A DESCRIPTIVE STUDY ON THE USAGE OF PERFORMANCE MEASURE ACCORDING TO BALANCED SCORECARD (BSC) PERSPECTIVES WITHIN THE MALAYSIAN ELECTRICAL & ELECTRONIC SECTOR

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ABSTRACT

This research presents the use of multiple measures of performance in the electrical and electronic (E&E) manufacturing firms in Malaysia. The objective of this study is to investigate the usage of multidimensional performance measure which includes financial and nonfinancial indicators within the Malaysian E&E manufacturing firms' performance. Basically, the theoretical gaps concentrated on the issue of focusing solely on financial measurements to measure the firm's performance. This is to investigate the usage of performance measure according to the Balanced Scorecards (BSC) perspectives within the E&E manufacturers in Malaysia.

Keywords: *performance measure usage, financial measurements, balanced scorecards, nonfinancial indicators, firm performance*

1.0. Introduction

The inadequacies of relying exclusively on the financial indicators in manufacturing performance measurement are well-documented and understood (Medori, Steeple, Pye & Wood, 1995). The drawbacks of looking solely into financial indicators are well-known by managers. Among the many limitations cited are the financial measures are at best too summarized to be useful (Eccles & Pybum, 1992) and at worst, they provide a very limited and often misleading picture of the performance of the organization (Tarr, 1995). It is widely recognized during the 1990's that the exclusive reliance on financial indicators is not appropriate anymore for the purpose of measuring performance in manufacturing (Geanuracos & Meiklejohn, 1993).

Non-financial measurements show better indicators for future performance and they are important in evaluating and motivating managerial performance (Banker, Potter &Srinivasan, 2000). Studies by others (Maiga & Jacobs, 2003; Hoque & James, 2000) showed that the usage of multiple performance measure which is inclusive of non-financial indicators will lead to better firms' performance. Because of this theoretical gap that explained clearly the sole reliance on using financial measure is not appropriate and suitable anymore, and that the multiple usages of performance measures will lead to

better firm performance, thus it is one of the objectives of this research to look into the multiple performance measures usage in the E&E companies in Malaysia.

A further look at performance indicators for local E&E industry illustrates that most of the measures used are financial measures which are represented by productivity and profitability indicators (Productivity Report, 2010/2011). Some of the mostly cited productivity performance indicators as explained in the report were Capital Productivity, Labour Productivity, Labour Competitiveness, Capital Intensity, Process Efficiency and Added Value Content.

To further determine the gaps with regard to the performance measures used in the E&E sector, an interview was conducted with a manager, industry and research division specialising on E&E sector at National Productivity Centre (NPC). The purpose of this interview was to gauge the usage of performance indicators in the E&E manufacturers that is to know the usage of financial and nonfinancial indicators in those firms. From the interview, it was revealed that financial indicators are mainly used as the indicators for company's performance, whereas the non-financial indicators are used mainly in the operations division. The non-financial measures used in operation are cited to be defect rates and process efficiency. This showed the gaps of the present practices of E&E manufacturers in the sense that the non-financial indicators were not fully practiced in the firms and this is one of the gaps that was highlighted in this study.

In terms of theoretical gap, criticisms were made on traditional financial measurements and showed the importance of introducing non-financial indicators. The extensive usage of financial indicators and selected non-financial indicators such as in operations division in Malaysian E&E manufacturing firms indicated that a more comprehensive approach is needed to be looked at so that firms would be better able to deal with practical gaps explained previously(Lok Lee & Mazlina Shafie, 2007). Thus, the problems of relying mostly on financial perspectives and less emphasis on nonfinancial performance indicators need to be investigated in terms of usage of both financial and nonfinancial indicators in the E&E industry, and to look at the advantages that firms can obtain if they are to use both financial and nonfinancial indicators in order to increase their firms' performance comprehensively.

This study attempts to close the theoretical gap on the E&E performance measurement by suggesting a Balanced Scorecard (BSC) approach to measure performance. BSC is chosen since it is the most widely used multiple measures in manufacturing (Gomes, Mahmoud, & Joao, 2004). BSC is multidimensional in nature and has a comprehensive set of performance measure that contains both financial and non-financial indicators (Kaplan & Norton, 1996). The usage of BSC in the E&E manufacturing firms is one of the key issues investigated in this study.

