

# **The Impact of Employee Motivation on Productivity at a Water Treatment and Supply's Laboratory in Johannesburg, South Africa**

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## **Abstract**

The aim of this research is to identify factors promoting motivation and to ultimately improve productivity levels in the laboratories of a water treatment and supply company in Johannesburg, South Africa. A review of the literature spanning for a period of 10 years was performed to determine the causes of motivation and demotivation from well-known theories. Two theories, closely investigated in the laboratory, were the McGregor Y Theory, Maslow Hierarchy. The researchers attempted to investigate what causes chemistry staff to be demotivated and perform poorly in the laboratory although there was an on-going continuous improvement drive based on lean thinking. This was achieved through a quantitative study by interpreting the data gathered during survey questioning with the laboratory staff. The sample chosen was based on a quota sampling selection. Results obtained from the analysis of data gathered through the questionnaires provide a clear indication of where the company's drive for continuous improvement is and where it should be. The research was successful in showing the influence of motivational factors on productivity in the laboratory and recognizing any techniques to improve motivation amongst chemistry staff.

## **Keywords**

Employee motivation, productivity

## **1. Introduction**

### **1.1 Background of the study**

Motivation in routine analysing laboratories is a challenge due to the fast-growing service industry. Employee's lack of motivation is believed to influence negatively on productivity levels and thus creating low morale in employees, declining productivity, high employee turnover, and increased absenteeism rate in laboratories. Notwithstanding, Dartey-Baah and Amoako (2011) show that there are various motivation theories that have affected the way firms oversee workers to achieve a driven workforce. Cerasoli, Nicklin and Ford (2014) through their study on intrinsic motivation which was a 40-year meta-analysis, stated critical insights on motivation. Cerasoli *et al* (2014) noted that as stated by Maier (1965), Champbell and Pritchard (1976) and later by Pinder (2011) it is evident that motivation is a central element of any dependable model of human performance, and that it has been a core emphasis of engineering and organizational psychology for countless years (Steers, Mowday, & Shapiro, 2004). Literature studies such as that from Abbasi and Hollman (2000) suggest that high staff turnover leads to poor staff development and a decline in productivity. Ramlall (2004) defines worker motivation or drive as "the inclination to employ high levels of determination to deal with business goals, inured by the effort's aptitude to gratify some individual want". This study attempts to identify factors promoting motivation and the influence of continuous improvement efforts on employees' motivation and productivity levels in the laboratory of a water treatment and supply company, South Africa.

The company studied in this paper, referred to as RW, was established in May 1903 to treat and supply water to Johannesburg and in 1904 RW was required to take over the undertakings of the companies at that time supplying or potentially capable of supplying water to the Witwatersrand, Gauteng, South Africa. It was expected to supply water in bulk only. Today it is one of the best water boards from the 12 available in South Africa. Water quality management is one of its expertise apart from its core competence being water purification. RW has adopted the South African

National Standard (SANS) 241:2005 drinking water quality standard. RW's distribution incorporates more than 3056 kilometres of vast breadth pipeline, supplying 58 deliberately found administration reservoirs. Its clients incorporate metropolitan districts, neighbourhood regions, mines, and ventures and it supplies, largely, 3653 million litres of water to these clients on a daily basis. In order to ensure high quality of supply of water, the company is involved in a tap analysis programme, a voluntary program which monitors water quality for the end user (consumer) which covers 14 of the 20 municipal areas within RW's area of supply as depicted in Figure 1 below.

