ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE
DEPARTMENT OF PROJECT MANAGEMENT

STRATEGIC PROJECT MANAGEMENT SYSTEMS AND PRACTICES IN RESEARCH AND DEVELOPMENT PROJECTS: THE CASE OF ETHIOPIAN ROADS ADMINISTRATION

By **Abiy Eguale**

A Final Project Work Submitted to School of Graduate Studies
Addis Ababa University In Partial Fulfillment Of the Requirement for the Degree of
Master of Arts in Project Management

Advisor: **Dr. Bahran Asrat**

June 2023

Addis Abeba, Ethiopia

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Statement of Declaration

I, Abiy Eguale, declare that this project work entitled “Strategic Project Management Systems and Practices in Research and Development Projects: The Case of Ethiopian Roads Administration” in partial fulfillment of the requirement for the Degree of Master of Arts in Project Management is my original work prepared with the guidance and support of the research advisor Dr. Bahran Asrat. All sources of materials used for the research project work have been duly acknowledged. I further confirm that the study has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

Abiy Eguale	June 2023	Addis Abeba
Name of candidate	Date	Place

Statement of Certification

This is to certify that Abiy Eguale has carried out this project work entitled “Strategic Project Management Systems and Practices in Research and Development Projects: The Case of Ethiopian Roads Administration” under my supervision. This work is original and suitable for the submission in partial fulfillment of the requirement for the award of Master of Arts Degree in Project Management.

Dr. Bahran Asrat	_____	_____
Advisor	Signature	Date

Approval Sheet

STRATEGIC PROJECT MANAGEMENT SYSTEMS AND PRACTICES IN RESEARCH AND DEVELOPMENT PROJECTS: THE CASE OF ETHIOPIAN ROADS ADMINISTRATION

By **Abiy Eguale**

Approved by Board of Examiners

_____	_____	_____
Advisor	Signature	Date
_____	_____	_____
External Examiner	Signature	Date
_____	_____	_____
Internal Examiner	Signature	Date

ACKNOWLEDGEMENT

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Table of Contents

List of Tables

List of Figures

Acronyms/Abbreviations

ANOVA	Analysis of Variance
ARDP	Appointment of R&D Project Team
ERA	Ethiopian Roads Administration
IRC	Internal Research Committee
OLS	Ordinary Least-Squares
OSI	Organization's Strategic Intent
PAOS	Projects Alignment with Organizational Strategy
PM	Project Management
PPSI	Prioritize Projects & Select Implementing Strategies
R&D	Research and Development
RDB	R&D Projects Benefits and Preparation for the Future
RDM	R&D Management
RDO	R&D in the Organization
RMC	Research Management Committee
RRC	Road Research Center
RSC	Research Steering Committee
SM	Strategic Management
SPM	Strategic Project Management
SPSS	Statistical Package for Social Sciences
TMI	Top Management Initiatives

Abstract

The objective of this study is to assess strategic project management systems and practices during initiation, planning and implementation phases of research and development projects and identify the enabling and constraining factors. It focuses on Road Research Center of ERA which is located in Addis Abeba. The variables include organization's strategic intent, top management initiatives, prioritizing projects & selecting implementing strategies, projects alignment with organizational strategy, appointment of R&D project team, R&D management and R&D in the organization with their different elements towards R&D projects benefits and preparation for the future. The type of research approach is descriptive type using case study method. Samples for the questionnaire include researchers working now at RRC, other departments and the sector. Moreover, samples for the semi-structured interview were senior research management staff as key-informants. SPSS was employed to apply ordinary least-squares regression with multiple explanatory variables. The OLS regression result indicated only the two explanatory variables R&D management and R&D in the organization are significant predictors that have positive effect on R&D projects benefits and preparation for the future at RRC. In addition, the correlation value for strategic management and project management aspects also shows low correlation. Therefore, strategic selection, prioritization and alignment of R&D projects with the organizational strategy is recommended by giving attention to talent acquisition in order to streamline strategic project management systems and practices at the Road Research Center of Ethiopian Roads Administration.

Key words: Strategic Project Management, Research and Development (R&D) Projects, Project Management, Road Research Center (RRC), Ethiopian Roads Administration (ERA)

1 Chapter One

INTRODUCTION

This chapter starts with background of the study, statement of the problem, research questions and research objectives. These are followed by significance of the study (conceptual, empirical & methodological), scope of the study (conceptual, empirical & methodological), limitation of the study and organization of the study. Finally, definition of key terms is given.

1.1 Background of the Study

Strategic project management (SPM) main purpose, according to Erceg and Gulam (2018), is to ensure that the projects that an organization is implementing are in line with its strategic goals. In order to implement the strategic goals successfully, Talantsev and Sundgren (2013) noted that organizations must choose and evaluate specific projects in a consistent, highly precise manner. According to Ugonna (2016), it is essential to apply strategic project management systems and practices in research and development initiatives so that they will be in line with the strategic goals of the organization.

Overall, R&D projects within organizations may not be in line with the overall business plan. This could lead to the R&D project's discontinuation or the continued implementation of initiatives that fall short of the desired results and objectives (Alsudiri et al., 2012). Hence, strategic project management systems and practices help prevent wasting valuable organizational resources.

Most of research and development projects carried out under Ethiopian Roads Administration promote quality, reducing time and cost of road network development in Ethiopia (Ethiopian Roads Authority, 2017). The current perspective in R&D projects at the center is focused on the triple constraints. This aspect only no longer defines project success; instead, it now involves globally a contemporary analysis of the advantages to stakeholders and organizations through strategic project management systems and practices (Castro et al., 2019).

The idea of SPM systems and practices in R&D projects would improve organizations' capacity to choose the appropriate projects and match such projects to company strategy in order to ensure success (Ugonna et al., 2015). Thus, it is important to assess these in R&D projects in light of strategic project management systems and practices at the Road Research Center.

1.2 Statement of the Problem

This research was motivated by the need to consider achievement of organizational strategies beyond the triple constraints of project success at RRC. According to Castro et al. (2019), success criteria must be aligned with an organization’s needs. This can be gained by having insights and streamlining strategic project management in R&D projects. However, Srivannaboon (2006) noted that there is a deficiency of empirical literature that provides a clear understanding on how to integrate project management with organizational strategy. Furthermore, Ansari et al. (2014) also provided additional evidence that there is no practical methodology for evaluating the degree of congruence between them. In addition, according to Srivannaboon & Milosevic (2006), the alignment is multidimensional and there is ample potential of research in this area.

On the other hand, according to several studies, effective strategic project management depends on a number of internal factors, including effective communication, the project manager's competence, leadership, involvement at the beginning and the top management commitment (Alsudiri, et al., 2012). Thus, different literatures were consulted including working manuals of the Road Research Center to list out various contributing factors from initiation through review and learning.

In effective strategic project management, it is a necessary condition to understand the strategic alignment of projects (Erceg & Gulam, 2018). This demands the involvement of project managers and the top management of the organization. Broader perspectives of project success measures were considered from literatures. Hence, in this research attempt was made in studying different aspects of SPM towards the alignment of R&D projects to the strategic goals of the organization.

SPM is a growing field of study and there are limited studies done on R&D projects. This research project studied the strategic project management systems and practices at RRC that includes involvement of top management at initiation up to the implementation by the researchers. This study was also considered important in order to assess the problem areas and potentials in the course of strategic project management in R&D projects at RRC towards achieving the strategic goals of the organization. This will help to specter light on the need to apply SPM approach in order to sustain successful R&D projects in the organization.

1.3 Research Questions

1. What does the strategic project management systems and practices like at the Road Research Center in R&D projects?
2. What are the enabling factors in strategic project management systems and practices at the Road Research Center in R&D projects?
3. What are the constraining factors in strategic project management systems and practices at the Road Research Center in R&D projects?

1.4 Research Objectives

General Objective

To assess strategic project management systems and practices in R&D projects at Road Research Center of Ethiopian Roads Administration.

Specific Objectives

1. To assess the strategic project management systems and practices in R&D projects at the Road Research Center.
2. To identify the enabling factors in strategic project management systems and practices at the Road Research Center in R&D projects.
3. To identify the constraining factors in strategic project management systems and practices at the Road Research Center in R&D projects.

1.5 Significance of the Study

Conceptual Significance: The readers of this study will get well informed on the applicability of SPM in R&D projects. Also, it enables to see how to connect strategy to research and development projects. Moreover, there will be an understanding of the potential benefits it brings to the organization and prospects for the future.

Empirical Significance: The study will shed light to the researchers and management staff of the center in bringing a study that will describe strategic project management is potentially useful in aligning the research and development projects with strategic goals of the organization. Thus, there will be organizational learning and understand more the benefits to favor it in their endeavor.

Methodological Significance: The study will possibly encourage further researches in a more elaborated methodological techniques and tools than those applied in this study.

1.6 Scope of the Study

Conceptual Scope: The study assessed the alignment of research and development projects initiation through implementation phases to the strategic goals of the organization.

Empirical Scope: The study is focused on Road Research Center of Ethiopian Roads Administration which is located in Addis Abeba. In cases of research and development projects alignment with strategic objectives of the organization-the study first evaluated prior articles and consulted respective departments at the research center located in Addis Abeba.

Methodological Scope: The study targeted all the researchers of the center to assess the application of SPM through questionnaire. In addition, for assessments on research and development projects alignment with strategic goals of the organization relevant department staff who had R&D experience were interviewed.

