Perceived Drivers of Labour Productivity in Organisations

A Research Report

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EXECUTIVE SUMMARY

Productivity is one of the strategic areas in which organisations seek to achieve long-term prosperity. It has been argued that firms that can improve the input-output relationship would improve their profitability (Pearce and Robinson, 2003). According to the Organisation for Economic Co-Operation and Development –OECD (2001), there is not a single exhaustive definition of productivity. Their objectives of productivity measurement include technology, efficiency, real cost savings, benchmarking production processes, and living standards. The focus of this research project was not on how to generate growth in labour productivity but rather the factors that influence labour productivity. Therefore, the research project addressed the following objectives:

- Identifying the distinct set of labour productivity drivers for an organisation.
- Determining the order of importance of the identified labour productivity drivers for the organisation.
- Identifying if there were any interdependencies among the identified drivers of labour productivity.

The literature review was based on research done on Total Factor productivity (that is overall labour productivity), Leadership, Performance Management, Training and Development, Market Competition, Continuous Improvement, and Socio –Economic conditions. Based on the assertions that were been formulated in the literature review, and in conjunction with the research project objectives, the following research hypothesis was derived:

- There are factors that influence labour productivity, in addition to inputs and outputs of an organisation.

Quantitative research was done through a questionnaire. The population for the research project were the employees of Astrapak. A balance among variability, precision, and confidence level was considered in determining the sample size (Diamontopoulos and Schlegelmilch, 2006). Using stratified sampling, surveys were sent to Astrapak employees within the three operating divisions (Rigids, Films, and Flexibles) and across the geographical regions of (Gauteng , Kwazulu-Natal , Western, and Eastern Cape. 143 surveys questionnaires were sent out. 59 questionnaires were completed and sent back, representing 41% of the total surveys sent out. Based on a population size of 3000 and the 143 questionnaires sent, and the success rate of 41%, the sampling error was approximated as 7.8%.

Based on the substantive significance of the labour productivity drivers results, it was concluded that the factors of labour productivity, on which the research project was based, were substantially significant (at a 95% confidence level) to overall labour productivity. The statistical analysis results were that there were no significant relationships between overall labour productivity and the respective productivity factors. Substantive significance takes precedence over statistical significance, since the substance of the results has implications for theory, practice or policy (Diamantopoulos and Schlegelmilch, 2005).

The top three labour productivity factors were motivation (Leadership category), continuous improvement (Continuous improvement category), and employee performance (Performance Management category).

The results of the analysis of the Pearson correlations among the productivity factors was that only 98 (24%) of the Pearson correlation coefficients were statistically significant. Even though the type and quantity of labour productivity factors may be different, the survey results indicated that there might be interactions among the labour productivity drivers. Therefore, the interactions among the labour productivity drivers may not be ignored in evaluating the effect of labour productivity drivers on overall labour productivity.

The research project on labour productivity drivers was not exhaustive of all labour productivity drivers. Therefore, the opinions of the respondents on other factors that they considered important were also captured in the survey. The top three factors that respondents considered important but which were not explicitly covered in the questionnaire were teamwork, communication, and company strategy and objectives respectively.

It was recommended that the research study be done on a project basis within the Astrapak group of companies. The project would be focused on implementing the research findings of the study. One company would be used as an experiment group and the other companies would be the control group. Doing the survey, at both the experimental and control groups would guide the evaluation of the change in labour productivity.

Chapter 1: ORIENTATION

Keeping employees engaged, productive and positive can be a challenge during prospective times, even to a well – managed organisation. When the competitive environment threatens the survival of an organisation, engaging employees could be more critical. The productivity of an organisation is based on the interactions among human capital, physical capital, technology, energy, and materials among a myriad of factors that drive prosperity in an organisation (Catteeuw, Flynn, and Vodervost, 2007). The focus of this research report is on assessing the drivers of labour productivity in an organisation.

1.1 Introduction

Productivity is one of the strategic areas in which organisations seek to achieve long-term prosperity. It is argued that firms that can improve the input-output relationship would improve their profitability. Productivity objectives are usually stated in terms of quantities of items produced relative to inputs or, in terms of cost decreases. Typical objectives for productivity improvement include reducing defects, reducing customer complaints or overtime (Pearce and Robinson, 2003).

Productivity is defined as the amount of output, whether it is a product or service, produced relative to the inputs (i.e. resources) that have been used (Gaither and Frazier, 2002). Thus, in a period, productivity can be expressed by the following formula:

$$\text{Productivity} = \frac{\text{Quantity of products or services produced}}{\text{Amount of resources used}} \quad (1)$$

As per equation 1, productivity can be increased in several ways:

- Increase output by utilising the same or smaller amount of resources.
- Reduce the amount of resources utilised whilst keeping output constant or increasing it.
- Increasing output more than the input increases.
- Decrease amount of resources much more than the decrease in output.

In order to be able to compare productivity among different production processes, equation (1) can be converted to an equation that expresses productivity in terms of value (examples being Rands) relative to the costs associated with producing goods or services. Thus, equation (1) becomes:

$$\text{Productivity} = \frac{\text{Value of products or service produced}}{\text{Value of resources used}} \quad (1a)$$

Among the various factors that contribute to productivity, there are capital, materials, labour, energy, and overheads. Productivity in terms of value of products and cost of resources can be expressed as:

- **Capital**: Value of products produced divided by asset value.
- **Materials**: Value of products produced divided by value of materials.
- **Labour**: Value of products produced divided by cost of labour.
- **Energy**: Value of products produced divided by cost of energy.
- **Overhead**: Value of products produced divided by cost of overheads.

Over a typical business cycle productivity would increase during the expansionary phase and decrease during the contraction phase (Case and Fair, 2004). It is argued that the workforce of an organisation is significant to these cyclical changes as labour tends to pull down productivity during the contraction phase and, labour tends to push productivity up during the expansion phase. Hence, productivity Figures do not necessarily reflect the state of an organisation, industry, and even an economy (Case and Fair, 2004).

The different evaluations of productivity are limited in that they all evaluate productivity based on only a few selected inputs. This assumption that one input or a few inputs are responsible for the productivity growth of an entity undermines the role of some of the resources that contribute to the success of the value chain of an organisation. The variables that are not included in the calculation of productivity either are ignored or are assumed included in some defined variable. Failure to

identify critical variables to a business's productivity growth may lead to the inability of the business in identifying productivity bottlenecks and drivers or applying solutions that will not increase the productivity of a business.

Although the different measures of productivity have their limitations, they do provide a reference point for tracking productivity. The overall productivity of a business would be determined by the net effect of all relevant factors that are deployed to enable the business to produce its outputs. It should be noted that some factors might decrease whilst others decrease or remain constant. Thus, equations (1) and (1a) would be relevant in providing a guideline on calculating the overall productivity of a business.

In order to increase productivity, all inputs of production (examples being capital, materials, labour, energy, overheads, etc.) might have to be increased. However, labour productivity is a critical input to all productivity factors as it influences all other productivity inputs by virtue of human capital being involved in deriving benefits from all the inputs. According to Gaither and Frazier (2002), three major factors affect employee productivity:

- Employee job performance
- Physical work environment
- Product quality

Employee job performance draws on factors such as job definition, match between employee and the job and, performance management. The physical work environment would include the machines, materials, and environment

(examples being temperature in work area) (Gaither and Frazier, 2002).

Since the aforementioned factors are neither necessarily exhaustive nor representative of a particular organisation, industry, or economy, it cannot be assumed that factors of employee productivity are the same in different situations, firms, organisations, industries, and even economies. Labour productivity as an aggregate measure of economic activity may be different to labour productivity of an industry or a particular organisation. Thus, the drivers of labour productivity are not necessarily the same for an organisation, industry or a country.

1.2 Objectives of this research

The focus of this research project is not on how to create growth in labour productivity but rather the factors that influence labour productivity. Therefore, the research project will address the following objectives:

- Identify the distinct set of labour productivity drivers for an organisation.
- Determine the order of importance of the identified labour productivity drivers for the organisation as a whole.
- Identify if there are any interdependencies among the identified drivers of labour productivity.

1.3 Statement of the problem and sub-problems

Employees bring a diverse contribution of latent and dynamic skills and competencies to the productivity of a business that the traditional definitions of labour productivity in particular, fail to quantify or give credit. Therefore, the problem the research project is targeting is:

- Conventional evaluations of labour productivity do not take into account the factors that drive the productivity of employees in an organisation.

Following from the main problem are the following sub – problems:

- The cumulative factors that make labour productive in one organisation are not necessarily the same as in another organisation, even if the productivity growth is the same.
- Since the abilities of employees are dynamic, the factors that drive labour productivity will always change in order of importance and relevance over time.

1.4 Delimitation of the study

The research project would contribute to the literature on productivity, and in particular labour productivity. The focus on factors that are regarded as soft, would contribute in the understanding of the forces that drive labour productivity within the organisation. However, several limitations are existent in the research project. Limitations are existent in

the literature review, and the design of the research methodology.

The literature is focusing only on labour productivity drivers. In reality, other factors also contribute to productivity of an organisation. In addition, the factors that have been derived as drivers of labour productivity in literature review are limited to the researcher's literature review. Other significant factors, to labour productivity, that may have been omitted in the literature review may be important to the study of labour productivity. The significant factors to labour productivity may also be applicable to the proposed study.

The design of the research has been based around one company in the plastic packaging industry. Although Astrapak is the largest plastic packaging company in South Africa, it does not necessarily represent the whole plastics industry in South Africa. The usage of cross – sectional data instead of longitudinal data does not allow the researcher to make conclusion on causality of labour productivity drivers and the extent thereof (Leedy and Ormrod, 2005). An argument for the usage of one company, and the subsequent relatively small sample is that meaning is being sought after rather than representation. In addition, the questionnaires were only handed to employees in operating companies, excluding employees at the head office.

Although the sample size would be statistically determined, there would be a limitation on representation as the sample would be limited to employees on the management ranks of the respective companies of Astrapak (Diamontopoulos

and Schlegelmilch, 2006 and Leedy and Ormrod, 2005). The lowest management rank at Astrapak is a shift supervisory position. Therefore, operators, artisans, technicians, and general workers would be excluded in the research survey. This exclusion has been based on the recommendation that relatively lower level employees would not be able to comprehend the management issues raised on the questionnaire (Eiselen, 2008).

The analysis of the data from the interviews and questionnaires would be limited to the type tools that would be used. A case in point is the test of normality for each of the data sets that would be emanating from the various variables. Tests that are available, in the MINITAB statistical programme, include the Anderson – Darling test, Ryan – Joiner test, and the Kolmogorov – Smirnov test. The Anderson – Darling test has been selected for testing normality of data as it is considered the most accurate (Minitab, 2008). With the usage of one model, there would be consistency, but the consistency would be limited only to that model. Since the test of normality is critical to the statistical analysis of data, further data analysis would depend on the tests that have been utilised. Therefore, the research hypothesis may be statistically rejected or accepted based on the normality test (Diamontopoulos and Schlegelmilch, 2006 and Leedy and Ormrod, 2005).

1.5 Importance of the study

The research project will be focusing on the ‘black box’ that lies between inputs and outputs, which is the conversion step of the production function of any business. It is the opinion of the researcher that the conversion step is given

the least attention relative to the inputs and outputs steps. Evaluation of productivity is based on the value of outputs relative to inputs. Therefore, evaluation of productivity assumes that productivity can only be influenced by a change in inputs, outputs, or both. In particular, to this study, labour productivity is evaluated based on the value of products relative to the value of labour input. Labour input is invariably measured in terms of remuneration in most instances.

The research project will be focused on the factors or variables that control the conversion process of labour inputs into organisational outputs. Some of these factors may be inputs to the process and, other factors may be inherent to the conversion process. The study will aim to find which the critical factors are, and how they interact in driving productivity. Identification and understanding of the role played by these factors may change the productivity function from an equation of this form:

$$\text{Productivity} = \frac{\text{Value of products or service produced}}{\text{Value of resources used}} \qquad (1a)$$

To a productivity function of this form:

$$\text{Productivity} = \lambda \frac{\text{Value of products or service produced}}{\text{Value of resources used}} \qquad (2)$$

Where:

λ: composite 'fudge' factor that represents the factors that drive productivity.

This factor would invariably change as the factors of productivity change, either in quantity, significance, or in any applicable measure of variability. Time can also induce change, even if the inputs do not change. As long as the composite 'fudge' factor (λ) is not equal to one (unity), productivity would be affected by factors other than a change in either inputs or outputs. This would imply that productivity could change without inputs or outputs changing. In case of a composite input function, there may be individual 'fudge' factors for each component variable of the input function. In that case, equation (2) would change to the following form:

$$\text{Productivity} = \frac{\text{Value of products or service produced}}{\sum_{1}^{n} \beta_1 V_1, \beta_2 V_2, \beta_3 V_3 ... \beta_n V_n} \qquad (2a)$$

Where:

V_i: is an input variable

B_i: component 'fudge' factor that represents the interaction of the particular variable with other variables and the output variable.

n: total number of variables

As in equation (2), the 'fudge' factors in equation (2a) would be variable and dependent on the interactions with other variables. The omission of the composite 'fudge' factor (α) in equation (2a) is because of the composite 'fudge' factor that is being derived from the individual composite 'fudge' factors. Therefore, the composite 'fudge' factor may be factored from the individual composite 'fudge' factors.

The importance of the study lays in the fact that existence of factors that drive productivity and the effects of their interactions would influence the way productivity is evaluated. The only instance when these factors would not have an effect on labour productivity is only when each one of them is equal to one. Otherwise, productivity would be affected by the presence of these factors. This implies that the productivity of an organisation can change even if inputs and outputs do not change. When productivity is decreasing or is not increasing as expected, organisations would infuse changes in the output and output relationship. Typical changes include adding new and improved equipment, innovation, invention, changes in labour, and other factors. These changes may be necessary but may not be sufficient to realise the productivity growth that an organisation is aiming for. In some instances, some of these changes may actually be counter - productive.

In case of labour productivity, it is common for organisations to try to improve labour productivity by replacing employees, adding employees, training, and re - training, and using other corrective measures. Although these activities may be important, they may not be the root cause of the problem. In some instances, labour productivity would remain constant or even decrease, due to the ‘cancelling’ effect these actions may have on the input and output relationship of productivity. The ‘cancelling’ effect would exist if the output value increases or decreases by the same margin that inputs have been increased or decreased. Emotional intelligence (EQ) – the ability to recognise and manage emotions, has been shown to be a productivity booster at Coca-Cola (Tassler,

No Date). It is argued that low EQ augments the performance deficits that are exposed during difficult business periods, as the individuals with low EQ lack the skills to cope effectively with an emotional and volatile workplace. Tassler (No Date) argues that knowledge, experience, and technical skills cannot address a productivity issue rooted in poor emotional coping mechanisms.

The study would contribute to the body of knowledge of productivity by bringing up the importance of labour productivity drivers in productivity growth. A significant amount of research is done on productivity (examples being Multiple Factor Productivity – MFP, Malmquist index) that can benefit from the dimension presented by this research project. In Addition, this research may contribute in explaining and resolving discrepancies between expected and actual productivity results.

1.6 Outline of the research report

The research report is organised into the following chronological chapters:

Foundation of the study

Literature review

Research design

Results

Discussion

Conclusion

Recommendations

Chapter 2: FOUNDATION OF THE STUDY

According to the Organisation for Economic Co-Operation and Development –OECD (2001), there is not a single exhaustive definition of productivity. Their objectives of productivity measurement include technology, efficiency, real cost savings, benchmarking production processes, and living standards.

Productivity growth is used to trace technology change. Although there is a concerted effort to link productivity growth to technological developments, the association is weak (Organisation for Economic Co-Operation and Development, 2001).Efficiency gains are attributed to improvement in efficiency at the organisational level, shifting business operations to efficient establishments, or implementing both options. This aligns efficiency improvement to the notion of 'best practice', which is aimed at eliminating organisational inefficiencies. It should be noted that efficiency differs in the various business sectors. As an example, allocative efficiency results in increased profits for an organisation but does not necessarily result in an improvement in the economy (Organisation for Economic Co-Operation and Development, 2001).

The real cost savings concept is based on the residual effect of productivity growth initiatives in an organisation (Organisation for Economic Co-Operation and Development, 2001). Real cost savings looks at the effect of productivity growth on business costs. Thus, decrease in costs, increase in revenue, or both, would be measured as an increase in productivity. Real cost savings focuses on

the aggregate effect of all productivity growth initiatives in an organisation.

Benchmarking of processes in terms of output allows for comparison of productivity among different production systems. Unless, the productivity measures are the same, benchmarking has a disadvantage of not allowing for aggregation or combination, as the units of output are highly specific (Organisation for Economic Co-Operation and Development, 2001). Standard of living in an economy is a macro economic measure of productivity, with income per capita being one of the common measures. Multi Factor productivity (MFP) is another productivity measure, which is purported to evaluate an economy's underlying productive capacity (Organisation for Economic Co-Operation and Development, 2001).

Productivity measures are defined based on economic theory, according to gross output (Gross Domestic Product (GDP)) or value added. The value added methodology discounts the value of intermediate inputs from the gross output value. Although both gross output and value added are used for measuring productivity, net value added seems to be the preferred method for evaluating labour productivity (Organisation for Economic Co-Operation and Development, 2001).

The standard of living in an economy is a macro economic measure of productivity. Standard of living is measured through income per capita (Organisation for Economic Co-Operation and Development, 2001). Multi Factor productivity (MFP) is one of the measures used to evaluate an economy's underlying productive capacity. It is the

measure of labour productivity and capital productivity combined. Macroeconomic measures of productivity are not useful at assessing industry or organisational productivity, as they are weighed average measurements of the economy. This notion could be used at organisational level by measuring the revenue per employee (Organisation for Economic Co-Operation and Development, 2001).

Both measures (gross output and value added) use single factors or multiple factors to measure productivity. Single factors used include labour, capital (i.e. equipment) and intermediate inputs (examples being energy, materials, and services). Labour and capital productivity measures account for the effects of changes in technology, capital, efficiency, economies of scale, capacity and, utilisation (Organisation for Economic Co-Operation and Development, 2001). Since the effect of each of the measures cannot be measured in isolation, like in a controlled laboratory experiment, any measure of single factor productivity is not a true reflection of the real situation as there will always be intervening variables. Multiple factors used in measuring productivity are a combination of two or more of the single factors.

The weakness of both the single factor and multiple factor measures is that they look at the macro (aggregate) level of the economy, and are thus focused on the inputs and outputs whilst giving none or little attention to the variables that are driving the conversion of inputs to outputs (Organisation for Economic Co-Operation and Development, 2001).

As a macro economic indicator, productivity is important as it forms the basis for improvement in real incomes and economic well being, as shown by both monetary policy (examples being inflationary pressures) and fiscal policy (examples being financing of health, education, social welfare). Thus, slow productivity growth or no productivity growth at all would create conflicting demands for distribution of income (Organisation for Economic Co-Operation and Development, 2005).

The foundation of the study leads onto the review of the literature on labour productivity. The work carried out by various researchers builds onto the foundations of productivity.

Chapter 3: LITERATURE REVIEW

The literature review is based on research done on productivity and includes focus on labour productivity, labour productivity drivers, performance measurement, leadership, continuous improvement, and the work environment.

Labour productivity

Labour productivity is regarded as the simplest; most extensively developed and, frequently encountered measure of productivity (Schreyer -OECD, 2005). It is not surprising as labour is the single most important input to most production processes. Measurement of labour input is best achieved by calculating the number of hours worked instead of just doing a headcount. A headcount hides changes in average hours worked by a particular employee. Thus, there is a need to adjust hours paid relative to hours worked. Labour input differs, as human capital is not the same for all workers, even for workers at the same level of knowledge and ability of the production process. Differences may arise due to skills, education level, health, and (professional) experience (Organisation for Economic Co-Operation and Development, 2001).

In a ‘productive ward’ concept, which is based on the lean principles, Kay (2007) defines labour productivity growth for health workers with specificity to the individual’s current skills. Hence, improving labour productivity is not about the individual doing more of the same work that they are currently doing in the allocated time, but it is about individuals dedicating quality time to what they have been trained to do. When nurses dedicate quality time to the

clinical care provided to patients (input), the quality of the nursing care received by patients (output) increases. Therefore, the productivity of the ward has increased by increasing the quality of the input rather than the quantity of input (Kay, 2007).

Labour productivity drivers

In decomposing labour productivity, the question of drivers of labour productivity emerges. Is labour productivity driven by 'traditional' capital (examples being increase in capital intensity) or is labour productivity driven by 'intangible' capital (examples being innovation, organisational change, research and development)? (Schreyer -OECD, 2005).

Majumdar (2007) asserts that the decrease in state owned firms in India was due to an increase in privately owned firms. This 'crowding out' effect of the state institutions in India's economy was associated with an increase in human capital productivity. Thus, it is inferred that the increase in human capital productivity was a driver of the autonomous change of ownership from the state to the private sector (Majumdar, 2007).

The improvement in labour productivity of some Finnish firms was studied (by Karjalainen, Miettinen & Mikkola, 2005) in order to identify the most important factors driving labour productivity. According to the analysis, product development, supplier relations, and efficiency of production processes were the factors that contributed the most to productivity improvement. Employee relations, work organisation, education, and training were not identified as major drivers of productivity, but it is

acknowledged that these factors are precursors to labour flexibility (Karjalainen, *et al.* 2005).

O'Mahony (No date) argues that productivity lags of the UK relative to its European Union (EU) counterparts can be explained in terms of gaps in: physical capital, labour force skills, innovation, and residual productivity relative to its competitors. When planning future investments, it is anticipated that 'complementary investment' (i.e. organisational changes and appropriate skills) would be considered. In terms of skills, there is a question as to the type of skills required (i.e. graduate, work-related, technical or a combination of skills) and, the relative breakdown thereof according to the various skills levels (examples being high, intermediate, and low) (O'Mahony, no date).

In a study done in Japan (Kawaguchi and Ohtake, 2007), under deflationary economic conditions, it was found out that nominal income decrease demoralised workers. Nominal income refers to the income based on current money terms, and excludes effects of time value of money (examples being inflation). In deflationary conditions, a decrease in nominal income can imply a decrease, freeze, or increase in real income. The driving factor of the effect of deflation on real income is the magnitude of the individual's income decrease relative to the average deflation. Therefore, a nominal income decrease that is less than the average deflation rate is effectively a real income increase. It is claimed that the decrease in worker morale is associated with a break in trust between the employer and employees. On the other hand, pay freezes during deflationary economic conditions did not change worker morale (Kawaguchi and Ohtake, 2007). The study

tends to challenge the notion of remuneration as the sole motivating factor of workers. Rather, this may support the assertion of the existence of other factors that contribute to worker motivation, and therefore the net productivity of the workforce.

Competitive factors on Spanish firms include product innovation, staff and planning issues, quality products, customer orientation and, financial attractiveness (Madrid-Guijarro, Van Auken & Garcìa-Pérez-de-Lema, 2007). An examination of the influence of these factors on firm performance was undertaken. Firstly, it was found out that the manager's ranking of importance of competitive factors was strongly associated with productivity. Secondly, financial attractiveness, and staff and planning issues were strongly correlated to Return on Assets (ROA). Lastly, the results suggest that organisations need to invest in these competitive factors with a long –term view of benefits, as there would be a time lag between implementing new competitive factors or improving current competitive factors, and realising the benefits (Madrid-Guijarro, *et al*., 2007).

In a test of the relationship between leverage and labour productivity in Portuguese firms, Nunes, Sequeira & Serrasqueiro (2007) used quantile regression to test the relationship between labour productivity and leverage. It was found out that, for the largest firms, leverage does not increase labour productivity. In contrast, total assets and foreign ownership had a positive effect on labour productivity. The relationship was not tested in small and medium enterprises; hence, the empirical results could not be extended to those enterprises (Nunes, *et al*., 2007).

The aforementioned discussion highlights some commonalities in the factors that drive labour productivity although each study does not present the same set of factors. Extending the study to cover more economic sectors may increase the homogeneity of labour productivity drivers, but there would still be factors that would be unique to a specific industry or an organisation. The heterogeneity of the cumulative sets of factors that drive labour productivity, and their respective interactions, could imply that the factors that drive labour productivity may be different in different organisations. Therefore, the following assertion has been made:

- Labour productivity is related to the cumulative effect of factors that influence labour productivity.

Training and development

Labour productivity rates in the United Kingdom (UK) were found to vary across organisations and, across firms in an organisation (Webber, Boddy, and Plumridge, 2007). In literature review done by Webber, *et al.*, 2007, the UK treasury identified five key drivers of productivity: skills, investment, competition, innovation and, enterprise development. The research by Webber, *et al.*, 2007, yielded a direct correlation between skills level and the productivity growth rate: economic areas with low skills had the lowest productivity growth rates and, economic areas with high skills had high productivity growth rates. It is also pointed out that investing in areas with high economic potential might yield higher rates of return. Analysing business performance at firm level overcomes weaknesses

of macro data, by providing an unambiguous link between output and the (human) resources responsible for producing the output. This allows for an extensive set of variables to be analysed at the level of the firm (Webber, *et al.*, 2007).

Shaw (2003) argues that Human Resource Management (HRM) practises that jointly improve performance include teamwork, communication, training, recruitment and selection, job rotation, employee retention and, incentive schemes. These innovative practises aid in developing the problem solving capacity of the workforce. The higher cost of employing the high calibre people is compensated by the correspondingly high performance gains that directly impact on labour productivity. Government policies in support of HRM as a labour productivity driver are focused in investment in education and HRM practises (Shaw, 2003).

Liu and Batt (2007) studied the relationship between informal training and labour productivity among telephone operators and, three findings were made. Firstly, a positive relationship was found between informal training investment and productivity. In addition, the accrued benefits of training were sustained over several months after the informal training had been done. Secondly, a negative relationship was found between the informal training performance and job proficiency level. Employees that had high initial job competence performed worse than those who had low initial job competence in the informal training. It is claimed that the difference was due to the different information processing and self-regulatory mechanisms among the different job levels of workers.

Finally, the study demonstrated that organisations might have a return on their training investment even if the work is highly routinised, as found in many jobs that require relatively low skills (Liu and Batt, 2007).

Pankhurst and Livingstone (2006) dismissed the investment in formal education and training programs as a precursor to productivity growth in organisations, particularly for employees that do not have a formal education background. The dismissal of investment in formal education and training is based on the assertion that the content of human capital is continually evolving over time, and is not merely an accumulation of lifetime learning. Based on this assertion, increasing investment in training and development programmes would not necessarily have a return on the education investment. Thus, it is inferred that investing in formal education programmes would not necessarily increase labour productivity. Rather, Pankhurst and Livingstone (2006) suggest that improving the utilisation of human capital as a source of cognitive development and knowledge is more closely associated with sustained labour productivity growth. The challenge to organisational management systems is to transcend traditional techniques such as multitasking, job rotation, and incentive schemes to designing jobs that facilitate autonomous cognitive development (Pankhurst and Livingstone, 2006).