This approach included both financial and non-financial indicators under four perspectives, namely financial, internal business process, innovation & learning and customer perspectives. All of the perspectives are linked by cause and effect or means end relationship whereby improvement in non-financial perspective will in the end lead to improvement in financial performance.

1.1 Scope of the Study

The decision to study the manufacturing sector in general and E&E sector in particular was due to several reasons. Firstly for the manufacturing sector, it recorded a growth of 11.4% with 27.7% contribution to GDP, second after the services sector in 2010 (Productivity Report, 2010/2011).

Secondly, for the E&E subsector, it is considered as the engine of growth to the national economy. When compared to other manufacturing subsectors, it was the biggest contributor to the manufacturing sector accounting for 26.1% of manufacturing output and it was also the largest employer giving jobs to more than 40% of total manufacturing labour (Productivity Report, 2010/2011).

2.0 Literature review

2.1 Balanced Scorecard

The performance measurement literature suggested that use of multiple measures of performance which include both financial and non-financial would bring many advantages to the company as explained previously. The multidimensional assessment on organizational performance could work as the impetus for the firms' present and future success (Kaplan & Norton, 1996). As part of the efforts to integrate non-financial indicators to performance measurement, the Balanced Scorecard (BSC) was developed that incorporated the elements of strategy, financial and non-financial measurements into it (Kaplan & Norton, 1996). It was a technique that allowed firms to translate their strategic objectives into a coherent set of performance measures (Kaplan & Norton, 1993).

The purpose of BSC was to translate strategy into measures that uniquely communicate vision to the organization (Kaplan & Norton, 1992). In short, the BSC was created to; (1) clarify and translate vision and strategy, (2) communicate and link strategic objectives and measures, (3) plan, set targets and align strategic initiatives and (4) enhance strategic feedback and learning and furthermore, it helped in realizing both tangible and intangible benefits of their investments (Kaplan & Norton, 1992; 1993; 1996; 2001).

Kaplan and Norton's "balanced scorecard" originally developed as a tool for performance measurement at the organizational level (Kaplan & Norton, 1992). This was followed by further articulations on BSC discussing its concept and applications (Kaplan & Norton, 1993, 1996, 2001). In general, several researchers managed to empirically study BSC (Hoque & James, 2000; Hoque, Mia &Alam, 2001; Maiga & Jacob, 2003, Fang & Lin, 2006). The summary of some of the previous empirical research on BSC is illustrated in Table 1 (Appendix A).

The BSC could be used to measure organizational performance, which emphasise on financial objectives. But, it also includes the performance drivers of these financial objectives, and measures organizational performance across four balanced perspectives; (1) financial, (2) customer, (3) internal business processes and (4) innovation and learning.

Creators of the BSC argued that, traditional financial measures *"Tell the story of the past"* (Kaplan & Norton, 1992) and they want to complement this drawbacks by suggesting past performance measures (financial measures) would be measured together with the drivers of future performance indicators (customers, suppliers, employees, processes, technologies and innovation). The main concept outlined in BSC was that to translate the company's vision and objective into strategic actions which can be measured using the four perspectives. A properly developed Balanced Scorecard should have cause and effect relationships, linkage to financials, performance drivers and measures that create change (Edwards, 2001). For example, by training the employees (innovation & learning perspective), this would lead to shorter cycle times in production process (internal business process perspective), which in turn lead to better on time delivery (customer perspective) and in the end lead to improved Return on Investment (ROI) and financial performance (Ruzita, DaingNasir, Yuserrie, 2006).

The prominence of BSC was that it emphasised on the future performance drivers instead of solely relying on financial indicator. The point was that if the leading indicators were good then it will eventually be reflected in financial indicators.

2.1.1 Financial Perspective

Financial measurement would show the outcome of using appropriate strategy to translate the company's mission into measurable objectives. Financial perspective using right financial indicators could show whether a firm is profitable or not (Hoque et al., 2001). In the BSC orientation, financial perspective was considered as the ultimate goal which would be achieved when the other perspectives namely internal business process, customer and innovation & learning perspectives were good, then it would eventually lead to good financial performance also.

