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A correlation study on project success and entrepreneurial performance, and the moderating effect of project risk

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Background: This study will elaborate on previous research investigating the relationship between project success (PS) (customer perception [CP], project characteristics [PC], project performance [PP], project team [PT]) and entrepreneurial performance (EP) (improved entrepreneurial action [IEA], company characteristics [CC]), and how project risk (PR) moderates this relationship.

Aim: The aim of this study is to investigate the correlation between PS and EP, and how PR moderates the relationship. This way, a better understanding of organisational performance and the contribution that PS can make is established.

Setting: Survey data were collected from 369 South African project-oriented organisations.

Methods: The research design is a formal, ex post facto study, incorporating existing statistical measures between PS and EP, and how PR moderates this relationship. Linear regressions were used to investigate these complex correlations and explore possible causal relationships. These regressions demonstrated possible patterns of relationships that appear consistent with specific causal interpretations and inconsistent with others.

Results: Companies' characteristics or entrepreneurial activity is not significantly predicted by industry type or experience. Despite organisations initiating new projects, it does not necessarily imply innovation. Moreover, as most data came from people with less than 5 years in the field, it strongly indicated that lack of experience adversely affected the study.

Conclusion: There's only partial consistency between the results and previous studies, as volatility, uncertainty, complexity, and ambiguity limit the reliability of project success.

Contribution: Practitioners and researchers can still benefit from the present study results despite its misalignment with previous research.

Keywords: project success; entrepreneurial performance; project risk; moderating effect and correlation.

Introduction

Project activities are an integral part of the day-to-day operations in contemporary organisations. Moreover, organisations increasingly incorporate project management methods as a competitive advantage strategy to improve organisational performance (Aga, Noorderhaven & Vallejo 2016:10; Maylor et al. 2006:663). Organisations through projects can turn business opportunities into valuable assets, increase revenues, reduce life cycle costs and achieve business goals. Project management methods, tools and practices have become increasingly sophisticated to improve project success (PS) rates. Organisations can improve their performance in two ways: by doing projects right and, more importantly, by doing the right project (Flechas Chaparro, De Vasconcelos Gomes & Tromboni de Souza Nascimento 2019:212).

Therefore, it is unsurprising that project practices have been a popular subject in many disciplines over the last three decades. In most cases, projects are driven by a business perspective, focusing on the goals, results and improvements of the organisation's performance that will increase profits, create additional growth and boost market value. In this regard, projects are often part of the organisation's strategic objectives. Their benefits are multifaceted, with both long-term and short-term objectives defined to aid in success (Bahli, Sidenko & Borgman 2011:2).

As projects have gained importance to organisations, despite their inherent complexity, they have become more than just meeting budget, time and quality; more so, they have become an integrated

evaluation of stakeholders' benefits. Researchers have studied the primary determinants of entrepreneurial performance (EP) for decades as 'performance' is generally considered a well-established dependent variable in the management literature (Anderson & Eshima 2013:417; Engelen et al. 2015:1070; Rauch et al. 2009; Wales, Gupta & Mousa 2013). Entrepreneurial performance can be defined as follows:

> The entrepreneurial performance of a company at a given point in time is reflected in its entrepreneurial intensity (EI) score. EI is an extension of EO and is concerned with both the degree and frequency of entrepreneurship. (Kuratko & Morris 2018:48)

Pretorius, Millard and Kruger (2005:55) stated, 'EP results from a combination of industry knowledge, general management skills, people skills, and personal motivation'. Despite this, project management's role and contribution to performance are only widely recognised in the community. Furthermore, project management must demonstrate its value to be adopted by organisations (Aubry & Hobbs 2011:3). It is these underlying issues that drive this study.

Even though the links between entrepreneurship and projects may be robust and well-founded, the two domains have been studied in parallel but on separate paths (Kuura, Blackburn & Lundin 2014:214). These potential links between the two disciplines can therefore be exploited. This study argues that both practical and theoretical perspectives can prove helpful in exploring the conceptual links between the two disciplines. Organisations are constantly striving to add value via temporal initiatives heavily dependent on the factors that make projects successful. While many resources, new methods, procedures and practices are available to manage projects, frequently, many of these projects fail. Therefore, more research is needed to investigate how PS relates to EP (Pace 2019:56).

This study will examine the correlation between PS and EP, and how project risk (PR) moderates the relationship between the independent and dependent variables. This study will contribute to the literature by investigating the potential relationship between two interdisciplinary research domains – PS and EP in South African project-oriented organisations. The research results can potentially inform practitioners of projects and entrepreneurship about how these two variables interact. It will ensure that organisations realise their strategic objectives for sustainable competitive advantage.

