

Analyzing the Business Performance of An Erp Systems in Automotive Ancillary Industries-Balanced Scorecard Perspective

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Abstract

This study aims to analyze the business performance of Enterprise Resource Planning (ERP) system in Automotive Ancillary Industries using four interrelated dimensions of performance measurement framework Balanced Scorecard (BSC); Innovation and Learning, Internal, Customer and Financial perspective. This analysis was carried out based on survey questionnaires with 281 stakeholders who are familiar with ERP system and results were presents as evidence. The analysis result shows that uses of ERP system resulted in a positive in financial performance of the organization, deliver best services to their customer, increases the overall internal performance of the firm increases and enhances firm loyalty and simplify the complex work. Friedman's ranking analysis and correlation analysis were applied, and detailed analysis was submitted in this study. The results from the survey indicate that integrated software system such as ERP need to be implemented in Automotive Ancillary Industries to improve the business performance in various dimension i.e. Innovation and Learning, Internal, Customer and Financial perspective.

Keywords: Automotive ancillary industry, balanced scorecard; enterprise resource planning; business performance.

1. Introduction

The present worldwide business brought in new competitions, new environment, new challenges and new opportunities. This has resulted in decreasing product life cycles and reducing profit margins. To anticipate and respond quickly to the changing business conditions, the firm needs a solid information system that supports all aspects of business with power and flexibility. Global ERP market registered huge growth in the past decades. In automotive industry in the world is under unbelievable pressure for the past few years due to volatile demand and excess contribution from developed countries. As a result the Automobile Industries across the globe looking for marketplace with increasing requirement and locations for cheaper supply. Developing countries like the Czech Republic and Mexico are economical sourcing for the top automotive in the world. In recent year's Asian countries China and India developed as the low-priced auto components and low-cost sourcing for automobiles. Automobile industries need ERP system as a solution for the best practice and streamlined business process. By implementing ERP systems, it attains some benefits include coordination of enterprise-wide operations between or within the firm, inventory control functionality for storage product, rapid real-time data sharing and accessing the information at any time anywhere, customizable interfaces, and scalable for growing business [1]. Therefore; automobile industry has been selected for this study to

analyze the performance measure. The result of the study provides a clear-cut idea about the different business process.

This study was carried out to analyze the business performance of ERP system by means off our interrelated dimensions of performance measurement framework Balanced Scorecard (BSC); Innovation and Learning, Internal, Customer and Financial perspective. of the balanced scorecard (BSC) framework namely Financial, Customer, Innovation and Learning and Internal There is a growing body of scholars recommending that BSC is the best method to analyze the business performance of the ERP System [2]. The uses of BSC have been analyzed with regards to IT and data frameworks and it can be applied to Information Technology functions where they categorized in to balance scorecard (BSC) measurements of finance, customer, learning and growth as user-orientation, internal business processes, operational excellence and future orientation and corporate contribution, respectively. [3]

- 1) What are the impacts of ERP towards the business performance in financial perspectives?
- 2) What are the impacts of ERP towards the business performance in customer perspectives?
- 3) What are the impacts of ERP towards the business performance in internal perspectives?
- 4) What are the impacts of ERP towards the business performance in Innovation and Learning perspectives?

2. Literature review

Enterprise Resource Planning (ERP) System is an integrated software system. It integrates various departments within and across the firm. ERP System accesses the central database to retrieve entire departments data of firm. (1). This is the major benefits of ERP and many firms implement this system to achieve this benefit. The ERP Selection, Implementation requires a lot of money, time and many efforts from the functional team to map the business process. This paper presents the journey after ERP implementation in the firm and explain how to analyze and examine the Performance of an ERP system.

Automotive Industries is a vital industry in the manufacturing sector that comprise continuous movement of material from the raw material, intermediate material or finished product that are procured, transformed, stored and sold. Manufacturing costs are rising. Demands are dynamically changing. Business globalization is changing the competitor, manufacturers, distributors, dealers and suppliers landscape. They are responding to these challenges by looking the demand and supply of the current trend. ERP is extensively helpful in active supply chains in automotive logistics to manage, monitor and reduce the cost. It clarifies the business processes and improves delivery accuracy to the customer (5). The Man, Machine, money, method are integrated into ERP. ERP helps the firm to build a supply chain in such a way that easier to manage, anticipate and respond quickly to dynamic changes in the market conditions (16). It also makes the firm more competitive, like service, productivity, and innovation.

