Management Practices and Success of Innovation Projects

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Innovation projects occupy a privileged place in human activities: they are carriers of socio-economic values and levers of strategic positioning. This article improves understanding of the success of innovation projects in Chad through project management practices (PMP) and benefits management practices (BMP). To achieve this, the literature has made it possible to propose a model for representing success. The mixed methodology was used. It was applied to the Grand Ecosystem Lacustres Tchadiens (GELT) project. The results show that PMPs are more effective in achieving innovation management success (β = 0.38) but also investment success (β = 0.21). On the other hand, BMPs are better predictors (β=0.39) of investment success. However, PMPs and BMPs, when combined, are the preferred lever to generate ($\Delta r2$= 92%) the success of innovation projects.

Keywords: innovation projects, project management practices, benefits management practices, management successes, investment successes

INTRODUCTION

It is widely accepted that innovation projects are key factors in the competitiveness of organisations (Ika and Pinto, 2022; Meddeb, 2010; Midler et al., 2012; Migeon, 2012; Mignenan, 2021b). As a result, companies need to carry out their innovation project successfully. However, a reasonably accepted corollary suggests that the determination of innovation values can only be late or even retrospective (Garel, 2007; Garel and Mock, 2012; Garel and Sarazin, 2014). However, the success of innovation projects is one of the difficult terms to define because of its unpredictability. Indeed, although it differs according to the stakeholders, the success of the project raises a lot of interest while generating various definitions (Bertheau and Garel, 2015; Celhay and Cusin, 2011; Cordellier, 2011; McLaughlin and Kennedy, 2016). Perceived as *happy results*, the success of innovation projects allows the organisation to continuously improve its reputation (Blindenbach-Driessen and Ende, 2010; Deschamps and Nelson, 2014). For some authors (Pinget, 2012; Renaud et al., 2012; Robeveille, 2015), the success of projects is *the culmination of the level of energy deployed*; it is a question, for the beneficiary, of obtaining what he has sought or of leading to the envisaged result. For others, however, it is the achievement of a very large strategic result based on the doctrine of 'On time, on budget' (Pénin, 2013; Peters, 2008; Tremblay, 2007).

Similarly, the production of project results on time and on budget was the main concern of managers (Ika, 2009). In addition, although the 6th edition of PMBOK (2017) integrated *stakeholder satisfaction* with the project, several project managers still focus on traditional management success factors and indicators.

However, in recent years, project success has also been associated with *benefits management practices but collective intelligence* (Chih and Zwikael, 2015; Dalcher, 2018; Mignenan, 2021a, 2021b). Indeed, for

many studies, benefits management practices and human capital increase the success of projects (Mignenan, 2020) (Berssaneti and Carvalho, 2015; Breese, 2012; Breese et al., 2015; Mignenan, 2021c). However, little empirical work has explicitly shown the contribution of these practices to the success of innovation projects. Most research approaches benefit management from an implementation perspective (Coombs, 2015). In contrast, little research has synchronised project management practices (PMP) and benefits management practices (PGAs) to explain management success but also investment success (Badewi, 2016; Badewi and Shehab, 2015; Eduardo and Serra, 2017).

To shed light on this grey area, this article aims to test the relationship between innovation project success (investment success and management success) and management and benefits management practices. Specifically, it proposes to examine:

1. whether PMP alone and benefits management practices alone (Badewi, 2016; Badewi and Shehab, 2015; Eduardo and Serra, 2017) would positively and significantly affect the success of innovation project management. Finally, it proposes.
2. to explore, to what extent, the combination of PMP and PGA would improve the level of success of the innovation project (SPI).

LITERATURE REVIEW

It is accepted that all entities in our societies have become aware *of doing better differently* or *something else* for all continuing practical purposes. This observation is made in the economic sector but also in spheres of activity as diverse as teaching, research, health, water, etc. As a result, innovation projects are omnipresent, but the question of their success is still relevant. Thus, all stakeholders are concerned about the success of their innovation project. Although it is sometimes divergent depending on the status, the success of innovation project, this *happy result* is essential to the survival of the organisation (Barlatier et al., 2016; Bertheau and Garel, 2015). It makes it possible to measure the know-how and interpersonal skills of the manager.