In correlation analysis, two variables are measured and interpreted to determine if there is a possible relationship between them. Even though correlations can be established, the correlation does not explain the relationship between them and how they are related. In other words, correlation does not imply causation between variables; thus, further examination may be needed (Lamprou & Vagiona 2022:247). This study explores the correlation between PS and EP and how PR moderates this relationship. Although the main objective of correlation analysis is to measure the strength or degree of a relationship between variables, regression analysis helps describe these relationships (Pace 2019:61).

Research questions

The following research questions guided the study:

RQ1: Is there a correlation between the project team (PT), project characteristics (PC), project performance PF) and customer perception (CP)?

RQ2: Is there a significant relationship between the predictor and dependent variables?

RQ3: To what extent does PR moderate the relationship between the predictors (PT, PC, PP, CR, industry type and years of experience) and the dependent variables (company characteristics [CC] and improved EP)?

Hypotheses

The first hypothesis used Spearman's correlation coefficient to identify and measure differences in the variables (Pace 2019:60):

H1: There is a positively correlated relationship between PT, PC, PP, CP.

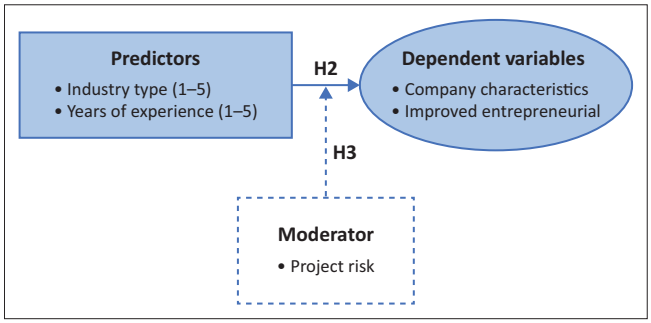
The second hypothesis was tested using linear regression, as depicted in (Figure 1).

The linear regression method helps identify the strength of the relationship between multiple predictor variables and the dependent variable, especially when another variable moderates it (Pace 2019:60):

H2: There is a positive relationship between the predictor and dependent variables.

H3: Project risk moderates the relationship between the predictor and dependent variables.

This article is structured as follows. After the introduction, a literature review is presented. It is followed by the research methodology that includes the sampling, data collection and measurement procedures used in this study. Thereafter, the results are presented. Finally, the study will elaborate



H, hypothesis.

FIGURE 1: Research model.

on its contribution, limitations and recommendations for future research.

Literature review

Artto and Wikström (2005:351) define project business as '… the part of the business that relates directly or indirectly to projects, with a purpose to achieve the objectives of a firm or several firms'. For this study, the term 'business' will be referred to as entrepreneurship. Therefore, the term business reflects entrepreneurial business. Both project management and entrepreneurship are vital, but understanding how they are related within an organisation is crucial. Project management research is primarily concerned with solving practical problems (Pace 2019:59). At the same time, in the context of an organisation, EP primarily focuses on growth, profitability and innovation (Kapepa & Van Vuuren 2019:5). Thus, adaptability to change will be one of an organisation's core characteristics, allowing the organisation to remain relevant and competitive. Therefore, organisations regard projects and project management practices as essential to their success (Fonrouge, Bredillet & Fouché 2018:6).

Project success

In their seminal work, Pinto and Slevin (1988:67) pointed out, 'There are few topics in the field of project management that are so frequently discussed and yet so rarely agreed upon as the notion of project success'. While traditionally PS is measured by ensuring that a project has adequate quality (functionality) and meets the dual constraints of time and budget (Atkinson 1999:337), Frefer et al. (2018:2) argued that these criteria should be revised. A common misconception in mainstream project management literature is that PS is a single homogeneous concept (Korbijn 2014:14). In reality, several factors can significantly affect performance and, ultimately, the project's success (Castro 2021:789).

Furthermore, there is a strong correlation between organisational performance and robust project management methods, including scope and budget administration systems, continuous monitoring of PRs, and evaluation of results and progress (Serrador & Pinto 2015:1043).

