 27369 in last FY 2013/14. The unfunded liability of ADBL was found only Zero. The 2751 numbers of employees were working in FY2016/17,which was only 2584 in FY 2015/16. The administrative expenditure has reached in Rs 65606 million in FY2016/17,which was Rs. 36347 in FY2015/16. At last fiscal year, 2017/18, the total number of employees working in ADBL was found 2632 and administrative expenditure had reached Rs.41555 million. The unfunded liabilities all reference year was found zero

## 7. CONCLUSION

Agriculture Development Bank was established in Nepal with the main objective of providing institutional credit for enhancing the production and productivity of the agriculture sector in the country. It is also obvious that, in spite of huge capital investment by government of Nepal in ADBL have been able to provide satisfactory rural financial credit for agricultural development, financial returns on the overall net profit, total operating income operating profit to net capital investment, Government revenue generation and Employees Generation. The rate of Employees Generation in this research period decreasing tendency. The administrative expenditure was slightly increasing and unfunded liabilities were totally controlled, which indicate that the question about transparency, accountability, productivity and performance of ADBL in Nepal. In additions this, the administrative expenses was slightly normal rate of increasing and unfunded liabilities was not founded. The achievement of ADBL as a public enterprises investment of Government is better than the other sector of public enterprises. The rate of return from ADBL in Nepal is getting better than the current interest rate of market price. The capital output ratio also remained satisfactory the labour productivity also showed little-bit unfavorable trends with a few exceptions. In fact, the all capital output ratio, employee productivity ratio, and value added employee return, share and loan and investment ratio on, dividend-received ratio have been up to the mark better than the balance level. ADBL has passed to perform in an efficient manner

On the other hand, the role of ADBL has become remaining significant in mobilizing income tax, value added tax and non-taxable tax, public welfare, service delivery, employees Generation, Carting, Syndicate controlled, Market controlled, financial crisis management and an emergency situation.

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# A STUDY ON CUSTOMER AWARENESS TOWARDS INTERNET BANKING – WITH REFERENCE TO TUMKURDISTRICT

**Mr. M. Mathiyarasan*; Dr. V. Chitra****

*Assistant Professor,
Department of Commerce,
Kristu Jayanti College, Bangalore, INDIA
Email id: mathiyarasan@kristujayanti.com

**Assistant Professor,
Department of Commerce,
Kristu Jayanti College, Bangalore, INDIA
Email id: chitra@kristujayanti.com

## ABSTRACT

*The E-Banking is increasingly becoming popular because of convenience and customer-friendly. It has reduced transactional costs for the financial institutions and helped them to provide variety of services to their clients. E-Banking has not only reduced the time consumed in financial transactions, it has shrunk the geographical frontiers to make their business truly global. The present paper explores the customer's perception towards e-banking in India. The e-banking services divided into two. One is payment services and the other is Request services. Customer's satisfaction towards payment services, request services and e-banking issues are analyzed. The results are discussed along with suggestions for improving e-banking services in India. It makes available to customers a full range of services including some services not offered at branches. Internet banking has the advantage that the customer avoids traveling to and from a bank branch. In this way, Internet banking saves time and money provides convenience and accessibility (Karjauloto, 2003).Since then, Internet banking has been able to successfully cross the chasm as a complete service within the financial services industry but not up to the mark. As mentioned above, technologies in the early market provided many single services and not complete solutions during this period*

**KEYWORDS:** *E-Banking, Customer-Friendly, Geographical*

## INTRODUCTION

Internet Banking (or E-banking or on line banking) refers to the deployment of banking services and products over electronic and communication networks directly to customers. It can be described in many ways. In a very simple form, it can mean the provision of information or services by a bank to its customers, via a computer, television, telephone, or mobile phone.

This type of banking allows consumers to check the balances in their accounts, transfer funds and order electronic bill payments. Internet banking systems allowing customers to apply for loans, trade stocks or mutual funds, and even view actual images of their checks or deposit slips. The services available for Internet banking vary from bank to bank. Nowadays the Internet is the main channel for electronic banking. Internet banking offers many benefits to banks and their customers (Karjaluoto, 2002). The main benefits to banks are cost savings, reaching new segments of the population, efficiency, enhancement of the bank's reputation and better customer service and satisfaction (Jayawardhena and Foley, 2000). To customers Internet banking offers also new value. With the help of the Internet, banking is no longer bound to time or geography. Consumers all over the world have relatively easy access to their accounts 24 hours per day, seven days a week. It makes available to customers a full range of services including some services not offered at branches. Internet banking has the advantage that the customer avoids traveling to and from a bank branch. In this way, Internet banking saves time and money provides convenience and accessibility (Karjauloto, 2003).

## LITERATURE REVIEW

The Internet, much like the ATM that came before it, is fundamentally a new distribution channel through which banks can deliver traditional banking products and services. Consumers have developed a high degree of comfort for using remote basic banking services, as demonstrated by the rapid proliferation of ATMs since their introduction 30 years ago. Initially, banks promoted their core capabilities, namely, products, channels and advice, through the Internet. Then, they entered the Internet commerce market as providers/distributors of their own products and services The vast majority of the banks that avoided Internet banking in the beginning did so because they simply did not see the benefits of using it. Polatoglu& Kin (2001) state that the average internet banking transaction costs the institution only one twentieth of a teller transaction. An extensive study conducted in 2001 by the Consumer Bankers Association indicates that Internet banking usage remained stagnant from 1996 to 1998, with less than 10% of the market utilizing the service. This characterizes the early adoption phase where the banking industry, in its striking transformation, has embarked on an era of 'anytime, anywhere' banking. In fact, earlier researchers (Reil et al., 2001; Long &McMellon, 2004) point out that automated service is still at its infancy stage and there is no generally accepted theoretical conceptualization of automated service quality. Banks that had the capability of implementing such a system became the first movers and focused primarily on the technological benefits offered by such a setup in order to capture technology enthusiasts at that time. Since then, Internet banking has been able to successfully cross the chasm as a complete service within the financial services industry but not up to the mark. As mentioned above, technologies in the early market provided many single services and not complete solutions during this period. These examples demonstrate the development of a complete service that becomes widely used within a small segment of the pragmatic early majority, representing an entry into the bowling alley. Conclusions of study undertaken for European Commission on public perceptions (September, 2003) say that lack of trust has been frequently

cited to be one of the key factors that discourage customers from participating in e-commerce, while cultural differences affect the formation of trust. Apart from trust, there are other variables which influence the usage of Internet banking. They are intention, beliefs, and subjective norms, trust in the bank, attitude, perceived usefulness and perceived ease of use (Journal of Services Research, 2007). Demography may also affect the usage pattern of Internet Banking. It is interpreted that the female respondents are yet to get fully involved in Internet purchase (Journal of Internet Banking and Commerce, 2006). Therefore, enhancing the level of service performance acceptance is the major issue to get competitive advantages. Service quality has received much attention because of its obvious relationship with financial performance, customer satisfaction and retentions (Al-Hawari et al., 2005). Suganthi et al. (2001) conducted the review of Malaysian banking sites and revealed that all domestic banks were having a web presence. Only 4 of the ten major banks had transactional sites. The remaining sites were at informational level. There are various psychological and behavioral issues such as trust, security of Internet transactions, reluctance to change and preference for human interface which appear to impede the growth of Internet banking Corrocher (2002) investigated the determinants of the Internet technology adoption for the provision of banking services in the Italian context and also studied the relationship between the Internet banking and the traditional banking activity, in order to understand if these two systems of financial services delivery are perceived as substitutes or complements by the banks. According to the results of the empirical analysis, banks seem to perceive Internet banking as a substitute for the existing branching structure, although there is also some evidence that banks providing innovative financial services are more inclined to adopt the innovation than traditional banks. Technology has had a remarkable influence on the growth of service delivery portions (Dabholkar&Bagozz, 2002). Rao et al. (2003) provide a theoretical analysis of Internet banking in India and found that as compared to banks abroad, Indian banks offering online services still have a long way to go. For online banking to reach a critical mass, there has to be sufficient number of users and the sufficient infrastructure in place. I.T. has introduced new business paradigms and is increasingly playing a significant role in improving the services in the banking industry. Internet banking is becoming more and more popular today, as is banking via digital television. Beyond doubt, a substantial part of the future of banking business lies in a banking environment that is less and less branch-based and where customers are able to access banking services remotely. The automated service quality research has been limited to relationship management rather than service quality or its acceptance by consumer. Even comprehensive definition of banking service quality is lacking Innovative Marketing, Volume 3, Issue 4, 2007 69 (Parasuraman et al., 2005). Only discusses automated service quality within the service that is delivered through web sites. In addition to internet banking, service quality, telephone banking and ATM service quality need to be addressed in particular service environment. Black et al. (2001) performed a qualitative study on the adoption of internet services and found out that those with the highest income with a greatest use of information technology were most likely to purchase financial services using internet channel. Education and gender were not studied in this study. Earlier studies (Barczak et al., 1997; Danniel& Strong, 1997; Lia et al., 1999; Polatoglu&Ekin, 2001; Devlin & Yeung, 2003) report factors such as convenience, flexibility, security concern, complexity, and responsiveness being associated with a higher propensity to use internet banking.

## RESEARCH PROBLEM

Changes in banks' external environment, including globalization and deregulation, have made the banking sector highly competitive. Banks find it hard to compete on price, and need to look at other ways to retain customers. As customers become more sophisticated, it becomes imperative for banks to consider the use of technology to respond to their continuously changing requirements.

## NEED FOR INTERNET BANKING

One has to approach the branch in person, to withdraw cash or deposit a cheque or request a statement of accounts. In true Internet banking, any inquiry or transaction is processed online without any reference to the branch (anywhere banking) at any time. Providing Internet banking is increasingly becoming a "need to have" than a "nice to have" service. The net banking, thus, now is more of a norm rather than an exception in many developed countries due to the fact that it is the cheapest way of providing banking services.

## OBJECTIVES OF THE STUDY

The following objectives are framed for this study;

1. To study the awareness of the customers towards the internet banking in Tumkur district
2. To analyse the factors motivating customers to use the of internet banking.

## RESEARCH METHODOLOGY

The present research is held in Tumkur district. This district is selected due to the effective functioning of large number of public and private sector banks and more poultry farms are running at large level. And the small industries are operated by the rural mass and they are wide spread throughout the district.

## AREA OF THE STUDY

The present study takes up six banks, three from private sector and three from public sector. State Bank of India, Indian Bank and Indian Overseas Bank are selected from the public sector. On the other hand, ICICI Bank, HDFC Bank and City Union Bank Limited are selected from the private sector.

## SAMPLING DESIGN

Population of the study consists of all customers using the internet banking facilities of the six banks. Form the large population, 600 customers (100 customers from each bank) are selected at random. The samples are selected from the branches from towns and villages.

### Variables of the Study

The present study uses two types of variables such as demographic variables and research variables. The demographic variables are the personal characteristics of the customers i.e., gender, age, educational, occupation and income. The research variables are the aspects that are related to the study. The variables are based on the objectives of the study.

### Sources of Data

Primary data are collected by means of a structured questionnaire. Secondary data are collected from various journals, books, annual reports of the bank, and internets.

**Questionnaire**

Questionnaire is the tool to collect the primary data for the study. It consists of the personal data of the customers and multiple choice questions related to the research variables.

**FINDINGS AND ANALYSIS:**

**DEMOGRAPHIC PROFILE**

**Demography of the customers**

| Sl.No | Variable | Divisions | No. of customers (N=600) | Percent |
|---|---|---|---|---|
| 1. | Gender | Male | 540 | 90 |
| | | Female | 60 | 10 |
| 2. | Age (in years) | 20–40 | 204 | 34 |
| | | 41-60 | 324 | 54 |
| | | 60 & above | 72 | 12 |
| 3. | Marital status | Married | 216 | 36 |
| | | Unmarried | 384 | 64 |
| 4. | Educational qualification | Upto HSC | 96 | 16 |
| | | Degree/Diploma | 144 | 24 |
| | | P.G Degree | 228 | 38 |
| | | Professional | 132 | 22 |
| 5. | Occupation | Employee | 396 | 66 |
| | | Business | 108 | 18 |
| | | Professional | 60 | 10 |
| | | Agriculture | 12 | 2 |
| | | Household | 24 | 4 |
| 6. | Annual Income (in Rs.) | Upto 1 Lakh | 12 | 2 |
| | | 1-2 Lakhs | 108 | 18 |
| | | 2-3 Lakhs | 144 | 24 |
| | | 3 Lakhs & above | 336 | 56 |
| 7. | Area of Residence | Village | 210 | 35 |
| | | Town | 390 | 65 |

*Source: Primary Data*

1. The above table reveals that 90% respondents of this study belonged to male and 10% respondents of this study belonged to female.
2. The above table reveals that 34% respondents were belonged to 20-40 years of age, 54% respondents belonged to 41-60yrs of age and 12% respondents belonged to above 60yrs of age. Therefore maximum numbers of respondents were youngsters i.e. their age is below 41-60years
3. The above table reveals that 36% of respondents of this study were married and 64% respondents were unmarried. Therefore majority of respondents were unmarried.
4. The above table reveals that 16% respondents were either higher secondary, 24% respondents were graduates or diploma, 38% respondents were Post graduate and 22% respondents belonged to professional degree. Professional degree includes C.A (IIB), B.E, B.L and B.Tech.
5. The above table reveals that 66% respondents were salary person (Employee),18% respondents were self-employed (Business) 10% respondents were professionals, 2% of respondents were

farmers and 4% of respondents were house wife. Therefore maximum numbers of respondents were salary person.

6. The above table reveals that 2% respondents earning below Rs 1,00,000 p.a., 18% respondents are earning between 1,00,000 – 2,00,000 p.a., 24% respondents earning 2,00,000 – 3,00,000p.a.,.and 56% respondents were earning above 3,00,000 as their annual income. Therefore majority of respondents were earning above 3,00,000as their annual income.
7. The above table reveals that 35% of respondents of this study are residing in village and 65% respondents are from semi-urban area. Therefore majority of respondents are from semi-urban area.

**PERCENTAGE ANALYSIS**

Percentage analysis was used to study customers awareness towards the internet banking

| Sl. No | Sub Dimensions | Fully aware % | Sufficiently aware % | Less aware % | Not aware % | Total |
|---|---|---|---|---|---|---|
| **1.** | **Log in and Log out** | 68 | 18 | 14 | - | 100 |
| **2.** | **Level of Awareness towards Credit Card** | 34 | 40 | 20 | 6 | 100 |
| **3.** | **Change of password** | 34 | 35 | 15 | 16 | 100 |
| **4.** | **Internet browser** | 68 | 18 | 14 | - | 100 |
| **5.** | **Online Enquiry** | 16 | 24 | 38 | 22 | 100 |
| **6.** | **Online Payment** | 13 | 25 | 40 | 22 | 100 |
| **7.** | **Depository Service** | 18 | 54 | 24 | 2 | 100 |
| **8.** | **e-Transfer of Funds** | 20 | 60 | 18 | 2 | 100 |
| **9.** | **Level of Awareness towards Debit Card** | 36 | 46 | 14 | 4 | 100 |
| **10.** | **Level of Awareness towards Mobile Banking** | 14 | 66 | 16 | 4 | 100 |

*Source: Primary Data*

The above table reveals that customers are aware of various aspects of internet banking. Especially awareness towards basic information and safety aspects such as internet browsing, Login& Log out, changing their passwords, Debit card, Credit card, Depositary services and mobile banking.

