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Effects of Project-Based Change Management Processes on Operational Performance in the Zambian Mining Sector: Evidence from Kansanshi Mine

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Abstract: Mining companies work in a technically challenging and safety sensitive environment, where changes in equipment, process and organisational systems have to be executed without disrupting the operational flow. The study involved the effects of project based change management processes on operational performance of Kansanshi Mine in Zambia. In particular, it looked at change management strategies, evaluated the models employed, investigated links between change practices and employee adoption and operational outcomes, and reviewed the challenges to implementation. The study was of a descriptive case-study type with a mixed method approach. The thesis uses a judgemental sampling method to reach a sample of 50 respondents, which include 200 project team members, and reports findings from this sample. Questionnaires, interview, observation and documentary sources were used in the collection of data. Descriptive statistics and reported inferential tests were used to analyse the findings. 40% reported on-the-job coaching, 36% formal training and 24% no training. The Kotter 8-Step Model was the most common framework mentioned (24%). Formal training and adopting structured change models were significantly related to higher adoption rate and more positive operational results (p < .001). Funding limitations, digital/information technology issues, lack of tools and manpower, communication issues, and training limitations were cited as major challenges. The study identifies structured training as well as a commitment of leadership and context-specific change frameworks as important factors in successful project-based change in mining operations.

Keywords: *Change Management; Project-Based Change; Mining; Operational Performance; Employee Adoption; Kansanshi Mine.*

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I. INTRODUCTION

➢ *Background*

Organisations have to work within a technological context, market conditions, regulatory requirements and workforce expectations. Such pressures mean that organizational change is an ongoing management task and not a one-off occurrence. Change in mining can include new equipment, changed maintenance systems, new digital systems, new safety requirements, and project structure changes. The changes need to be coordinated very carefully as operational delays, equipment downtime and lack of preparation by employees can have an impact on safety and productivity (Burnes, 2014).The effectiveness of change, is thus, not only determined by the technical design of a project, but also by the understanding, acceptance and implementation of the changes by the employees and other stakeholders. Individual change (Hiatt, 2006) is the focus of the ADKAR framework, which includes awareness, desire, knowledge, ability and reinforcement. Kotter's change approach also emphasizes leaders, urgency, communication, and consolidating the change. These views are applicable to the mining industry, where these factors must align with project goals, leadership action, and capacity and resource availability to realize the successful implementation.

➢ *Problem Statement and Research Gap*

Several studies have been undertaken on the organizational change management and the effect on performance. Kochan et al., (2023) found out that an organization that is receptive to change is expected to register positive results in terms of customer satisfaction and returns.

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Oakley (2013) show that change management is known to solve and intervene loss of money in the management of resources. Local studies have largely focused on the strategic change process without necessarily linking it to performance.

For instance, Gachara (2014) study on managing strategic change at Sumac Microfinance Bank Limited which established that the microfinance uses both planned and emergent approach to manage change and the major challenges faced during the implementation of change was resistance to change. Wataka (2013) researched on managing strategic change. Muteti (2013) researched management of strategic change at the Telkom Kenya Limited and found out that management of strategic change practices adopted includes change of leadership, change of structure, training of employees and change of programs. Change Management Practices include the various activities undertaken by managers as they handle various aspects of change. For the change processes to be manageable, clear priorities must be set since the processes involved in the change management are complex in nature. Change programs and projects must make sense from the beginning, when the actual idea of change comes to place. The feeling that changes are right for an organization and the necessary sense of urgency to secure its realization will occur if it is clear that the changes have to be tailored to the organization and its particular business situation (Burnes, 2024).

➢ *Research Objectives*

- *General Objective*

The general objective of the study is an examination of project-based change management processes in mining companies. A case study of Kalumbila mine drilling department.

- *Specific Objectives*

✓ To Assess the effectiveness of change management strategies employed in project-based change management within mining companies.
✓ To determine the existing change management models employed by mining companies and determine their effectiveness in facilitating project-based change.
✓ To ascertain relationship between effective change management strategies employed and performance in project-based change management within mining companies.
✓ To find out challenges significantly influencing the effectiveness of project-based change management processes within mining companies

II. LITERATURE REVIEW

According to the literature reviewed in the thesis, the change management process is encompassed by the following elements: leadership, communication, employee involvement, training and technology and organizational adaptation. Communication is essential as workers must be made aware of the need for change, and the nature of the change and how it will impact them. Communication problems may foster doubt, lessen commitment and cause resistance. Employee involvement can also help to build ownership as staff members can draw on their knowledge of the operation in designing and introducing change.

