

BUSINESS INTELLIGENCE IN HEALTHCARE INDUSTRIES IN & AROUND PUNE

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ABSTRACT

Today's age is digital age. Healthcare organizations today find themselves entangled within the dynamic set of new rules, pressures, threats and new opportunities. Variety of healthcare data encompassing that of patients, payers and purchasers of healthcare services have become more demanding and more critical. Data volume increasing at exponential rate and former partners and allies have now become competitors and foes.

New service oriented are models replacing the way hospitals, doctors, medical groups and ancillary service providers are compensated. Superior service with Quality, Accountability and Transparency are the KPI's(Key Performance Metrics).The changing government regulations and dynamic customer demands are compelling.

These organizations universally have a tremendous supply of the very resources they need to adapt, survive, thrive, rescue themselves and even lead the changes they are experiencing. But many simply do not recognize their existing resources including people, processes and technologies, as well as the analytical mindset, knowledge and resourcefulness needed to succeed.

One key difference between the winners and losers is their failure for analysis and for using their analytical capabilities to improve clinical quality, operational efficiency and financial strength. The differentiator is how they use the data they already own to become smarter, stronger and faster, being business intelligence (BI), analytics and informatics.

This research paper is intended to find the current scenario of BI in healthcare organizations in and around Pune and understand the impact of BI implementation from a strategic and business perspective particular to the healthcare industry. The findings reveal

how BI enhances the Sustainability and Growth of a Business by affecting its key areas. The respondents are the CIO's / CIU's (Chief Information Officer's / User's) who rely heavily on the data for Business Processes to function properly.

INTRODUCTION:-

As shown in Figure 1.1, widespread Healthcare EMR (Electronic Medical Record) implementation will help to have instant access to the digitized data. This will accelerate the data process in ubiquitous environment (at anytime and anywhere access). Nick Sullivan, MHA, in his discussion on 'HEALTHCARE BUSINESS INTELLIGENCE AND ANALYTICS' has explained the need and importance of analyzing the historical data and have predictions for better tomorrow.

The various components of the architecture are:

- **Source Data:**
 - Raw data at the heart of the organization, that is critical for running the business.
 - The data is operational in nature and built to handle large numbers of simple, predefined read/write transactions using OLTP.
 - It's integrated into data warehouse for analytical use (OLAP).