However, bankers has to educate their customer how to make online payment and to file the online enquiry.

**Factor analysis was performed to identify the most influencing factors of customers towards internet banking.**

**Factor analysis**

Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy/Bartlett's Test of Sphericity Prior to the extraction of the factors, several tests are required to be used to assess the suitability of the respondent data for factor analysis. These tests include Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, and Bartlett's Test of Sphericity.

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .624 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 12230.302 |
| | df | 276 |
| | Sig. | .000 |

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistics that indicates the proportion of variance in variables that might be caused by underlying factors. In this study, the value of Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.624. Bartlett's tests the hypothesis that correlation matrix is an identity matrix, which would indicate that variables are unrelated and therefore unsuitable for structure detection. A small value (less than 0.05) of the significance level indicates that a factor analysis may be useful with data.

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 5.423 | 22.595 | 22.595 | 5.423 | 22.595 | 22.595 | 4.013 | 16.719 | 16.719 |
| 2 | 4.360 | 18.165 | 40.760 | 4.360 | 18.165 | 40.760 | 3.592 | 14.967 | 31.687 |
| 3 | 2.841 | 11.839 | 52.599 | 2.841 | 11.839 | 52.599 | 3.422 | 14.260 | 45.947 |
| 4 | 2.327 | 9.698 | 62.296 | 2.327 | 9.698 | 62.296 | 2.678 | 11.159 | 57.105 |
| 5 | 1.663 | 6.930 | 69.226 | 1.663 | 6.930 | 69.226 | 2.324 | 9.685 | 66.790 |
| 6 | 1.237 | 5.153 | 74.379 | 1.237 | 5.153 | 74.379 | 1.821 | 7.589 | 74.379 |

Extraction Method: Principal Component Analysis.

Factor analysis is used in data reduction to identify number of factors that explain most of the variance observed in a much larger number of manifest variables. The loadings of the item in factor explain the correlation between item and that factor. An eigenvalue for a Factor is obtained by squaring the every item on that factor, and adding these squared factor loadings together. In this study factor analysis is performed to analyze the Customers attitude towards Internet banking and accordingly the results are as follows.

Rotated Component Matrices

| | Component | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Time saving | .867 | -.012 | -.019 | -.019 | .184 |
| Safety | .822 | .021 | -.074 | .067 | .096 |
| Willing to bear additional charges if any | .814 | -.147 | .118 | .077 | -.166 |
| Wider coverage | .746 | .149 | .122 | -.245 | .440 |
| Willing to wait | .702 | .011 | .326 | -.083 | .089 |
| Encouragement of bank | -.127 | .774 | -.020 | -.245 | .213 |
| Low cost | -.112 | .742 | -.211 | -.164 | -.127 |
| More responsive service | .134 | .725 | -.015 | -.279 | .318 |
| Easiness | -.243 | .710 | -.207 | .396 | -.079 |
| Recommendation | .049 | .663 | -.453 | -.305 | .050 |
| Switch over | .103 | .639 | .327 | .125 | -.156 |
| Usage in Emergency | .350 | .595 | .259 | -.133 | .490 |
| Bank's help | -.078 | .008 | .875 | -.065 | .037 |
| Possible for big loss | .174 | -.134 | .791 | -.146 | -.215 |
| Compatibility | .211 | -.097 | .737 | -.102 | .035 |
| TRUST Managing financial transactions | .234 | .089 | .656 | .082 | .015 |
| Difficulty in User ID | -.292 | -.070 | .608 | .194 | .445 |
| Fulfillment of banking needs | -.116 | -.263 | -.061 | .859 | .108 |
| Easy access | -.116 | -.010 | -.053 | .809 | -.270 |
| REACTION Confusion | .221 | -.118 | .028 | .737 | -.216 |
| More Easy in future | .104 | .159 | -.190 | -.137 | .840 |
| Under Control | .082 | .116 | -.022 | .162 | .870 |
| Risky nature | .297 | .027 | -.133 | .303 | .700 |
| Independence | .477 | .068 | .140 | .005 | .696 |

**Factor – 1Security**

With the ongoing expansion of internet services, virtually every bank, savings and loan, lending institution and brokerage firm is using the internet to communicate and allow their customers the

advantages of conducting transactions online. The convenience this offers to customers, and the cost savings this represents to the businesses is enormous, and when done correctly, can be as safe as, and potentially safer than, transactions through the mail. Privacy refers to the idea that personal information of the users is kept confidential and not misused for any inappropriate purpose. In the absence of privacy concerns, the customers are unlikely to transact through internet banking. The respondents highly agreed that they had substantial privacy when using internet banking services. Security is defined as the freedom from danger, risk, or doubt. It involves physical safety, financial security and confidentiality. Moreover, security is defined as personal and possessions safety of the customers. It is includes confidentiality maintained by service providers

- Internet banking saves my time .867
- I assure safety/ privacy of transactions while using net banking .822
- I am willing to bear any additional charges if any towards the usage of Internet banking .814
- Internet banking covers a wider range of banking transactions .746
- I am will willing to wait in case of technical fault .702

**Factor – 2 Customer services**

Technology has made it extremely convenient for the bank as well as the customer to access to a host of wonderful services by simply logging in. These services include financial planning capabilities, functional budgeting and forecasting tools, loan calculators, investment analysis tools and equity trading platforms which are available as simple applications on the bank's website. Additionally most banks also provide the facility of online tax forms and tax preparation. For the successful internet banking services, it is highly important that banks must provide reliable and consistent services and keep their promises and commitments. In this regard, some of the respondents disagreed which suggest that banks need to improve its commitment level to meet the expectations of customers. The results from secondary data have evaluated that the promises of banks regarding reliability and efficiency services influence customers to shift towards internet banking. In addition, it is more likely that when a bank fulfils the commitment level of customers through traditional banking, it will also meet the expectations of customers through internet banking services.

- My bank encourages me to maintain internet banking .774
- Internet banking incurs low cost .742
- Internet banking provides more responsive services .725
- Internet banking practices can be easily learnt .710
- I am willing to recommend the Internet banking to others .663
- In case of frequent network problem, I will switch over to traditional banking .639
- Internet banking is useful only in emergency situations.595

**Factor – 3 Trust**

Trust not only refers to the idea that internet banking service provider is trustworthy but it also means points out the system probably web through which transactions are processed and carried is also trustworthy. This needs to be accomplished through establishing a close contact with the customers. The banks need to take measures such as loyalty programs and membership programs for assuring customers that they are valuable assets from the banks. This will result in positive perceptions of the customers towards bankers. This will also result in the creation of positive word of mouth marketing of the internet bankers and will communicate a positive message to the public.

Moreover, the existing customers of the internet bankers will also use the internet banking services to a greater extent. Moreover, positive perceptions of customers will also make the, to recommend the internet banking services to their peers and reference groups.

- If any problem occurs my bank helps me .875
- Small negligence/ ignorance in the Internet banking leads to big loss .791
- My Net Banking is compatible with my life style .737
- I can manage banking and financial transactions through e banking effectively .656
- It is difficult to remember and protect my user ID .608

**Factor – 4 Conveniences**

Convenience: This is the single most important benefits that outweigh any shortcoming of internet banking. Making transactions and payments right from the comfort of home or office at the click of a button without even having to step out is a facility none would like to forego. Keeping a track of accounts through the internet is much faster and convenient as compared to going to the bank for the same. Even non transactional facilities like ordering check books online, updating accounts, enquiring about interest rates of various financial products etc become much simpler on the internet.

- Internet banking fulfills my all needs relating to banking transactions .859
- I can access into my account page easily .809
- Sometimes, I get confusion while using the Internet banking .737

**Factor – 5 Ease of use**

Online accounts are easy to set up and require no more information than a traditional bank account. Many offer the option of inputting your data online or downloading the forms and mailing them in. If you run into a problem, you have the option of calling or emailing the bank directly. One advantage of using online checks is that the payee's information is retained, which eliminates having to reenter information on subsequent checks to the same payee.

Online banking is also environmentally friendly. Electronic transmissions require no paper, reduce vehicle traffic and are virtually pollution-free. They also eliminate the need for buildings and office equipment. Ease of use is as the factor influencing the adoption of Internet banking, and related to an easy-to-remember URL address, well-organized, easy in site navigability, concise and understandable contents, terms and conditions

- Internet banking will become more easily in future .840
- All My Net Banking transactions are under my control .870
- Internet banking is risky practice but it is necessary to me .700
- While using net banking I am independent .696

**CONCLUSION**

The present study has analyzed the various aspects of the internet banking in view of the customers of public and private sector banks in Tumkur district. Awareness, satisfaction and awareness of customers of the banks are the important aspects of the study. The research shows that the customers of private sector banks are of high level that that of the public sector banks in respect of these aspects. So, the study concludes that the public sector banks must have commitment to net banking along with a deeper understanding of customer needs. This becomes possible only when

they provide better service quality to the customers. At the same time, the both sector banks should maintain effective e-banking practices by all means.

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# FORECASTING OF PROCESSES THE TURNOVER AND STRUCTURE OF THE FINANCIAL RESOURCES OF THE BANKING SECTOR

**Altinbek Abdullayev Yangibayevich*; Narimanov Baxodir Absalomovich**; Narimanov Shoxrux Baxodirovich*****

*Doctor of sciences (DSc),
Professor of Jizzakh Polytechnic institute, UZBEKISTAN
Email id: oltinbek60@gmail.com

**Senior Lecturer of Jizzakh Polytechnic Institute,
UZBEKISTAN

***Student, Jizzakh Polytechnic Institute,
UZBEKISTAN

## ABSTRACT

*The purpose of the article: to explore the current approaches to turnover and the structure of financial resources of the banking sector, choose the priority direction of productive qualities of funds, justify the direction of improving this process and determine the effectiveness of the impact of special working regimes on banking activity. The methods of economic-statistical and economic-mathematical analysis of the results of the functioning and development of the banking sector, taking into account the existing forms and tools of banking incentives, are used. The methods of empirical analysis of sources on this topic were also used. Based on the results of the study, appropriate forward-looking recommendations and suggestions for decision makers were prepared. The author comes to the conclusion that the article summarizes the standard conditions for the reproduction of financial resources and the peculiarities of the movement of reproductive groups, taking into account quantitative and qualitative characteristics.*

**KEYWORDS**: *Recession, Trend, Component, Aspect, Sector, Reproduction, Turnover, Location, Source, Deposit, Core, Forecast, Experiment.*

## INTRODUCTION

The development of the economic aspects of the banking sector to market relations suggests the possibility of the existence of various forms of ownership of the means of reproduction. Under these conditions, the development of effective management decisions is impossible without the use

of appropriate mathematical tools that allow for system analysis and form the prospective development of the turnover of financial resources of the banking sector both in the primary and in the country as a whole. In a market economy, the financial and economic importance of substantiating the development strategy of the banking sector increases substantially in order to solve the problem of meeting the needs of businesses and individuals in a bank's cash.

The study of the financial resources market showed that the banking sector plays an important role in solving the monetary resource problem. Therefore, in the future, an increase in financial resources should be envisaged both on the basis of a deepening of intensification of reproduction, and by taking drastic measures on the composition and structure of banking sector liabilities and improving the productive qualities of money.

Effective implementation of these procedures involves the use of tools that take into account the qualitative characteristics of the structures of financial resources, the principles of market relations. One of the rational tools for solving these problems are the methods of mathematical modeling. They allow multivariate calculations on a PC using a model, which makes it possible to identify certain reserves for increasing the volume of financial resources of the banking sector.

The solution of such problems is of particular relevance in the conditions of our country, where the actual consumption of financial resources does not fully meet the requirements of legal entities and individuals and significantly lags behind the international level.

The purpose of this topic is to develop economic and mathematical models for the prospective development of the banking sector, allowing to identify reserves for the growth of the turnover of financial resources of the bank.

Intensive growth in the volume of cash flow is ensured by improving the qualitative composition and level of profitability of banking resources. At the same time, an important role is played by the scientific substantiation of the turnover and structure of financial resources. As already noted, the turnover of financial resources is the core of the program of a commercial bank [1; 2].

The prospective development of the turnover of financial resources of the banking sector determines the complex of forecast-analytical, balance-optimization calculations, which form the organizational basis for the implementation of the banking sector management systems aimed at increasing the profitability of financial resources. To this end, it is necessary to ensure: an increase in the efficiency of the banking sector through the introduction of methods of reproductive and parallel-absorption cross-breeding; the rationale for the effectiveness of organizational decisions, etc.

The basis of the organization and the system of the banking sector is the different directions of the circulation of funds, taking into account various methods of dilution and expansion of the structure of financial resources. In general, increasing the profitability of the financial resources of the bank is carried out in two ways: reproduction by raising money; reproductive and parallel absorption mating.

Raising funds together with the reproductive crossing of the structure of financial resources allows us to improve the banking sector. In the overwhelming majority of cases, intensive reproduction takes place simultaneously with a qualitative improvement in the turnover and structure of the bank's financial resources. With reproductive and parallel-absorption cross-breeding, extended reproduction occurs mainly due to the improvement of the system for maintaining financial resources.

The principles of market relations imply the transition of commercial banks to an intensive way of reproduction, which allows to increase the profitability of financial resources and reduce the cost of reproduction of 1 sum resource of the banking sector.

In a market economy, there is a real possibility of implementing in the banking sector a system for encouraging an increase in the efficiency of reproduction. To this end, intrabank settlement and external economic relations of a commercial bank should be strengthened, a management system and incentives should be held, which together contribute to increasing efficiency and increasing the turnover of the bank's financial resources.

It should be noted that at the republican level, those organizational and economic tasks are solved that, in accordance with the management function, fall within the competence of the governing bodies of the banking sector.

A lot of work has been devoted to modeling the planning and management of the development of the banking sector. However, despite this, it should be noted some issues that can be fully attributed to poorly studied categories. These include: achieving the optimal structure and turnover of banking resources; providing a more complete account in the calculations of the real potential of a commercial bank in terms of the turnover of financial resources and economic conditions of commercial banks, limited capabilities of commercial banks experts in assessing the consequences of decisions taken on the future development of the banking sector, taking into account the need to implement the principles of market relations and within the bank calculation the structure of the banking resources of liability standards costs.

When developing indicators for the prospective development of the banking sector, an important place is occupied by a differentiated forecast of the financial resource for 1 sum. Based on the analysis of retrospective data on the development of financial resources in a number of commercial banks, we identified the main factors affecting the level of profitability of financial resources of the bank. Taking into account the need to adequately describe the interaction of these influencing factors and the results of reproduction, we have chosen the least squares method for predicting the profitability of the financial resources of the bank.

This method was tested in relation to the conditions of the joint-stock commercial bank «Alokabank» for forecasting the profitability of financial resources. Using this method, a multifactor forecasting model has been built for banks on the profitability of financial resources [3].

Multi-factor model to have the following form:

$$dr_{it} = 1\underbrace{29,02}_{[3.01]} + \underbrace{4,53}_{[1.68]}\,df_{it} + \underbrace{3,91}_{[1.16]}\,sk_{it} + \underbrace{3,07}_{[0.93]}\,fp_{it} + \underbrace{2,69}_{[0.84]}\,ks_{it} + 0,91\,df_{i(t-1)} \qquad (1)$$

where: $dr_{it}$ - the amount of profitability of financial resources, respectively, present at the time $t$ (in sum); $df_{it}$ the volume of deposits of individuals at time ***t*** (in sum); $fp_{it}$ – funds and profits at the time $t$ (in sum); $ks_{it}$ – credits and other funds received from other banks at the time $t$ (in sum);$df_{i(t-1)}$ – the amount of profitability of financial resources, respectively, present at the time ($t$ - 1).