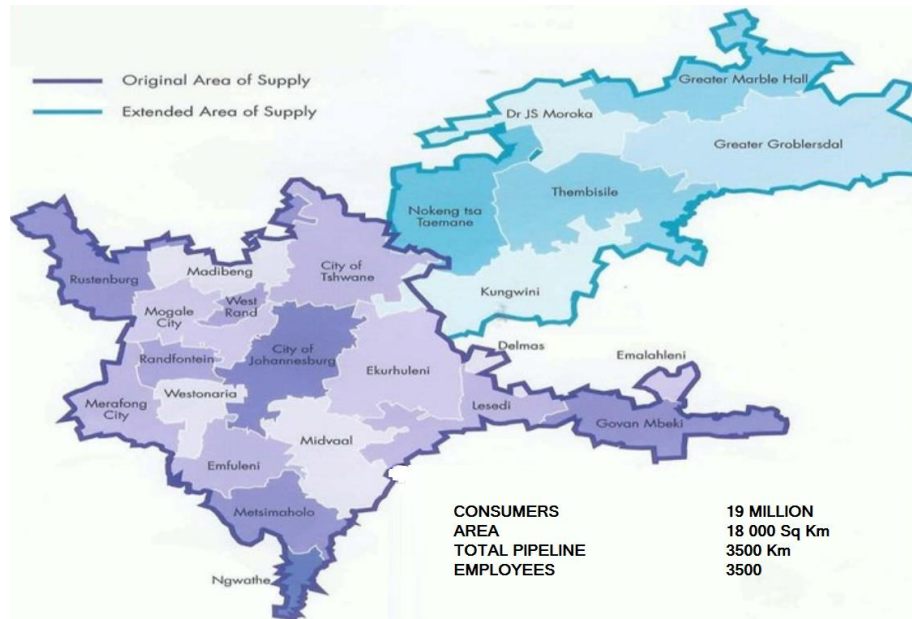


Figure 1. Area of Supply Covered by RW

Consumers are allowed to bring their water samples from home to be tested. To reduce analysis costs from outsourcing tests the organization has its own 4 laboratories that conduct their own analysis on their own samples representing their area of supply. The laboratories main function is to ensure quality control on water leaving the plant to the municipality and water at different sampling points outside of the municipalities. This would mean that there are a lot of samples which require analysis. With this type of quantities being brought to the laboratories daily, factors which could mean that productivity levels be compromised is not an option. However, low motivation impacts greatly on productivity, turnaround times, levels of absenteeism and all together opposes productivity. As explicitly stated by Pinder (2008), motivation is also said to be a set of energetic forces which is initiated equally inside as well as outside the individual existences, to trigger in-service behaviour, and to determine its form direction intensity and duration". As Srivastava and Kakkar (2008) state, motivation is the stimulant to provide supplementary energy to overcome the fatigue, lack of interest and feelings to quit the job.

RW embarked on a continuous improvement program since 2014 in the aim of improving the organisation's performance. The company bought into the idea that continuous improvement through lean thinking will lead to the identification and eradication of excess in all facets of an organisation, hence enriching value from the customer perspective. The need for continuous improvement lean thinking was in fact chosen to eliminate high operational costs tied into various key processes that the company runs. The link between employees and business process is quite evident since no organisation can operate without employees. Employees represent the core resource of any organisation striving to achieve business process management as stated by Zairi (1997). The accomplishment of a business process management culture especially lay on the formation of complete alignment to corporate objectives and having each employee's endeavors centered around enhancing the end customer. This statement is all around recognized by numerous authors (Olian and Rynes, 1991).

Using the inspiration of the above authors who have researched on this topic, which affects employees at all sectors, this study aimed at assessing the impact of employee motivation on productivity at RW laboratory.

## 1.2 Purpose of the Study

The purpose of this research is to identify the factors that promote motivation and to ultimately improve productivity levels in the RW laboratories. This research will be an opportunity for management to realize and understand those factors so that the laboratories can increase its level of performance.

The primary objective of the research project was to establish how the employee motivator factors affect productivity and as a result evidence of decreased productivity levels and lack of interest in furthering any chemistry studies. Whereas, the secondary objective of the study is to establish what causes motivator factors to affect productivity and how they can be controlled to avoid decreased levels of productivity.

## 1.3 Research Hypothesis

The following four Hypotheses were derived from existing literature review.

*H1. Better leadership and effective communication in the laboratory will improve the employee's productivity.*

According to Allen and Katz (1986), motivating is the manager's responsibility to inspire, encourage and drive employees to act. Allen and Katz (1986) explain that for motivation to be possible the employee needs to be reached, and to reach him there should be complete understanding.