Another core mechanism of training is also central. Formal training can develop a consistent knowledge and procedure, and on the job training can offer practical support in the workplace. Informal coaching can be less effective, however, because people can be coached differently resulting in different outcomes. One way of looking at whether employees are aware, motivated, know and able to embrace change, and whether change is reinforced is the ADKAR model (Hiatt, 2006).

Additionally, Kotter's 8-Step Model and Lewin's three-stage model will be discussed. These frameworks offer a structure to start, enable and keep change going. The findings analysed in the thesis indicate that models by themselves are not necessarily effective, because leadership commitment, engagement of employees, and compatibility of the model with the operational context and resources are important. This reflects the wider literature on organisational change which sees change as an process that takes place continuously with both organisational systems and people (Weick and Quinn, 1999).

Another theme is related to the connection between change management and organisational performance. Technological/Structural change can increase productivity but the benefits will be contingent on the systems being introduced being integrated into the skills, communication and operation of the organisation. The current research adds a local investigation of these relationships in a mining environment of Zambia.

III. METHODOLOGY

➢ *Research Design and Approach*

A descriptive case study using a project-based change processes approach was used in the study at Kansanshi Mine. The thesis states that the research has a mixed method that blends quantitative and qualitative sources of evidence together. The case-study design allowed exploration of change practices in their context.

➢ *Population, Sample and Sampling*

The thesis has been to find a target population of 200 members of a drilling team. It concludes with 50 responses. A non-probability judgemental (purposive) sampling technique was used to select the participants, whose sampling purpose was to involve people who were believed to have information relevant to project-based change.

➢ *Data Collection*

Primary and secondary data were collected. The instruments and methods described in the thesis include self-administered questionnaires, personal and telephone interviews, observation, and documentary review of manuals, reports and related organisational records. The use of multiple

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sources supported comparison of survey patterns with participants' explanations and documentary information.

➢ *Data Analysis and Ethics*

The thesis describes the use of descriptive statistics, including frequencies and percentages, with results presented in tables and figures. The reported results also include Pearson chi-square tests and Kendall's coefficient of concordance to examine associations and ranking patterns. The methodology chapter mentions Microsoft Excel for data handling, while the results include statistical test outputs; the thesis does not consistently identify the software used for every inferential analysis. Participation was voluntary, respondents were assured of confidentiality, and identifying information was not collected.

IV. RESULTS AND DISCUSSION

➢ *Respondent Profile*

The study reports 50 valid respondents. Most were male (84%), while 16% were female. The largest age group was 30–39 years (40%), followed by 40–49 years (28%). In terms of education, 40% held certificate or trade qualifications, 24% held diplomas, 24% held bachelor's degrees and 12% had postgraduate qualifications. Technicians and equipment operators each represented 28% of respondents. A substantial proportion had long work experience: 32% reported 6–10 years and 36% more than 10 years.

➢ *Change Management Strategies and Adoption*

Training experiences were mixed. Forty per cent of respondents reported that training was mainly delivered through on-the-job coaching, 36% reported formal structured courses, and 24% reported receiving no training. Employee adoption was also varied: 40% reported medium adoption (40–75% of the team), 36% reported high adoption (above 75%), and 24% reported low adoption (below 40%). The thesis reports a statistically significant association between training provision and adoption ($\chi^2 = 100.000$, df = 4, $p < .001$). The pattern indicates that structured training was associated with stronger adoption, while the absence of training coincided with low adoption.

Table 1 Reported Training Provision Among Respondents (N = 50).

Training approach	Respondents (n)	Percentage
On-the-job coaching	20	40%
Formal structured course	18	36%
No training	12	24%

➢ *Change Management Models*

Kotter's 8-Step Model was the most frequently identified framework (24%). ADKAR and custom or hybrid models each accounted for 20%, while Prosci was reported by 16%, Lewin's model by 12%, and no formal model by 8%. The thesis reports a significant association between the model used and the level of team adoption ($\chi^2 = 76.667$, df = 10, $p < .001$). Kotter's model recorded the strongest reported adoption outcome: all 12 respondents identifying it reported high adoption. Under ADKAR, 60% reported high adoption and 40% medium adoption. Hybrid approaches and the absence of a formal model were associated with weaker or less consistent adoption in the reported cross-tabulations.

Table 2 Change Management Models Identified in the Study.