Liu and Batt (2007) reached similar conclusion as Webber, *et al.* (2007) and Shaw (2003) in that an abundance of skills has a positive relationship with labour productivity growth. Webber, et al. (2007) did not necessarily link investment in skills development to productivity growth, but

Liu and Batt (2007) and Shaw (2003) did find a relationship between investment in (informal) training and productivity growth. Mayer and Altman (2005) argue that South Africa's unemployment crisis cannot be resolved by only focusing on developing the relatively high-skill labour force, but actually needs a forceful development of relatively low and intermediate skills. Therefore, it can be inferred that there is a relationship between investment in skills and labour productivity growth. However, there is still no absolute conclusion as to whether investment in both informal (examples being peer training on the job) and formal (examples being degree programmes) skills development programmes contributes to labour productivity growth.

The conclusion reached by Pankhurst and Livingstone (2006) is opposite to the conclusion reached by Webber, *et al*. (2007), and Liu and Batt (2007) particularly on the relationship between formal skills development and productivity growth. However, there seems to be agreement among Webber, *et al.* (2007), Liu, and Batt (2007), and Pankhurst and Livingstone (2006) on the positive relationship between informal training and productivity growth. This alludes to the fact that although both (informal or formal) skills development and skills investment may individually have a positive relationship with labour productivity growth, they do not necessarily have a positive relationship between the two of them. A negative relationship between the two variables may have a negative relationship to labour productivity growth that is more significant than the cumulative positive relationship of the respective variables with labour productivity growth.

In research done by Arthur and Huntley (2005), Graham-Moore and Ross (1995) define gain sharing as an organisation wide incentive scheme in which all employees are encouraged to suggest ways to improve the productivity of the business, from which both management and employees share in the savings. The results of the study suggest that, after discounting for knowledge depreciation, the gain-sharing scheme contributed significantly to reducing business costs. The gain–sharing scheme has an impact on the organisation's learning mechanisms as it can address both ability and motivational aspects of learning in an organisation (Arthur and Huntley, 2005).

Arthur and Huntley's findings (2005) add another dimension to the link between employee development and labour productivity. The availability of an incentive scheme linked to labour productivity could act as a buffer to the differences in effective labour productivities purported to exist between formal and informal training as found in studies by Webber, *et al.* (2007), Liu, and Batt (2007), and Pankhurst and Livingstone (2006). Having an incentive scheme, beyond normal remuneration, may propel employees to use all available avenues to ensure that their respective performances meet the productivity targets associated to the incentive scheme. Therefore, both formal and informal development programmes may be effective in delivering growth in labour productivity.

The type, level, and quality of skills in a business can affect labour productivity. In addition, the quantity and quality of capital investment in employee job-relevant skills can increase the productivity of an employee. Although there is

agreement on the benefits of training and development of employees to labour productivity, there is no definitive agreement on the type and extent of training and development that an organisation has to employ to increase its labour productivity. Based on the implications of investment in skills development to labour productivity growth, the following assertions have been made:

- There is a relationship between investment in skills development of employees and labour productivity.
- There is a relationship between the organisation's formal skills development programmes and labour productivity.
- There is a relationship between the organisation's informal skills development programmes and labour productivity.
- There is a relationship between the organisation's incentive scheme and labour productivity.
- There is a relationship between the environments of an employee (examples being home, community, work) and labour productivity.

Performance management

There exists a significant and noticeable difference among firms when it comes to the purpose of performance appraisals and the criteria used. These results were found in a study done in Taiwan between firms in the service and manufacturing industries respectively (Chu and Chen, 2007). Firstly, it was found that the service industry emphasised the administrative elements (examples being salary increases) whereas the manufacturing industry

emphasised the developmental elements (examples being goal attainment). Secondly, the service industry was more focused on quantitative appraisal criteria and the manufacturing industry was more focused on qualitative appraisal criteria (Chu and Chen, 2007).

Both quantitative and qualitative tools included process and outcome criteria. Quantitative process criteria included efficiency, financial performance, and attendance. Quantitative outcomes criteria included sales volume, price, productivity, and goal achievement rate. Qualitative process criteria were based on judgement, work attitude, leadership, and personal conduct. Qualitative outcomes criteria were quality of product or service, and customer satisfaction (Chu and Chen, 2007). The divergence in focus between the two industries with respect to qualitative and quantitative criteria is an indication of the subjectivity of labour productivity measures among organisations. This finding highlights the need of looking beyond labour productivity values into the drivers of labour productivity. The balance between administrative vs. developmental elements and qualitative vs. quantitative criteria could have an effect on labour productivity. If an organisation is only basing its choice of performance management tools on historical or industry trends, without examining the effect of the elements or criteria, the organisation could miss labour productivity drivers in its quest of achieving productivity growth.

An effective method of measuring labour productivity, in the service industry, is the utilisation of performance appraisals and reviews (Lohrasbi, 2006). Lohrasbi (2006) argued that when performance management is viewed as

a business strategy driver, rather than compliance with the law or organisational policy, both the employees and employer benefit. Lohrasbi (2006) identified inconsistent performance appraisals as a source of low employee morale. The involvement of both the employee and superior in setting well-defined and realistic goals was perceived to be critical to performance management (Lohrasbi, 2006). At the service organisation utilised in the research paper, it was concluded that the key determinants of low labour productivity were low employee morale, high absenteeism and weak communication (Lohrasbi, 2006). This study extends the study done by Kawaguchi and Ohtake (2007) by identifying performance management as a tool of unearthing other factors that contribute to the morale of the workforce, and by implication the productivity of the workforce.

Lohrasbi (2006) asserts that performance management could be utilised to infer labour productivity. Therefore, performance management can affect labour productivity. By implication, performance appraisals cannot be disassociated from labour productivity. The effect of factors such as administrative elements vs. developmental elements, and qualitative vs. qualitative criteria (Chu and Chen, 2007) on performance management contribute another element of variability to labour productivity. Hence the assertion that:

- There is a relationship between an organisation's performance management system and labour productivity.

Leadership

Johnson and Johnson's organisational development team concluded that labour productivity growth would be realised when the organisation's management team appreciate the need of employing inspirational leadership and employee engagement in all aspects of the business (Catteeuw, Flynn & Vodervost, 2007). The engagement strategy is most effective when the management team creates a link between the organisation and its employees, and develop communication channels. In addition, managers have to properly define roles of their subordinates, manage performance of all employees, and give regular feedback on performance (Catteeuw, *et al.*, 2007).

As in sports, managers in the business world are better off with a solid foundation of coaching skills (DeMarco, 2007). An endowment of these coaching skills would allow the manager to be able to fine-tune the performance of employees and teams in delivering bottom line results. DeMarco argues that training alone would improve productivity by only 22%, whereas coaching and training used in tandem would increase labour productivity by as much as 88%. Coaching strategies for managers include a foundation of trust, communication channels, being a motivator and morale booster, and listening and questioning techniques (DeMarco, 2007).

It is argued that employee motivation is closely associated with absenteeism, as employees with low motivation tend to lose the will to succeed in their job functions, hence a high tendency to absenteeism (Lohrasbi, 2006). The

increase in absenteeism could lead to a decrease or stagnation in labour productivity of a business. Motivation would be achieved by designing the work to be desirable, building employee self-confidence by trusting in their ability and, creation of an environment that encourages commitment in seeing the job through to completion. Communication audits, from the highest to the lowest level of employees, are one method of identifying weaknesses in the communication system across an organisation. A communication audit follows the message trail from senior management to the lowest levels of an organisation and how those messages are interpreted (Lohrasbi, 2006). By employing a communication audit, an organisation can reduce the expenditure associated with improving labour productivity. As an example, an organisation can end up replacing employees or equipment when the root cause of the problem could be including the communication system in the organisation. Thus, identification and management of labour productivity drivers could improve productivity at reduced or no cost at all to the business.

Employee motivation could fluctuate, depending on the work environment that the manager permits (DeMarco, 2007). Motivation enhancing tools include releasing and delegating responsibilities, creating an environment in which employees can display their knowledge and contributions, and willingness to share rewards with the team. For listening to be effective, the manager-coach needs to listen to explanations behind the verbal reaction. Some of the tools for effective listening include (in order) clarification, encouragement, perception checking, feelings check, and reviewing the received communication. A manager needs to be tactful in their use of open-ended

and close-ended questions to guide the employee, unblock impediments to success, identify relevant resources, and know how to reach specific goals (DeMarco, 2007).

Gimžauskiene and Klovienė (2007) studied the role of changing organisational values on performance measurement systems. In research done by Gimžauskiene and Klovienė (2007), Hofstede (1991) argues that if organisational values are defined within social values then the national cultural differences in value sets cannot be ignored. Using Quinn's Competing Values Model (CVM), the values of an organisation can be inferred from its cultural landscape.

Gimžauskiene and Klovienė (2007) investigated the alignment of various organisational cultures along the dimension of flexibility vs. control and, along the dimension of external vs. internal focus. The organisational cultures identified in the study were human relations (flexibility and internal focus); open systems (flexibility and external focus), internal process (internal focus and control) and, rational goal (external focus and control). Results of the case study led to the conclusion that changes in organisational values can lead to changes in the performance measurement system. In this case study, when changes in organisational values were made, the internal process model became dominant, which was interpreted as the organisation becoming more bureaucratic. The management model, which dominated the organisation, was the rational goal. The rational goal model would dominate in management, as it is perceived as striving towards maximising output and values productivity, efficiency, planning and, goal setting

(Gimžauskiene and Klovienė , 2007). As per discussion on performance management (Chu and Chen, 2007, Lohrasbi, 2006 & Kawaguchi and Ohtake 2007), it could be inferred that any factor that affects the performance of an employee would affect labour productivity. Therefore, a change in organisational values could affect labour productivity. Although change is inevitable in organisations it is the management thereof that could affect the organisation.

According to Levin (2006), the gulf between workers and managers prevalent in industrial and post-industrial society is exacerbated by the authoritarian style of business leadership prevalent in most organisations. It is argued that an increase in democracy in the workplace will increase employee skills, job satisfaction and, productivity growth. Workplace democracy hinges around employees participating in decisions that affect their working lives. Levin (2006) asserts that the increase in democracy would lead to a concomitant decrease in employee turnover and absenteeism. Therefore, there is a need for organisations to experiment with different kinds of democratisation systems in order to enhance business growth models (Levin, 2006). At Cinqplast Plastop (current employer of researcher), feedback sessions have been utilised to create a forum of exchange between all the workers and the managing director (MD). The sessions were composed of a feedback to employees on company performance, and the future of the company. Employees were allowed to comment or question any aspect of the business. Any issues that could not be directly addressed at the session were noted and attended to later, with feedback given

through the respective departmental managers or at the next feedback session.

The leadership style (example being inspirational, situational leadership), traits (example being adaptability, stress tolerance), and skills (example being creativity, and tact) utilised in an organisation could have an effect on the labour productivity (Yukl, 2006). Although the results on what makes effective leadership are inconclusive and inconsistent (Yukl, 2006), the leadership style would impact on labour productivity since the traits and leadership skills used by the leader, and the extent of usage, would impact on the ability of the employees to deliver on their responsibilities. The following assertions have been made:

- There is a relationship between labour productivity and the leadership style used in an organisation.
- There is a relationship between labour productivity and the traits displayed by a leader.
- There is a relationship between labour productivity and the leadership skills used by a leader.
- There is relationship between the culture of the organisation and labour productivity.

The human factor

In an explorative study of the human factor in various socio – economic conditions, Rubin and Adu-Febiri (2004), redefine human capital to include dimensions that exist beyond the individual person. Rubin and Adu-Febiri's definition of human capital is a complex phenomenon that

includes interaction of knowledge, skills, habits, institutional structures, power relations, and normative practices. It is argued that the interaction of these variables drives the individual, or group, reaction towards challenges posed by institutional productivity growth, cultural development, social interaction, social justice and, the sustainable environment. It is purported that the human factor is composed of spiritual capital, moral capital, aesthetic capital, human capital, human abilities, and human potential.

Spiritual capital is regarded as the ability for one to live in harmony with all of God's creation from which all living beings received the gift of life (Rubin and Adu-Febiri 2004). Moral capital allows an individual to balance between doing what one regards as the best option and what is best for the collective. As per Maslow's hierarchy of needs, aesthetic capital is pursued once the relative basic needs have been satisfied. It is thought of as an acquired talent for appreciating and creating beauty. The knowledge within an individual, or group, is central to the definition of human capital. It is this knowledge that is instrumental in the systematic enhancement of productivity of human beings through the various strengths that individuals and groups possess (Rubin and Adu-Febiri 2004).

The four types of capital factors alluded to should not to be viewed as a closed model of the human factor (Rubin and Adu-Febiri 2004). Since the abilities of human beings cannot be defined within one set of boundaries, human abilities is an extension of human attributes that allows for elasticity of the human factor. Human potential is pre-determined by the dynamic socio-economic circumstances

in which one exists. Therefore, the manifestation of the individual's knowledge, skills, and habits would be influenced by the circumstances that the individual faces in a particular environment (Rubin and Adu-Febiri, 2004). Therefore, any change in the environments around an employee (examples being home, community, and workplace) could affect the productivity of the employee. Although an organisation may not be able to impact on environments beyond its borders, there is a need for awareness of the effect of such changes to the employee and their performance at their work duties.

Psychological capital is defined as a combination of psychological constructs of hope, resilience, optimism, and self-efficacy factors (Luthans, Avolio, Avey & Norman, 2007). The facets of psychological capital were analysed, individually and as a composite facet, against work performance and satisfaction. Empirical results indicated that the composite factor had a more significant positive relationship with work performance and satisfaction than when the individual factors were assessed individually. It is added that the combined factor is a more reliable driver of work performance and satisfaction than the individual factors (Luthans, *et al*., 2007). According to Gaither and Frazier (2002), employee job performance is one of the factors that affect employee productivity. Thus, it can be inferred that psychological capital can be leveraged for labour productivity improvement.

The aforementioned discussion opens up a possible link among organisational values, employee performance, remuneration, organisational leadership, and trust. In addition to the relationship among the four variables, there

could be linkages between each of the variables (i.e. organisational values, employee performance, remuneration, leadership, and trust) to the productivity growth of a business. To facilitate a further analysis of relationships among the variables, the following assertions have been formulated:

- There is a relationship between the leadership style of the organisation and labour productivity.
- There is a relationship between organisational values and labour productivity.
- There is a relationship between trust and labour productivity.
- There is a relationship between motivation and labour productivity.

Information and Communication Technologies

A study on the United States (US) productivity improvements since 1995 has isolated Information and Communication Technologies (ICT's) as a key contributor to the productivity growth drive through two primary channels of technological advances and strategic investment in ICT's (Amiti and Stiroh, 2007). Technological advances have allowed ICT firms to produce improved products at lower unit prices. Firms that consume or purchase ICT products have made strategic investments that have aided labour productivity. Central to these productivity gains have been competitive product markets, flexible labour markets and flexibility of organisations towards dynamic economic conditions (Amiti and Stiroh, 2007).

In a study based on local government in Taiwan (Sung, 2007), the impact of ICT's on improving technical efficiency and productivity growth was investigated. Based on the empirical results, it was concluded that there was indeed a strong relationship between ICT's and technical efficiency and, between ICT's and productivity growth. Sung (2007) asserts that firm specific knowledge is a key driver of productivity growth. Hence, the importance of knowledge management, particularly in a strong ICT environment, cannot be ignored if organisations are going to make significant impacts on productivity growth (Sung, 2007).

The relatively poor performance of European Union (EU) countries relative to the US, has led to productivity being raised as one of the key driver of EU competitiveness. A review of productivity studies showed that low productivity in EU countries was not only due to poor productivity growth in ICT intensive sectors, but also due to low influence of productive and knowledge driven sectors (Grilo and Koopman, 2006). The relatively inferior productivity growth observed EU countries is in contrast to the gains made by the US and Taiwan, as alluded to in studies done by Amiti and Stiroh (2007) and Sung (2007), in leveraging ICT knowledge development to achieve productivity growth. This may be linked to the time at which each of the respective countries adopted ICT's, with early adopters (i.e. US and Taiwan) being ahead of the relatively late adopters (example being the EU).

Furthermore, Van Ark (2006) studied the contribution of ICT to the Japanese economy. Productive use of ICT in the Japanese economy was identified as a major

contributor to the country's productivity growth. Organisational innovations have been used to increase the absorption capacity of new technologies by firms. In addition, a continuous improvement programme of human capital was developed. Necessary labour market adjustments were made to allow for a more efficient flow of skills, which is a seamless process of bringing in better skilled people into the most productive firms and, re-employing and re-training of redundant workers from relatively non-productive industries. Furthermore, in order to free up resources, the economic environment was allowed to enable best performing firms to flourish and for weak firms to exit (van Ark, 2006).

Using India as a case, Mathur (2007) confirmed the potential of Information technology (IT) in realising productivity gains from employing different levels of studies (ranging from macro economic to organisation level). The benefits of IT depend on factors such as contemporary IT skills, business models that are in line with the business strategy and transformation of institutions and regulations within the economic system. India's enablers in its IT advantage include a skilled workforce, pursuing low cost and quality in parallel, and a dynamic business sector (Mathur, 2007).

The studies in Asia, EU and US have shown the potential of ICT's as productivity drivers in these economies. The different times at which each of the three countries adopted ICT's, and the extent of their respective benefits, leads to an inference that ICT's are an integral part of an organisation's productivity growth. Since employees are central to the development and/or deployment of all ICT's,

labour productivity could be affected by ICT's and labour productivity could affect ICT's. In order to test the relationships among labour productivity, ICT's and technical efficiency, the following assertions have been made:

- There is a relationship between ICT's in an organisation and its labour productivity.
- There is a relationship between labour productivity and technical efficiency.

Total Factor Productivity

A paper by Mahesh and Rajeev (2007) examined the changes in Total Factor Productivity (TFP) of Indian commercial banks for the period 1985-2004. By decomposing TFP into efficiency change and technical change, it was found out that neither technical change nor efficiency change was an outright driver of TFP change. Actually, TFP was driven by technical change in certain years, efficiency change in some years and by both efficiency and technical changes in other years. This implies that both technical change and efficiency change contributed to the TFP growth of India's commercial banks (Mahesh and Rajeev, 2007).

In a similar TFP decomposition study, done in China's townships between 1978 and 1994, Tong (2001) concluded that TFP growth in China's Township and Village Enterprises (TVE's) was mainly driven by technological advancement and less by production efficiency increase. The deterioration in China's production efficiency was observed in both state owned enterprises as well as TVE's. Both technological advancement and

production efficiency improvement were correlated to geographic location of the enterprises. TVE's in regions well endowed in infrastructure had higher efficiencies and technological advancements whereas TVE's in regions with relatively inferior infrastructure had lower efficiencies and technological advancements (Tong, 2001).

Both studies were done in developing Asian countries (India and China) and were both based on extended data sets of 19 years and 16 years for India and China respectively. Whilst the Indian study was based on the formal sector (i.e. commercial banks), the Chinese study was based on the relatively informal business sector. It could be argued that the Chinese productivity growth model was emphasising technology adoption more than production efficiency as means of achieving quantum growth in productivity. This might have led to production efficiency being overshadowed by technological advancement to the extent that its contribution to TFP was diminished, but not necessarily non-existent. In the case of India's commercial banks, there might have been a double-pronged approach to productivity growth, implementing technological advancement in parallel with production efficiency improvements. This might have resulted in technological advancements and production efficiency competing to the extent that neither was an outright driver of TFP.

Although the studies by Tong (2001), Mahesh, and Rajeev (2007) were based on only two factors of productivity, it could be argued that any two factors of productivity could have been utilised in the respective scenarios and, the results could have been similar. The same factors used for

the total productivity could be utilised to investigate labour productivity. Hence, the following assertions have been made:

- There is a relationship between labour productivity and competitive factors of productivity.
- There is a relationship between labour productivity and production efficiency.
- There is a relationship between labour productivity and technological advancement.

Continuous improvement

One of the best stimuli for improving profits and productivity is a system comprised of internal and external auditing systems, benchmarking, accounting, and clarifying needs. In preparation for a performance improvement initiative, an organisation has to ensure the integrity of its information as information quality can undermine the improvement initiative (Fogelholm and Bescherer, 2007).

Theory of Constraints (TOC) has bee used as a foundation for determining criteria for selection of Quality Improvement (QI) projects (Koksal, 2004). Based on two case studies, it was concluded that throughput variance along process steps should not be the only deterministic variable in selecting QI projects for resolving bottlenecks. However, it should be noted that choosing the bottleneck for process improvement rather than the process step that has the highest scrap rate could increase the throughput of a company. It is recommended that quality losses not just scrap rates, should be used in conjunction with throughput to guide the product mix and selection of QI projects

(Koksal, 2004). Project teams for QI projects have to be selected such that the skills of the team members maximises the benefits accrued from embarking on the project. There needs to be consideration of whether team members are going to learn or are going to contribute to the QI project. Whether a team member is in the QI project for learning or contributing purposes, the productivity of all the team members could contribute to the results of the QI project.

The contribution of Total Quality Management (TQM) in Thailand's quality and productivity centred strategy motivated Reis and Pati (2007) to generate a profile of quality practises that could be utilised by Thailand's decision makers to identify areas of improvement. The factors identified included: the role of management leadership, the role of the quality department, training, product and service design, supplier quality management, process management, quality data and reporting and, employee involvement in quality decisions. Training is critical to the realisation of the TQM benefits, particularly in providing training on Statistical Process Control (SPC) for employees. SPC knowledge would enable employees to take ownership of quality. Since any training involves significant investment, the organisation's management team has to be committed to the process not just the results (Reis and Pati, 2007).

Among the myriad of tools available for solving problems associated with product quality, Ho and Chuang (2006) studied the implementation of Six Sigma in government agencies. It is believed that implementation of Six Sigma would enhance the effectiveness of the employees to

resolve process problems. Since Six Sigma implementation would improve the process capability, labour productivity would also be improved, as workers would be able to produce more using less (human) resources (Ho and Chuang, 2006).

Lee, Beruvides, and Chiu (2007) studied the relationship among quality, productivity and profit in a study aimed at proving the existence of a positive relationship among productivity, quality and profit. Based on three mathematical models relating quality, profit, and productivity, the researchers provided an alternative method of examining these three performance measures in a company. The mathematical models derived in the study support the application of continuous improvement tools on productivity and quality to improve profitability. Similarly, Wang (2006) asserts that both capacity utilisation and quality of output are relevant parameters in the measurement of productivity in any decision-making unit and, should not be regarded as separate parameters.

A study, based on Finnish firms, aimed at identifying the most important factors driving labour productivity identified product development, supplier relations, and efficiency of production processes as the factors that contributed the most to productivity improvement (Karjalainen, Miettinen & Mikkola, 2005). Karjalainen, *et al*., (2005) concluded that product development was improved mainly through innovative solutions that created value for customers and thus keep the price level up. In addition, co – operation with customer's product development teams resulted in solutions that drove the production costs down. Product development investment would most likely decrease

profitability initially with benefits boosting profitability later. Improvements in supplier relations were achieved through the development of supplier networks. A major drawback is that firms that are intermediate suppliers face pressures from upstream (suppliers) and downstream (customers) as suppliers are passing on cost increases and customers are pushing for stagnant and even decreasing selling prices. Improvements in production processes were achieved mainly through utilising the best production technology and control, anticipation of growth, and flexible working time arrangements (Karjalainen, *et al*., 2005).

Improvements in processes, customer relations, quality, and innovative product development are invariably linked to an improvement in labour productivity and productivity as a whole. Continuous improvement tools, such as TQM, TOC, Six Sigma, and SPC, are used individually or interchangeably by organisations to drive the continuous improvement initiatives. The productivity improvement initiatives that do not translate to profitability improvement of the business would not receive sustained support, and would often be abandoned. Profitability improvement could be achieved through increase in cash flow, earnings, or capacity utilisation in current or future periods. This implies that there could be a link among continuous improvement, productivity, and profitability. Therefore, the following assertions have been made:

- There is a relationship between continuous improvement and labour productivity.
- There is a relationship between profit improvement and labour productivity.

- There is a relationship between product or service quality and labour productivity.

Workplace environment

In a study of ergonomics application in business processes, Lee (2005) used a six-month case study at a Korean electric appliance company to argue that ergonomics has a role to play in improving labour productivity. Rather than viewing ergonomics as an isolated tool solely focused on reducing medical and compensation costs, an argument is made that TQM needs ergonomics to remain credible as a management tool. Therefore, ergonomics can be integrated into an organisation's TQM programme (Lee, 2005).

In a survey performed in office environments in five European countries, it was concluded that people were more concerned with being comfortable in the workplace than having a workplace controlled at certain levels (Humphreys and Nicol, 2007). The sources of environmental effects included carbon dioxide concentration, temperature, humidity, illuminance, air movement, and noise. This implies that improved labour productivity can be achieved if the workplace allows for more adaptive opportunities for workers (Humphreys and Nicol, 2007).

Significant loss of labour productivity, for both the employee and company, were realised when ergonomic deficiencies in workplace design restricted work performance and created high, frequent unilateral stresses that accelerated worker fatigue in the automotive industry

(Landau and Peters, 2006). The stresses could adversely affect the long-term physical health of workers and thereby reduce the productive time of an employee. The reduction of the employee productive period may adversely affect the financial well being of an organisation, particularly if employees have to be on extended sick leave or be on early retirement (Landau and Peters, 2006). The redesign of the workplace that followed the analysis focused on posture, visual conditions, and flow of materials between workplaces in the value chain of the organisation. Whilst the design of the workplace was crucial, the success of the ergonomic improvements had to be parallel to the selection, motivation and training of the appropriate employees with respect to the different stages of the value chain (Landau and Peters, 2006).

Workplace ergonomics could enhance the efficiency of other factors that drive labour productivity such as TQM and TOC (Lee, 2005). Since ergonomics can affect labour productivity, the following assertion has been made:

- There is a relationship between ergonomics and labour productivity.

Unemployment

A study based on the census bureau in the US concluded that employment protection, particularly during contractionary phases of the economy, decreased productivity (Autor, Kerr, and Kugler, 2007). In response to employment protection, organisations raised their capital investments and increased non-production worker employment.

The adoption of job shedding technology and capital intensification was chosen as an alternative to a labour intensive economy in an empirical investigation of the productivity – wage relationship in South Africa (Wakeford, 2004). There was a long-term equilibrium relationship between real wages and productivity. However, unemployment was apparently not connected to the system.

The study of the relationship between unemployment and output in post-communist European countries concluded that the employment relevant component of aggregate demand was too low to reduce the high unemployment of the former communist countries (Gabrisch and Buscher, 2006). GDP growth was driven by productivity progress, irrespective of the unemployment level.

The weak relationship between unemployment and productivity led to the following assertion being made:

- There is no relationship between the unemployment level and productivity.

3.1 HYPOTHESIS

Based on the assertions that have been formulated in the literature review, and in conjunction with the research project objectives, the following research hypothesis has been derived:

- There are factors that influence labour productivity, in addition to inputs and outputs of an organisation.

The factors identified in the literature review are not necessarily the only factors that would be existent in an organisation at any point in time. In addition, they may be interdependencies among them that may have an implication on their relative importance in any organisational setting. The research methodology would be designed around this hypothesis.