*H2. Poor working conditions and environment affects job satisfaction and employee motivation.*

Gouws (1995) points out that factors which motivate employees are the same as those which contribute towards satisfaction in the work place and concludes that motivated employees are generally satisfied with their work as well. Schultz and Schultz (1995) support Gouws statement as they state that "job satisfaction encompasses both positive and negative feelings and attitudes that people hold about their jobs depending on many work related and personal characteristics.

*H3. Giving employees authority and responsibility in their work will improve job satisfaction and ultimately highly motivated employees and increased productive lab.*

Marchington and Wilkinson (2016) define autonomy/independency as something which provides workers authority and the ability to exert control over decisions related to their jobs. To support this Nicholson (1997) says that one should permit workers to embrace the full scope to different methods, sequence, and realistic turnaround times.

*H4. Rewards and promotions will motivate employees to study further and perform more at work.*

Freedman (1978) when rewards and recognition is implemented in an organization, favourable working environment is produced and in tum motivates employees to excel in their performance. Csikszentmihalyi (1990) points out that state of satisfaction and happiness is achieved by employees when they put their abilities in performing their work.

This study will be beneficial to management of all levels in a sense that they would gain some knowledge on factors which motivate employees and will be able to identify which areas to improve.

## 2. Literature Review

In an analytical laboratory, productivity includes the precision and accuracy of the work performed. Thus, it is not a measure of physical work output only but also includes quality output as well. Testing laboratories are accredited with an ISO 17025 (An International Organisation of Standardization that oversees the quality of management and the technical aspects of the laboratory operations around the world). Based on the above statements, the contribution of employee motivation is paramount.

### 2.1 Productivity

Productivity is defined as the ratio of outputs to inputs for a specific production situation. Increased levels of productivity imply that more output is produced with the same amount of inputs, or that decreased inputs are required to produce the same amount of inputs. As reported by an article by Pavlina (2009) Productivity is the process of increasing the value of output and reducing the time required to create value. Therefore, productivity is closely linked to efficiency. Efficiency being defined as, the (often measurable) ability to avoid wasting materials, energy, efforts, money, and time in doing something or in producing a desired result. Work done by Abbasi which states that "a lack of motivation endangers consequences at an extreme and could jeopardize the company's objectives" supports the article by Pavlina (2009).

## 2.2 Motivation

Motivation plays a big role in the success of organizations' productivity. The term motivation originates from the Latin word *movere*, which in turn means movement (Steers, Mowday & Shapiro, 2004). Motivation is described as something which is intangible, a drive which is inside a person that pushes the person to react in a certain way and behaviour. Therefore, motivation is a constant movement and is always directed to something or away from something. This means that there is no final goal to motivation as the moving target can ever be reached. For a long-term view in a workplace it means that it will be difficult to motivate employees as their demands for growth as motivation continuously grow.

A scientific perception of motivation is defined by Grant (1990) who states, "Motivation is a psychological force analogous to a physical force that is a vector quantity, possessing both magnitude and direction". This would mean that motivation is the amount of effort that one desires to expand in a given direction towards a goal. Gellerman (1993) also believes that it is in human nature to require motivation to actually perform a task, want to act, and the degree of performance is relative to the desire to want to act. According to Allen and Katz (1986) motivating employees is the manager's responsibility. To this we add that manager's responsibility is to inspire, encourage and drive employees to take action. Allen and Katz (1986) explain that for motivation to be possible the employee needs to be reached, and to reach him/her there should be complete understanding.

It is important to indicate that theories have been developed over years of research to explain the factors which support motivation in employees. These theories are believed to form the foundation of motivational studies. One such theory is from McGregor (1960) who believed that people want to learn, and work is an activity in which they can reach self-discipline and self-development. The theory is called the Y theory which assumes that employees take responsibility and are motivated to reach the set goals, take full responsibility of their own work and don't need direction, and also considers work as a part of their natural part of their daily lives.

