

FRONT-LINE SUPERVISOR EFFECTIVENESS ASSESSMENT ON AN ENGINEERING SHOP-FLOOR

P.N. Zincume^{1*} and J. Romon-Maneveld²
^{1,2}Department of Industrial Engineering
University of Stellenbosch, South Africa
philaniz@sun.ac.za¹, 19102178@sun.ac.za²

ABSTRACT

This paper entails the creation of a Front-Line Supervisor Effectiveness Assessment Model on an Engineering Shop-Floor. Supervisors were assessed according to assessment criteria to evaluate their performance and effectiveness as Front-line Supervisors. Criteria were determined from literature and documentary research. The paper states how these criteria were determined and why they are relevant. The model consists of 38 assessment criteria by which Front-line Supervisors are assessed at a specific engineering company. Furthermore, the model created is demonstrated and validated by implementing the model. Lastly, various recommendations are made on how to improve the model.

* Corresponding Author

1 INTRODUCTION

The Front-line Supervisor is the leader of a work team and is directly responsible for relaying management’s instructions to the work team [1]. The supervisor’s role is to translate the organisational goals and objectives into implementable instructions for his work team [2]. A supervisor is also a mentor to the team since the supervisor understands the organisation and the role that employees need to play within the organisation. This means that the supervisor acts as a guide and provides advice to subordinates. The advice given by supervisors usually includes information about the employee’s job at hand and the employee’s career as a whole. Furthermore, the supervisor is the connection between top management and the work team; implying that the supervisor informs the work team about new methods, policies and rules implemented by management. The supervisor also needs to communicate the work teams’ requests and inquiries to management [2].

This paper deals with the effectiveness of supervisors within an engineering organisation and how to assess them. The assessment created is useful for decision support on supervisor governance, supervisor appraisals, problem-solving with regards to the supervisor’s tasks, and the necessary supervisory requirements. The industry partner that was used to implement the effectiveness assessment model was PRASA, the Passenger Rail Agency of South Africa.

PRASA is a state-owned entity with the purpose of providing rail services for commuters in the Metropolitan area of South Africa. However, the Metrorail Infrastructure and Rolling Stock Depot in Salt River, Cape Town, specifically deals with the maintenance and upgrading of rolling stock. This department has various assembling and maintenance divisions for which Front-line Supervisors are responsible.

The paper aims to define a model that acts as an Effectiveness Assessment of Front-line Supervisors on an engineering shop-floor. PRASA has three technical divisions for which Production Managers are responsible. These three divisions, namely: Fleet Maintenance, Reliability Shop and Component Services, consist of subdivisions that are managed by Front-line Supervisors. The subdivisions are as follows: Faults, North Shedding, South Shedding, Lifting Shop, Carriage and Wagon Shop, Coach Repair Shop, Instrumentation and Valve Shop, Armature Repair Shop, and the Rotary Machine Repair Shop.

This study is based on the Effectiveness Assessment of the Front-line Supervisors working in the subdivisions mentioned. Top management has identified the need for Front-line Supervisors in these divisions within the organisation; however, the optimal way in which to assess these supervisors and the determination of whether they are effective, has not yet been reviewed.

The objectives of this study are indicated in Table 1.

Table 1: Study Objectives

1.	Understand the roles of each of the Front-line Supervisors in the Fleet Maintenance, Reliability Shop, and Component Services divisions.
2.	Identify the tasks that each supervisor is responsible for.
3.	Ascertain which tasks are the most important to ensure productivity.
4.	Formulate a Supervisor Effectiveness Assessment model based on the most important tasks identified to assess the Front-line Supervisors.
5.	Assess the Front-line Supervisors using the assessment model created to allow for model validation.
6.	Evaluate the results obtained from the Supervisor Effectiveness Assessments and make recommendations.

2 RESEARCH DESIGN AND METHODOLOGY

Figure 1 is a graphical representation of the research design and methodology followed in this study.