Chapter 4: RESEARCH DESIGN

In order to contextualise the research design, the research problem, and its sub - problems, are restated. The research problem is:

- Conventional evaluations of labour productivity do not take into account the factors that drive the productivity of employees in an organisation.

Following from the main problem are the following sub – problems:

- The cumulative factors that make labour productive in one organisation are not necessarily the same as in another organisation, even if the productivity growth is the same.
- Since the abilities of employees are dynamic, the factors that drive labour productivity will always change in order of importance and relevance over time.

The hypothesis that has been formulated is as follows:

- There are factors that influence labour productivity, in addition to inputs and outputs of an organisation.

4.1 Research Paradigm

The paradigm adopted in the research project has been based on finding answers to the problems posed in the research project rather than utilising the best or preferred method between the qualitative and quantitative approaches. In this research project, quantitative methods would be the primary methods used to gather information. Quantitative research methods are characterised by testing theories. The quantitative research process is relatively focused and the researcher tends to take a detached view. Data used in quantitative research is numeric and statistical analysis is used to analyse the data based on deductive reasoning (Leedy and Ormrod, 2005).

A lot of debate on research paradigm focuses on fitting research into the two categories of qualitative and quantitative research (Lee, 1999 and, Leedy and Ormrod, 2005). In reality the researcher, choose tools from either group depending on the needs of the research project. The focus should be on the results, not the extent to which qualitative or quantitative a research project has been. In this research project, a theory will be tested using a questionnaire. Although quantitative research is based on detached views, personal views always influence the responses of individuals. Even though the data in quantitative research is analysed using statistical tools, there would always be themes that are generated. These themes, which are qualitative in nature, would be captured in the discussion of the results (Lee, 1999 and, Leedy and Ormrod, 2005).

The focus on deriving meaningful results ensures that the research project makes an addition to the body of knowledge of the subject of labour productivity (Leedy and Ormrod, 2005). Quantitative tools in research project will help in achieving some systematic regularity in the subject of labour productivity. Qualitative tools would help in the description of organisational settings, interpretation of results, and verification of certain assumptions and generalisation (Lee, 1999).

4.2 Research Methodology

Since the factors that drive labour productivity are large and varied, the literature review, and the hypothesis that has been derived from thereon, will be used as a guideline in the project research methodology. Quantitative research will be done through survey research. According to Leady and Ormrod (2005), a survey is a descriptive research method that seeks to learn about a population by asking questions from a selected sample of the population. A survey relies on information acquired at one point in time and extrapolates to longer times beyond the research period. Questionnaires and interviews are some of the tools utilised to conduct surveys (Leedy and Ormrod, 2005). The survey will be composed of a questionnaire. A draft questionnaire will be designed from the literature review and hypothesis. The questionnaire will be designed from the literature review in order to keep the research project within scope of the objectives and problems posed in the research project.

A trial questionnaire will be generated which will be tested in a pilot study. The pilot study will be done to check for

weak spots in the questionnaire (Eiselen, 2007 and Leedy and Ormrod, 2005). This is not limited to relatively ambiguous questions, but includes the time it takes to complete the questionnaire. The input from the pilot study will be used to revise the trial questionnaire and produce the final questionnaire.

The final questionnaire will be sent to a sample of employees from the participating organisations (Leedy and Ormrod, 2005). A covering letter would be included with the survey questionnaire to ensure that participants understand the purpose of their participation in the research survey (APPENDIX I). The covering letter would also be utilised to convey ethical considerations of participating in the research survey (Leedy and Ormrod, 2005).

The results will be analysed based on the phenomena being studied, statistical, and substantive significance Leedy and Ormrod, 2005, and Diamontopoulos and Schlegelmilch, 2006). Comparison and contrasting of the results will be done to check for continuity among the different levels of management of the research organisation.

4.3 Definition of population and sample

The population that will be used in this research project will be the Astrapak Group. Astrapak is the largest specialist-packaging manufacturing group of firms in South Africa. The group employs more than 3000 people in South Africa and has 31 operating companies. The 31 companies are housed in three strategic groups, being the Rigids division

(13 firms), the Films division (10 firms) and, the Flexibles division (8 firms) (King, 2008 and Astrapak, 2008). It is believed that the Astrapak group, being the largest plastic packaging group in South Africa, and being dispersed across the country (examples being operations in Gauteng, Western Cape and KwaZulu - Natal), represents a microcosm of the plastic packaging industry and thus qualifies to represent a population of the plastic packaging industry. The sample for the research survey will be selected using a multistage sampling method. This method has been selected in order to maintain the demographics of various employee levels in each firm within each division of the group (Diamontopoulos and Schlegelmilch, 2006).

4.4 Sampling frame

The sampling frame for the questionnaire will be drawn from the various management levels of the Astrapak group, starting from supervisory level or junior management. The questionnaire would be distributed to employees in randomly selected companies in each of the three divisions as per multistage sampling (Diamontopoulos and Schlegelmilch, 2006). The questionnaires would be distributed according to the employee distribution for the whole group. Within the questionnaires distributed to each group, the distribution of questionnaires will be according to the management levels of the chosen firms. Using probabilistic sampling methods would enable the researcher to evaluate the extent the sample being unrepresentative and the quantification thereof (Diamontopoulos and Schlegelmilch, 2006).

4.5 Sampling method

A probability sampling method would be employed for sampling. With probability sampling, the ability to evaluate the sampling error allows the researcher to evaluate the extent to which the sample is not representative of the population, and the quantification of the error (Diamontopoulos and Schlegelmilch, 2006). The sample for the questionnaires would be chosen using the multistage sampling method.

The trial questionnaire will be piloted using one of the companies in one division of Astrapak, and drawing a representative sample of that firm. The pilot would be used to test the ability of the employees to comprehend the questionnaire, fill it correctly, and to check the duration of each questionnaire (Eiselen, 2007 and Leedy and Ormrod, 2005). The feedback from the pilot study would be used to improve the questionnaire before it is sent to the sample at Astrapak operations.

The questionnaires would be sent to a sample of permanent employees within a randomly selected number of firms from each of the Astrapak divisions. Within each of the selected firms, employees would be chosen according to the employment demographics of the company. Within each employment demographic, employees would be chosen randomly (Diamontopoulos and Schlegelmilch, 2006).

4.6 Sample size

A balance among variability, precision, and confidence level is considered in determining the sample size (Diamontopoulos and Schlegelmilch, 2006). The variability of the sample is guided by the extent to which the population is homogenous or heterogeneous, with an increasing heterogeneity requiring larger samples than relatively homogenous populations. The precision of the measurement gives the measurement error associated with a measurement. Therefore, the higher the precision (or the lower the measurement error), the larger the sample needed all other factors being equal (Diamontopoulos and Schlegelmilch, 2006). Using the Statistical Process Control (SPC) for MS Excel program a relationship between sampling success rate and sample size was plotted at measurement errors of 5% and 10% respectively, at a confidence level of 95% and a population of 3000.

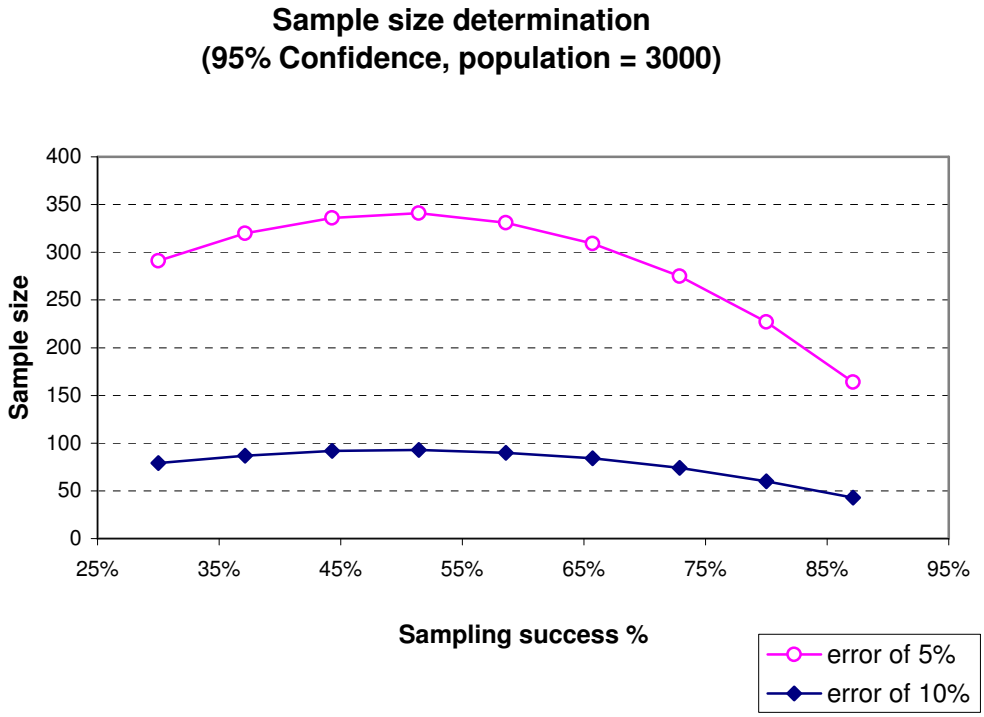

Figure 1: Sampling success rate vs. sample size

Figure 1 shows the variation of sample size with sampling success rate at measurement errors of 5% and 10% based on discrete (attributes) data. The chart shows that if small measurement errors are required (an examples of 5%), the sample has to be larger than if relatively larger measurement errors (examples being 10%) would be tolerated (Diamontopoulos and Schlegelmilch, 2006). The chart shows that sample size is more sensitive to sampling success rate at lower measurement errors than at larger measurement errors.

For both measurement errors, the sample size required decreases as the sampling success rate increases. As

sampling success rate decreases the sample size also decreases, suggesting that as the envisaged success rate of the sampling decreases the lesser a sample that is needed (Diamontopoulos and Schlegelmilch, 2006). The limit thereof is that if sampling success rate is equal to zero, the sample should not be taken. As per the (inverted) parabolic nature of the two series in Figure 1, the maximum sample sizes are found at about 50% sampling success rate for both measurement errors. The corresponding maximum sample sizes at 5% and 10% measurement errors are 340 and 93 respectively. Therefore, using 10% as a measurement error, the benchmark sample size would be 93 from a population of about 3000 employees of Astrapak.

The sample of 93 would represent the total number of questionnaires that would be sent out to employees of Astrapak, considering the distribution of employees among the various management levels as per stratified random sampling. As per multistage sampling, the 93 participants would be drawn among all the Astrapak firms as per the distribution of employees according to the respective divisions and firms (Diamontopoulos and Schlegelmilch, 2006).

4.7 Measuring instrument

A questionnaire would be used as a measuring instrument for the research project (Leedy and Ormrod, 2005). The questionnaire would be based on the hypothesis devised on the literature review. In order to produce the appropriate data set, units of analysis, variables, and values have to be properly defined. The units of analysis for this project

would be the individuals that would be approached to participate in the research survey. The characteristics studied through the questionnaire would yield the variables of the research project, and the responses that link the individuals to the characteristics would be the values.

There are 32 unique variables used in the questionnaire (APPENDIX II). The first eight discrete variables (variables 'a' to 'h') are aimed at describing the respondent, and are classified as independent variables relative to labour productivity (Eiselen, 2008). The literature review was based on seven broad groups of characteristics (Leadership, Performance Management, Training and Development, Competition, Continuous Improvement, and Socio – Economic conditions). Based on the seven broad characteristics, 20 variables (variable X1 to X20) were derived, and these variables are independent relative to labour productivity. In addition, the variables are continuous within the intervals they are defined. The respondent can select three variables that the respondent deems to be the most important 'drivers' of labour productivity (variable X21). The respondent's perception on overall labour productivity is also captured in the questionnaire (variable 'Y'), which is also the only dependent variable. In addition, overall labour productivity is classified as a continuous variable within the interval it is defined. Labour productivity issues that are not provided for in the questionnaire are provided for by allowing the respondent to list any other issues that they consider to be important to labour productivity (Eiselen, 2008). A copy of the survey questionnaire is attached in APPENDIX III.

The level of analysis would be bi-variate, as each of the variables would be compared against labour productivity. In designing the questionnaire, care would be taken to ensure that questions are linked to the correct variables. Thus, a question with multiple responses would have sub variables defined to ensure that all responses have a unique variable (Diamontopoulos and Schlegelmilch, 2006 and Steffens, 2007).

Only primary data from the questionnaire would be used for this research project. Since the data would only be analysed over a single point in time, cross sectional data would be used. As the different firms would be surveyed at different times, it can be inferred that the data from the total sample would represent trend data. However, this would still not be true longitudinal data (Diamontopoulos and Schlegelmilch, 2006).

Various measurement scales would be employed in the questionnaire to ensure that all the relevant information is collected from the respondents. The measurement scales would include the nominal, ordinal and interval scales. Since the variables would be representing counts, discrete variables would be measured. Likert and itemised rating scales would be used to capture responses. An even number of categories would be used in each question to minimise the central tendency (Diamontopoulos and Schlegelmilch, 2006, Steffens, 2007 and Eiselen, 2007).

The measurement quality would depend on both the random and systematic errors of the measuring tool. Validity of the results would depend on the level of both systematic and random errors. However, reliability only

depends on random errors (Diamontopoulos and Schlegelmilch, 2006, Lee, 1999 and Leedy and Ormrod, 2005). The manner in which questions are designed would influence the validity of the measurement. Where there are ambiguities in questions validity would decrease. The way in which the questionnaire is set has to take into account the type of audience. The other part of validity would depend on the authenticity of the answers given by the respondents (Diamontopoulos and Schlegelmilch, 2006). A respondent in a good mood may give relatively positive answers whilst a respondent in a bad mood may give relatively negative answers. Reliability of the measuring instrument could be seen in the extent of inter - rater reliability (Diamontopoulos and Schlegelmilch, 2006) of results among the different firms of Astrapak, since the firms are different but comparable. The pilot study would give a good indication of the validity of the questionnaire. By implication, the validity of the final questionnaire could be improved by changing the questionnaire, based on the pilot study results and feedback, to increase the accuracy of the measuring instrument (Diamontopoulos and Schlegelmilch, 2006 and Leedy and Ormrod, 2005).

The data in the questionnaire would be coded to a computer readable format. This would include assigning variable labels, value labels, and type of variable. Value labels are important as they can distort the analysis. When using a Likert scale, assigning a value of 6 for ‘Strongly agree’ going down to a value of 1 for ‘Strongly disagree’ has to correspond to the polarity of the question being asked. Otherwise, the calculations may distort the results that are reported. Assigning a numeric value to the type of variable, even if the variable is alphanumeric, helps in

aggregating and summarising the data (Diamontopoulos and Schlegelmilch, 2006).

4.8 Ethical considerations

The research project would be based on a survey questionnaire (Leedy and Ormrod, 2005). There are ethical considerations that have to be taken into consideration in designing and executing the research instruments. The ethical issues to be considered include protection of anonymity, voluntary participation, protection of disclosure, and professional honesty (Leedy and Ormrod, 2005).

Since the research project would be based on employees of firms, the identities of participants are going to be protected. The research instruments would be designed such that participants would not have to disclose their identities. At most, the level of employment (examples being supervisor) would be disclosed. In case of the executive leadership of the organisation, anonymity of individuals would be limited as there are fewer individuals at this level. A case in point is that each division of Astrapak only has one executive director. In cases where the discussions are vocally recorded, permission would be sought from the interviewee beforehand.

Related to the protection of anonymity is voluntary participation in the research project (Leedy and Ormrod, 2005). Although participants would be chosen on a random basis, any chosen person that has reservations about participating in the research project would be discharged. In that case a replacement person would be chosen and the fact that a replacement was done would be noted. The

participation in the research project would not expose participants to any undue harm, or embarrassment, in any way. By way of example, selected individuals who cannot comprehend English, and who prefer to opt out of the survey, would be excused. Voluntary participation would be explained to all selected respondents before the survey is started. In addition, research participants would be informed of their right to withdraw from participation at any point during the survey. Since some of the firms are unionised, the relevant union would be informed of the research project and how it will be conducted. This is relevant as the researcher is also an employee of the group (Leedy and Ormrod, 2005).

Although the information would be linked to certain individuals in some of the divisions and firms, it is the intention of this research project to protect the privacy of all respondents, and keep their responses confidential (Leedy and Ormrod, 2005). Therefore, the researcher would not disclose how a particular individual answered the questionnaire.

Professional honesty will be applied in giving credit to other authors and in reporting findings (Leedy and Ormrod, 2005). The researcher's indebtedness to other researchers would be respected in all activities of this research project. The results of the research project would be reported as per the statistical and substantive analyses without misrepresenting other researchers. In addition, care would be taken not to intentionally mislead any of the interested and affected parties in reporting the findings of this study (Leedy and Ormrod, 2005).

Chapter 5: RESEARCH RESULTS

The research of labour productivity drivers was based on a research survey. The Astrapak employees served as the population. Using stratified sampling, surveys were sent to Astrapak employees within the three operating divisions (Rigids – 63 questionnaires, Films – 64 questionnaires, and Flexibles – 16 questionnaires) and across the geographical regions (Gauteng – 89 questionnaires, Kwazulu-Natal – 35 questionnaires, Western Cape – 13 questionnaires, and Eastern Cape – 6 questionnaires). One hundred and forty three (143) surveys questionnaires were sent out. Fifty-nine (59) questionnaires were completed and sent back, representing 41% of the total surveys sent out. Based on a population size of 3000 and the 143 questionnaires sent out, and the success rate of 41%, the sampling error was approximated as 7.8% (see Figure 1). A summary of the questionnaires sent and received back was listed in APPENDIX IV (Table IV-1 and Table IV-2).

The completed surveys were assigned a respondent number, in the order in which they were captured into a Microsoft Excel worksheet. Assigning a respondent number allowed for a review of the respondent's input during analysis (Diamontopoulos and Schlegelmilch, 2006). Responses in which the respondents choose more than the required number of responses were ignored and a 'NULL' value was put in instead. Item non-responses were also represented with a 'NULL' value. Item non-responses could have been due to the question not applying to the respondent, the respondent refusing to answer the question, or the respondent not understanding the question

(Diamontopoulos and Schlegelmilch, 2006). Thirty-four (34) responses were classified as 'NULL', representing 2% of the responses (from a maximum of 32 responses per questionnaire, based on 59 respondents).

The data were analysed and the results presented under the following categories:

- Data description
- Descriptive statistics
- Hypothesis testing

5.1 Data description

As per Diamontopoulos and Schlegelmilch (2006), data description provided an insight into the responses received, contributed to the identification of errors in the sampling process, and provided a compact method of presenting research results. The results were described in terms of respondent descriptors (variables 'a' to 'h'), the 20 productivity factors (X1 to X20), grouping as per the labour productivity drivers derived from the literature review (Leadership, Performance Management, Training and Development, Market Competition, Continuous Improvement, and Socio – Economic conditions), labour productivity, and ranking as per the three most important labour productivity drivers. In addition, the 'open ended' perceptions of the respondents on labour productivity were also captured.

CATEGORY	DESCRIPTORS	NUMBER OR RESPONDENTS	% OF RESPONDENTS
GEOGRAPHICAL LOCATION	GAUTENG	33	61%
	KWAZULU-NATAL	17	31%
	WESTERN CAPE	4	7%
	EASTERN CAPE	0	0%
ASTRAPAK DIVISION	RIGIDS	34	61%
	FLEXIBLES	3	5%
	FILMS	19	34%
MANAGEMENT LEVEL	EXECUTIVE	8	14%
	SENIOR	18	32%
	MIDDLE	19	34%
	JUNIOR	11	20%
EMPLOYMENT STATUS	PERMANENT	58	98%
	TEMPORARY	0	0%
	CASUAL	0	0%
	FIXED CONTRACT	1	2%
	OTHER	0	0%
GENDER	MALE	42	71%
	FEMALE	17	29%
AGE GROUP (IN FULL YEARS)	18-24	1	2%
	25-34	15	25%
	35-44	19	32%
	45+	24	41%
LENGTH OF SERVICE (IN FULL YEARS)	-1	7	12%
	1-3	14	24%
	4-6	10	17%
	7-9	11	19%
	10+	17	29%
HIGHEST EDUCATION LEVEL	GRADE 9 OR LOWER	0	0%
	GRADE 10	2	3%
	GRADE 11	2	3%
	GRADE 12	26	44%
	DIPLOMA/CERTIFICATE	14	24%
	DEGREE	8	14%
	HONOURS DEGREE	5	8%
	MASTERS/DOCTORAL DEGREE	1	2%
	OTHER	1	2%

Table1. Description of the respondents to the questionnaire

Table 1 described the respondents to the questionnaire in terms of eight categories. The number of respondents was based on the quantity of people that responded to the respective questions of the questionnaire. Questions in which there were no responses had the number of responses less than 59. The percentage of respondents was based on the number of respondents. The respondent that selected the highest education level as 'other' was specifically referring to ordinary ('O' level) education, which is offered by the examination boards in the UK (Wikipedia, 2008).

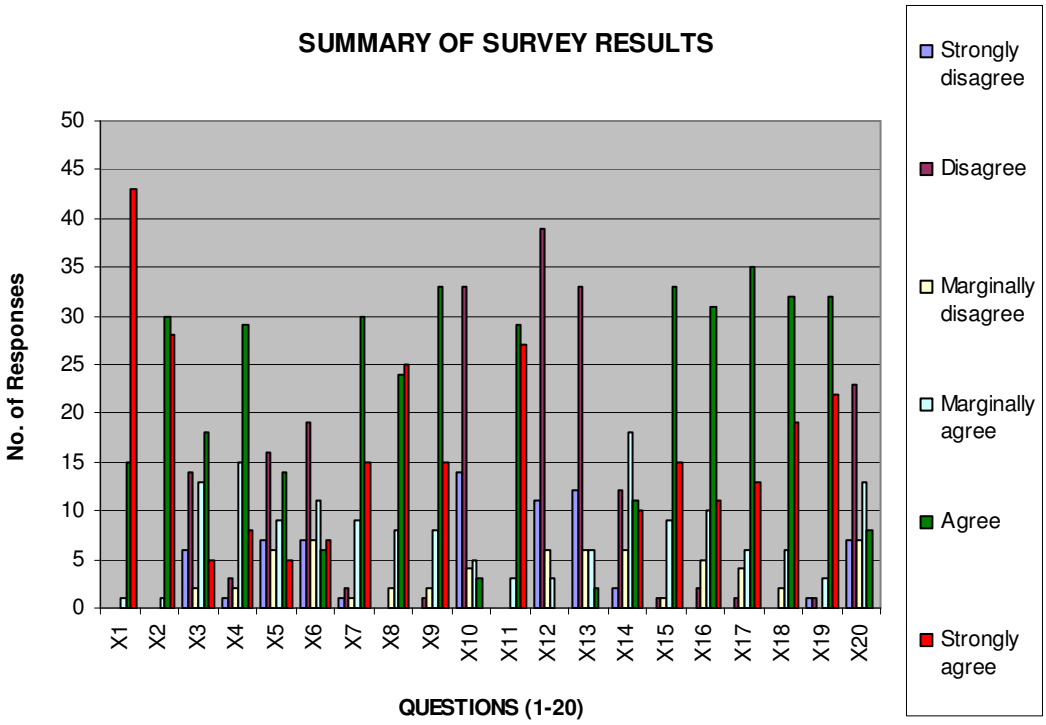

Figure 2: Summary of responses for the questions 1 to 20

Figure 2 summarised the responses to the 20 core questions of the questionnaire (APPENDIX III). The vertical bars showed the number of responses as per the six categories of answers on the Likert scale (from 'strongly disagree'-1 to 'strongly agree'-6). In questions where all the 59 respondents answered the question, the sum of all the categories was 59. Since there were questions in which there were no responses, there were questions in which the total responses were less than 59. Grouping the responses according to the productivity drivers derived from the literature review transformed the responses to those depicted in Figure 3.

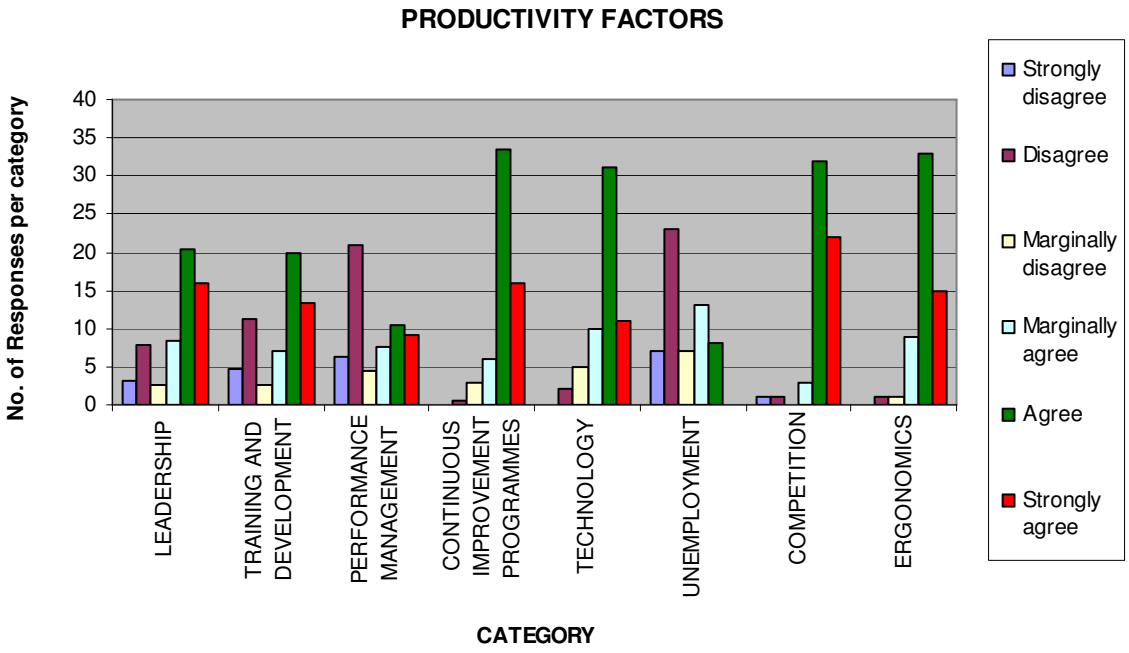

Figure 3: Summary of responses for productivity factors

The labour productivity drivers derived from literature were also described in terms of the eight respondent classifications (Figure 4 to Figure 11).