1.7 Limitations of the Study

There was lack of documentation at the Research Center. This created a challenge in understanding the details of how R&D focus areas were determined. In addition, it also created a challenge in understanding R&D projects alignment to strategic objectives of the organization.

1.8 Organization of the Study

This research consists of five main chapters including references and appendix (figure 1).

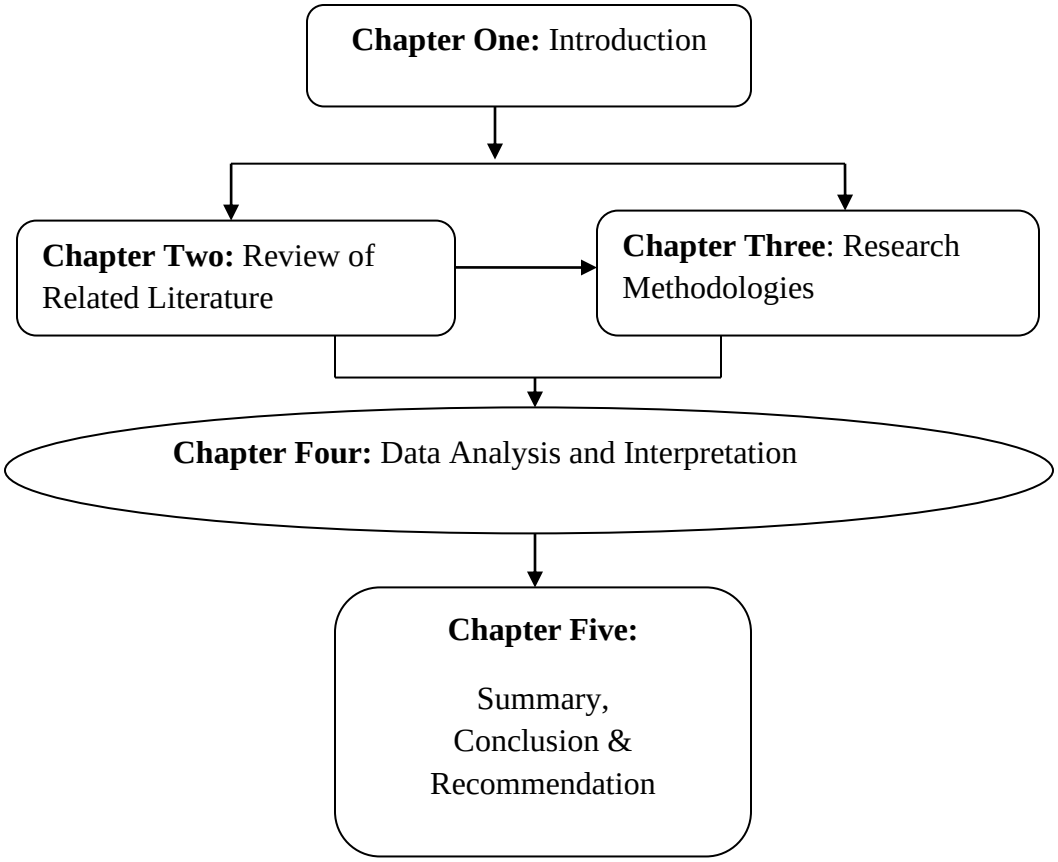


Figure 1 Organization of the Study

1.9 Definition of Key Terms

Project: "is a temporary organization to which resources are assigned to do work to bring about beneficial change" (Turner, 2006).

Strategic Alignment: "is a collaborative state where project activities continually support the achievement of organization's strategic goals" (Shenhar et al., 2007).

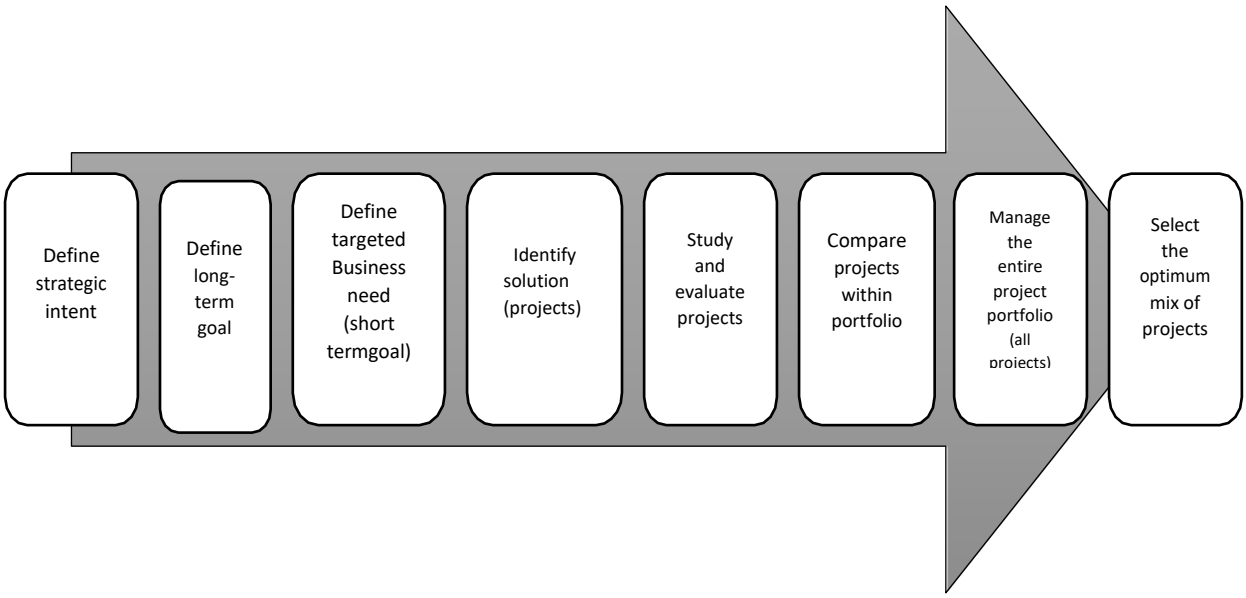
2 Chapter Two

REVIEW OF RELATED LITERATURE

This chapter deals with a review of related literature on strategic project management systems and practices in light of R&D projects. The review first does literature assessment on nature, importance, stages and challenges of strategic project management. Review of empirical studies follows these which includes past studies and finally the conceptual framework follows that shows the conceptual model of this study.

2.1 Meaning and Nature of Strategic Project Management

Understanding strategies and projects well enables one in a better position in order to effectively implement systems and practices of strategic project management. According to Heerkens (2007), effective linking and alignment through appropriate systems and practices



enables achieve the strategic business goals necessary for project success.

Figure 2 Strategic Project Management Process by Herkeens (Source: Ugonna, 2016)

SPM process starts with defining the strategic intent of an organization, and then goes through the above series of steps as shown in Figure 2 above (Herkeens, 2007).

2.1.1 Project Strategy and Its Components

Project strategy, according to Anderson and Merna (2003), is a high level and elaborate plan that aids in fulfilling the project's objectives. On top of this, project strategy offers a framework or umbrella that may be utilized to dynamically manage projects and help implementation towards decision-making, according to Poli and Shenhar (2003).

The figure below enables visualize the elements of project strategy and its components. Patanakul and Shenhar (2012) underlined that there has not yet arisen no all-agreed system or definition for project strategy.

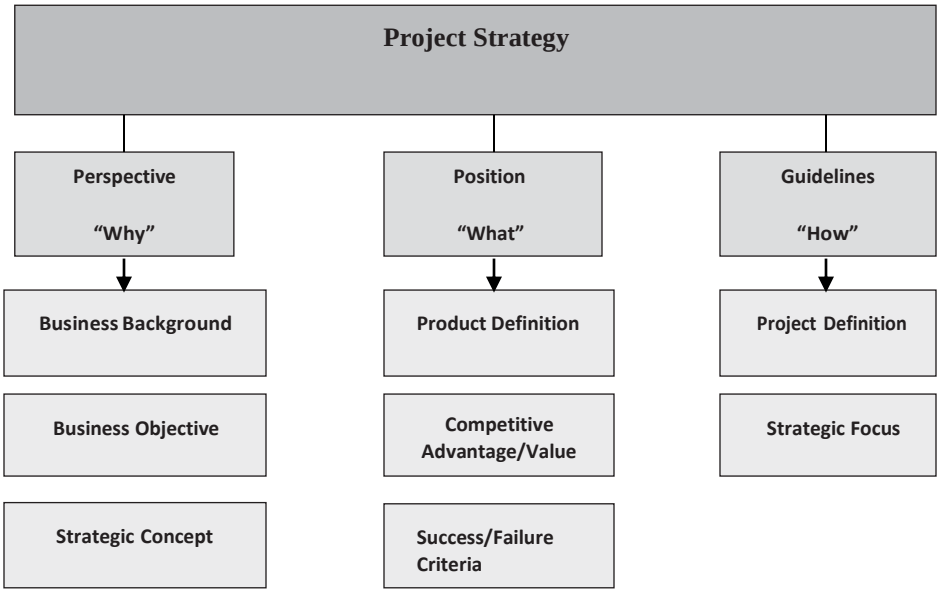


Figure 3 Project Strategy and its Components (Source: Patanakul & Shenhar, 2012)

2.2 Stages of Strategic Project Management

According to Grundy and Brown (2002), SPM contains the following five key stages shown in the figure below. The strategic project management stages shown below point out to revisit the strategy during project planning and also to anticipate implementation difficulty before project implementation and control. In the five stages it is not clear in the flow chart what kind of project to define and whether it has considered the strategic intent of the organization.