Financial perspective was conceptualized as the key financial drivers that could improve performance by its way of reducing costs and increase in revenue and productivity which would in

turn help to create shareholder wealth. Traditionally, ROI was a preferred method for most firms, which in broad terms analyses tangible benefits minus costs, in order to gauge the pay-offs of their company's IT projects (Lee & Bose, 2002).

2.1.2 Internal Business Process Perspective

Great emphasis should be placed on internal business processes since it was this process that created the product. Managers needed to focus on those critical internal processes that enabled them to satisfy customer needs. According to Hoque et al. (2001), internal business processes were concerned on using the resources that they had as efficient as possible and determining the competitive performance for future business endeavours.

The internal business process measures should focus on traits that had given impact on customers cycle time, quality, employees' skills, and productivity (Kaplan & Norton, 1992). The internal perspective concerns mainly on the efficiency of the processing system and it should focus mainly on creating customer value (Kaplan & Norton, 1992).

Internal business process perspective was conceptualized as the efficiency of business process in general and accounting process in particular that can serve as the leading indicators of what the financial perspective will subsequently reveal. For instance, if the internal business process is efficient, then it will lead to smooth production runs and more output which would in turn help to increase sales and performance thereafter.

2.1.3. Innovation and Learning Perspective

The focus of this perspective was the effort for continuous improvement so that firms can always cater for changing demands by constantly creating products that can fulfill customers' needs. For the firms to survive in the dynamic and changing business demands, it must be able to always creating new products, improving on existing ones and always learning to cope with changing situations. Only when these were done, then they will stand better chance to survive in ever changing business situations by penetrating new markets, increase market share and increase profitability (Kaplan & Norton, 1992).

In this study the innovation and learning perspective was conceptualized as the leading measures that focus on organizational innovation and learning that could bring cause and link effect to other measures which ultimately lead to improved financial performance. Further to these, enterprises are increasingly turning to IT for their employees training (Westerman, 2004). The training of employees is key factor for employee satisfaction because training builds and sharpens employees' skills (Sami, 2010). Thus, the perspective is conceptualized as innovation and learning perspective mainly because learning relates to employees' satisfaction and therefore, it is considered as one of the items in this perspective.

2.1.4. Customer Perspective

Customers' concerns tended to fall into four categories: time, quality, performance and service, and cost (Kaplan & Norton, 1992). What was meant by time was the response time taken by the company to meet its customers' request. For example, the length of time it took for the company to deliver the products to customer once it had received orders from them. Quality normally indicated the defects in the products but can also be used to measure time delivery which came from other dimensions. The factor of performance and service measures will show added value to the customers when purchasing the products.

The purpose of having this measure was to assess customers' satisfaction whereby in a competitive market, customers must be content, or market share will drop and customers were concerned about price, faster and reliable deliveries, design, quality and level of services (Hoque et al., 2001)

Hence in this study customers' perspective was conceptualized as the leading measure that included non-financial terms that could help to satisfy customers' needs. They may be leading indicators of

what the financial measures will subsequently reveal, for example, increases in customers' satisfaction would lead to sales growth and hence financial performance.

3.0 Methodology

3.1 Pilot Study

As a methodological procedure, a pilot study was carried out prior to the actual data collection. The very purpose of conducting this pilot study is to determine the validity of the instruments that is to identify ambiguous or biased items in the questionnaires for elimination and the suitability of the instruments to collect data. Another purpose is to improve the items and to determine whether the questions are clear enough to the respondents. By doing this, it is hoped that any ambiguous questions can be corrected so that future respondents will have a full understanding of the questions before the final questionnaire is mailed to them.

The questions from this pilot testing are adapted from previous studies, plus new additional questions to suit the objective of the study. The additional questions consist of questions on the general information and demographic profiles about the firm and respondents. The appropriateness of the questions is very important and by conducting this pilot study, the appropriateness of the questions can be determined prior to the full data collection.

The first step in this pilot testing is to select 30 companies from the listing as mentioned above to serve as the respondents for the pilot study. The respondents are mainly from the top financial management of the company since they are expected to have an overall view of the firms' financial and management encompassing different departments and thus, by having the overall knowledge about the management of the company and by virtue of the authoritative position that they hold, they are expected to be able to solicit answers for the questions asked from the various departments involved.