It could be argued that organisations with established project management practices strongly align the project's objectives and strategic and tactical goals (Pace 2019:59). Project success is influenced by time, as success is measured at various stages (Korbijn 2014:15). It implies that the strategic objectives and goals of the organisation are directly related to its product success, which includes the final product's purpose, function and effects (Al-Shaaby & Almessabi 2018:1; Frefer et al. 2018:1), measured over a short-term to long-term period. As project-oriented activities become increasingly prevalent within organisations, methods are being developed to understand how PS impacts performance (Martens et al. 2018:256). Using a multidimensional approach to PS as the basis for defining PS, Shenhar and Dvir (2007:25–27) argued that overall PS is based on meeting stakeholders' expectations and successfully achieving strategic objectives (Ahmed, Azmi bin Mohamad & Ahmad 2016:56; Serrador & Turner 2015:31).

Entrepreneurial performance

Entrepreneurship involves acting in an entrepreneurial manner to generate profits, either independently or within an organisation. Despite significant uncertainty or risk, the main objective is to identify new opportunities and introduce new products or services. It involves deciding where to locate; how to design the product; and how to use resources, institutions and reward systems (Carlsson et al. 2013:914). Despite differences and contradictions about what entrepreneurship is and is not, entrepreneurship has infiltrated almost every aspect of society. It is possible because entrepreneurship covers various topics and is studied from various perspectives, leading to various definitions (Agunwah 2019:17). Globalisation has notably impacted competition in all sectors, organisations and institutions.

Furthermore, organisations need help to outperform their competitors under these pressures. It is, therefore, not surprising that one of the most critical subjects in the management area is gaining a competitive advantage so that an organisation can perform better than its competitors (Zehir, Can & Karaboga 2015:359).

Organisational theory often assumes that organisations are or should be permanent. However, many organisational activities are more temporal because they focus on project-oriented activities. Organisations should incorporate time as a strategy in their practices to achieve success and sustained performance. Some scholars (Carvalho & Rabechini 2017) have studied PS and how it can be measured to improve competitive performance. The success of projects can positively affect organisational outcomes, referring to the contributions of projects to organisational performance, such as efficiency, development and innovation (Yang, Huang & Hsu 2014).

Project risk

Although it is widely used, the concept of 'risk' is a semantically overloaded term that covers many topics, which makes conveying its meaning easier if you are familiar with the context (Denney 2020:278). Organisations traditionally view risk management as a defensive measure to minimise economic losses (Mohammed & Knapkova 2016:272). In addition, perceived risk may also influence entrepreneurs' risk-taking behaviour. In other words, the risk associated with a given project is determined primarily by how the entrepreneur perceives the outcome, so their experiences heavily influence risk takers. (Agunwah 2019:61).

Generally, risk management aims to increase the chances of success in a project. The complexity, multidisciplinary nature and challenges of projects make risk management an essential

part of project management and the success thereof (Rampini, Takia & Berssaneti 2019:895). According to Jun, Qiuzhen and Qingguo (2011:925), inherent PRs can be regarded as project-specific characteristics that exist at the beginning of a project rather than emerge as a result of its implementation. In their research, Shenhar and Dvir (2007) argued that while all projects are subject to risk, uncertainty and complexity are not the sole criteria for determining a project's risk level. They examined various project types and issues project practitioners had to address within different organisations. According to the research, failure to acknowledge the diversity of project types is often the critical error project managers make (Sidney 2019:16).

Project management encompasses not only the traditional aspects of the process but also other vital considerations that are essential to not only the success of a project but also the organisation's performance as a whole (Das & Khanapuri 2019:323; Hartono, Wijaya & Arini 2019:2; Willumsen et al. 2019:732).

These arguments further emphasise that the role of the project must be considered in terms of broader organisational strategy and long-term expectations (Mir & Pinnington 2014:204).

A moderating effect occurs when the relationship between the independent and dependent variable constructs changes or is affected by the interaction of the moderating variables, and the strength of the relationship may change based on these changes (Matthews, Hair & Matthews 2018:4). In this research, PR is presented as a moderator.

Akoglu (2018) defined correlation as:

> [*A*] relation existing between phenomena or things or between mathematical or statistical variables that tend to vary, be associated, or occur together in a way not expected by chance alone. (p. 91)

When two variables are correlated, one variable's magnitude change is correlated with the change in magnitude of the other, either positively (positive correlation) or negatively (negative correlation). A Spearman's rank correlation can be used to measure a monotonic relationship. Correlation coefficients range from –1 to +1, where 0 indicates no linear or monotonic association. As the relationship strengthens or continuously increases or decreases, the coefficient approaches an absolute value of 1. To determine the statistical significance of the results and estimate the strength of the relationship in the population from which the data were gathered, hypothesis tests and confidence intervals can be used.