Analysis of the results of the influence of factors on the level of financial resources shows that the increase in the volume of deposits of individuals $dr_{it}$ by 1 units on average 4,53 sum y is the

annual volume of profitability of the bank's financial resources. Similarly, the influence of other factors on the increase in the volume of profitability of financial resources is analyzed.

The economic-mathematical model of optimizing the turnover of a financial resource of a bank allows you to: determine the composition and structure of financial resources in a commercial bank; maximize profits from the turnover and sale of banking resources [4]. To record the economic-mathematical model (EMM), we introduce the following conventions:

**indexes**: *k* - number of channels for placement of financial resources; *j* - the number of urgent financial resources; *r* - is the number of financial resources; *α* - the number of short-term and long-term group of financial resources; *β* - the number of the maximum and minimum share of financial resources (*β* = 1 – max; *β* = 2 - min); *γ* - the number of attracted groups of funds (*γ* = 1 - short-term; *γ* = 2 - long-term); *μ* - is the number of types of material, financial, labor and other resources;

**coefficients:** $Q_j^k$ - unit price of financial resources; $T_j^k$ - unit cost of financial resources; $d_{r\alpha}^{\beta}$ - maximum (*β* = 1 - max) and minimum (*β* = 2 - min) share of the composition of the short-term and long-term group of financial resources; $s_{r\alpha}$ - the share of written off funds (factoring, credit, leasing, etc.) in the short-term and long-term group; $\beta_{r\alpha}$ - the share of attracted funds in the liability of a specific composition of financial resources; $P_{rj}^q, P_{rj}^d$ - average annual income per unit of financial resources for the short-term and long-term group; $r_{\mu r\alpha}$ - standards of resource costs per unit of financial resources; $\alpha_j^q$, $\beta_j^d$ - the proportion, respectively, income from the allocation of financial resources;

**Known data:** $M'_{r\alpha}$ - amount of financial resources; $E_{\mu}$ - availability of financial, material, labor and other resources; $R_j^k$, $R_j^d$ - minimum required amount of financial resources of the bank.

**unknowns:** $x_j^k$ - the required amount of financial resources sold through placement channels; $x_r$ - the required amount of financial resources by composition; $x_{r\alpha}$ - same group specific formulations; $x_{r\alpha}^q$ - the required size of the remaining in the liabilities volume of financial resources on the structure of a specific composition; $x_{r\alpha}^{\gamma}$ - the required amount of receipt of redeemed cash in the asset balance; $x_{r\alpha}^s$ - sought-for withdrawn funds (factoring, credit, leasing, etc.) in the asset ; $x_{r\alpha}^p$ - required cash of borrowed funds in liabilities; $x_{r\alpha}^v$ - amount of financial resources in the passive balance;

**sets:** *J* - numbers of financial resources; *K* - set of channel numbers for placement of financial resources; *N* - numbers of short-term and long-term financial resources group; *R* - a set of numbers of a specific composition of financial resources; *M* - numbers of financial, material, labor and other resources.

We describe the EMM optimization of the turnover of financial resources of a commercial bank, taking into account its specific composition. The criterion for evaluating the effectiveness is to maximize profits from the turnover and sale of financial resources under the following limiting conditions:

$$\sum_{j\epsilon J}\sum_{k\epsilon K} Q_j^k x_j^k - \sum_{j\epsilon J}\sum_{k\epsilon K} T_j^k x_j^k \to max \qquad (2)$$

**1.** The amount of financial resources for short-term and long-term groups should not exceed the maximum and minimum limits.

$$x_{r\alpha} - d_{r\alpha}^{\beta} x_r \geq 0, \qquad \beta = 1$$
$$x_{r\alpha} - d_{r\alpha}^{\beta} x_r \leq 0, \qquad \beta = 2,\ r \in R,\ \alpha \in N \tag{3}$$

**2.** The total amount of financial resources of a specific composition should not be greater than their number in the short-term and long-term groups.

$$\sum_{\alpha \in N} x_{r\alpha} - x_r \geq 0, \qquad r \in R \tag{4}$$

**3.** The prospective structure of financial resources for specific compositions and short-term and long-term groups is determined taking into account their attracted volume.

$$x_{r\alpha}^{v} \geq M'_{r\alpha}, \qquad r \in R$$
$$x_{r\alpha}^{v} + x_{r\alpha}^{p} + \sum_{\gamma \in 1,2} x_{r\alpha}^{\gamma} - x_{r\alpha} = 0, \qquad \alpha \in N \tag{5}$$

**4.** Written off and remaining in the liabilities volume of financial resources (factoring, credit, leasing, etc.) are determined taking into account the standards of written off funds.

$$s_{r\alpha} x_{r\alpha} - x_{r\alpha}^{s} \leq 0, \qquad r \in R,$$
$$\sum_{\gamma \in 2,3} x_{r\alpha}^{\gamma} (1 - s_{r\alpha}) x_{r\alpha} - x_{r\alpha}^{q} \leq 0, \qquad \alpha \in N \tag{6}$$

**5.** The number of incoming repaid funds in the asset balance is determined on the basis of the share of receipt of repaid funds (factoring, credit, leasing, etc.).

$$\beta_{r\alpha} x_{r\alpha}^{q} - x_{r\alpha}^{\gamma} \leq 0, \qquad \gamma = \overline{1,2}; \quad r \in R, \quad \alpha \in N \tag{7}$$

**6.** The financial, material, labor and other resources used should not exceed their availability in the liability

$$\sum_{r \in R} \sum_{\alpha \in N} r_{\mu r\alpha}\, x_{r\alpha} \leq E_{\mu}, \qquad \alpha \in N \tag{8}$$

**7.** For the minimum required amount of financial resources in the liability

a) for short-term financial resources

$$\sum_{r \in R} P_{rj}^{q} x_{r\alpha}^{q} \geq R_j^{q}, \qquad j \in J, \quad \alpha \in N \tag{9}$$

b) on the long-term amount of financial resources:

$$\sum_{r \in R} P_{rj}^{d} x_{r\alpha} \geq R_j^{d}, \qquad j \in J, \quad \alpha \in N \tag{10}$$

**8.** The amount of financial resources sold through distribution channels should not exceed the reproducible amount:

a) on short-term financial resources:

$$\alpha_j^{q} P_{rj}^{q} x_{r\alpha}^{q} - x_j^{k} \leq 0, \quad \sum_{q \in Q} \alpha_j^{q} = 1, \quad j = 1, \qquad q \in Q, \quad r \in R \tag{11}$$

b) long-term financial resources:

$$\beta_j^d P_{rj}^d x_{r\alpha} - x_j^k \le 0, \quad \sum_{d \in D} \beta_j^d = 1, \quad j = 2 \quad d \in D, \quad r \in R \tag{12}$$

- by nonnegativity of variables

$$x_j^k \ge 0, x_r \ge 0, x_{r\alpha} \ge 0, x_{r\alpha}^q \ge 0, x_{r\alpha}^\gamma \ge 0, x_{r\alpha}^s \ge 0, x_{r\alpha}^p \ge 0, x_{r\alpha}^v \ge 0. \tag{13}$$

In practice at calculation of reproduction of bank resources of a passive of commercial bank the balance method is applied. Thus the complex of typical basic conditions for reproduction and turnover of bank resources is observed. The structure of typical conditions of reproduction and turnover of bank resources is more low resulted.

**indexes:** $j_1, J_1$ - an index and set of signs of movement of bank resources; $j_2, J_2$ - an index and set of industrial groups of bank resources; μ- number of month of the accounting period; $t -$ number of duration of various elements (placing, service-period, payment, a reflexivity); $i -$ number of month of the forecast period; $\alpha -$ coefficient of reflexivity; $\beta -$ coefficient of the increased part of the involved resources; $k_1 -$ factor of updating of the involved resources; $k_2 -$ coefficient of updating of own resources;

**industrial groups and passive subgroups:** $WS$ – returnable means for bank resources; $DS$ – depositary means; $SS$ – own means; $OS$ – the updated means; $\boldsymbol{CI}$ - the updated means to the beginning of the forecast period; SP- delayed to the beginning of the forecast period the updated means; $OR$ - the updated means as a part of own means; $SO$ – over updated means; $PS -$ depositary means to the beginning of the forecast period; $NS -$ depositary means which is in the service-period to the beginning of the forecast period; $SD$ - a structural share of industrial groups of bank resources; $RS -$ the depositary means which has taken places in the accounting period; $VS -$ repayable to the beginning of the forecast period depositary means;

**signs of movement of bank resources:** $NP$ – the beginning of the forecast period; $PD$ – receipt of the increased part of bank resources; $PV$ – internal transfer from other groups; $PK$ – receipt from the party; $PP$ – income part of reproduction of bank resources; $PG$ – transfer in other groups; $PS$ – realisation on the party; $NO$ - not updated means in the forecast period; $RP$ - an account part of reproduction of bank resources; $KP$ – the end of the forecast period;

**characteristics of signs of movement of incomes and passive expenses:** $R -$ volume bank resources of a passive of bank; $DC_{pr}$ - the pure percentage income; $DV_{pr}$ - all percentage incomes;; $RV_{pr}$ - all percentage expenses; $DP_{vu}$- the pure percentage income after a deduction of a reserve of possible losses; $VU_{oc}$ - an estimation of possible losses - loans and advance payments; $DI_{pr}$ - total incomes; $DV_{bp}$ - all interest-free incomes; $DO_{or}$ - the net profit to incurred operational expenses; $RJ_{bp}$ - all interest-free expenses; $DN_{cd}$ - the net profit without surtax; $RV_{op}$ - all operational expenses; $PN_{oc}$ - a surtax estimation; $DU_{op}$ - the net profit (losses) for the accounting period;

**Characteristics of parameters of reproduction of bank resources:** $V$ - duration of the maintenance of returnable bank resources; $W$ - duration of the maintenance of bank resources in group; $B$ - duration of placing; $S$ - duration of the service-period; $T$ - duration of the forecast period.

Then econometric the model of reproduction and structure bank resources of commercial bank is formalized as follows.

**1.** An establishment of interrelation of time parameters of reproduction of bank resources of a passive:

$$\begin{aligned} &V \le W^{WS} < S < B < T; \\ &T < W^{OS} \le W^{OR} \le W^{SO} \le W^{SS}; \\ &Z_1 = S + B; \\ &Z_2 = S + B + V; \\ &Z_3 = B + V; \\ &T < B + V + W^{WS}; \\ &Z_1 < T < 2Z_1. \end{aligned} \tag{14}$$

**1.** An initial condition of industrial groups:

$$DS^{NP} = \sum_{t=1}^{B} PS_t + \sum_{t=1}^{S} NS_t + \sum_{t=1}^{V} VS_t$$

$$SS^{NP} = \sum_{t=1}^{W^{SS}} SS_t;$$

$$OS^{NP} = \sum_{t=1}^{W^{SP}} SP_t + \sum_{t=1}^{B} CI_t; \tag{15}$$

$$OR^{NP} = \sum_{t=1}^{W^{OR}} OR_t;$$

$$SO^{NP} = \sum_{t=1}^{W^{SO}} SO_t;$$

$$WS^{NP} = \sum_{t=1}^{W^{WS}} WS_t;$$

**3.** Prognosis passive resources to movement signs:

**3.1**. Depositary means:

$$DS^{PP} = OS^{PG} + DS^{PK};$$

$$DS^{PG} = \begin{cases} \sum_{t=1}^{V} VS_t + \sum_{t=1}^{B} PS_t\alpha_t^{\mu} + \sum_{t=1}^{S} NS_t\alpha_t^{\mu} & at\ Z_3 < Z_2 \le T, \\ \sum_{t=1}^{V} VS_t + \sum_{t=Z_2-T+1}^{B} PS_t\alpha_t^{\mu} & at\ Z_2 > Z_3 > T, \\ \sum_{t=1}^{V} VS_t + \sum_{t=1}^{B} PS_t\alpha_t^{\mu} & at\ Z_3 \le T < Z_2; \end{cases}$$

$$DS^{RP} = OS^{PG} + DS^{PS};$$

$$DS^{NO} = OS^{NP} - DS^{RP};$$

$$DS^{KP} = OS^{NO} + DS^{PP};$$

$$DS^{PD} = OS^{NP} + OS^{PG} - \left(\sum_{t=1}^{S} NS_t\alpha_t^{\mu} + \sum_{t=1}^{V} VS_t\right). \quad (16)$$

**3.2.** Own means:

$$SS^{PP} = OR^{PG} + SS^{PK};$$
$$SS^{PG} = SS^{NP}\alpha^{SS};$$
$$SS^{NO} = SS^{NP} - SS^{RP};$$
$$SS^{KP} = SS^{NO} + SS^{PP}. \quad (17)$$

**3.3.** The updated means:

$$\begin{cases} OS^{PD} = DS^{PD}\beta k_1, \\ OR^{PD} = DS^{PD}\beta k_2; \end{cases}$$

$$\begin{cases} OS^{PP} = OS^{PD} + OS^{PK}, \\ OR^{PP} = OR^{PD} + OR^{PK}; \end{cases}$$

$$\begin{cases} OS^{PS} = \sum_{t=1}^{W^{OS}} OS\alpha^{OS}, \\ OR^{PS} = \sum_{t=1}^{W^{OR}} OR\alpha^{OR}; \end{cases} \quad (18)$$

$$\begin{cases} OS^{PG} = \sum_{t=1}^{W^{OS}} CI_t + \sum_{t=W-T+1}^{W^{SP}} SP_t(1-\alpha^{SP}), \\ OR^{PG} = \sum_{t=W^{OR}+T+1}^{W} OR_t(1-\alpha^{OR}); \end{cases}$$

$$\begin{cases} OS^{NO} = \sum_{t=1}^{W^{OS}-T} SP_t(1-\alpha_t{}^{SP}), \\ OR^{NO} = \sum_{t=1}^{W^{OR}-T} OR_t(1-\alpha_t{}^{OR}); \end{cases}$$

$$\begin{cases} OS^{KP} = OS^{NO} + OS^{PP}, \\ OR^{KP} = OR^{NO} + OR^{PP}; \end{cases}$$

**3.4.** Over updated means:

$$SO^{PD} = DS^{PD}\beta(1-k_1-k_2);$$

$$SO^{PP} = SO^{PD} + SO^{PK}; \qquad (19)$$

$$SO^{PS} = \sum_{t=w^{SO}-T+1}^{W^{SO}} SO_t + \sum_{t=1}^{W^{SO}-T} SO_t\alpha^{SO};$$

$$SO^{NO} = \sum_{t=1}^{W^{SO}-T} SO_t(1-\alpha_t{}^{SO});$$

$$SO^{KP} = SO^{NO} + SO^{PP}$$

**3.5.** Returnable means for bank resources:

$$WS^{PP} = DS^{PG} + \sum_{t=1}^{T} SS_t{}^{PG} + WS^{PK});$$

$$WS^{PS} = WS^{NP} + \sum_{t=1}^{V} VS_t\alpha_t{}^{\mu} + \sum_{t=z_s+W^{WS}-T+1}^{V} PS_t\alpha_t{}^{\mu} + \sum_{t=1}^{T-W^{WS}} SS_t{}^{PG} + WS_t{}^{PK}) \qquad (20)$$

