



ANALYSIS OF PERFORMANCE MANAGEMENT SYSTEM AT A LOCAL MANUFACTURING COMPANY

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ABSTRACT

Effective use of performance management (measurement) system enables companies to improve on their competitiveness in the marketplace. Through a case study research, the paper reviews the performance management system of a local manufacturing company. Most researchers have focussed on wide range of performance management surveys and few paid attention to individual companies, which is the focus of this paper. The balanced score card framework was used to evaluate both internal business processes and external outcomes. Four perspectives of the scorecard; financial, customer, process and learning were looked into. The paper established that top management is clear and committed to the company's strategy and goals. The company is struggling to increase its market share due to lower levels of productivity. High levels of rework were noticed on the shop-floor and are impacting negatively on their cash-flow. These problems have led to poor customer retention due to unmet delivery dates. The paper proposes that the company must initiate staff development programmes to enable a culture of continuous improvement.

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1 INTRODUCTION

It is important for companies to, “align their performance management systems with their strategic goals”, [1], in-order to achieve competitiveness, growth and sustainability [2]. At strategic level, performance measurement systems (PMS) are used to formulate and direct organisational strategic objectives and activities, [2], to establish the strengths and weaknesses of the organisation [3]. At operational level, PMS are used to ensure that customer requirements are met, [2], provide standards for establishing comparisons, provide visibility and a “scoreboard” for people to monitor their own performance level, [2, 3], to highlight quality problems and determine areas for priority attention, [1,4] and to provide feedback for driving the improvement effort, [2, 4].

In this respect, performance measurement and appraisal systems have come to play indispensable roles in helping organisations to reach their goals of productivity, profitability and competitiveness, [2], and making sure that their systems operates effectively and efficiently, [5]. Most companies have some kind of measurement system that keeps track of various financial and operational performance measures (often referred to as metrics) [6]. Company A, which is the unit of analysis in this paper, introduced the Balanced Scorecard in 2009. While the company carries out its own evaluations periodically, none of them have been done by an outside body, hence the motivation of this study.

Various performance measurement frameworks have been developed [7, 8] as shown in Table 1. However the most popular of these is the balanced score card (BSC) developed by Kaplan and Norton, [8]. The BSC emphasises on the balance between the use of financial and non-financial measures to achieve strategic alignment, [1,2] and is the focus of this study.

Table 1: Various Performance Measurement Frameworks [7, 8]

Selected frameworks	Performance measurement attributes
Deischel and Smith (1991)	Measures linking CSFs (quality, flexibility, customer service, resource management, cost, flexibility) to process drivers
Fitzgerald et al (1991)	Results, determinants,
Kaplan and Norton (1992)	Scorecard of financial, customer, internal, learning and growth
Smith (1997)	Value and non-value adding, drivers
Otley (1999)	Objectives, strategies, performance targets, incentives, information flows
Kennerley and Neely (2000)	Performance prism, stakeholder satisfaction, strategies, processes, capabilities, stakeholder contributions
Neely and Jarrar (2004)	The Performance Planning Value Chain (PPVC)
St-Pierre and Delisle (2006)	The Performance, Development, Growth Benchmarking System (PDGBS)
Balachandran et al (2007)	The Unused Capacity Decomposition Framework (UCDF)
EFQM 2010	The EFQM Excellence Model



This study focusses on the BSC because that is the framework the company has implemented since 2009.

1.1 Research Objective

To analyse the use of Balanced Score Card as a performance measurement system used in Company A.

1.2 Research Questions

To achieve the above-mentioned research objective, the author created the following research questions related to the study of performance management systems:

- To what extent do the employees understand the use of BSC as a performance management system?
- To what extent does the management evaluate and communicate results of the implemented BSC?
- What are the performance improvement strategies being implemented?