The main objective of this study is to examine the correlations between the predictor variables and the dependent variable and how PR moderates this relationship (Schober, Boer & Schwarte 2018:1763). In addition, this study will incorporate linear regression to measure the association between the variables. Linear regression is a modelling technique where a dependent variable is predicted based on one or more independent variables (Kumari & Yadav 2018:33).

Research methods and design

Sampling

The target population was various management positions within project-orientated organisations with various levels of responsibility and years of experience. The unit of analysis for this study is project-orientated organisations such as engineering (mining, electrical, civil), information technology, professional services, financial and business services, wholesale trade and commercial agents services. Based on the nature and scope of the target population, convenient sampling methods were used to collect data. The research instruments were adapted from three validated questionnaires previously used in the literature. Morris and Kuratko (2002:292–294) developed the Entrepreneurial Performance Index (EPI), and Shenhar and Dvir (2007: 219–2225) developed the Project Success Assessment Questionnaire and Project Classification Questionnaire. These questionnaires were tailored to analyse the relationship between PS and EP and the moderating effect of PR.

Even though there is no absolute method for determining an appropriate sample size, the precision and confidence required by the research can influence the sample size. According to Bell, Bryman and Harley (2019:195), the degree of error the study is willing to allow is an essential determining factor. While the general rule of thumb – 10 participants per variable – can be considered an acceptable sample size, there needs to be more consensus regarding the recommended sample size (Sivo et al. 2006). Kline (2015:16) suggested 200 as an optimal sample size, whereas Pallant (2011:18) indicated that a larger sample size is required when conducting factor analysis. Zailani et al. (2016:358) suggested that, as a general rule, 'the minimum is to have at least five times as many observations as the number of variables to be analysed' (Hair et al. 2010:101). Therefore, 72 variables multiplied by 5 gave a sample size of 360. This sample size for project-oriented organisations was regarded as adequate for testing the conceptual model proposed in this study (Oosthuizen 2018:146).

Of the 370 completed questionnaires, 369 were usable for analysis. All the respondents were involved in projects at different levels of their organisation. All respondents were from South Africa.

Data collection

The research instruments were adapted from three validated questionnaires previously used in the literature. Morris and Kuratko (2002:292–294) developed the EPI, and Shenhar and Dvir (2007:219–2225) developed the Project Success Assessment Questionnaire and Project Classification Questionnaire. These questionnaires were tailored to analyse the relationship between PS and EP, and the moderating effect of PR. Several methods were used to collect the data: firstly, written invitations were sent to project-oriented

organisations; secondly, questionnaires were emailed to individuals; and thirdly, various social media platforms were used to promote the survey. No incentives were offered to respondence to participate in the research. The data were collected over 5 months.

Measurement

The different categories of questions required diverse types of scales to allow for the quantitative analysis of the responses. A 5-point Likert scale, (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree and (5) Strongly agree, was used to obtain the measurements for the various questions. The questionnaire consisted mainly of closed-ended responses; however, open-ended responses were only used to allow respondents to include options that the closed-response questions might not have covered. Furthermore, the PR assessment instrument required the respondents to answer dichotomous questions, which resulted in categorical data.

Reliability and validity are based on whether the methods used to obtain data will produce the same results in the future. Reliability refers to the instrument's ability to measure a construct in the same way, continuously, regardless of the situation. In contrast, validity requires reliability for the instrument to measure the intended construct accurately.

In this study, to test for the reliability of internal consistency measures, Cronbach's alpha coefficient was used. Furthermore, to determine the construct validity of the research instruments, factor analysis was used.

Understanding the demographic profile of the sample is essential before analysing the data empirically because it will provide context for the findings. The demographic analysis gives insight into the characteristics of the sample, and it provides a method for interpreting the results and generalising them. This study measured industry type and years of experience as variables.

Data analysis

Statistics aims to define, organise, analyse and interpret information for description and decision-making. In data analysis, the researcher can determine relationships between variables and order, categorise, manipulate and summarise the data to conclude (Taljaard 2020:288). Data analysis was done with the Statistical Package for the Social Sciences (SPSS); of the 370 responses, only 369 could be used. A factor analysis was conducted to determine the stability of the functional constructs, followed by a study of the demographic data and a more detailed analysis of variance (ANOVA).

Factor analysis aims to determine whether a set of variables forms logical subsets that are relatively independent of each other. By grouping related variables into one factor, factor analysis provides an invaluable method of identifying underlying factors (Shrestha 2021:4). Eigenvalues represent the proportion of variance explained by a factor. An eigenvalue greater than one is considered significant, indicating that that fact contributes to a more common variance than a unique one (Shrestha 2021:7).