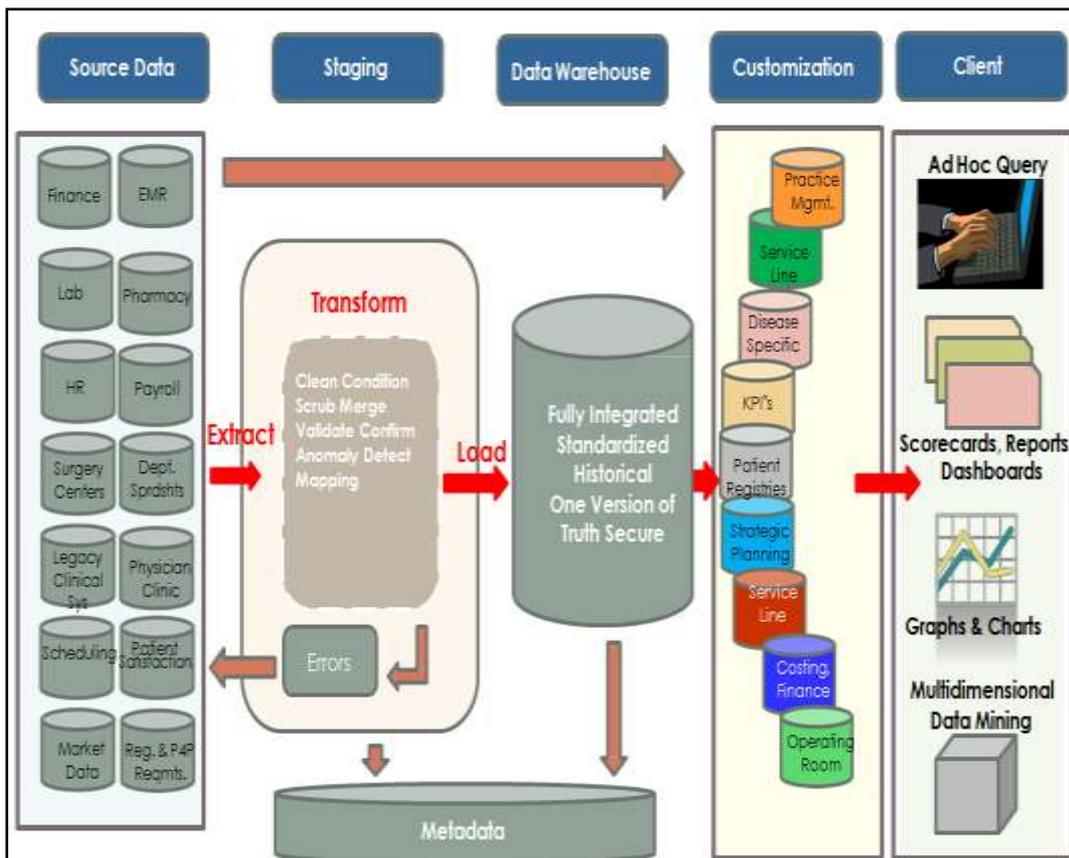


Fig. 1.1: BI for enhancing the Healthcare Framework

- **ETL:**

ETL is the process of gathering, preparing and integrating data into the data warehouse with the maintenance of data integrity.

- **Extraction:** data taken in “as-is” format from source.
- **Transform:** data cleaned, validated and confirmed for eligibility for inclusion into data warehouse.
- **Load:** maps source data attributes to schema of data warehouse.

- **Repository for organizational data, ultimate source for reporting and analysis:**

- **Subject-oriented:** Organizing data in the data warehouse to gather all the data elements relating to the same real-world event for performing object linking.
- **Non-volatile:** Data in the warehouse is never deleted or replaced. Once the data is in the data warehouse, it is permanent and kept for reporting purposes.

- ***Integrated:*** Integrating all the data contained from nearly all of the organizations operational systems.
- ***Time-variant:*** Time slice for every operational data element.

- **Data Mart's:**

Data mart is defined as the subsets of data warehouses that focuses on one business area.

- Faster access to specific information of the groups.
- Depends on data warehouse, does not interfere with integrity.
- Gives “ownership” to individual business units over specific data.
- Allows business units to create and track metrics, targets, KPI's.
- Achieve the performance goals.

- **Reporting**

- ***Ad Hoc Query processing:*** It's the highest level of client customization. Allows the user to interact and work with raw data.
- ***Multidimensional Data Mining:*** Use of OLAP tool and cube to create various views.
- ***Scorecards, Dashboards Reports:*** Pre-defined views and KPI's for specific business units.
- ***Graphs & Charts:*** Pictorial visual representation of predefined metrics and views with easy of understanding.

Table 1.1: Analyzing Healthcare Decisions using Business Intelligence perspective

<i>Sr.No.</i>	<i>Purpose and Analytical Uses</i>	<i>Goal</i>	<i>Types of Measures</i>	
1	Tactical	Patient Level Decisions	Patient Satisfaction	Disease Mgmt. Protocol Adherence
			Order Set Compliance	Episode Profiling
			Medication Errors	Risk Scoring
			Provider Performance	Activity Based Costing
2	Operational	Care Process Stewardship & Cost Management	Care Process Variance	Process Mapping
			Supply Use	Value-Add Analysis
			Process Based Costing	Care Coordination
			Gap Identification	
3	Strategic	Planning & Growth	MD Network Analysis	Staffing Predictions
			Price Setting	Pattern and Trend Recognition
			Utilization Predictions	Agile Marketing
			Resource Channeling	Community Needs Assessment

Table 1.1 depicts the picture for Healthcare analytics that is intended to improve decision making. The various parts of Healthcare Decisions can be broken as *Tactical*, *Operational*, and *Strategic*.