The instruments used in this study involved responses from top financial management of the company since the questionnaire covers mostly on firm performance. The questionnaires for the current research were self-developed. The questionnaires were sent via post and after two weeks, follow ups were made by phone calls. Responses were received via post and some respondents just did not respond although various and determined efforts had been put to make them to respond to the questionnaires. These whole processes took about two months plus to complete this pilot testing process.

The findings from the pilot showed that the respondents did not have difficulty in understanding the questions, judging from their full responses on the items asked in the questionnaire. Based on the feedbacks from the respondents, it seemed all the questions were fully understood by them and therefore no ambiguous question was reported. The respondents also never indicated on their comments about items that needed to be deleted, inappropriate for the constructs and they also did not suggest modifications to the questionnaire used in this study. Since the respondents did not suggest any changes to the instruments, thus it can be safe to say that the instruments used have fulfilled the criteria for face validity. Face validity indicates items that are intended to measure a concept; do on the face of it look like they measure a concept (Sekaran, 2003). Face validity can be assessed not only through ratings by expert judges, but also by pre-tests with multiple sub-populations (Hair, Black, Babin, Anderson &Tatham; 2006). Face validity is the extent to which the content of the items is consistent with the construct definition, based solely on the researcher's judgment (Hair et al., 2006). However, factor analysis was not conducted on pilot samples because a minimum sample of 50 is needed before a factor analysis can be carried out (Hair et al., 2006). As a result, the instruments that were used for pilot study were maintained and no change was made and the questionnaire was used for final data collection.

3.2 Population and Sampling Procedure

The data used in this study was drawn from a questionnaire-based survey of Malaysian Electrical and Electronic (E&E) manufacturing firms. Sample firms from E&E sector were selected from the Malaysian Industrial Development Authority (MIDA) listing which became the population frame for this study. The electrical and electronic industry has been selected because of its significant contributions to employment, turnover and exports.

The E&E companies listed by MIDA became the population frame for this study. The total population of E&E manufacturers listed at the MIDA website was about 650 companies. An enquiry made to MIDA for the latest listing of E&E companies were directed to the online listing at www.mida.gov.my. After doing some verifications which included eliminating double counting of company names and addresses, the exact numbers of E&E population came down to 630 companies. Although 30 samples have been used for pilot study, but 630 samples have been sent for final data collection to avoid the problems of low response rate reported within this industry.

As for the research site, the segregation of the respondents according to the state is listed as follows; Penang (27.6%), Selangor (23.6%), Wilayah Persekutuan (7.6%), Johor (21.5%), Melaka (4.3%), Negeri Sembilan (2.9%), Kedah (7.3%), Perak (3.1%), Perlis (0.1%), Pahang (0.6%), Terengganu (0.3%), Kelantan (0.6%) and Sarawak (0.5%).

To ensure the generalizability of the current research's findings, few guidelines have been observed with regard to the estimation of sample size. According to Hair et al. (2006), the effects of sample size are seen most directly among others, in the generalizability of the results. As for the estimation of the sample size, a few references were made. Sample size between 30 to 500 was appropriate for most research Roscoe (1975). The estimated sample size for a population of 630 is 238 (Krejzie& Morgan, 1970). To be more exact, the general rule of thumb was to have a ratio of 5:1; that was to have an adequate sample size wherein each independent variable would need 5 samples. However, the recommended sampling was to have 15 to 20 samples for each independent variable (Hair, Black, Anderson, &Tatham, 1998). Thus, in this study, the required minimum sample size would be 60 (15 samples for four independent variables).

Sample firms from E&E sector were selected using simple random sampling technique from the list provided by MIDA. Simple random sampling was chosen because of the criteria of each sample to be selected equally out of the population and thus would ensure generalizability of the findings in the study (Sekaran, 2003). The method at which the samples are selected randomly from the population was by creating 630 small pieces of paper and numbering it accordingly. Starting from number one for the first piece, number two for the second piece and so on until all the pieces were numbered. Then the pieces of paper were placed in a box and all the pieces would have equal chance of being selected. Then a piece of paper was drawn from the box one at a time until 488 pieces were fully drawn. In this study the required sample size is 60, out of the population of 488. This is how the simple random sampling process was conducted in this study. However, to ensure responses obtained exceeding the required limit, the questionnaires were sent to all of the population.