The four eigenvalues for PS were all greater than one; factor 1: CP (13.426), factor 2: PC (1.937), factor 3: PP (1.600) and factor 4: PT (1.279).

These values explain 67.56% of the variance. It is regarded as acceptable for this analysis. The eigenvalues of EP were 7.096 for factor 1: improved performance, and 1.906 for factor 2: CC.

These values explain 51.66% of the variance. It is regarded as acceptable for this analysis and concludes that the questionnaire was valid (Masilela, Pangala & Van Vuuren 2020:6).

Ethical considerations

This article followed all ethical standards for research approved by the Department of Business Management at the University of Pretoria, South Africa. A letter from the Committee for Research Ethics was issued to the researchers, permitting them to conduct their research. The study approval number is EMS120/20. It was a non-human subjects research. A permission letter was presented to executives in participating project-orientated organisations to obtain consent to conduct the survey study. Permission letters can be obtained from the author of this study. If participants were contacted through social media platforms, the survey questionnaire included a disclaimer that allowed them to accept or reject participation in the study.

Results

Correlation analysis

Correlation analysis is a statistical method to measure and interpret the possible relationship between variables. However, correlation cannot specify the causal relationship between the variables or why they are related. Moreover, because the correlation of the variables does not necessarily reflect causality, further examinations will be required. The Spearman's correlation coefficient test was used to analyse if there was a significant correlation between improved EP and CC. The confidence level was 95% ($p \leq 0.05$) for all types of analyses explained. Table 1 presents the correlation values and significance used in this study.

TABLE 1: Spearman's correlation values and level of significances.

Correlation value	Significance
r < 0.2	Very weak
0.2–0.4	Weak
0.4–0.6	Moderate
0.6–0.8	Strong
0.8 > R	Very strong

Source: Özkür, F. & Duman, G., 2019, 'Analysing the embedded learning-based movement education program's effects on preschool children's visual-motor coordination and self-regulation', *Journal of Education and Learning* 8(5), 193–202. https://doi.org/10.5539/jel.v8n5p193

TABLE 2: Non-parametric correlations.

Variables	Mean	SD	Improved entrepreneurial action	Company characteristics	Customer perception	Project characteristics	Project performance	Project team	Project risk
Improved entrepreneurial action	3.6998	0.74236	1	-	-	-	-	-	-
Company characteristics	3.6520	0.68878	0.505*	1	-	-	-	-	-
Customer perception	4.1105	0.72856	0.464*	0.427*	1	-	-	-	-
Project characteristics	3.8997	0.74369	0.453*	0.441*	0.456*	1	-	-	-
Project performance	3.9973	0.78183	0.436*	0.428*	0.695*	0.499*	1	-	-
Project team	3.9995	0.72237	0.416*	0.398*	0.634*	0.419*	0.599*	1	-
Project risk	2.2724	0.47213	0.435*	0.213*	0.209*	0.243*	0.197*	0.140*	1

SD, standard deviation.

*, Correlation is significant at the 0.01 level (2-tailed).

Considering all the theoretical data, this study conducted a correlation analysis using SPSS Statistics software and selected Spearman's correlation coefficient (Spearman's rho) to identify the correlation between the variables. A correlation coefficient of (0.2–0.4) indicates low to moderate correlation, whereas a correlation coefficient of r > 0.40 indicates moderate to high correlation.

Table 2 shows the results of the correlation analysis between the indicator, dependent and moderating variables. Even though most of the data reflect a low correlation between them, four variables showed moderate to high correlation and are briefly discussed next:

- Correlation between CC and improved entrepreneurial action (IEA) is 0.505, which indicates a moderate positive relationship. This relationship demonstrates the interdependency between attitudes and action. Organisations that regard entrepreneurship as paramount will act entrepreneurial.
- The data also indicate that the highest correlation in this research is between PP and CP (0.695). It is understandable when one considers that the most predominant participants in the execution of a project are its management, and the project's success ultimately depends on the perception of the customer and stakeholders. The success or performance of the project in this regard is influenced by the customer(s) of the project.
- The correlation between PT and CP of (0.634) is also significant. According to Shenhar and Dvir (2007:27), 'the customer represents major stakeholders whose perception is cuticle in the assessment of project success'. Furthermore, the authors indicate that the PT is closely related to the organisation; therefore, if the team can operate in a favourable environment, performance will be high.
- The correlation between PT and PP of (0.599) is also significant, as the performance of the project or the success thereof is entirely dependent on how well the team performs.