Table 1. Herzberg's two factor theory

Motivators	Description	Hygiene Factors	Description
Achievement	To be successful in a task and be able to see the results from that job.	Supervision	The confidence and fairness from management
Recognition	To receive recognition in the work performed.	Company Policy	Clarity and fairness of rules at work
Work itself	The attitude towards the tasks to be performed for a certain job.	Relationship with Supervisor	The interaction and state of working relations with the Boss
Responsibility	One being trusted in their abilities and skills.	Working conditions	The state of working conditions, surroundings, and equipment
Advancement	Being promoted in the organization.	Salary	Compensation for working performance
Growth	Being able to grow personally and learn new skills.	Relationship with peers	The interactions of working relations with colleagues.
		Personal life	Balancing personal and working life
		Relationship with subordinates	Interactions with colleagues
		Status	Working reputation
		Security	Job security

Maslow developed a theory which supports McGregor's theory of Y and he believed that employee motivation comes from a hierarchy of needs. Maslow's theory suggested that an employee's needs are arranged in an order of importance and that an employee will attempt to satisfy the more basic needs before directing behaviour towards satisfying higher levels needs (Le et al., 2005). Le et al. (2005) explain that Maslow divided his five needs into higher and lower order needs. The physiological and safety needs are classified as lower order needs as they are predominantly satisfied externally while social, esteem and self-actualisation needs are classified as higher order needs as they are satisfied internally. Thus, an employer needs to ensure that the higher order needs of their employees are satisfied first so that their motivational levels are increased and ultimately increase their productivity levels.

One of the theories which are relevant to the objectives of this study is the two-factor theory, represented in Table 1 above, which focuses at the individual and the needs for satisfaction in the work environment. As reported by Latham

(2012) the objective of this theory is to understand what workers want from their jobs, as a cure to improve productivity decreases employee turnover and absenteeism. The theory states that there are two factors which affect an employee attitude towards his/her job and motivation. The factors in the first group are called intrinsic factors (the core or fundamental factors) and they are the following elements, achievement, recognition, work itself, responsibility, advancement and growth. The second factors being hygiene factors called extrinsic factors and these are, supervision, company policy, relationship with (peers, subordinates, supervisor) working conditions, salary, personal life, status, security (Herzberg et al., 1959).

### **2.3 Communication and Leadership**

Adedokun *et al.* (2013) say that management can encourage motivation by giving relevant information on the consequences of their actions and their others. When information is shared subordinates can compete with one another. The research studies show that when management communicates with them, their performance and motivation improves.

The type of communication management portrays affects their subordinate in many ways, this statement is supported by Cole (2002) who said that "communication is a two-way process, a mutual interchange of ideas, feelings and opinions". Bennett et. Al (1999) say that communication can affect the attitudes of the employees and the degree to which they understand and support management policies. Cole (2002) emphasizes the importance of keeping employees informed of issues affecting their work, this reduces misunderstandings which may occur from a day to day activity and improves trust between the employer and employee.

A study conducted by Muindi & Wangara (2010) on the factors influencing leadership effectiveness observed that without proper leadership, the process of creating an environment that is positive for encouraging relationships and conducive to an effective production would weaken and the company will lose money, personnel, and production. One of the eight total quality management principles is leadership and it says that "leaders establish of unity of purpose and direction of organizations. They should create and maintain the internal environment in which people can become fully involved in achieving the organizations objectives". Wehrich & Koontz (2005) said that the ability to lead is one of the keys to being an effective manager. Spreitzer and Porath (2012) recommended that what companies need are leaders who are open to empowering employees and who set the tone in the workplace.

### **2.4 Working and Environmental Conditions**

Gouws (1995) points out that factors which motivate employees are the same as those which contribute towards satisfaction in the workplace and concludes that motivated employees are generally satisfied with their work as well. Schultz and Schultz (1995) support Gouws statement as they stated that "job satisfaction encompasses both positive and negative feelings and attitudes that people hold about their jobs depending on many work related and personal characteristics. Armstrong (2011) says that a supportive environment is one where appropriate attention is given to achieving a satisfied work and balanced life. Managers are the ones who are responsible for providing an environment which is conducive to being productive. Nicholson (1997) mentions that motivation falls into two categories (extrinsic and intrinsic factors). The extrinsic factors containing working conditions as one of the factors.