при $\begin{cases} V + W^{WS} < B, \\ B + V + W^{WS} > T; \end{cases}$

$$WS^{KP} = WS^{NP} + WS^{PV} - WS^{PS}.$$

**4.** Calculation of structure bank resources of a passive on the beginning and the end of the forecast period:

$$R_{j_1} = \sum_{j_1 < j_2} R_{j_1}^{j_2}; \quad SD_{j_1} = R_{j_1}^{j_2} / R_{j_1}. \tag{21}$$

where $j_1 < \{NP,\ KP\}.j_1 < \{NP,\ KP\}.$

**5.** Receipt of the movement ($R_{pp}$ ) consists of bank resources cash flows ($R_{pd}$), a translation of the other groups ($R_{pv}$), and proceeds from the ($R_{pk}$):

$$R_{pp} = R_{pd} + R_{pv} + R_{pk} \tag{22}$$

**6.** The account part of movement ($R_{rp}$) bank resources includes transfer in other groups ($R_{rv}$) and realisation on the party ($R_{rs}$):

$$R_{rp} = R_{rv} + R_{rs} \tag{23}$$

**7.** Bank resources on the beginning of the forecast period ($R_{np}$) in Receipt movement parts ($R_{pp}$) it should be equalled predicted on the period end (□□□) in an account part of movement of animals (□□□) in given the period:

□□□ + □□□ = □□□ + □□□ (24)

**8.** The sum of bank resources of transfer of other groups (□□□) resources is equaled to the sum of bank resources of receipt from other groups (□□□) the resources, reduced by the sum money resource receipt (□□□):

□□□ = □□□ + □□□ (25)

**9.** The volume of bank resources (□□□) is equalled own means (□□□), population contributions (□□□), the credits received by banks from the Central bank (□□□), accounts of banks (□□□); interbank credits (□□□), the means received from economic subjects (□□□), the let out promissory notes (□□□), other passives (□□□) in the predicted period, and also on the beginning and on the period end:

□□□ = □□□ + □□□ + □□□ + □□□ + □□□ + □□□+□□□ + □□□ (26)

**10.** Percentage incomes (□□□□□) are charged daily proceeding from the annual base period of quantity of days in a year:

$$□□_{□□} = (□_{□□} * □□_{ps} * □□_{kd})/KD \tag{27}$$

where □□□ - placed means in active operations (volume of bank resources); □□□□□ - the percent rate; □□□□□ –actual quantity of days; □□ - quantity of days in a year (365 or 366 days in a year).

**11.** Percentage expenses (□□□□□) are charged daily proceeding from the annual base period of quantity of days in a year

$$□□_{□□} = (\ □□_{□□} * □□_{ps} * □□_{kd})/KD \tag{28}$$

where □□□□□ - the involved means in bank resources; □□□□□ - the percent rate; □□□□□ – actual quantity of days; □□ - quantity of days in a year (365 or 366 days in a year).

**12.** Interest-free incomes (□□□□□) are charged daily commission and a payment for all services and the percent rate

$$DV_{bp} = KU_{pu} * SP_{ps}/100 \tag{29}$$

where $□□_{□□}$ - commission fee and a payment for all services, $□□_{□□}$ - the percent rate.

**13.** Interest-free expenses ($□□_{□□}$) are charged daily commission and a payment for all services and the percent rate

$$□□_{□□} = □□_{□□} * □□_{□□}/100 \quad (30)$$

where $□□_{□□}$ - commission fee and a payment for all services, $□□_{□□}$ - the percent rate.

**14.** Calculation of the net profit (losses) is calculated by next way:

**14.1**. Pure percentage income ($□□_{□□}$) is equalled to a difference of percentage incomes ($□□_{□□}$) and percentage expenses ($□□_{□□}$):

$$□□_{□□} = □□_{□□} - □□_{□□} \quad (31)$$

**14.2.** Pure percentage the income after a deduction of a reserve of possible losses ($□□_{□□}$) equal to pure percentage income ($□□_{□□}$) and an estimation of possible losses - of the loan and advance payments ($□□_{□□}$):

$$□□_{□□} = □□_{□□} - □□_{□□} \quad (32)$$

**14.3.** Total incomes ($□□_{□□}$) the income after a deduction of a reserve of possible losses ($□□_{□□}$) and of all of interest-free incomes ($□□_{□□}$) is equalled pure percentage:

$$□□_{□□} = □□_{□□} + □□_{□□} \quad (33)$$

**14.4.** The net profit to incurred operational expenses ($□□_{□□}$) is equalled total incomes ($□□_{□□}$) и of all of interest-free expenses ($□□_{□□}$):

$$□□_{□□} = □□_{□□} - □□_{□□} \quad (34)$$

**14.5.** The net profit without surtax ($□□_{□□}$) is equaled the net profit to incurred operational expenses ($□□_{□□}$) and all expenses operational ($□□_{□□}$):

$$□□_{□□} = □□_{□□} - □□_{□□} \quad (35)$$

**14.6.** The net profit (losses) for accounting period ($□□_{□□}$) is equaled the net profit without surtax ($□□_{□□}$) and an estimation of surtax ($□□_{□□}$):

$$□□_{□□} = □□_{□□} - □□_{□□} \quad (36)$$

**15.** Conditions of the expanded and intensive reproduction and кругооборота bank resources:

$$□_{□□} > □_{□□}; □□_{□□} > □□_{□□}; □□_{□□} > □□_{□□}; □□_{□□} > □□_{□□}; □□_{□□} > □□_{□□}; □_{□□} > □'_{□□}$$

where $□_{□□}$ and $□'_{□□}$ - volume of bank resources on the beginning and the period end.

Thus, this model serves as the basis for drawing up the turnover of bank resources of a commercial bank for a specific period of time (day, month, quarter, year). In this generalized model the conditions of reproduction and circulation of bank resources and features of the motion production groups in the forecast period based on quantitative and qualitative characteristics.

The developed models and algorithms were the basis for creating a system that allows you to implement the task of managing the targeted development of the process of financial resources in the bank.

Managed parameters of the model to justify the direction of the future development of the turnover of financial resources of a commercial bank are: the actual composition and structure of financial resources; dynamics of profitability of financial resources; standards of transition from one short-term and long-term group and another; maximum and minimum limits of content in the structure of individual short-term and long-term group of financial resources; dynamics of the unit cost of financial resources; differentiated price of financial resources through their implementation channels; the share of written-off funds (loan, leasing, factoring, etc.) in the short-term and long-term group and the receipt of repaid funds in the asset balance; total financial resources in liabilities; data characterizing the attracted funds for short-term and long-term groups and specific compositions; standards of labor costs per turnover of 1 sum of money, etc.

Output parameters are formed as a result of the implementation of each model and algorithms, some of which are then used as input for solving subsequent predictive and analytical tasks. Based on the principle of information and logical communication and the structure of the system of tasks, we have developed an integrated scheme for their implementation on a PC (figure 1

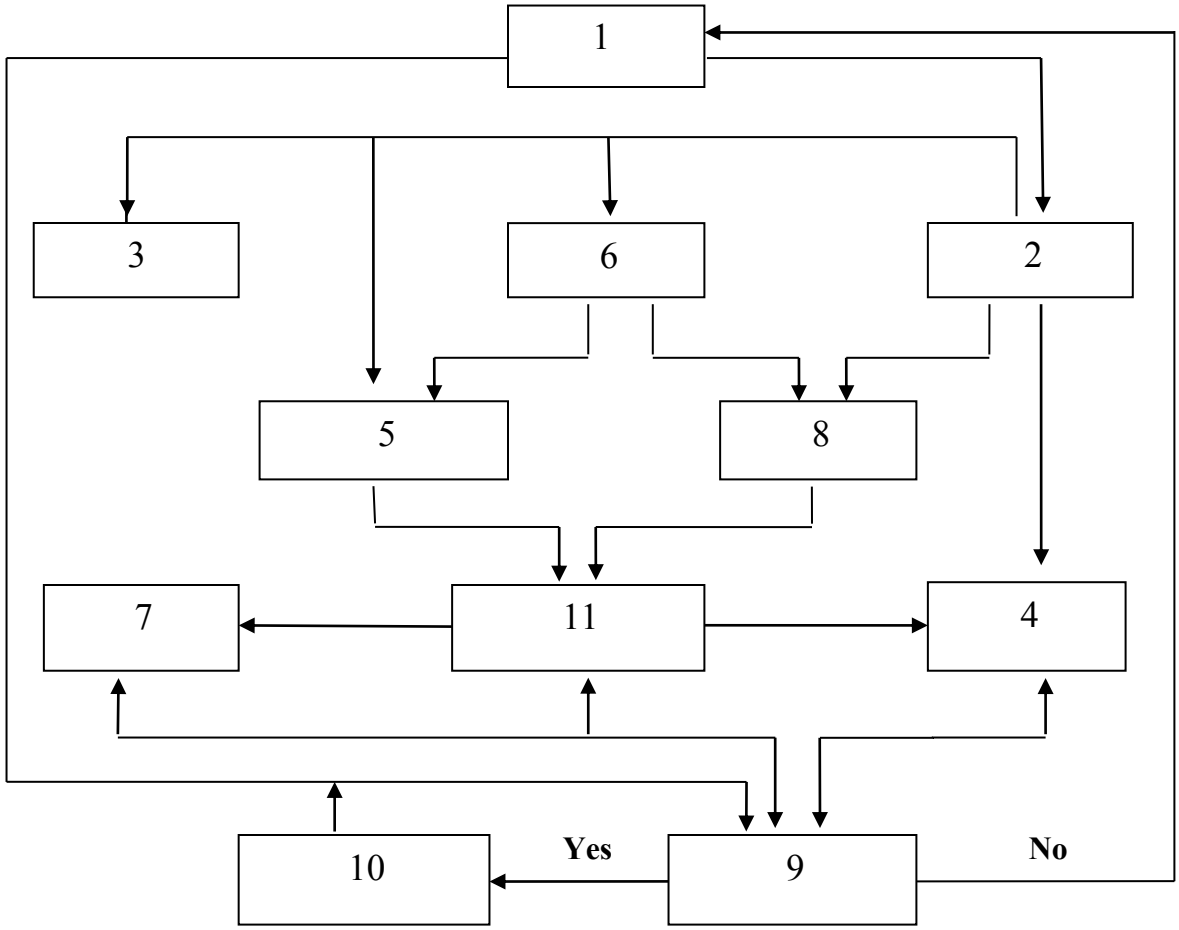


**Fig. 1. The mechanism for assessing the financial resources of a commercial bank**

In the figure, the following designations are adopted: 1 - decision-maker (DM); 2 - database; 3 - a set of algorithms for the tasks of analyzing retrospective data on the development of the bank's activities; 4 - the balance sheet model of turnover and allocation of funds in assets; 5 - economic and mathematical model of the turnover of financial resources of the bank; 6 - algorithm for calculating the receipt of redeemed cash in the asset; 7 - economic and mathematical model for

predicting the turnover of financial resources of the bank; 8 - a model for predicting the profitability of financial resources for short-term and long-term groups; 9 - checking the balance and acceptability of the results; 10 - model results for the analysis and assessment of the consequences of decisions made; 11 - economic-mathematical model of forecasting the need and implementation of financial resources.

Based on the implementation of the algorithm for calculating the receipt of redeemed money in an asset, the amount of redeemed funds entering the liability is determined (factoring, credit, leasing, etc.).

The latter indicator, together with the amount of attracted funds, is used as an input for the implementation of EMM optimization of the turnover of financial resources for short-term and long-term groups. On the basis of a comprehensive account of the influence of the main factors, a forecast is made of the profitability of financial resources for short-term and long-term groups, which, in turn, is used in the implementation of EMM turnover forecasting and the realization of financial resources in liabilities. This model is directly related to the EMM of the same problem, which is solved at the republic level. At the same level, the structure of turnover and sales, indices of the need and consumption of legal entities and individuals of the country of funds are determined.

After achieving a balance in all indicators, a comparative assessment is made by the decision maker of the consequences of decisions taken on alternative options. If none of the alternatives satisfies the decision maker in terms of financial and economic values, then he re-applies to the database and implements the models with a quantitatively new array of information.

This procedure is repeated until a satisfactory calculation option is reached. The structure of the database provides for the possibility of reflecting all the necessary data that takes into account the economic conditions and content systems of each structure of liabilities in a commercial bank [5; 6].

The developed models and algorithms were implemented while justifying the possible directions for the prospective development of the turnover of financial resources of the commercial bank **"**Alokabank**"**.

In tab. 1 reflects the data characterizing the parameters of these models and algorithms. As can be seen from this table, the availability at the beginning of the planned year money resource was financial resources in the bank's liabilities amounted to 5282876 million sum, of which 93,3% is a short-term remedy, and 6,70% is a long-term remedy. In general, the structure and amount of financial resources in liabilities differ both in short-term and long-term groups, and in specific composition. For example, according to calculations, deposits amount to 28,182 million sum, of which 88,2% is short-term remedy, and 11,80% is long-term remedy.

**TABLE 1 CALCULATION OF THE STRUCTURE AND TURNOVER OF THE FINANCIAL RESOURCE FOR 2019 ON JOINT-STOCK COMMERCIAL "ALOKABANK"**[1]

| Indicator | Short term | | Long term | | Total |
|---|---|---|---|---|---|
| | million sum | % | million sum | % | |
| **Availability at the beginning of the year** | **4928923** | **42,30<br>93,30** | **353953** | **28,25<br>6,70** | **5282876<br>40,94** |
| **Arrival (attracted):** | | | | | |
| **Deposits** | 2485732 | 21,33<br>88,20 | 332558 | 26,55<br>11,80 | 2818290<br>21,84 |
| for payment to other banks and financial institutions | 2582221 | 22,16<br>87,70 | 362159 | 28,91<br>12,30 | 2944380<br>22,82 |
| translation from other groups | 771653 | 6,62<br>86,20 | 123536 | 9,86<br>13,80 | 895189<br>6,94 |
| issued debt securities | 19640 | 0,17<br>89,00 | 2449 | 0,19<br>11,00 | 22067<br>0,17 |
| equity | 863325 | 7,41<br>91,70 | 78142 | 6,24<br>8,30 | 941167<br>7,30 |
| Total | **11249942** | **100<br>87,18** | **1654327** | **100<br>8,82** | **12904269<br>100** |
| **Consumption (posted):** | | | | | |
| Money in hand | 30554 | 0,65<br>100,00 | 0 | 0,00<br>0,00 | 30554<br>0,41 |
| receivable from the Central Bank and other banks | 438443 | 9,26<br>87,70 | 61492 | 2,30<br>12,30 | 499935<br>12,09 |
| investments | 19640 | 0,41<br>89,00 | 2427 | 0,09<br>11,00 | 22067<br>0,30 |
| loans and avana customers | 3471757 | 73,36<br>58,30 | 2483229 | 92,98<br>41,70 | 5954986<br>80,44 |
| transfer to other groups | 771653 | 16,30<br>86,20 | 123536 | 4,63<br>13,80 | 895189<br>12,09 |
| other disposals | 686 | 0,00<br>88,90 | 86 | 0,00<br>11,10 | 772<br>0,01 |
| Total | **6453701** | **100<br>87,18** | **949030** | **100<br>12,82** | **7402731<br>100** |
| **Availability at the end of the year** | **4796241** | **100<br>87,18** | **705297** | **100<br>12,82** | **5501538<br>100** |
| **Annual average** | **4700926** | **36,88<br>87,18** | **691281** | **36,88<br>12,82** | **5392207<br>100** |

The situation is similar for the optimal short-term and long-term groups and financial resources. Thus, the total amount of financial resources transferred from other groups for all funds amounted

to 895189 million sum, of which 771653 million sum or 86,2% is a short-term facility, and 135,336 million sum or 13,80% is a long-term facility.