2 LITERATURE REVIEW

2.1 Performance Management and Performance Measurement

In literature the terms “performance management” and “performance measurement” are used interchangeably [10]. Armstrong and Baron[11], defines *performance management* as a strategic and integrated approach aimed at delivering sustained successes to the company by improving individual and group performances and also developing the capabilities of teams and individuals. Performance management also involves training, team work, dialogue, management style, attitudes, shared vision, employee involvement, multi-competence, incentives and rewards, [6, 7, 10]. Lebas, [12] defined performance measurement as measures based on key success factors, measures for detection of deviations, measures to track past achievements, measures to describe the status potential, measures of output, measures of input, and these are the measures that will be analysed in this paper through the BSC. However this paper uses both terms, (performance management and performance measurement) interchangeably.

2.2 Performance Appraisal

Performance appraisal is “...an organisational system comprising deliberate processes for determining staff accomplishments to improve staff effectiveness,” [13]. It is a *discreet* event that most organisations perform periodically [14] to evaluate employees’ performance [15]. Performance appraisal is used to facilitate effective communication between managers and employees, [as well as providing feedback that can immediately be applied by employees to improve their performance, [14]. Managers show employees how improving their overall performance and developing new skills will lead to additional responsibilities, [12]promotions and increased monetary benefits, [15]

2.3 Balanced Scorecard

The Balanced Scorecard (BSC) is a performance measurement framework that was developed by Kaplan and Norton [8], that enables organisations to clarify their vision and strategy, and translate them into action, [2,3]. The scorecard is designed to link strategy to operations, [1,8], by establishing operating objectives and quantifiable performance measures based on strategic direction, (mission and vision statements), [1,3], and measures actual performance against these,[8]. It provides feedback around both the internal business processes and external outcomes, [16] in order to continuously improve strategic performance and results,

[9]. When fully deployed, the BSC transforms strategic planning from an academic exercise into a powerful and pragmatic approach to improve performance [17]. The BSC, normally a key output from strategy formulation, focusses on four perspectives that are aimed at satisfying stakeholders, namely financial performance, customer value performance, internal business process performance and innovation performance and lastly learning and growth, [8, 15]. Both financial and customer perspectives are intended to reflect the needs of stakeholders and target groups, [1, 3, 8, 16]. The internal business perspective focusses on internal operations that are important for customer satisfaction and efficiency, [1, 8, 10, 16].

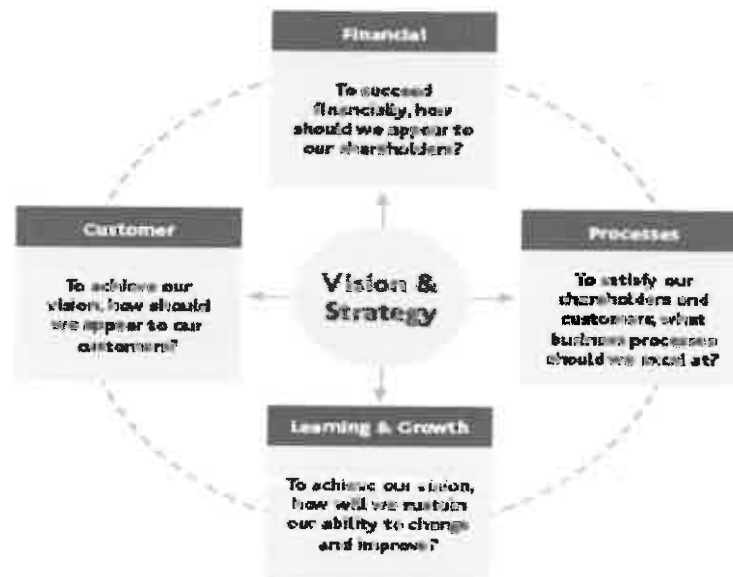


Figure 1: Balanced Scorecard Management System, Adapted from [8]

2.3.1 *Balanced Scorecard categories of performance:*

2.3.1.1 Financial perspective

Financial performance is a key measure of a successful business, as it reflects its ability to continue to secure new business, to increase its market share, [8, 16], and to achieve high levels of productivity, which continue to improve year-on-year, [10]. The financial performance measures focuses on revenues, sales, profitability, earnings, return on capital, and cash flow, [16, 18].