### **2.5 Rewards and promotions**

Freedman (1978) when rewards and recognition is implemented in an organization, favourable working environment is produced and in turn motivates employees to excel in their performance. Csikszentmihalyi (1990) points out that state of satisfaction and happiness is achieved by employees when they put their abilities in performing their work.

### **2.6 Authority and Responsibility**

Marchington *et al.* (2016) defined autonomy as something which gives employees authority and control over job related decisions. To support this (Nicholson, 1997) says that you need to allow employees to maximum scope to different methods, sequence, and realistic turnaround times.

## **3. Methodology**

### **3.1 Research Design**

The objective of this research project was to establish the impact of motivational factors on productivity in the laboratory. The evaluation of the motivational factors was based on the literature review of motivational factors from

the Y theory (McGregor), Maslow Hierarchy of needs, and other literature review. The motivational factors were compared against productivity in the laboratory to determine their correlation.

This study used quantitative descriptive survey. A survey is a system for collecting information from or about people to describe, compare, or explain their knowledge, attitudes, and behaviour (Fink, 2003). Quantitative data is defined as research that involves the analysis of data/ information which is descriptive in nature and not readily quantifiable (Sekaran and Bougie, 2016). It's aimed at determining the relationship between one thing (an independent variable) and another (a dependent variable) in a population. This descriptive study assisted in understanding how the Independent variables affected the dependant variable. The research was based on primary collected data by using the survey containing close ended questions.



Figure 2. Dependent and Independent Variables Used in the Study

### 3.2 Survey Instrument

A survey questionnaire labelled the impact of employee motivation on productivity at RW laboratory was used for the collection of data on this study. The questions were designed to accomplish the objectives of the study. The survey was divided into two parts with the first part being labelled as the demographics and the second part containing the questions to prove the hypothesis.

A Likert scale was used in this questionnaire with responses ranging from Strongly Disagree (1), Disagree (2), fair (3), Agree (4), Strongly Agree (5). A Likert scale according to (Sekaran and Bougie, 2016) is a scale designed to examine how strongly respondents agree with a statement on a five-point scale. To determine the reliability of the scale a Cronbach's alpha calculation was conducted to test the internal consistency within the items.

### 3.3 Data Collection

A twenty-six-sized sample containing the chemistry department was sampled and the survey questionnaires were emailed to the staff members and those who were not able to answer the questionnaires within the given time frame, the researcher took initiatives to get responses.

The respondents of the survey were made aware that their responses to the survey would be only beneficial to proving this study and would remain confidential. The results of the research methodology were an explanation on the impact of the independent variables (Leadership skills & communication, working conditions, rewards and promotions, and synergy/ social relations) against the dependent variable (productivity).

The SPSS analytical software was used to analyze the data. This software was able to analyze descriptive statistics and multivariate statistical procedures like analysis of variance (ANOVA). An ANOVA was used to determine the relationship between the employee motivation and the demographic factors, and the productivity variable.

The methodology discussed in this chapter enabled the researchers to make conclusions which has been discussed later in this paper. From all this the researchers were also able to make accurate conclusions on the impact of motivation (independent variables) on employee's productivity at RW.

## 4. Survey Results and Discussion

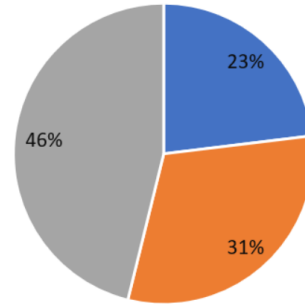
### 4.1 Frequency Distributions on the Demographic Variable

As per the data depicted in Table 2 below, the majority of the laboratory staff is aged at 40 years or older (more than 46% of respondents), while six employees are less than 30 years of age and twenty employees being above the age of

30 (including those above). However, fifty three percent of the laboratory is occupied by females and forty six percent being male.