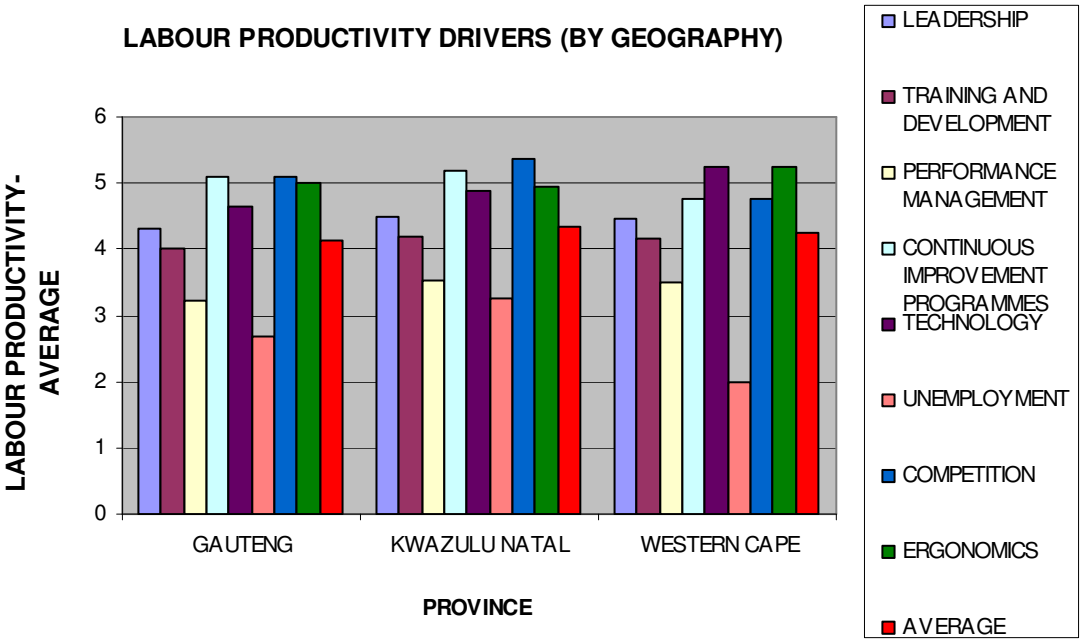

Figure 4: Labour productivity drivers (Geography)

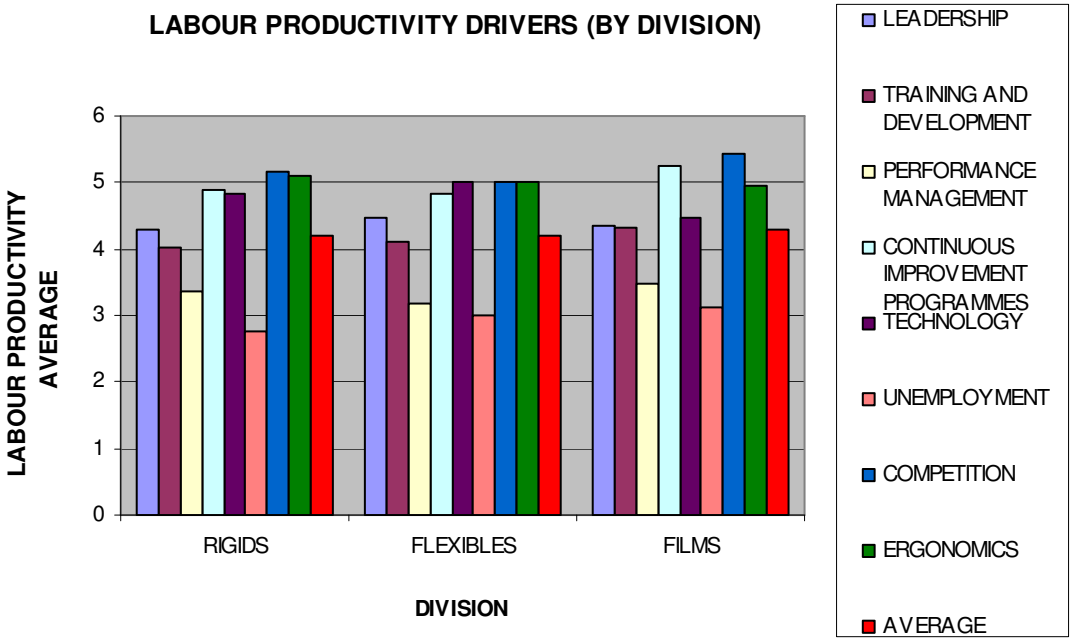

Figure 5: Labour productivity drivers (Division)

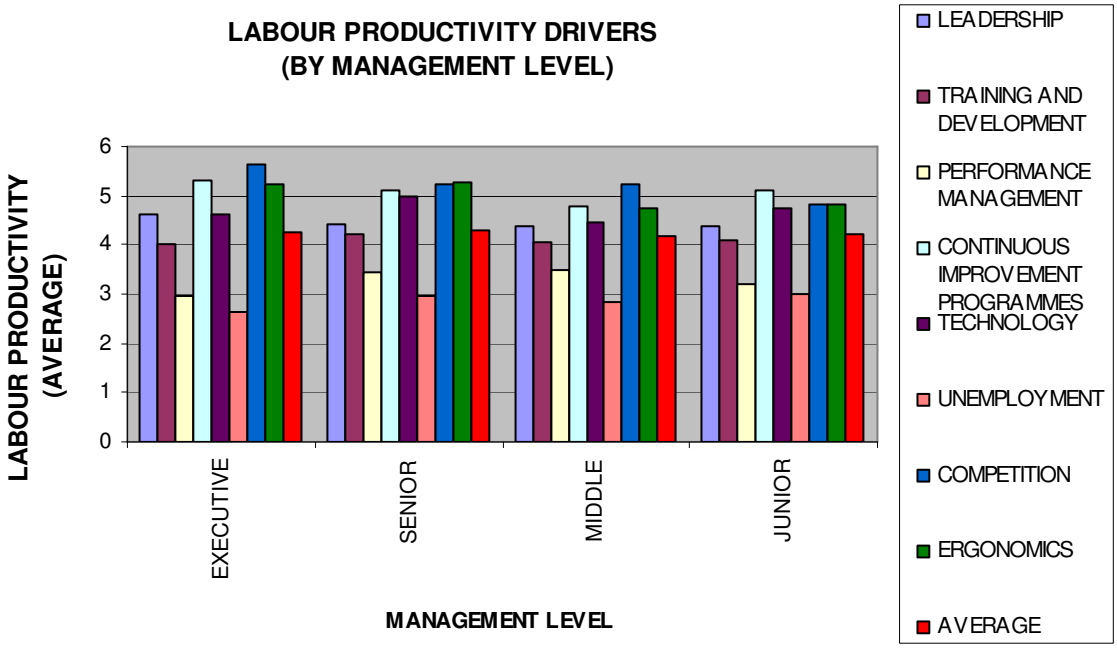

Figure 6: Labour productivity drivers (Management level)

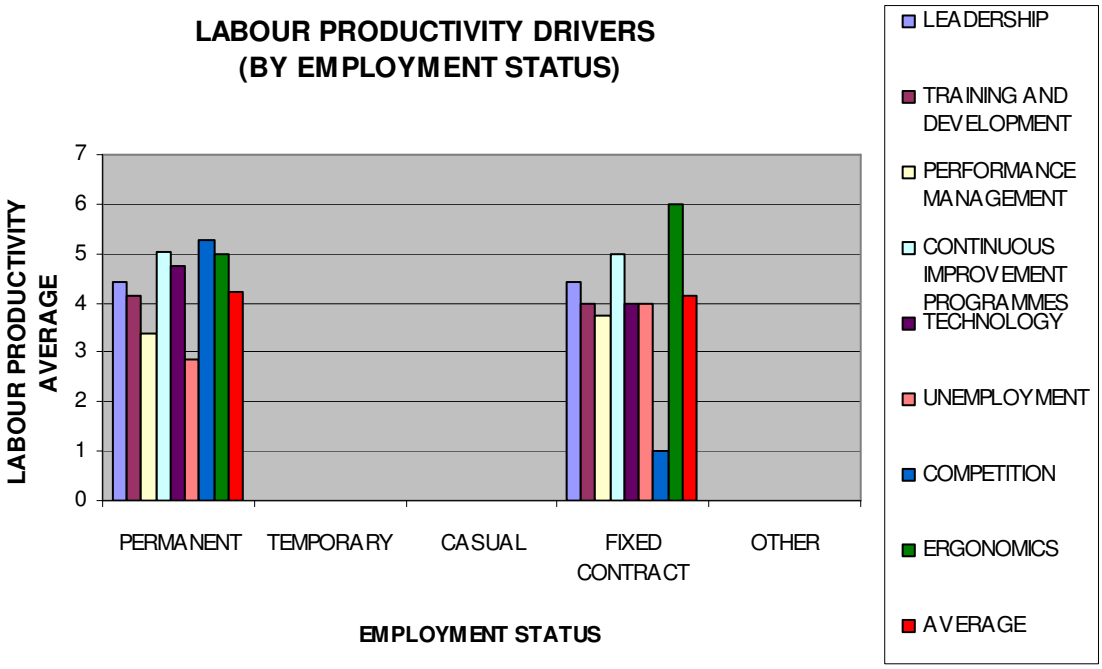

Figure 7: Labour productivity drivers (Employment status)

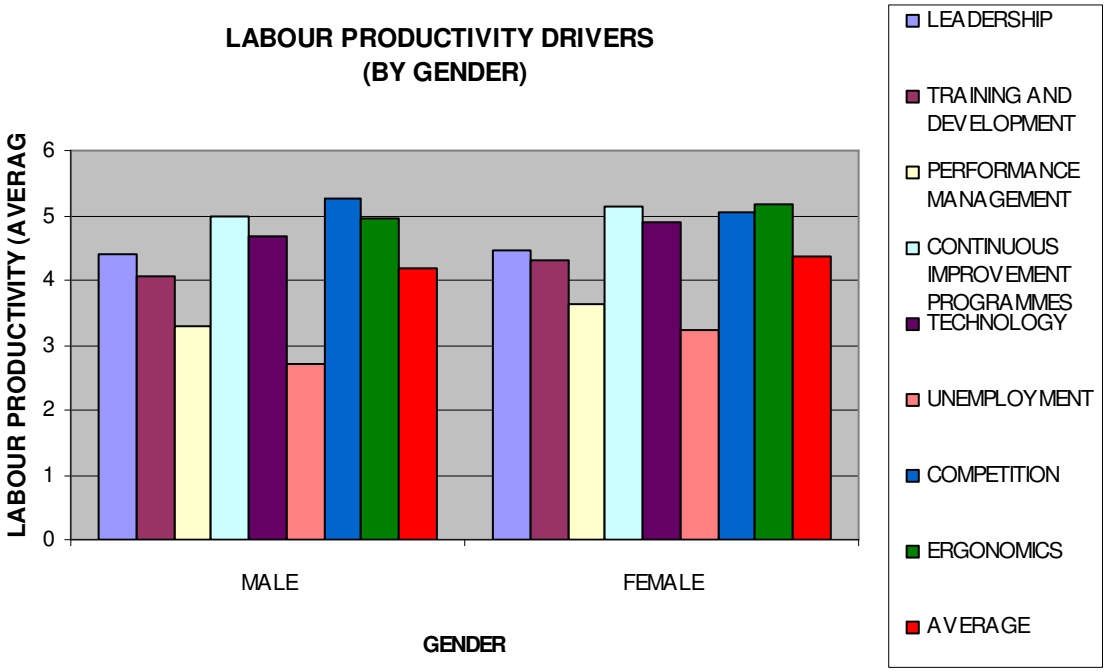

Figure 8: Labour productivity drivers (Gender)

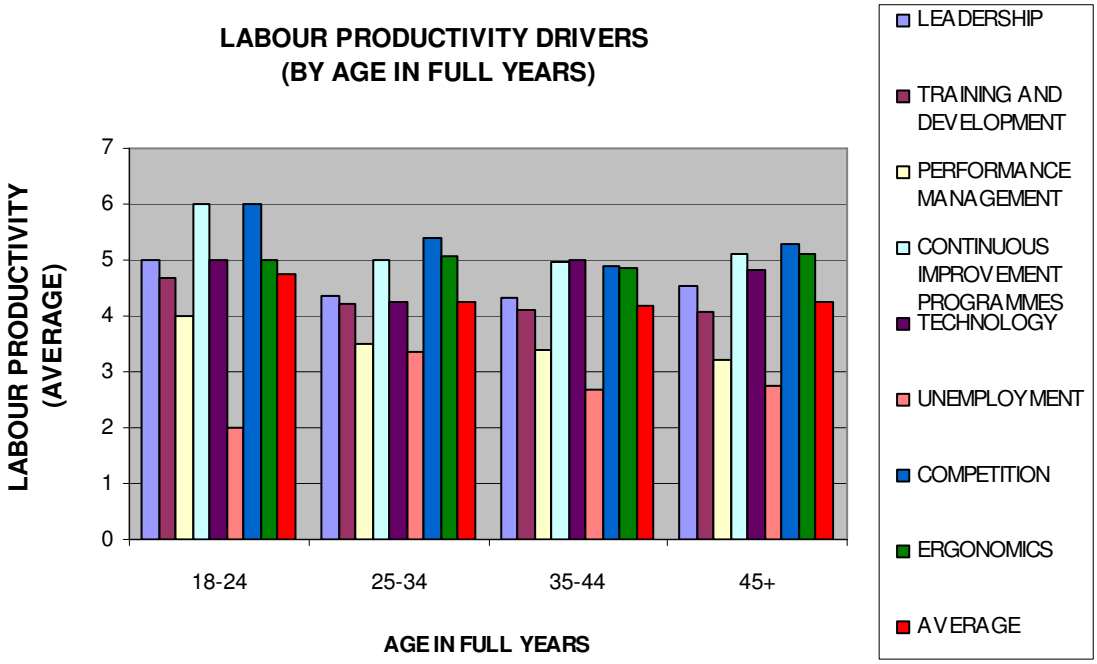

Figure 9: Labour productivity drivers (Age)

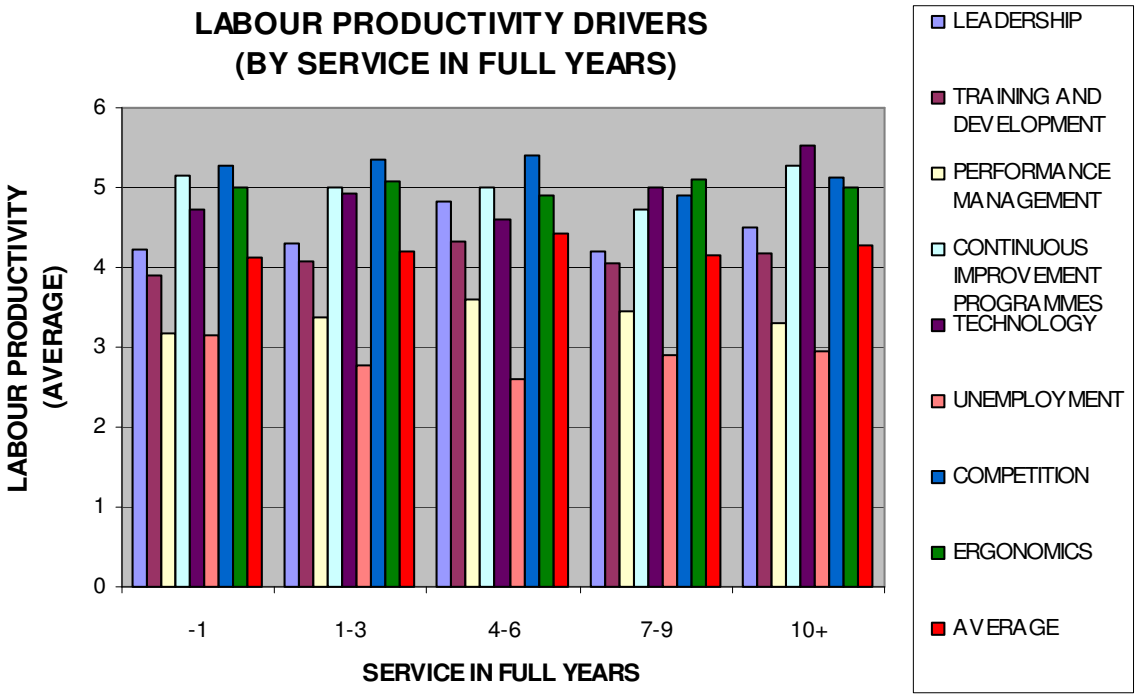

Figure 10: Labour productivity drivers (Company Service)

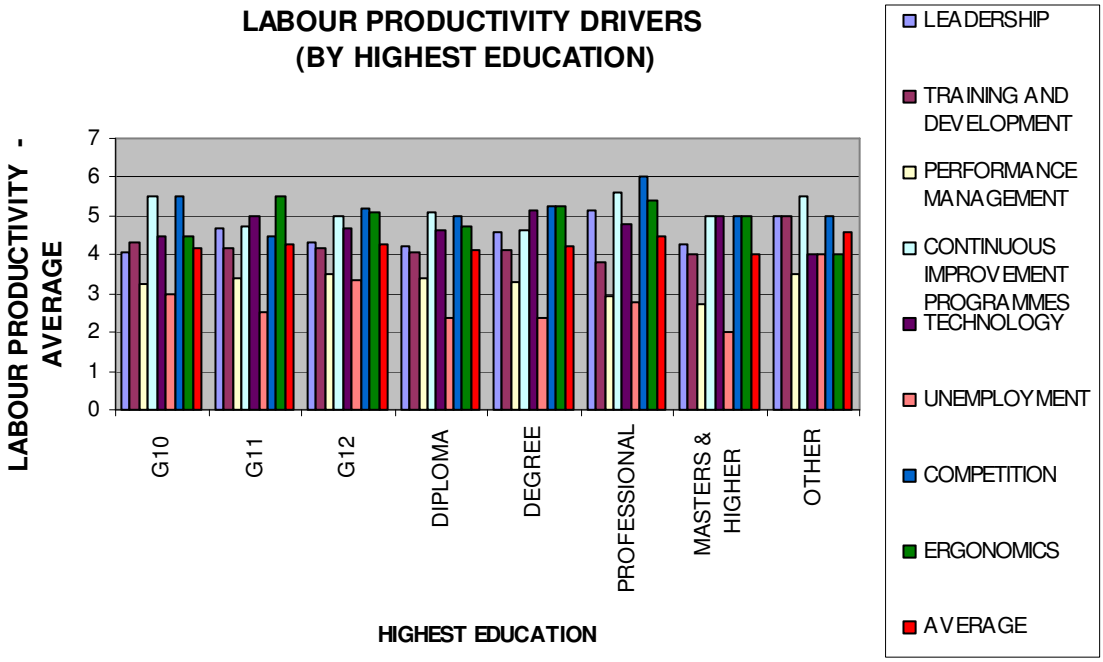

Figure 11: Labour productivity drivers (Highest Education)

In addition to the responses to the 20 core questions, each respondent was requested to identify three core questions that they considered the most important productivity drivers among the 20. Based on the selections of the respondents, the proportions of each of the questions were calculated. A summary of the ranking of all the 20 productivity factors as per the respondents' selections was listed in Table 2. The results of the actual selections were classified as the 'ACTUAL' series on Figure 12. Based on the scores of the individual 20 questions, the prevalence of each of the respective 20 questions were calculated based on the selections of the respondents as per the six categories (ranging from 'Strongly disagree' -1 to 'Strongly agree-6'). The scores were classified as the 'CALCULATED' series on Figure 12. The detailed results, showing all the 20 questions, were listed in APPENDIX V (Figure V-1 and Figure V-2.).

LABOUR PRODUCTIVITY FACTOR	CATEGORY	RANK
Motivation	LEADERSHIP	1
Continuous improvement	CONTINUOUS IMPROVEMENT	2
Employee performance	PERFORMANCE MANAGEMENT	3
Remuneration	PERFORMANCE MANAGEMENT	4
Ergonomics	ERGONOMICS	5
Leadership skills	LEADERSHIP	5
Skills budget	TRAINING AND DEVELOPMENT	7
Technology	TECHNOLOGY	8
Trust	LEADERSHIP	9
Informal skills	TRAINING AND DEVELOPMENT	10
Performance management system	PERFORMANCE MANAGEMENT	11
Culture	LEADERSHIP	12
Leader behaviour	LEADERSHIP	12
Competition	MARKET COMPETITION	14
Values	LEADERSHIP	14
Incentive schemes	PERFORMANCE MANAGEMENT	14
Leadership style	LEADERSHIP	17
Quality	CONTINUES IMPROVEMENT	18
Employment level	SOCIO-ECONOMIC CONDITIONS	19
Formal skills	TRAINING AND DEVELOPMENT	19

Table 2. Ranking of the 20 Productivity drivers

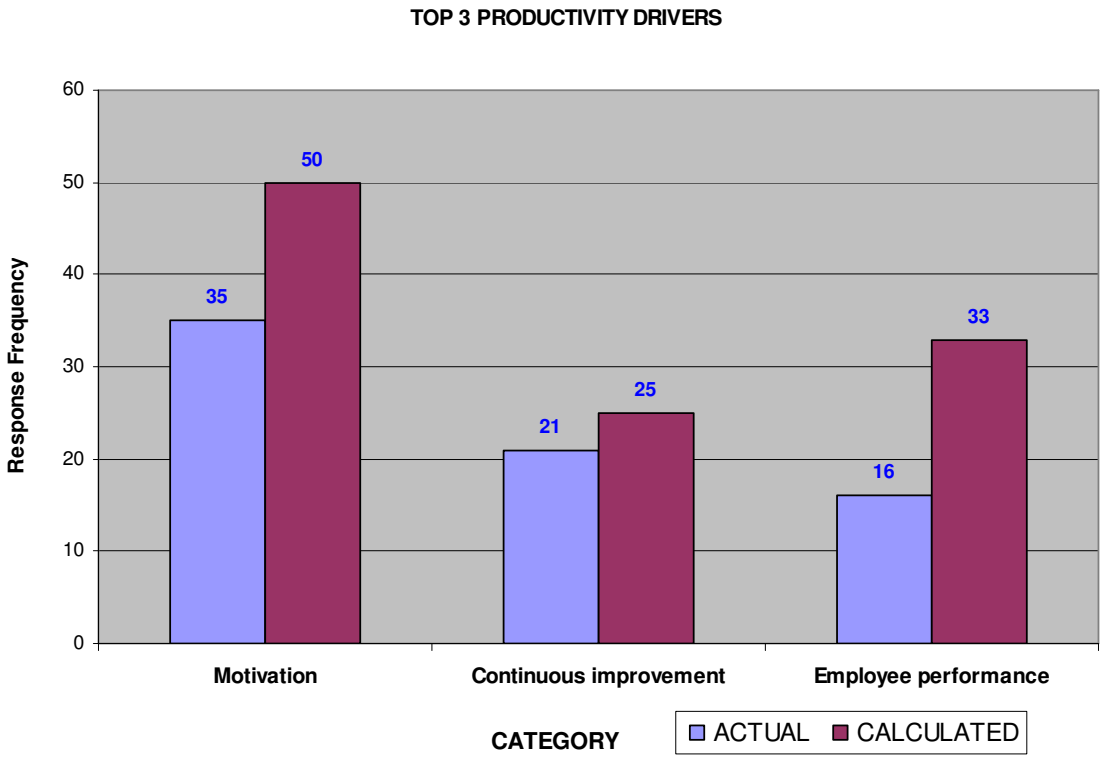

Figure 12: Ranking of labour productivity drivers

The perceptions of respondents to the overall labour productivity at their respective companies were depicted in Figure 13. The responses were shown in both quantitative and percentage terms.

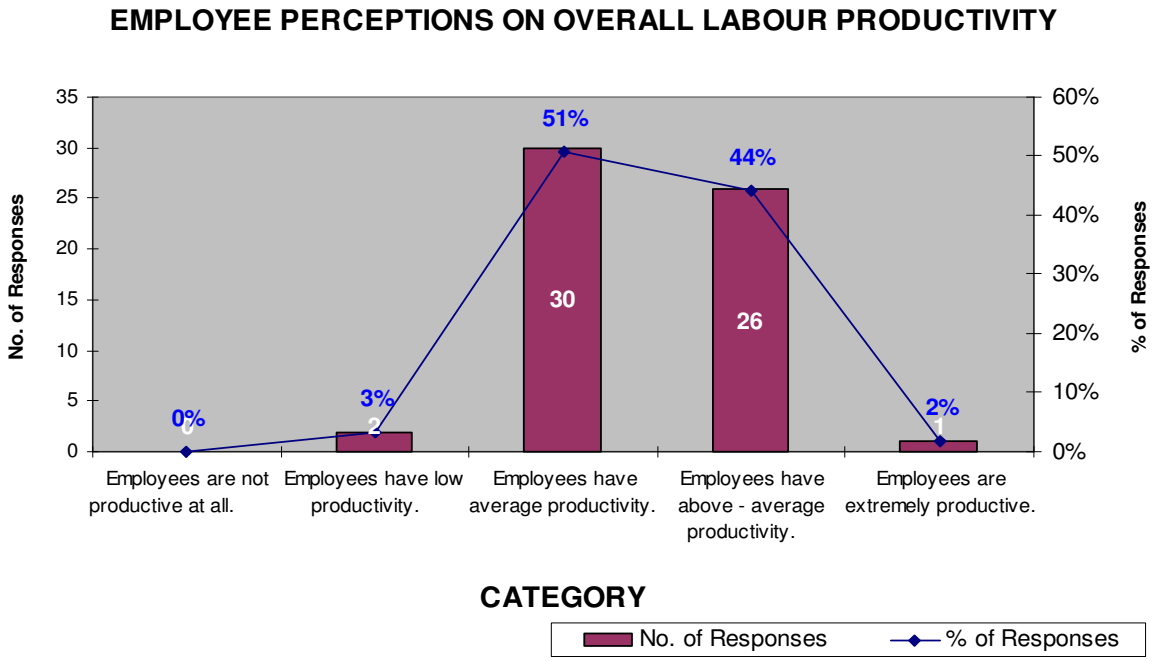

Figure 13: Overall Labour Productivity

Some of the respondents (58 % of 59 respondents) filled in the section on other factors that the respondents considered being important to labour productivity, other than the ones mentioned on the survey. The three most popular factors of productivity cited by respondents in the comments section were listed in Figure 14. A listing of all the factors was attached on APPENDIX V (Figure V-2). The factors were identified by the mention of the respective factors on the comments, be it implicit or explicit, by the respondents.

