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High Performance Team Development and its impact on performance within the South African Railway Maintenance Industry

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The effective and efficient planning and execution of maintenance within the South African railway industry relies on infrastructure teams. Despite the critical role of these teams, there is a significant gap in understanding how to develop high-performance teams (HPTs) within this sector. Basic teams need to transition towards integrating the concept of HPTs. However, industries have been slow to adopt structured HPT development, lacking awareness of its potential to significantly enhance productivity and performance at the maintenance execution level. This research addresses this gap by theoretically identifying the key characteristics that define HPTs. The study's originality lies in its focus on assessing team morale, evaluating employees' perceived understanding of HPTs, and proposing tailored development strategies for the South African railway maintenance industry. The research identifies gaps between existing and ideal team morale and HPT development, proposing targeted focus areas and structured methods for achieving HPTs. The proposed methods and recommendations offer a strategic framework for senior management, human resources, and training divisions to systematically close these gaps, facilitating the transformation of standard maintenance teams into HPTs. By doing so, the research provides a novel approach to improving maintenance execution performance, which is expected to yield enhanced team morale, reduced railway incidents, and increased customer satisfaction.

Keywords: Maintenance Management, high-performance teams, team development, team morale, railway industry.

1. Introduction

The largest state-owned logistics company in South Africa is responsible for managing and operating the country's freight logistics infrastructure. The entity focuses on the growth of South Africa's market share, by aiming to improve operational reliability and efficiency, whereby the bulk of this growth is accounted for in the freight transport and operations division. The provision of network availability is always dominant and is achieved by the efficient planning and execution of maintenance.

Equipment and assets are resources of utmost importance, which continually add value to products or service delivery; therefore, such resources should be kept at an optimum condition or workability. The poor upkeep of assets causes the lack of workability of systems resulting in excessive downtime as well as a decrease in productivity and the ability to deliver the necessary services. Maintenance management is based on accurate planning and execution of maintenance tasks. The planning phase forms the basic grounds, of which narrates the tasks efficiency and cost of actions.

The Freight Rail Infrastructure (FRI) division is made up of various depots situated across South Africa, which focus on the resourceful planning, logistics and safe execution of railway maintenance. Maintenance of the railway infrastructure forms the core effort of the depots in FRI. The ultimate execution of this planned maintenance as per the standards and guidelines, is mostly done by the depot labor, and referred to as the infrastructure teams, at times in conjunction with on-track maintenance machines.

FRI relies on the various disciplinary teams to not only plan, but most importantly execute the

planned maintenance. Efficient teamwork and alignment is paramount in order to achieve the desired productivity and depot performance, ultimately enabling the safe passage of trains. Therefore, the need for not only standard working teams, but high-performance teams has become a necessity for the depot and FRI as a whole. However, in order to work towards achieving this standard of "teamwork" it is necessary to understand what teamwork entails and how standard teams differ from high performance teams.

The phrase "teamwork" is described as two or more individuals that have roles and who work together "interdependently and adaptively" towards a shared objective (Salas et al, 1997). Maintenance management is a critical business process and is seen as the process of maximising the return of investment on all assets owned by the company (Wireman, 1998). In some industries, the execution of maintenance activities is dependent on teamwork. The South African Railway Industry depends on the use of teams for the maintenance management of the railway network, enabling the safe passage of freight. However, to fully maximise the utilization of teams, it is important to identify and evaluate such needs and characteristics.

While teamwork is often discussed in literature, the need for clearly defining HPTs in relation to the railway maintenance industry as well as how HPTs can impact an industries performance/productivity is an essential area of understanding. It is suggested by Irani and Sharp (1997), that to succeed, the integration of knowledge, experience, skills, and perspectives of a variety of people is vital. Teamwork is therefore a great contributing factor in the performance of an organisation. The ability to optimize teams into HPTs is a concept that is unclear and rarely accurately implemented but is a vital need in such industries since high performance is an objective.

This study aims to explore the definition and characteristics of HPTs as well as the gaps that presently exist in the successful development of HPTs within the railway infrastructure maintenance environment.