ERP system provides some merits for firms to enhance and improve the firm performance. ERP system implementation improves the relations between various business functions in the firm and the information is available and accessible in the system. ERP systems have more merits in the integration of operation and business processes between various functions in the firm, but it will not reduce the IT costs [6], ERP systems have numerous advantages, which might be attained by the firm. These benefits differ from five major benefits which comprise managerial benefits, Tactical benefits, strategic benefits, operational benefits, IT infrastructure design and firm benefits. A BSC is the appropriate evaluation processes which assures more accurate results and smooth and faster the progress of assessments for decision-makers. Decisions based on accurate performance result may lead to more effective and efficient way of attaining the management strategic objectives [7]. Evaluation of ERP success is a difficult approach; if the result of an ERP System evaluation is utilized as a source for measures for an improvement of the business performance then the results of improvements can be measured through a new assessment of the ERP system performance using a comparison of the outcome of each evaluation. So, the upcoming research will be encouraging to investigate and study the result of an ERP system in a poor dimension (in sequence quality flexibility of accessing system, reduces quality and maintenance costs, improve resource utilization) where improvements should be made [8]

An ERP implementation success has the advantages of reducing the cost, reducing the time of the process and quality of the product [9]. It gives the benefits to its customers on purchase required goods or products at cheaper price and shares the information of production status in real time [10]. The Successful ERP system brings business performance improvement and benefits to the firm. To get the good ERP Implantation, system must be managed by the wide-ranging firmal change of present software installation [11]. Many business firms implemented ERP software systems to attain the required benefits and process they needed [12]. After successfully ERP software implementation, companies can make standards in finance related transactions and operating measures for tracking real-time inventory and warehouse systems[13]. The operational advantages of ERP software system incorporate effectiveness measures of

turn-cycles reduction in the elaboration of reports, quickness in information sharing, and changes in information quality because of lessened redundancies. ERP is attached to decrease the cost which prompts enhancing exhibitions in the production network effectiveness, quicker monetary detailing, more precious information and a higher limit with regards to delivering highly qualified and a procedure focused mindset [17]. ERP is noted for more efficiencies to reduce labor costs, inventory cost and faster financial relating monthly and yearly closings. It improves managers decision making and judgment who can retrieve real time data and reports and Top Management expectations on effective utilization of resource using ERP software system [15]. The management expectation with ERP Software system is to share real time information with customer and supplier to plan their business effective way by using Customer Relationship Management and Supplier Relationship Management modules Qu et al. [14] gives ERP system should have capable to plan for long term planning, forecast planning for organizations internal and strategic policy and procedure implementation.

3. Research methodology

The Balanced Scorecard (BSC) performance measurement framework was designed for business performance measurement of automobile ancillary as illustrated below in various perspectives;

- The financial perspective
It looks at what should be done for the organization to succeed financially.
- The customer perspective
It shows an increasing customer satisfaction with product and process in their business which will increase Customer profitability, Increasing customer retention and loyalty and corporate image
- The Internal Perspective
It is concerned with how the user benefits from using the system in terms of ease in workload and simplification of tasks
- The Innovation and Learning & Growth Perspective
It looks at what an organization should do to achieve its vision.

Table 1: ERP Strategic Measurements from BSC

Strategic Perspective	ERP Business Performance	Strategic Measures
Financial Perspective	Operating cost Reduction Revenue Increase	Net Operating profit improvement
		Return on Investment improvement
		Sales growth improvement
		Inventory turnover rates reduction
Customer Perspective	Customer satisfaction Corporate Image improvement	Product delivery time reduction
		Product delivery rate improvement
		Corporate Image improvement
		Customer reaction & satisfaction improvement
Internal Perspective	Time Reduction Optimum Utilization of firm resources	Invoice processing time reduction
		Capacity utilization & Overall performance Improvement
		Manufacturing cycle time reduction
		Order processing time reduction
Innovation and	Enhancing employee productivity	Employee's Productivity Enhancement

Learning Perspective	Standardize the business process	Employee Loyalty enhancement	Human error reduction
		Complexity routine work Simplification	