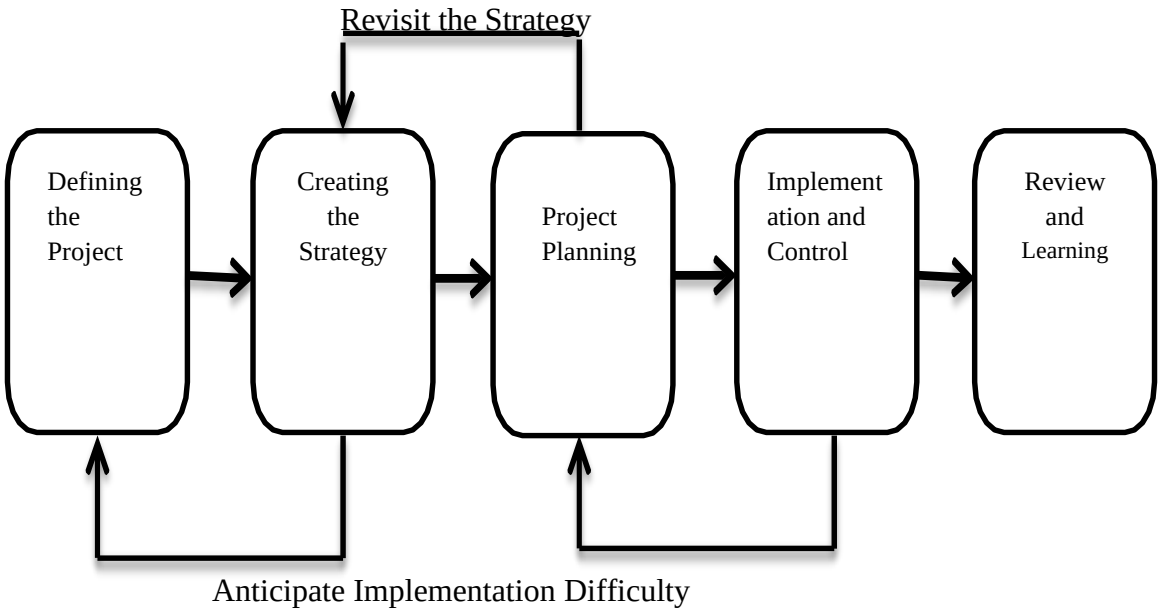


Figure 4 SPM Stages (Source: Grundy and Brown, 2002)

However, the authors (Ugonna et al., 2015) considered the strategic intent and proposed SPM stages for public research organizations which starts from identifying the strategic gaps of the organization through needs assessment. Then the R&D project will be initiated and continues with the creation of a project strategy aligned with the organization's strategy towards the successful implementation of R&D projects. These are followed in sequence by planning for the R&D project, implementation and control, and review and closure of the project, including the documentation of lessons learnt.

2.3 Importance of Strategic Project Management

To have further ideas on the importance of strategic project management, there has to be an understanding of such concepts as project goal and strategic objectives of an organization. Kozarkiewicz and Kabalska (2016) contend that projects and an organization's strategic objectives are intertwined, with projects serving as the foundation for organizational change.

Wessels (2007) also observed that implementing strategic project management systems and practices to choose, manage, and support a number of projects that have the potential to advance the business results in the return of the greatest possible shareholder value. Moreover, projects are also a crucial component of strategic management in organizations, according to Shenhar et al. (2001), and their aims must be established to best aid the firm in

achieving its goals. In addition to these, picking the right projects and having them together play a significant role in ensuring achieve strategic goals as effectively as possible (Warszawski, 1996).

2.3.1 Contemporary View of Project Success

The table below shows the project success evolution.

Table 1 Project Success Evolution Framework (Source: Castro, et al., 2019)

Dimensions	**Period 1:** (1960s-1980s)	**Period 2:** (1980s-1990s)	**Period 3:** (1990s-2000)	**Period 4: SPM (21 century)**
Project Focus	Project done	✓ Staff training; ✓ dedicated resources ✓ good tools ✓ strong leadership and strong management ✓ development of the individual, team and organization.	✓ Achievement of project performance objectives ✓ contribution to the business strategy & ✓ contribution to customer organization.	Project success dimensions include ✓ benefits to the organization; & ✓ preparation for the future.

For a successful implementation of projects Ugonna (2016) indicated applying the following principles of SPM:

- ✓ Ensuring that all projects are strategically aligned;
- ✓ Creating a culture that supports a project management environment;

- ✓ Implementation of SPM best practices; and
- ✓ Creating a strategic project measurement system.

2.4 R&D at Road Research Center and Projects Preparation

The Ethiopian Roads Administration established Research and Development Department in 2010 with the responsibility for the development, planning, implementation & dissemination of all research activities including the establishment of the Road Research Center. The mission of the center is to support the Ethiopian road sector through the provision of innovative and effective knowledge-based research solutions for a safe and efficient Ethiopian road network (Ethiopian Roads Authority, 2020).

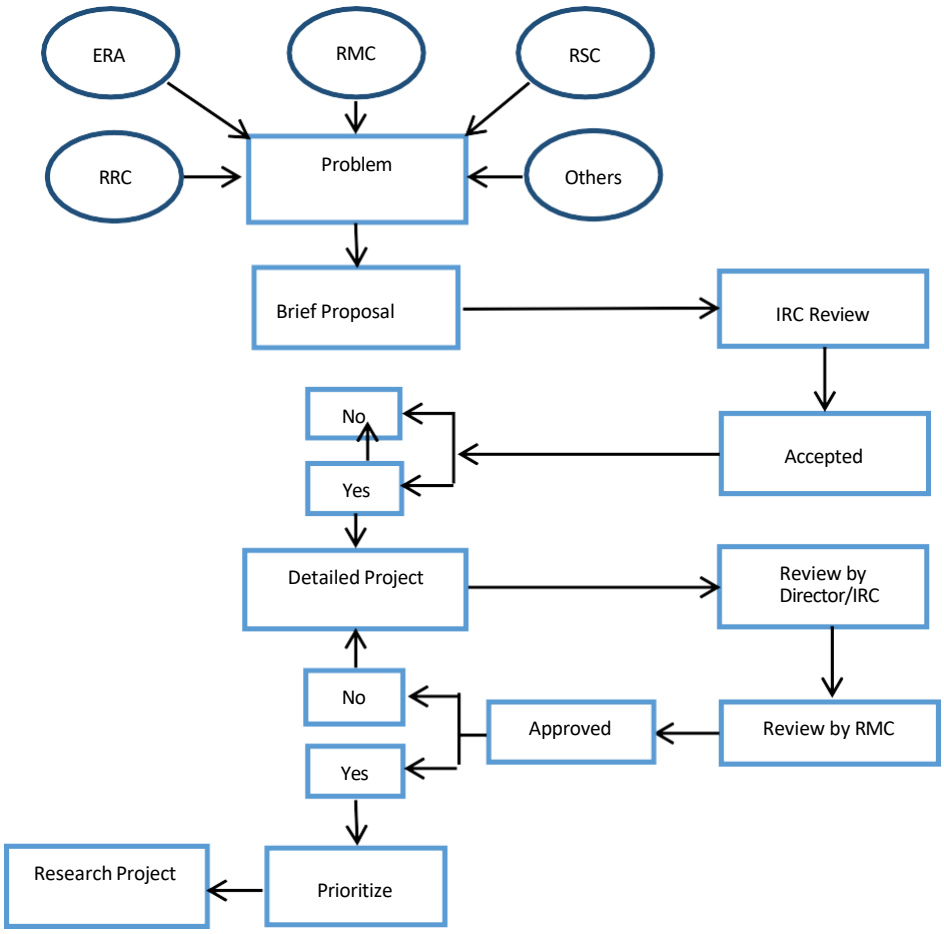


Figure 5 Flow Diagram of Projects Preparation (Source: Ethiopian Roads Authority, 2020)

RRC has four research teams (material research and laboratory, highway design, landslide and geotechnical and road transport, safety and environment), and two other teams (knowledge transfer and dissemination team and administration and finance team). The research center undertakes R&D projects in areas associated with traffic and transportation, planning, design, construction and maintenance of road projects. Mostly research is undertaken by in-house research staff based on the business plan and approved budget and occasionally research works will be outsourced if the need may arise (Ethiopian Roads Authority, 2020). The steps involved in the project preparation process are shown in Figure 5 as a flow chart above (Ethiopian Roads Authority, 2020)

As per the standard operating procedure (2020), the director of the research center has the overall responsibility in managing the research framework and is supported by management committees and R&D teams. Thus, a number of stakeholders are involved in the operation: Research Management Committee (RMC), Internal Research Committee (IRC), Research Steering Committee (RSC) and Conference Management Committee. In the R&D projects under RRC, the manuals used are research mmanagement and procedures manual, quality management system manual and laboratory quality manual. According to the standard operating procedure (2020), the first step in the research process is problem identification. This is done by RRC or ERA or the researcher or the public, or some knowledge or information that is needed by any of them.

2.5 Challenges of Strategic Project Management

The gaps or challenges in strategic project management are seen in different aspects. According to Anderson and Merna (2003), the primary challenges result from the initiation and planning phases vis-a-vis the implementation phase. Maylor (2001) goes on to say not to set clear policies and priorities contribute to more than 80% of all challenges. The perspective of selecting projects is seen as the critical part of the alignment process in a number of researches (Haniff & Fernie, 2008) in order to minimize challenges in the implementation. There is no consensus on various dimensions of challenges with respect to strategic project management of projects.