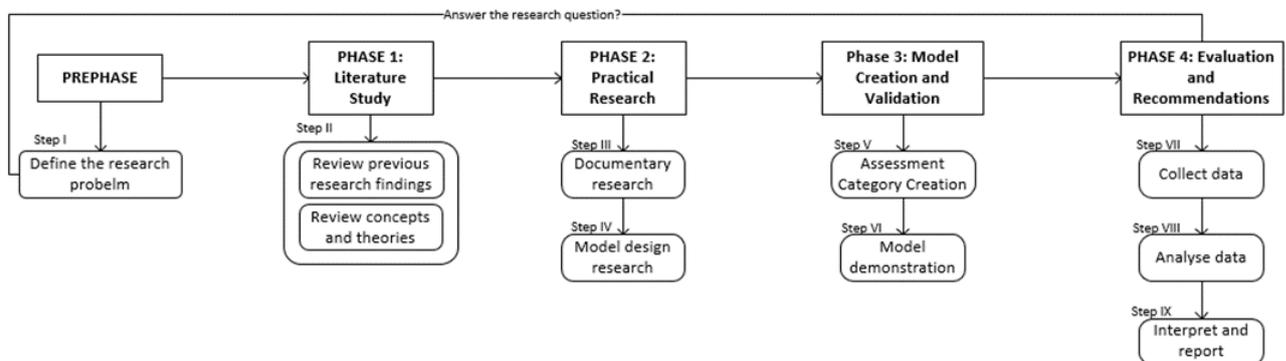


Figure 1: Graphical Representation of Methodology (adapted from [3, p.11])

As indicated by Phase 1 in Figure 1, a literature study was completed to deduce the important criteria and competencies by which a supervisor should adhere to be effective, and to fulfil objective 1 in Table 1. The role of a supervisor was identified, and this includes providing leadership and guidance to employees [7], providing information and feedback to subordinates [8], and providing support [9] [10] [11]. Influences on supervisor effectiveness were investigated which were concluded to be job satisfaction [12], subordinates' use of impression management [13], the self-verification theory [14], supervisor's job experience [15] and performance [16], personality traits of the supervisor [17], and feedback on the supervisor's performance [18]. The supervisor's effect on subordinates was also investigated and this entails how supervisory governance is implemented [19], the connotation of the feedback given to subordinates by supervisors [20], and the subordinate's impressions of their supervisors [17]. In addition, the consequences of an inadequate supervisor were explored, and it was found that they are the following: poor relationships with co-workers, lower performance ratings, conflicts, the tension in the workplace [21], avoiding recognition, instilling fear and cultivating negative environments [22]. Furthermore, previous models such as the Engineering Competency Model [23], Operant Supervisory Taxonomy and Index [24], Operant Supervisory Team Taxonomy and Index [25], and the Supervisor Activity Analysis at Kumba Mine Engineering [26] were studied to allow for a basis on which the Front-line Supervisor Effectiveness Assessment could be created.

The Engineering Competency Model consists of 5 tiers of competencies that a professional should possess within the engineering working environment [23]. To aid the formulation of the Front-line Supervisor Effectiveness Assessment model, tiers 1 and 3 were used. Tier 1 consists of Personal Effectiveness Competencies such as interpersonal skills; integrity; professionalism; initiative; adaptability and flexibility; dependability and reliability; and lifelong learning competencies that the supervisor should display. Tier 3 refers to workplace competencies such as teamwork; planning, prioritising and organising; creative thinking; problem solving, definition and decision making; seeking and developing opportunities; working with tools and technology; scheduling and coordinating; checking, examining and recording; and business fundamentals.

The Operant Supervisory Taxonomy and Index is described as

“operant-based taxonomy and observational instrument of supervisory behaviour” [24, p. 260].

This taxonomy was developed to test the behaviours of supervisors and how these behaviours affect their effectiveness. Previous research was used to generate the categories by which behaviours were grouped. Only those categories that appeared to relate to supervision were chosen. There are seven categories, namely: performance antecedents, performance monitors, performance consequences, own performance, work-related, non-work related, and solitary (the

interaction of the supervisor with subordinates). Performance antecedents refer to the supervisor providing instructions to subordinates on how to perform. Performance monitors refer to collecting information on the subordinates' performance, and performance consequences refer to the acknowledgement by the supervisor of the subordinate's performance. These three categories form the basis of the taxonomy [24].

The Operant Supervisory Taxonomy and Index were adapted and expanded to apply it to the supervision of teams, rather than focusing on the supervision of individuals. This adaptation is known as the Operant Supervisory Team Taxonomy and Index. It includes descriptions of the leader's role, the behaviours of the team as a whole as well as interdependent tasks, i.e. tasks that require cooperation from all team members to reach completion. Interdependence coordination is said to be the most important role of a supervisor when overseeing a team. According to this model, the ability of the supervisor to organize and coordinate teams in an effective, efficient manner is a direct indication of the supervisor's effectiveness [25].