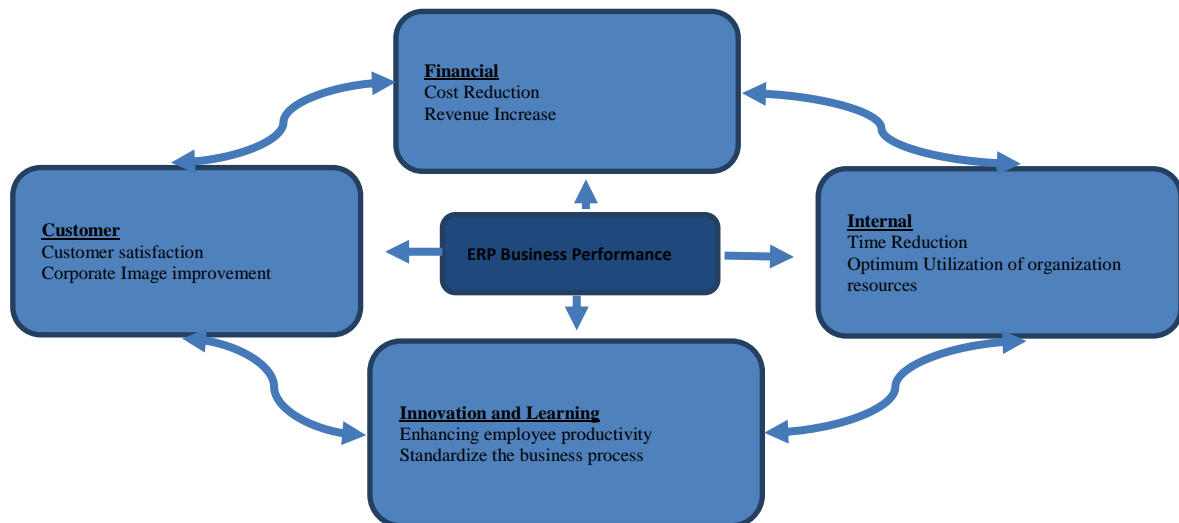


Fig. 1: ERP implementation business performance Balanced Scorecard

3.1. Survey design

The survey construct was designed for this study and data were collected. This study used primary as well as secondary data. Secondary data were collected from the thesis, websites, various journals, and books. The primary data for the KPIs were collected from the Business Process owners[BPOs], Top level Management and middle-level managers and various business users involved in the ERP Implementation & Usage. A five-point scale (1 denotes strongly disagree and 5 denotes strongly agree) was applied sensitivity of this measure.

The various Key Performance Indicator were identified by the researcher in her pilot study. They were analyzed using four interrelated dimensions of performance measurement framework Balanced Scorecard (BSC); Innovation and Learning, Internal, Customer and Financial perspective. The ranking given by the ERP Business users per their opinions were analyzed with the help of Friedman ranking techniques, and the mean scores are presented in Table.

3.2. Data collection and sampling method

Questionnaires were sent to the respondents through Hard copy and mail. Data were collected from 281 respondents who are all having very good knowledge of business process and ERP usage in Automobile ancillary industries who are all manufacturing. The data is collected from Top 20 component manufacturing firm in Tamilnadu with different manufacturing parts. Like Drive and Transmission parts, suspension and breaking Systems, Engine and Engines parts, Electrical Parts and Glass Parts. Multistage Random Sampling method used to collect the data from 1100 ERP users.

4. Data analysis hypothesis testing

Collected data were analyzed by using the software package SPSS and Analysis of Moment Structure (AMOS) Version 20.0. Reliability Statistic Cronbach’s alpha was calculated, examined for validating the internal consistency and reliability statistics scales of the construct for 30 samples. Reliability Statistic Cronbach's Alpha measured value has the value greater than 0.6 is ensure the the internal consistency of the reliability. Statistical

techniques like descriptive analysis, Friedman Test, and Correlation Test were applied for data analysis and evaluating the different Performance measures of the ERP Implementation in Automobile Ancillary Industries in India,

Table 2 Shows Reliability statistic Cronbach's Alpha for internal consistency check for the Strategic measures

Table 2: Reliability Statistic Cronbach's Alpha

Strategic Perspective	Strategic Measure	Sample Size (N)	Cronbach's Alpha
Financial Perspective	F1	30	0.8
	F2	30	
	F3	30	
	F4	30	
Customer Perspective	CU1	30	0.643
	CU2	30	
	CU3	30	
	CU4	30	
Internal Perspective	I1	30	0.64
	I2	30	
	I3	30	
	I4	30	
Innovation and Learning Perspective	IN1	30	0.929
	IN2	30	
	IN3	30	
	IN4	30	

4.1.Hypothesis

Null Hypothesis: There is no significant difference among different performance measures mean ranks towards ERP Implementation in Automobile Ancillary Industries

Table 3 shows the Significant Difference in Friedman Test among different performance measures towards the ERP Implementation.