Change model/framework	Percentage	Reported pattern
Kotter's 8-Step Model	24%	Highest reported adoption; all in this category reported high adoption
ADKAR	20%	60% high adoption; 40% medium adoption
Custom/hybrid models	20%	Variable; largely low adoption
Prosci	16%	Medium adoption reported
Lewin's model	12%	Medium adoption reported
No formal model	8%	Ad hoc change; low adoption reported

➢ *Operational Performance and Relationships*

Forty per cent saw clear improvements in operational performance, in particular in throughput and equipment uptime. A further 36% reported slight improvements, while 24% reported no improvement. The thesis also states that of the 18 individuals who had formal training, all of them said they had a significant improvement in operation. 70% of the 20 who had received on-the-job coaching indicated that it had little or no effect and 30% said it had some effect. No improvement or worse performance was reported by the 12 respondents who did not receive training. There was a statistical significance between training and operational outcomes ($\chi^2 = 90.500$, $p < .001$).

Such outcomes confirm the interpretation that change management has a relationship with operational performance via readiness and adoption of employees. Formally trained personnel seem to have a more consistent foundation to launch new processes and machinery. While coaching is helpful for practical learning, the benefits the coaching is reported to offer indicate that coaching should be supplemented with structured learning, effective communication, and follow-up support.

➢ *Leadership and Employee Resistance*

The results of the thesis indicated a significant relationship between senior leadership commitment and employee resistance ($\chi^2 = 40.278$, $p < .001$, df = 4). 40% reported strong leadership commitment, 36% reported

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moderate, and 24% reported weak leadership commitment. Leadership support was reported to assist teams deal with resistance, though as reported in the cross-tabulation, there was an unexpected pattern in which weak commitment went hand in hand with weak resistance. These cases may have had smaller or less complex changes, which are explained in the thesis. This finding should thus be seen with some caution, and should be compared with scale and nature of the change initiative.

➢ *Challenges Affecting Change Implementation*

The most prominent challenges were funding constraints and problems with digital or information technology tools, both of which received a mean rank of 3.70. Shortages of tools, spares or manpower received a mean rank of 3.58; structured training availability received 3.46; communication quality received 3.40; and procurement delays received 3.16. Kendall's coefficient of concordance was W = 0.108 (χ^2 = 26.970, df = 5, p < .001), indicating statistically significant but relatively low agreement among respondents in their ranking of the challenges.

Table 3 Ranking of Challenges Affecting Project-Based Change Management.

Challenge	Mean rank
Funding constraints	3.70
Digital/IT tool problems	3.70
Shortages of tools, spares or manpower	3.58
Availability of structured training	3.46
Quality of communication	3.40
Procurement delays	3.16

The findings suggest that change initiatives require more than employee willingness. Adequate budgets, functional digital systems, equipment and staffing are necessary to translate plans into practice. Communication and training remain important because resource availability alone does not ensure that employees understand or can implement new procedures.

V. CONCLUSION AND RECOMMENDATIONS

➢ *Conclusion*

The study showed there was a correlation between project-based change management and different levels of adoption and operational performance of the employees at the Kansansi Mine. The relationships between formal training and structured change frameworks with adoption outcomes were positive. The most prevalent framework and the one most likely to be adopted was Kotter's 8 Step Model of Leading Change. Training also was strongly related to operational outcomes. However, funding issues, digital/IT related issues, lack of tools and manpower, communication issues, lack of training provision and procurement delays were observed to be stumbling blocks for effective implementation of the change initiatives. The survey and qualitative evidence was provided to meet the reported four research objectives.

➢ *Recommendations*

- Establish mandatory, role-specific training before new equipment, systems or work procedures are introduced, supported by practical assessment and refresher sessions.
- Select and apply a recognised change management framework, such as Kotter's 8-Step Model or ADKAR, while adapting implementation to the scale and operational context of each project.
- Strengthen leadership sponsorship by requiring managers and supervisors to communicate the rationale, expected benefits, implementation stages and responsibilities associated with each change.
- Provide realistic project budgets and ensure timely procurement of tools, spares and other resources required for implementation.
- Improve the reliability and accessibility of digital and information technology systems that support project execution and operational monitoring.
- Create feedback mechanisms through toolbox meetings, employee consultations and post-implementation reviews so that concerns and implementation barriers can be identified early.
- Monitor change outcomes using indicators such as equipment uptime, downtime, throughput, training completion, employee adoption and implementation milestones.

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