The Operation Improvement Management Consulting Company developed the Supervisory Activity Analysis to be implemented at Kumba Mine Engineering. The activity analysis aims to identify the non-core activities performed by the supervisors and the impact it has on the effectiveness of supervisors. The purpose of conducting the study was to highlight the non-value adding activities that should be mitigated to increase the effectiveness of supervisors and increase the value of their roles within the company. From the study, it was noted that supervisors should spend most of their time in Active and Passive Supervision. Active Supervision is known as the direct engagement between supervisor and subordinate on production and safety-related issues. This includes instructions from the supervisor and requests from subordinates. Passive Supervision occurs when the supervisor observes subordinates, inspects and evaluates quality. Passive becomes Active Supervision when the supervisor intervenes [26]. Because time study was not the ideal method to employ in this time-constrained project, the Supervisor Activity Analysis was used as a guideline to determine whether the activities mentioned are included and are the focus of the supervisors' daily tasks.

Phase 2, as shown in Figure 1, consisted of practical research, shown in Step III, which included documentary research such as the job descriptions of Front-line Supervisors at PRASA and model research, shown in step IV, such as determining the advantages and disadvantages of conducting interviews [27] and surveys [28] to collect data. Practical research was completed to further achieve objective 1 in Table 1, as well as achieve objectives 2 and 3. Phase 3 and Phase 4 are discussed in the following sections.

3 RESULTS

The model was created as a resultant of the literature study and documentary research such that the supervisors at PRASA can be assessed with regards to their effectiveness. The formulation of the surveys and interviews is discussed, and the assessment categories and their weightings are justified in this section. Furthermore, validation of the model is established. An example of the model is displayed to demonstrate how the model works and how the effectiveness of supervisors is calculated.

3.1 Assessment Model Creation

This section deals with the formulation of the Front-line Supervisor Effectiveness Assessment Model and refers to Phase 3 of the study, fulfilling Step V as well as achieving objective 4 in Table 1. The way in which the interviews and surveys were constructed is explained and each Assessment Category and its weighting is discussed to give the reader an in-depth understanding of the model that was created. The survey completed by subordinates and managers, and the questionnaire used to interview supervisors are based on the categories, themes and previous models deduced from the literature study, as well as the job descriptions derived from documentary research. The following points highlighted from the literature study and documentary research were used to aid

the formulation of the assessment categories and criteria on which the Front-line Supervisor Effectiveness Assessment model is based.

- According to the role of a supervisor, it is deemed the most important for the supervisor to provide support and constructive feedback to subordinates; to ensure the safety of subordinates; to minimise conflict in the working environment and to provide the adequate training and sharing of skills to subordinates.
- The Engineering Competency Model states that a supervisor should possess personal effectiveness and workplace competencies. Personal effectiveness skills refer to the ability of the supervisor to act appropriately in various situations. Workplace competencies in the supervisory context refer to the ability to manage a team and the tasks the team needs to accomplish.
- The Operant Supervisory Taxonomy and Index and the Operant Supervisory Team Taxonomy and Index models state that the supervisor should provide adequate instructions to subordinates on how to perform, they should monitor the performance of subordinates, and they should acknowledge the performance.
- The Supervisor Activity Analysis indicates the activities a supervisor should be involved in daily. Active and Passive Supervision is highlighted as the most important.

The technical skills, initiative, self-management skills, communication and teamwork skills, innovation abilities, leadership skills, project management skills and personnel management skills of the supervisor as well as the quality and quantity of work performed by the supervisor are the matters of interest when conducting the Effectiveness Assessment model. These are referred to as the Assessment Categories and are adapted from the Supervisory Staff Performance Evaluation determined by Oklahoma State University [29]. The Initiative, Leadership Skills and Personnel Management Assessment Categories correspond to and are derived from tier 1 of the Engineering Competency Model, whereas the Technical Skills, Quality of Work, Self-management, Communication and Teamwork, Innovation and Project Management Assessment Categories are derived from tier 3. Discussions of these categories follow.

