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INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

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APPENDIX/ANNEXURE

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- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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ONLINE RESOURCES

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WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

STATUS OF BI SOLUTIONS AT SELECTED BRANCHES OF BANKS IN RAJASTHAN

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ABSTRACT

In the wake of global financial crises the efficiency of the banking sector has also come under scrutiny. The mainstay of Indian economy has been the strength of its banking system. With rapid development in the field of information technology, the use of business intelligence practices in banking sector has increased many folds. In an empirical study of 25 selected Indian banks in the state of Rajasthan, the status of Business Intelligence and its applicability at branch level due to implementation of Business Intelligence (BI) solutions have been studied. The major finding is that public sector banks are lagging in implementation of business intelligence solutions compare to private banks. Branch Manager does not make much use of Dashboard and scorecard tools. They are confined to use standard and ad-hoc reporting tools only. At Branch level, fraud prevention and detection analysis and Key Performance Indicators (KPI) analysis are highest application being utilized by the respondent's bank. Execution of regulatory compliances is highest benefit perceived by the respondents. New banks are in better position to implement business intelligence solutions compare to old banks. The research is particularly useful for practitioners in the banking field and suggestions have been given toward the end of paper.

KEYWORDS

Banking, BI Implementation, Business Intelligence, Decision Making, Financial Benefits.

INTRODUCTION

With the globalization and removal of business boundaries, customer, supplier and competitor base has been increased, which has also increased the complexity of decision making process. The emergence of fast communication makes environment less stable and unpredictable and provides less time for examining the available business information, knowledge, and intelligence. Decision makers are taking decision by considering various factors based on strategies and actual performance (Khan and Saxena, 2011).

The decision making depends on quality of available data, tools and technology, trust, flexibility and sound judgments taking capability of decision makers. Business Intelligence (BI) systems should facilitate the decision makers to correct their intuition by taking advantage of analytical tools, which can test and verify intuition before applying it to the decision making process. Decision maker can also use predictive models to improve their decision making. The current state of decision making is forcing us to reap the real benefits of business intelligence.

Storing vast amounts of data does not ensure effective decision making. Business intelligence solution must turn dynamic, detailed data into information, and make it available in real-time to the decision makers at the time of a decision. Actionable information must be accessible on-demand when it's required. It provides trends and patterns that might otherwise go undetected and unseen by decision makers. To be a successful bank, it needs a foundation of accurate, current and complete information rather than managing a bank on intuition, educated guesses or averages. Business Intelligence can derive better return on investment (ROI) from complex integrated banking software and other operational system implemented by unlocking the wealth of information stored in these systems by consolidation of data from many sources, including a diverse customer base, extensive branch networks, and shareholders at data warehouse and utilization of various business intelligence tools.

REVIEW OF LITERATURE

A review of literature of various studies related to applicability of business intelligence and financial benefits achieved due to BI implementation in banks clearly shows that very limited research has been done in Indian context. As per Morris et al., (2002) conducted a study on the financial impact of Business Analytics based on 43 case studies of organizations that successfully implement and utilize analytic applications by interviewing in-person. The project goal was to examine the return on investment (ROI) for analytic applications and financial impact of analytic applications on the core business processes that help contribute to an organization's success. They found that businesses that make an investment in analytics can achieve a significant and rapid return because of increased efficiencies and expanded opportunity.

As Williams and Williams (2003) suggest that the business value of BI lies in its use within management processes that impact operational processes that drive revenue or reduce costs, and/or in its use within those operational processes themselves. The quest for delivering business value via BI can be seen as a matter of determining how an organization can use BI to improve management processes such as planning, controlling, measuring, monitoring, and/or changing so that management can increase revenues, reduce costs, or both. And also to improve operational processes such as fraud detection, sales campaign execution, customer order processing, purchasing, and/or accounts payable processing so that the business can increase revenues, reduce costs or both

According Eckerson (2006), most of the benefits from business intelligence are intangible in nature, which makes organizations to justify in terms of cost based on survey of 510 respondents by the data warehousing institute in 2003. Kalakota and Robinson (2001) suggested that a business intelligence system built on a data warehouse is about empowering best people of organization to gain insight from exploiting the information organization has spent millions to control and years to develop. The data warehouse with business intelligence has the potential to enable users to continuously produce enormous, sustainable, measurable benefits that lead to competitive advantage and fulfill the promise of IT.