Data were collected via mail and follow up procedures were performed for the late responses. One month after the questionnaire had been distributed; the follow up was done firstly via email to enquire the respondents about the responses from the posted questionnaires. After another month, when there was no response from e-mail method, the phone calls were made to the respondents to ask about their responses to the sent questionnaires. In certain instances and over a period of the next three months, multiple phone calls were placed to the respondents just to remind and ensure that they will reply within the stipulated time period. And a three-month response period was given to wait for any further due responses from the respondents.

3.3 Measurements of Variables

3.3.1 Performance measure usage

The questions asked the respondents to tick on the set of criteria which represent each of the four perspectives of BSC measures being used in their firms. The exact BSC perspective's names were not specified in the questionnaire to avoid the biasness on the respondent's answers.

3.3.2 Profile of Respondent

This section asked the position and demographic profiles of respondent in the firm.

4.0 Data Analysis

4.1 Response Rate

The questionnaires were distributed to respondents via mail. Approximately 630 questionnaires were mailed to managers of electrical and electronic (E & E) manufacturers, located throughout Malaysia for final data collection. From this 630 population, 30 samples were used for pilot study testing as has described in the previous chapter. But the question which was sent for final data collection was still 630, to allocate for low response rate in this industry (Ruzita, Daing Nasir & Yuserrie, 2005). 102 people returned responses but only 74 were usable, making a usable response rate of 12.3%. This was slightly higher than the previous studies in manufacturing and information system studies from England and the US (Valsamakis & Sprage, 2001; Bhatt, 2000, Gomes, Yaasin & Lisboa, 2005). All of these studies reported a response rate of about 10 percent. The summary of the questionnaires' rate of return is illustrated in Table 2.

Table 2: Response of questionnaires

	No. of questionnaires	%
Questionnaires sent through mail	630	100.00
Questionnaires received through mail	102	17.0
Completed questionnaires received and usable	74	12.3

4.2 Descriptive Statistics

4.2.1 Performance measure usage

The descriptive statistics of these constructs that include the frequency, percent and cumulative percent would be ascertained. The result of descriptive statistics on performance measure usage is illustrated in Table 3.

Table 3: BSC Usage (Financial)

	Frequency	Percent	Cumulative Percent
Missing value	3	4.1	4.1
Yes	67	90.5	94.6
No	4	5.4	100.0
Total	74	100.0	

As can be seen in table 1.3, majority of the respondents (67 out of 74) were using financial indicator to measure their performance. This means that the usage of financial indicators are very high (90.5%) among the respondents. This can be translated to represent 90.5% of the samples in this study.

However 4 respondents were not using the financial indicator and there was no answer from 3 respondents making the percentage of 4.1% for missing values.

Table 4: BSC Usage (Internal Business Process)

	Frequency	Percent	Cumulative Percent
Missing value	2	2.7	2.7
Yes	61	82.4	85.1
No	11	14.9	100.0
Total	74	100.0	

As can be seen in Table 4, majority of the respondents (82.4%) were using internal business process indicator to measure their performance. This can be translated to represent 61 out of the 74 of the samples in this study. This shows that internal business process indicators are being used widely (82.4%) in the respondents' firms. However, 2 respondents were not answering items on the internal business process indicator and there were 11 respondents making the percentage of 14.9% for not using internal business process indicator.

Table 5: BSC Usage (Innovation and Growth)

	Frequency	Percent	Cumulative Percent
Missing value	3	4.1	4.1
Yes	65	87.8	91.9
No	6	8.1	100.0
Total	74	100.0	

Table 5 shows the BSC usage for innovation and growth indicator. Majority of the respondents (87.8%) were using innovation and growth indicator to measure their performance. This can be translated to represent 65 out of the 74 samples in this study. However, 6 respondents were not using the innovation and growth indicator and there was no answer from 3 respondents making the percentage of 4.1% for missing values.

Table 6: BSC Usage (Customer)

	Frequency	Percent	Cumulative Percent
Missing value	4	5.4	5.4
Yes	50	67.6	73.0
No	20	27.0	100.0
Total	74	100.0	

Finally in Table 6, majority of the respondents (67.6%) were using internal business process indicator to measure their performance. This can be translated to represent 50 out of the 74 of the samples in this study. However, 4 respondents were not answering on the customer indicator and there were 20 respondents making the percentage of 27% for not using internal business process indicator. This is the highest non uses of perspectives among the four performance perspectives as specified in the BSC.