Technical Skills

Technical skills are essential for the competence and effectiveness of supervisors. It is the most important characteristic trait a supervisor should possess in order to fulfil his duties. A Front-line Supervisor's technical skills consist of being able to perform the supervisory tasks as outlined in their job description and doing so safely such that no harm is encountered by anyone in his department. These tasks include the managing of time schedules and work operations. Technical skills also refer to following the correct procedures and using tools and equipment in the correct capacity.

Quality of Work

Producing exceptional quality of work is what any supervisor should strive for. Quality is a direct indicator of the supervisor's performance as it indicates the success of the supervisor and his team as they work together to achieve the goals as set out by the supervisor and the Production Manager without extra help. It also indicates whether the supervisor has corrective actions in place to rectify defects or mistakes. Furthermore, it identifies the priorities of the supervisor and whether PRASA's standards are being adhered to.

Initiative

Initiative is a trait that indicates whether the supervisor is capable of going beyond what is expected of him. This trait is what will separate an exceptional supervisor from one that merely adheres to his job description. A supervisor that is willing to learn new skills and provides effective solutions to arising problems will be more effective.

Self-management

Self-management is a depiction of a supervisor's character as it indicates the time management and punctuality of the supervisor. It is a direct indication of the effectiveness of a supervisor as the supervisor will effectively monitor his subordinates, should he effectively monitor himself. Self-management also stipulates whether the supervisor can be held accountable and be responsible for his actions - these are essential for an effective supervisor. Overall, self-management refers to the ability of the supervisor to display self-control in all situations and handle them without allowing the supervisor's emotions to cause any effect.

Communication and Teamwork

This is vital in each department at PRASA. This is because processes within the departments link together to fulfil the goal of the department. A supervisor's job primarily involves effective communication of instructions to his subordinates such that daily tasks and objectives can be completed and achieved, respectively. Supervisors should also provide guidance and help when subordinates do not understand instructions. It is important that the policies and procedures of PRASA are thoroughly understood by the supervisor and properly relayed to the subordinates. The supervisor has to facilitate teamwork such that the subordinates work together to achieve the departments' goals. Additionally, the supervisor has to facilitate a pleasant working environment such that subordinates are happy, feel respected and can be open about any concerns. Subordinates create the team and without the team, supervisors cannot fulfil their duties.

Innovation

Innovation is important because supervisors have the authority to implement improved ways of completing tasks as long as they adhere to the policies and procedures of PRASA. It is also important that subordinates be allowed to suggest their own innovation ideas and that the supervisor investigate these ideas for implementation. This will make subordinates feel valued and it creates a welcoming working environment. Furthermore, it is essential that supervisors can adapt to changing working environments and relay adaptations to subordinates as improvements are continually being made.

Leadership Skills

It is also important that supervisors have good leadership skills. These skills will ensure that the supervisor has the ability to lead others to achieve the goals of the department in which they work, as well as the goals of PRASA as a whole. A supervisor who exhibits leadership skills will encourage subordinates to grow and expand their knowledge, while continuously improving themselves. This aligns with effectiveness as the subordinates will want to aid the supervisor to achieve departmental goals if they know that the supervisor is willing to help them achieve their personal goals. In addition, supervisors who are good leaders will know how to act appropriately when criticised and perform effectively under pressure.

Project Management

Project management abilities are vital for a supervisor as he is managing a constant project. For example, each train coach that is repaired or each valve that is fixed can be seen as small projects. It is important that repairs take place in a timely manner, with the correct resources and that they are completed to the quality standards of PRASA. This will be done if repairs are managed sufficiently by the supervisor and it can be done should the supervisor provide clear definitions of tasks, provide sufficient time for task completion, and delegate authority when necessary.

Personnel Management

Supervisors should always ensure the well-being of their subordinates as the emotional state of a subordinate can directly affect the work output the subordinate produces. Because of this, a supervisor should promote optimism and enthusiasm in the workplace to ensure a contented working environment. A pleasant working environment is also attributed to the supervisor

recognising and rewarding subordinates for their successes. It is important that supervisors provide feedback to their subordinates such that subordinates can be aware of the areas in which they excel and the areas in which they need to improve. A supervisor should also help subordinates to set goals in the areas that need improvement such that growth actually occurs. Finally, it is essential that a supervisor always acts rationally and fairly, and that conflict is resolved in an appropriate manner.