As per IBA-Finsight (2007) special report suggests about the operational business intelligence in banking, it delivers information and insights to those manager that are involved in operational and transactional processes. While serving a customer at a counter, the executive can cross sell other product based on the information and analytics available from operational business intelligence system based on customers past transactions. The operational business intelligence reduces the time it takes for a line of business user or application to react to business issue or requirement. The data latency to data warehouse should be as small as possible to get operational analytics. ICICI bank had implemented the SAS solutions to address this problem. Nadeem and Hussain (2004) studied Credit Information Bureau (CIB), State Bank of Pakistan (SBP), which maintain the information related to borrowing. The CIB is acting as central repositories in SBP to provide the credit worthiness report. The bank was in need of providing fast, accurate, and dynamic analysis on both individual and group basis. They have developed and customized the business intelligence solution OLBA-Online Business Analyst using oracle 9i database, MS SQL Server (data staging) and C# programming language. The software provides credit worthiness analytics based data with graphical visualization.

Bach et al. (2007) studied to explore usage of business intelligence tools in Croatian banks. Author had examined the possible business tools and their usage in general, and then explored their possible usage in banks. The survey on usage of business intelligence tools in Croatian banks was conducted. The results of the survey revealed that only 46% of Croatian banks use both main business intelligence tools (data mining and data warehousing). Banks which use business intelligence tools differ from the banks which do not have such a system. They differ in the following characteristics: size of total assets, participation of their own assets in the Croatian banking sector, size of off-balance items, size of income and capital stock and rate of capital adequacy. Banks which use business intelligence tools are larger and more successful. Large and successful banks invest more in information technology, especially business intelligence in the purpose of more efficient business reporting. By using business intelligence tools, these banks will use their organizational knowledge even better, and consequently they will become even more successful. This will make possible to invest even more into advanced information technology.

As per InformationWeek, News Network, published on 11th March, 2010, the Yes bank was awarded the Financial Insights Innovation Award for innovation in Business Intelligence at the Asian Financial Services Congress for its efforts in driving enterprise-wide, actionable business intelligence. The bank has sought a comprehensive focus across retail liabilities, corporate assets, operational risk, and asset-liability management, with the end-game of providing financial, risk, operational, and customer intelligence to the right users, in the right place, at the right time, and in the relevant format, delivered in a secure, automated environment. Bank uses Credit Risk management solution to measure, manage and mitigate credit risk across its retail assets by using its superior data mining and statistical analysis capabilities (IDBI, 2011). Max New York Life (MNYL, 2011), a joint venture of two leading global businesses, (Max India Limited and New York Life International), has adopted SAS technology to transform its efforts to strengthen customer retention and cross-selling to a tightly segmented customer base. With SAS, Max New York Life has access to the right data, the right models, and the right execution. As a result, high-margin revenue from cross-selling has tripled. Earlier, only Seven percent of revenue came from existing customers. In the first quarter after implementing SAS, sales to existing customers reached more than 20 percent.

The success of business intelligence implementation can be measured with overall improvement in business performance and facts based decision making.

METHODOLOGY

A structured questionnaire was developed for collecting the data related to implementation of business intelligence solutions at branch level. The questionnaire seeks to extract responses from IT Manager/Branch Manager or In-charge of BI or Person who understood and utilized business intelligence solutions at branch from selected banks of Rajasthan. They were identified through stratified judgment sampling.

In India, as per the reports available from Reserve Bank of India website, there are about 105 scheduled banks operating in India. The study included 20 banks like SBI, IDBI, SBBJ, Bank of India, Allahabad bank, Bank of Baroda, Corporation Bank, Dena Bank, Uco Bank, OBC, Union Bank of India, Vijaya Bank (public sector) and Yes Bank, Kotak Mahindra, HDFC Bank, Axis Bank, ICICI Bank, ING Vasya, IndusInd Bank, Karnatak Bank, HSBC (private sector) for the regional/zonal/head offices data collection regarding the usage of business analytics using business intelligence solution.