2.3.1.2 Customer perspective

Under customer value performance the BSC focusses on market share, customer satisfaction measures and customer loyalty, [1, 3, 8, 16]. Quality and reliability deliver benefits for customers which ensure that they rarely move on to an alternative supplier, [18]. Leading businesses deliver what they promise to deliver, reliably and on-time. Delivering products on time will in turn lead to perceived value and quality, and growth in customer satisfaction, [2, 4]. High levels of customer retention can, over time, result in more profitable customers, [10], and ensure that new business results in growth, [17]

2.3.1.3 Internal process perspective

Internal business process performance focusses on "...internal operations important for customer satisfaction and efficiency...", [7]. The measures typically include productivity rates often called yield rates, quality measures, timeliness-cycle time and unit cost data, [16]. A well designed and delivered service will meet customer needs, providing a clarity of product/service concept and distinctive service, [16, 18]. The flow of work will be controlled and generally smooth, with speed and timeliness giving the business an additional



edge in the marketplace, and suppliers playing their part through their own reliability and responsiveness, [7, 8].

Innovation performance focusses on new ideas for services and products, [2,8], that will give customers additional reasons to be loyal and to increase their commitment to the business, [11,12]. Typical measures for innovation include rate of improvement in reducing defect rates, the percentage of revenue from new products, employee suggestions and time it takes to market new products from inception of a new product to its introduction to the market, [8,16].

2.3.1.4 Learning and growth perspective

Employee performance measures are level of staff morale, knowledge, turnover and use of best demonstrated practices, [8, 13,]. Leading businesses understand that their success is heavily dependent on the health, safety and welfare of their employees, [3,10]. They understand the proven link between satisfied employees, satisfied customers and business success, and act accordingly, [18]

2.3.1.5 What Balanced Score Card Do

Bain and Company, [16], summarised what BSC do:

- Articulate the business's vision and strategy
- Identify the performance categories that best link the business's vision and strategy to its results (e.g. financial performance, operations, innovation, employee performance)
- Establish objectives that support the business's vision and strategy
- Develop effective measures and meaningful standards, establishing both short -term milestones and long term goals
- Ensure company-wide acceptance of the measures
- Create appropriate budgeting, tracking, communication and reward systems
- Collect and analyse performance data and compare actual results with desired performance
- Take action to close unfavourable gaps

The above BSC attributes will be used to create a set of questions that will be used to survey Company A's performance measurement system. However some authors such as Kennerley and Neely, [18] have highlighted a number of the balanced scorecard shortcomings, as shown below, and these are out of the scope of this study.

- Absence of a competitiveness dimension
- Failure to recognise the importance of aspects such as human resources, supplier performance and
- No specification of the dimensions of performance

2.3.1.6 Implementation of BSC in SMEs

The motivation for SMEs in implementing BSC is primarily to reduce number of failures by paying attention to leading indicators such as customer satisfaction and quality. SMEs want to stay in business by developing growth potential. Gumbus [19], stated that, "SMEs use BSC for continuous improvement which is important for growth". Anderson [20], argued that, "BSC can be used as a tool by SMEs to meet the challenges of introducing a more efficient strategic planning process while retaining the competitive advantage of having relatively simple structures". These less complex organisational structures and fewer employees found in SMEs enables them to develop and implement BSC in a shorter period of time than large

corporations, [20]. Employees can then easily understand the company’s strategic plans and objectives. Through BSC implantation SMEs can develop longer term plans, [21], which they can use to create future value [22]. Henschel, [21], further argued that, "SMEs can connect BSC and business planning in creating an instrument for risk identification and risk evaluation".

However BSC implementation barriers that SMEs have to deal with include lack of human and financial resources [23], lack of skills, tacit knowledge, unfamiliarity with strategic management techniques and processes [24]. SMEs owner managers are sensitive to share business information and strategic planning with their employees [25]. SMEs concentrate on short term objectives and financial gains. Garengo (2005), [26], stated that SMEs focus on less BSC measures than large firms, this phenomenon brings in mis-alignment between strategy and performance measures.