These categories are derived from the literature study and this ultimately produces the results of the project. It also answers the first research question of the study. The job descriptions of the Front-line Supervisors as described by PRASA are also taken into consideration in the development of the Front-line Supervisor Effectiveness Assessment model. The duties completed by the supervisors to ensure safety, quality and the management of resources and products are assessed in the model to evaluate whether supervisors are adhering to their job specifications. A questionnaire is created from the assessment categories and criteria identified such that surveys and interviews can be conducted to allow for the validation of the Front-line Effectiveness Assessment model.

Production Managers, Supervisors and their Subordinates are required to rank the supervisor’s performance for each criterion. This is such that a 360-degree feedback method of assessment is employed [18]. Furthermore, it also allows the Production Manager to identify the supervisor’s perceived level of competency. The ranking order by which supervisors are to be rated is shown in Table 2.

Table 2: Ranking Order of Supervisor's Performance

1 = Unsatisfactory	Supervisor's performance does not meet the expectations of the job
2 = Needs Improvement	Supervisor's performance sometimes meets the expectations of the job
3 = Meets expectations	Supervisor's performance consistently meets the expectations of the job
4 = Exceeds expectations	Supervisor's performance often exceeds the expectations of the job
5 = Exceptional	Supervisor's performance always exceeds the expectations of the job

It is deemed important to access information from subordinates and managers as the actions of the Front-line Supervisors directly impact them. Subordinates and managers are required to rank the supervisors on a scale of 1 to 5 for various criteria depending on how supervisors perform in each of the criterion, 1 being unsatisfactory and 5 being exceptional. The average of the ratings provided by the manager, supervisor and subordinate is taken to obtain the Average Ranking for the specific criteria. The mean of the Average Ratings is then obtained to determine the Category Rating. This then indicates how the supervisor is performing within the category.

Front-line Supervisors report to the Production Managers in their respective divisions. Because of this, the important factors that Production Managers aim to excel in, should also be the factors in which the Front-line Supervisors strive to achieve. This is because Front-line Supervisors form part of the support team that aid the Production Managers to achieve their goals such that the Maintenance Operation Manager can achieve the overall goal of PRASA.

The assessment criteria by which the supervisors are assessed are weighted according to the Production Manager’s Performance Appraisal that was provided by PRASA. This was done to ensure that the effectiveness of the supervisor is attributed to the goals of the Production Manager such that PRASA can reach its objectives as an organisation. The weightings were calculated according to the Business Imperative Performance Indicators. Table 3 indicates the weightings of the assessment categories and the corresponding Key Performance Indicators (KPIs) from which the percentages were derived.

Table 3: Assessment Category Weightings and Corresponding KPIs

Assessment Category	Weighting	Corresponding KPIs
Technical Skills	13%	Safety of Staff - Occupational Health and Safety Management; Ensure sound Labour Relations; Stakeholder Interface - Protection Services and Train Operations
Quality of Work	27%	Train Sets in Service; Fully Configured Train Sets; Operational Safety - Number of Derailments; Mean Time to Repair; Mean Distance between Service Affecting Failures; Conformance Audit
Initiative; Self-Management; Leadership	10%	Corporate Governance: Conformance Audit; Risk Management
Communication and Teamwork; Innovation	10%	Workplace Skills Plan Training; Skills Development (Learning and Growth)
Project Management	20%	Rolling Stock Budget; Management of Overtime Budget; Irregular Expenditure of Fruitless & Wasteful Expenses
Personnel Management	20%	Leave of Staff Managed; Absence of Staff Managed; Overtime
Total	100%	

The KPIs were obtained from the Production Manager Performance Appraisal. The KPIs are grouped according to the assessment category in which they fit. The percentages for the KPIs in each group are summed to determine the Assessment Category weighting. Although the Front-line Supervisor is not directly responsible for some of the KPIs, such as the Rolling Stock Budget, the Project Management duties that are carried out by the Front-line Supervisor assist the Production Manager to draw up and adhere to the Rolling Stock Budget.

3.2 Model Validation

This section concludes Phase 3 in Figure 1 by completing Step VI. It also achieves objective 5 in Table 1. Validation involves implementing the model in the industry. The focus of this project was to create an Effectiveness Assessment model specifically for the Front-line Supervisors at PRASA. For this reason, validation was completed at PRASA. Table 4 indicates an example.