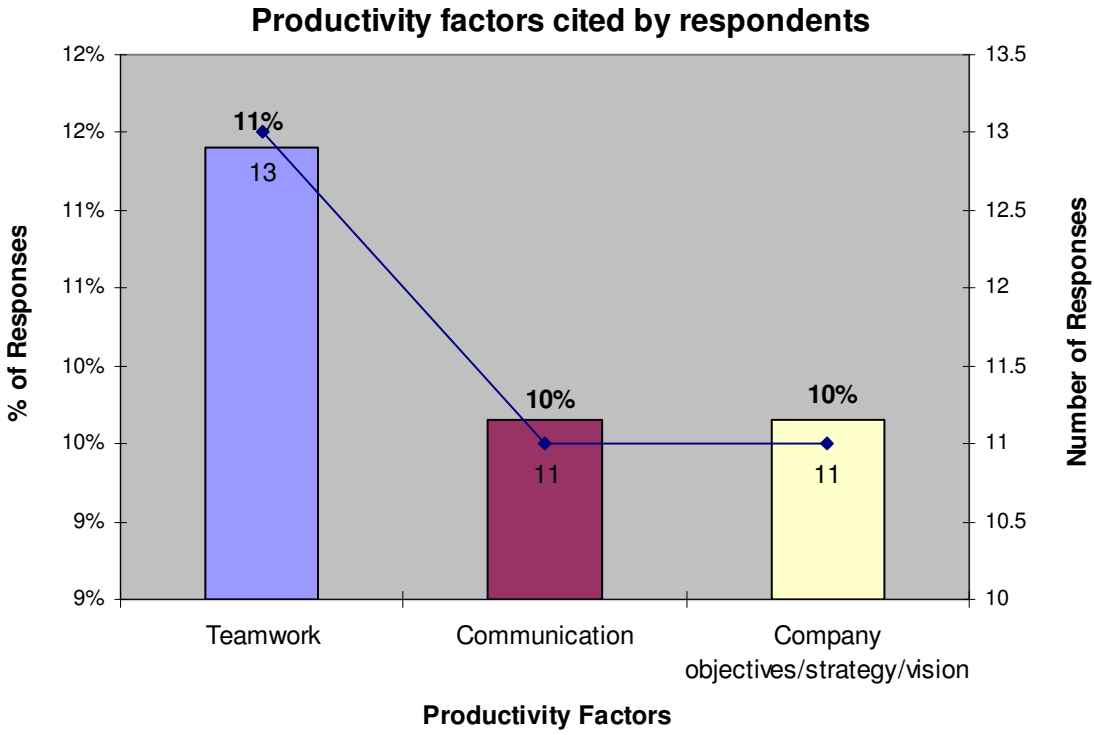

Figure 14: Other Productivity drivers not listed in questionnaire

Since the labour productivity factors were grouped as per the labour productivity drivers derived from the literature review (Leadership, Performance Management, Training and Development, Market Competition, Continuous Improvement, and Socio – Economic conditions), the data were also summarised in terms of the respective literature categories (Figure 15 to Figure 22).

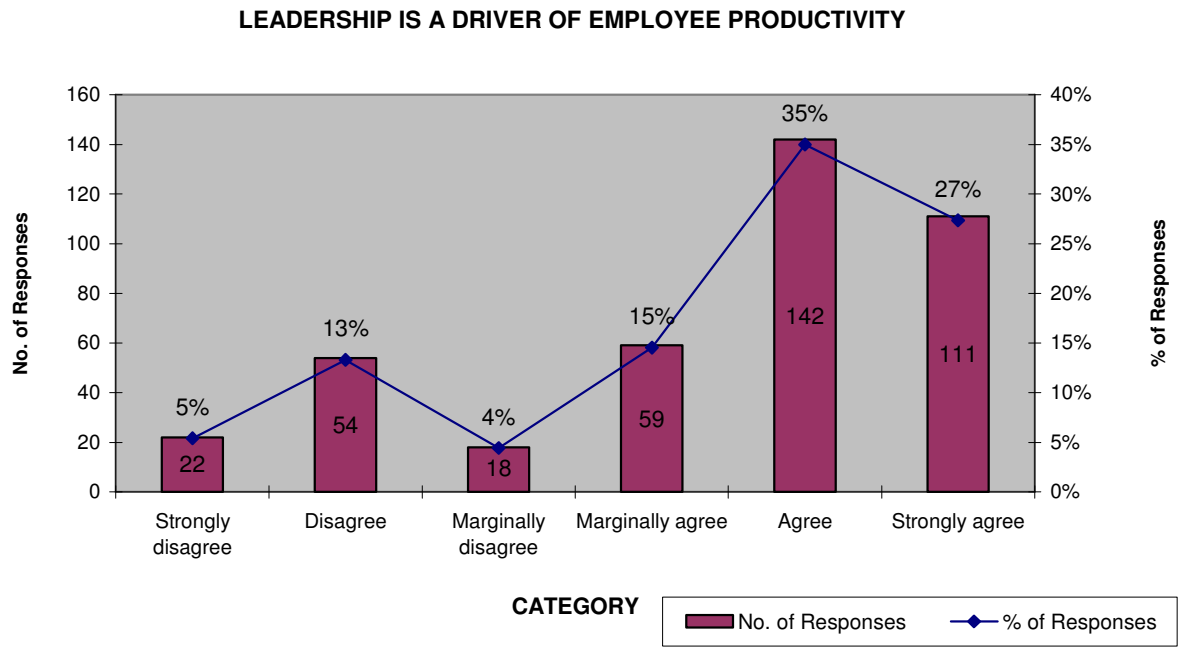

Figure 15: Leadership as a driver of labour productivity

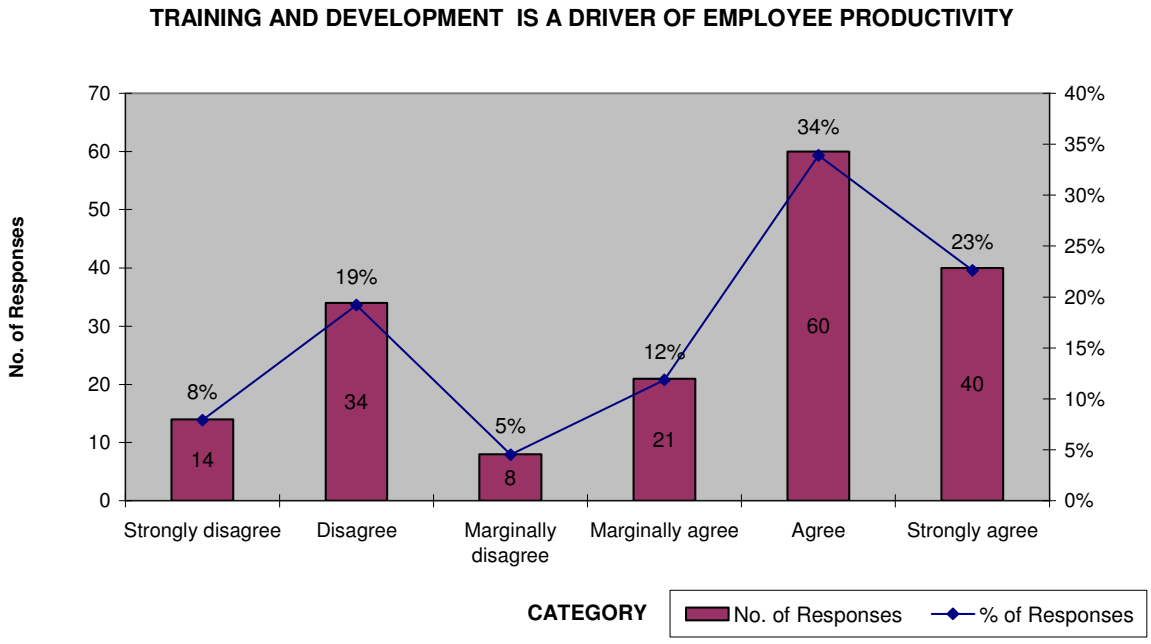

Figure 16: Training and development as a driver of labour productivity

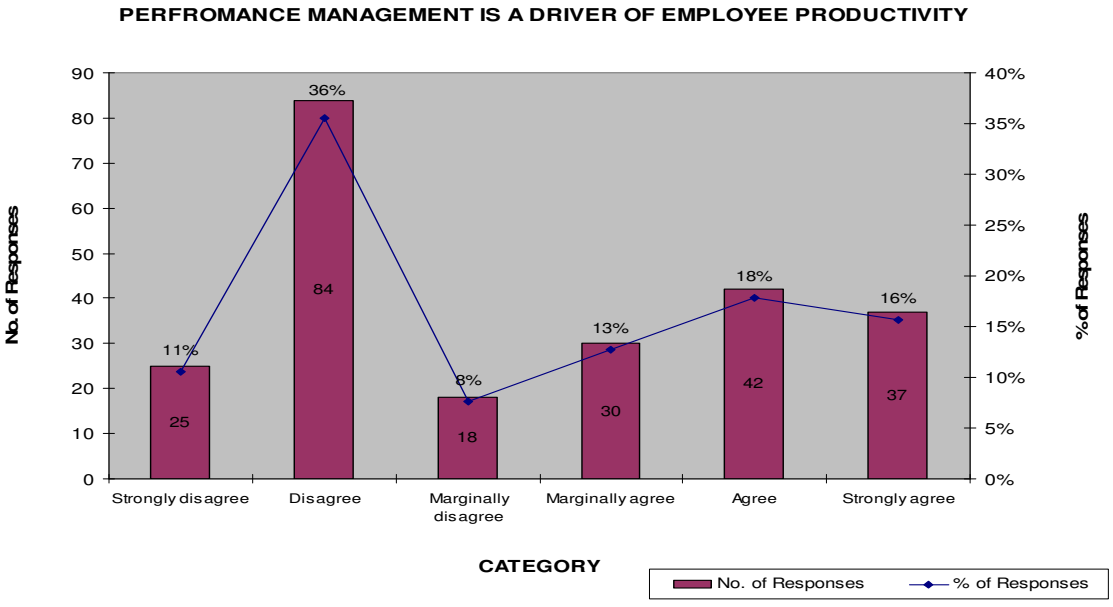

Figure 17: Performance management as a driver of labour productivity

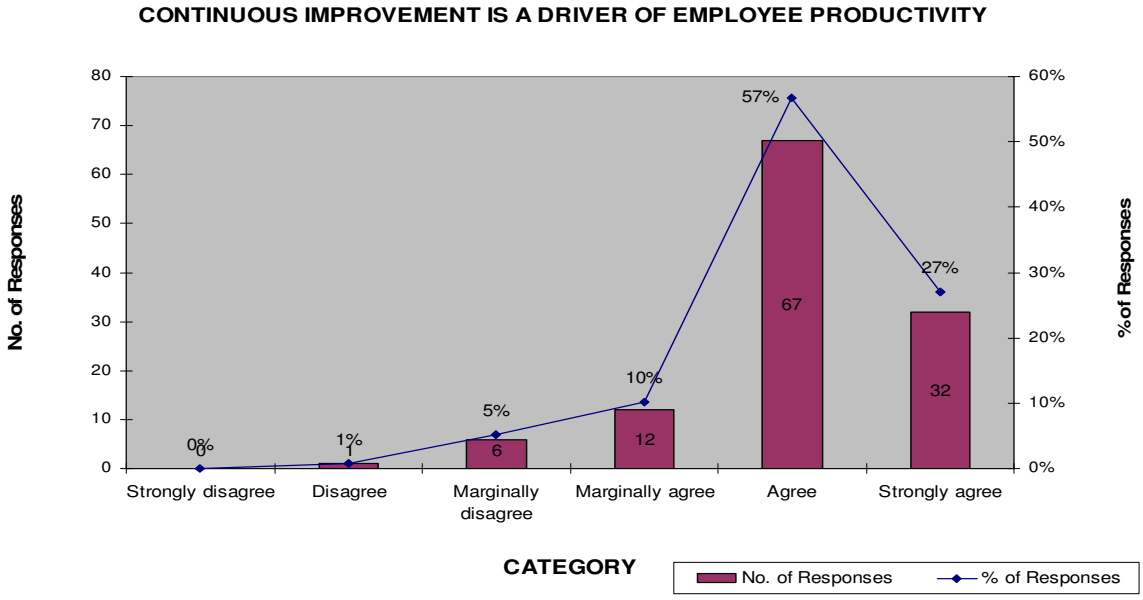

Figure 18: Continuous improvement as a driver of labour productivity

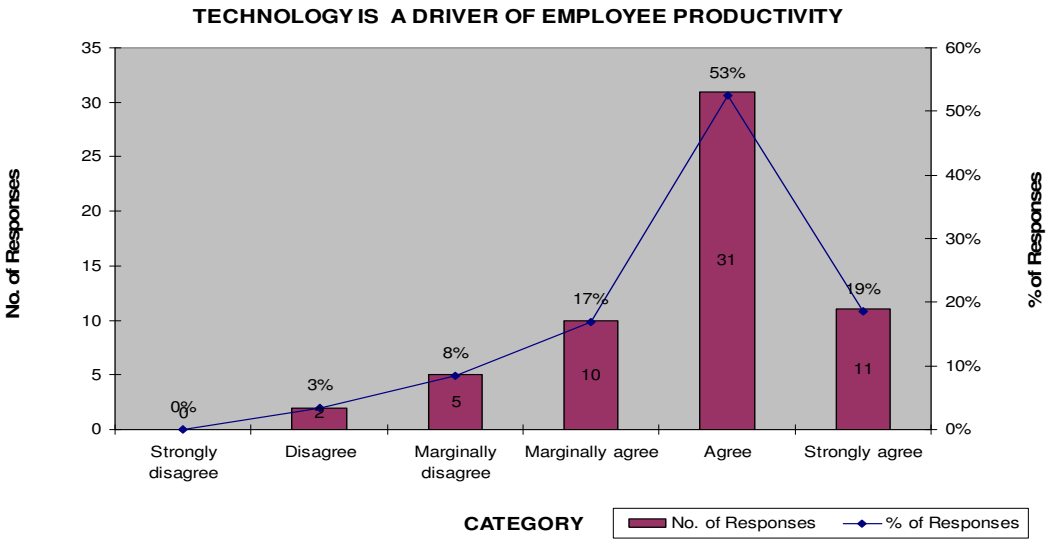

Figure 19: Technology as a driver of labour productivity

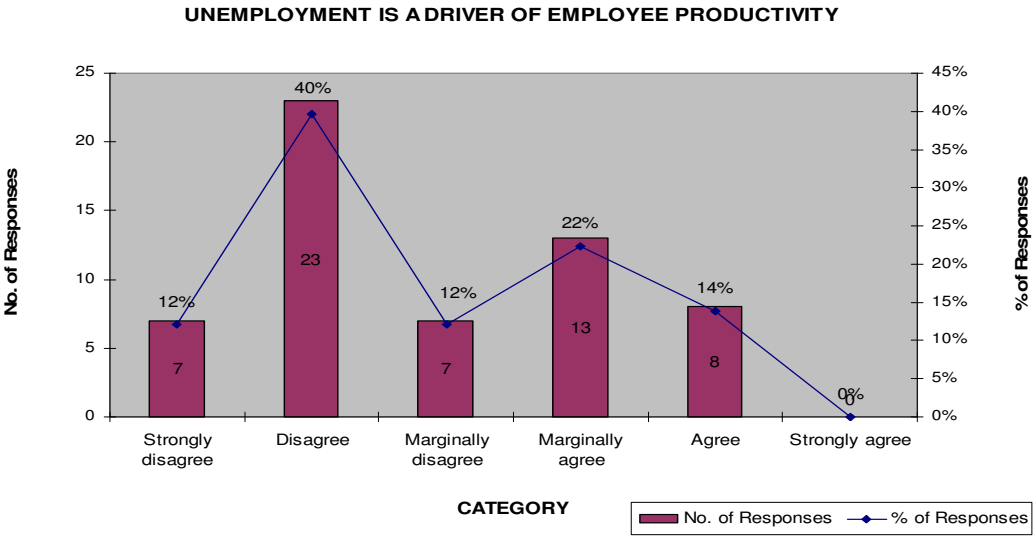

Figure 20: Unemployment as a driver of labour productivity

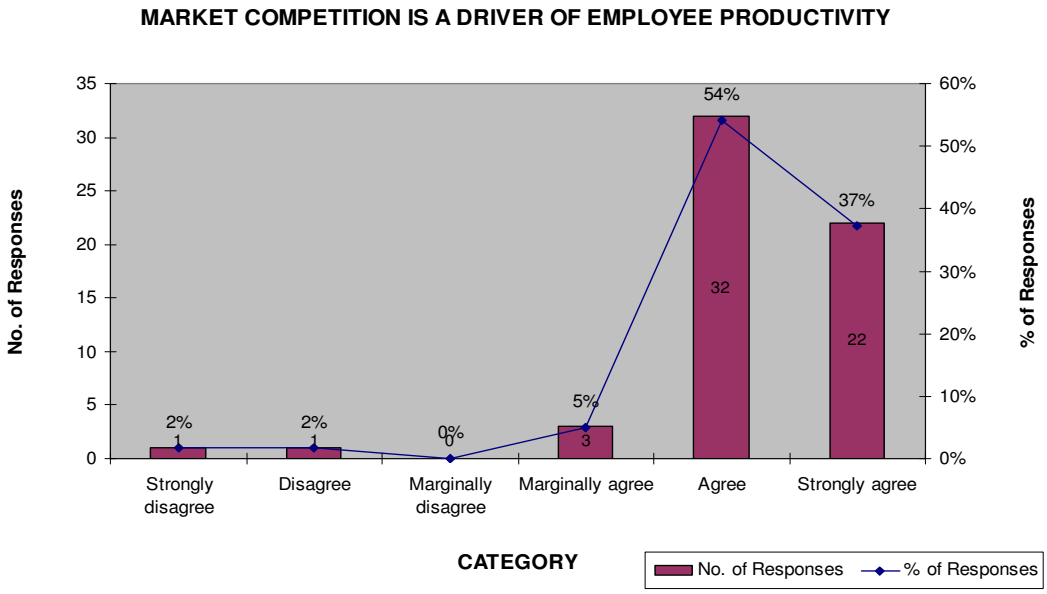

Figure 21: Market competition as a driver of labour productivity

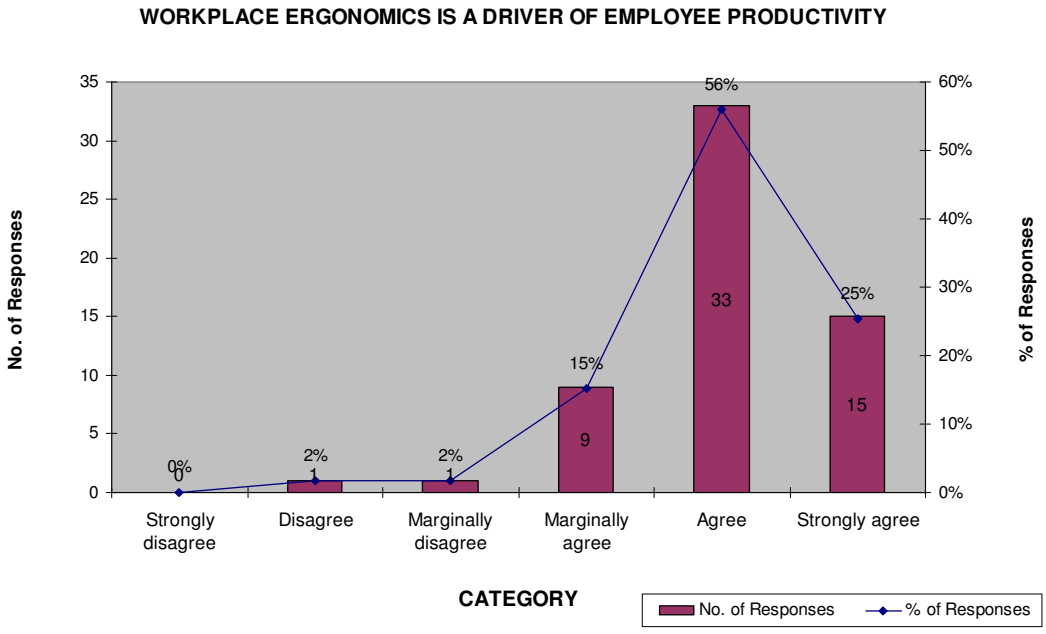

Figure 22: Ergonomics as a driver of labour productivity

5.2 Descriptive Statistics

Descriptive statistics are an extension of the data description, particularly focusing on the summary measures that capture the essential characteristics of the data. The summary measures included central location, averages, variability, and comparison to the normal distribution (Table 3, and Table 4) (Diamontopoulos and Schlegelmilch, 2006).

Description of Respondents	Variable	Measurement Scale	Count	Mode	% for Mode	Median
Geographical location	Va	Nominal	54	1	61%	N/A
Astrapak Division (RIGIDS, FLEXIBLES, FILMS)	Vb	Nominal	56	1	61%	N/A
Management level	Vc	Ordinal	56	3	34%	3
Employment status	Vd	Nominal	59	1	98%	N/A
Gender	Ve	Nominal	59	1	71%	N/A
Age group (full years)	Vf	Ordinal	59	4	41%	3
Length of service (full years)	Vg	Ordinal	59	5	29%	3
Highest education level	Vh	Ordinal	59	4	44%	4

Table 3. Summary statistics for respondents

Variable	X1	X2	X3	X4	X5
Productivity Factor	**Motivation**	**Trust**	**Culture**	**Values**	**Leader behaviour**
Measurement Scale	NOMINAL	NOMINAL	NOMINAL	NOMINAL	NOMINAL
Mean	5.7	5.5	3.7	4.6	3.4
Standard Error of Mean	0.1	0.1	0.2	0.1	0.2
Confidence Level for Mean (95.0%)	0.1	0.1	0.4	0.3	0.4
Median	6.0	5.0	4.0	5.0	3.0
Mode	6.0	5.0	5.0	5.0	2.0
N for Mode	43.0	30.0	18.0	29.0	16.0
% for Mode	73%	51%	31%	50%	28%
Standard Deviation	0.5	0.5	1.6	1.1	1.6
Sample Variance	0.2	0.3	2.5	1.1	2.6
Minimum	4.0	4.0	1.0	1.0	1.0
Maximum	6.0	6.0	6.0	6.0	6.0
Range	2.0	2.0	5.0	5.0	5.0
Count	59.0	59.0	58.0	58.0	57.0
Kurtosis	1.0	-1.2	-1.3	2.2	-1.4
Skewness	-1.4	-0.2	-0.3	-1.3	0.1

Table 4. Summary statistics for productivity factors

Variable	X6	X7	X8	X9	X10
Productivity Factor	**Leadership style**	**Leadership skills**	**Skills budget**	**Informal skills**	**Formal skills**
Measurement Scale	NOMINAL	NOMINAL	NOMINAL	NOMINAL	NOMINAL
Mean	3.2	4.9	5.2	5.0	2.2
Standard Error of Mean	0.2	0.1	0.1	0.1	0.1
Confidence Level for Mean (95.0%)	0.4	0.3	0.2	0.2	0.3
Median	3.0	5.0	5.0	5.0	2.0
Mode	2.0	5.0	6.0	5.0	2.0
N for Mode	19.0	30.0	25.0	33.0	33.0
% for Mode	33%	52%	42%	56%	56%
Standard Deviation	1.6	1.0	0.8	0.8	1.0
Sample Variance	2.6	1.1	0.7	0.7	1.1
Minimum	1.0	1.0	3.0	2.0	1.0
Maximum	6.0	6.0	6.0	6.0	5.0
Range	5.0	5.0	3.0	4.0	4.0
Count	57.0	58.0	59.0	59.0	59.0
Kurtosis	-1.0	3.8	0.2	2.3	1.3
Skewness	0.4	-1.6	-0.8	-1.1	1.3

Table 4. Summary statistics for productivity factors (continued)

Variable	X11	X12	X13	X14	X15
Productivity Factor	**Employee performance**	**Performance management system**	**Incentive schemes**	**Remuneration**	**Ergonomics**
Measurement Scale	NOMINAL	NOMINAL	NOMINAL	NOMINAL	NOMINAL
Mean	5.4	2.0	2.2	3.9	5.0
Standard Error of Mean	0.1	0.1	0.1	0.2	0.1
Confidence Level for Mean (95.0%)	0.2	0.2	0.3	0.4	0.2
Median	5.0	2.0	2.0	4.0	5.0
Mode	5.0	2.0	2.0	4.0	5.0
N for Mode	29.0	39.0	33.0	18.0	33.0
% for Mode	49%	66%	56%	31%	56%
Standard Deviation	0.6	0.7	1.0	1.5	0.8
Sample Variance	0.3	0.5	1.0	2.1	0.6
Minimum	4.0	1.0	1.0	1.0	2.0
Maximum	6.0	4.0	5.0	6.0	6.0
Range	2.0	3.0	4.0	5.0	4.0
Count	59.0	59.0	59.0	59.0	59.0
Kurtosis	-0.7	1.7	1.0	-1.0	2.6
Skewness	-0.4	0.9	1.1	-0.2	-1.1

Table 4. Summary statistics for productivity factors (continued)

Variable	X16	X17	X18	X19	X20
Productivity Factor	**Technology**	**Quality**	**Continuous improvement**	**Competition**	**Employment level**
Measurement Scale	NOMINAL	NOMINAL	NOMINAL	NOMINAL	NOMINAL
Mean	4.7	4.9	5.2	5.2	2.9
Standard Error of Mean	0.1	0.1	0.1	0.1	0.2
Confidence Level for Mean (95.0%)	0.3	0.2	0.2	0.2	0.3
Median	5.0	5.0	5.0	5.0	2.0
Mode	5.0	5.0	5.0	5.0	2.0
N for Mode	31.0	35.0	32.0	32.0	23.0
% for Mode	53%	59%	54%	54%	40%
Standard Deviation	1.0	0.9	0.7	0.9	1.3
Sample Variance	1.0	0.8	0.5	0.8	1.7
Minimum	2.0	2.0	3.0	1.0	1.0
Maximum	6.0	6.0	6.0	6.0	5.0
Range	4.0	4.0	3.0	5.0	4.0
Count	59.0	59.0	59.0	59.0	58.0
Kurtosis	0.9	1.9	0.9	9.1	-1.2
Skewness	-1.0	-1.2	-0.8	-2.4	0.3

Table 4. Summary statistics for productivity factors (continued)

Variable	(X1 - X7)	(X8-X10)	(X11-X14)	(X15)
Category	**LEADERSHIP**	**TRAINING AND DEVELOPMENT**	**PERFORMANCE MANAGEMENT**	**ERGONOMICS**
Measurement Scale	NOMINAL	NOMINAL	NOMINAL	NOMINAL
Mean	4.4	4.1	3.4	5.0
Standard Error of Mean	0.1	0.1	0.1	0.1
Confidence Level for mean (95.0%)	0.1	0.2	0.2	0.2
Median	5.0	5.0	3.0	5.0
Mode	5.0	5.0	2.0	5.0
N for Mode	6.0	20.0	16.0	18.0
% for Mode	10%	34%	20%	31%
Standard Deviation	1.5	1.7	1.7	0.8
Sample Variance	2.3	2.8	2.9	0.6
Range	5.0	5.0	5.0	4.0
Minimum	1.0	1.0	1.0	2.0
Maximum	6.0	6.0	6.0	6.0
Sum	1796.0	730.0	799.0	296.0
Count	406.0	177.0	236.0	59.0
Kurtosis	-0.4	-1.1	-1.4	2.6
Skewness	-0.9	-0.6	0.2	-1.1

Table 5. Summary statistics for literature review categories

Variable	(X16)	(X17-X18)	(X19)
Category	**TECHNOLOGY**	**CONTINUOUS IMPROVEMENT**	**COMPETITION**
Measurement Scale	NOMINAL	NOMINAL	NOMINAL
Mean	4.7	5.0	5.2
Standard Error of Mean	0.1	0.1	0.1
Confidence Level for mean (95.0%)	0.3	0.1	0.2
Median	5.0	5.0	5.0
Mode	5.0	5.0	5.0
N for Mode	33.0	21.0	32.0
% for Mode	56%	36%	54%
Standard Deviation	1.0	0.8	0.9
Sample Variance	1.0	0.7	0.8
Range	4.0	4.0	5.0
Minimum	2.0	2.0	1.0
Maximum	6.0	6.0	6.0
Sum	280.0	595.0	307.0
Count	59.0	118.0	59.0
Kurtosis	0.9	1.7	9.1
Skewness	-1.0	-1.1	-2.4

Table 5. Summary statistics for literature review categories (continued)

Variable	(X20)	(Y)
Category	**UNEMPLOYMENT**	**PRODUCTIVITY**
Measurement Scale	NOMINAL	NOMINAL
Mean	2.9	3.4
Standard Error of Mean	0.2	0.1
Confidence Level for mean (95.0%)	0.3	0.2
Median	2.0	3.0
Mode	2.0	3.0
N for Mode	32.0	30.0
% for Mode	55%	51%
Standard Deviation	1.3	0.6
Sample Variance	1.7	0.4
Range	4.0	3.0
Minimum	1.0	2.0
Maximum	5.0	5.0
Sum	166.0	203.0
Count	58.0	59.0
Kurtosis	-1.2	-0.4
Skewness	0.3	0.0

Table 5. Summary statistics for literature review categories (continued)

5.3 Hypothesis testing

The aim of hypothesis testing was to check whether a certain proposition, concerning a population, was valid or not (Diamontopoulos and Schlegelmilch, 2006). The research hypothesis was derived based on the literature review as:

- There are factors that influence labour productivity, in addition to inputs and outputs of an organisation.