2.6 Review of Empirical Studies

Effectively linking project management to strategic management through appropriate systems and practices leads to achieving the strategic business goals towards project success. This empirical review discusses recent studies made in relation to SPM systems and practices in light of R & D projects. According to Srivannaboon & Milosevic (2006), strategic alignment of projects is understudied in the literature on strategic management. Ansari et al. (2014) also pointed out that project management was frequently overlooked by studies in favor of the alignment of strategy and organizational processes. Srivannaboon (2006) noted that there is a shortage of empirical literature as to how of a strategic alignment on clear basis. Strategic alignment brings benefits to the organization and preparation to the future in three different ways: by maximizing return on investment, helping the organization to achieve competitive advantage, and providing direction and openness to new opportunities (Avison et al., 2004).

There are limited authors who have studied on R&D projects alignment to organizational goals. R&D projects generally require a project management tool that will use strategic project management systems and practices to gain a competitive edge (Ugonna et al., 2015). In one study, Talantsev (2020) emphasized that in order to meet the long-term objectives of R&D projects, the entire life-cycle must be taken into account, which includes assessing the project's overall environmental aspects and achieving organizational objectives.

Grundy and Brown (2002) described prioritizing strategic project options needs to made using the strategic option grid and evaluating options of implementing projects by using strategic techniques. Also focus to identification of an optimum solution that will address the strategic objectives of the organization is an important initial step in strategic project management (Herkeens, 2007). It can be implied from the above reviews that organizations need to focus more on the benefits of projects and also their comparative advantages towards preparation to the future by applying strategic techniques.

In a study made in Nigeria by Ugonna (2016), though the process of R & D projects prioritization and selection applied the alignment with business strategy were not achieved. The author further identified key determinants in the application of SPM systems towards implementing R & D projects as: project planning, project funding, appointment of project teams and their experience, motivation and competency, understanding of SPM concept and PM methodology and adoption of a well-defined PM framework (Ugonna, 2016).

According to Kisielnicki (2014), R&D projects have a good chance of achieving success if the project is relatively new and consideration of organizational goals is essential at the initial stage of identification of potential areas. The author further stated that in order to increase the chances of success there needs to be a very clear goal of what needs to be achieved. In addition, the assignment of researchers and R&D team organization has to be in line with in specific area of research by assuring the necessary resources. Also, the R&D project has to be consistent with the strategies of the organization to attain success. As SPM importance is gaining attention, many organizations that are functioning in a highly competitive environment are in a way gradually moving towards a more strategic project management world in order to gain competitive advantage (Shenhar, 2004).

2.7 Conceptual Framework of the Study

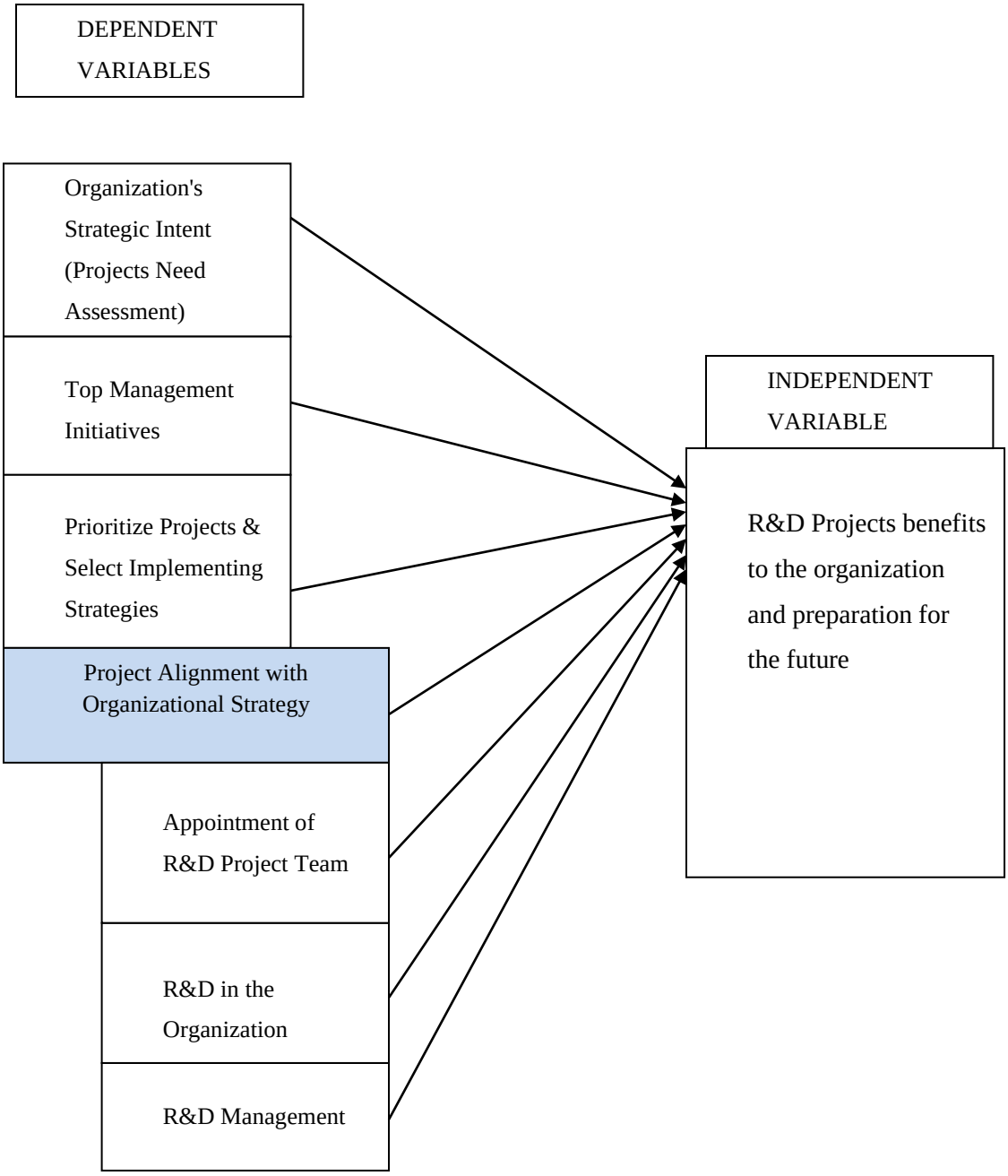


Figure 6 Conceptual Model of the Study

3 Chapter Three

RESEARCH METHODOLOGIES

This chapter covers research design, study variables, target population, sampling technique, data collection instruments and data analysis techniques. In addition, it covers ethical considerations that were followed.

3.1 Research Design

According to Saunders et al. (2012), descriptive, exploratory, or explanatory research will inevitably be used for study design reasons, resulting to an answer that is either descriptive, descriptive and explanatory, or explanatory. Descriptive research studies, according to Kothari (2015), are those that are focused with describing the traits of a specific person or of a group. Research designs and procedures are chosen based on the goal of the investigation. In order to produce an accurate representation of the situations with regards to strategic project management systems and practices at RRC, the sort of research technique used in this study is the descriptive type.

According to Kothari (2015), the study structure consists of a survey or a case study, with the case study method being a type of qualitative analysis that entails a thorough and in-depth observation of a social unit. Thus, case study method was used in this study and the survey tools applied were both questionnaire and interview. In this study the collection of information was carried out at a single point in time, i.e., cross-sectional research survey.

3.2 Description of Study Variables

The study variables were adopted from Grundy & Brown (2002), Herkeens (2007), Ugonna (2016) and Castro, et al. (2019). The dependent variable of the study is R&D projects benefits to the organization and preparation for the future. According to Castro, et al. (2019) the 21st century project success dimensions consider SPM to include benefits to the organization and preparation for the future. Questions 23 and 24 were adopted from this study to measure the dependent variable of this study using the five-point Likert scale. The

independent variables of the study were adopted from different authors as explained below. It includes questions 1 up to 22 and they were measured using the five-point Likert scale.

- ✓ Organization's strategic intent: allows to understand long-term goals and business needs of the organization (Herkeens, 2007). It was measured using questions 1 up to 3.
- ✓ Top management initiatives: consider the extent of organizational practices in linking the business needs and the PM aspects (Herkeens, 2007). It was measured using questions 4 and 5.
- ✓ Prioritize projects & select implementing strategies: includes the aspects of selection of options of projects that align with organizational goals and further selection of options of implementing strategies to the projects (Grundy & Brown, 2002). It was measured using questions 6 up to 8.
- ✓ Projects alignment with organizational strategy: is about the extent to which an organization ensures projects are linked to organizational strategy (Grundy & Brown, 2002; Herkeens, 2007). It was measured using questions 9 up to 11.
- ✓ Appointment of R&D project team: is about experiences and competencies of the project team and understanding of the principles of PM (Ugonna, 2016). It was measured using questions 12 and 13.
- ✓ R&D management: considers systems and practices to the motivation of project team and it also considers aspects of project management practices to achieve project success (Ugonna, 2016). It was measured using questions 14 up to 16
- ✓ R&D in the organization: considers systems contributing towards maximizing R&D strategy in the organization such as R&D culture, researchers, etc. (Ugonna, 2016). It was measured using questions 17 up to 22.

