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Decision Support System in Banking Sector : A Critical Study of the Factors Responsible for Planning of the System

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Abstract

In ever increasing competitive business environment of these days, decision support systems (DSSs) are vital for effective decision-making of a manager in an organisation, which in turn are responsible for the survival and growth of the organisation. The study reveals DSS is very useful for the people engaged in the design and development of decision support system and those who are involved in strategic decision-making in the banking sector. It empowers the management with the decision tools and models that help in taking decisions for unstructured or semi-structured problems at all levels of management. This study shows that it helps the top management for formulating the policies, fixing the business goals and objectives. This would also help in developing the long-term as well as short-term plans. The study reveals that DSS is an important tool in the hands of managers to take decisions which helps in increasing efficiency of the operations and improves the planning activities at various levels of management. It helps effectively in the management of customer relationship. The DSS helps the management to chalk out the optimum strategies keeping in view the strategies of the competitors and the resource constraints of the organisation.

INTRODUCTION

Today, all employees need integrated information systems to do their daily activities. Their activities have shifted from procedure based to goal based, where the enterprise and its objectives are more important than the individual processes. Organizations are turning to technology enabled organizations where the people are

replaced/assisted by IT. The information system (IS) objectives shift from right information at right time to process improvement. All the organizations are exerting towards leveraging the best value of IT for competitive advantage. However, for some of them this has become the necessary condition for survival.

DSS is a specialized kind of information system that helps the decision-makers in the organizations at handling semi-structured and unstructured problems. It supports the decision-makers in evaluating various alternatives and selecting an optimum alternative and also supports the decision-makers in what-if analysis. Purpose of DSS is to establish an integrated framework between the problem, machine and decision-maker. It allows the manager to interactively query large reservoir of data and to isolate information that was of particular interest to a specific problem.

LITERATURE REVIEW

Rawani and Gupta (2002), in their paper titled, "Role of Information Systems in Banks : An Empirical Study in the Indian Context" made an attempt to explore empirically the difference in the role of IS in the banking industry, i.e., between public sector, private sector, and foreign sector banks operating in India. In this paper, a strategic grid has been used to determine the role played by IS in banks. The study is focused on the role of Information Systems in banks from the perspective of technical persons in development and maintenance of IS, i.e., strategic or supportive. The study indicates that IS plays a supportive role in public sector banks and a strategic role in private and foreign sector banks. The study also indicates that the future impact of IS does not vary significantly with the banking groups.

Ramadhyani (2006), in his paper titled, "Audit of Banks Operating in a computerized Information Systems Environment" focused on audit related issues of IS in banks. It is emphasized that the use of computers changes the processing, storage, retrieval and communication of financial information and may affect the accounting and internal control systems employed by a bank. The potential for human errors in the development, maintenance and execution of computer information systems may be greater than in manual systems, due to level of details inherent in these activities. Through audit reviews we can have a thorough look and understanding of IS in a bank. The audit of IS will provide us general understanding of IS in a bank, managing authentication of users, access control, data security, data integrity, audit logs, testing, accounting entries, data migration, network and RDBMS security, business continuity and disaster recovery plans, hacking, identification of transaction for substantive checking, and use of reports generated by system & documentation.

Rajashekara (2004), in the paper titled, "Application of IT in Banking" talked about impact analysis of IT on banking. The problem of doing proper impact analysis is due to difficulty of measuring output accurately when the quality of service is changing as a result of such factors as convenience, speed, and lower risk. Through IT, banks anticipate reduction in operating costs through such efficiencies as the streamlining back office processing and elimination of error-prone manual input of data. Due to IT, banks can offer new products and services. Banks are able to develop and implement sophisticated risk, information management system and techniques with more powerful data storage and analysis technologies. IT has positively affected the stakeholders of bank like management, employees, and customers.

Delone and Mclean (2003), in their paper titled, "The Delone and Mclean Model of Information Systems Success" presented Information Systems (IS) Success Model as a framework and model for measuring the complex-dependent variable in IS research. They discussed the utility of the model for measuring e-commerce system success. The study was focused on measuring e-commerce system success through a proposed model.

Malik and Goyal (2003), in their paper titled, "IS Alignment and IS Effectiveness : Experiences from Indian Industry" proposed a model to evaluate information system (IS) alignment with business goals and internal organizational environment. The model has been applied to study Indian automobile industry. The study reveals level of alignment between various functional areas with respect to common understanding of business goals. Some possible areas to improve upon IS alignment are highlighted.