The research hypothesis was classified as the alternative hypothesis (H_1). As there were no priori expectations on the direction of the influence of the factors that influence labour productivity, the alternative hypothesis was set as exploratory. Therefore, two –tailed tests were utilised (Diamontopoulos and Schlegelmilch, 2006).

The null hypothesis was based on the possibility of there not being any factors that influence labour productivity other than the inputs and outputs of an organisation. The null hypothesis (H_0) was stated as:

- There are no other factors that influence labour productivity, other than the inputs and outputs of an organisation.

The pre-determined significance level (α) for all hypothesis was set at 0.05 (α = 0.05 or α = 5%). The significance level of 0.05 was set as a standard for all the significance tests related to the hypothesis testing. All the significance tests were based on the following criteria:

	Situation in population
Decision made	**H_0 is True**
H_0 is not rejected	$\alpha > 0.05$
H_0 is rejected	$\alpha \leq 0.05$

The hypothesis tests were focused on population characteristics, comparisons among measures, and relationships.

5.4 Normality test

The normality test evaluates the null hypothesis (H_0) that a data set follows a normal distribution. When the p-value is less than the significance level of 0.05, the null hypothesis is rejected and it is concluded that the data set does not follow a normal distribution (Diamontopoulos and Schlegelmilch, 2006). The Anderson – Darling (AD) test was utilised to test for normality.

All the data sets from the various variables (X1- X20 and overall labour productivity) had the individual p-values being less than 0.05 (highly significant), except for the leadership category. The AD p-value for leadership was 0.181(non-significant). Leedy and Ormrod (2005) purported that the data; must fit a normal distribution, and the measures have to be at least interval for parametric tests to be used on the data. Since each of the data sets were based on an effective sample sizes greater than 50

(rule of Leedy and Ormrod (2005) suggest a rule of thumb of a sample size at least equal to 30), parametric tests could still be utilised on all the interval measures (Diamontopoulos and Schlegelmilch, 2006). The results of the normality tests were listed in Table 6.

Factor	Number of data points	AD test statistic	P-value	Conclusion
Va	54	7.53	1.234E-18	Ho fail, not normal
Vb	56	9.52	2.384E-23	Ho fail, not normal
Vc	56	2.57	1.393E-06	Ho fail, not normal
Vd	59	22.36	0	Ho fail, not normal
Ve	59	13.00	0	Ho fail, not normal
Vf	59	4.56	1.869E-11	Ho fail, not normal
Vg	59	2.58	1.375E-06	Ho fail, not normal
Vh	59	3.07	8.412E-08	Ho fail, not normal
X1	59	12.22	1.229E-29	Ho fail, not normal
X2	59	9.09	2.565E-22	Ho fail, not normal
X3	59	2.93	1.921E-07	Ho fail, not normal
X4	58	4.16	1.755E-10	Ho fail, not normal
X5	57	2.28	7.568E-06	Ho fail, not normal

Table 6. Results of the Anderson – Darling normality test

Factor	Number of data points	AD test statistic	P-value	Conclusion
X6	57	2.23	1.018E-05	Ho fail, not normal
X7	58	4.62	1.310E-11	Ho fail, not normal
X8	59	4.69	9.063E-12	Ho fail, not normal
X9	59	4.86	3.495E-12	Ho fail, not normal
X10	59	5.65	4.363E-14	Ho fail, not normal
X11	59	7.40	2.643E-18	Ho fail, not normal
X12	59	6.90	4.201E-17	Ho fail, not normal
X13	59	5.17	6.309E-13	Ho fail, not normal
X14	59	1.89	6.864E-05	Ho fail, not normal
X15	59	4.84	3.944E-12	Ho fail, not normal
X16	59	4.23	1.226E-10	Ho fail, not normal
X17	59	5.59	6.072E-14	Ho fail, not normal
X18	59	5.21	4.865E-13	Ho fail, not normal
X19	59	6.29	1.193E-15	Ho fail, not normal
X20	59	3.09	7.344E-08	Ho fail, not normal

Table 6. Results of the Anderson – Darling normality test (continued)

Factor	Number of data points	AD test statistic	P-value	Conclusion
PRODUCTIVITY	59	7.21	7.601E-18	Ho fail, not normal
LEADERSHIP	59	0.52	0.1810	**Ho pass, normal**
TRAINING AND DEVELOPMENT	59	1.50	0.0007	Ho fail, not normal
PERFORMANCE MANAGEMENT	59	1.24	0.0029	Ho fail, not normal
ERGONOMICS	59	4.84	3.944E-12	Ho fail, not normal
ICT	59	4.23	1.226E-10	Ho fail, not normal
CONTINUOUS IMPROVEMENT	59	2.17	1.432E-05	Ho fail, not normal
COMPETITION	59	6.29	1.193E-15	Ho fail, not normal
UNEMPLOYMENT	58	3.26	2.852E-08	Ho fail, not normal

Table 6. Results of the Anderson – Darling normality test (continued)

5.5 Pearson correlation coefficients

Relationships among the survey variables were examined by using correlations. The Pearson linear correlation coefficients between overall labour productivity and the productivity factors (X1 to X20) were examined. The null hypothesis was that there were no linear relationships between labour productivity and labour productivity factors. When p-values were less than the significance level of 0.05, the null hypothesis was rejected and it was concluded that there were linear relationships between overall labour productivity and the respective productivity factors. The Pearson linear correlation coefficients between each of the factors of productivity and overall labour productivity (variable Y) were listed in Table 7.

Labour Productivity Factor	Variable	Correlation	p-value	Decision
Motivation	X1	0.205	0.119	Non-significant
Trust	X2	0.06	0.654	Non-significant
Culture	X3	-0.063	0.639	Non-significant
Values	X4	-0.018	0.892	Non-significant
Leader behaviour	X5	-0.172	0.2	Non-significant
Leadership style	X6	-0.049	0.715	Non-significant
Leadership skills	X7	-0.012	0.93	Non-significant
Skills budget	X8	0.045	0.733	Non-significant
Informal skills	X9	0.105	0.43	Non-significant
Formal skills	X10	-0.137	0.3	Non-significant
Employee performance	X11	-0.028	0.832	Non-significant
Performance management system	X12	-0.1	0.451	Non-significant
Incentive schemes	X13	-0.183	0.166	Non-significant
Remuneration	X14	0.163	0.216	Non-significant
Ergonomics	X15	0.02	0.879	Non-significant
Technology	X16	0.107	0.419	Non-significant
Quality	X17	-0.041	0.756	Non-significant
Continuous improvement	X18	-0.156	0.239	Non-significant
Competition	X19	-0.105	0.428	Non-significant
Employment level	X20	0.104	0.436	Non-significant

Table 7. Pearson correlation coefficients between overall labour productivity and labour productivity factors

Pearson correlation coefficients among the productivity factors were also calculated (APPENDIX IV, Table IV-4 to Table IV-6). Among the 28 variables that were defined (20 productivity factors, and 8 literature review categories) there were effectively 407 unique combinations between any two variables. The analysis resulted in 98 (24%) significant Pearson correlation coefficients from 407 possible correlations.

5.6 Multiple linear regressions

Multiple linear regression was performed on the data set to investigate and model the linear relationship between the predictors (all independent variables as per APPENDIX II) and the response (overall labour productivity) (Leedy and Ormrod, 2005). The null hypothesis was that there were no linear relationships between the predictors and the response; and the linear regression coefficients were equal to zero. Only 47 of the cases were used as 12 had some missing values. The results of the analysis were listed in Table 8. The coefficient of determination (R-squared value) for the multiple regression analysis was 54%.

Predictor	Coefficient	SE Coefficient	T statistic	P-value	Decision
Constant	6.185	3.953	1.56	0.135	Non-significant
Va	0.4554	0.3028	1.5	0.15	Non-significant
Vb	-0.1456	0.2116	-0.69	0.5	Non-significant
Vc	-0.0828	0.2468	-0.34	0.741	Non-significant
Vd	0.0733	0.7039	0.1	0.918	Non-significant
Ve	-0.0114	0.3675	-0.03	0.976	Non-significant
Vf	-0.1197	0.2245	-0.53	0.6	Non-significant
Vg	0.067	0.1137	0.59	0.563	Non-significant
Vh	0.02918	0.09269	0.31	0.757	Non-significant
X1	0.4467	0.6052	0.74	0.47	Non-significant
X2	-0.1887	0.3943	-0.48	0.638	Non-significant
X3	-0.0168	0.107	-0.16	0.877	Non-significant
X4	-0.1498	0.1205	-1.24	0.23	Non-significant
X5	-0.1193	0.2072	-0.58	0.572	Non-significant
X6	0.0597	0.2016	0.3	0.77	Non-significant
X7	-0.1444	0.1515	-0.95	0.353	Non-significant
X8	0.0238	0.2059	0.12	0.909	Non-significant
X9	-0.0101	0.2648	-0.04	0.97	Non-significant
X10	-0.0895	0.1785	-0.5	0.622	Non-significant
X11	-0.1216	0.3491	-0.35	0.732	Non-significant
X12	-0.4107	0.271	-1.52	0.147	Non-significant
X13	0.1093	0.1934	0.57	0.579	Non-significant
X14	-0.0102	0.162	-0.06	0.95	Non-significant
X15	-0.157	0.2194	-0.72	0.483	Non-significant
X16	0.1685	0.1824	0.92	0.368	Non-significant
X17	0.0955	0.2604	0.37	0.718	Non-significant
X18	-0.3531	0.2462	-1.43	0.169	Non-significant
X19	-0.097	0.404	-0.24	0.813	Non-significant
X20	0.1228	0.1742	0.7	0.49	Non-significant

Table 8. Regression coefficients for the predictor variables

Chapter 6: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The discussion of the results followed on from the results section, encompassing the data description, descriptive statistics, and hypotheses testing. Conclusion and recommendations followed on from the discussion of the results.

6.1 Respondent descriptors

The descriptors that were utilised for the respondents were classified as nominal (Va, Vb, Vd, and Ve) and ordinal (Vc, Vf, Vg, and Vh) respectively (Table. 2 and APPENDIX II). Therefore, the nominal variables could only be described in terms of the mode. The ordinal variables could be described in terms of the mode and median (Diamontopoulos and Schlegelmilch, 2006).

The geographical distribution of the survey respondents was from Gauteng (61%), Kwazulu-Natal (31%), and Western Cape (7%) respectively. The Astrapak companies were located in Gauteng (28%), Kwazulu – Natal (31%), Western Cape (25%), Eastern Cape (9%), and Free State (3%) (Astrapak, 2008). The response rate was due to more respondents, in Gauteng, Kwazulu – Natal, and Western Cape, filling in the surveys and returning them back. There were no surveys sent to the Free State. The mode of 1 for the geographical location (61% of respondents) implied that the most frequently occurring geographical location for the respondents was the Gauteng province. The mode being in Gauteng province was due to most of the surveys that were returned being from Gauteng province.

The responses from the surveys were from the Rigids division (61%), Films division (34%), and Flexibles division (5%). The Rigids division represented the mode (61% of respondents) of the geographical location distribution. The mode was in agreement with the Rigids division being the largest division of the Astrapak group (Astrapak, 2008).

The spread of the surveys across all management levels of the organisation ensured that all the management levels were represented in the survey. The management level had a mode and median of 3 (34% of the respondents). Therefore, middle management was the most frequently occurring management level, and it was in the middle of the management level distribution.

The demographics of the employees were mainly permanent employees (98%), with only one fixed contract employee (2%). The employment status had a mode of 1 (98% of the respondents), thus implying that most respondents had a permanent employment status.

Both male (71%) and female (29%) genders were represented in the survey. The most frequently occurring gender was the male gender, as indicated by the mode of 1 (representing 71% of the respondents).

The age distribution of the respondents was across age groups from 18-24 years to the 45 years old and older (45+) group. The mode of the age group was 4 (45+) (representing 41% of the respondents). However, the median of the age group was 3, implying that employees in

the 35-44 age group were in the middle of the age group distribution.

The length of service varied from individuals that had just joined their respective firms (less than one year service; represented by -1) to individuals that had more than 10 years (10+) experience with their respective organisation. The spread across the years allowed perspectives from across various periods of Astrapak to be captured; from the period when the respective organisations were part individual entrepreneurial ventures to the current system under Astrapak, which is currently the largest plastic packaging group in South Africa (Astrapak, 2008). The mode for length of service with the organisation was 5 (29% of respondents), implying that most of the respondents had already been with their respective companies for at least ten years. The corresponding median for length of service was 3.

The highest education levels of Astrapak employees varied from grade ten (3%) to Masters and Doctoral degree level (2%). The largest group of employees (44%) had grade twelve as the highest level of formal education. The distribution across various education levels could have an effect on the responses of the individuals. The median for the highest education level was 4 (44% of respondents), implying that most respondents had the highest education level of grade 12. Grade 12 also represented the median of the highest education level distribution.

6.2 Responses to the survey questions

The summary of the survey responses for questions 1 to 20 (Figure 2) indicated that respondents answered the questions in line with whether the statement of the question was affirmative or negative (APPENDIX III). Six questions (3, 5, 6, 10, 12, and 13) were based on negative statements. The responses indicated that most of the respondents selected answers corresponding to values of '1' (Strongly disagree) and '2' (Disagree) as indicated by the respective bars of the histogram being the longest on Figure 2. The fourteen questions (1 – 4, 7 - 9, 11, and 14 – 19) that were based on affirmative statements had most of the responses corresponding to the values of '5' (Agree) and '6' (Strongly agree). Question 20 attempted to link high unemployment (negative assertion) with increased productivity (affirmative). The responses to question 20 were distributed across the scale but more skewed towards disagreement with the statement. Since all the 20 factors were classified as nominal variables (APPENDIX II), all the variables could be analysed with all the descriptive statistics (Diamontopoulos and Schlegelmilch, 2006).

Leadership

The leadership category was formed from questions 1 to 7 (APPENDIX III). Questions 1 to 7 dealt with motivation, trust, culture, values, behaviour of managers, leadership style, and leadership skills respectively.

Lohrasbi (2006) argued that motivation created an environment that encourages commitment in seeing the job through to completion. Employee motivation could fluctuate, depending on the work environment that the manager permitted (DeMarco, 2007). Failure to create a work environment conducive to labour productivity could lead to absenteeism, as employees with low morale tend to lose the will to succeed in their job functions (Lohrasbi, 2006). All the responses to the motivation question fell between the 'marginally agree' (score of 4) and 'strongly agree' (score of 6) categories of the measurement scale (Figure 2), which was in agreement with the literature findings. The survey results on motivation supported the assertion that there was a relationship between labour productivity and employee motivation.

Similar to motivation, the responses to the question on trust were only in the 'marginally agree' (score of 4), to the 'strongly agree' (score of 6) categories on the measurement scale (Figure 2). The selection of the afore-mentioned categories was an indication of the support of the affirmative statement of trust being a driver of labour productivity. A break in trust between the employer and employee led to a decrease in worker morale (Kawaguchi and Ohtake, 2007). Effectively, demoralised workers lose their confidence, and impetus to be productive. Managers having trust in the employee's abilities could build employee self-confidence (Lohrasbi, 2006). Therefore, there was agreement between the research findings and literature on trust being a driver of labour productivity.

The results on organisational culture as a driver of labour productivity were distributed across all the six categories of

the measurement scale (that is there was at least one response for each of the six categories from ‘strongly disagree’ (score of 1) to ‘strongly agree’ (score of 6)) (Fig .2). Overall, the affirmative responses (‘agree’ to strongly agree’) were higher than the negative responses, which was in agreement with there being a relationship between organisational culture and labour productivity. Change in an organisation required change in the organisational culture (Yukl, 2006). The mechanism by which culture could be influenced included how leaders reacted to crises, role modelling, and design of management systems and procedures. Yukl (2006) argued that organisational culture might be interpreted differently if underlying beliefs were inconsistent with espoused values. As an example, a company may espouse a culture of open communication when the underlying belief was that criticism of management was detrimental to one’s job prospects. The spread of the results among the respondents may be an indication of the inconsistency between underlying beliefs and espoused values. Although there was a spread of responses, the results of the survey were in agreement with literature.

The values espoused by Astrapak companies were perceived to be a driver of labour productivity, as indicated by the high prevalence of ‘agree’ to ‘strongly agree’ scores (Figure 2). The results from the survey were supported by literature on organisational values. Research on organisational change concluded that changes in organisational values affect labour productivity (Chu and Chen, 2007, Lohrasbi, 2006 & Kawaguchi and Ohtake 2007). In research done on performance management systems, Gimžauskiene and Klovienė (2007) concluded

that changes in organisational values could lead to changes in the performance measurement system. Chu and Chen (2007) argued that the management of change, rather than the change itself, eventually affected the organisation's productivity.

The results of the influence of the leader's behaviour were split between 'agree' and 'disagree' categories (Figure 2). Therefore, the result tended towards the centre of the measurement scale, which implied that the results were not conclusive. Research on task orientated behaviour and relations orientated behaviour concluded that the two orientations were mutually exclusive of each other (Yukl, 2006). The inconclusive results between leader behaviour and labour productivity could be linked to respondents being biased towards task orientation or relations orientation. The literature findings were in agreement with the research findings.

Similar to leader behaviour, the leadership style results were also split between the 'agree' and 'disagree' categories (Figure 2). The central tendency for the leadership style results could be linked to the respondent's perceptions of their respective leader's styles, which could vary from authoritarian to democratic. Levin (2006) argued that the chasm between employees and employers in industrial and post-industrial societies was exacerbated by the predominantly authoritarian style of leadership exercised in most organisations. It is argued that an increase in the application of more democratic leadership styles in the workplace would increase employee skills, job satisfaction and, productivity growth. It has been argued that the leadership style (example being inspirational

leadership) in an organisation could influence the labour productivity (Yukl, 2006). The results of the relationship between leadership skills and labour productivity supported the assertion that leadership skills positively affected labour productivity as indicated by most of the respondents selecting the categories from ‘marginally agree’ to strongly agree’ (Figure 2). The respondents that selected the ‘disagree’ categories were minimal. Leadership skills displayed by a leader, and the extent of the usage thereof, influenced the ability of the employees to deliver on their responsibilities (Yukl, 2006). Most leadership roles need technical, conceptual, and interpersonal skills for a leader to be effective (Yukl, 2006). The positive response to leadership skills being a driver of labour productivity could be inferred as support for the leadership skills of the respective leaders at Astrapak companies.

Consolidation of the factors that were encompassed by questions 1 to 7 under leadership (Figure 3 and Figure 15) resulted in a net result that was in support of the assertion that the leadership system of an organisation had an influence on labour productivity. The average score was between ‘marginally agree’ and ‘agree’ (range of 1-6, Table 5). The lower scores for the negative questions (question 3, 5, and 6) compared to the affirmative questions (questions 1, 2, 4, and 7) were actually an indication of the support of leadership as a driver of labour productivity. The rejection of the negative assertions implied support of the alternative assertions that were actually in support of leadership as a significant factor of labour productivity. The mean score of the leadership category was 4.4, with a 95% confidence interval for the mean of 0.1. The mode and median (10% of respondents) were both equal to 5 (Table

5). Therefore, there was a 95% confidence level that Astrapak employees agreed with the assertion that leadership was a significant factor of labour productivity.

Performance management

The performance management category was based on questions 11 to 14 (APPENDIX III). Questions 11 to 14 dealt with employee performance, performance management systems, incentive schemes, and remuneration.

All the respondents to the question on receiving recognition for job performance (59) agreed that being recognised for job performance had a positive effect on one's productivity (Figure 2) as indicated by all the scores being in the categories of 'marginally agree' to strongly agree'. According to Gaither and Frazier (2002), performance recognition was one of the three major factors that affected employee productivity (the other two being the physical environment and product quality).

Question 12 was based on a negative assertion that a performance management system negatively affected labour productivity. The majority of respondents disagreed with the statement whilst a minority marginally agreed (Figure 2). Lohrasbi (2006) argued that when performance management was viewed as a business strategy driver, rather than compliance with the law or organisational policy, both the employees and employer benefited. Since there was overwhelming disagreement with the negative assertion, it could be implied that Astrapak employees regard performance management systems as being a positive factor to labour productivity.

Similar to question 12, question 13 (Figure 2) was based on the negative assertion that incentive schemes do not have an effect on the productivity of employees (APPENDIX III). The responses, from 'strongly disagree' (score of 1) to 'marginally agree' (score of 4) (Figure 2), indicated that there was more disagreement than agreement with the negative assertion. The majority of the respondents disagreed with the assertion, and therefore supported the link between incentive schemes and labour productivity. Shaw (2003) argued that Human Resource Management (HRM) practises that improved performance linked incentive schemes to teamwork, communication, training, recruitment and selection, job rotation, and employee retention.

In research done by Arthur and Huntley (2005), Graham-Moore and Ross (1995) defined gain sharing as an organisation wide incentive scheme in which all employees were encouraged to suggest ways to improve the productivity of the business, from which both management and employees share in the savings. The results of the study suggested that, after discounting for knowledge depreciation, the gain-sharing scheme contributed significantly to reducing business costs. The gain–sharing scheme had an impact on the organisation's learning mechanisms as it could address both ability and motivational aspects of learning in an organisation (Arthur and Huntley, 2005). The literature findings corroborated the study findings in that incentive schemes do have an effect on labour productivity.

The response to remuneration as a labour productivity driver were spread across the numerical scale from ‘strongly disagree’ (score of 1) to ‘strongly agree’ (score of 6), with the average response being on ‘marginally agree’ (score of 4) (Figure 2). Therefore, there was no outright support for remuneration as a driver of labour productivity. A study by Kawaguchi and Ohtake (2007) challenged the notion of remuneration as being the sole motivating factor for workers. Rather, they supported the assertion of the existence of a set of factors, including remuneration, which collectively contributed to worker motivation. These factors effectively contributed to the net productivity of the workforce.

The collective responses to questions 11 to 14 were spread across the categories of ‘strongly disagree’ (score of 1) to the category of ‘strongly agree’ (score of 6), with the disagree category (score of 4) being the largest (Figure 3, Figure 17, and Table 5). However, it should be noted that questions 12 and 13 were based on negative assertions. Therefore, the implied responses, to questions 12 and 13 respectively, were actually affirming performance management as a driver of labour productivity. The mean score of the performance management category was 3.4, with a 95% confidence interval for the mean of 0.2. The mode and median (16% of respondents) were 2 and 3 respectively (Table 5). Therefore, there was a 95% confidence level that Astrapak employees marginally agreed with the assertion that performance management was a significant factor of labour productivity.

Training and development

The performance management category was based on questions 8 to 10 (APPENDIX III). Questions 8 to 10 dealt with the investment in skills development, informal skills, and formal skills respectively.

The majority of Astrapak employees agreed that investing in the development of employee's skills increased the productivity of those employees. The support of skills investment was supported by 57 respondents (out of 59) that selected categories between 'marginally agree' (score 4) and 'strongly agree' (score of 6) (Figure 2 and Figure 16). The other two respondents selected the 'marginally disagree' (score of 3) category. The UK treasury department identified investment in skills as one of the five key drivers of productivity along with capital investment, competition, innovation, and enterprise development (Webber, Boddy, and Plumridge, 2007). Shaw (2003) argued that policies that are in support of HRM practises included investment in employee education and training. The conclusion of the literature review was in agreement with the survey results.

Question 9 dealt with the effectiveness of informal training on employee productivity (Figure 2). Although the results were spread from 'disagree' (score of 2) to 'strongly agree' (score of 6), the majority of the respondents agreed that informal skills development programmes aided employee productivity (an example being on the job training). A study by Liu and Batt (2007) demonstrated that organisations could realise a return on their informal training investment even if the work was highly routinised, as found in many jobs that require relatively low skills. In addition, a positive

relationship was found between informal training investment and productivity. Furthermore, the accrued benefits of training were sustained over several months after the informal training had been done (Liu and Batt, 2007).

The assertion presented on question 10 challenged the notion that the more formally educated a person was the more productive they become. Actually, the assertion was that the higher the qualifications of an employee, the less productive they became. The results showed an overwhelming disagreement with the assertion as most respondent's selected the 'strongly disagree' (score of 1) and 'disagree' (score of 2) categories. Pankhurst and Livingstone (2006) dismissed the investment in formal education and training programs as a precursor to productivity growth in organisations, particularly for employees that do not have a formal education background. The dismissal of investment in formal education was based on the assertion that the content of human capital was continually evolving over time, and is not merely an accumulation of lifetime learning. Mayer and Altman (2005) argued that South Africa's unemployment crisis could not be resolved by only focusing on developing the relatively high-skill labour force, but actually needed a forceful development of relatively low and intermediate skills. Therefore, most respondents concurred with literature in that acquisition of formal education did not necessarily improve labour productivity.

Overall, investment in training and development of employees was supported as a driver of labour productivity. Converting the negative assertion of question

10 to a positive assertion, as in questions 8 and 9, resulted in an overall score on the positive categories (scores of 4 to 6) (Figure 2 and Figure 3). The mean score of the training and development category was 4.1, with a 95% confidence interval for the mean of 0.2. The mode and median (20% of respondents) were both 5 (Table 5). Therefore, there was a 95% confidence level that Astrapak employees marginally agreed with the assertion that investment in training and development was a significant factor of labour productivity.

Continuous improvement

The continuous improvement category was based on questions 17 and 18 (APPENDIX III). Question 17 was based on quality management systems; and question 18 was based on continuous improvement programmes.

Question 17 linked productivity to quality products. A majority of the respondents agreed that when employees were productive, the quality of the products satisfied the customer requirements. This was indicated by most of the responses falling into the 'marginally agree' (score of 4) to the 'strongly agree' (score of 6) categories. Lee, Beruvides, and Chiu (2007) proved the existence of a positive relationship among productivity, quality, and profit. In addition, Wang (2006) concluded that both capacity utilisation and quality of output were relevant parameters in the measurement of productivity in any decision-making unit and, should not be regarded as separate parameters.