RESEARCH METHODOLOGY

The research carried out was Descriptive Research Type where quantitative data was used. Based on the purpose and objectives of the research the questionnaire was designed to provide answer to following aspects which emphasize the role and importance of BI in ITES sector industries

The questions were divided into various parts as below –

- ✓ Awareness / Knowledge of BI
- ✓ Implementation Strategy for BI
- ✓ Resources and their utilization / availability
- ✓ BI performance, outcomes, satisfaction and achievements / results.
- ✓ Overall impact on organization.

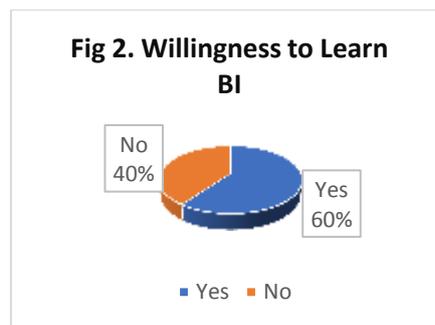
The survey was carried out on respondents from healthcare service industries in and around Pune considering the similarities of functional requirements. The respondents are the CIO's / CIU's who rely heavily on the data for Business Processes to function properly for the cost effective productivity. A total response of 100 respondents was taken.

RESULTS

The data analysis was performed using the statistical tool SPSS which has revealed the following facts having a direct impact on the Organization.

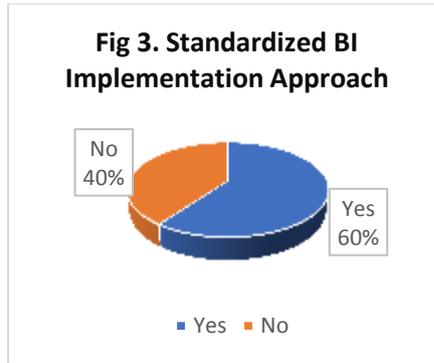
Willingness to Learn BI and its Need:

Out of total respondents a majority of 84% respondents expressed the need of BI and their willingness to learn the same. Further it was found that 66% person people had no or limited awareness of BI.



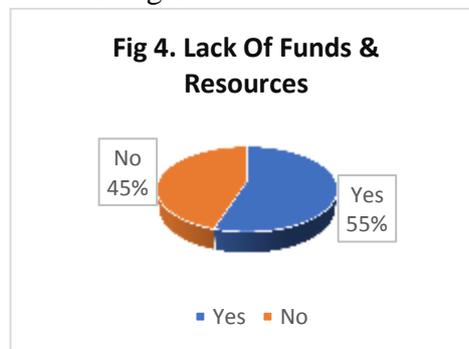
Lack of Standardized Implementation Approach:

Out of total respondents a majority of 90% respondents said that a standard BI implementation strategy was not followed. None of the standard practises like Induction Training, Performance Monitoring and Benchmarking were followed.



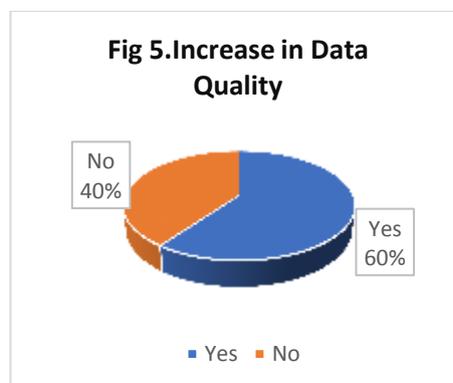
Lack of Sufficient Funds and Resources:

Out of total respondents a majority of 92% respondents said that the required funds and resources were not provided by the management. Management stressed more on adjusting within existing resources. Full-fledged support for necessary IT resources(Hardware, Software and Training) was not supported by Management which is a crucial factor for smooth functioning of BI.