It is easy to see that all articles of the credit part of the turnover of financial resources are dominated by long-term cash. In the financial resources of the liabilities in the whole bank at the end of the year 7402731 million sum, including, short-term means 6453701 million sum or 87,18%, and long-term means 949030 million sum or 12,82%.

The dynamics of changes in the incoming and outgoing parts of financial resources for short-term and long-term groups and specific compositions predetermines the difference between the average annual bank funds and the availability at the beginning at the end of the year. Thus, the average annual means of a bank for a short-term facility is lower than the availability at the end of the year - 6.12%, and the long-term facility is higher than 6,12%.

By all means, an increase in the volume of financial resources of a commercial bank is provided (table 2). The calculation of the increase is achieved due to the influence of factors of intensification, structure and improvement of the productive qualities of financial resources, which takes place on the basis of various methods of cash withdrawal.

**TABLE 2 THE RESULTS OF THE CALCULATION ON THE PC OPTIONS FOR THE VOLUME OF FINANCIAL RESOURCES FOR JOINT-STOCK COMMERCIAL "ALOQABANK"[2]**

| Indicator | The fact of 2017. | Options for model calculations | | | Calculation options in % to the actual for 2017 | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 1 | 2 | 3 |
| Interest income | 363252 | 377419 | 387590 | 390496 | 103,9 | 106,7 | 107,5 |
| Interest free | 39868 | 41303 | 41742 | 42180 | 103,6 | 104,7 | 105,8 |
| Interest expense | 169086 | 175511 | 174666 | 174328 | 103,8 | 103,3 | 103,1 |
| Operating expense | 181438 | 186700 | 186337 | 185974 | 102,9 | 102,7 | 102,5 |
| Net profit for the year | 24507 | 25561 | 26149 | 26688 | 104,3 | 106,7 | 108,9 |

The results of the calculation of the indicators presented in table. 2, and a comparative assessment of them with actual data for 2017. They showed the economic efficiency of the proposed methodological approach and the complex of models and algorithms. Efficiency is achieved on the basis of finding reserves to increase the volume of financial resources of the bank through the rational use of the potential of cash in a commercial bank.

## CONCLUSIONS

1. The current level of consumption of legal entities and individuals in cash lags far behind the international level. This situation in the conditions of market relations requires rethinking and changing the structure of the volume of financial resources of a commercial bank. The banking sector is characterized by the need to increase the volume of financial resources on the basis of deepening the intensification of reproduction. At the same time, the identification and use of reserves, the increase in the volume of financial resources of a commercial bank through the effective use of reproduction resources, the use of breeding methods and the raising of monetary resources are of particular importance.
2. Consistent implementation of these measures in the practice of the banking system provides for the need to substantiate them with forecast, analytical, balance-optimizing calculations of

indicators for the future development of the turnover of financial resources of the bank. The need to maximize the needs of legal entities and individuals in cash requires an increase in the volume of cash directly both in the banking and non-banking sectors.

3. An important role in improving the efficiency of reproduction of bank funds is given to improving the productive qualities of money, providing organizational and economic measures for the cost-effective mechanism at each stage of turnover and optimal allocation of financial resources, etc. At the same time, correct establishment of intrabank proportions taking into account the principles market economy.
4. The process of finding reserves for increasing the turnover of financial resources involves carrying out multivariate calculations on a PC on economic and mathematical models that reproduce, unlike other works in a single system, several composition of financial resources in a single liability, increase the profitability of a commercial bank, and others.

In order to maximize the adaptation of these models to the production and economic conditions of specific commercial banks, a combination of methods of economic and statistical analysis, optimization and simulation modeling are used. Coordination of parameters is based on the interaction of these models on the basis of feedback.

**5.** In order to predict the profitability of financial resources, economic-mathematical models have been developed, allowing to take into account differentially the economic properties of individual specific composition of financial resources and the main conditions for the maintenance of a liability of a commercial bank.

The developed economic-mathematical models and methodological techniques allowed to ensure the interaction of indicators for forecasting profitability per 1 sum with parameters on financial resources, summary indicators of commercial development at the republic level and others.

**6.** According to the calculations on the structure and turnover of the bank's financial resources by composition, the availability of joint-stock commercial "Aloqabank" at the beginning of the year amounted to 93.3% and 6.7%, respectively, of the short-term and long-term financial resources relative to the total amount of the income. Approximately the same situation exists in the expenditure part of the turnover of financial resources of a commercial bank.

**7.** The variant calculations in the work of the volume of financial resources of a commercial bank are made on the basis of maneuvering the values of the model parameters according to the ratio in the liabilities of the financial resources. Analysis of model calculations allowed us to identify and justify the growth reserves of the increase in the volume of financial resources in joint-stock commercial "Aloqabank", which will amount to 3,9-7,5% compared to 2017. This growth is achieved by improving the structure of banking resources and the productive qualities of money.

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# PERFORMANCE OF NATIONAL AGRICULTURAL INSURANCE SCHEME (NAIS) IN GUJARAT

**Kalpana Kapadia*; Mrutyunjay Swain****

*Research Associate,
Agro-Economic Research Centre,
Sardar Patel University, Vallabh Vidyanagar, Anand, INDIA
Email id: kalpanakapadia25@yahoo.com

**Assistant Professor/ Research Officer,
Agro-Economic Research Centre,
Sardar Patel University, Vallabh Vidyanagar, Anand, INDIA
Email id: mrutyunjay77@gmail.com

## ABSTRACT

*India is an agrarian country and agriculture continues to be the main stay of economy providing livelihood to 2/3rd of its population. The fortune of the majority of the population depends on the performance of the agriculture sector that faces numerous risks such as drought, flood, cyclone, pests and diseases. It is reported that just 20% of farmers in India are covered under the Centre's crop insurance schemes that basically provide a safety net for farm loan dues in case of crop damage. The aim of this paper is to analyze the status and prospects of National Agricultural Insurance Scheme (NAIS) in India with a special focus on its performance in Gujarat. NAIS is considered as world's largest crop insurance scheme. The study is based on secondary data and literature. The study finds that, the ratio of farmers benefited to farmers covered and claims to premium is 0.26 and 2.98 respectively from 2000-01 to 2013-14 in India. Positive trend was observed in major states in terms of number of farmers covered under the scheme since its inception. However, scheme apparently seems not to be successful in minimizing the risks of farming. About 95 million farmer households are not yet covered. So far as Gujarat is concerned, 143.3 lakh farmers covered and 49.5 lakh farmers benefited under the NAIS scheme. Overall, Rs 700 crores of claims of farmers were paid under the crop insurance scheme in the State during 2014-15. It is observed that the delay in settlements, huge administrative costs and lack of transparency are the major constraints inherent in the NAIS. It is suggested to consider Village level /Grama Panchayat to fasten the claims settlement by simplification of procedure for revival of the scheme.*

**KEYWORDS:** *Agricultural Risk, Climate Risk, Crop Insurance, National Agricultural Insurance Scheme JEL: Q14, Q18*

## INTRODUCTION

Agriculture production and farm incomes in India are frequently affected by natural disasters such as droughts, floods, cyclones, storms, landslides and earthquakes. These disaster risks are eating into the profitability of agriculture and also causing several welfare implications through forward and backward linkages of agriculture sector with other sectors of the economy (Raju and Chand, 2008). Risks in production of crops also affect the credit worthiness of the farmers (Singh, 2010 and Jose 2013). Susceptibility of agriculture to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price flections etc. All these events severely affect farmers through loss in production and farm income and these are not in the control of farmers. With the growing commercialization of agriculture, the magnitude of loss due to unfavourable eventualities is increasing. Among the natural calamities, drought is prominent one affecting more people and their livelihood than any other hazards worldwide. In dry land farming, drought is severely affecting farmers through loss in production. Drought is a situation of lower than normal rainfall and it is as much a management issue as a technical one. Drought management and mitigation is important for the future sustainability of agriculture production, productivity and livelihoods (Swain, 2010; 2014). Agricultural insurance is considered as an important mechanism for management of drought, other natural calamities and related output and income risks (Swain and Swain, 2015). Agricultural Insurance implies protecting the farmers against financial losses due to uncertainties that may lead to agricultural losses from all unforeseen perils beyond their control (AIC, 2016). Unfortunately, agricultural insurance in the country has not made much headway even though the need to protect farmers from agriculture variability has been a continuing concern of agriculture policy.

Crop insurance is one method by which farmers can stabilize farm income and investment and guard against disastrous effect of losses due to natural hazards or low market prices. It is not only stabilizes the farm income but also helps the farmers to initiate production activity after a bad agricultural year. It cushions the shock of crop losses by providing farmers with a minimum amount of protection. It spreads the crop losses over space and time and encourages farmers make more investments in agriculture. However, one need to keep in mind that crop insurance should be part of overall risk management strategy. Insurance comes towards the end of risk management process. Insurance is redistribution of cost of losses of few among many, and cannot prevent economic loss. The question of introducing an agriculture insurance scheme was examined soon after the Independence in 1947 and different crop insurance scheme's like Pilot Crop Insurance Scheme (PCIS), Comprehensive Crop Insurance Scheme (CCIS), Experimental Crop Insurance Scheme (ECIS), Pilot Scheme on Seed Crop Insurance (PSSCI), Farm Income Insurance Scheme (FIIS), Sookha Suraksha Kavach, National Agricultural Insurance Scheme (NAIS), Weather Based Crop Insurance Scheme (WBCIS), etc. were implemented in the country over a period of time. All major cereals, pulses and oilseeds crops were covered under CCIS and few horticulture crops like onion, potato were covered in NAIS. Among different crop insurance products, NAIS is popular one and has been implemented throughout the country. The present National Agriculture Insurance Scheme (NAIS) replaced the CCIS in 1999. NAIS was implemented in all states/union territories with premium rates that vary from 1.5 to 3.5% for food-grain and oilseed crops on an actuarial basis for annual commercial and horticultural crops. While CCIS was restricted only to loanee farmers, NAIS widened the coverage by envisaging voluntary participation of non-loanee farmers.

NAIS has enabled farmers to choose indemnity limits of 60%, 80% or 90% of the threshold yields as indemnity limits. The limit of the sum insured was increased to the value of 150% of average yield against payment of an actuarial based premium. Though NAIS was launched to cover the short falls observed in CCIS, the scheme is far from breaking even or achieving the desired coverage.

## OBJECITVIE AND RESEARCH METHODOLOGY

In this context, this study attempts to analyze the progress and performance of NAIS in Gujarat state. The study examines the development of various agricultural insurance schemes in India and finds out the scope of future development in these schemes. The study is mainly based on the secondary data and literatures.

## HISTORY OF CROP INSURANCE IN INDIA

Crop insurance as a concept for risk management in agriculture has emerged in India since the turn of the twentieth century. From concept to implementation, it has evolved sporadically but continuously through the century and is still evolving in terms of scope, methodologies and practices. India is an agrarian country, where the majority of the population depends on agriculture for their livelihood. Yet, crop production in India is dependent largely on the weather and is severely impacted by its vagaries as also by attack of pests and diseases. These unpredictable and uncontrollable extraneous perils render Indian agricultural and extremely risky enterprise. It is here that crop insurance plays a pivotal role in anchoring a stable growth of the sector. In India, The first crop insurance program was introduced in 1972-73 by the 'General Insurance' Department of Life Insurance Corporation of India on H-4 cotton in Gujarat. Later, the newly set up General Insurance Corporation of India took over the experimental scheme and subsequently included Groundnut, Wheat and Potato and implemented in the states of Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka and West Bengal.

Professor V. M. Dandekar, often referred to as the "Father of Crop Insurance in India", suggested an alternate "Homogeneous Area approach" for crop insurance in the mid-seventies. Based on this Area approach, the General Insurance Corporation of India (GIC) introduced a Pilot Crop Insurance Scheme (PCIS) from 1979. Participation by the State Governments was voluntary. The scheme covered cereals, millets, oilseeds, cotton, potato, gram and barley. Than after in the year 1985 when seventh five year plan was announced. A scheme called Comprehensive Crop Insurance Scheme (CCIS) was introduced which covered all the major crop production. In the year 1999, this scheme was replaced by National Agricultural Insurance Scheme. In the year 2003, other private players also entered the market. One of them is Royal Sundaram which runs many pilot schemes to provide benefits to the farmers.

## PROGRESS IN IMPLEMENTATION OF NATIONAL AGRICULTURAL INSURANCE SCHEME (NAIS) 1999

The National Agricultural Insurance Scheme (NAIS) was introduced in the country from the rabi season of 1999 - 2000. Agricultural Insurance Company of India Ltd (AIC) which was incorporated in December, 2002, and started operating from April, 2003, took over the implementation of NAIS. This scheme is available to both loanees and non-loanees. The performance of the Scheme has been presented in Annexure II covers all food grains, oilseeds and annual horticultural/ commercial crops for which past yield data are available for an adequate number of years. Among the annual commercial and horticultural crops, sugarcane, potato,

cotton, ginger, onion, turmeric, chillies, coriander, cumin, jute, tapioca, banana and pineapple, are covered under the scheme. The scheme is operating on the basis of both area approach, for widespread calamities and individual approach, for localized calamities such as hailstorm, landslide, cyclone and floods. The rates of premium collection in NAIS in India and Gujarat are stated in Table 1. Agriculture insurance in India till recently concentrated only on crop sector and confined to compensate yield loss. Recently some other insurance schemes have also come into operation in the country which goes beyond yield loss and also cover the non-crop sector. These include Farm Income Insurance Scheme, Rainfall Insurance Scheme and Livestock Insurance Scheme. Main objectives of the scheme are:

**a.** To provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crop as a result of natural calamities, pests and diseases;

**b.** To encourage the farmers to adopt progressive farming practices, high value inputs and higher technology in Agriculture; and

**c.** To help stabilize farm incomes, particularly in disaster years.

**TABLE 1: PREMIUM COLLECTION IN NAIS IN INDIA AND GUJARAT**

| Season | Crops | Premium Rates |
|---|---|---|
| Kharif | Bajra & Oilseeds | 3.5% of sum insured or actuarial rate whichever is less |
| | Other Kharif oilseeds | 2.5% of sum insured or actuarial rate whichever is less |
| Rabi | Wheat | 1.5% of sum insured or actuarial rate whichever is less |
| | Other Rabi crops | 2% of sum insured or actuarial rate whichever is less |
| Kharif+Rabi | Annual commercial/ horticultural crops | Actuarial rate |

**PERFORMANCE OF NATIONAL AGRICULTURAL INSURANCE SCHEME(NAIS) IN GUJARAT**

To evaluate the performance of NAIS under implementation in Gujarat, the analysis has been made on time series data on area and number of farmers covered, sum assured, premium collected, claims paid and farmers benefited have been collected from AIC official website. As NAIS is a universal scheme and under implementation in all the districts of Gujarat, to examine the extent of farmers' participation, the trends in area and number of farmers covered under this scheme have been analysed. It may be seen from the Table 2 that, over the period of TE 2003-04 to TE2012-13, the area under NAIS during both the kharif and rabi seasons in India show more or less an increasing trend compared to declining trend in Gujarat.