Table 2. Age Frequency Distribution

	Age (Year)	Freq.	Percent	Valid Percent	Cum. Percent
Valid	Less than 30	6	23%	23%	23%
	30 ≤ age ≤ 40	8	31%	31%	54%
	40 or above	12	46%	46%	100%
Total		26	100%	100%	



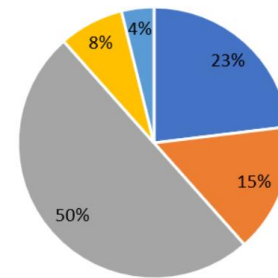
■ Less than 30 ■ 30 ≤ age ≤ 40 ■ 40 or above

Figure 3. Age Percent Distribution

The level of education with a median of 3 indicates that majority of the staff hold a university degree, however the results indicate that less than fifteen percent of respondents have a university masters or PhD qualifications, as represented both Table 3 and Figure 3 below.

Table 3. Level of Education Frequency Distribution

	Type of Qualification	Freq.	Percent	Valid Percent	Cum. Percent
Valid	High School	6	23%	23%	23%
	National Diploma	4	15%	15%	38%
	University B-Degree	13	50%	50%	88%
	University Masters	2	8%	8%	96%
	University PhD	1	4%	4%	100%
Total		26	100%	100%	



■ University B-Degree ■ High School ■ National Diploma ■ University Masters ■ University PhD

Figure 4. Level of Education Percent Distribution

The years of service results indicate that the laboratory is mainly composed of employees who have been working there for more than 10 years with a median of 3 found for the years of service.

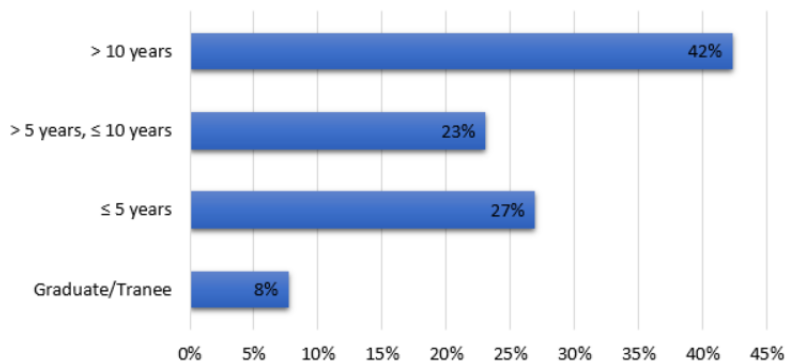


Figure 5. Years of Service Percent Distribution

The results from the Frequency distribution with a Mean of 2.231 for age, 1.46 for Gender, 3.00 for years of service, and 2.54 for level of education indicate that most of the respondents for Age were choosing the third option being 40 years and older. The laboratory is largely composed of 40 years and older people. The Gender results indicate that this

laboratory is composed mainly of number one option being (female). The median chosen as 1 and only a standard deviation of 0.508.

Table 4. Demographics Frequency Distribution

		Age	Gender	Years of Service	Level of Education
<b>N</b>	<b>Valid</b>	26	26	26	26
	<b>Missing</b>	0	0	0	0
<b>Mean</b>		2.231	1.46	3	2.54
<b>Median</b>		2	1	3	3
<b>Std. Dev</b>		0.8152	0.508	1.02	1.067

#### 4.2 Cross-tabulation of Demographics and Variables

The cross-tabulation results, represented in Table 5, indicate that 42% of respondents in all three age groups said that they strongly disagree with the statement that their supervisors have good communication and leadership skills. The results also show that the majority of the staff who hold a university B-Degree strongly agreed that promotions and rewards make an employee more willing to study further. The results further indicate that 42% of respondents agreed to the statement that their working conditions are conducive to productive work performance. Another look at the results show that 38% of the respondents felt that, if they were paid better salary (including rewards, opportunities) and presented with promotion opportunities, they would perform their work better. A total of 20% respondents agreed that their managers trust their opinions and authority. According to Cole (2002) managers relations with their employees are based on fear of upsetting them instead of being based on respect for their skills and know how. To support this statement the researchers, conclude that it could be that the 65% of respondents are not the only group of respondents to disagree with the question asked and it could be that the 15%, who chose that their answer to this question is fair, did so because they had a fear of being isolated from any opportunities. Lastly, 62% of respondents agree and strongly agree that their productivity at the laboratory was affected by their motivation levels. Table 5 below depict the above results.