TABLE 1: RESPONSE PATTERN OF BANKS AT BRANCH LEVEL

	No. of Respondents		Responses
	Approached	*Respondents*	
Public Sector Banks	14	12	86%
Private & Foreign Banks	11	8	73%
Total	25	20	80%

The researcher have collected data about the respondent organization like name of bank, inception year of bank, category of bank and to get knowledge about business intelligence used in banking by framing various questions related to practices followed for implementation of business intelligence solutions in bank. Implementation of business intelligence solutions in banks with the practices followed were categorized in term of organizational factors such as management commitment, effective steering committee, user initiative, availability of IT skills, analyst and training facilities, work culture, qualities of BI staff and implementation consultant, and partnership between IT and business, financial factor like availability of funds, and technological factors such as data quality, quality of ETL tools, complexity of BI solutions, data warehouse update time, responses to queries and implementation of core banking solution, ERP, CRM and SCM. Banks which were established in 1994 and thereafter considered as new banks while banks which were established before 1994 were considered old banks. Public Sector Banks means any Government Sector Bank/Institute that goes public i.e. it issues its shares to general public. It also has a greater share of Government of India or Reserve Bank of India (more than 50%).

Responses were collected from IT Manager/Branch Head of the various banks on the various items. The respondents indicated the extent to which they attach importance on various factors while implementing and utilizing business intelligence in day to day and long term decision making.

ANALYSIS OF BUSINESS INTELLIGENCE STATUS AT BRANCH

The status of business intelligence in respondents' bank at branch level is assessed by collecting data from the part I of section B. In this section, various question related to status of business intelligence have been asked to the respondents including information technology uses, categories of BI tools used, and access of BI at branch level as operational BI.

INFORMATION TECHNOLOGY'S USAGE

Information technologies used by the respondent banks is consolidated in the Table 2. As revealed in Table 2, an Internet usage in the banks is 65% at frequency of low level and 20% at higher frequency. Intranet applications are used by private and foreign banks at 75% (as High) compared to public sector banks 41.7% (as High). Public sector bank used intranet 58.3% (as Moderate). The decision support system is being used 62.5% (as Moderate) compared to 50% by public sector banks.

TABLE 2: INFORMATION TECHNOLOGY'S USAGE AT BRANCHES

Criteria	Public		Private & Foreign		Total	
% within Category	*N*	*%*	*N*	*%*	*N*	*%*
Internet						
Low	9	75	4	50	13	65
Moderate	2	16.7	1	12.5	3	15
High	1	8.3	3	37.5	4	20
Intranet						
Low	0	0	0	0	0	0
Moderate	7	58.3	2	25	9	45
High	5	41.7	6	75	11	55
Decision Support System (DSS)						
Low	4	33.3	1	12.5	5	25
Moderate	6	50	5	62.5	11	55
High	2	16.7	2	25	4	20
Business Intelligence (BI)						
Low	6	50	0	0	6	30
Moderate	5	41.7	3	37.5	8	40
High	1	8.3	5	62.5	6	30

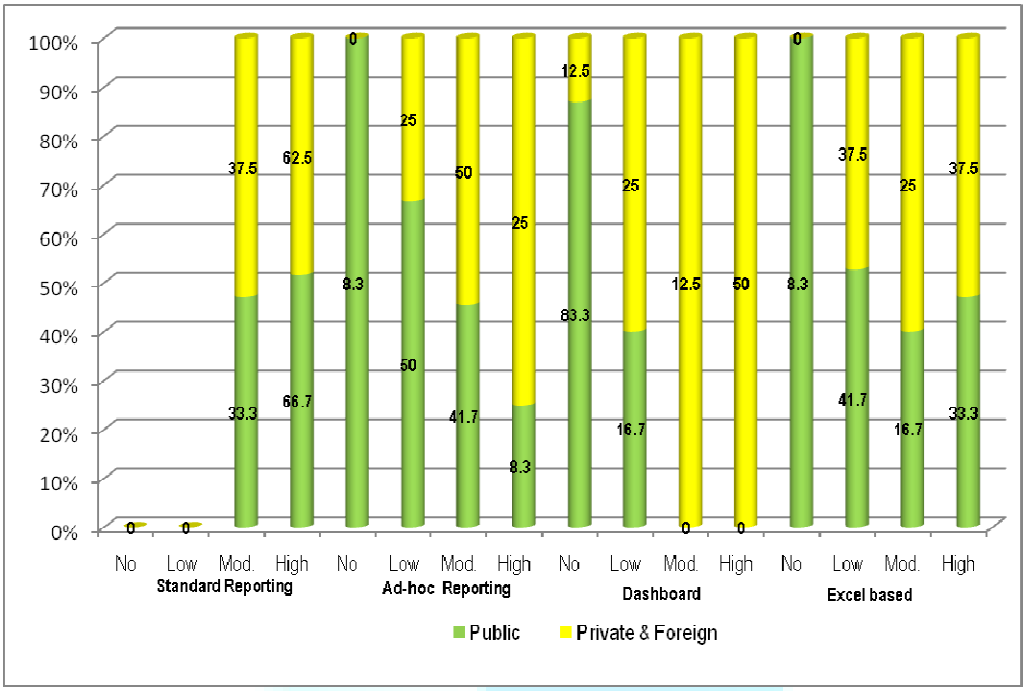
Applications based on DSS are not much popular at branch level. Two thirds of the private and foreign banks (62.5%) are using business intelligence at high frequency where as public sector respondents, are using only 8.3% (as High). But over all, BI is used only 30% as high at branch level which indicates that in branches whether private or public sector banks, it is not used frequently.