Table 3: The Significant Difference in Friedman Test

Strategic Perspective	Mean Rank	Rank	Chi-square value	P value
Financial Perspective	2.24	III	128.060	0.000**
Customer Perspective	2.96	I		
Internal Perspective	2.02	IV		
Innovation and Learning Perspective	2.79	II		

. ** Denotes significant at 1% level

Since the P value is lesser than 0.01. in the above table, null hypothesis is rejected at the 1 % level of significance. Thus, it is

confirmed that there is a significant difference among different performance measures mean ranks towards ERP Implementation. From the mean rank, Customer Perspective (2.96) ranked first followed by Innovation and Learning Perspective (2.79). Financial Perspective occupies the third rank with the mean rank of 2.24. Internal Perspective is found to be the least Performance measures of ERP Implementation in Automobile Ancillary Industries. It has the lowest mean rank of 2.02

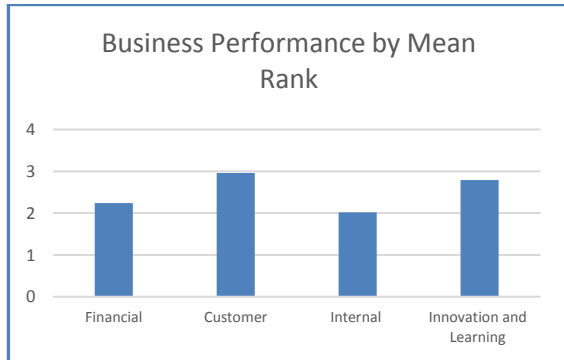


Fig. 2: Business performance by mean value

4.2. Correlation analysis

On performance measures in ERP Implementation in Automobile Ancillary Industries. Table 4 Showing Pearson Correlation Coefficient between performance measures in ERP Implementation in Automobile Ancillary Industries

Table 4

Strategic Perspective	Financial Perspective	Customer Perspective	Internal Perspective	Innovation and Learning Perspective
Financial Perspective	1.000	0.386**	0.570**	0.350**
Customer Perspective	-	1.000	0.661**	0.615**
Internal Perspective	-	-	1.000	0.524**
Innovation and Learning Perspective	-	-	-	1.000

** Correlation is significant at 1% level

The correlation coefficient between performance Measure Financial Perspective and Customer Perspective is 0.386, which shows 38.6 percentage positive relationships at 1% significant level. The correlation coefficient between Performance Measures Financial Perspective and Internal Perspective is 0.570, which shows 57.0 percentage positive relationships at 1% significant level. The correlation coefficient between Performance Measures Innovation and Learning Perspective and Financial Perspective is 0.350, which shows 35.0 percentage positive relationships at 1% significant level. The correlation coefficient between Performance Measures Customer Perspective and Internal Perspective is 0.661, which shows 66.1 percentage positive relationships at 1% significant level. The correlation coefficient between Performance Measures Customer Perspective and Innovation and Learning Perspective is 0.615, which shows 61.5 percentage positive relationships at 1% significant level. The correlation coefficient between Performance Measures Innovation and Learning and Internal Perspective Perspective is 0.524, which shows 52.4 percentage positive relationships at 1% significant level. From the above regression analysis result reveals that there are more positive relationships between different Strategic Perspective in different measure in business performance.

5. Conclusion

This study results contributes to knowledge management on ERP System in a better way of approach and contribution in the literature regarding business performance measures of Enterprise Resource Planning (ERP) system post-implementation phase as a measurement standard in Automotive Ancillary Industries using four interrelated dimensions of performance measurement framework Balanced Scorecard (BSC); Innovation and Learning, Internal, Customer and Financial perspective. From the Friedman's ranking analysis provides Performance measures on Customer Perspective is achieved followed by Innovation and Learning Perspective, Financial Perspective and Internal Perspective. The regression analysis reveals that there are more positive relationships between different Strategic Perspective. All Management executives and are suspicious about achieving strategic objectives by using modern ERP System functionality. Evaluation and examine using systematic approach using BSC models improves business performance which assures more accurate information for smooth and faster assessments for decision-makers. Decisions based on accurate performance result may lead to more effective and efficient way of attaining the management strategic objectives. This study will encourage the ERP implementation in competitive, volatile, dynamic and knowledge-based economy in Automobile Ancillary Industry.

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