Table 2 Study Variables

Organization's Strategic Intent
✓ Projects needs assessment by top management
✓ Identify strategic projects by top management

- ✓ Communicating long term strategic goals and strategic intent

Top Management Initiatives

- ✓ Appoint committed and capable R&D management
- ✓ Strategy for competency-based recruitment of researchers

Prioritize Projects & Select Implementing Strategies

- ✓ Selection of options of projects that align with organizational goals
- ✓ Selection of options of implementing strategies to the projects
- ✓ Prioritize projects with their implementing strategies

Projects Alignment with Organizational Strategy

- ✓ Identification of project strategy and its components
- ✓ Projects strategy alignment with their implementing strategies

Appointment of R&D Project Team

- ✓ Project team technical competency to the nature of the R&D project
- ✓ Project team leadership skills and prospects for the future
- ✓ Project management knowledge of team

R&D Management

- ✓ Systems and practices to the motivation of R&D project team
- ✓ Clear project management systems and practices
- ✓ Clear communication between R&D project team and management

R&D in the Organization

✓ R&D culture ✓ R&D work environment ✓ Researchers as main resources ✓ Opportunity to innovation ✓ Managing change and risks of R&D projects ✓ Managing the interrelationships between all active R&D projects
R&D Projects Benefits and Preparation for the Future ✓ R&D projects contribution to the organization, stakeholders & prospects for the future ✓ Organizational learning from previous projects

3.3 Description of Study Area and Target Population

According to the Human Resources Department of ERA, the total employees in 2023 are 11976. The study was done on Road Research Center of Ethiopian Roads Administration. It is on strategic project management systems and practices of the center. According to Administration and Finance Team of RRC, the total population of the researchers at the center is 44 in the year 2023 and in addition 16 former researchers working in other departments and the sector are considered for this study. These were target population for the questionnaire. In addition, interviews with three key informants who are senior research management staff were conducted.

3.4 Sampling Technique and Sample Size

Purposive sampling calls for the researcher to utilize his own discretion in choosing examples that would best address his research questions and achieve the research goals (Saunders et al., 2012). As the area of this study is focused on R&D, Road Research Center was chosen from all other departments of ERA. As mentioned above, the total target

population of the study is a maximum of 60. Thus, census were the major sampling techniques that were used for questionnaire. In addition, three senior research management staff of the research center were samples for the semi-structured interview as they are key informants. As the number is manageable interviews were made with all the three key informants through semi-structured interview.

3.5 Data Collection: Source, Types, Instruments

Kothari (2015) underlined that when we conduct descriptive research and surveys, we collect primary data by observation or through direct contact with respondents in one way or another. Additionally, secondary data refer to information that has previously been gathered, evaluated, and published by another party.

Through questionnaire, primary data was collected in aspects of organization's strategic intent, top management initiatives, prioritizing projects & selecting implementing strategies, projects alignment with organizational strategy, appointment of R&D project team, R&D management, R&D in the organization and R&D Projects benefits and preparation for the future. In addition, interviews were held with three key informants to enrich the study and augment the questionnaire. Both the interview and the questionnaire were prepared taking in to consideration of addressing the two research questions.

3.6 Data Analysis

In relation to statistical modeling, one of the generalized linear modeling techniques is ordinary least-squares (OLS) where a continuous response variable can be modeled. In multiple OLS regression, a single response variable Y is predicted by multiple explanatory variables (X1 to X3) if they are three: $Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3$ (Hutcheson, 2011).

The dependent variables (Xi) include strategic management aspects that include organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies and projects alignment with organizational strategy. Moreover, the project management aspects that are also dependent variables (Xi) including appointment of

R&D project team, R&D management and R&D in the organization. The independent variable (Y) is R&D projects benefits and preparation for the future.

For the data analysis, SPSS software was employed. The Likert Scale was used in questionnaires to obtain respondents' degree of agreement. Likert variables are used in OLS and the assumption of the regression is that the criterion is continuous (Owuor, 2001). In this study, semi-structured interviews enabled the researcher to obtain detailed information.

3.7 Reliability and Validity Analysis

According to Kothari (2015) validity indicates the degree to which an instrument measures what it is supposed to measure. Validity will be improved by having a questionnaire that covers all the variables being measured. The author (Kothari, 2015) further states for a sound measurement the test of reliability is important.

3.7.1 Reliability

According to Ekolu and Quainno (2019), a common interpretation of Cronbach's alpha is of low reliability (below 0.5), moderate or acceptable reliability (between 0.5 and 0.8) and high or good reliability (above 0.8).

Table 3 Summary of Reliability Test

Variables	No. of Items	No. of Samples	Cronbach's Alpha Value
Organization's Strategic Intent	3	53	0.864
Top Management Initiatives	2	53	0.815
Prioritize Projects & Select Implementing Strategies	3	53	0.900
Projects Alignment with Organizational Strategy	2	53	0.950
Appointment of R&D Project Team	3	53	0.654
R&D Management	3	53	0.670

R&D in the Organization	6	53	0.831
R&D Projects benefits and preparation for the future	2	53	0.479

According to the above table 4, the minimum coefficient of Cronbach's Alpha value is 0.479 and the maximum is 0.950 for each item of the test. The average coefficient of Cronbach's Alpha value of all items is 0.770 which is moderate (between 0.5 and 0.8) and acceptable.

3.7.2 Validity

Validity is the extent to which data collection methods accurately measure what they were intended to measure. The variables of this study were adopted from literature in areas of strategic project management.

3.8 Ethical Consideration

The rights of the study's participants were protected by informing them of the purpose of the study and its goal. Additionally, the study protects the privacy of each participant's identity and all information sources used in the study were also duly acknowledged.

4 Chapter Four

DATA ANALYSIS AND INTERPRETATION

Introduction

In this chapter result data analysis was presented and discussed to address the research questions and objectives. Response rate, staff size, respondent's demographic information, descriptive statistics analysis, Pearson correlation analysis, ordinary least-squares analysis and interview findings were discussed based on the results.

4.1 Response Rate and Staff Size

Among the distributed questionnaires, 53 were properly filled and returned and used for analysis purpose which accounted 88.3 % response rate, but the remaining 7 questionnaires were not returned which accounted only 11.7 %. The table below shows distributed, collected and uncollected questionnaires to current and former RRC staff.

Table 4 Response Rate of Respondents

No.	Items	Total	Percent
1	Questionnaires Distributed	60	100
2	Questionnaires Collected	53	88.3
3	Questionnaires uncollected	7	11.7

There are four research and development teams with a total staff size of 44. The table below shows the research and development teams with their current staff size.

Table 5 Research Teams with Staff Size

Research and Development Team	Researchers	Technical Assistants
Material Research & Laboratory	11	11
Highway Design	12	-
Landslide &	6	-

Geotechnical		
Road Transport, Safety & Environment	4	-
Total	33	11
Grand Total	**44**	

4.2 Demographic Information of Respondents

The demographic information in this study includes gender, education, experience in the road and transport sector and experience in the road and transport R&D projects.

Table 6 Demographic Information of Respondents

Characteristics	**Items**	**Frequency**	**Percent**
Gender	Male	44	83.0
	Female	9	17.0
	Total	**53**	**100.00**
Educational Background	Diploma	5	9.4
	Bachelor's Degree	27	50.9
	Master's Degree	21	39.6
	PhD	-	-
	Total	**53**	**100.00**
Experience in the Road & Transport Sector	1-5 years	17	32.0
	>5-10 years	20	37.8
	>10-15 years	16	30.2
	More than 15 years	-	-
	Total	**53**	**100.00**
Experience in the Road & Transport: R&D Projects	1-3 years	20	37.7
	>3-7 years	25	47.2
	>7-10 years	8	15.1
	More than 10 years	-	-

	Total	**53**	**100.00**

4.3.1. Gender Distribution of Respondents

From the total respondents of 53, (83.0%) are males, whereas (17.0%) of respondents are females. As it can be seen from table 6, there is an unbalanced sex distribution of respondents.

4.3.2 Educational Background of Respondents

The above table 6 shows that from the total respondents of 53 5 (9.4%) are diploma holders, the majority 27 (50.9%) are degree holders and 21 (39.6%) are master's degree holders and none have PhD degree.

4.3.3 Respondents Experience in the Road and Transport Sector

The above table 6 shows that 17 (32.0%) of respondents have road and transport sector work experience in the range of 1-5 years, the majority 20 (37.8%) of the respondents have from more than 5 to 10 years of experience, 16 (30.2%) of the respondents have more than 10 to 15 years and none have more than 15 years of experience.

4.3.4 Respondents Experience in the Road and Transport Sector R& D Projects

The above table 6 shows that 20 (37.7%) of respondents have road and transport sector R&D experience in the range of 1-3 years, the majority 25 (47.2%) of the respondents have from more than 3 to 7 years of experience, 8 (15.1%) of the respondents have more than 7 to 10 years and none have more than 10 years of experience.

4.3 Descriptive Statistics

The descriptive statistics includes mean, standard deviation and valid observations of the respondents towards the study variables. A low mean score indicates disagreement of responses and a high mean score indicates agreement of responses. According to Field (2009), the mean score below 2.5 is considered as low, the mean score from 2.5-2.99 is considered as moderate and the mean score above 3.00 is considered as high.

The table 7 shown below indicates the valid observations, means and standard deviations of explanatory variables organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies, projects alignment with organizational strategy, appointment of R&D project team, R&D management and R&D in the organization which influence the dependent variable R&D projects benefits and preparation for the future by respondents.