CATEGORIES OF BUSINESS INTELLIGENCE TOOLS

Respondents from Branches have given their view about the business intelligence tools like standard reporting, ad-hoc reporting, dashboard, and excel. Two third of banks (65%) including public and private banks are having standard reporting tool and they are using it at High level where as 35% are using it at Moderate level. Ad-hoc reporting tool is used 45% at "Moderate", where as 35% are using at "Low". The pattern of utilization of Ad-hoc reporting is similar in both public and private banks.

Dashboard tool is an essential tool of BI and it gives a graphical view of various key performance indicators with controlling parameter of operation of branch. But it is surprising that 55% banks does not have dashboard. 83.3% respondents have given their opinion "Not at all" on use of dashboard tool in public sector category. Only 20% in overall banks are using Dashboard. Private and foreign banks' branches are ahead in using dashboard for monitoring their performance.

FIGURE 1: VARIOUS CATEGORIES OF BI TOOLS AT BRANCHES



Excel is still a supportive tool to get analytics from exported transaction data. As per responses, 35% of all banks are using excel as High where as 40% of banks are having lower use. It is concluded from the responses given by the respondents that private, foreign and public sector banks are equally utilizing the BI tools except the dashboard which is better utilized by private and foreign banks as shown in Fig. 1.

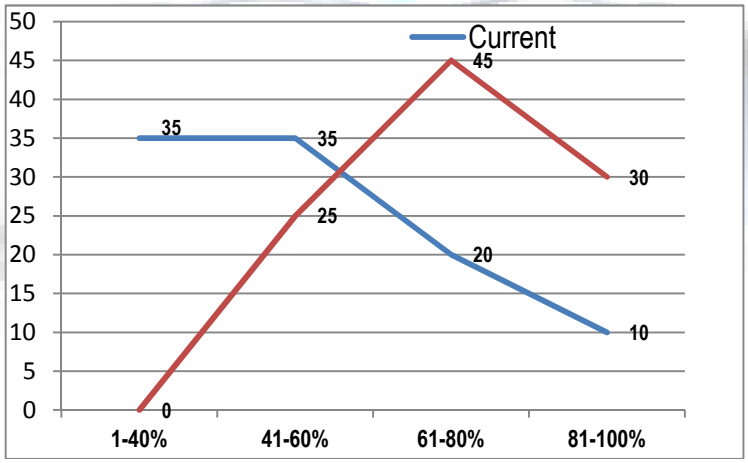
ACCESS OF BUSINESS INTELLIGENCE AT BRANCH LEVELS

The response received to get the response on current available access of business intelligence versus BI should have at various levels, is depicted in the figure 2. There were four blocks given to check the current and should have access to the respondents. It is revealed from the responses that 70% of banks are having access of less than 60% at branch level. Only 30% banks would like to access in 81-100% bracket. 60% of public sector banks using BI (1-40% range) while 75% private and foreign banks are accessing BI in the range of 61-80% and 81-100%.

APPLICABILITY FOR BUSINESS INTELLIGENCE

Responses were collected from branch head or operation head of the various banks on the various items by using 5-point rating scale of importance, where 1 = very poor, 2 = low, 3 = medium, 4 = high and 5 = very high. The respondents indicated the extent to which they attach importance on various applications.