Smith et al. (2002), in their research paper titled, "Implementation of Intelligent Decision Support Systems in Health Care" concluded that DSS are valuable tools available to the marketing decision-makers. They allow the decision-makers to make objective and consistent decisions by supporting the fast solution of complex and semi/unstructured problems. They allow the user to experiment with strategies under different scenarios using simulation or sensitivity analysis.

OBJECTIVES OF THE STUDY

1. To identify and analyze the factors determining need of DSS
2. To analyze the environmental factors affecting DSS
3. To study and analyze the effect on the working of business processes
4. To study and analyze the quality of information generated.

RESEARCH METHODOLOGY

The study is based on the primary data collected from the respondents, who were selected scientifically from Head office, Zonal office, Regional office and the various branches of the State Bank of Patiala.

Sampling technique used for the research is the stratified random sampling at all the levels of management.

Sample distribution is given in Table 1. Primary data was collected through a well-designed questionnaire by conducting personal interviews with the selected respondents. The questionnaire was designed after holding discussions with many academicians and professionals in the field with respect to comprehension, depth of study and relevance. To ensure the quality of the instrument, it was tested for its reliability, content validity and sensitivity.

Table 1
Level-wise Distribution of Respondents

Management Level	Population	Sample	Actual Response	Response Rate (per cent)
Level I	34	17	14	82.35
Level II	398	80	54	67.50
Level III	1015	102	90	88.23
	1447	199	158	74.37

Sensitivity of the questions was also found good as Likert scales were used to gather the responses on the perceptions of the respondents. Second, multiple questions pertaining to similar theme were incorporated to ensure the sensitivity. Secondary data was collected from the records/reports, etc. of the respective organizations. A total of 158 respondents from the various offices and branches of the bank participated and responded to the questions enlisted in the questionnaire. In order to reach meaningful conclusions, collected data was analyzed by making use of appropriate statistical and mathematical tools.

SPSS Package was used to compile and analyze the data collected from field survey. Frequency distributions were studied to gather the first hand information on various variables considered for the study. Further, the data was analyzed for Mean & Standard Deviation of the frequency distribution of the various variables under study.

DATA ANALYSIS

The analysis of the various factors considered in view of the objectives listed above is given below :

1. Need of Decision Support System

In all, 17 factors were considered for analysis to determine the need of Decision Support System. Frequency distribution of the rating of various factors by the respondents, determining the need of DSS is shown in Table 2.

Table 2

Frequency Distribution for Need of DSS

S. No.	Factors	Not at all Important		Neutral		Important		Very Important		Most Important	
		N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent
1.	Long-term & Short-term Goals of the Business	0	0.00	0	0.00	25	15.82	88	55.70	45	28.48
2.	Better Vision and Strategy	0	0.00	0	0.00	5	3.16	100	63.29	53	33.54
3.	Market Share	0	0.00	6	3.80	30	18.99	69	43.67	53	33.54
4.	Product and Services	0	0.00	0	0.00	9	5.70	83	52.53	66	41.77
5.	Timely and Right Decisions	0	0.00	0	0.00	8	5.06	77	48.73	73	46.20
6.	Value Added Services	0	0.00	3	1.90	8	5.06	78	49.37	66	41.77
7.	Efficiency of Work	0	0.00	0	0.00	14	8.86	55	34.81	89	56.33
8.	Utilization of Resources	0	0.00	3	1.90	12	7.59	77	48.73	64	40.51
9.	Cost and Time Reduction	0	0.00	0	0.00	22	13.92	72	45.57	64	40.51
10.	Accuracy in the System	0	0.00	9	5.70	20	12.66	66	41.77	63	39.87
11.	Customer Relations	0	0.00	3	1.90	9	5.70	85	53.80	61	38.60

Table 2 (Contd.)

12.	Communication within the Organization	0	0.00	0	0.00	11	6.96	71	44.94	76	48.10
13.	Management Planning	0	0.00	0	0.00	28	17.72	71	44.94	59	37.34
14.	Edge Over Competitors	0	0.00	0	0.00	14	8.86	78	49.37	66	41.77
15.	Cash Management	0	0.00	2	1.27	28	17.72	96	60.76	32	20.25
16.	Improvement in Revenue/Profit	0	0.00	8	5.06	17	10.76	72	45.57	61	38.61
17.	Economic Performance of Firm	0	0.00	3	1.90	17	10.76	92	58.23	46	29.11

Three of the respondents did not respond to the factor 'Value added services' and two of the respondents did not respond to the factor 'Utilization of resources' with their percentages as 1.90 and 1.27 respectively.