The majority of respondents agreed that continuous improvement programmes contributed to an increase in labour productivity. This assertion was supported by

respondents selecting the categories from ‘marginally disagree’ (score of 3) to ‘strongly agree’ (score of 6) (Figure 2), with the ‘agree’ (score of 5) category being the largest. Ho and Chuang (2006) concluded that the implementation of Six Sigma in government agencies enhanced the effectiveness of the employees to resolve process problems. Since Six Sigma implementation would improve the process capability, labour productivity would also be improved, as workers would be able to produce more products using fewer resources (Ho and Chuang, 2006). Theory of Constraints (TOC) had been used as a tool for determining criteria for selection of Quality Improvement (QI) projects (Koksal, 2004).

Overall, respondents agreed that continuous improvement programmes (examples being Total Quality Management, Six Sigma, and TOC) increased labour productivity (Figure 3 and Figure 18). The mean score of the continuous improvement category was 5, with a 95% confidence interval for the mean of 0.1. The mode and median (36% of respondents) were both 5 (Table 5). Therefore, Astrapak employees agreed (with 95% confidence) with the assertion that implementing continuous improvement programmes was a significant factor of labour productivity.

Ergonomics

The discussion on ergonomics was based on question 15 (APPENDIX III). Based on 59 respondents, 57 respondents selected categories from ‘marginally agree’ (score of 3) to ‘strongly agree’ (score of 6). This implied that the majority of respondents agreed that the conditions in the workplace contribute to labour productivity. Significant loss of labour productivity, for both the

employee and company, were realised when ergonomic deficiencies in workplace design restricted work performance and created high, frequent unilateral stresses that accelerated worker fatigue in the automotive industry (Landau and Peters, 2006). The redesign of the workplace that followed the analysis focused on posture, visual conditions, and flow of materials between workplaces in the value chain of the organisation. Whilst the design of the workplace was crucial, the success of the ergonomic improvements had to be parallel to the selection, motivation and training of the appropriate employees with respect to the different stages of the value chain (Landau and Peters, 2006). The literature conclusion was in agreement with the research findings.

The mean score of the ergonomics category was 5, with a 95% confidence interval for the mean of 0.2. The mode and median (31% of respondents) were both 5 (Table 5). Therefore, there was a 95% confidence level that Astrapak employees agreed with the assertion that an ergonomically efficient workplace was a significant factor of labour productivity.

Technology in the workplace

The availability of various technologies in the workplace was assessed by question 16 (APPENDIX III). Although there were respondents that selected ‘marginally disagree’ (5 responses) and ‘disagree’ (two responses) categories, the majority of respondents (52) selected categories between ‘marginally agree’ to ‘strongly agree’ (Figure 2, Figure 3, and Figure 19).

Using India as a case study, Mathur (2007) confirmed the potential of Information technology (IT) in realising productivity gains. The benefits of IT depended on factors such as contemporary IT skills, business models that were in line with the business strategy, and transformation of institutions and regulations within the economic system. A study of the United States (US) productivity improvements since 1995 isolated Information and Communication Technologies (ICT's) as a key contributor to the productivity growth drive through two primary channels of technological advances and strategic investment in ICT's (Amiti and Stiroh, 2007). Van Ark (2006) concluded that the productive use of ICT's in the Japanese economy was a major contributor to the country's productivity growth. The findings of the study agreed with literature that the availability and utilisation of technology enhanced labour productivity.

The mean score of the technology category was 4.7, with a 95% confidence interval for the mean of 0.3. The mode and median (56% of respondents) were both 5 (Table 5). Therefore, Astrapak employees marginally agreed (with 95% confidence) with the assertion that implementing appropriate technologies across all categories of the value chain was a significant factor of labour productivity.

Competition in the marketplace

The assertion made in question 19 (APPENDIX III) was that productive employees enabled an organisation to beat its competitors in the marketplace. Most of the respondents chose the categories of 'agree' (score of 5) and 'strongly agree' (score of 6), thus supporting the assertion that

labour productivity influenced the competitiveness of an organisation (Figure 2 and Figure 3). Market competitiveness was identified as one of the five key drivers of productivity by the UK treasury department (Webber, Boddy, and Plumridge, 2007). The mean score of the market competition category was 5.2, with a 95% confidence interval for the mean of 0.2. The mode and median (54% of respondents) were both 5 (Table 5). Therefore, Astrapak employees agreed (at a 95% confidence level) with the assertion that the competitiveness of the plastic packaging industry was a significant factor of labour productivity.

Unemployment

The assertion made on question 20 (APPENDIX III) was that high unemployment made employees more productive. The majority of employees disagreed with the assertion by selecting responses in the categories that disagreed with the negative assertion (that is 'strongly disagree' to 'marginally disagree') (Figure 2, Figure 3, and Figure 22). Therefore, the respondents did not make a link between unemployment and labour productivity. In an empirical investigation of the productivity – wage relationship in South Africa, Wakeford (2004) concluded that there was a long-term equilibrium relationship between real wages and productivity. However, unemployment was not connected to the system. The study of the relationship between unemployment and output in post-communist European countries concluded that the employment relevant component of aggregate demand was too low to reduce the high unemployment of the former communist countries (Gabrisch and Buscher, 2006). Gross Domestic

Product (GDP) growth was mainly driven by productivity progress, irrespective of the unemployment level. Therefore, there was agreement between the research findings and literature on unemployment not being related to labour productivity. The mean score of the unemployment category was 2.9, with a 95% confidence interval for the mean of 0.3. The mode and median (55% of respondents) were both 2 (Table 5). Therefore, Astrapak employees marginally disagreed (at a 95% confidence level) with the assertion that high unemployment made employees more productive.

6.3 Analysis of results according to respondents classifications

The results to the 20 questions were analysed according to the respondent indicators (APPENDIX II) as indicated in Figure 4 to Figure 11. Comparison of the labour productivity drivers based on the eight respondent descriptors (Geographical location, Astrapak division, Management level, Employment status, Gender, Age group, length of service, and highest education level) did not result in significant differences among the results as per the eight descriptors (Figure 4 to Figure 11).

All the results for the leadership category, across all eight respondent descriptors, had an average score of 4, (‘marginally agree’) except for the highest education category (Figure 11) that had an average score of 5 (‘agree’). Although the education level scores were higher than other categories, there was no distinct relationship (direct or inverse) between the education level and perceptions on labour productivity. Therefore, it could not

be inferred that the education level of an individual affected their perceptions on labour productivity.

Training and development questions averaged a score of 4 (‘marginally agree’) across the eight descriptors. In the age category of 18-24, there was one individual and the individual scored 5 (‘agree’). Since there was no relationship between age and perceptions on labour productivity, the score of the individual could be regarded as non-significant (and a statistical outlier). Hence, it was concluded that respondents marginally agreed that training and development were related to labour productivity across the eight respondent descriptors.

The performance management category had an average score of 3–4 (‘marginally disagree’ to ‘marginally agree’) for the eight respondent descriptors. The average score implied that there was not a clear indication on how performance management impacted on labour productivity across the respondent descriptors.

The continuous improvement category had an average score of 5 (‘agree’) for each of the eight respondent descriptors. Technology had an average score of 5 (‘agree’) across all respondent descriptors except employment status, which was at 4-5 (‘marginally agree’ to ‘agree’). The respondent that scored a 4 (‘marginally agree’) was on a fixed contract. Based on the employment status of the respondent, and that the respondent only represented 2% of the respondents (1 of 59 respondents) the score of the respondent could be regarded as non-significant. Therefore, the effective score for continuous improvement was 5 (‘agree’) across all eight respondent

descriptors. The average score for the unemployment category was 3 (‘marginally disagree’) across each of the eight descriptors respectively.

The average score for the unemployment category was 3 (‘marginally disagree’) for each of the eight respondent descriptors. All categories for market competition had an average score of 5 (‘agree’) except for the employment status category that had an average score of 3 (‘marginally agree’). There was one individual, under fixed contract, that scored a 3. The lower score of 3 (‘marginally disagree’) reduced the average score as per the employment status category. The lower score could have been due to a lack of understanding of the effects of the external environment forces on internal business practices. An average score of 5-6 (‘agree’ to strongly agree’) was realised for the ergonomics category for each of the eight respondent descriptors. Thus, ergonomics was regarded as a driver of labour productivity across the eight respondent descriptors.

The similarities among the average scores, across different respondent descriptors, for the various literature review categories of labour drivers implied that the respondent descriptors were non-significant in determining the factors that drove labour productivity. By extrapolation, it could be inferred that the questionnaires that were not returned would not have significantly changed the average results. Similarly, addition of other respondent descriptors would not have changed the average results of the survey.

6.4 Important productivity drivers

The three most important productivity drivers according to the respondents selections (APPENDIX III) were; motivation (X1), continuous improvement (X18), and employee performance (X11) respectively ('ACTUAL' chart on Figure 5). The three factors were based on the factors that were selected the most by the respondents as per question 21 of the questionnaire. Each of the three top labour productivity factors had average scores of 5-6 ('agree' to 'strongly agree'). Based on the highest scores for each of the 20 core questions per respondent, the questions with the highest scores were calculated and ranked similarly to question 21 of the survey. The top three ranking factors were compared to the actual selections of three most important factors as per question 21. The comparison was plotted in Figure 5 as the 'CALCULATED' chart. Compared to the 'ACTUAL' chart, the 'CALCULATED' chart was not in descending order. Employee performance rated higher on the 'CALCULATED' chart when compared to the 'ACTUAL' chart. In addition, the calculated chart was larger than the 'ACTUAL' chart across all the categories.

Generally, there was agreement between the actual and calculated top three labour productivity drivers. However, the frequencies were much higher on the calculated top three labour productivity drivers than on the actual ones. In addition, the order of the last two factors was reversed for the actual and calculated top three factors. The differences between the actual and calculated top three labour productivity drivers could have been due to measurement error (Diamontopoulos and Schlegelmilch, 2006).

6.5 Overall labour productivity

The overall labour productivity perceived by the respondents was at 3.4 (between 'average productivity and 'above average productivity') (Figure 6). Thus, most respondents were of the perception that labour productivity at Astrapak companies was at an average level. On average, the responses to questions 1 to 20 agreed that there were factors, other than conventional inputs and outputs, which contributed to labour productivity. Comparing the results for the 20 labour productivity factors to the responses on overall labour productivity it could be concluded that factors other than conventional inputs and outputs do contribute to overall labour productivity.

The mean score for overall labour productivity was 3.4, with a 95% confidence interval for the mean of 0.2. The mode and median (51% of respondents) were both 3 (Table 5). Therefore, it could be concluded that Astrapak employees perceived (at a 95% confidence level) the overall labour productivity as being at an average level.

6.6 Other labour productivity drivers

The literature review on labour productivity drivers was not exhaustive of all labour productivity drivers. Therefore, the opinions of the respondents on other factors that they considered important were also captured in the survey. The top three factors that respondents considered important but which were not explicitly covered in the

questionnaire were teamwork, communication, and company strategy and objectives respectively (Figure 7).

Shaw (2003) argued that HRM practises that jointly improved performance included teamwork, communication, training, recruitment and selection, job rotation, employee retention and, incentive schemes. Johnson and Johnson's organisational development team concluded that labour productivity growth would be realised when the organisation's management team appreciated the need of employing inspirational leadership and employee engagement in all aspects of the business (Catteeuw, Flynn & Vodervost, 2007). The engagement strategy was most effective when the management team created a link between the organisation and its employees, and developed communication channels. In addition, managers had to properly define roles of their subordinates, manage performance of all employees, and give regular feedback on performance (Catteeuw, et al., 2007). The literature review linked teamwork, communication, and company strategy as collaborative parts of one system. Therefore, it could be concluded that teamwork, communication, and company strategy were integral components of factors that drive labour productivity.

6.7 Hypothesis testing

The aim of hypothesis testing was to check whether the relationship between factors of labour productivity and overall labour productivity were valid or not (Diamontopoulos and Schlegelmilch, 2006).

Normality test

The Anderson – Darling (AD) test was utilised to test for normality prior to testing the hypothesis with methods that assumed normality. All the variables had individual p-values being less than 0.05 (highly significant), except for the leadership category (Table 6). The AD p-value for leadership was 0.181(non-significant). Leedy and Ormrod (2005) purported that the data; must fit a normal distribution, and the measures to be at least interval for parametric tests to be used on data. Since each of the data had an effective sample sizes more than 50 (Leedy and Ormrod (2005) recommended a sample size at least 30), parametric tests could still be utilised on all the interval measures (Diamontopoulos and Schlegelmilch, 2006).

Pearson correlation coefficients

The output of the multiple linear regression yielded predictor coefficients that were not significant as all the p-values were greater than 0.05 (Table 7). Therefore, the linear regression coefficients were statistically non - significant, and the null hypothesis that there were no linear relationships (regression correlation coefficients equal zero) between labour productivity drivers and overall labour productivity could not be rejected.

Pearson correlation coefficients among the productivity factors were also calculated (APPENDIX IV, Table IV-4 to Table IV-6). Among the 28 variables that were defined (20 productivity factors and 8 literature review categories) there were effectively 407 unique combinations between any two variables. The analysis resulted in 98 (24%) significant Pearson correlation coefficients from 407 possible correlations.

The results of the analysis of the Pearson correlations among the productivity factors was that only 98 (24%) of the Pearson correlation coefficients were statistically significant. Based on the result that some of the coefficients were statistically significant, it could be inferred that the productivity factors could influence each other. The 20 productivity factors that were utilised in the research were based on literature review rather than insight into labour productivity drivers theory or practical knowledge. In addition, meaning rather than representation was being sought out in the research project. Even though the type and quantity of labour productivity factors may be different, the survey results indicated that there might be interactions among the labour productivity drivers. Therefore, the interactions among the labour productivity drivers may not be ignored in evaluating the effect of labour productivity drivers on overall labour productivity.

The rejection of the linear statistical relationships between overall labour productivity and productivity factors did not imply that productivity factors did not have an effect on overall labour productivity factors. The analysis of the survey results concluded that the relationships between overall labour productivity and productivity factors were substantially significant, that is productivity factors did have an effect on labour productivity factors. Substantive significance takes precedence over statistical significance, since the substance of the results has implications for theory, practice or policy (Diamantopoulos and Schlegelmilch, 2005). However, correlation did not imply causality, as the Pearson correlation coefficients only measured the degree of co-variation between overall

labour productivity and the individual productivity factors. Causality of overall labour productivity by the productivity factors had to be derived from empirical knowledge or theoretical insights into the subject of labour productivity drivers, and the causality claim had to be supported by longitudinal data (Diamantopoulos and Schlegelmilch, 2005).

Multiple linear regressions

The null hypothesis for the multiple linear regressions was that there were no linear relationships between the predictors (all independent variables as per APPENDIX II) and the response (overall labour productivity); the linear regression coefficients were equal to zero.

The output of the multiple linear regression yielded predictor coefficients that were not significant as all the p-values were greater than the significance level of 0.05 (Table 8). Therefore, the linear regression coefficients were statistically non – significant. In addition, the null hypothesis that there were no linear relationships (regression correlation coefficients equal zero) between labour productivity drivers and overall labour productivity could not be rejected. The coefficient of determination (R-squared value) for the multiple regression analysis was 54%. The coefficient of determination implied that the predictors (all independent variables, APPENDIX II) explained only 54% of variation in the overall labour productivity.

The failure to reject the null hypothesis did not imply that there were no correlations between overall labour productivity and productivity factors as the correlations

could have been curvilinear. The results of the regression analysis were in agreement with the results that were realised from the Pearson correlations in that there were no significant linear relationships between overall labour productivity and the productivity factors.

The failure of the regression did not imply that the relationship between overall labour productivity and the labour productivity factors could not be represented by an algebraic relationship. The relationship between overall labour productivity could be represented by a curvilinear algebraic function, which could be realised by transformation of the independent variables. Realisation of the algebraic function between overall labour productivity and productivity drivers would contribute to the definition of the composite 'fudge' factor (λ) that was alluded to in the importance of the study (Chapter 1):

$$\text{Productivity} = \lambda \frac{\text{Value of products or service produced}}{\text{Value of resources used}} \qquad (2)$$

Similar to the analysis of the Pearson correlation coefficients, the algebraic function that would represent the causality of overall labour productivity by the productivity factors had to be derived from empirical knowledge or theoretical insights into the subject of labour productivity drivers. In addition, the causality algebraic function had to be supported by longitudinal data (Diamantopoulos and Schlegelmilch, 2005).

6.8 Conclusion

The focus of this research project was not on how to generate growth in labour productivity but rather the factors that influence labour productivity. Therefore, the research project addressed the following objectives:

- Identifying the distinct set of labour productivity drivers for an organisation.
- Determining the order of importance of the identified labour productivity drivers for the organisation.
- Identifying if there were any interdependencies among the identified drivers of labour productivity.

There was substantive evidence from the research results that the factors of labour productivity assessed in the research project were significant. The factors of productivity that were regarded as important were based on literature review categories of Leadership, Performance Management, Training and Development, Market Competition, Continuous Improvement, and Socio – Economic conditions. Comparison of the labour productivity drivers according to the respondent descriptors (Geography, Astrapak division, Management level, Employment status, Gender, Age group, length of service, and highest education level) did not yield significant results.

The following conclusion was reached for each of the labour productivity drivers as per the literature review categories:

- There was a 95% confidence level that Astrapak employees agreed with the assertion that leadership was a significant factor of labour productivity.
- There was a 95% confidence level that Astrapak employees marginally agreed with the assertion that performance management was a significant factor of labour productivity.
- There was a 95% confidence level that Astrapak employees marginally agreed with the assertion that investment in training and development was a significant factor of labour productivity.
- Astrapak employees agreed (with 95% confidence) with the assertion that implementing continuous improvement programmes was a significant factor of labour productivity.
- There was a 95% confidence level that Astrapak employees agreed with the assertion that an ergonomically efficient workplace was a significant factor of labour productivity.
- Astrapak employees marginally agreed (with 95% confidence) with the assertion that implementing appropriate technologies across all categories of the value chain was a significant factor of labour productivity.
- Astrapak employees agreed (at a 95% confidence level) with the assertion that the

competitiveness of the plastic packaging industry was a significant factor of labour productivity.

- Astrapak employees marginally disagreed (at a 95% confidence level) with the assertion that high unemployment made employees more productive.

Based on the substantive significance of the labour productivity drivers, it was concluded that the factors of labour productivity, on which the research project was based, were substantially significant (at a 95% confidence level) to overall labour productivity. The statistical analysis results were that there were no significant relationships between overall labour productivity and the respective productivity factors. Substantive significance takes precedence over statistical significance, since the substance of the results has implications for theory, practice or policy (Diamantopoulos and Schlegelmilch, 2005).

The order of importance of the labour productivity drivers as derived by the respondents were derived as per Table 2. The top three labour productivity factors were motivation (Leadership category), continuous improvement (Continuous improvement category), and employee performance (Performance Management category).

The results of the analysis of the Pearson correlations among the productivity factors was that only 98 (24%) of the Pearson correlation coefficients were statistically significant. The 20 productivity factors that were utilised in the research were based on literature review rather than insight into labour productivity drivers theory or practical knowledge. In addition, meaning rather than representation

was being sought out in the research project. Even though the type and quantity of labour productivity factors may be different, the survey results indicated that there might be interactions among the labour productivity drivers. Therefore, the interactions among the labour productivity drivers may not be ignored in evaluating the effect of labour productivity drivers on overall labour productivity.

The research project on labour productivity drivers was not exhaustive of all labour productivity drivers. Therefore, the opinions of the respondents on other factors that they considered important were also captured in the survey. The top three factors that respondents considered important but which were not explicitly covered in the questionnaire were teamwork, communication, and company strategy and objectives respectively.

6.9 Recommendations

It was recommended that the research study be done on a project basis within the Astrapak group of companies. The project would be focused on implementing the research findings of the study. One company would be used as an experiment group and the other companies would be the control group. Doing the survey, at both the experimental and control groups would guide the evaluation of the change in labour productivity.

The following guidelines were recommended:

- The survey that was performed on a sample of companies should be performed on all companies of Astrapak, involving all employees at each company. This would identify a baseline for each company in the group, and a baseline for the group as a whole.
- Astrapak should formally implement the labour productivity drivers, as per the eight identified categories, on a pilot project basis at one of the companies in the group (experimental group). The other sites would serve as a control group. The productivity factors that were studied in the research project were Leadership, Performance Management, Training and Development, Market Competition, Continuous Improvement, and Socio – Economic conditions.
- The pilot implementation of labour productivity drivers at a pilot company should be coupled with a concomitant measurement of productivity on a monthly basis. This would allow the organisation to track changes to productivity, and implement corrective and improvement actions where required.

- Regular feedback sessions should also be held on a monthly basis with all the employees of the pilot company. The feedback session should ideally be hosted by the general manager or managing director of the pilot site. The feedback sessions would aid in capturing both the positive and negative perceptions of the implementation of the labour productivity drivers. In addition, corrective action could be taken on time rather than waiting until the end of the project.
- A follow up survey should be done at all the sites after one financial year. The results of the pilot would give an indication of the change in labour productivity after a conscious effort to improve labour productivity. The results of the other sites (that is the control group) would give an indication, if any, of the 'Hawthorne effect'. Comparison of the experimental group to the control group would give a measurement of the extent of labour productivity improvement after discounting for the reactivity of the control group.

APPENDIX I: SURVEY COVER LETTER

June 1, 2008

Dear Respondent,

I am a final year student at the School of Business Leadership (SBL) at the University South Africa (UNISA). I am conducting a study of perceived drivers of productivity in organisations, focusing on Astrapak companies. The focus of this research project is not on how to create growth in labour productivity but rather the factors that influence labour productivity. Through your participation, I eventually hope to gain an understanding of how to improve labour productivity through selection, control, and improvement of internal organizational factors.

Enclosed with this letter is a questionnaire that asks a variety of questions about your opinions toward various factors related to employee productivity. I hope you will take a few minutes to complete this questionnaire. Your participation is voluntary and there is no penalty if you do not participate.

Your responses will be strictly confidential, only summary data from all survey participants will be included in the final report. Nothing you say on the questionnaire will in any way influence your present or future employment with your company.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me at 011 417 6300/ 083 235 4227 or at obakeng.sebona@cinqplast.co.za.

Sincerely,

Obakeng Sebona

APPENDIX II: DESCRIPTION OF SURVEY VARIABLES

LABEL	FACTOR INVOLVED	TYPE OF VARIABLE	GROUPED BY
Va	Geographical location	INDEPENDENT	GEOGRAPHY
Vb	Astrapak Division (RIGIDS, FLEXIBLES, FILMS)	INDEPENDENT	SPECIALISATION
Vc	Management level	INDEPENDENT	MANAGEMENT LEVEL
Vd	Employment status	INDEPENDENT	EMPLOYMENT STATUS
Ve	Gender	INDEPENDENT	GENDER
Vf	Age group (in full years)	INDEPENDENT	AGE
Vg	Length of service in full years	INDEPENDENT	SERVICE
Vh	Highest education level	INDEPENDENT	EDUCATION LEVEL
X1	Motivation	INDEPENDENT	LEADERSHIP
X2	Trust	INDEPENDENT	LEADERSHIP
X3	Culture	INDEPENDENT	LEADERSHIP
X4	Values	INDEPENDENT	LEADERSHIP
X5	Leader behaviour	INDEPENDENT	LEADERSHIP
X6	Leadership style	INDEPENDENT	LEADERSHIP
X7	Leadership skills	INDEPENDENT	LEADERSHIP
X8	Skills budget	INDEPENDENT	TRAINING AND DEVELOPMENT
X9	Informal skills	INDEPENDENT	TRAINING AND DEVELOPMENT
X10	Formal skills	INDEPENDENT	TRAINING AND DEVELOPMENT
X11	Employee performance	INDEPENDENT	PERFORMANCE MANAGEMENT
X12	Performance management system	INDEPENDENT	PERFORMANCE MANAGEMENT
X13	Incentive schemes	INDEPENDENT	PERFORMANCE MANAGEMENT
X14	Remuneration	INDEPENDENT	PERFORMANCE MANAGEMENT
X15	Ergonomics	INDEPENDENT	ERGONOMICS
X16	Technology	INDEPENDENT	TECHNOLOGY
X17	Quality	INDEPENDENT	CONTINUOUS IMPROVEMENT
X18	Continuous improvement	INDEPENDENT	CONTINUOUS IMPROVEMENT
X19	Competition	INDEPENDENT	COMPETITION

X20	Employment level	INDEPENDENT	SOCIO-ECONOMIC CONDITIONS
X21	3 High ranking issues	INDEPENDENT	HIGH RANK FACTORS
Y	Overall labour productivity	DEPENDENT	PRODUCTIVITY

LABEL	**SCALE**	**MIN**	**MAX**	**INTERVALS/DESCRIPTION**
Va	NOMINAL	N/A	N/A	Gauteng - 1, KZN - 2, Western Cape -3, Eastern Cape - 4
Vb	NOMINAL	N/A	N/A	Rigids - 1, Flexibles - 2, Films - 3
Vc	ORDINAL	1	5	Exec - 1, Senior - 2, Middle - 3, Junior - 4, Elementary - 5
Vd	NOMINAL	1	5	Permanent -1, Temporary - 2, Casual -3, Fixed-contract-4, Other-5
Ve	NOMINAL	1	2	1-MALE, 2-FEMALE
Vf	ORDINAL	1	4	1: 18-24, 25-34, 3: 35-44, 4: 45+
Vg	ORDINAL	1	5	1:-1, 2: 1-3, 3: 4-6, 4: 7-9, 5:10+
Vh	ORDINAL	1	9	G9 - 1, G10 - 2, G11 - 3, G12 - 4, CERTIFICATE/DIPLOMA - 5, DEGREE/NATIONAL DIPLOMA - 6, HONOURS DEGREE/ PROFESSIONAL QUALIFICATION - 7, MASTERS/ DOCTORATE/POST GRADUATE-8, OTHER - 9
X1	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X2	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X3	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X4	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X5	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X6	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X7	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X8	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X9	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X10	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X11	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X12	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X13	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6

X14	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X15	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X16	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X17	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X18	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X19	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X20	INTERVAL	1	6	Strongly disagree - 1, strongly agree - 6
X21	NOMINAL	1	20	Any of the variables (X1 to X20 could be selected as one of the three high ranking variables)
Y	INTERVAL	1	5	1 - no productivity , 5 - employees extremely productivity

APPENDIX III: SURVEY QUESTIONNAIRE

SURVEY OF PERCEIVED PRODUCTIVITY DRIVERS IN A COMPANY

LOCATION OF COMPANY (PROVINCE, TOWN) :	

DIVISION (Please cross the number corresponding to the category of your choice):	**RIGIDS**	**FLEXIBLES**	**FILMS**	**INDUSTRIAL**	**HEAD OFFICE**
	1	2	3	4	5