Table 4: Model Example

		Manager	Supervisor	Subordinate	Ave.	Category
	Technical Skills					
1	Performs assigned and required duties (e.g. analysis of train delays, quality assurance, etc.)	3	4	3	3	4
2	Follows the correct procedures as outlined by PRASA	4	4	4	4	
3	Uses tools, materials and equipment effectively	4	4	3	4	
4	Works safely and conducts assessments to minimise potential hazards (e.g. breathalyser tests, PPE, etc.)	5	4	4	4	

The category used in the example is Technical Skills. Each assessment criteria, 1 to 4, is rated by the manager, the supervisor and the subordinate. A weighted average rating is then calculated to determine the overall weighting for each assessment criteria. The weighted average is calculated as follows: the manager rating is multiplied by 3, the supervisor rating is multiplied by 2 and the subordinate rating is multiplied by 1. These values are then summed and divided by 6 to obtain the weighted Average Rating values. A weighted average is calculated to eliminate bias whilst still including the 360-degree feedback method of performance assessment.

The manager’s rating should weigh the most as the manager’s job is to ensure that the supervisor complies to his job description. Subordinates have the lowest weight as they might be biased towards or against the chain of command. Averages are rounded off to identify which order rank is appropriate, according to Table 2. The mean of the averages for criteria 1 to 4 is obtained to determine the Category Rating value. This example yields that the supervisor ‘Exceeds Expectations’ in the Technical Skills category.

After the weightings are calculated, the supervisor assessed obtained 62% for effectiveness. According to the effectiveness ranking in Table 5, it shows that the supervisor is Very Effective. Although this is a good percentage to obtain, the model allows the assessor to analyse the loss of the other 38%. By doing this, the second research question of the study is answered. The assessor can use the model to identify categories in which the supervisor is performing inadequately. The assessor can then further identify the issues within the categories by inspecting the ratings given for each question. This allows for identification of the problem areas and the need for improvement. Discrepancies between manager, supervisor and subordinate rankings can also be addressed and resolved. To validate the model in the real-life context, the surveys were presented to the employees at PRASA on Wednesday, 12 September 2018. On this day, the Front-line Supervisors were also interviewed to provide feedback on their rankings.

Table 5: Effectiveness Rank Order (adapted from [29])

0 - 20% = Not effective
21 - 40% = Occassionally effective
41 - 60% = Effective
61 - 80% = Very effective
81 - 100% = Extremely effective

4 DISCUSSION

Overall, 60 surveys were distributed to the employees in the Component Services and Fleet Maintenance divisions. Apart from the Faults department, both Production Managers and all Front-Line Supervisors completed surveys to rank the supervisors within the respective departments. Of the 50 subordinates that were asked to rank their supervisors, 39 subordinates completed surveys, 7 of which were marked ineffectual due to mistakes made by the subordinate when completing them. Considering the subordinates who did not want to participate and the subordinates who did not complete the survey correctly, the process resulted in a 70% respondent success rate.

Once the data was consolidated, it was found that all the Front-line Supervisors assessed achieved an effectiveness rating between 61 and 80%, yielding them as Very Effective according to Table 5. The results are shown in Table 6. This fulfils Step IX of the research methodology shown in Figure 1.

Evaluating the results for all supervisors, it is noted that most supervisors exceed expectations in the Technical Skills category, most supervisors meet expectations in the Project Management, Self-Management, Quality of work and Initiative categories and all supervisors meet expectations in the Personnel Management category.

Table 6: Consolidation of Survey Results

		Assessment Category									Overall Rank
		Technical Skills	Quality of Work	Initiative	Self-Management	Communication and Team Work	Innovation	Leadership	Project Management	Personnel Management	
Department	South Shedding	4	3	3	3	3	4	3	3	3	66%
	North Shedding	3	3	3	3	3	3	3	3	3	65%
	Instrumentation and Valve Shop	4	4	4	4	4	4	4	4	3	74%
	Armature Repair Shop	4	3	3	3	3	2	3	3	3	62%
	Rotary Machine Repair Shop	4	3	3	3	3	4	3	4	3	68%

5 CONCLUSION AND RECOMMENDATIONS

This section further fulfils Step XI and concludes Phase 4 of the research methodology shown in Figure 1. The Front-line Supervisor Effectiveness Assessment model created produced that overall, none of the supervisors are performing below expectations. However, this may not be a completely true reflection.