Table 7 Descriptive Statistics on Explanatory and Dependent Variables

Variables	Mean	Standard Deviation	N
Organization's Strategic Intent	3.56	0.900	53
Top Management Initiatives	3.37	0.871	53
Prioritize Projects & Select Implementing Strategies	3.37	0.926	53
Projects Alignment with Organizational Strategy	3.22	0.885	53
Appointment of R&D project team	3.30	0.712	53
R&D Management	3.03	0.704	53
R&D in the Organization	2.97	0.744	53
R&D Projects benefits and preparation for the future	3.64	0.615	53

Source: Own Survey 2023

The highest mean score is the independent variable (M= 3.64, SD=0.615) that indicates on average, the respondents are approaching to agree to the benefits and preparation for the future of R&D projects in the Road Research Center. The mean scores are all greater than 3.00 for the strategic management aspects that include organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies and projects alignment with organizational strategy. These indicate all strategic management aspects are contributing is high towards the independent variable.

Moreover, for the two project management aspects that include appointment of R&D project team, R&D management, the mean scores are greater than 3.00; whereas for the third aspect that is R&D in the organization the mean is between 2.5 and 2.99. These indicate that the former two project managements are contributing high and the later aspect is contributing moderately towards the independent variable.

From the interview, it was found that there is a gap in the SM aspects of R&D projects in different phases. For example, there is minimal effort of higher level prioritization of R&D projects by applying strategic techniques in an effort that contributes to effectiveness of SPM. Furthermore, in the PM aspects in areas of organizational attitude to R&D, researcher's interest to R&D projects and research culture that is not conducive are preventing the SPM effectiveness in the Road Research Center.

As per the 2020 RRC standard operating procedure, there are criteria for R&D projects evaluation. However, several committees that are responsible have not yet been onboard in the process that bring a gap to have a higher level prioritization of R&D projects that indicates SPM is not streamlined yet.

4.4 Correlation Analysis

4.4.1 Pearson's Correlation Analysis

Pearson correlation coefficient is commonly used for measuring a linear correlation. According to Hinkle, et al., (1979), the following correlation values with corresponding strength of correlation are given below on table 9.

Table 8 Correlation Values with their Strength

0.90 to 1.00	Very high correlation
0.70 to 0.90	High correlation
0.50 to 0.70	Moderate correlation
0.30 to 0.50	Low correlation
0.00 to 0.30	Little if any correlation

The correlation coefficient for each explanatory variable in relation to the dependent variable indicated that: prioritize projects & select implementing strategies (r =0.438, p<0.01); R&D management (r = 0.669, p <0.01); R&D in the organization (r =0.764, p< 0.01). This indicated that there is moderate positive correlation between the two independent variables of R&D management and R&D in the organization with the dependent variable of the study. In addition, there is low positive correlation between one independent variable prioritize projects & select implementing strategies with the dependent variable of the study.

Table 9 Correlation Analysis

	OSI	TMI	PPSI	PAOS	ARDP	RDM	RDO	**RDB**
OSI	1							
TMI	0.278*	1						
PPSI	0.103	0.551**	1					
PAOS	-0.027	0.697**	0.800**	1				
ARDP	0.246	0.387**	0.309*	0.243	1			
RDM	-0.045	0.006	0.341*	0.235	0.380**	1		
RDO	-0.04	0.341*	0.666**	0.432**	0.277*	0.613**	1	
RDB	-0.09	0.141	**0.438****	0.205	0.235	**0.669****	**0.764****	1
N	53	53	53	53	53	53	53	53

* Significant at 0.05 level

** Significant at 0.01 level

4.4.2 Strategic Management and Project Management Aspects Correlation

The SM aspects include organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies and projects alignment with organizational strategy. Moreover, the project management aspects include appointment of R&D project team, R&D management and R&D in the organization.

The grand means for strategic management and project management are 3.386 and 3.104 respectively as shown in table 10 below. According to Field (2009) the mean score above 3.00 is considered as high and the standard deviations 0.664 and 0.565 also show low variation of responses. This result indicates that on average, the respondents are approaching to agree to the strategic and project level contributions to benefits and preparation for the future of R&D projects.

Table 10 Grand Mean of Strategic Management and Project Management Aspects

Variable	Mean	Standard Deviation	N
Strategic Management Grand Mean	3.386	0.664	53
Project Management Grand Mean	3.104	0.565	53

Furthermore, correlation value between strategic management and project management aspects is shown in the table 11 below. Correlation values with their strength are given earlier as shown in table 9.

As indicated on the table 11 below, the correlation values for strategic management and project management aspects is ($r = 0.458$, $p < 0.01$). This finding revealed that they have low correlation that falls between 0.3 and 0.5. It shows the linkage between the two is of low value in contributing towards strategic alignment of R&D projects at the Road Research Center of Ethiopian Roads Administration.

Table 11 Correlation between Strategic Management and Project Management Aspects

Variable	SMGM	PMGM
Strategic Management Grand Mean (SMGM)	1	0.458**
Project Management Grand Mean (PMGM)	0.458**	1

** Correlation is significant at 0.01 level

4.5 Regression Analysis

OLS regression has many data assumptions that a researcher must undergo various diagnosis tests before conducting the analysis.

4.5.1 Diagnosis Tests

The diagnosis tests include tests for normality, linearity, multicollinearity, homoscedasticity and non-autocorrelation checks were conducted which are discussed below.

4.5.1.1 Test of Normality

Shapiro-Wilk test is widely used for checking normality. However, it requires the sample size to be between 3 to 50 (Shapiro & Wilk, 1965 cited in Ahad, et al., 2011). Normality of data can also be checked based on skewness and kurtosis values. Curran et al. (1996) suggest normality thresholds of 2.0 and 7.0 for skewness and kurtosis respectively. Some authors suggest skewness and kurtosis up to absolute value of 1 may indicate normality (Orcan, 2020).

Table 12 Test of Normality

Variables	N	Skewness		Kurtosis	
		Statistic	Std Error	Statistic	Std Error
Organization's Strategic Intent	53	-0.720	0.327	0.172	0.644
Top Management Initiatives	53	-0.582	0.327	-0.002	0.644
Prioritize Projects & Select Implementing Strategies	53	-0.142	0.327	-1.064	0.644

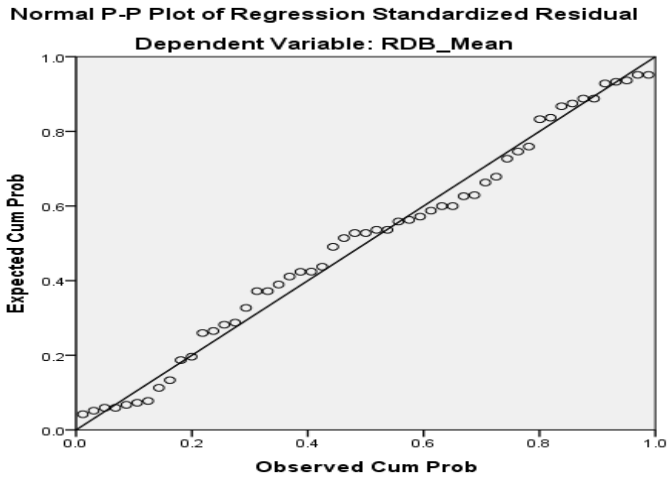
Projects Alignment with Organizational Strategy	53	-0.189	0.327	-0.694	0.644
Appointment of R&D project team	53	-0.389	0.327	-0.127	0.644
R&D Management	53	-0.471	0.327	-0.145	0.644
R&D in the Organization	53	0.186	0.327	-0.676	0.644
R&D Projects benefits and preparation for the future	53	-0.247	0.327	-1.064	0.644

Table 12 above indicates all Skewness values in absolute value are less than 1 and the majority of Kurtosis values in absolute values are less than 1 except for prioritize projects & select implementing strategies (-1.064) and R&D projects benefits and preparation for the future (-1.064) which are slightly more than one but less than 7. These tests of normality of the data used in the study indicate that it is normally distributed.

4.5.1.2 Test of Linearity

Test of linearity indicated there is nearly linear relationship between independent and SM and PM dependent variables as shown below. When using 6 or more predictors in a regression, a minimum of 10 participants per predictor is appropriate (VanVoorhis & Morgan, 2007) vis-a-vis census of study's 53 participants show the deficiency.

Figure 7 Test of Linearity



4.5.1.3 Test of Multicollinearity

According to Gujarati (2004), the presence of multicollinearity can be recognized if the tolerance is below 0.1 and if the variance inflation factor (VIF) is over 10.