FIGURE 2: ACCESS OF BI AT VARIOUS LEVELS



It is conceived from the Table 3 that the three applications fraud prevention and detection analysis, fair banking practices analysis and Key Performance Indicators (KPI) have highest application being utilized by the respondent's bank with mean 4.2, 3.65 and 3.40 respectively. Fraud prevention and detection analysis is highly applicable in present circumstances as every banks is utilizing information technology based automated system.

TABLE 3: DESCRIPTIVE STATISTICS OF APPLICATIONS USED AT BRANCH

Applications	Mean Score*	Std. Deviation	C.V. (Percent)	Result @5%
Fraud Prevention	4.20	0.70	16.57	NS
Fair Banking	3.65	0.88	23.98	S
KPI	3.40	1.23	36.21	NS
Branch Profitability	3.35	1.14	33.93	NS
Account Profitability	3.30	1.17	35.58	NS
Collection Recoveries	3.30	0.86	26.20	NS
Segmentation	3.25	1.07	32.92	NS
Individual Profitability	3.05	1.10	36.03	NS
Cross Sell	3.05	0.94	30.97	NS
Attrition Analysis	3.00	1.30	43.26	NS
Channel efficiency	2.75	1.33	48.46	NS
Product Profitability	2.50	1.24	49.42	NS
Operational Analytics	2.20	1.58	71.64	NS
Campaign Analysis	1.05	1.43	136.36	S

*** Mean score is the average on 5-point interval scale of importance**
S=Mean importance score is significantly greater than that listed immediately below, based on t test
NS=Mean importance score is not significantly greater than that listed immediately below, based on t test

Campaign analysis application with mean score 1.05 was considered least applicable by respondents. Reason of lower applicability of Campaign analysis is least used at branch level. Fraud prevention (CV=16.57%) applications has lowest variation in response, which means that the responses are consistent and therefore mean score can be considered highly representative where as Campaign analysis has highest variation (CV=136.36%), which means that responses varied greatly and it can be said that mean score is least representative. Further, One-Sample Kolmogorov-Smirnov test for significance shows that the result of the One-Sample Kolmogorov-Smirnov test is significant for fair banking and campaign analysis.

FINANCIAL BENEFITS OF BUSINESS INTELLIGENCE

It is clear from the Table 4 that the execution of regulatory compliances is highest benefit perceived by the respondents with mean 3.45. Financial benefits in term of cost reduction is with mean score 2.55 has considered least applicable by respondents. Reason of lower response might be due to public sector banks which do not give much importance to cost reduction.

TABLE 4: DESCRIPTIVE STATISTICS OF FINANCIAL BENEFITS OF BI AT BRANCH

Financial Benefits	Mean Score*	Std. Deviation	C.V. (Percent)	Result @5%
Execution Compliance	3.45	1.05	30.44	S
Revenue Growth	2.95	1.19	40.37	NS
Competitive Advantage	2.95	1.05	35.60	NS
Budget Control	2.65	1.14	42.89	NS
Cost reduction	2.55	1.19	46.70	NS

*** Mean score is the average on 5-point interval scale of importance**
S=Mean importance score is significantly greater than that listed immediately below, based on t test
NS=Mean importance score is not significantly greater than that listed immediately below, based on t test

Execution of regulatory compliance (CV=30.44%) has lowest variation in response, which means that the responses are consistent and therefore mean score can be considered highly representative where as cost reduction has highest variation (CV=46.70%), which means that responses varied greatly and it can be said that mean score is least representative. All results are of One-Sample Kolmogorov-Smirnov test show that all factors which delivered financial benefits are non significant except execution compliances.