The above table reveals that none of the 158 respondents considered any of the factors as 'Not at all Important'. And in 8 of the 17 factors considered, the number of respondents that remained neutral were nine or less than nine and thus constituted less than 5.7% of the sample size. The rest of the respondents considered all the factors either 'Important', 'Very Important' or 'Most Important'. Mean and Standard Deviation scores for these factors, levels as well as overall, have been tabulated in Table 3 below. Overall score of all the factors is found to be more than 4 varying from 4.031 for Cash Management to 4.500 for Efficiency of Work.

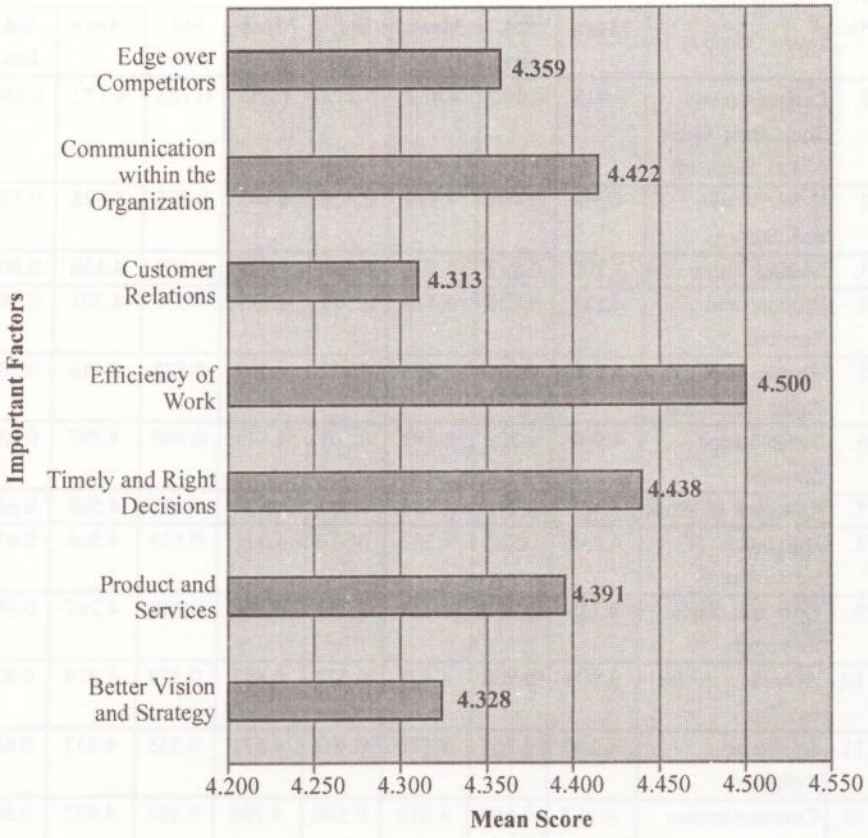
It is observed that while the factor Efficiency of Work has been rated the highest by both Lower Level (4.367) and Top level (4.857) of management, the Middle management rates the factors Market Share, Timely & Right Decisions and Value Added Services with a score of 4.593 in each case as most important. Cash Management has been rated the least both by the Middle (4.296) & Top management (3.714) but according to Lower management Market Share (3.700) is least important that has been perceived by the Middle management as most important.