3 RESEARCH METHODOLOGY

The research methodology of this study included relevant literature review, and detailed case study on one medium sized manufacturing company. Case studies, [28] can be used to explore, describe, explain and compare while Denscombe, [29], stated that case studies focus on one instance’s relationships and processes in a natural setting with the possibility of using multiple sources and methods for both data gathering and analysis. The triangulation method was used for data gathering as suggested by Williams and Scandura, [30]. Triangulation offers more complex, overlapping descriptions of the case and makes the report more trustworthy [31]. From literature a questionnaire was developed. The questionnaire focussed on six perspectives and measurements as shown in Table 2, and sought to establish if employees in Company A understood the Balanced Scorecard Framework used in their company.

Table 2: BSC perspectives and measurements used in the questionnaire

Perspective	Measurements
Strategy	Definite strategy, Strategy focussed on customers, updating of strategy, strategy translated into company, department, unit and individual goals and objectives, managing of key financial and non-financial information
Financial performance	Growth in profit, sales, market share, total asset turnover, net cash flow and cash flow to sales
Customer value performance	Customer satisfaction measures, customer satisfaction relative to competitors, customer loyalty, customer complaints
Internal business process performance	Productivity rates, quality measures, unit cost data, cycle times, yield rates, use of performance measurement tools
Innovation and learning performance	Revenue from new products, employee suggestions, rate of improvement index, investment in new product development
Employee performance	Employee satisfaction, employee turnover/loyalty, remuneration and benefits benchmark, employee training, employees’ knowledge in measuring their performance

4 FINDINGS

50 questionnaires were circulated and a total of 18 was received giving a response rate of 32 %. The responses received were from Managers, Engineers, Technicians, Production and Marketing personnel. The summary of the company's Balanced Score Card is as shown in Table 3.

Table 3: Summary of the Company's Balanced Score Card

Perspective and question	Goals	Objectives	Measurements
Customer- <i>How do customers see us?</i>	Continuously improve customer satisfaction	Decrease lead time, Increase on time delivery, Reduce customer complaints	Average lead time, Percentage of delivery on time, Number of customer complaints
Internal business- <i>What must we excel at?</i>	Continuously improve manufacturing excellence	Decrease cycle time, increase quality, improve yield	Productivity rates, quality measures, unit cost data, cycle times, use of performance measurement tools
Innovation and Learning- <i>Can we continue to improve and create value?</i>	To continue to develop and deliver new innovative products	Increase sales of new products, Reduce development time	Percentage of sales obtained from new products
Financial- <i>How do we look to shareholders?</i>	Continuously improve on financial performance	Decrease costs, Increase sales growth, market share, return on investment	Quarterly sales growth and operating income by division, increased market share

4.1 Employees' Understanding of the Balanced Scorecard's Perspectives

Figure 2 shows that almost 50 % of the respondents indicated that strategy was considered as a high priority in the company, with 20 % of the respondents, mainly from management, indicating that strategy was considered an essential component at senior levels. 30 % indicated that strategy was considered a medium priority. Generally it was observed that personnel in Company A, understand their company's strategy, [8,16]. However various departments did not have a detailed strategy map, thus impacting negatively on the non-financial performance measurements as suggested by Ittner et al, [32].

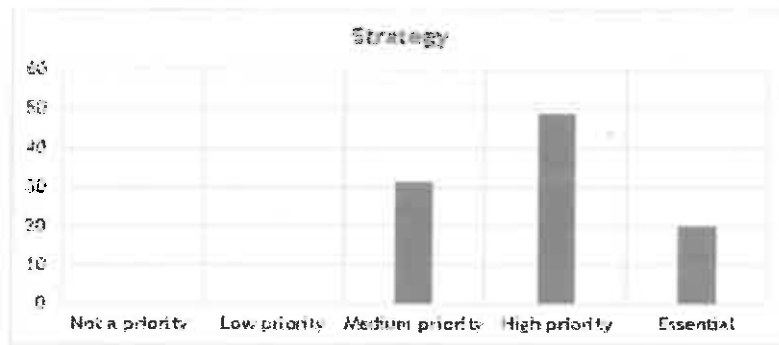


Figure 2: Employees' understanding of strategy according to the BSC metrics

Figure 3 shows that almost 90 % of the respondents understood the financial performance metrics which are the need for growth in profit, increase in sales, market share and total asset turnover, [8, 16, 18]