Table 7: Profile of Respondent

	Frequency	%
Position:		
Director	7	9.4
Senior manager	13	17.6
Manager	31	41.9
Others (Assistant Managers)	21	28.4
Missing Value (Did not answer)	2	2.7
Total		
	74	100.0

As can be seen in Table 7, approximately 68.9% of the respondents held the position in the upper management level (directors, senior managers, managers), with the remaining 31.1% for other positions.

5.0 Discussion

5.1 Usage of Balanced Scorecard Measures

One of the questions that need to be answered in this study is to find the extent of usage of BSC perspectives in Malaysian E&E manufacturing firms. The percentage of manufacturing firms using all four perspectives of BSC account was only 63.5% only. According to descriptive statistics, some firms were not using the financial perspective (5.4%), internal business process perspective (14.9%), innovation and growth perspective (8.1%) and customer perspective (27%).

These findings indicated that elements of BSC perspectives such as financial, internal business process, innovation & growth and customer were in fact being practiced in evaluating performance whether directly or indirectly although it could not be conclusively said that they had used the Balanced Scorecard as their main performance measurement system in evaluating organizational performance.

To be more specific, the usage of financial measure constituted 90.5% from the total samples collected. This is not surprising given that financial indicator is considered as key measures in evaluating firm's performance (Fang & Lin, 2006) and most of the measures used are financial measures (Productivity Report, 2010/2011). As for the internal business process measure, 14.9% of the respondents did not use this measure in their performance evaluation. On the opposite explanation, 61 out of 74 of samples collected used internal business process measure when evaluating performance in their companies. The high number of firms using this perspective in performance measurement is not surprising given that the samples consisted of E&E manufacturers which are related very much to production and processing in general, and internal business process in particular. E&E sector is an important industry in Malaysia whereby it contributes 26.1% of manufacturing output in total and this sector contributed 41% of total export in 2009 (Productivity Report 2010/2011).

As for Innovation and Growth perspective, the statistic recorded 87.8% respondents used this measure in the respective firms. This perspective concerns with continuous improvements efforts to meet changing demands by consistently introducing new products and positioning organization for growth from modified and enhanced products (Weill & Aral, 2004). The high usage of this perspective among the E&E samples are best explained by the fact that firms need to constantly meet the changing demand by constantly coming up with modified and enhanced product.

Finally, from the customers' perspective, the usage of this measure among the respondents revolved around 67.6% only. This is by far the lowest usage measure among the four BSC perspectives. When firms do not use customers' perspective, it means they are neglecting the customers' concerns and satisfactions when producing their products. This low usage of customer measure is supported by the

earlier practical gap that mentioned about the higher complaints per customer and complaints per order directed towards the firms.

The above discussions answered the research issues on the usage of financial and non-financial measures in our E&E manufacturing firms.

6.0 Conclusion

The usage of multidimensional performance measurement that includes both financial and nonfinancial indicators have been used widely within the E&E industry as presented by the statistics. This indicates high awareness among the respondents that they need to use measures that not only from the financial perspectives but also from nonfinancial perspectives as well.

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Appendix A

Table 1: Some previous empirical studies on BSC

Author	Topic	Scope
Hoque& James (2000)	Linking Balanced Scorecard Measures to Size and Market Factors: Impact on Organizational Performance.	It studies the association between organization size, market position, balanced scorecard (BSC) usage and organizational performance. It posited that BSC usage was related to improved performance, but factors such as organization size, product life cycle, or market position didn't significantly influence it.
Maiga& Jacobs (2003)	Balanced Scorecard, Activity Based Costing and Company Performance: An empirical Analysis	The study concerned with the complimentary effect of BSC & ABC on manufacturing performance. The findings suggested the association of ABC & BSC in affecting performance.
Hoque et al. (2001)	Market Competition, Computer-Aided Manufacturing and Use of Multiple Performance Measures: An Empirical Study	The multidimensional measurement of performance in manufacturing was the subject of this study. The outcome stated the relationship between multidimensional performance measurement to businesses facing high competition and making greater use of computer-aided manufacturing processes.
Fang & Lin (2006).	Measuring the Performance of ERP System - from the Balanced Scorecard Perspectives	This study measured ERP performance using BSC approach. A comprehensive set of key perspectives were used to assess the firm's performance using BSC approach.