Table 3
Mean & Standard Deviation of the Factors for Determining Need of Decision Support System

S. No.	Parameters	Lower Level N=90		Middle Level N=54		Top Level N=14		Overall N=158	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1.	Long-term and Short-term Goals of the Business	3.933	0.640	4.407	0.572	4.286	0.756	4.172	0.656
2.	Better Vision and Strategy	4.200	0.484	4.519	0.509	4.143	0.690	4.328	0.536
3.	Market Share	3.700	0.837	4.593	0.501	4.429	0.535	4.156	0.801
4.	Product and Services	4.233	0.626	4.519	0.509	4.571	0.535	4.391	0.581
5.	Timely and Right Decisions	4.300	0.596	4.593	0.572	4.429	0.535	4.438	0.588
6.	Value Added Services	4.067	0.726	4.593	0.501	4.143	0.690	4.297	0.655
7.	Efficiency of Work	4.367	0.718	4.556	0.577	4.857	0.378	4.500	0.642
8.	Utilization of Resources	4.133	0.776	4.333	0.510	4.571	0.535	4.266	0.672
9.	Cost and Time Reduction	4.133	0.730	4.481	0.643	4.286	0.488	4.297	0.683
10.	Accuracy in the System	3.900	0.960	4.407	0.572	4.857	0.378	4.219	0.826
11.	Customer Relations	4.200	0.761	4.370	0.492	4.571	0.535	4.313	0.639
12.	Communication within the Organization	4.367	0.669	4.519	0.580	4.286	0.488	4.422	0.612
13.	Management Planning	4.167	0.747	4.333	0.679	3.857	0.690	4.203	0.717
14.	Edge over Competitors	4.200	0.664	4.519	0.580	4.429	0.535	4.359	0.627
15.	Cash Management	3.867	0.629	4.296	0.609	3.714	0.756	4.031	0.666
16.	Improvement in Revenue/Profit	3.933	0.828	4.519	0.700	4.429	0.787	4.234	0.811
17.	Economic Performance of Firm	4.033	0.765	4.370	0.492	4.000	0.577	4.172	0.656

The factors with a mean score of 4.3 or above, considered as most important have been shown in Figure 1 below.

Figure 1 : Important Factors for Need of DSS



2. Environmental Factors

Frequency distribution of the rating by the respondents, of the various environmental factors affecting DSS, has been depicted in Table 4.

None of the respondents was of the opinion that the environmental factors considered does not affect the DSS. Regarding seven factors out of nine under study some of the respondents expressed their opinion as 'Can't Say' but in no case their percentage was more than 8.86%. The percentage of respondents, having the opinion that the factors considered have 'Negligible' effect, varied from 5.7 per cent to 27.22 per cent, while others considered the effect of the factors as 'Moderate' or 'Significant'. In two of the cases, it is observed that percentage of

respondents opting for moderate or significant effect is more than 90 per cent. It is 92.40 per cent in the case of 'Adoption of Advancements in Technology' and 91.77 per cent in 'Business and Competitive Climate'.

Table 4

Frequency Distribution for Environmental Factors

S. No.	Factors	Does not Affect		Can't Say		Negligible		Moderate		Significant	
		N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent
1.	Organization Culture	0	0.00	8	5.06	18	11.39	79	50.00	53	33.55
2.	Concern of the Stakeholders	0	0.00	6	3.80	32	20.25	82	51.90	38	24.05
3.	Organizational Policies and Initiatives	0	0.00	0	0.00	24	15.19	95	60.13	39	24.68
4.	Government Regulations and Industry Standards	0	0.00	14	8.86	28	17.72	87	55.06	29	18.35
5.	Initiatives by Participants	0	0.00	11	6.96	43	27.22	90	56.96	14	8.86
6.	Business and Competitive Climate	0	0.00	0	0.00	13	8.23	84	53.16	61	38.61
7.	Policies and Practices Regarding Information Sharing, Privacy, etc.	0	0.00	13	8.23	32	20.25	78	49.37	35	22.15
8.	Technology Policies and Practices	0	0.00	8	5.06	16	10.13	87	55.06	47	29.75
9.	Provisions for Adopting the Advancement in Technology	0	0.00	3	1.90	9	5.70	87	55.06	59	37.34

Overall Mean and Standard Deviation of these factors is found to be varying from 3.688 for 'Initiative by Participants' to 4.328 for 'Business and Competitive Climate'. Minimum and maximum rating of the various factors given by the respondents from the various levels of management have been indicated by bold figures in Table 5.