**TABLE2: PERFORMANCE OF THE NAIS IN INDIA AND SHARE OF THE GUJARAT STATE**

| Season | No. of Farmers Covered (In '000') | Area Insured (In 000 ha.) | Sum insured (Rs. in Crore) | Gross Premium (Rs. in Crore) | Premium Subsidy (Rs. in Crore) | Claim(Rs. in Crore) | No. of Farmers Benefited (in 000') |
|---|---|---|---|---|---|---|---|
| **India** | | | | | | | |
| TE 2003-04 | 11713.22 | 18142.64 | 334.38 | 288.48 | 1240.32 | 37430.63 | 3743.06 |
| TE 2006-07 | 16950.85 | 28223.75 | 566.58 | 537.31 | 1638.09 | 38792.42 | 3879.24 |
| TE 2009-10 | 20526.66 | 29435.17 | 881.75 | 787.46 | 3514.48 | 61275.24 | 6127.52 |
| TE 2012-13 | 17078.36 | 23939.39 | 1106.14 | 926.40 | 1636.04 | 30329.61 | 3032.96 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CAGR | -24.63 | -18.77 | -59.23 | -58.31 | -18.75 | 17.09 | 17.09 |
| **Gujarat** | | | | | | | |
| TE 2003-04 | 1109.33 | 2787.33 | 2009.00 | 99.11 | 5.73 | 341.18 | 355.69 |
| TE 2006-07 | 864.67 | 2063.68 | 2130.68 | 83.38 | 3.01 | 204.85 | 167.83 |
| TE 2009-10 | 910.33 | 1976.33 | 2937.67 | 102.22 | 3.04 | 449.33 | 301.67 |
| TE 2012-13 | 1076.80 | 2305.83 | 5475.37 | 216.59 | 35.40 | 854.14 | 393.94 |
| CAGR | 2.26 | 15.28 | -52.86 | -44.37 | -74.48 | -49.76 | -7.37 |
| **% of the Gujarat Share** | | | | | | | |
| TE 2003-04 | 0.09 | 0.15 | 6.01 | 0.34 | 0.00 | 0.01 | 0.10 |
| TE 2006-07 | 0.05 | 0.07 | 3.76 | 0.16 | 0.00 | 0.01 | 0.04 |
| TE 2009-10 | 0.04 | 0.07 | 3.33 | 0.13 | 0.00 | 0.01 | 0.05 |
| TE 2012-13 | 0.06 | 0.10 | 4.95 | 0.23 | 0.02 | 0.03 | 0.13 |

Sources: (1) GOI (2015); (2) www.aicofindia.com

In India, during the entire period from TE2003-04 the NAIS covered 11.71 million farmers and 18.14 million hectares area. The total sum insured taken together was to the Rs 334.38 crore in TE 2003-04 to highest sum insured covered Rs. 1106.14 crore in TE 2012-13 and the premium collected was Rs 1240.32 crore in TE 2003-04 highest premium collected was Rs. 3514.48 crore in TE 2009-10. The highest number of claim Rs. 61275.24 crore and 6.13 million highest farmers benefited in TE 2009-10.

In Gujarat, during the same period number of farmers covered 1.10 million to 1.07 million famers in TE 2003-04 to Te 2012-13 respectively. Rs. 5465.37 crore sum insured taken by the farmers in TE 2012-13. 3.55 lakh farmers benefited to NAIS during TE 2003-04 its increased to 3.94 lakh benefited farmers during TE 2012-13 (Table 2).

The total area under NAIS has decreased from 28 lakh ha in 2000 to 22 lakh ha in 2011(Table 3). However, percentage of Gross Cropped Area under NAIS has highly decreased from 26.3 per cent in 2000 to 17.6 per cent during 2011 but year 2004, percentage of GCA under NAIS 33.1 percent. Thus, the penetration of NAIS is abysmally low and slow, as nearly 90 per cent of gross cropped area in Gujarat is not yet covered under NAIS.

**TABLE 3: PERCENTAGE OF GROSS CROPPED AREA UNDER NAIS IN GUJARAT (KHARIF AND RABI 2000-2010) (AREA IN LAKH HA.)**

| Year | GCA | NAIS under area | | | % of GCA under NAIS |
|---|---|---|---|---|---|
| | | Kharif Area | Rabi Area | Total | |
| 2000 | 107 | 28 | 0.6 | 28 | 26.3 |
| 2001 | 105 | 25 | 0.4 | 25 | 23.9 |
| 2002 | 108 | 23 | 0.4 | 23 | 21.5 |
| 2003 | 106 | 22 | 0.4 | 22 | 20.9 |
| **2004** | **114** | **38** | **0.0** | **38** | **33.1** |
| 2005 | 113 | 25 | 0.2 | 25 | 22.6 |
| 2006 | 115 | 19 | 0.3 | 19 | 16.5 |
| 2007 | 118 | 17 | 0.3 | 18 | 15.0 |
| 2008 | 121 | 18 | 0.6 | 19 | 15.3 |
| 2009 | 116 | 20 | 0.7 | 21 | 17.8 |

| | | | | | |
|---|---|---|---|---|---|
| 2010 | 111 | 20 | 0.8 | 21 | 18.6 |
| 2011 | 122 | 21 | 0.7 | 22 | 17.6 |

Source: (1) www.aicofindia.com (2) GoG (2014)

The percentage of farmers benefited under NAIS Kharif and Rabi 2000-2013 has been stated in Table 4. It may be observed that, between 2000 and 2012 kharif seasons, the percentage of farmers benefited has declined from 87.4 percent in year 2000 to 74.4 percent in 2012. During abnormal years of flood and drought the number of farmers benefited is very large. During rabi seasons the percentage of farmers benefited ranges from zero per cent in the year 2005 to 78.6 per cent in 2009.

The results of analysis on financial performance of NAIS in Gujarat have been shown in Table 5. The claim-premium ratio was computed by dividing the indemnity claim or compensation payment by insurance premium collected. If the claim-premium ratio exceeds one, it indicates financial loss on the part of the insurance companies in insurance business. As could be seen from the table, the claim premium ratio was more during kharif season compared to rabi season. During Kharif, it was 4.18 on an average during the period of 2000 to 2013; whereas it was 2.42 on an average during Rabi season over the period of 2000 to 2013.

**TABLE 4: PERCENTAGE OF FARMERS BENEFITED UNDER NAIS IN GUJARAT (KHARIF AND RABI 2000-2013) (NO. OF FARMERS)**

| Year | Kharif Season | | | Rabi Season | | |
|---|---|---|---|---|---|---|
| | Farmers Covered | Farmers Benefited | Percentage of Farmers Benefited | Farmers Covered | Farmers Benefited | Percentage of Farmers Benefited |
| 2000 | 1118 | 977 | 87.4 | 15 | 8 | 53.3 |
| 2001 | 1254 | 262 | 20.9 | 32 | 8 | 25.0 |
| 2002 | 1169 | 671 | 57.4 | 26 | 11 | 42.3 |
| 2003 | 1016 | 30 | 3.0 | 27 | 8 | 29.6 |
| 2004 | 1068 | 347 | 32.5 | 22 | 0 | 0.4 |
| 2005 | 880 | 14 | 1.6 | 0 | 0 | 0.0 |
| 2006 | 864 | 450 | 52.1 | 11 | 1 | 4.5 |
| 2007 | 825 | 35 | 4.2 | 14 | 4 | 28.6 |
| 2008 | 813 | 283 | 34.8 | 14 | 2 | 14.3 |
| 2009 | 915 | 521 | 56.9 | 28 | 22 | 78.6 |
| 2010 | 927 | 70 | 7.6 | 34 | 7 | 20.6 |
| 2011 | 976 | 260 | 26.6 | 39 | 7 | 17.9 |
| 2012 | 1144 | 851 | 74.4 | 33 | 6 | 17.5 |
| 2013 (P) | 1005 | 43 | 4.2 | 33 | 16 | 48.9 |
| Average | 116.05 | 459.30 | 4.18 | 1.17 | 3.02 | 2.42 |

Source: www.aicofindia.com

**TABLE 5: CLAIM-PREMIUM RATIO UNDER NAIS KHARIF AND RABI FROM 2000-2013 (RS. CRORE)**

| Year | Kharif | | | Rabi | | |
|---|---|---|---|---|---|---|
| | Premium | Claims | Claim-Premium Ratio | Premium | Claims | Claim-Premium Ratio |
| 2000 | 62.00 | 770.00 | 12.42 | 0.43 | 2.00 | 4.64 |
| 2001 | 74.00 | 149.00 | 2.01 | 0.78 | 3.00 | 3.84 |
| 2002 | 88.00 | 726.00 | 8.25 | 0.63 | 0.52 | 0.82 |
| 2003 | 99.00 | 6.00 | 0.06 | 0.84 | 2.00 | 2.37 |
| 2004 | 108.00 | 289.00 | 2.68 | 0.85 | 0.02 | 0.02 |
| 2005 | 85.00 | 8.00 | 0.09 | 0.00 | 0.00 | 0.00 |
| 2006 | 82.00 | 583.00 | 7.11 | 0.42 | 0.02 | 0.06 |
| 2007 | 82.00 | 23.00 | 0.28 | 0.70 | 0.53 | 0.75 |
| 2008 | 83.00 | 467.00 | 5.63 | 0.67 | 1.00 | 1.48 |
| 2009 | 104.00 | 796.00 | 7.65 | 1.00 | 11.00 | 11.00 |
| 2010 | 116.00 | 68.00 | 0.59 | 2.00 | 5.00 | 2.50 |
| 2011 | 143.79 | 316.53 | 2.20 | 3.00 | 3.00 | 1.00 |
| 2012 | 233.48 | 2190.57 | 9.38 | 2.33 | 2.51 | 1.08 |
| 2013 | 264.42 | 38.08 | 0.14 | 2.75 | 11.72 | 4.26 |

Source: www.aicofindia.com

**COMPARATIVE PERFORMANCE OF NAIS AND WBCIS**

WBCIS has been implemented in Gujarat on pilot basis since Kharif 2007. The features of NAIS and WBCIS have been compared in Table 6. NAIS covers both Kharif and Rabi crops whereas WBCIS covers mainly kharif crops. NAIS covers all kinds of risks whereas WBCIS covers only Weather related risks like rainfall, frost, temperature, humidity etc. The claim settlement is also faster in case of WBCIS compared to NAIS.

**TABLE 6: COMPARISON BETWEEN NAIS AND WBCIS**

| **National Agricultural Insurance Scheme (NAIS)** | **Weather Based Crop Insurance Scheme (WBCIS)** |
|---|---|
| Practically all risks covered (drought, excess rainfall, flood, hail, pest infestation, plant disease etc.) | Weather related risks like rainfall, frost, temperature, humidity etc. are covered. |
| Easy-to-design if historical yield data up to 10 years is available | Technical challenges in designing weather indices and also correlating weather indices with yield losses. Needs up to 25 years historical weather data |
| High basis risk [difference between the yield of the Area (Block / Tehsil) and the individual farmers] | Basis risk with regard to weather could be high for rainfall and moderate for others like frost, heat, humidity etc. |
| Objectivity and transparency are relatively less. | Objectivity and transparency are relatively high |
| Quality losses are beyond consideration. | Quality losses to some extent gets reflected through weather index |

| | |
|---|---|
| High loss assessment costs (crop cutting experiments) | No loss assessment costs |
| Delays in claims settlement | Faster claims settlement |
| Government's financial liabilities are open ended, as it supports the claims subsidy. | Government's financial liabilities could be budgeted up-front and close ended, as it supports the premium subsidy. |

Source: Swain (2014)

The comparison of performance of NAIS and WBCIS has been stated in Table 7. It reveals that the premium paid per hectare was Rs. 1125 per hectare higher in WBCIS comparison to NAIS in year 2009 but year 2013 the premium paid Rs. 1238 per hectare higher in NAIS to compare WBCIS. It is observed that insured area per farmer was higher in case of WBCIS in comparison to NAIS for all the kharif seasons but the sum assured per hectare was more in the case of NAIS. Thus, WBCIS seems to perform better than NAIS because of more coverage, higher percentage of farmers benefited, less premium and higher claim-premium ratio.

**TABLE7: PERFORMANCE OF NAIS AND WBCIS IN GUJARAT (KHARIF 2009 TO 2013)**

| Year | Insured (Ha/Farmer) | Sum Assured (Rs/Ha) | % of Farmers Benefited | Premium Paid (Rs/Ha) | Claim Received (Rs/Ha) | Claim/ Premium |
|---|---|---|---|---|---|---|
| **NAIS** | | | | | | |
| 2009 | 0.5 | 0.1 | 56.9 | 521 | 3988 | 7.7 |
| 2010 | 0.5 | 0.2 | 7.6 | 583 | 342 | 0.6 |
| 2011 | 0.5 | 0.2 | 26.6 | 690 | 1519 | 2.2 |
| 2012 | 0.5 | 0.2 | 74.4 | 944 | 8859 | 9.4 |
| 2013 | 0.5 | 0.3 | 4.2 | 1238 | 178 | 0.1 |
| **WBCIS** | | | | | | |
| 2009 | 2.5 | 0.1 | 85.8 | 1125 | 1176 | 1.0 |
| 2010 | 1.0 | 0.0 | 4.3 | 450 | 44 | 0.1 |
| 2011 | 1.0 | 0.0 | 19.6 | 450 | 61 | 0.1 |
| 2012 | 1.2 | 0.1 | 34.3 | 542 | 207 | 0.4 |
| 2013 | 1.2 | 0.1 | 34.3 | 542 | 207 | 0.4 |

Source: (1) GOI (2015); (2) www.aicofindia.com

## SUMMARY AND CONCLUSION

Crop insurance is a means of "protecting the farmers against uncertainties of crop yields, arising out of practically all natural factors beyond their control". It is a financial mechanism in which the uncertainty of loss in crop yields, is minimized by pooling most uncertainties that impact crop yields, so that the burden of loss can be distributed. National Agricultural Insurance Scheme (NAIS) was implemented until Kharif 1999. Some of the important features of this scheme allowed a cover to the farmers availing crop loans from Financial Institutions for growing food crops & oilseeds on compulsory basis. The premium rates for Cereals and Millets were 2% and for Pulses and Oil seeds 5%. The ratio of farmers benefited to farmers covered under the scheme and the claims to premium is 0.26 and 2.98 respectively from 2000-01 to 2013-14 in India. Positive

trend was observed in major states in terms of number of farmers covered under the scheme since its inception. The scheme apparently seems to be successful in minimizing the risks of farming. However, about 95 million farmer households are not yet covered under the scheme. Delay in settlements, huge administrative costs and lack of outreach transparency are the major constraints inherent in the NAIS (Adivappar and Aditya, 2014). It is suggested to consider Village level/Grama Panchayat to fasten the claims settlement by simplification of procedure for revival of the scheme.