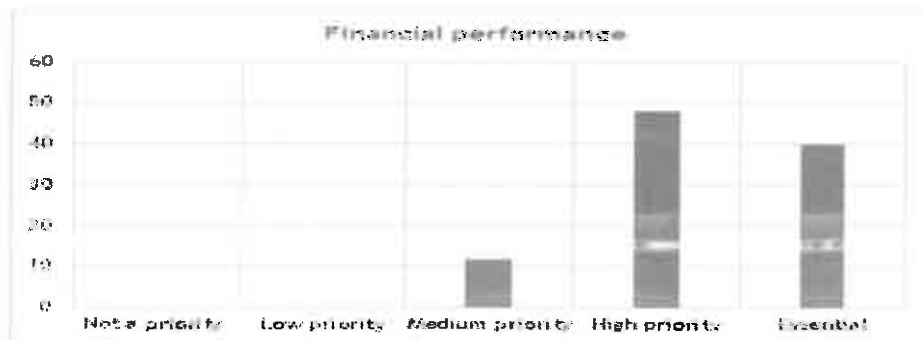


Figure 3: Employees' understanding of financial performance according to the BSC metrics

Figure 4 shows that 75 % of the respondents consider customer satisfaction as an important part in the implementation of the BSC. Issues such as customer loyalty and complaints are taken into consideration in their daily business, this supports the suggestions put forward by reference [10] that customer satisfaction somehow guarantees customer retention, which will promote profitability and market share, [8, 10]

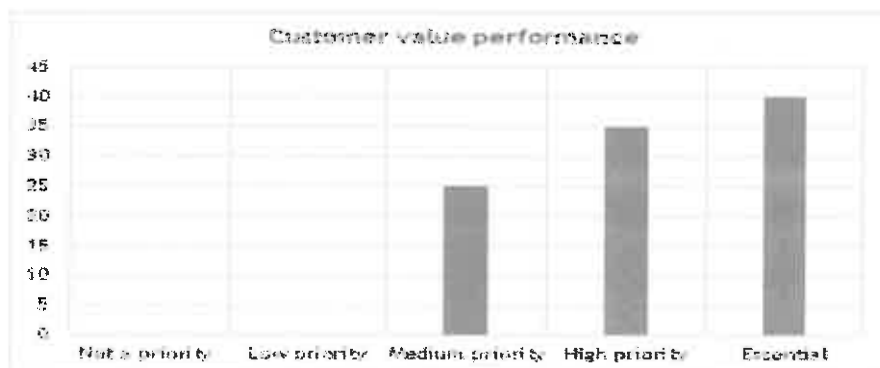


Figure 4: Employees' understanding of customer value performance according to the BSC metrics.

Figure 5 suggests that critical internal operations that enables the company to satisfy the customer needs, [3, 8, 10, 17] are not well understood by majority of the employees. The consequences are that productivity and quality issues will be compromised, [17]. Measures

of warranty, repair and treatment of defects and returns is also affected because of non-uniform understanding of the internal business process performance, [10].

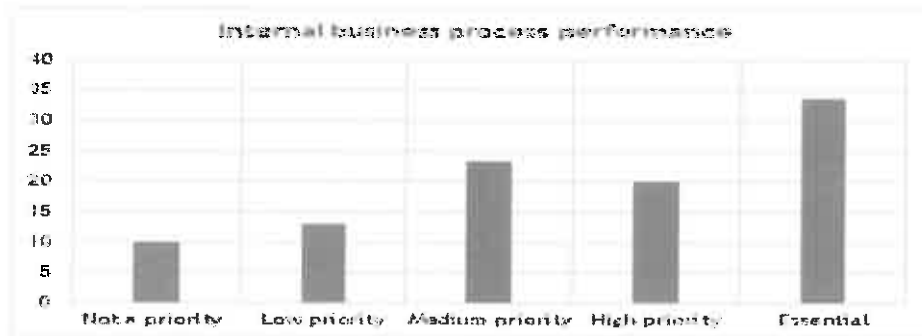


Figure 5: Employees’ understanding of internal business process performance according to the BSC metrics.