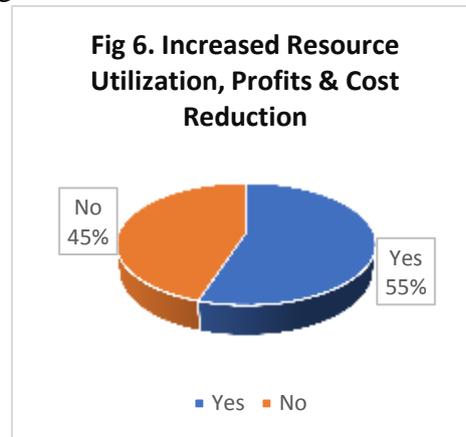
Increase in Data Quality and Functional Efficiency:

Out of total respondents a majority of 65% respondents claimed that BI has brought about a major increase in data quality. This further added to satisfactory BI performance expressed by the respondents. Respondents expressed the ease in use of BI which further had exponential impact on the role support thereby leading to a major increase in Functional Efficiency.



Enhanced Resource Utilization, Profits and Cost Reduction:

Out of total respondents a majority of 55% respondents claimed that BI has brought about a major increase in Resource Utilization. This further added to increase in the Profit Levels and thereby helping in Cost Reduction.



RESEARCH FINDINGS AND INTERPRETATION

Following are some of the major findings and interpretations based on the Statistical Data analysis -

1. It was found that majority of the information officers who used organizational data for decision making are not aware of the BI capabilities. Also no steps were taken by the organization to make the officers aware about BI as well as its capabilities.
A majority of 66.1 % information officers were not aware of what BI is and what its capabilities are.
2. It was found that the in spite of having a less awareness of BI majority of information users felt that they as well as their organization was in need of a suitable BI software. This need was felt by the information officers considering the volume of data and its importance that the users felt that was needed in decision making. A majority of 82.6 % information officers felt the need for a BI software to be implemented in the organization.
3. When the information officers were asked if the software was made as per their custom requirements the reply was a major NO. The information officers said that the software was made considering some specific functionalities and was forced upon them to be used on a as it is basis. No specific requirements gathering and software built up as per the information requirements happened. 66% information officers

reported that the BI software's that they were using were not made as per their requirements.

4. It was observed that no BI software implementation strategy was followed. The BI software was purchased from the vendor and was put into use immediately. No prior awareness or trainings were given to the information officers. A majority of 91.6% information officers reported that no implementation strategy was followed.
5. The information officers were asked if the problems faced in BI implementation process were identified and raised concern about. A majority of 77% information officers said that the problems were identified and were reported further for due course of action.
6. When asked about the comfort in use of BI software a majority of 53.7% information officers reported that they were quite comfortable with the use of BI software to a great extent. They reported that the BI software was easy to use provided you have minimum operational knowledge of the software.
7. The information officers were asked to comment on the induction training given to them towards the implementation of BI software. A majority of 62.1 % information officers reported that they were not given any induction training related to the BI software that was implemented in their organization.
8. The information officers were asked whether the BI software was being monitored and evaluated. A majority of 73.3 % information officers said that the performance of the BI software was not being monitored and evaluated. This reflected the negligence towards harnessing of BI software capabilities due to lack of awareness.
9. The information officers were asked if they were provided with sufficient IT resources for the implementation of BI software. A majority of 85.4 % of them revealed that they were in fact not provided with the sufficient IT resources which are an integral part of a successful BI software implementation.
10. The information officers were asked if they were provided with sufficient funds for various resources required for the implementation of BI software. A majority of 87.8 % of them revealed that they were in fact not provide with the sufficient funds which has a direct impact on the successful BI software implementation.
11. The information officers were asked if the BI software has enhanced the quality of the organizations data. A majority of 56.4% information officers said that the BI software helped them in improving the quality of organizational data which plays a crucial role in the functioning of Business.