Preliminary investigation suggests that the execution of highly productive maintenance management relies strongly on the performance of the designated teams. Most industries and organisations utilize teamwork for maintenance execution; however, there are various factors that need to be identified for an industry to optimise these teams, resulting in the desirable high-performance teams. Although this is a necessity, complete understanding of the term and proper team development or frameworks to produce HPTs is not well recognized and implemented.

The lack of understanding on high performance maintenance teams and the proper processes needed to implement such to contribute to high productivity, lead to the inability to effectively improve on reliability and availability within South African railway industry. While teamwork is often discussed in literature, the need for clearly defining HPTs in relation to the railway maintenance industry as well as how HPTs can impact an industries performance/productivity is an area of research that is essential.

To address the gap within the South African railway industry, the following objective was proposed:

- What factors define and characterize HPT within the railway maintenance industry?
- What gaps are present in the development of HPTs?
- Will HPT impact performance positively within the maintenance execution sphere?

2. Literature Review

An explorative literature review process based on a thematic analysis was followed, identifying the sections below.

2.1 *High-Performance Teams*

Within the Railway Maintenance industry, the execution of maintenance tasks relies on teams. Maintenance management, as literature has outlined, is made up of the planning phase and the execution phase. Maintenance teams form a pivotal role in the successful completion of the latter. Several sources of literature agree that a team is made up of the following aspects:

- social interaction among each other (Mealiea & Baltazar, 2005; Gander, Gaitzsch & Ruch, 2020),
- brought together to execute tasks aligned to the organizational context (Doolen, Hacker, and Van Aken, 2003; Adler and Heckscher, 2018),

- encompass complimentary skills and have various responsibilities (Kozlowski & Ilgen, 2006; Mickan and Rodger, 2000), and
- have a general purpose agreed upon by the team members and the leader (Salas et al, 1997).

Thus, the effective management of maintenance teams is necessary as this is one of the factors, that can contribute to improved performance or productivity (de Vries and Visser, 2021). Leaders who take considerable time and effort into gaining a deep understanding of team management issues may assist in converting teams into highly proficient teams that an organization can depend on. With the increasing complexity of this type of industry, ultimately the need for not just teams, but high-performance teams are a must to maintain and improve on the overall achievement of the objective.

Table 1: HPT Characteristics Presented by Literature

Literature	HPT Characteristics
Organisational Support - Meyer (1998)	It is important for organisations focused on building HPTs, to make available resources such as time, support, training, money and information. Organisations also need to encourage open communication for empowerment and innovation purposes.
Defined Focus - Scholtes et al (1996)	HPTs must have "defined purposes and goals that serve the organisation". Clear parameters in which to work within, assists the team to understand the importance and expectations of a task.
Group Culture – Stott and Walker (1995)	HPTs require a work environment of creativity, participation and empowerment, suggesting that creative chaos, to an extent, may improve performance. Senge (1990) also argues that tension due to creativity characterize the ability for HPTs to learn.
Knowledge and Skills – Katzenbach and Smith (1993)	Skills such as conflict management, communication skills, problem solving skills and creativity approaches, to name a few are vital in the performance of teams.

High performance teams are a group of highly skilled people, committed to the mutual growth of an organization as well as personal success (Moscovici, 2003). HPTs embody the ability to perform at the highest level for an extended duration of time in order to achieve the desired outcome in the most efficient and effective manner possible (Holmes, 2012). To be able to work towards the building and implementation of HPTs, it is necessary to understand the skills and characteristics that HPTs encompass. Table 1 outlines various elements presented by literature regarding the characteristics of HPTs.

2.2 *Developing Successful High-Performance Teams*

In working environment, teams form the backbone in modern-day work life. In the way in which organizations carry out tasks and organize work, HPTs are essential, leading to high-class performance, resulting in a competitive advantage. Therefore, methods and processes must be put in place to develop teams into HPTs, to maximise on team deliverables. The most common model to develop HPTs consist of four phases being forming, storming, norming and performing (Tuckman, 1965). Iorhen (2019) states that the most important aspect of developing HPTs and getting team members aligned is the ability and space for team members to get to know each other prior to becoming an HPT. The coalition of the team is required so that the team can build on the next level of trust and relations. Exercises are a necessity to develop ways to work together and attain deliverables together, ways to support each other and ensure that team members hold each other accountable and have the ability to recognize, celebrate and achieve personal growth.