Analysis of variance

The data analysis' central focus is the correlation between the measures of CC and the measures of IEA and whether PR moderates these variables.

TABLE 3: Analysis of variation: Company characteristics and project risk.

Model		Sum of squares	*df*	Mean square	*F*	Sig.
1	Regression	56.177	4	14.044	43.173	< 0.001*
	Residual	118.410	364	0.325	-	-
	Total	**174.587**	**368**	-	-	-
2	Regression	57.052	8	7.132	21.843	< 0.001*
	Residual	117.535	360	0.326	-	-
	Total	**174.587**	**368**	-	-	-
3	Regression	58.309	12	4.859	14.877	< 0.001*
	Residual	116.277	356	0.327	-	-
	Total	**174.587**	**368**	-	-	-
4	Regression	60.011	13	4.616	14.303	< 0.001*
	Residual	114.576	355	0.323	-	-
	Total	**174.587**	**368**	-	-	-

Sig., significance level; *df*, degrees of freedom.

*$p < 0.01$ (two–tailed).

Firstly, ANOVA is introduced. The rationale for incorporating ANOVA is to determine the effect of the independent variables on the dependent variable. Additional tests can also be performed using ANOVA by separating the observed variance into different components. ANOVA's *F*-ratio should be close to one if there is no variance between the groups. Tables 3 and 4 report the ANOVA analysis for CC and IEA, and the moderator PR.

From the information presented in Table 2, the following results were obtained. For CC, Model 1 showed significant results, $p < 0.05$ (F [4, 364] = 43.173, $p < 0.001$). The adjusted R^2 displays that the model predicts 31.4% of the variability in the response and is explained by the project's success. Model 2 showed significant results, $p < 0.05$ (F [8, 360] = 21.843, $p < 0.001$). In Table 3, the adjusted R^2 displays that the model predicts 32.1% of the variability in the response and is explained by the project's success. Model 3 showed significant results, $p < 0.05$ (F [12, 356] = 14.877, $p < 0.001$). The adjusted R^2 displays that the model predicts that the project's success explains 32.1% of the variability in the response. Model 4 showed significant results, $p < 0.05$ (F [13, 355] = 14.303, $p < 0.001$). The adjusted R^2 displays that the model predicts 32% of the variability in the response and is explained by the project's success.

From the information presented in Table 4, the following results were obtained. For IEA, Model 1 showed significant results, $p < 0.05$ (F [4, 364] = 44.769, $p < 0.001$). The adjusted R^2 displays that the model predicts that EP explains 32.2% of the variability in the response.

Model 2 showed significant results, $p < 0.05$ (F [8, 360] = 23.269, $p < 0.001$). The adjusted R^2 displays that the model predicts that EP explains 32.6% of the variability in the response. Model 3 showed significant results, $p < 0.05$ (F [12, 356] = 16.107, $p < 0.001$). The adjusted R^2 displays that the model predicts 33% of the variability in the response is explained by EP. Model 4 showed significant results, $p < 0.05$ (F [13, 355] = 20.397, $p < 0.001$). The adjusted R^2 displays that the model predicts 40.7% of the variability in the response and is explained by EP. Model 4 showed that adding PR as a moderator did not significantly affect the results, $\Delta R^2 = 0.001$, F (13, 355) = 0.003, $p = 0.001$, $b = -0.03$, t (364) = -0.26, $p = 0.79$.

Reported model summary

In Table 5, the multiple linear regression model summary and overall fit statistics for CC are displayed and are interpreted as follows. Model 1's adjusted R^2 is 0.314 with the $R^2 = 0.322$. It means that linear regression explains 32.2% of the variance in the data. Model 2 reported an adjusted R^2 of 0.321 and an $R^2 = 0.327$, which explains 32.7% of the variance in the data. Model 3 also reported an adjusted R^2 of 0.321 with an $R^2 = 0.334$, which accounts for 33.4% of the variance in the data.

The data show that industry type did not significantly predict CC (model 2). It is likely because most data come from the IT sector. Even though IT companies undertake many novel projects, they do not necessarily imply innovation. In this study, years of experience (model 3) did not significantly impact CC as most of the data came from individuals with less than 5 years of experience, indicating inexperience. As a result, a lack of experience will not significantly predict CC. Model 4 (the moderator) showed an adjusted R^2 of 0.320 and an R^2 of 0.344, which accounts for 34.4% of the variance in the data. We will interpret the 'change statistics' column to determine whether Model 4 has a moderating effect.