Table 5. Cross-tabulation Results

Questions	Age	Strongly Disagree (1)		Disagree (2)		Fair (3)		Agree (4)		Strongly Agree (5)		N	Mean	Median	Std Dv
		f	%	f	%	f	%	f	%	f	%				
Q1. Would you say your supervisor's communication and leadership skills are good?	< 30	3		1		1		1		0		26	2.38	2	1.472
	30 ≤ age ≤ 40	6	42%	1	12%	0	27%	0	4%	1	15%				
	> 40	2		1		6		0		3					
Q2. Your working conditions are conducive to performing your work?	< 30	1		3		1		1		0		26	3.12	3	1.275
	30 ≤ age ≤ 40	2	12%	2	23%	2	23%	1	27%	1	15%				
	> 40	0		1		3		5		3					
Q3. Would you say your supervisor or Manager trusts your opinion and authority?		10	38%	7	27%	4	15%	2	8%	3	12%	26	2.96	3	1.971
Q4. Will a promotion or rewards make you more willing to study further in Chemistry and perform your work better?	High School	2		0		3		1		2		26	4.12	4.5	0.993
	National Diploma	1	12%	1	4%	1	31%	0	15%	2	38%				
	Univ. B-Degrees	0		0		4		3		6					
Q5. Would you say productivity is affected by an employee's motivation level?		3	12%	1	4%	6	23%	8	31%	8	31%	26	2.79	3	1.078

The results from the ANOVA analysis performed against questions Q1, Q2, Q3 and Q4 and the productivity are summarised in Table 6 below and are discussed under conclusion and discussion.



Table 6. ANOVA Analysis Summary

<b>Q1 Against Productivity</b>						
<b>H1. Better leadership and effective communication in the laboratory will improve the employee's productivity.</b>						
<b>HA: Better leadership and effective communication in the laboratory will not improve the employee's productivity.</b>						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Would you say your supervisor's communication and leadership skills are good?	26	62	2.384615	2.166154		
Would you say productivity is affected by an employee's motivation level?	26	95	3.653846	1.675385		
<b>ANOVA</b>						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	20.94231	1	20.94231	10.90308	0.001777	4.03431
Within Groups	96.03846	50	1.920769			
Total	116.9808	51				
<b>Q2 Against Productivity</b>						
<b>H2: Poor working conditions and environment affect job satisfaction and employee motivation.</b>						
<b>HA: Poor working conditions and environment will not affect job satisfaction and employee motivation.</b>						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Would you say your working conditions are conducive to working?	26	81	3.115385	1.626154		
Would you say productivity is affected by an employee's motivation level?	26	95	3.653846	1.675385		
<b>ANOVA</b>						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	3.769231	1	3.769231	2.283318	0.137067	4.03431
Within Groups	82.53846	50	1.650769			
Total	86.30769	51				
<b>Q3 Against Productivity</b>						
<b>H3. Giving employees authority and responsibility in their work will improve job satisfaction and ultimately highly motivate employees and increase productive lab.</b>						
<b>HA. Giving employees authority and responsibility in their work will not improve job satisfaction and highly motivate employees and increase productive lab.</b>						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Would you say your supervisor or Manager trusts your opinion and authority	26	77	2.961538	1.878462		
Would you say productivity is affected by an employee's motivation level?	26	95	3.653846	1.675385		
<b>ANOVA</b>						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	6.230769	1	6.230769	3.506494	0.066982	4.03431
Within Groups	88.84615	50	1.776923			
Total	95.07692	51				
<b>Q4 Against Productivity</b>						
<b>H3. Giving employees authority and responsibility in their work will improve job satisfaction and ultimately highly motivate employees and increase productive lab.</b>						
<b>HA. Giving employees authority and responsibility in their work will not improve job satisfaction and highly motivate employees and increase productive Job.</b>						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Will a promotion or rewards make you more willing to study further in Chemistry?	26	107	4.115385	0.986154		
Would you say productivity is affected by an employee's motivation level?	26	95	3.653846	1.675385		
<b>ANOVA</b>						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	2.769231	1	2.769231	2.080925	0.155385	4.03431
Within Groups	66.53846	50	1.330769			
Total	69.30769	51				