Katzenbach and Smith (1993) in addition suggest that clear performance standards are essential for the development of HPTs. Standards ensures the provision of accountability, which results into an ethic of performance to achieve the desired goals for all stakeholders involved.

2.2.1 *Challenges*

Challenges and obstacles typically experienced with HPTs are unaligned goals, team member conflicts, confused roles, lack of trust, poor leadership and unstructured reward systems

(Robbins and Finley, 2000). Additional barriers, such as not supporting of employee creativity (Saleem, et al 2021) and the alignment of the needs of the individual to that of the team (Senge, 1990) exist. Finally, measures of importance trigger improved performance and are the reason why many developmental programmes fail, emphasising the necessity of such a system structure within the organisation.

2.2.2 *The Leadership Gap*

HPTs function on self-generated energy, whereas low performing teams are overcome by low self-motivation and dysfunction. This is mostly due to low self-awareness from members within the team and meagre leadership (Brazil, 2022). This notion is supported by Gilkey (2014), stating, "An individual's poor performance is usually just the tip of the iceberg, with the underwater portion of the iceberg being made of performance gaps at the strategic, planning, communication, or systemic levels." This shows that team performance is not always based on the individual within that team, but the gaps within the leadership stages that lead up to the performance execution.

Practically, the leadership gap is one that is rarely focused on with the regards to why some teams are low performers. This shows that in order to develop and enhance HPTs, focusing on senior management processes is vital in the goal of achieving HPTs.

2.3 *The Impact of High-Performance Teams on Performance*

Presently, most emphasis is placed on individual performance and achievements, overlooking the concept of teamwork in an organisation. Stott and Walker (1995) state that performance is dependent on the ability of the team, the motivation of the team and the work environment. Jones et al (2008) state that the facilitation of improved performance can be done by effective team behaviours. However, teams, more specifically HPTs are a major source of performance and productivity, believing that teams can impact an organization's performance. The characteristics of HPTs reviewed by the literature and what is needed for an HPT to be successful contribute to the positive impact of HPTs on performance. These characteristics and developmental factors encourage the efficient and constructive behaviour of HPTs, thus resulting in an improved level of performance within an organisation.

3. Conceptual Method

The literature review forms the base of this conceptual model, whereby particular variables were identified, and their relation was analysed. The aim of this study is to analyse the characteristics of HPTs and determine the perceived positive impact such teams have on performance in terms of the execution of maintenance activities within the South African railway industry. Hence the variables selected where HPT characteristics, means of development, and their subsequent impact on performance of maintenance tasks. To be able to implement HPTs in the current industry, it is fundamental to define and understand the make-up of HPTs, which thereafter gives the ability to recognize the steps necessary to build present teams, into HPTs.

The three focus areas for this study, identified by the researcher, as shown in Figure 1 begin with an analysis of the first variable being the characteristics of HPTs. For this study it is vital to define the term HPT and what are the characteristics of such, to fully understand its role and the difference between a traditional team and an HPT. To do this, the characteristics need to be identified and defined. This will assist the industry in recognizing the steps to take to be able to build and implement an HPT, as the foundation of understanding will be present amongst all stakeholders.

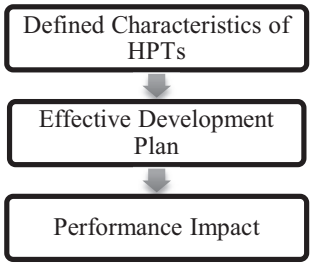

Figure 1: Relationship between Identified HPT Study Variables

The review of literature has shown that the implementation and effective operation of HPTs within industry does in fact have a positive effect on performance. To achieve this, the first two variables identified play a critical role in

recognizing the objective of improved performance. Therefore, is important to identify the perceived impact HPTs have on performance rates within the railway maintenance division, to be able to establish the importance and need for HPTs to be well-defined and developed within the industry, to meet the goals and objectives thereof. Based on the elements discussed and the literature analysed, the following is hypothesised:

- H1: The concept of HPT characteristics within the workplace is poorly understood
- H2: The South African Railway Industry focuses inadequately on team development programmes and frameworks to optimise team performance
- H3: Team development programmes, effective rewards and recognition schemes and regular high-quality training programmes will facilitate the development of HPTs