Figure 6 shows that about 65 % of the respondents indicated that the company emphasises the need to generate revenue from new products that can be sustained from a high investment in new product development, [10]. However during the interviews most employees indicated that their suggestions were not taken into consideration by management. This contradicts BSC’s objectives on employee morale, [13].

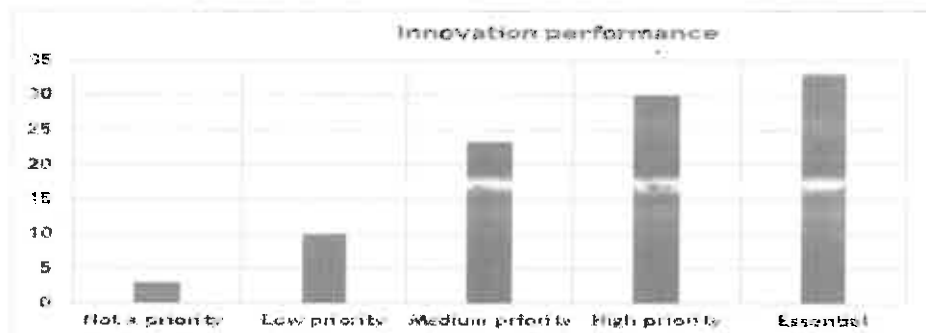


Figure 6: Employees’ understanding of innovation and learning performance according to the BSC metrics.

Figure 7 shows that about 60% of the respondents indicated that employees were dissatisfied, due to remuneration and benchmark benefits that were not well understood, [14,15], and that the company was not training its employees on how to measure their performance,[15]. This was found to be affecting the smooth implementation of the BSC, [4, 10, 18]

In summary figures 1 to 7 shows that employees have a mixed understanding of the BSC perspectives. Employees demonstrated a strong and passionate understanding of strategy, financial, customer value and innovation and learning performances. Employees’ understanding of the internal business process and the employee performance was found to be weak. This was found to compromise the effective and efficient implementation of the BSC, [4, 10, 18].

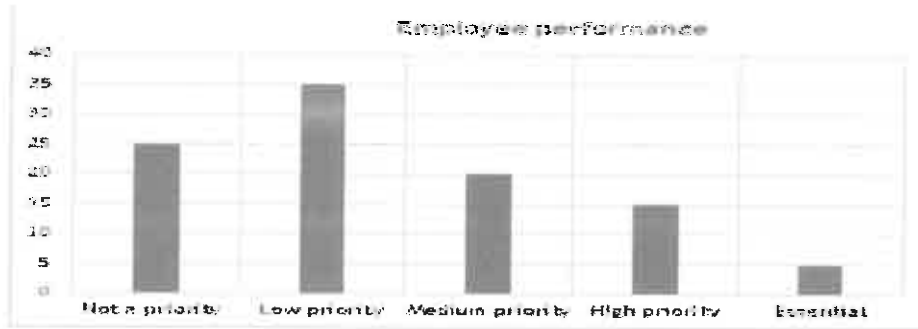


Figure 7: Employees' understanding of employee performance according to the BSC metrics.

4.2 Use of Graphical and Statistical Methods, Re-works and Un-met Deliveries

Table 4 shows use of graphical and statistical methods used in the company. Statistical analysis and Taguchi loss functions including the design of experiments are not used at all. Use of Pareto charts was expected to give the workshop personnel a clue on how to improve the quality standards, [33] which in-turn would have reduced the amount of rework done.

Table 4: Frequency of use of graphical and statistical methods

Graphical and Statistical method	Frequency of use
Pareto	10
Histogram	16
Scatter diagrams	4
Run charts	3
Control charts	15
Regression analysis	0
Taguchi methods	0

Figure 8 shows the 2013 percentage of re-work levels that were done in the workshop. These levels of re-work does not support the outcomes expected from a company that has implemented a BSC, [10].