Table 13 Test of Multicollinearity

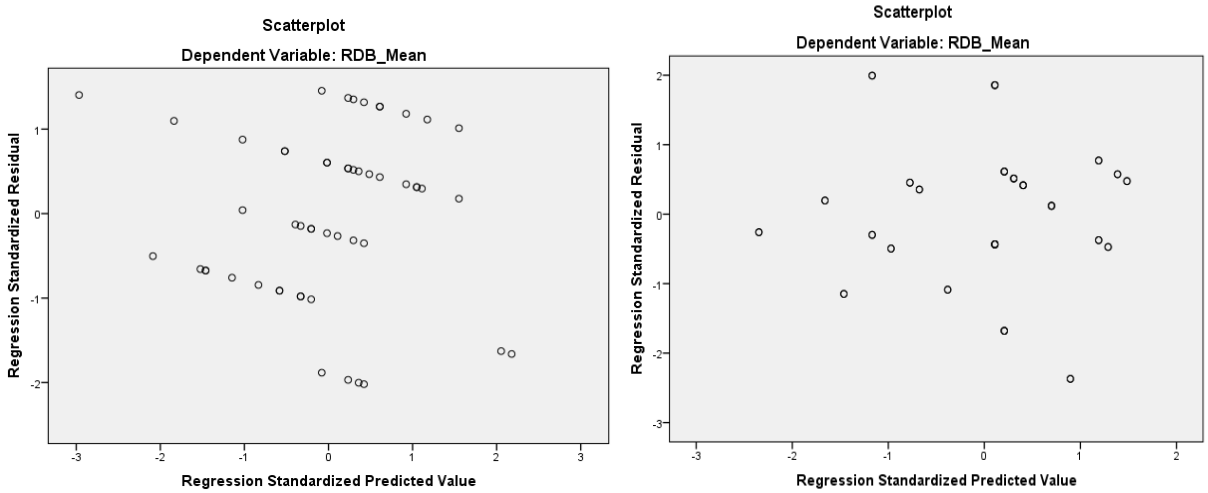
Independent Variables	Collinearity Statistics	
	Tolerance	VIF
Organization's Strategic Intent	0.730	1.370
Top Management Initiatives	0.298	3.361
Prioritize Projects & Select Implementing Strategies	0.196	5.105
Projects Alignment with Organizational Strategy	0.180	5.560
Appointment of R&D project team	0.634	1.578
R&D Management	0.426	2.347
R&D in the Organization	0.308	3.248

As indicated in table 13 above, the result of this study showed that the values of tolerance and VIF are between 0.180 to 0.730 and between 1.370 to 5.560 respectively indicating that there is no multicollinearity problem in the regression model. Because, tolerance and Variance Inflation Factor (VIF) all fall within the acceptable ranges (tolerance = above 0.1 and VIF = below 10).

4.5.1.4 Test of Homoscedasticity

Homoscedasticity can be assessed graphically as shown above by a scatterplot of standardized residuals against standardized predicted values whereby it is diffused. If there is an evidence of a funnel like shape of points, it is considered a violation of the assumption. Thus the test of homoscedasticity of for SM (left) and PM (right) variables with the dependent variable indicates the assumption is met as shown in the figure 9 below.

Figure 8 Test of Homoscedasticity



Source: Own Survey 2023

4.5.1.5 Test of Independence (Non-autocorrelation)

The independence assumption can be assessed statistically by looking the Durbin-Watson statistic. Durbin –Watson test statistic can vary between 0 and 4. According to Field (2009), values less than 1 or greater than 3 are definitely cause for concern. In this study as indicated in table 14 below, the Durbin-Watson result is 1.911. As a result, it indicates the independence assumption is satisfied.

4.5.2 Linear Regression Analysis

Multiple regressions analysis was applied on the mutual effect of the independent variables (organization's strategic intent, top management initiatives, prioritize projects and select implementing strategies, projects alignment with organizational strategy, appointment of R&D project team and R&D management) on the dependent variable of R&D Projects benefits and preparation for the future.

Table 14 Model Summary of OLS

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.820[a]	.673	.622	.37818	1.911

a. Predictors: (Constant), OSI, TMI, PPSI, PAOS, ARDP, RDM, RDO

b. Dependent Variable: RDB

The model summary table 15 indicates an adjusted R-square value of 0.622 whereby the seven independent variables which include organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies, projects alignment with organizational strategy, appointment of R&D project team, R&D management and R&D in the organization were able to explain 62.2 % variations of the dependent variable of the study. The remaining 37.8 % of the variance is explained by other variables that are not included in this study.

Table 15 Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.253	7	1.893	13.238	.000[b]
	Residual	6.436	45	.143		
	Total	19.689	52			

a. Dependent Variable: RDB

b. Predictors: (Constant), OSI, TMI, PPSI, PAOS, ARDP, RDM, RDO

Source: Own Survey 2023

The overall model explained 62.2 % of variance in dependent variable shows that the overall effect is statistically significant, F (7,45) = 13.328, p < 0.01, or that the variables have a significant combined effect on the dependent variable.

Table 16 Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.637	.369		4.432	.000
	OSI	-.020	.068	-.030	-.299	.766

TMI	.087	.110	.124	.791	.433
PPSI	.105	.128	.158	.821	.416
PAOS	-.217	.140	-.313	-1.555	.127
ARDP	-.064	.092	-.074	-.690	.494
RDM	.338	.114	.387	2.968	**.005**
RDO	.442	.127	.534	3.479	**.001**

a. Dependent Variable: RDB

As indicated on the table 16 above, the regression coefficients of individual predictor variables (explanatory variables) revealed that the coefficients of R&D management (Beta = 0.338, $p < 0.01$) and R&D in the organization (Beta = 0.442, $p < 0.01$) are significant predictors. This finding revealed that the two only have significant (99% confidence level) and positive effect on R&D projects benefits and preparation for the future at the Road Research Center.

Moreover, in this study, five factors were found to be insignificant in affecting R&D projects benefit and preparation for the future at the Road Research Center. Out of these, the three factors are inversely related to the dependent variable: organization's strategic intent (Beta= -0.020, p(0.766) >0.05); projects alignment with organizational strategy (Beta = -0.217, p(0.127) >0.05) and appointment of R&D project team (Beta =-0.064, p(0.494)>0.05). These may be caused by a lack of knowledge of the respondents (researchers) on the strategic aspects of the organization. The reasons can be insufficient information flow from the top management on the strategic intent, difficulty in understanding the meaning of project strategy itself and difficulty in understanding project management concepts when they label their agreement to the questions. The management level researchers have better exposure to know about the strategic intent and the appointment of R&D project team than the majority of respondents who are expert level researchers. These have a bearing on the negative output to show the inverse relationship of the above three predictors.

Furthermore, top management initiatives (Beta =0.087, p(0.433) >0.05) and prioritize projects & select implementing strategies (Beta =0.105, p(0.416) >0.05) were found to be

insignificant in affecting the independent variable. Strategic project management is a new concept for the respondents (researchers) that were requested to label their agreement, disagreement or uncertainty on the list of questions. This has a great bearing on the outputs of the regression to make these two predictors insignificant.

The majority of respondents are expert level researchers who are well acquainted and well informed on the two predictors that have shown positive significance. Thus the resulting predictive equation from this study regression model using unstandardized coefficients is: R&D Benefits and Preparation for Future (RDB) = 1.637+ 0.338 (R&D management)+ 0. 442 (R&D in the organization).

4.6 Qualitative Analysis

In order to validate the quantitative findings, semi- structured interview was employed in this study. The interviews were conducted face-to-face that helped to have better understanding on R&D projects management at the Road research Center. The interview questions were prepared in consideration of including themes towards addressing the research questions.

The interview analysis was carried out based on the hand written notes from the interview. The statements of the interviewees were categorized in themes that enabled the researcher gain insight on the center's undertakings. During the analysis the statements of interviewees and meanings of their views on different aspects of the questions were taken in to consideration. The analysis helped to triangulate the quantitative analysis. Finally, the findings from the analysis were summarized that helped to make further recommendations.

4.6.1 Interviews Findings

Three key informants were interviewed and the interview findings are described and presented below.

Research and Development Projects Initiation

R&D projects at the research center arise from problems encountered in design, construction, contract administration, naturally occurring disasters which have an effect on road

construction process, time and cost. Research and development projects are initiated from different parties including executive management, management members of the organization, road research center researchers and management, different departments, road research conference feedbacks and road sector development stakeholders.

Even though, there are theoretically committees in the process of problem identification, they have not yet been onboard that brings a gap to have a higher level prioritization of R&D projects by applying strategic techniques towards SPM systems and practices.

R&D Projects Prioritization and Alignment

Research and development projects prioritization at the research center is based on urgency and sensitivity of the problem. In addition to this, factors taken in to consideration are researchers' specialization area and the project funding. Moreover, if the project is a collaboration research with local or international organizations the contract agreement governs. Many projects that were implemented and currently ongoing are not effectively aligned with strategic objectives of the organization. However, there were limited projects that were aligned.

Challenges and Opportunities towards Alignment

The main challenges are qualified and interested researcher and research management, not well-developed research culture and organizational attitude to the research itself. As to the opportunities there are a lot of potential areas of research to be investigated in the road and transport sector which creates an ample space for strategic alignment.

Measures for R&D Project Success

The measures for success are to correctly address the research objective of the research within allowable time and budget. The research center is at the infant stage in a way that the research projects are not practically taken to the ground. This indicates strategic project management perspective of project success is not streamlined on R&D projects towards benefits to the organization and preparation for the future.

Documentation on R&D Projects Lifecycle

There is no well-developed complete documentation that indicates the details of initiation, planning and implementation of research and development projects of the research center. This creates gap to take lessons from the projects and brings a challenge for organizational learning.