Table 5

Mean & Standard Deviation of the Environmental Factors Affecting Decision Support System

S. No.	Parameters	Lower Level N=90		Middle Level N=54		Top Level N=14		Overall N=158	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1.	Organization Culture	4.100	0.885	4.185	0.736	**4.000**	0.577	4.125	0.787
2.	Concern of the Stakeholders	3.600	0.724	**4.481**	0.580	4.286	**0.488**	4.047	0.765
3.	Organizational Policies and Initiatives	3.900	0.662	4.296	**0.465**	4.571	0.535	4.141	**0.614**
4.	Government Regulations and Industry Standards	3.833	0.874	3.630	0.742	4.571	0.535	3.828	0.827
5.	Initiatives by Participants	**3.633**	0.669	**3.556**	0.751	4.429	0.787	**3.688**	0.753
6.	Business and Competitive Climate	**4.200**	**0.610**	4.370	0.629	**4.714**	**0.488**	**4.328**	0.619
7.	Policies and Practices Regarding Information Sharing, Privacy, etc.	3.833	0.986	3.852	0.602	**4.000**	1.000	3.859	0.833
8.	Technology Policies and Practices	4.033	0.850	4.148	0.718	4.286	**0.488**	4.109	0.758
9.	Provisions for Adopting the Advancement in Technology	**4.200**	0.761	4.370	0.492	4.429	0.535	4.297	0.634

It is observed that while the factor 'Business and Competitive Climate' has been rated highest by both Lower Level (4.200) and Top Level (4.714) of management, the Middle management rates the factor 'Concern of the Stakeholders' with a score of 4.481 as most important. 'Initiatives by the Participants' has been rated least both by the Lower (3.633) and Middle management (3.556) but according to Top management 'Organization Culture and Policies' regarding 'Information Sharing & Privacy' with a score of 4.000, is least important. Overall 'Initiatives by the Participants' with a score of 3.688, has been rated as least important among all the factors.

The factors with a mean score of 4.2 or above, considered as most important are 'Business and Competitive Climate' and 'Provisions for Adopting the Advancement in Technology'.

3. Working of Business Processes

Table 6 below depicts the frequency distribution of the ratings of the respondents both in terms of numbers and percentage.

Three of the respondents did not respond to the factor 'Tightly integrated system increases problems in the working of banking operations' and sixteen of the

Table 6
Frequency Distribution for Working of Business Processes

S. No.	Parameters	Strongly Disagree		Disagree		Neither Agree Nor Disagree		Agree		Strongly Agree	
		N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent
1.	Local viewpoint is ignored in decision-making	0	0.00	42	26.58	59	37.34	55	34.81	2	1.27
2.	System ensures efficiency but not the quality standards	0	0.00	25	15.82	37	23.42	92	58.23	4	2.53
3.	Tightly integrated system increases problems in the working of banking operations	0	0.00	9	5.70	33	20.89	107	67.72	6	3.80
4.	Reduce low-level variations	0	0.00	9	5.70	29	18.35	101	63.92	19	12.03

Table 6 (Contd.)

5.	Fundamentally, similar processes get differential treatment	0	0.00	0	0.00	59	37.34	74	46.84	9	5.70
6.	DSS leads to higher productivity	0	0.00	0	0.00	9	5.70	110	69.62	39	24.68
7.	Rate of output increases due to lower error rate	0	0.00	2	1.27	12	7.59	94	59.49	50	31.65
8.	Optimum utilization of capacity is achieved	0	0.00	0	0.00	3	1.90	89	56.33	66	41.77
9.	Automation and systematizing the work increases the rate of output	0	0.00	0	0.00	4	2.53	94	59.49	60	37.97
10.	Ensures quality management	0	0.00	2	1.27	3	1.90	82	51.90	71	44.94
11.	Frequent need of upgrading the old version with new version	0	0.00	0	0.00	6	3.80	87	55.06	65	41.14
12.	Database requirements make the working more complex	0	0.00	0	0.00	10	6.33	123	77.85	25	15.82
13.	Modules increase the frequency of interruptions in the banking operations	0	0.00	0	0.00	34	21.52	111	70.25	13	8.23
14.	Networking of branches leads to better customer satisfaction	0	0.00	0	0.00	14	8.86	97	61.39	47	29.75
15.	Authorizations and authentication of accesses ensure security	0	0.00	0	0.00	19	12.03	94	59.49	45	28.48

respondents did not respond to the factor 'Fundamentally similar processes get differential treatment' with their percentages as 1.90 and 10.12 respectively.

As can be observed from the above table, the percentage of the respondents agreeing or strongly agreeing was quite high varying from 36.08 per cent to 98.10 per cent. More than 90% of the respondents were of the opinion that DSS leads to higher productivity; Lower error rate, and Automation and systematizing the work increases the output rate; Optimum utilization of capacity is achieved; Ensures quality management; and Networking of branches leads to better customer satisfaction but they also expressed that there is frequent need of upgrading the old version with new version and database requirements make the working more complex.