It is evident that bias exists based on the results received from the surveys. Apart from the bias, of the 60 surveys that were distributed, 50 were administered to subordinates. Only 39 of these surveys were completed and of the 39, 7 had to be scrapped due to errors. This scrapping accounts for 11.7% of the surveys distributed. Because of this and the bias that exists, it is recommended that if PRASA is to implement the model, participants and employees are to be properly educated on how to complete the surveys and the benefits of being subjective when completing them. These benefits include improving the governance of supervisors and identifying the skills that supervisors lack. Educating employees will not only make them realise the benefits but it will also encourage more employees to complete surveys and become a part of the process to improving supervisor governance and problem-solving.

It is recommended that PRASA does not solely look at the effectiveness percentage a supervisor received when they are proven to be effective. The results of each assessment criteria should be analysed as there is always a need for improvement and should improvements be implemented, it will only better supervisor governance and ultimately the organisation. In addition, criteria in which supervisors are performing inadequately should be highlighted such that training needs and the required improvement of skills are identified.

Furthermore, comparisons can be made between supervisors. These comparisons; however, are not to serve negative purposes but rather to allow the more effective supervisors to help less effective supervisors. From the validation results, the supervisor who achieved 74% can help the supervisor who achieved 62% with the criterion in which the less effective supervisor is receiving lower scores. For example, the Front-line Supervisor in the Instrumentation and Valve Shop attained an Innovation ranking of 4, whereas the Front-line Supervisor in the Armature Repair Shop attained an Innovation ranking of 2. In this case, the supervisor for the Instrumentation and Valve Shop can recommend ways in which the supervisor of the Armature Repair Shop can identify areas for improvement, realise the reason for and become adaptable to changing working environments and identify the importance of generating and being open to new ideas. Additionally, outside factors such as the working environment or task requirements should be investigated if supervisors achieve the same ranking for the same categories.

6 REFERENCES

- [1] **Bestsampleresume.com**. 2018. *The Duties and Responsibilities of a Front-Line Supervisor*. Available at: <http://www.bestsampleresume.com/job-descriptions/customer-service/front-line-supervisor-responsibilities.html> [Accessed 16 Mar. 2018].
- [2] **Managementhelp.org**. 2018. *Roles and Responsibilities of a Supervisor*. Available at: <https://managementhelp.org/supervision/roles.htm> [Accessed 16 Mar. 2018].
- [3] **Kothari, C.** 2004. *Research Methodology: Methods and Techniques*. doi: <http://196.29.172.66:8080/jspui/bitstream/123456789/2574/1/Research%20Methodology.pdf>
- [4] **Erickson, F.** 1985. 'Qualitative Methods in Research on Teaching', *Handbook of research on teaching - A project of the American research association*, pp. 119-161. Available at: <http://eric.ed.gov/?id=ED263203>.
- [5] **Gilmore, A. and Carson, D.** 1996. "Integrative" Qualitative Methods in a Services Context', *Marketing Intelligence & Planning*, 14(6), pp. 21-26. doi: 10.1108/02634509610131126.
- [6] **Matveev, A.** 2002. *Theory of Communication and Applied Communication*. 1st ed. [ebook] New York, USA: Collected research articles, Bulletin of Russian Communication Association, pp.59 - 67. Available at: http://ruscomm.ru/eng/rca_biblio/m/matveev01_eng.shtml [Accessed 8 Oct. 2018].
- [7] **Stanton, E. S.** 1960. 'Company Policies and Supervisors' Attitudes toward Supervision', *Journal of Applied Psychology*, 44(1), pp. 22-26.
- [8] **Bartol, KM, Durham, CC and Poon, JM.** 2001. 'Influence of Performance Evaluation Rating Segmentation on Motivation and Fairness Perceptions', *Journal of Applied Psychology*, vol. 86, no. 6, pp. 1106-1119.
- [9] **Turner, N., Barling, J. and Zacharatos, A.** 2002. 'Positive psychology at work', *Handbook of positive psychology*, pp. 715-728. Available at: [http://web.business.queensu.ca/faculty/jbarling/Chapters/Positive Psychology at Work.pdf](http://web.business.queensu.ca/faculty/jbarling/Chapters/Positive%20Psychology%20at%20Work.pdf).
- [10] **DeConinck, J. B. and Johnson, J. T.** 2009. 'The Effects of Perceived Supervisor Support, Perceived Organizational Support, and Organizational Justice on Turnover among Salespeople', *Journal of Personal Selling and Sales Management*, 29(4), pp. 333-351. doi: 10.2753/PSS0885-3134290403.
- [11] **Neal, A. and Griffin, M. A.** 2004. *Safety climate and safety at work, The Psychology of Workplace Safety*. doi: 10.1037/10662-000.
- [12] **Beehr, T. A. et al.** 2006. 'The nature of satisfaction with subordinates: Its predictors and importance to supervisors', *Journal of Applied Social Psychology*, 36(6), pp. 1523-1547. doi: 10.1111/j.0021-9029.2006.00070.x.
- [13] **Wayne, S. J. and Liden, R. C.** 1992. 'Effects of Impression Management on Performance Ratings: A Longitudinal Study', (1), pp. 232-260.
- [14] **Swann, W. B., Stein-seroussi, A. and Giesler, R. B.** 1992. 'Why People Self-Verify', 62(3), pp. 392-401.
- [15] **Mitchell, T. R., & Kalb, L. S.** 1982. Effects of job experience on supervisor attributions for a subordinate's poor performance. *Journal of Applied Psychology*, 67(2), 181-188. <https://doi.org/10.1037/0021-9010.67.2.181>.
- [16] **Kelley, H. H.** 1973. 'The processes of causal attribution.', *American Psychologist*, 28(2), pp. 107-128. doi: 10.1037/h0034225.
- [17] **Canger, J. M.** 2004. "Big Five" Personality on Subordinate Attitudes', 18(4), pp. 465-481.
- [18] **Hazucha, J., Hezlett, S. and Schneider, R.** 1993. 'The Impact of 360-degree Feedback on Management Skills Development', *Human Resource Management*, pp. 2-3.