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# DIFFUSION AND ADOPTION OF CREDIT CARDS IN INDIAN BANKING SECTOR

**Dr. Kamalpreet Kaur*; Dr. Mandeep Kaur****

*Assistant Professor,
Department of Commerce,
N.M. PG Goverrnmebt College (Hansi)
District -Hissar, Haryana, INDIA
Email ID: kamal54preet@gmail.com

**Professor,
Department of Commerce,
Guru Nanak Dev University, Amritsar, INDIA

## ABSTRACT

*The study emphasizes on the identification of factors which may have influenced the banks to adopt credit cards along with their traditional banking services. Bank specific variables were investigated to deepen the understanding on the diffusion and adoption of credit cards. The data relating to sampled banks' characteristics have been collected from database of Reserve Bank of India. To know about the status of the bank regarding its adoption of credit card, the websites and annual reports of the banks were explored during different intervals of time period of the study. The study considers the dependent variable i.e. adoption of credit cards as dichotomous variable, whether or not a bank renders the credit card services, denoting 1 if the bank has adopted credit card otherwise 0. The logistic regression has thus been applied to get the valid and reliable results. The empirical findings reveal that, size, non-interest income, non performing assets, profitability, age and market share of the bank are the variables which have contributed significantly in the diffusion and adoption of credit cards. The process of change and restructuring that must be undergone to capitalize on these opportunities poses a challenge for many banks. Due to adoption of technology, alternative channels of delivery would become more active. Hence, it becomes necessary for the banks to meet the required standards and to shake hand with the pace of technology.*

**KEYWORDS:** *Identification, Adoption, Dichotomous, Non-Interest Income*

## INTRODUCTION

The Indian banking sector is thus at an exciting point in its evolution. The opportunities are immense – to enter new businesses and new markets, to develop new ways of working, to improve efficiency, and to deliver higher levels of customer service. The process of change and restructuring that must be undergone to capitalize on these opportunities poses a challenge for many banks. Due to adoption of technology, alternative channels of delivery would become more active. This, in turn, would result in a leaner branch network and better skilled workforce. Technology, therefore, will impact on the business model strongly by cutting down costs of delivery and transaction.

Hence, it becomes necessary for the banks to meet the required standards and to shake hand with the pace of technology. Also the deregulation in the banking industry has made it more competitive with greater autonomy which ultimately leads to the severe need to manage various risks for them to survive in long run. As a result, banks have now redefined themselves with new rules by transforming its operations to universal banking and adding new channels with lucrative deals (Indian Banking; McKinsey & Company, 2010). This in turn has made it necessary for the banks to introduce innovative products through e-banking and e-payment system. This can be regarded as one of the ways for the banks to survive in this environment by launching the electronic products in the market viz. Internet Banking, Plastic Cards, Electronic fund transfer, Mobile Banking etc. which are known for its unique features like more speed to conduct transactions, universal applicability, lesser financial cost etc. while taking into consideration the customers' needs, preferences, perceptions, convenience and need of an hour.

The technological trajectory helped banks satisfying the mass consumption of banking services, increasing return to scale, and enhancing their ability to expand in size with the installation of innovations in product and services (Buzzacchi *et al*., 1995). Electronic banking innovations have thus become a strategic weapon that no bank can ignore. Credit Cards can be referred as one of the innovations with non-clerical and customer self-served banking channel (Chen, 1999).

The Indian banking sector is thus at an exciting point in its evolution. The opportunities are immense – to enter new businesses and new markets, to develop new ways of working, to improve efficiency, and to deliver higher levels of customer service. The process of change and restructuring that must be undergone to capitalize on these opportunities poses a challenge for many banks. Due to adoption of technology, alternative channels of delivery would become more active. Technology, therefore, will impact on the business model strongly by cutting down costs of delivery and transaction. The study emphasizes on the identification of factors which may have influenced the banks to adopt credit cards along with their traditional banking services. Bank specific variables were investigated to deepen the understanding on the diffusion and adoption of credit cards.

## REVIEW OF LITERATURE

The voluminous studies and research has been conducted on the financial innovation services. However, the maximum emphasis has been given on the adoption and diffusion of internet banking and Online banking (Pennings and Harianto, 1992; Bughin, 1999; Gurthrie, 1999; Hasan, 2002; Corrocher, 2002; Sullivian and Wang, 2006; Malhotra and Singh, 2007; Sullivan and Wang, 2008 and Murrilo, 2010). Few studies have also been conducted on the adoption and diffusion of ATM cards as well in different parts of the world (Hannan and Mcdowell, 1983; Hannan and Mcdowell, 1984; Sharma, 1993; Sloner and Shepard, 1995; Gourlay and Pentacost, 2002 and Hester, 2001)

other than India. These studies were conducted in the developed economies like US, UK and Italy as the adoption rate of new technologies and financial innovation is comparatively more there. The organizations in these economies have tendency to take risk and capability to make huge investment. While following these economies, the developing economies like India also try to match themselves with the need of an hour taking initiatives to incorporate innovations in their system. Thus, the factors influencing the banks' decision to adopt new technology is an interesting area to explore. The present study tends to fill the gap by analyzing the adoption pattern and diffusion of smart cards in Indian banking Industry.

**TABLE 1 EMPIRICAL STUDIES RELATED TO THE DETERMINANTS OF DIFFUSION AND ADOPTION OF INNOVATION BY BANKS.**

| **Author (Year)** | **Sample Description (Country, Period and Size)** | **Research Technique & Innovation studied** | **Findings** |
|---|---|---|---|
| Hannan and Mcdowell (1983) | USA, 1971-79 and 351 banking firms | Tobit Model ATMs | Banks operating in more concentrated local markets and growth in terms of deposits were having higher probability to adopt ATMs. However banks with more wage expense and size did not find to have any impact on the adoption decision. |
| Hannan and Mcdowell (1984) | USA, 1971-79 and 3841 banking firms | Duration Model, ATMs | Larger banks, banks operating in more concentrated local markets, having offpremise ATMs, more wage expenses and demand deposits had higher probability to adopt ATMs. Profits of banks do not find to have any impact on the adoption decision. |
| Hannan and Mcdowell (1987) | USA, 1971-1982 and 4952 banks | Regression, ATMs | No relationship was found between the size of the banks with adoption of ATMs. It was found that large as well as small banks had probably adopted new technology on equal basis. |
| Pennings and Harianto (1992) | US, 1977-1987 and 152 US banks | Logistic Model, Video Banking | The banks having more linkages and experience with the computer and telecommunication firms and of larger size are more prone to adopt new technology. |
| Sharma S. (1993) | UK, 1971-1979 and 3689 banking firms | Duration Model, ATMS | Larger and experienced firms, having high wage rate, higher deposits and banks operating in urban areas were more likely to influence the high rate of adoption among banks. |
| Sloner and Shepard (1995) | UK, 1972-1979 and 2,231 banks | Duration Model, ATMs | The banks with many branches adopted ATMs earlier than banks with fewer branches confirming the presence of network effect. |
| Bughin J. (1999) | Europe, 1997- 2000 and 65 banks | Duration Model, Internet Bank | Variables such as its ATM coverage, customers, assets, profits, growth, organisation structure, internet use or its overall cost efficiency are referred as significant variables of on-line banking diffusion in Europe. |

| Author (Year) | Sample Description (Country, Period and Size) | Research Technique & Innovation studied | Findings |
|---|---|---|---|
| Gurthrie (1999) | USA, 1990-1996 and 712 banks | Internet Banking | The study revealed that organizations with large proportions of employees having degrees of higher education were likely to make use of Internet-based information technology. |
| Andriy (2001) | Ukraine, 1998- 2000 and 163 banks | Logit Regression, Electronic Banking | Assets, return on equity, non-interest expenses, non-interest income, deposits and fixed assets were found as main economic factors of decision-making on introduction of electronic banking by a bank. |
| Hester *et al.* (2001) | Italy, 1991-1995 and I268 banks. | Tobit Regression Model, ATMs | The number of a bank's ATMs in a province was positively related to the number of its branches, employees per branch, deposit accounts and the value of its deposits in a province. |
| Gourlay and Pentecost (2002) | UK, 1991-1998 and75 banks | Duration Model, ATMs | The main factors affecting the diffusion of new technology were found to be firm size, growth in deposits, profitability and price expectations. |
| Hasan (2002) | New Zealand, 1993-2000 and 105 banks | Logistic Regression, Internet Banking | A negative association was found between the adoption of internet banking and different proxies of risk like non performing loans, doubtful loans, and variability of stock returns. Larger banks, banks with past experience and higher branching network also had higher likelihood of adoption of internet banking. |
| Corrocher N. (2002) | Italy, 1995-2000 and 672 Italian banks | Duration Model, Internet Banking | The adoption of internet banking is negatively affected by the large customer base and branch intensity however it is positively affected by size, education and income of the customers. |
| Gourlay and Pentecost (2005) | UK, 1972-1986 and 532 banks | OLS Regression, ATMs | Slow growing firms with higher average wages were found to adopt it sooner. Firm growth in deposits had a negative impact, indicating that firms whose deposits are growing more quickly tend to adopt it later. Firm liquidity had no impact on the conditional probability of adoption. |
| Corrocher N. (2006) | Italy, 1995-2003and 698 banks | Duration Model, Internet banking | The probability of adoption of Internet banking was affected by the size, profitability, growth in deposits and cost of operations. |
| Malhotra & Singh (2007) | India, 1997-2005 and 88 banks | Logit Model, Internet Banking | The larger banks, younger in age, private ownership, high expenses for fixed assets, higher deposits and lower branch intensity evidenced a higher probability of adoption of Internet banking. |

| Author (Year) | Sample Description (Country, Period and Size) | Research Technique & Innovation studied | Findings |
|---|---|---|---|
| Sullivan and Wang (2008) | United States, 2003-2007 and 50 Banks | Cox proportional Model, Internet Banking | The factors which significantly affect the Internet banking adoption include average bank size, household Internet access, average bank age, imitations of early adopters , commercial internet adoption, population density and the number of bank offices per value of deposits. |
| Murrilo (2010) | US, 2003-2006 and 7788 banks | Logistic Regression, Online Banking | Size, profits, fixed expense and competition were relevant determinants in the adoption decision. |
| Kumar *et al.* (2011) | India, 1989-2005 and 80 banks | Regression analysis, ATMs | The study revealed that the higher wages paid to employees contributed to the diffusion of ATMs positively. |
| Sullivian & Wang (2013) | US, 2003-10 and 5600 banks. | Logistic Regression, Internet Banking | Size of the bank, the location of banks in metropolitan areas and average age of the bank had positive affect on both bank size and Internet Banking adoption. |

## DATABASE AND RESEARCH METHODOLOGY

### *Objective of the Study*

In present study, the main objective is to explore the factors which may have helped to drive the diffusion and adoption of credit cards in Indian banking sector. The study thus aims to unfold the questions like:

- Does time really matter in the diffusion process? If yes, then what are the various determinants significantly affecting the diffusion of Plastic cards?
- Is adoption the function of variability in bank specific characteristics? If yes, how much do these factors affect the decision of adoption by banks?

### *Sample Description*

The sample consists of all the commercial banks prevailing in India during 2013 i.e. 79 in number out of which 29 are foreign banks, 23 are private sector banks and 27 are public sector banks. The time period of the study is 14 years i.e. from 2000 to 2013. The data relating to sampled banks' characteristics have been collected from database of Reserve Bank of India. To know about the status of the bank regarding its adoption of particular card (credit as well as smart cards), the websites and annual reports of the banks were explored during different intervals of time period of the study.

***The Model***

This section seeks to identify the important/significant factors which can influence the propensity to implement a certain innovation namely smart card in Indian banking industry. The study considers the dependent variable i.e. adoption of smart cards as dichotomous variable, whether or not a bank renders the smart card services, denoting 1 if the bank has adopted credit card otherwise 0. The logistic regression has thus been applied to get the valid and reliable results. The probability function in a logistic form can be written as shown in equation as follows:

$$L_i = \ln\left|\frac{P_i}{1-P_i}\right|$$

$$= \beta_1 + \beta_2 X_2 + \beta_3 X_3 \ldots\ldots \ldots\ldots \qquad \ldots\ldots \beta_{11} X_{11} + \varepsilon_i$$

$X_i$ are the explanatory variables, where I = 1,2,3….11

$B_i$ are the regression coefficients, where I = 1,23,3….11

Logit parameters are estimated by the method of maximum likelihood estimation (MLE)

**TABLE 1: LIST OF DETERMINANTS OF DIFFUSION AND ADOPTION OF PLASTIC CARDS IN INDIAN BANKING SECTOR**

| **Variables** | **Explanation** | **Expected Relation** |
|---|---|---|
| Size | Log of Total Assets of the bank | +ve |
| Profitability | Ratio of Net profits to Total Assets | -ve |
| Fixed Cost | Ratio of Expenses for Premises and Fixed Assets to Operating Revenue | -ve/+ve |
| Deposits | Ratio of Total Deposits to Total Funds | -ve/+ve |
| Branch Intensity | Ratio of number of Branches to Total Assets of the bank | -ve/+ve |
| Age | Number of Years since the bank being incorporated | -ve/+ve |
| Market Share | Ratio of Bank's Loan & Investment to Loan & Investment of all the banks | +ve |
| Non Interest Income | Ratio of Non Interest Income to Total income | +ve |
| Non Performing Assets | Ratio of Non Performing Loans to Total Loans to Total Loans | -ve |

*Source: Compiled from review of literature*

***Size:*** Firm size is a critical factor which serves as a proxy for risk aversion, economies of scale and research and development activities (Sharma, 1993). Thus, in the firm characteristics, size of the individual firm is of great importance. Some scholars advocate the measurement of bank size by considering total assets of the bank, while others consider number of branches and number of customers a bank has a more suitable base (Hannan and McDowell, 1983; Corrocher, 2002 and Sharma, 1993).

It has been hypothesized by most of the researchers that, larger the bank, more will be the probability of adoption of new technology by the banks. It is assumed that due to the presence of economies of scale and scope, the larger firms are provided with more chances for development and innovation. Hence, theoretically as well as empirically, firm size is found to have positive and significant effect on the decision to adopt the technological innovation (Corocher, 2002 and

Sharma, 1993). Moreover, greater size is necessary to allow the firm to accommodate the economies of scale inherent in research and development facilities. Finally, greater size is more likely to accommodate a wider range of activities and products (Frame and White, 2002).

***Age:*** Age of the firm is also a prominent variable being studied by most of the researchers. It has been measured by the number of years since the bank has been incorporated. Age has dual proxy effect too. Firstly, it represents banks' experience and growth over the years. Secondly, it is taken as the proxy to measure the banks' trust and creditworthiness in the market which ultimately tend to reduce the riskiness involved in the implementation of new ventures. It can thus be assumed that the more the age of the bank, more will be the chances to innovate (Gourlay and Pentecost, 2005).

Age may have negative relation with the adoption level as the new and younger banks will be more innovative than the older ones and thus be able to fetch competition in the market. Thus, it can be expected that the new banks are formed based on a belief that new technology created new business opportunities (Furst *et al*., 2000). Hence, the younger banks may adopt the technology earlier so as to establish themselves in the market and compete with old and experienced banks. However, on the other hand the new banks may face losses in initial stages due to less market share and high start up costs, which act as hindrance for them to further invest in the new projects.

***Deposits:*** According to Gourlay and Pentecost (2002), deposits play the dual role. Deposits on the one hand represent the traditional source of funding for the bank while on the other hand it can be regarded as banks' overall customer base. The increase in deposits can be described as a proxy of trust of the customer for the banks as they put their money into it. More the customer base of the banks and more there is the likelihood to take up the new technology. However, some of the researchers found it negatively related to the adoption of innovation. Andriy (2001) and Furst *et al*. (2002) suggest that the banks which are less reliant on traditional sources of funding may have more aggressive business strategy including the adoption of new products.