Overall Mean and Standard Deviation of these factors is found to be varying from 3.078 for 'Ignorance of Local viewpoint in decision-making' to 4.422 for 'Ensures quality management'. Minimum and maximum ratings of the various factors given by the respondents from the various levels of management have been indicated in bold figures (Table 7).

Table 7

Mean & Standard Deviation of the Factors for the Working of Business Processes

S. No.	Parameters	Lower Level N=90		Middle Level N=54		Top Level N=14		Overall N=158	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1.	Local viewpoint is ignored in decision-making	**3.233**	0.774	3.148	0.818	**2.143**	**0.378**	**3.078**	0.822
2.	System ensures efficiency but not the quality standards	3.500	0.777	3.630	0.792	2.714	0.488	3.469	0.796
3.	Tightly integrated system increases problems in the working of banking operations	**4.967**	7.402	3.926	0.550	3.429	0.535	4.359	5.072
4.	Reduce low-level variations	3.600	0.724	4.222	0.577	3.714	0.488	3.875	0.701
5.	Fundamentally, similar processes get differential treatment	3.533	0.571	**2.667**	0.631	4.000	0.577	3.219	0.606

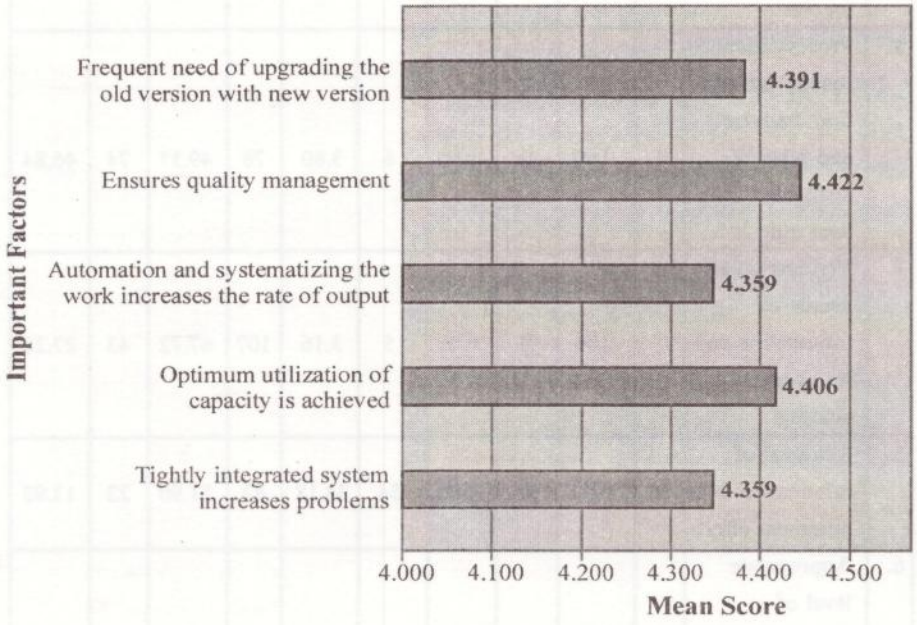
Table 7 (Contd.)

6.	DSS leads to higher productivity	4.067	0.521	4.370	**0.492**	4.286	0.488	4.219	0.519
7.	Rate of output increases due to lower error rate	4.200	0.551	4.333	0.734	3.857	0.690	4.219	0.654
8.	Optimum utilization of capacity is achieved	4.367	0.556	**4.444**	0.506	4.429	0.535	4.406	0.526
9.	Automation and systematizing the work increases the rate of output	4.333	0.479	4.407	0.572	4.286	0.756	4.359	0.545
10.	Ensures quality management	4.333	0.547	4.407	0.694	**4.857**	**0.378**	**4.422**	0.622
11.	Frequent need of upgrading the old version with new version	4.300	0.596	4.407	0.501	4.714	0.488	4.391	0.553
12.	Database requirements make the working more complex	4.033	0.414	4.111	0.506	4.429	0.535	4.109	**0.475**
13.	Modules increase the frequency of interruptions in the banking operations	3.900	**0.403**	3.741	0.712	4.143	**0.378**	3.859	0.560
14.	Networking of branches leads to better customer satisfaction	4.167	0.531	4.148	0.662	4.714	0.488	4.219	0.603
15.	Authorizations and authentication of accesses ensure security	4.133	0.571	4.111	0.698	4.571	0.535	4.172	0.631