MANAGEMENT LEVEL (Please cross the number corresponding to the category of your choice):	
EXECUTIVE MANAGEMENT (e.g. CEO, Divisional Director, Managing Director, Company Director)	1
SENIOR MANAGEMENT (e.g. General, Sales, Operations, Technical, Supply Chain/Warehouse, Finance)	2
MIDDLE MANAGEMENT (e.g. Production/Business unit, Maintenance, Quality, Toolroom, Design, Internal Sales, Human Resources, Finance)	3
JUNIOR MANAGEMENT (e.g. Supervisor, Foreman, Clerk, Receptionist, Officer, Sales Assistant, management trainee)	4

EMPLOYMENT STATUS (Please cross the number corresponding to the category of your choice):	**PERMANENT**	1	**TEMPORARY**	2	**CASUAL**	3
	FIXED CONTRACT (e.g. six months, etc.)		4	**OTHER** (Please specify):		5

GENDER (Please cross the number corresponding to the category of your choice):	**MALE**	**FEMALE**
	1	2

What is your age group in full years ? (Please cross the number corresponding to the category of your choice):	**18 - 24**	**25 - 34**	**35 - 44**	**45 or older**
	1	2	3	4

Length of service in full years ? (Please cross the number corresponding to the category of your choice):	**Less than 1 year**	**1 - 3**	**4 - 6**	**7 - 9**	**10 or more**
	1	2	3	4	5

HIGHEST EDUCATION QUALIFICATION (Please cross the number corresponding to the category of your choice):

GRADE 9 (STD 7) OR LOWER	GRADE 10 (STD 8) OR N1	GRADE 11 (STD 9) OR N2
1	2	3
GRADE 12 (STD 10) OR N3	NATIONAL CERTIFICATE/ DIPLOMA	HIGHER DIPLOMA / NATIONAL DEGREE
4	5	6
PROFESSIONAL QUALIFICATION / HONOURS DEGREE	MASTERS / DOCTORATE/ POST - DOCTORAL DEGREE	OTHER (Please specify):
7	8	9

	To what extent do you agree/disagree with the following statements? (Please cross the number corresponding to the category of your choice)	Strongly disagree	Disagree	Marginally disagree	Marginally agree	Agree	Strongly agree
1	Employees that are motivated are more productive.	1	2	3	4	5	6
2	Employees that trust their managers are more productive employees.	1	2	3	4	5	6
3	The culture of my company (e.g. assumptions, beliefs, behaviour, rules) decreases my productivity.	1	2	3	4	5	6
4	The values of my company (e.g. standards, principles, morals, ethics) make me more productive.	1	2	3	4	5	6
5	The behaviour of my manager negatively affects my productivity.	1	2	3	4	5	6
6	The style of leadership of my manager negatively affects my productivity.	1	2	3	4	5	6
7	The leadership skills of my manager positively affects my productivity.	1	2	3	4	5	6
8	Spending money in developing skills of employees increases the productivity of those employees.	1	2	3	4	5	6
9	Employees provided with on the job training are more productive.	1	2	3	4	5	6
10	The higher the qualifications of employees, the less productive they are.	1	2	3	4	5	6
11	Receiving recognition for my job performance has a positive effect on my productivity.	1	2	3	4	5	6

	To what extent do you agree/disagree with the following statements? (Please cross the number corresponding to the category of your choice)	Strongly disagree	Disagree	Marginally disagree	Marginally agree	Agree	Strongly agree
12	A performance management system (e.g. targets, KPA's, KPI's) has a negative effect on my productivity.	1	2	3	4	5	6
13	Having bonus schemes for achieving targets (e.g. efficiency) has no effect on the productivity of employees.	1	2	3	4	5	6
14	Increasing the remuneration (wages or salary) of employees makes employees more productive.	1	2	3	4	5	6
15	The conditions in the workplace (e.g. temperature, light, noise, layout of machines) affects the productivity of employees.	1	2	3	4	5	6
16	Having access to technology at workplace (e.g. computers, phones, fax, e-mail, new or better machines) makes employees more productive.	1	2	3	4	5	6
17	When employees are productive, the quality of the products meet customer requirements.	1	2	3	4	5	6
18	Continuous improvement programmes (e.g. World Class Manufacturing) results in increased productivity.	1	2	3	4	5	6
19	Employees that are productive enable the company to beat its competitors.	1	2	3	4	5	6
20	A high unemployment rate makes employees more productive.	1	2	3	4	5	6

	How do you rate the overall productivity of employees in your company (Please cross the number corresponding to the category of your choice).	
21	Employees are not productive at all.	1
	Employees have low productivity.	2
	Employees have average productivity.	3
	Employees have above - average productivity.	4
	Employees are extremely productive.	5

22	**Which 3 of the issues raised (in questions 1 - 20) do you think contribute the most to productivity?** (Please cross the numbers corresponding to the categories of your choice).	1	2	3	4	5
		6	7	8	9	10
		11	12	13	14	15
		16	17	18	19	20

What factors, other than the ones mentioned in the survey, do you think contribute to increasing the productivity of employees in your company? (Please specify)

Thank you for your participation

APPENDIX IV - SUMMARY TABLES

QUESTIONNAIRES (SENT and RECEIVED)	% of Astrapak Group companies (Quantity)	SENT		RECEIVED BACK		
		Quantity	% of total sent	Quantity	% of total received	% of total sent
RIGIDS	39%	63	44%	38	64%	60%
FILMS	30%	64	45%	21	36%	33%
FLEXIBLES	24%	16	11%	0	0%	0%
TOTAL	94%	143	100%	59	100%	41%

Table IV-1: Summary of questionnaires as per Astrapak Division

QUESTIONNAIRES (SENT and RECEIVED)	% of Astrapak Group companies (Quantity)	SENT		RECEIVED BACK		
		Quantity	% of total sent	Quantity	% of total received	% of total sent
GAUTENG	28%	89	62%	38	64%	43%
KWAZULU-NATAL	31%	35	24%	17	29%	49%
EASTERN CAPE	9%	6	4%	0	0%	0%
WESTERN CAPE	25%	13	9%	4	7%	31%
FREE STATE	3%	0	0%	N/A	N/A	N/A
TOTAL	97%	143	100%	59	100%	41%

Table IV-2: Summary of questionnaires as per Geographical location of Astrapak companies.

Variable	Description	X1	X2	X3	X4	X5	X6	X7	X8	X9
X2	Pearson correlation	0.508								
	p-value	0								
	Significant?	YES								
X3	Pearson correlation	-0.019	-0.063							
	p-value	0.886	0.64							
	Significant?	NO	NO							
X4	Pearson correlation	0.166	0.178	0.018						
	p-value	0.214	0.181	0.893						
	Significant?	NO	NO	NO						
X5	Pearson correlation	0.146	-0.076	0.496	0.106					
	p-value	0.279	0.576	0	0.431					
	Significant?	NO	NO	YES	NO					
X6	Pearson correlation	0.141	0	0.454	0.151	0.885				
	p-value	0.296	0.998	0	0.261	0				
	Significant?	NO	NO	YES	NO	YES				
X7	Pearson correlation	0.145	0.085	-0.139	0.152	-0.067	0.162			
	p-value	0.279	0.526	0.296	0.255	0.622	0.229			
	Significant?	NO	NO	NO	NO	NO	NO	YES		
X8	Pearson correlation	0.42	0.32	-0.21	0.291	-0.014	0.047	0.09		
	p-value	0.001	0.014	0.113	0.027	0.92	0.726	0.502		
	Significant?	YES	YES	NO	YES	NO	NO	NO		
X9	Pearson correlation	0.126	0.039	-0.026	0.079	-0.328	-0.291	0.061	0.307	
	p-value	0.34	0.771	0.844	0.555	0.013	0.028	0.652	0.018	
	Significant?	NO	NO	NO	NO	YES	YES	NO	YES	
X10	Pearson correlation	0.02	-0.004	0.116	-0.114	0.141	0.118	-0.321	0.122	0.04
	p-value	0.882	0.978	0.384	0.394	0.297	0.381	0.014	0.357	0.766
	Significant?	NO	NO	NO	NO	NO	NO	YES	NO	NO
X11	Pearson correlation	0.35	0.328	0.173	0.054	0.051	0.119	0.327	0.134	0.246
	p-value	0.007	0.011	0.194	0.688	0.707	0.376	0.012	0.313	0.06
	Significant?	YES	YES	NO	NO	NO	NO	YES	NO	NO
X12	Pearson correlation	-0.085	-0.066	0.207	-0.153	0.117	0.106	-0.258	-0.097	-0.147
	p-value	0.524	0.617	0.119	0.252	0.385	0.434	0.05	0.465	0.267
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	NO
X13	Pearson correlation	-0.265	-0.177	0.039	-0.094	-0.044	-0.071	-0.096	-0.142	-0.104
	p-value	0.043	0.179	0.772	0.484	0.742	0.6	0.472	0.284	0.432
	Significant?	YES	NO	NO	NO	NO	NO	NO	NO	NO
X14	Pearson correlation	0.206	0.161	0.051	0.093	-0.007	0.017	-0.149	0.192	0.343
	p-value	0.118	0.222	0.706	0.487	0.959	0.902	0.263	0.146	0.008
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	YES
X15	Pearson correlation	0.144	-0.018	0.265	-0.021	0.097	0.125	0.043	0.047	0.182
	p-value	0.277	0.89	0.045	0.877	0.474	0.356	0.751	0.722	0.168
	Significant?	NO	NO	YES	NO	NO	NO	NO	NO	NO
X16	Pearson correlation	0.275	0.325	0.009	0.316	-0.002	0.075	0.3	0.246	0.213
	p-value	0.035	0.012	0.945	0.016	0.986	0.577	0.022	0.06	0.106
	Significant?	YES	YES	NO	YES	NO	NO	YES	NO	NO
X17	Pearson correlation	0.437	0.068	-0.081	-0.088	0.157	0.098	0.108	0.217	0.096
	p-value	0.001	0.61	0.547	0.511	0.243	0.467	0.42	0.098	0.471
	Significant?	YES	NO	NO	NO	NO	NO	NO	NO	NO
X18	Pearson correlation	0.17	0.126	-0.177	0.038	0.082	0.004	0.067	0.144	0.084
	p-value	0.198	0.343	0.184	0.775	0.547	0.977	0.62	0.275	0.525
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	NO
X19	Pearson correlation	0.172	0.054	-0.071	0.017	0.077	0.069	0.153	0.22	0.115
	p-value	0.192	0.687	0.596	0.896	0.571	0.61	0.253	0.095	0.387
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	NO
X20	Pearson correlation	-0.009	0.018	-0.019	0.221	0.068	0.168	-0.014	0.046	-0.26
	p-value	0.944	0.891	0.887	0.098	0.619	0.215	0.917	0.729	0.049
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	YES
AVERAGE	Pearson correlation	0.446	0.26	0.429	0.347	0.57	0.636	0.178	0.362	0.142
	p-value	0	0.047	0.001	0.008	0	0	0.182	0.005	0.282
	Significant?	YES	YES	YES	YES	YES	YES	NO	YES	NO
LEADERSHIP	Pearson correlation	0.201	0.148	0.636	0.356	0.763	0.781	0.091	0.066	-0.125
	p-value	0.126	0.262	0	0.006	0	0	0.495	0.618	0.344
	Significant?	NO	NO	YES	YES	YES	YES	NO	NO	NO
TRAINING AND DEVELOPMENT	Pearson correlation	0.339	0.217	-0.192	0.261	-0.204	-0.021	0.657	0.661	0.652
	p-value	0.009	0.099	0.15	0.048	0.129	0.877	0	0	0
	Significant?	YES	NO	NO	YES	NO	NO	YES	YES	YES
PERFORMANCE MANAGEMENT	Pearson correlation	-0.046	-0.016	0.196	-0.138	0.104	0.095	-0.202	-0.001	-0.01
	p-value	0.731	0.904	0.141	0.302	0.443	0.481	0.129	0.992	0.941
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	NO
ERGONOMICS	Pearson correlation	0.206	0.161	0.051	0.093	-0.007	0.017	-0.149	0.192	0.343
	p-value	0.118	0.222	0.706	0.487	0.959	0.902	0.263	0.146	0.008
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	YES
ICT	Pearson correlation	0.144	-0.018	0.265	-0.021	0.097	0.125	0.043	0.047	0.182
	p-value	0.277	0.89	0.045	0.877	0.474	0.356	0.751	0.722	0.168
	Significant?	NO	NO	YES	NO	NO	NO	NO	NO	NO
CONTINUOUS IMPROVEMENT	Pearson correlation	0.445	0.259	-0.042	0.159	0.092	0.109	0.265	0.295	0.2
	p-value	0	0.048	0.755	0.232	0.495	0.419	0.044	0.023	0.129
	Significant?	YES	YES	NO	NO	NO	NO	YES	YES	NO
COMPETITION	Pearson correlation	0.17	0.126	-0.177	0.038	0.082	0.004	0.067	0.144	0.084
	p-value	0.198	0.343	0.184	0.775	0.547	0.977	0.62	0.275	0.525
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	NO
UNEMPLOYMENT	Pearson correlation	0.172	0.054	-0.071	0.017	0.077	0.069	0.153	0.22	0.115
	p-value	0.192	0.687	0.596	0.896	0.571	0.61	0.253	0.095	0.387
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	NO
PRODUCTIVITY	Pearson correlation	0.205	0.06	-0.063	-0.018	-0.172	-0.049	-0.012	0.045	0.105
	p-value	0.119	0.654	0.639	0.892	0.2	0.715	0.93	0.733	0.43
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO	NO

Table IV-3: Pearson correlation coefficients among labour productivity factors

Variable	Description	X10	X11	X12	X13	X14	X15	X16	X17
X11	Pearson correlation	0.009							
	p-value	0.943							
	Significant?	NO							
X12	Pearson correlation	0.579	-0.141						
	p-value	0	0.288						
	Significant?	YES	NO						
X13	Pearson correlation	0.218	-0.143	0.313					
	p-value	0.098	0.28	0.016					
	Significant?	NO	NO	YES					
X14	Pearson correlation	0.212	0.161	0.236	-0.274				
	p-value	0.106	0.222	0.072	0.036				
	Significant?	NO	NO	NO	YES				
X15	Pearson correlation	0.038	0.095	0.03	0.212	-0.058			
	p-value	0.775	0.475	0.821	0.106	0.662			
	Significant?	NO	NO	NO	NO	NO			
X16	Pearson correlation	-0.13	0.362	-0.144	-0.035	0.203	0.382		
	p-value	0.326	0.005	0.278	0.795	0.122	0.003		
	Significant?	NO	YES	NO	NO	NO	YES		
X17	Pearson correlation	0.012	0.122	-0.026	-0.083	0.35	0.225	0.244	
	p-value	0.931	0.358	0.844	0.53	0.006	0.086	0.063	
	Significant?	NO	NO	NO	NO	YES	NO	NO	
X18	Pearson correlation	-0.164	0.132	-0.401	-0.137	0.141	-0.004	0.222	0.474
	p-value	0.214	0.319	0.002	0.302	0.288	0.973	0.091	0
	Significant?	NO	NO	YES	NO	NO	NO	NO	YES
X19	Pearson correlation	0.076	0.036	-0.086	0.049	0.026	-0.005	0.157	0.171
	p-value	0.568	0.786	0.516	0.713	0.843	0.971	0.235	0.194
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO
X20	Pearson correlation	0.273	-0.062	0.327	-0.099	0.402	-0.017	-0.07	-0.027
	p-value	0.038	0.646	0.012	0.462	0.002	0.899	0.601	0.843
	Significant?	YES	NO	YES	NO	YES	NO	NO	NO
AVERAGE	Pearson correlation	0.338	0.369	0.241	0.017	0.482	0.369	0.466	0.424
	p-value	0.009	0.004	0.066	0.898	0	0.004	0	0.001
	Significant?	YES	YES	NO	NO	YES	YES	YES	YES
LEADERSHIP	Pearson correlation	0.203	0.128	0.16	-0.037	0.086	0.114	0.146	0.149
	p-value	0.122	0.332	0.226	0.779	0.516	0.391	0.27	0.259
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO
TRAINING AND DEVELOPMENT	Pearson correlation	-0.113	0.369	-0.266	-0.172	0.166	0.134	0.391	0.209
	p-value	0.393	0.004	0.042	0.193	0.208	0.311	0.002	0.112
	Significant?	NO	YES	YES	NO	NO	NO	YES	NO
PERFORMANCE MANAGEMENT	Pearson correlation	0.799	0.171	0.734	0.648	0.101	0.156	-0.028	-0.008
	p-value	0	0.196	0	0	0.447	0.237	0.834	0.95
	Significant?	YES	NO	YES	YES	NO	NO	NO	NO
ERGONOMICS	Pearson correlation	0.212	0.161	0.236	-0.274	1	-0.058	0.203	0.35
	p-value	0.106	0.222	0.072	0.036	*	0.662	0.122	0.006
	Significant?	NO	NO	NO	YES	NO	NO	NO	YES
ICT	Pearson correlation	0.038	0.095	0.03	0.212	-0.058	1	0.382	0.225
	p-value	0.775	0.475	0.821	0.106	0.662	*	0.003	0.086
	Significant?	NO	NO	NO	NO	NO	NO	YES	NO
CONTINUOUS IMPROVEMENT	Pearson correlation	-0.08	0.315	-0.112	-0.073	0.345	0.39	0.816	0.76
	p-value	0.545	0.015	0.399	0.583	0.007	0.002	0	0
	Significant?	NO	YES	NO	NO	YES	YES	YES	YES
COMPETITION	Pearson correlation	-0.164	0.132	-0.401	-0.137	0.141	-0.004	0.222	0.474
	p-value	0.214	0.319	0.002	0.302	0.288	0.973	0.091	0
	Significant?	NO	NO	YES	NO	NO	NO	NO	YES
UNEMPLOYMENT	Pearson correlation	0.076	0.036	-0.086	0.049	0.026	-0.005	0.157	0.171
	p-value	0.568	0.786	0.516	0.713	0.843	0.971	0.235	0.194
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO
PRODUCTIVITY	Pearson correlation	-0.137	-0.028	-0.1	-0.183	0.163	0.02	0.107	-0.041
	p-value	0.3	0.832	0.451	0.166	0.216	0.879	0.419	0.756
	Significant?	NO	NO	NO	NO	NO	NO	NO	NO

Table IV-4: Pearson correlation coefficients among labour productivity factors

Variable	Description	X18	X19	X20	AVERAGE	LEADERSHIP	TRAINING AND DEVELOPMENT
X19	Pearson correlation	0.288					
	p-value	0.027					
	Significant?	YES					
X20	Pearson correlation	-0.251	-0.067				
	p-value	0.057	0.616				
	Significant?	NO	NO				
AVERAGE	Pearson correlation	0.175	0.294	0.322			
	p-value	0.186	0.024	0.014			
	Significant?	NO	YES	YES			
LEADERSHIP	Pearson correlation	0.07	-0.017	0.092	0.683		
	p-value	0.6	0.896	0.493	0		
	Significant?	NO	NO	NO	YES		
TRAINING AND DEVELOPMENT	Pearson correlation	0.146	0.245	-0.108	0.34	0.024	
	p-value	0.271	0.061	0.42	0.009	0.854	
	Significant?	NO	NO	NO	YES	NO	
PERFORMANCE MANAGEMENT	Pearson correlation	-0.245	0.042	0.187	0.361	0.174	-0.124
	p-value	0.062	0.752	0.159	0.005	0.189	0.35
	Significant?	NO	NO	NO	YES	NO	NO
ERGONOMICS	Pearson correlation	0.141	0.026	0.402	0.482	0.086	0.166
	p-value	0.288	0.843	0.002	0	0.516	0.208
	Significant?	NO	NO	YES	YES	NO	NO
ICT	Pearson correlation	-0.004	-0.005	-0.017	0.369	0.114	0.134
	p-value	0.973	0.971	0.899	0.004	0.391	0.311
	Significant?	NO	NO	NO	YES	NO	NO
CONTINUOUS IMPROVEMENT	Pearson correlation	0.431	0.208	-0.063	0.565	0.187	0.387
	p-value	0.001	0.115	0.638	0	0.156	0.002
	Significant?	YES	NO	NO	YES	NO	YES
COMPETITION	Pearson correlation	1	0.288	-0.251	0.175	0.07	0.146
	p-value	*	0.027	0.057	0.186	0.6	0.271
	Significant?	NO	YES	NO	NO	NO	NO
UNEMPLOYMENT	Pearson correlation	0.288	1	-0.067	0.294	-0.017	0.245
	p-value	0.027	*	0.616	0.024	0.896	0.061
	Significant?	YES	NO	NO	YES	NO	NO
PRODUCTIVITY	Pearson correlation	-0.156	-0.105	0.104	-0.045	-0.057	0.065
	p-value	0.239	0.428	0.436	0.737	0.67	0.626
	Significant?	NO	NO	NO	NO	NO	NO

Table IV-5: Pearson correlation coefficients among labour productivity factors

Variable	Description	PERFORMANCE MANAGEMENT	ERGONOMICS	ICT	CONTINUOUS IMPROVEMENT	COMPETITION	UNEMPLOYMENT
ERGONOMICS	Pearson correlation	0.101					
	p-value	0.447					
	Significant?	NO					
ICT	Pearson correlation	0.156	-0.058				
	p-value	0.237	0.662				
	Significant?	NO	NO				
CONTINUOUS IMPROVEMENT	Pearson correlation	-0.024	0.345	0.39			
	p-value	0.859	0.007	0.002			
	Significant?	NO	YES	YES			
COMPETITION	Pearson correlation	-0.245	0.141	-0.004	0.431		
	p-value	0.062	0.288	0.973	0.001		
	Significant?	NO	NO	NO	YES		
UNEMPLOYMENT	Pearson correlation	0.042	0.026	-0.005	0.208	0.288	
	p-value	0.752	0.843	0.971	0.115	0.027	
	Significant?	NO	NO	NO	NO	YES	YES
PRODUCTIVITY	Pearson correlation	-0.197	0.163	0.02	0.047	-0.156	-0.105
	p-value	0.135	0.216	0.879	0.722	0.239	0.428
	Significant?	NO	NO	NO	NO	NO	NO

Table IV-6: Pearson correlation coefficients among labour productivity factors

APPENDIX V - SUMMARY GRAPHS

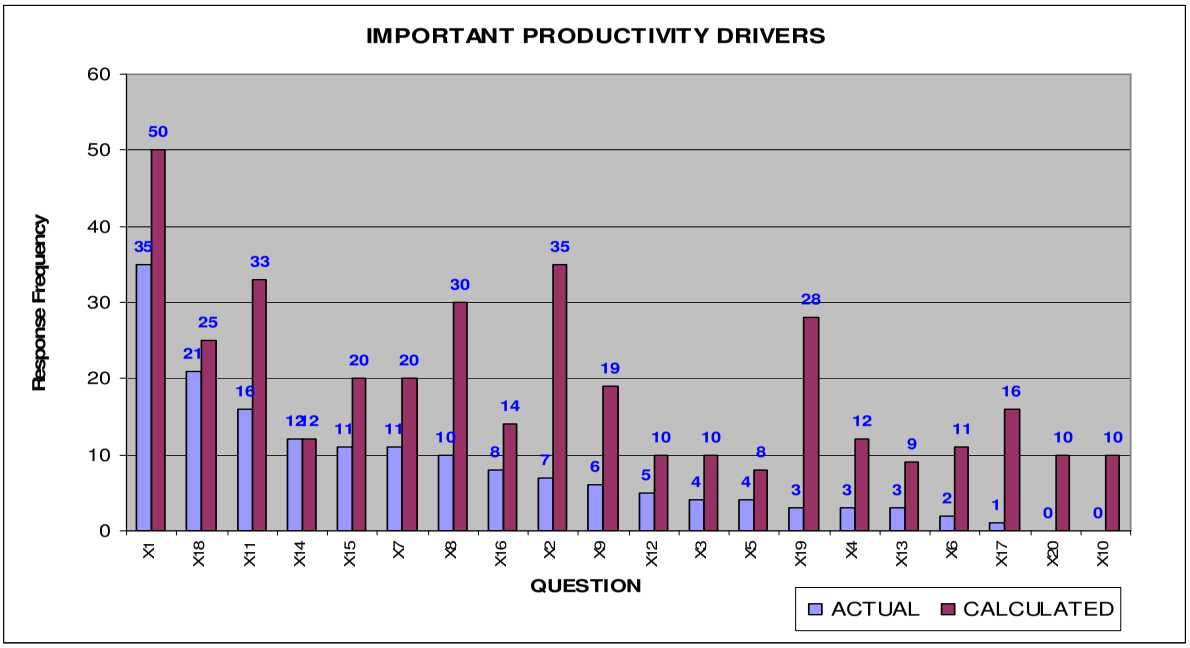

Figure V-1: Rank of Productivity Drivers

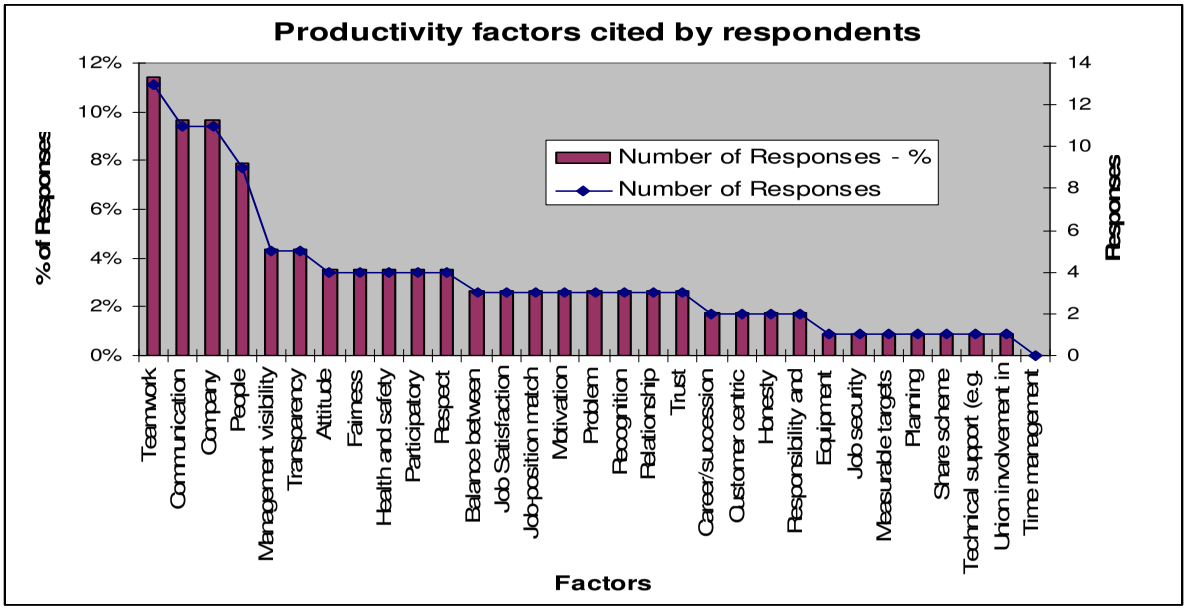

Figure V-2: Other productivity factors raised by respondents

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