***Branch Intensity:*** The ratio of number of bank branches to its total assets has been considered as the branch intensity of that bank. The researchers have different viewpoints on this ambiguous measure. Few researchers opine that the banks having more number of branches are more likely to have dispersed ATM networks. Whereas, the others contend that the banks having less number of branches can expand their network by installing more ATMs so as to reach to the customers where they do not have branches. According to Corrocher (2002) the banks with sufficient number of branches have wide geographical coverage which means that they have well established contacts with the customers and therefore do not feel the need to implement technological systems faster. According to this view, the plastic money will be considered as the substitute to the branch activity. Alternatively, the banks having more intensive branch network may prefer to adopt technology sooner in order to reduce their cost of establishing branches in future. However, most of the studies concluded the results by considering branches as the complementary to innovation in the banks (Sloner and Shepard, 1995; Hester *et al*., 2001 and Malhotra and Singh, 2007).

***Infrastructure Expenses:*** The introduction of plastic cards may have tendency to diminish infrastructure cost of the banks in the long run. The banks with high fixed cost may adopt the new innovation much easily so that the cost can be reduced in future. However in the short run, when bank decides to install new technology, the infrastructure expenses or fixed cost of the organization may increased instantly (Andriy, 2001 and Furst *et al*., 2002). It gives the other viewpoint that banks who already have incurred huge infrastructure expenses may not afford to install new technology so quickly.

***Ownership:*** The ownership of the bank is also one of the main determinants which may affect the adoption decision of the bank. In general, it is the belief that the banks owned by public sector are reluctant to adopt the new technology as compared to private sector banks. It may be due to the fact that some public sector banks are well established and experienced having sufficient number of customers, branches and deposits and thus are less competitive. While, the private sector banks are supposed to bring competition in the market by taking risk and making the new technology readily available to the customers soon so as to raise the market potential (Bughin, 1999; Guthrie, 1999 and Gourlay and Pentecost, 2002). On the other hand, it can also be depicted that public sector banks may have more potential to take risk regarding the installation of new services and products than that of private sector banks due to its strong customer base, expanded branch network and more market share.

***Market Share:*** Market share represents industry advantage of the bank. Banks having large share in the form of deposits in the industry would have more chances to install new technology. It is thus expected that if the banks' market is growing, the value of investment on innovation will be more as if the bank expects to capture a share of the new depositors too (Sloner and Shephard, 1995).

***Profitability:*** Profitability is one of the main measures to test the importance of liquidity constraints in funding the adoption of a new technology. The total profits have been considered to estimate this variable. However, (Hester *et al*., 2001 and Sloner and Shephard, 1995) consider return on equity and return on assets as the measure of profitability. From this, it can be projected that with more profits potential of the bank to install the new technology increases. While, it may also be possible that the banks with less profits will have more urge to implement new technology so as to improve their performance and meet competitive edge in the market. However, (Sullivian and Wang, 2013; Corrocher, 2007 and Malhotra and Singh, 2007) did not find any significant relationship between the profitability and adoption decision of the new technology.

***Asset Quality:*** Asset quality can be estimated by the amount of non performing assets (NPAs) of the banks. It can be considered as proxy of credit risk also. Banks with lesser non performing assets can be considered as efficient ones. It represents that managerial efforts put on by banks are positive and banks are efficient enough to manage its functions and funds. The efficient banks would tend to introduce new services and grow quickly. According to Furst *et al*. (2002), on an average the banks having less NPAs are more efficient and safe which leads to the early adoption of technology.

***Diversification:*** One of the measure of the aggressiveness of the bank's business strategy is the magnitude of non interest based transactions in proportion to its gross income. It has been hypothesized that banks who have greater reliance on nontraditional revenue are more likely to view new technology as a way to market fee generating services, and are more likely adopt innovative services as part of an overall aggressive business strategy (Furst *et al*., 2002; Carlson *et al*., 2001; Hernando and Nieto, 2006; Malhotra and Singh, 2009; Crietie *et al*., 2009 and Arnaboldi and Claeys, 2010). Corrocher (2002) too supported that banks with high share of interest based income could be considered as less innovative than a bank with a high proportion of income deriving from other value added services.

## THE EMPIRICAL RESULTS

Firstly, to find out the significant determinants of diffusion of smart cards, pair wise correlation of all independent variables and dependent variable were calculated. The Table 2 reveals that several

statistically significant correlations exist among dependent and independent variables. It reveals that the probability to adopt smart card is positively related with size of the bank, branch intensity, age, non-interest income, deposits and market share. The credit card adoption decision is found to be negatively related with the profitability and non-performing assets of the banks. The correlation between different independent variables is also found to be less than 0.6 in all the cases, which eliminates affect of multicolinearity in the final model.

The results of the logistic regression have been shown in Table 2. -2 log likelihood of the model is found to be significant which depicts that the observed model is better than the null model. McFadden $R^2$ is calculated to measure the strength of association which is found to be strong enough (31%). A likelihood Ratio (LR) test was conducted to examine the joint explanation power of independent variables. The estimated logit model applied on the sample had significant LR test and satisfactory $R^2$ which suggest that the model adequately fits the data.

**TABLE 2: PEARSON CORRELATION MATRIX OF VARIABLES INFLUENCING THE ADOPTION OF SMART CARDS IN INDIAN BANKING SECTOR**

| Variables | Size | Profitability | Fixed Cost | Branch Intensity | Age | Non Interest Income | Non Performing Assets | Deposits | Market Share | Private Sector Banks | Public Sector Banks | Smart card |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Size** | 1.000 | | | | | | | | | | | |
| **Profitability** | -0.075 | 1.000 | | | | | | | | | | |
| **Fixed Cost** | -0.058 | -0.020 | 1.000 | | | | | | | | | |
| **Branch Intensity** | 0.178 | -0.136 | -0.065 | 1.000 | | | | | | | | |
| **Age** | 0.459 | -0.049 | -0.027 | 0.434 | 1.000 | | | | | | | |
| **Non Interest Income** | -0.271 | 0.516 | -0.033 | -0.163 | -0.194 | 1.000 | | | | | | |
| **Non Performing Assets** | -0.245 | -0.298 | 0.035 | 0.054 | -0.157 | -0.070 | 1.000 | | | | | |
| **Deposits** | 0.553 | -0.251 | -0.105 | 0.619 | 0.410 | -0.360 | -0.024 | 1.000 | | | | |
| **Market Share** | 0.563 | -0.039 | -0.03 | 0.044 | 0.098 | -0.106 | -0.061 | 0.188 | 1.000 | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | | |
| **Private Sector Banks** | -0.009 | 0.083 | -0.025 | -0.242 | 0.035 | 0.144 | 0.019 | -0.320 | 0.111 | 1.000 | | |
| **Public Sector Banks** | -0.409 | 0.116 | 0.057 | -0.391 | -0.389 | 0.238 | 0.086 | -0.489 | -0.399 | -0.493 | 1.000 | |
| **Smart Cards ($Y_1$)** | 0.896 | -0.367 | 0.114 | 0.557 | 0.714 | 0.654 | -0.059 | 0.536 | 0.612 | 0.736 | 0.648 | 1.000 |

*Source: Calculated through E-views*

**TABLE 3: DETERMINANTS OF DIFFUSION AND ADOPTION OF CREDIT CARDS IN INDIAN BANKING SECTOR**

| Variables | Coefficient | Std. Error | z-Statistic | Prob. |
|---|---|---|---|---|
| **C** | -23.93407 | 4.205079 | -5.691705 | 0.0000*** |
| **Age** | 0.012268 | 0.004059 | 3.022241 | 0.0025** |
| **Branch Intensity** | 0.167647 | 0.113654 | 1.475063 | 0.1402 |
| **Deposits** | 3.949290 | 2.359245 | 1.673963 | 0.0941* |
| **Fixed Cost** | 0.093786 | 0.074622 | 1.256817 | 0.2088 |
| **Market Share** | 21.13648 | 12.06011 | 1.752594 | 0.0797* |
| **Non Interest Income** | 0.257813 | 0.110687 | 2.329210 | 0.0198** |
| **Non Performing Assets** | -0.025424 | 0.025267 | 1.006181 | 0.3143 |
| **Profitability** | -0.192098 | 0.139245 | -1.379564 | 0.1677 |
| **Size** | 0.991729 | 0.181912 | 5.451699 | 0.0000*** |
| **Public Sector Banks** | 1.685421 | 0.631191 | 2.670225 | 0.0076** |
| **Private Sector Banks** | 2.962653 | 0.758832 | 3.904228 | 0.0001*** |
| McFadden R-squared | 0.310718 | Mean dependent var | | 0.366906 |
| S.D. dependent var | 0.482395 | S.E. of regression | | 0.388700 |
| Akaike info criterion | 0.963669 | Sum squared resid | | 81.58728 |
| Schwarz criterion | 1.088007 | Log likelihood | | -251.8999 |
| Hannan-Quinn criter. | 1.012235 | Restr. Log likelihood | | -365.4525 |
| LR statistic | 227.1052 | Avg. log likelihood | | -0.453057 |
| Prob(LR statistic) | 0.000000 | | | |

*Source: Calculated through E-views*

*Note: Here ***, and ** and * means statistically significant at 1%, 5% and 10 respectively.*

Table 3 demonstrates the effect of various explanatory variables on the probability to adopt credit cards by banks in India. The variable size was found to have positive coefficient i.e. 0.991 and highly significant too. Large the size of the bank, more will be the chances of adoption of new technology by banks (Hannan and McDowell, 1983; Pennings and Harianto, 1992; Gourlay and Pentecost, 2005; Murrilo, 2010 and Sullivian and Wang, 2013). The results support the priori condition too as the size of the bank increases, the banks tend to become more innovative and technological savvy. Thus it can be concluded that the large banks in India adopt smart cards easily.

The present study has rejected significant impact of profitability on the banks' adoption decision regarding the smart cards. This finding is similar to the findings of Hannan and McDowell, 1985; Corrocher, 2006 and Deyoung *et al*., 2006. Moreover, the results of fixed cost (b = 0.093, p = 0.208) and branch intensity (b = 0.167, p = 0.1402) are found to be insignificant and thus confirmed its least impact on the adoption decision of the banks regarding smart cards. Also, the insignificant coefficient of non-performing assets (b = 0.025, p = 0.3143) signifies that the probability to adopt smart cards by banks in India is not affected by it. These findings of the study coincide with the finding of Hannan and McDowell, 1983; Hannan and McDowell, 1984; Bughin, 1999; Gourlay and Pentacost, 2005, Hester *et al*., 2001 and Malhotra and Singh, 2007

According to the empirical results, deposits have positive and significant coefficient having the value i.e. 3.949 which depicts that with the increase in deposit, the chances of adoption of smart cards also increases. It may be due to the fact that those banks who already have higher deposits try to retain their market by offering new competitive product and services. The findings of the study are similar to the findings of Hannan and McDowell, 1984; Sharma, 1993; Bughin, 1999; Gurthrie, 1999; Andriy, 2001; and Malhotra and Singh, 2007.

As per the findings, the coefficient of age is positive i.e. 0.122 and having significant effect on the probability of adoption of smart cards by banks. Hence, the older and experienced banks in India have greater propensity to adopt smart cards. These results coincide with the findings of Gourlay and Pentecost, 2005.

The larger share of the bank in industry induces it to be more innovative in nature (Hasan, 2002; Corrocher, 2002; Malhotra and Singh, 2007; Murrillo, 2010 and Sullivian and Wang, 2013). The market share in case of smart card adoption decision of the banks found to be the most important determinant of adoption of smart cards by banks in India having the value of coefficient of 21.13. It shows that the industry advantage push the banks to respond quickly for the adoption of new technology.

Noninterest income is found to have significant and positive coefficient i.e. b = 0.257, p = 0.019. It indicates that the banks which are already diversified and have large proportion of income generated from fee and other value based services have more likelihood to adopt smart cards. The similar findings have been reported by Bughin, 1999; Andriy, 2001; Corrocher, 2001; Furst *et al*., 2002; and Sullivan and Wang, 2013.

Public and private sector banks are found to be more innovative than the foreign sector banks as the results are significant and having positive coefficients i.e. 1.68 and 2.96 respectively. It depicts that public and private sector banks take more initiatives regarding adoption of credit cards than foreign sector banks in India.

To conclude, the empirical findings suggest that the diversified banks having large size, having more market share with less profitability and more deposits have higher probability to adopt credit cards in India.

## SUMMARY AND CONCLUSIONS

The empirical results regarding the determinants of diffusion and adoption of credit cards show that private sector banks are eager to adopt new technology rapidly as compared to public and foreign sector banks in case of all types of cards. Also, the foreign sector banks are found to be least innovative in case of plastic cards in India. The reason behind it is that the foreign sector

banks in India are more involved in the wholesale and corporate banking than that of retail banking and payment system.

Table 4 shows that size of the bank plays an encouraging and dominant role in the adoption decision of credit card. It depicts that the banks which are comparatively larger in size and possess more assets have capacity to innovate at greater pace. Market share as industry advantage too plays a significant role in taking decision regarding the adoption of credit cards by banks. It positively and significantly affects the diffusion and adoption of plastic cards. It can be finally said that banks take advantage of their industrial competence and thus try to be more innovative. Other remarkable results report that the more diversified banks, which earn non interest income fetched by modern services and products, have more propensity to adopt plastic cards.

**TABLE 4: SUMMARY OF EMPIRICAL FINDINGS OF THE DETERMINANTS OF DIFFUSION AND ADOPTION OF PLASTIC CARDS IN INDIAN BANKING SECTOR**

| Variable | Empirical Results |
|---|---|
| **Size** | **Yes (+ve)** |
| **Profitability** | No (-ve) |
| **Fixed Cost** | No (+ve) |
| **Deposits** | **Yes (+ve)** |
| **Branch Intensity** | No (+ve) |
| **Age** | **Yes (+ve)** |
| **Market Share** | **Yes (+ve)** |
| **Non Interest Income** | **Yes (+ve)** |
| **Non Performing Assets** | No (-ve) |
| **Public Sector Banks** | **Yes (+ve)** |
| **Private Sector Banks** | **Yes (+ve)** |

*Source: Compiled from the empirical results of present study*

*Note: Here, Yes means statistically significant at 1%, 5% or 10%; No means not statistically significant at 1%, 5% or 10%; '+ve' means variable having positive relation with adoption and '-ve' means variable having negative relation with adoption.*

Lesser deposits are likely to increase the chances of its adoption of credit cards so as to enhance the customer base in future. Notable results have been observed in case of age of the bank. Younger banks are found to be keen to adopt credit cards.

Profitability has also shown noteworthy results. The less profitable banks were found to adopt credit cards sooner. Non-performing Assets (NPAs) as a measure of credit risk also reported significant impact on the adoption decision regarding credit cards. Apart from it, other variable i.e. fixed cost has the negligible impact on the adoption and diffusion of credit cards. Last but not the least, branch intensity representing geographical network of the banks has not influence the diffusion and adoption of plastic cards.

## IMPLICATIONS OF THE STUDY

The results of the study are reliable and authentic in the sense that data has been collected from authentic sources and further the tests conducted for the empirical analysis are best suited accordingly to the objectives stated. The current study is expected to be of great use to the regulators, commercial banks, other financial institutions, bank customers and other service providers. The study has also analysed the various determinants which affect the decision of banks

regarding the diffusion and adoption of plastic cards. Thus, a comprehensive model has been developed which can assist the bankers to check the rate of success of upcoming innovation within the industry. The present study may help the regulators to frame polices and guidelines while introducing new technology in the industry which are best suited to customers as well as bankers.

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