These data can verify whether PR modifies the effect of CC (PT, PC, PP, CP, industry and years of experience). 'R^2 change' shows the variation increase explained by adding the interaction term (the change in R^2). From the data, the change in R^2 is reported as 0.010. Generally, this measure is expressed as a percentage, with a 10% increase in the variation. Project risk does have a moderating effect on CC. Table 6 displays the multiple linear regression model summary and overall fit statistics for IEA and is interpreted as follows. The adjusted R^2 is 0.322, and the R^2 is 0.330 in Model 1; linear regression explains 33% of the variance in the data. Model 2 reported an adjusted R^2 of 0.326 and an $R^2 = 0.341$, which accounts for 34.1% of the variance in the data. Model 3 reported an adjusted R^2 of 0.330 and an $R^2 = 0.352$, which accounts for 35.2% of the variance in the data.

TABLE 4: Analysis of variance: Improved entrepreneurial action and project risk.

Model		Sum of squares	*df*	Mean square	*F*	Sig.
1	Regression	66.874	4	16.719	44.769	< 0.001*
	Residual	135.931	364	0.373	-	-
	Total	**202.805**	**368**	**-**	**-**	**-**
2	Regression	69.125	8	8.641	23.269	< 0.001*
	Residual	133.680	360	0.371	-	-
	Total	**202.805**	**368**	**-**	**-**	**-**
3	Regression	71.364	12	5.947	16.107	< 0.001*
	Residual	131.441	356	0.369	-	-
	Total	**202.805**	**368**	**-**	**-**	**-**
4	Regression	86.712	13	6.670	20.397	< 0.001*
	Residual	116.093	355	0.327	-	-
	Total	**202.805**	**368**	**-**	**-**	**-**

Sig., significance level; *df*, degrees of freedom.
*$p < 0.01$ (two–tailed).

TABLE 5: Model summary: Company characteristics.

Model CC	*R*	R^2	Adjusted R^2	SE of the estimate	Change statistics				
					R^2 change	*F* change	*df*1	*df*2	Sig. *F* change
1	0.567[a]	0.322	0.314	0.57035	0.322	43.173	4	364	< 0.001
2	0.572[b]	0.327	0.312	0.57139	0.005	0.670	4	360	0.613
3	0.578[c]	0.334	0.312	0.57151	0.007	0.962	4	356	0.428
4	0.586[d]	0.344	0.320	0.56811	0.010	5.271	1	355	0.022

Sig., significance at the 0.01 level; *df*, degrees of freedom; SE, standard error.
[a] Dependent Variable: Company Characteristics.
[b] Predictors (Constant): Project Team, Project Characteristics, Project Performance, Customer Perception.
[c] Predictors (Constant): Project Team, Project Characteristics, Project Performance, Customer Perception, Industry type.
[d] Predictors (Constant): Project Team, Project Characteristics, Project Performance, Customer Perception; Years of experience.

TABLE 6: Model summary: Improved entrepreneurial action.

Model IEA	*R*	R^2	Adjusted R^2	SE of the estimate	Change statistics				
					R^2 change	*F* change	*df*1	*df*2	Sig. *F* change
1	0.574[a]	0.330	0.322	0.61109	0.330	44.769	4	364	< 0.001
2	0.584[b]	0.341	0.326	0.60937	0.011	1.515	4	360	0.197
3	0.593[c]	0.352	0.330	0.60763	0.011	1.516	4	356	0.197
4.	0.654[d]	0.428	0.407	0.57186	0.076	46.932	1	355	< 0.001

Sig., significance at the 0.01 level; *df*, degrees of freedom; SE, standard error.
[a] Dependent Variable: Improved Entrepreneurial Action.
[b] Predictors (Constant): Project Team, Project Characteristics, Project Performance, Customer Perception.
[c] Predictors (Constant): Project Team, Project Characteristics, Project Performance, Customer Perception, Industry type.
[d] Predictors (Constant): Project Team, Project Characteristics, Project Performance, Customer Perception; Years of experience.