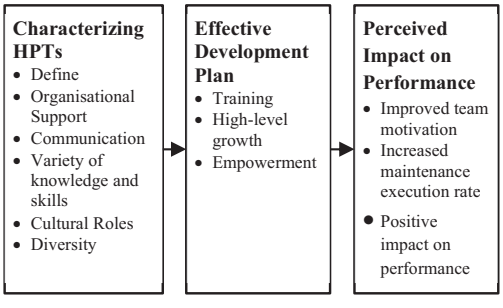

Figure 2: Conceptual Framework for Assessment

Based on the hypothesis, Figure 1 is further broken down by the researcher to depict the conceptual framework used as an assessment for this study, as shown in Figure 2.

4. Research Approach

4.1 *Research Strategy*

A theory application research was used in achieving the desired outcome, thus the use of a qualitative method. Collis & Hussey (2003) explain that the qualitative research method allows for a complete analysis of the research subject, without a limitation placed on the participant's responses. Although the execution of qualitative research is reliant on the abilities of the researcher and the outcomes may not be seen at completely reliable as the results stem from the researcher's interpretation of the data, utilizing the qualitative research method additionally promotes the need to understand the social and cultural contexts of the research at hand.

To ensure theory verification, empirical data will be used to measure the current state of team characteristics within the South African railway industry, specifically the maintenance execution area, as well as the perceived characteristics and value of high-performance teams. This method allows the researcher to make use of theory to guide the study design and the interpretation of the analysed results.

4.2 *Research Methodology*

The research employed a theory application approach with a qualitative, survey-based design. The questionnaire aimed to verify the theoretical hypotheses using empirical data, capturing railway maintenance personnel, including supervisors' perceptions. The questionnaire was distributed via email and focused on HPT characteristics, the development of HPTs, and HPTs' impact on performance using a Likert scale and yes or no questions.

4.3 *Data Collection*

The survey questionnaire was sent via email to rail infrastructure maintenance departmental admins, to be circulated among the maintenance execution supervisors and teams. The survey consisted of 21 questions with 77 data fields. The Survey was sent out on 12 April 2020 and closed on 25 September 2020 due to Covid Restrictions of employees being at work. Out of the 120-maintenance staff that the survey was circulated to, 72 participated in the survey. All 72 participants completed the survey fully.

4.4 *Data Analysis*

Data analysis involves breaking up the information themes or categories as described in section 4.3.3. This assist the analysis in being more manageable in terms of the information collected. Since a Likert-style questionnaire is used, ordinal data is gathered, therefore the parametric analysis method is inappropriate. Thus, the statistics because of the data analysis is descriptive, providing a graphical representation of the analysis, using bar charts.

The researcher made use of the Statistical Package for Social Sciences (SPSS) software to

complete the statistical analysis for the data collected to determine the frequencies, percentages, cumulative frequency and cumulative percentage of each question and sub question.

5. Results

5.1 *Characteristics of HPTs*

The survey results on the ranking of HPT characteristics suggest that respondents prioritised open communication, clarified roles and responsibilities, conflict resolution, and team member respect and support as the most critical attributes for effective team performance. Table 2 shows the ranking of the characteristics, from biggest to smallest based on the survey results.

Table 2: Ranking of HPT Characteristics

Characteristics	Ranking of Extremely Important
Communicate openly	49%
Clarified roles and responsibilities	48%
Resolution of conflict	48%
Team member respect and support	45%
Team empowerment	45%
Continuous development	45%
Clear and defined goals and plans	42%
Facilitation of productive meetings	32%
Able to adapt in different situations	31%
Effective team leadership	30%
Encourage creative thinking	28%

5.2 *HPT development*

An understanding of what is needed to develop teams into HPTs was then gained from the survey results. The survey results concluded that team development, performance incentive schemes, and regular training were seen as the most critical methods for developing HPTs within railway maintenance. Table 3 shows the ranking of the methods that are seen as most important.

5.3 *Team morale*

The understanding of the present team morale of the respondents assists in identifying gaps within the development and performance of the maintenance staff. Thereafter, a programme or framework can be developed, aiming to close these gaps, ultimately generating HPTs, and producing improved performance.