As shown in Table 6 above, the results from the ANOVA analysis performed against Question 1 and the productivity results show that the  $F\text{-crit}$  4.03 and the  $F\text{-cal}$  (F) to be at 10.90. This would mean that the researcher will be rejecting the Null hypotheses that with better leadership and effective communication in the laboratory, the employee productivity will improve. Another look at Table 6 reveals that the ANOVA analysis performed against Question 2 and the productivity results show that the  $F\text{-crit}$  4.03 and the  $F\text{-cal}$  (F) to be at 2.28. This would mean that the researcher will be rejecting the Null hypotheses that with better leadership and effective communication in the laboratory, the employee productivity will improve. The Calculated  $P\text{-value}$  is 0.14 indicating a positive correlation between working conditions and productivity. A further scrutiny of Table 6 shows that the results from the ANOVA analysis performed against Question 3 and the productivity results indicate that the  $F\text{-crit}$  4.03 and the  $F\text{-cal}$  to be at 3.51, which means that the researcher will not be rejecting the Null hypotheses that with better leadership and effective communication in the laboratory, the employee productivity will improve. The calculated  $P\text{-value}$  of 0.06 indicates that giving employees authority and responsibility over their work will improve productivity as there is positive correlation between the variables. The results from the ANOVA analysis performed against the question 4 and the productivity results show that the  $F\text{-crit}$  4.03 and the  $F\text{-cal}$  to be at 2.08 this would mean that the researcher will not be rejecting the Null hypotheses rewards and promotions motivate employees to study further and perform more at work. The P value of 0.16 indicates that there is a positive correlation between the two variables, showing that rewards and promotions impact productivity in the labs and that there is significant relationship between the two.

## 5. Conclusion

The results found from the ANOVA showed that formulated hypothesis would not be rejected with the second, third, fourth questions giving critical values of 2.28, 3.51, 2.08 respectively against the critical value of 4.03. The first questions answer from the ANOVA (Table 6) gave a result which wouldn't reject the tested hypothesis. From this the researcher can conclude that Working conditions of the laboratory, the trust from management given to employee's opinions and ideas, and Promotions (opportunities) and rewards do affect and have an impact on the productivity of the laboratory.

The theories used in this study are evident that their importance is significant for a laboratory to obtain increased levels of productivity, absenteeism, and lower turnover rates. The findings of this study indicate that there is a correlation that exists between motivation factors and productivity.

The research successfully showed the influence of Communication between the superiors and subordinates, working conditions, trust, and promotions and rewards greatly impact the productivity of the laboratory and hence Maslow suggestion that management needs to satisfy the higher-level factors first for them to ensure that their employees stay satisfied with their current jobs and the productivity of the lab is not affected. It can be seen from the results that the more years of service the employees had influenced their response to the questionnaire and that the older employees were more mature to the questions. They have had a lot of experience in avoiding or resolving and coping with the factors which affected their motivation towards the type of work they performed.

Management need to incorporate motivational techniques in the laboratory which can assist them to motivate their employees so that their laboratory productivity levels aren't affected.

## 6. Recommendations and the Way Forward

Future studies should focus on the effectiveness of motivators being applied from the perspective of the laboratory staff. Management can employ the following strategies to motivate their employees using salaries, wages, and conditions of service to improve their employee's morale, as well as to ensure that employees are developed through training and being awarded opportunities within the organization. Another way managers can stimulate motivation is by ensuring that information is available to the employees, transparency in the department helps subordinates compete with each other fairly. A study conducted by Brown and Sheppard (1997) examined the characteristics of the work of teacher in a four category being, knowledge based, technical skills, values, and beliefs. He reported that they will succeed in meeting the challenge only if they are motivated by deeply-held values and beliefs regarding the development of a shared vision. Colvin (1998) noted that he believed that financial incentives increase productivity. Additionally, Nzuve (1999) stressed that it is important that managers practice general supervision rather than close detailed supervision of employees so that managers devote their time on supervisory activities, rather than close detailed special tasks.

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