Table 17 Summary of Interview Findings

Areas of Focus (Themes) of the Interviews	Responses on Themes
Research and Development Projects Initiation	Mainly from problems encountered in design, construction, contract administration, etcetera.
R&D Projects Prioritization	Based on urgency and sensitivity of the problem
Challenges and Opportunities towards Alignment	main challenges are:- ✓ qualified and interested researcher and research management ✓ not well-developed research culture ✓ organizational attitude to the research itself opportunities are:- ✓ a lot of potential areas of research to be investigated
Measures for R&D Project Success	To correctly address the research objective of the research within allowable time and budget
Documentation on R&D Projects Lifecycle	No well-developed complete documentation

5 Chapter Five

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In this chapter, based on the result of the study and the findings in line with the research questions and objectives: summary of findings, conclusion, recommendation, research limitation and areas of further research are discussed below.

5.1 Summary of Findings

This study is on strategic project management systems and practices at Road Research Center of Ethiopian Roads Administration. Case study method was used in this study and the survey tools applied were both questionnaire and interview. Closed ended questionnaire was used to collect data from all researchers and semi-structured interview was conducted with three key informants.

The survey questionnaire containing 24 items was distributed for 60 respondents which was pilot tested. Among the distributed questionnaires, 53 were properly filled and returned and used for analysis purpose which accounted 88.3 % response rate, but the remaining 7 questionnaires were not returned which accounted only 11.7 %.

The correlation coefficient for each explanatory variable in relation to the dependent variable indicated that: prioritize projects & select implementing strategies ($r = 0.438$, $p<0.01$); R&D management ($r = 0.669$, $p <0.01$); R&D in the organization ($r = 0.764$, $p< 0.01$). This indicated that there is moderate positive correlation between the two independent variables of R&D management and R&D in the organization with the dependent variable of the study. In addition, there is low positive correlation between one independent variable prioritize projects & select implementing strategies with the dependent variable of the study.

The adjusted R-square value of 0.622 shows that the seven independent variables which include organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies, projects alignment with organizational strategy, appointment of R&D project team, R&D management and R&D in the organization were able to explain

62.2 % variations of the dependent variable of the study. The remaining 37.8 % of the variance are not covered by this study.

The regression coefficients of individual predictor variables (explanatory variables) revealed that the coefficients of R&D management (Beta = 0.338, $p < 0.01$) and R&D in the organization (Beta = 0.442, $p < 0.01$) are significant predictors. The study finding revealed R&D management and R&D in the organization have significant and positive effect on the dependent variable R&D projects benefits and preparation for the future.

It revealed that the five independent variables (organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies, projects alignment with organizational strategy and appointment of R&D project team) have not shown significant influence on R&D projects benefits and preparation for the future at the Road Research Center of Ethiopian Roads Administration.

Out of the five, three factors are inversely related to the dependent variable: organization's strategic intent (Beta= -0.020, p(0.766) >0.05); projects alignment with organizational strategy (Beta = -0.217, p(0.127) >0.05) and appointment of R&D project team (Beta =-0.064, p(0.494)>0.05). In addition, top management initiatives (Beta =0.087, p(0.433) >0.05) and prioritize projects & select implementing strategies (Beta =0.105, p(0.416) >0.05) were found to be insignificant in affecting the independent variable.

5.2 Conclusion

From the qualitative findings, the measures for R&D projects success currently are to correctly address the research objective of the research within allowable time and budget. The Road Research Center has not given focus on the importance of a broader success framework. This indicates strategic project management perspective of project success is not streamlined on R&D projects towards benefits to the organization and preparation for the future.

From the quantitative findings, the enabling factors contributing towards strategic project management at the Road Research center are the two project management aspects R&D

management and R&D in the organization. Those factors not contributing towards strategic project management (constraining factors) are the four strategic management aspects (organization's strategic intent, top management initiatives, prioritize projects & select implementing strategies and projects alignment with organizational strategy) and one project management aspect appointment of R&D project team. Furthermore, additional enabling factors are the potentials of the research center in aspects of the research center's good facility, the organization's partnership potentials both locally and globally, the road and transport sector vast potential of research areas in different fields of interest, large number of projects in the organization and prospects of R&D in the future. The constraining factors are attitude of research at organizational and individual level, poor systems towards talent acquisition, capability of researchers, expertise to R&D project alignment, knowledge of project management and lack of top management initiatives to attract talented and interested researcher's of the nation.

The above stated conclusions indicate that currently strategic project management is not streamlined in the R&D projects at the Road Research Center of Ethiopian Roads Administration. It can then be concluded that strategic project management is not effectively applied at the Road Research Center of Ethiopian Roads Administration.

5.3 Recommendation

The following are suggested recommendations to effectively apply strategic project management systems and practices at the Road Research Center during initiation, planning and implementation phases of R&D projects. Moreover, understanding the enabling and constraining factors towards effectiveness enables see directions for actions.

The top management has to take the lead in streamlining SPM systems and practices in the management of R&D projects with continuous involvement in prioritizing strategic project options by using strategic techniques for selecting and prioritizing R&D projects. In addition research culture and organizational attitude to research and development itself needs a direction towards focus on talent acquisition initiatives. Also project team technical

competency to the nature of the R&D project need to be aligned and it is good to optimize partnership potentials to regional research centers in Africa and other countries.

Knowledge of SPM has to be popularized and grasped by researchers in order that streamlining gets easier during implementation. Also needs assessment at the initial stage has to get proper attention. Lessons from R&D projects have to be captured and stored in the knowledge transfer and dissemination team. Moreover, measures for project success need to look the SPM dimensions of success.

Based on the findings, the researcher suggested the following recommendations to improve strategic project management systems and practices at Road Research Center of Ethiopian Roads Administration.

- The top management has to underline the importance of strategic project management systems and practices in the management of R&D projects;
- Top management continuous involvement in prioritizing strategic project options by using strategic techniques for selecting and prioritizing R&D projects has to get attention;
- The strategic intent of the organization has to be clearly communicated to R&D project implementers;
- Research culture and organizational attitude to research and development itself has to be well developed and its benefits to the organization has to get attention;
- Project team technical competency to the nature of the R&D project need to be aligned; and
- The research center has to effectively streamline strategic project management systems and practices in its R&D projects in its endeavor towards gaining benefits to the organization and preparation to the future.

In summary, strategic selection, prioritization and alignment of R&D projects with the organizational strategy is recommended by giving attention to talent acquisition to streamline

strategic project management systems and practices towards its effective application at the Road Research Center of Ethiopian Roads Administration.

5.4 Research Limitation and Areas of Further Research

5.4.1 Limitation of the Study

Lack of documentation at RRC was a challenge in order to understand the details of how of R&D projects selection, prioritization and implementation. Moreover, there are limited studies available on R&D projects alignment to organizational goals. Also there are limited empirical studies on strategic project management.

5.4.2 Suggestion for Future Research

This study tried to explore strategic project management systems and practices at Road Research Center of Ethiopian Roads Administration. To enrich this topic of study, other researchers are recommended to investigate by including additional variables and using a more elaborated methodological techniques and tools than those applied in this study.

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ANNEX (Questionnaire and Interview Questions)

SECTION I: GENERAL INFORMATION

1. Gender

Male [ ] Female [ ]

2. Educational Background

PhD [ ] Master's Degree [ ] Bachelor's Degree [ ] Diploma [ ]

3. How long have you worked within the road and transport sector?

1-5 years [ ] >5-10 years [ ] >10-15 years [ ] More than 15 years [ ]

4. How long have you been involved in road and transport research and development projects?

1-3 years [ ] >3-7 years [ ] >7-10 years [ ] More than 10 years [ ]

SECTION I I: STRATEGIC PROJECT MANAGEMENT SYSTEMS AND PRACTICES IN R&D PROJECTS

The following factors are related to strategic project management systems and practices. Select the best scale that best describes your response and put an " X" mark

Strongly Disagree=1		**Agree=4**
Disagree=2	**Uncertain=3**	**Strongly Agree=5**

Organization's Strategic Intent	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
R&D projects needs assessment done by top management in light of the strategic intent					
Communicating long term strategic goals and strategic intent clearly by top management					
Identify strategic R&D projects by top management					
Top Management Initiatives					
Appointment of committed and capable R&D management to RRC is practiced					
Strategy for competency-based recruitment of researchers is initiated					

Prioritize Projects & Select Implementing Strategies	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Selection of options of projects that align with organizational goals is being practiced					
Selection of options of implementing strategies to the projects is being practiced					
Prioritize projects with their implementing strategies is being practiced					
Projects Alignment with Organizational Strategy					
Identification of project strategy and its components is being practiced					
Projects strategy alignment with their implementing strategies is being practiced					
Appointment of R&D project team					
Project team technical competency to the nature of the R&D project is aligned					
Project team leadership skills and prospects for the future is high					
Project management knowledge of team is good					
R&D Management	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Systems and practices to the motivation of R&D project team exist					
Clear project management systems and practices exist					
Clear communication between R&D					

project team and management exists					

R&D in the Organization	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
R&D culture is well developed					
R&D work environment is conducive					
Researchers are seen as main resources of RRC					
Opportunity to innovation exists					
Managing change and risks of R&D projects is common					
The interrelationships between all active R&D projects is managed					
There is organizational learning from previous projects					
R&D projects contribution to the organization, stakeholders & prospects for the future is considered					

INTERVIEW QUESTIONS

1. How are R&D projects initiated at RRC and by whom?
2. How are R&D projects prioritized and what are the factors considered?
3. How effectively are R&D projects aligned with the strategic objectives of ERA?
4. What are the challenges and opportunities in aligning R&D projects to ERA goals and objectives?
5. What are the measures to say R&D projects are successfully implemented?
6. Is there a documentation at RRC on details of R&D projects initiation, planning and implementation?