It can be observed from the above table that the factors, viz. 'Ensures quality management' by Top Level (4.857), 'Optimum utilization of capacity' by Middle Level (4.444) and 'Tightly integrated system increases problems in the working of banking operations' by Lower Level (4.967) of management have been rated the highest. 'Local viewpoint is ignored in decision-making' has been rated the least both by the Lower (3.233) & Top management (2.143) but according to Middle management 'Fundamentally similar processes get differential treatment' with a score of 2.667, has the least rating. Overall, the factor 'Ensures quality management' gets the maximum score of 4.422 and the factor 'Local viewpoint is ignored in decision-making' gets a minimum score of 3.078.

The factors with a mean score of 4.3 or above, considered as most important, have been shown in Figure 2.

Figure 2 : Important Factors for the Working of Business Processes



4. Quality of Information

Table 8 below depicts the frequency distribution of the ratings of the respondents both in terms of numbers and percentages.

Table 8
Frequency Distribution for Quality of Information

S. No.	Parameters	Strongly Disagree		Disagree		Neither Agree Nor Disagree		Agree		Strongly Agree	
		N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent
1.	Ensure data accuracy and identify likely errors	0	0.00	14	8.86	11	6.96	101	63.92	32	20.25
2.	Information should be complete and precise	0	0.00	0	0.00	3	1.90	105	66.46	50	31.65
3.	Process should update information frequently and make it available to the user quickly	0	0.00	0	0.00	6	3.80	78	49.37	74	46.84
4.	Verification of source of information and its proper analysis	0	0.00	0	0.00	5	3.16	107	67.72	43	27.22
5.	Retrieval of information with minimum effort	0	0.00	0	0.00	54	34.18	82	51.90	22	13.92
6.	Appropriate level of summarization of information generated	0	0.00	0	0.00	50	31.65	92	58.23	16	10.13

Three of the respondents did not respond to the parameter 'Verification of source of information and its proper analysis' with their percentage as 1.90.

It is evident from the above table that out of the six factors considered for

Quality of Information, there was not even a single respondent strongly disagreeing with any of the factors. It is further observed that the respondents showed their disagreement only in one factor, i.e., 'Ensure data accuracy and identify likely errors' with a percentage of respondents as 8.86 per cent only. The respondents having

Table 9

Mean & Standard Deviation of the Factors Related to Quality of Information Produced

S. No.	Parameters	Lower Level N=90		Middle Level N=54		Top Level N=14		Overall N=158	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1.	Ensure data accuracy and identify likely errors	3.767	0.858	4.222	0.641	**4.143**	0.690	4.000	0.777
2.	Information should be complete and precise	4.167	0.461	4.407	**0.501**	4.714	0.488	4.328	**0.506**
3.	Process should update information frequently and make it available to the user quickly	**4.267**	0.583	**4.593**	**0.501**	**4.857**	**0.378**	**4.469**	0.563
4.	Verification of source of information and its proper analysis	4.000	**0.441**	4.370	0.565	4.429	0.535	4.203	0.515
5.	Retrieval of information with minimum effort	3.867	0.629	**3.519**	0.580	4.429	0.787	**3.781**	0.678
6.	Appropriate level of summarization of information generated	**3.667**	0.606	3.889	0.577	**4.143**	0.690	3.813	0.614