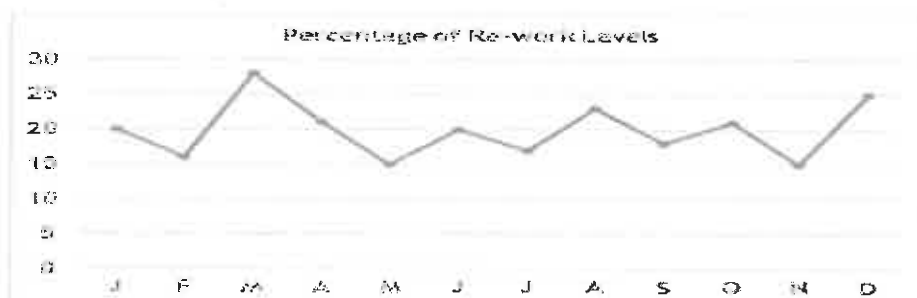


Figure 8: Percentage of Re-work levels

Re-works affects internal processes such as work scheduling, [33], and workflow processes that will cause production delays that knocks on throughput, [4] eventually affecting delivery capability and customer satisfaction levels, [8, 10, 16].

Figure 9 shows the percentages of un-met delivery targets in the four quarters of 2013. The company is failing to satisfy its customers and this is impacting negatively on customer value performance perspective, [16]. The unmet delivery targets also confirms the poor state of internal processes, [18], found in Company A.

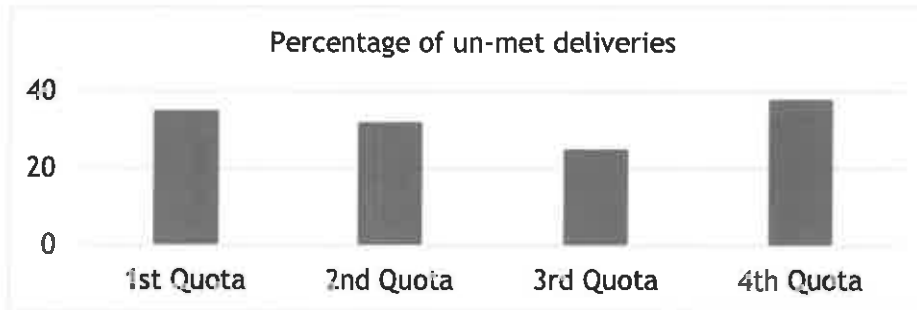


Figure 9: Percentage of un-met deliveries

The study established that management does communicate the results of the implemented BSC as exhibited by the use of graphical methods such as Pareto, Histograms and control charts. These graphical methods were used as shown in figures 8 and 9 above.

4.3 Discussion on Findings

The paper established that top management is clear and committed to the company's strategy and goals. Most employees are aware of the Balanced Score Card perspectives. The company is struggling to increase its market share due to lower levels of productivity, as evidenced by high levels of re-works. High levels of rework were noticed on the shop-floor and are impacting negatively on their cash-flow. This was supported by figure 5, which showed that employees had varied understanding of the internal business process performance. Employees do not understand internal business metrics such as productivity rates, quality measures, cycle times and the use of appropriate performance measurement tools. These problems have led to poor customer retention due to unmet delivery dates as shown in figure 9. Staff must be trained on BSC measurements.

Employee performance appraisal was found missing. Managers were seen to have been focussing more on employee performance plans with their elements and standards measuring behaviour, actions and processes without also measuring the results of employee's work. This has resulted in low worker morale. Workers' motivation was found to have been dampened by non-employee performance appraisal system. The working environment was found to be meeting industry standards on issues like ventilation, temperature and lighting. However workers generally felt in-secure and their inter-relationships were found to be weak. The author suggested to management that they must set up rewards systems that acknowledges groups instead of individuals. This will in turn improve group empowerment that can then suggest their own solutions to their problems. Data on financial and innovation performance was found to be scanty and no meaningful conclusions could be made. Barriers found in the implementation of BSC as performance management system were that; employees had no enough performance measurement system knowledge, and the existed the performance measurement tools or model are complex, employees do not know how to tailor them to suit their own activities.

Figures 8 and 9 show levels of reworks and unmet deliveries that were experienced by Company A in 2013. It is important for Company A to initiate staff development programs in-order to reduce the negative impacts of these two problems. Workers must also be developed to understand their internal processes.