Table 3: HPT Development Methods

Methods	Ranking of Extremely Important
Team development	44%
Performance incentive schemes	44%
Regular training	43%
Rewards and recognitions	43%
Team building exercises	38%
Coaching/mentorship	38%
Team member respect and support	37%
Problem solving sessions	36%
Strategy meetings	30%
Acknowledge and accept team members differences	27%
Getting to know team members before working towards objectives	25%

The results from the survey indicated that 76% of the respondents do not feel recognized for their hard work and accomplishments. However, 83% feel that their ideas and opinions can be communicated openly, suggesting that they feel valued and that their inputs are accepted. 75% stated that productive meetings are held without the influence of their supervisor/manager, aligning with the means of open communication. 85% trust and respect each other as team members, aligning with the ability of the team to communicate disagreements constructively, 81%.

6. Recommendations

6.1 *Characteristics of HPTs*

It is recommended that the organisation shows support for the important characteristics identified by the survey. This can be done by prioritising open communication, clearly defined roles, resolving conflict, and respecting and supporting team members. These characteristics should be embedded in training programmes, leadership development, and team-building initiatives to strengthen collaboration and performance.

6.2 HPT development

It is recommended that the identified performance development methods are established and implemented at the maintenance execution level of the railway industry. Team development sessions, performance incentive schemes, regular training and rewards and recognitions should be formally established by the training office,

developed for a specific purpose and implemented and acknowledged by executive management, cascaded down to middle and lower management to drive and monitor. Human resources as well as the infrastructure maintenance must be aligned of the need and purpose of team development, converting standard teams to HPTs.

The alignment between training, human resources and maintenance performance strategies is pivotal in the successful execution of developing HPTs. Performance incentive schemes and rewards and recognitions programmes can be restructured to incorporate the need to attend HPT trainings and courses, encouraging maintenance staff to participate, allowing for personal and professional growth, creating opportunities for advancement.

6.3 *Team morale*

To improve respondents not feeling recognized for their hard work and accomplishment performance incentive schemes should be reassessed to address gaps in motivating staff and ensuring adherence to roles. Respondents also highlighted the lack of team-building sessions, which are essential for trust, communication, and productivity. Their absence contributes to low morale and reduced performance. To address this, annual team-building plans should be integrated into maintenance operations to enhance skills, confidence, and teamwork.

6.4 *Contributions to theory and practice*

The data analysis validated all four hypotheses, confirming that developing standard teams into HPTs enhances maintenance performance. The findings highlight the importance of training, team-building, and effective incentive schemes in HPT development. Survey results indicate that open communication, clear roles, conflict resolution, and mutual respect are the most valued HPT characteristics. Additionally, concerns at the maintenance execution level reinforce the need to revise incentive schemes to benefit both management and workers.

6.5 *Limitations*

The first limitation would be that the results only represent the industry within South Africa and a specific employee base within the South African railway industry. The sample selected was only on the rail network infrastructure employees within the Eastern Region, therefore only representing a certain region. The second limitation was due to the survey being distributed during the COVID-19 pandemic and therefore restricted in terms of the audience it was able to reach. Future research can consider expanding the sample size to rail network infrastructure regions through South Africa as well as to different rail network populations in order to improve the model and results.

7. Conclusion

This study confirms the critical role of High-Performance Team (HPT) development in enhancing maintenance execution and overall performance within the South African railway industry. The research findings, derived from a survey, provide empirical support for the importance of open communication, clearly defined roles, conflict resolution, and mutual respect as fundamental HPT characteristics.

Additionally, the survey results highlight significant gaps in structured team-building initiatives and performance incentive programmes, which impact team morale and motivation. The data indicates that training, well-defined incentive structures, and strategic team development initiatives are essential in cultivating HPTs, yet their current implementation is inadequate.

The study further establishes that misalignment between human resources, training, and maintenance management limits the effectiveness of HPT development. By addressing these gaps through a structured framework based on empirical findings, organisations can enhance team efficiency, morale, and overall railway maintenance reliability. The statistical validation of responses ensures that these conclusions are grounded in measurable workforce insights rather than anecdotal assumptions.

To maximise the impact of these findings, further research should explore the sustainability of HPT development initiatives, particularly in leadership, incentive structures, and long-term performance impact. The recommendations outlined in this study provide a data-driven foundation for organisations to foster high-performing, motivated teams, ultimately leading to improved performance.

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