- [19] Griffin, M. A., Patterson, M. G. and West, M. A. 2001. 'Job satisfaction and teamwork: The role of supervisor support', *Journal of Organizational Behaviour*. doi: 10.1002/job.101.
- [20] Li, D., Luo, J. and Huang, L. 2012. 'A study on the relationship between supervisor's feedback and employees' creativity: The mediating effect of psychological capital', *ICSESS 2012 - Proceedings of 2012 IEEE 3rd International Conference on Software Engineering and Service Science*, pp. 669-672. doi: 10.1109/ICSESS.2012.6269555.
- [21] Workplace Impact: Good Supervision versus Poor Supervision - Training Course in Sydney, Parramatta. 2014. [Blog] *Professional Development Training*. Available at: <https://pdtraining.com.au/blog/supervision-training/workplace-impact-good-supervision-versus-poor-supervision-training-course-in-sydney-parramatta/> [Accessed 3 May 2018].
- [22] Lavoie, A. 2016. *Here Are 4 Problems That Occur with Poor Management Skills*. [online] Entrepreneur.com. Available at: <https://www.entrepreneur.com/article/276919> [Accessed 4 May 2018].
- [23] US Department of Labour. 2015. 'Engineering Competency Model', *Employment and Training Administration, USDOL*, (May), pp. 1-37. Available at: www.doleta.gov.
- [24] Komaki, J., Zlotnick, S. and Jensen, M. 1986. 'Development of an operant based taxonomy and observation index of supervisory behaviour', *Journal of Applied Psychology*, 71(2), pp. 260-269.
- [25] Komaki, J. L., Desselles, M. L. and Bowman, E. D. 1989. 'Definitely Not a Breeze: Extending an Operant Model of Effective Supervision to Teams', *Journal of Applied Psychology*, 74(3), pp. 522-529. doi: 10.1037/0021-9010.74.3.522
- [26] OIM Operations Solutions. 2018. 'Kumba Mine Engineering: Supervisor Activity Analysis'.
- [27] DeFranzo, S. 2012. *Advantages and Disadvantages of Surveys*. [online] Snap Surveys Blog. Available at: <https://www.snapsurveys.com/blog/advantages-disadvantages-surveys/> [Accessed 19 Jul. 2018].
- [28] DeFranzo, S. 2014. *Advantages and Disadvantages of Face-to-Face Data Collection*. [online] Snap Surveys Blog. Available at: <https://www.snapsurveys.com/blog/advantages-disadvantages-facetoface-data-collection/> [Accessed 26 Jul. 2018]
- [29] Hr.okstate.edu. n.d. *Supervisory Staff Performance Evaluation*. [online] Available at: https://hr.okstate.edu/sites/default/files/docfiles/evaluation_form_supervisors.doc [Accessed 11 Aug. 2018].