5 CONCLUSIONS

The paper proposes that the company must initiate staff development programmes that will enable a culture of continuous improvement, [4, 10, 33]. Staff must be taught how to measure their own performance. The company must focus on reduction of the 7 wastes namely; defects, over-production, waiting, non-utilised talent, transportation, inventory, unnecessary motion, and excessive processing, [33]. The company must improve on its work instructions, [34], and must set up inspection points along their production line, [4]. The author also recommended that the company must make use of automated jigs. These jigs might be expensive to set up but will reduce the amount of reworks which will then give the company an opportunity of a higher throughput and lowering of production costs.

6 LIMITATIONS

The study focussed on one medium manufacturing company. The response rate was so low making the results ungeneralisable. The study focussed on whether employees understood the implementation of the BSC. Future studies can focus on statistical analysis on the company's business performance. Future research can also focus on how industrial psychology issues have impacted on the smooth implementation of the BSC in Company A. Industrial psychology issues that can be looked at include behaviour of workers, communication, social interaction, and leadership. It is also important to note that leadership influences the organisational setting- context strategy, values and can direct change.

7 REFERENCES

- [1] Anderson, B. and Hendriksen, B. 2004. Performance measurement system success depends on design alignment with core purpose of its implementation, in Neely, A., Kennerly, M and Walters, A. (Eds), *Performance measurement Association*, Edinburgh, Fourth International Conference on Performance Measurement and Management, pp 27-34.
- [2] Kaplan, R.S. and Norton, D.P. 1996. Using the Balanced Scorecard as a strategic management system, *Harvard Business Review*, NO. January-February.
- [3] Kaplan, R.S. and Norton, D.P. 2000. The Strategy-Focussed Organisation: How Balanced Scorecard Companies Thrive in the New Business Environment, *Harvard Business School Press*.
- [4] Salvendy, G. 2001. *Handbook of Industrial Engineering, Technology and Operations Management*, 3rd Edition, John Wiley and Sons.
- [5] Stevers, J. W. and Joyce, T. 2000. Building a balanced performance management system, *SAM Advanced Management Journal*, Vol.8 , pp 22-28.
- [6] Pienaar, W. J. and Vogt, J. J. 2009. *Business Logistics Management : A supply Chain Perspective* , 3rd Edition, Oxford University Press Southern Africa (Pty) Ltd, Cape Town.
- [7] Rouse, P. and Putterill, M. 2003. An integral framework for performance measurement, *Management Decision*, 41(8), pp 791-805.
- [8] Kaplan, R.S. and Norton, D.P. 1992. The Balanced Scorecard-measures that drive performance, *Harvard Business Review*, No. January-February.
- [9] Lisiecka, K. and Czyz-Gwiadza, E. 2013. Performance Measurement Models-Comparative Review, 57th EOQ Congress, Quality Renaissance-Co-creating a Viable Future, Tallinn.



- [28] Yin, R.K. 2003. *Case study research: Design Methods*, 3rd Edition. Thousand OAKS, Sage.
- [29] Denscombe, M. 2003. *The Good Research Guide for small-scale social research projects*, 2nd Edition.
- [30] Scandura, T.A. and Williams, E.A. 2004. Research Methodology in Management: Current Practices, Trends and Implications for Future Research, *Academy of Management of Journal*, 65(3), pp 448-468.
- [31] Lapan, S.D. and Quartaroli, M. 2009. *Research Essentials: An Introduction to Designs and Practices Research Methods for the Social Sciences*, John Wiley and Sons.
- [32] Ittner, C.D., Larcker, D.F. and Meyer, M.W. 2003. Subjectivity and the weighting of performance measures: evidence from a Balanced Scorecard, *The Accounting Review*, 78(3).
- [33] Slack, N., Chambers, S., Harland, C., Harrison, A. and Johnston, R. 1998. *Operations Management*, 2nd Edition, Prentice Hall.
- [34] Basic Business. Date read: (2014-01-07). *Reducing Waste and Rework*, <http://basicbusiness.areavoices.com/2013/11/25/reducing-waste-and-rework/>.