FINDING AND CONCLUSION

BUSINESS INTELLIGENCE STATUS AT BRANCHES OF SELECTED BANKS

- Internet usage by the respondents of public sector banks at "Low" frequency is 75% and private and foreign banks is 50%. But an Internet usage at "High" frequency is 37.5% by private and foreign banks in comparison to 8.3% public sector banks. Overall only 20% respondents are using internet as "High".
- Three forth (75%) of private and foreign banks respondent and 41.7% from public and private banks confirm about the intranet usage at "High" frequency. In over all, 55% usage of intranet at "High" and 45% at "Moderate" level.
- Almost two third (62.57%) from private and foreign and 50% from public sector banks respondent is habituating Decision Support System at moderate frequency. 25% of private and foreign bank respondent is utilizing DSS at High frequency in compare to 16.7% of public sector banks.
- Business intelligence is used 30% as "High" and "Low" each and 40% as "Moderate" by respondent managers. In public sector category, only 8.3% is at "High" and 41.7% at "Moderate" where as in private bank category, 62.5% is used at "High" and 37.5% at "Moderate" by the respondents.
- Business intelligence is underutilized. The banks have significant opportunities to increase the use of business intelligence technology to support critical decision-making and operations.
- All banks including public and private banks are having standard reporting tool implemented as reported by respondents. 65% respondents are using as "High" and 35% as "Moderate".
- 15% Ad-hoc Reporting tool is used by respondents as "High", 45% as "Moderate", 35% as "Low". 5% respondents does not use ad-hoc reporting tool.
- Dashboard tools do not posses by 83.3% public sector banks and 12.5% private and foreign banks. In public sector banks, only 16.7% banks are using dashboard as "Low" frequency compare to 50% as "High" by private and foreign banks. Overall, 55% respondents does not have dashboard tool implemented.
- 35% respondents are employing Excel based analytics at "High" frequency where as 20% at "Moderate", 40% at "Low" frequency. 5% respondents do not use excel based analytics.
- Only 10% of respondents' bank is practicing of business intelligence in 81-100% group. 20% in 61-80%, 35% in each 41-60% and 1-40% respondents have access of business intelligence at branch level as operational BI. Respondent suggests, BI access should be 30% in 81-100% group, 25% in 41-60% and 45% in 61-80% at branch.

APPLICABILITY OF BI AT BANK'S BRANCH

- Two applications fraud prevention and detection analysis and Key Performance Indicators (KPI) analysis are highest application being utilized by the respondent's bank.
- Branch, account and individual profitability, collection recoveries, segmentation, and cross sell analysis are other applications which is being used by respondent's bank.
- Fraud prevention, Fair banking and KPI are applications given higher importance.
- Execution of regulatory compliances is highest benefit perceived by the respondents with mean score 3.45.
- Financial benefits in term of cost reduction are considered least applicable by respondents.
- Execution of regulatory compliance and competitive advantage has lowest variation in response, which means that the responses are consistent and therefore mean score can be considered highly representative.
- All factors which delivered financial benefits are non significant except execution compliance.

SUGGESTIONS FOR IMPROVEMENT TO REAP THE BENEFITS OF BI SOLUTIONS

Despite the implementation of sophisticated information technology infrastructure, a level of satisfaction out of delivered information is relatively low. Business Intelligence solution make up a complex solution that allows meeting such needs and fills the information gap by creating intelligent enterprise. To achieve improvement in the implementation of business intelligence solution at branches of banks, it is worthwhile to consider the following suggestions:

SUGGESTIONS TO BRANCHES OF THE BANKS AND RESPONDENT MANAGERS INCLUDEs;

- Branches should utilize various BI tools other than core banking system (CBS).
- Branches should also utilize intranet based applications for knowledge sharing.
- Performance management analytics usage in terms of branch and employees should be increased which is under utilized as of now.
- Branches should increase its business intelligence penetration towards operational BI and tactical level, which is currently at strategic level only.
- It is found during data collection that branch heads are not having any schedule of working on analytics. It is suggested that Branch manager/Operation head at branch should make a weekly and monthly schedule of doing analytics based on the customer data available with core banking system for their city.
- It is suggested that branches should perform analytics for customer profitability (at least account type and branch wise), channel efficiency analysis for various channels like branch, ATM, Internet, Mobile etc., customer segmentation for better cross sell and up sell of the products, customer churning analysis to retain good customer and increase their loyalty, and product profitability to increase sale of more profitable products.
- Braches should also perform anti-money laundering analysis to check the suspicious transactions, which is a regulatory requirement too.
- Branches should make Non-performing asset analysis on regular basis along with collection recovery analytics to reduce NPA.
- Branches should also make fair banking analysis which is also a regulatory requirement.
- Branch manager should use dashboard to see the key performance indicators of their branch on continuous basis to monitor and control the branch operation.
- With discussion held with branch manager during data collection, it is found that branch heads are lacking the knowledge and power of analytics. It is suggested that branches should conduct regular orientation and training programs about importance of business analytics for their employees. These programs should be conducted at least once in six months.
- Branches should also conduct some motivational and recreational programs on half yearly basis to break the monotony of job and rejuvenate them to perform better.

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