12. It was found that a majority of 49.1% information officers claimed that they were satisfied with the BI software performance on a great extent. This was observed because the BI software was catering to their functional needs thereby simplifying their routine work procedures.
13. Based on the response of the information officers it was found that the implementation of BI software led to improvement in the revenue generation and increase in organizational profits. A majority of 55.4 % information officers agreed that the revenues and profits had improved to a great extent after BI software implementation. This was reflected through the process improvements achieved by BI software implementation.
14. The information officers were asked if the implementation of BI software had any impact on their customer /client base. From the response it was found that a majority of 52.8% information officers confirmed that an increase in customer base was observed to a great extent. This was achieved through quality service being provided to customer which in turn was an outcome of the BI implementation.
15. The information officers were asked if the implementation of BI software helped in achieving any cost reduction. From the response it was found that a majority of 56.9% information officers confirmed that cost reduction was observed and achieved to a great extent. This was achieved through process optimization which in turn is an integral part of BI implementation.
16. It was found that the implementation of BI software had an impact on the Governance aspect of the organization. From the response it was found that a majority of 56.3% information officers confirmed that the governance process was more improved and responsive to a great extent. This was achieved through process definitions and optimizations which form an integral part of BI implementation.
17. It was found that the implementation of BI software had an impact on the functional efficiency of the various departments in an organization. From the response it was found that a majority of 51.2% information officers confirmed that the collective functional efficiency of the departments had demonstrated a considerable increase to a great extent. This was achieved through process definitions and optimizations at individual as well as department level which forms an integral part of BI implementation.
18. It was found that the information officers reported an increase in customer loyalty. A majority of 53.3 % information officers confirmed that the customer loyalty had

increased. This was achieved through improved quality of service and adaptation to customer expectations which is an integral part of BI implementation.

19. It was found that there was an increase in the overall resource utilization after the BI software implementation. A majority of 59.9 % information users confirmed that this overall increase in resource utilization was observed to a great extent.
20. It was also found that the implementation of BI software demonstrated the increase in customer responsiveness. A majority of 49.9% information officers confirmed that this increase was achieved through BI implementation. BI implementation improves the processes by making them more efficient and effective thereby enhancing the customer relationship management.
21. It was found that the implementation of BI software had optimized the operations and processes in the organization. A majority of 57.7% information officers said that the optimization of operations and processes was achieved to a great extent through BI implementation. BI gives more emphasis on optimization of operations and processes thus serving its purpose.
22. From the response of the information officers it was found that the BI software facilitated adaptation to market dynamics. A majority of majority of 54.5 % information officers agreed that the BI software facilitated adaptation to market dynamics to a great extent. This adaptation made the organization dynamic to adjust to the changing market scenarios.
23. From the response of the information officers it was found that the BI software changed the outlook of top management towards the organization. A majority of majority of 48.5 % information officers agreed that the BI software brought about a positive change in the top management's commitment and role. This was observed to a great extent. This change in the managements approach is achieved through BI thereby making them more responsive.
24. It was found that the BI software had a direct impact on the decision making process. The optimized processes, operations and overall increase in resource utilization clubbed with the enriched organizational data make the decision process more effective and efficient. A majority of 52.4 % information officers agreed that BI software has impacted the decision making process to a great extent.
25. From the response of the information officers it was found that the BI software facilitated efficient and effective time utilization thereby increasing the overall resource utilization and productivity. A majority of 58.3 % information officers

agreed to the fact that BI software facilitated efficient and effective time utilization to a great extent.

26. From the response of the information officers it was found that the BI software provided solution to almost all the Business problems they were facing at individual as well as organizational level. However this is limited to the level up to which the BI software is designed and implemented as per organizations requirements. A majority of 49.8% information officers agreed that BI software provides solution to all business problems to a great extent.

27. Further response of the information officers revealed that the implementation of BI software made the Business Conduct model more dynamic compared to present and past way of conduct. A majority of 45% information officers agreed that BI software changed the business conduct model implementation to a great extent comparing the past and current performance period.

Lastly it was found that the BI software implementation has brought about a paradigm shift in the way organizations were functioning comparing the pre and post implementation performance. A majority of 51% information officers agreed that there is a paradigm shift in the organization to a great extent brought about by BI software implementation.

CONCLUSION

The dynamic evolutions and developments in Business Intelligence (BI) systems help the Healthcare organizations in short term as well as long term survival. Based on the analysis and findings mentioned above the research concludes that an Effective and Efficient implementation of BI leads to Sustainability and Growth of Business in today's dynamic Business Environment. BI has a direct impact on the performance on growth parameters which are crucial for the Organizations very Existence and Future Growth.

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