Interestingly, industry type (model 2) did not significantly improve entrepreneurial action (0.197). The fact that industry type did not significantly predict IEA can be attributed to the fact that most data reside in the IT industry. Although IT frequently undertakes novel projects, it does not imply innovation. Years of experience (model 3) did not significantly predict improving entrepreneurial action (0.197). It could be attributed to the fact that most of the data had less than 5-year experience, which indicates inexperience and will therefore not impact intrapreneurial activity. Model 4 (the moderator) produced an adjusted R^2 of 0.407 and an R^2 of 0.428, which explains 42.8% of the variance in the data. The R^2 change is 0.076 or 76% increase in the variation explained; it can be concluded that PR moderated IEA.

Hypotheses

As previous research did not test for a correlation relationship between the predictors and dependent variables, it can be confirmed that the following hypotheses were either accepted or rejected in this article.

Spearman's correlation coefficient data indicated that not all the variables had a song or significant correlation. Project team strongly correlated with PP and customer perception. Project characteristics had a moderately weak correlation with the other variables. Therefore, H1 is rejected:

H2a: Analysis of the linear regression summary model indicated that there is a significant positive relationship between CC and improved entrepreneurial – Accepted.

H2b: Industry type indicated did not indicate a positive relationship between CC and improved entrepreneurial activity – Rejected.

H2c: Years of experience did not indicate a positive relationship between CC and improved entrepreneurial activity – Rejected.

H3: Project risk had a moderating effect on CC and improved entrepreneurial activity – Accepted.

Discussion

Projects continue to proliferate in contemporary society, including both academia and industry. More than ever, the number of project investments ranges in the billions within the South African project-orientated organisations. Project management is a popular topic, and scholars have investigated the relationship between project practices and their influence on organisations (Kuura et al. 2014). At the same time, organisations increasingly use project management methods to improve performance as a competitive advantage strategy (Maylor et al. 2006).

Despite this, investing in these projects is only sometimes justified because, most of the time, these projects fail or fail to meet the organisation's strategic goals.

For organisations to realise their strategic objectives for sustainable competitive advantage, more research is required to investigate the relationship between projects and performance. This study has the potential to contribute to the literature and inform practitioners about the relationship between projects and entrepreneurship. Not only does the study address previous research limitations but it also contributes significantly to interdisciplinary research between two distinct domains.

The results of this study provide insights into the research questions. Most variables indicated a moderate positive correlation for the dependent variables, CC and EP, which could demonstrate the interdependency between attitude and action. While PP and CP had the highest correlation score (0.695), it can be deduced that the success of a project is strongly correlated with how the customer perceives the project's results. Success is highly subjective. It also applies to the PT and customer perception, which had the second-highest correlation score (0.634). Once again, CP directly relates to the project's success. Interestingly the correlation between the PT and PP was also significant (0.599). The performance of a project and, ultimately, its success is determined by the people involved; the better the team dynamics, the better the project's performance.

The second research question was addressed through linear regression, which can identify the strength of relationships between multiple predictor variables and a moderated outcome. From the data, PR moderated CC and IEA. However, the data indicate that PR had no moderating effect on the predictors, PT, PC, PP and CP, industry type and years of experience. The research concluded that PR is a fundamental aspect of project management. The results could be because of a lack of experience and because most participants worked in the IT environment. This environment is lower in risk compared to the engineering environment. These results support the literature presented and justify the need for more research in the project and entrepreneurial academic domains.

During a roundtable at the Foreign and Commonwealth Office in London 2012, Elon Musk stated, 'I don't create companies for the sake of creating companies; I create companies to accomplish things' (Butcher 2012). Fundamentally, organisations are there to provide products or services and make a profit. It will contribute to the sustainable economic growth that South Africa desperately needs. This study will allow managers to understand the factors or variables that can contribute to PS and impact the organisational performance indirectly, which could help the organisation improve its competitiveness and growth.

Although this study took care in selecting the topic and research field, several limitations were experienced. The first limitation was inadequate literature on project practice and entrepreneurship in the South African context. Consequently, international studies were consulted as the primary source of information for the literature. Furthermore, the focus was on project-oriented organisations, as the research focused on the

organisation, not the individual. Also, while other research considered innovation, education, planning, time and sustainability, all these factors could be considered for evaluating project success and entrepreneurial performance. These research fields could provide additional insight into the relationship from a different perspective.

Conclusion

In conclusion, this study highlights the need for more risk research. It is because very little empirical research in the entrepreneurial domain focuses on risk in the context of projects initiated within the organisation. Traditionally, risk in entrepreneurship is considered in terms of the entrepreneur's characteristics. Although this is significant, this study argues it is a narrow view of risk concerning projects within the organisation.

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Authors' contributions

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Data availability

The data that support the findings of this study are available from the corresponding author, A.S., upon reasonable request.

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