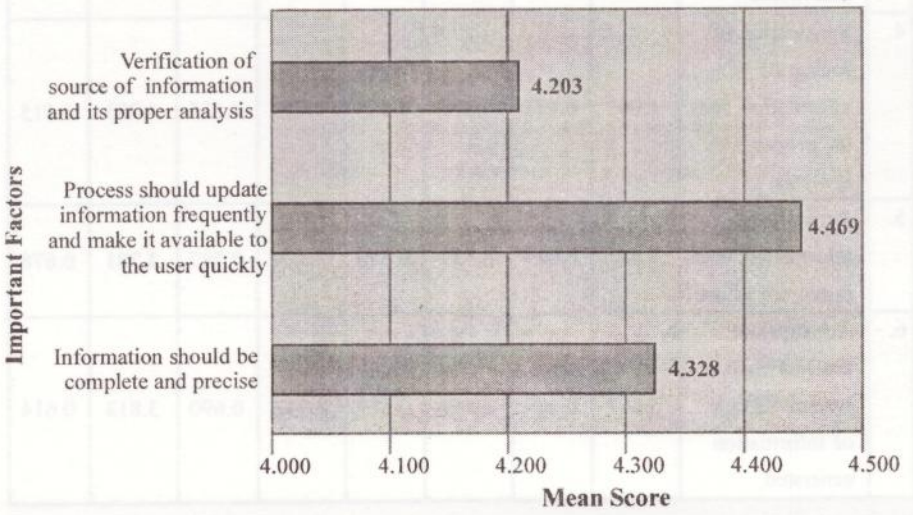
neutral attitude varied from 1.90 per cent to 34.18 per cent for the factors under study. However, the percentage of the respondents agreeing or strongly agreeing was quite high varying from 65.82 per cent for the factor 'Information retrieval with minimum effort maintaining its legal and cultural appropriate' to 98.11 per cent for the factor 'Information should be complete and precise'.

Mean and Standard Deviation scores for the different DSS process operations have been tabulated in Table 9. Overall score of all the factors is found to be varying from 3.781 for 'Information retrieval with minimum effort maintaining its legal and cultural appropriateness' to 4.469 for 'Process should update information frequently and make it available to the user quickly'. Minimum and maximum ratings of the involvement of the respondents from the various levels of management have been indicated in bold figures (Table 9).

It is apparent from the above table that the respondents at all levels of management have given maximum rating to the factor 'Process should update information frequently and make it available to the user quickly' with a rating of 4.267, 4.593, and 4.857 by Lower, Middle and Top Level of management respectively. The respondents at Lower and Top Level have given minimum rating of 3.667 and 4.143 respectively to the factor 'Appropriate level of summarization of information generated', while Middle Level respondents have given minimum rating of 3.519 to the factor 'Information retrieval with minimum effort maintaining its legal and cultural appropriate'.

The factors with a mean score of 4.2 or above have been considered most important for the quality of information produced and shown in Figure 3 below :

Figure 3 : Important Factors for Quality of Information



FINDINGS

The various factors considered and analyzed for the planning of Decision Support System in a banking sector in the present study reveal as under :

1. Although all the factors considered under need of DSS are relevant and important, the analysis carried out reveals that DSS is most important for increasing the efficiency, taking timely and right decision, better communication within the organization, better product & services, better customer relations, better vision and formulation of strategies, and providing edge over the competitors.
2. While planning the DSS, environmental factors such as organization culture, concern of stakeholders, business and competitive climate, policies regarding information sharing and privacy and provision for adopting advancement in technology must be given due care.
3. For maintaining quality of information, DSS should be planned such that it takes into account the verification of the source of information, ensures data accuracy and the identification of the likely errors, generate information that is complete and precise, updates information frequently and make it available to the user quickly.
4. A well planned DSS helps in automation and systematizing the work thereby reducing the error rate and increasing the rate of output leading to higher productivity, ensures quality management and optimum utilization of resources, authorization and authentication of accesses, and networking of branches ensures security and leads to better customer satisfaction. The study also reveals that large Database requirements make the working more complex and sometimes modules used increase the frequency of interruptions and tight integration of the system also increases the problems in the banking operations. In order to handle such problems, there is a regular need of monitoring and upgrading the old version of application software with new version.

CONCLUSIONS

The study will be very useful for the people engaged in the design and development of decision support system and those who are involved in strategic decision-making in the banking sector. It empowers the management with the decision tools and models that help in taking decisions for unstructured or semi-structured problems at all levels of management. This would help the top

management for formulating the policies, fixing the business goals and objectives. This would also help in developing the long-term as well as short-term plans. The DSS would help the management to chalk out the optimum strategies keeping in view the strategies of the competitors and the resource constraints of the organization.

The findings of the study listed above, if properly taken care of in the design and development of the decision support system, would increase the efficiency and productivity of the organization, provide better product and services leading to better customer relations and their satisfaction. It would help in optimum utilization of resources thereby increasing the overall revenue and profit. Developing a sound and effective decision support system will provide better chances of faster growth to the organization compared to their competitors.

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