According to some recent work (Haudeville and Bas, 2018; Noailles, 2011), project success is a set of failures that allows lessons to be learned. Similarly, other project management contributions believe that in innovation projects, you have *to fail early to succeed quickly* (Schier, 2014; Smida and Khelil, 2011). In any case, for several researchers (Battini, 2015; Bertheau and Garel, 2015), innovation project success has two dimensions:

1. project management success (SGPI)
2. investment/organisation success in innovation project (SIPI).

A similar distinction was proposed by Ika (2009). In connection with this distinction, some authors (Zwikael and Smyrk, 2012a) borrow the theoretical framework of project performance to break down the success of projects. These include:

1. *success of management/project management*, which is a measure of the project manager's performance.
2. *success from the point of view of the project promoter*, which is also considered organisational success, which measures the overall performance.
3. the *access of the investment in the project*, which measures the financial and socio-economic value generated by the investment (Mignenan, 2019; Zheng et al., 2018).

However, the frequently cited definition is one that draws the line between project criteria and success factors (Camilleri, 2011). Indeed, factors represent a set of elements that contribute to the success of the project: *communication management*, *knowledge*, *skills of the manager*, *teams*, *monitoring and control*, etc. Factors have a role in the implementation of the project, but do not allow for evaluation (Camilleri, 2011; Charles and Chang-Richards, 2021; Cooke-Davies, 2002a). The criteria for success, on the other hand, are the manifestations of its measure: *respect for the timetable*, *respect for the budget*, *satisfaction of the stakeholders*, etc. They are, in a way, common threads that can serve as an instrument for assessing the project. The success criteria, previously defined, make it possible to evaluate the project throughout its life cycle (Mignenan, 2019).

Traditional project management currents of thought define the first key criteria for success as a set of elements consisting respectively of compliance with the schedule, the budget and the quality of deliverables (IPMA, 2007; PMI, 2008, 2013, 2017a; PRINCE2, 2005; Turner, 2010). On-time, the project is to be implemented on time. Compliance with the budget framework consists in not exceeding the items of expenditure established during the design and planning phase of the project. Quality management focuses mainly on the implementation of the project in compliance with the technical characteristics initially defined and agreed by the main stakeholders (Mignenan, 2019).

Considering these divergences of views above, there is every reason to believe that the trajectory of project success remains a concern that is still relevant and a vast project to be undertaken. Therefore, many authors believe that the success of an innovation project is manifested by the acquisition of benefits, the level of satisfaction of stakeholders, the use of new knowledge (Lortie et al., 2013). For these authors, the component that can imprint the success of an innovation project is the added value that manifests itself through new products, processes, and organisational behaviour. However, there is still little consensus around these components (Mignenan, 2019).

In the context of this article and in line with the work of the two authors (Zwikael and Smyrk, 2012a) success has been broken down into *project management success* and *project investment/organisational success*. It is difficult, within the framework of the Chadian Large Ecosystems (Gelt) project, to measure and compare financial benefits, according to different perspectives and financial performance indicators. Similarly, it is difficult to measure the return on investment because the nature of the products/services is different. The same applies to what is expected or accepted in the context of Gelt. On the other hand, the success of the investment in terms of financial profitability is not considered. It is, however, measured in terms of organisational success and reproducibility.

Based on the above, it appears that for several works (Bertheau and Garel, 2015; Haudeville and Bas, 2018; Zwikael and Smyrk, 2012a) – a management success can be hindered by rigorous application of standards. Indeed, norms and rules inhibit creativity, innovation and make managers prisoner.

However, recent authors (Cordellier, 2011; Damanpour and Aravind, 2015; Deltour and Lethiais, 2014; Greco et al., 2022; Langston, 2022; PMI, 2017a; Roy et al., 2013; Schier, 2014) have shown that benefit management practices play an important role in the process of producing benefits/benefits. Their research indicates that PMAs and PMPs, such as *communication management* and *monitoring-control of the benefits/benefits of the innovation project*, etc. have more explanatory power over success than a task like *managing the timeline* and *managing the budget*. Under this principle, if instead of applying PMPs before PGA, a manager who simultaneously applies the instruments from PMPs and AGPs, their IP results would be better (Damanpour and Aravind, 2015; Haudeville and Bas, 2018). A few studies confirm this fact (Berger-Douce, 2014; Schier, 2014). These results are probably explained by the fact that PMPs and AGPs use methods and tools that, while not identical, are sufficiently similar and complement each other to be effective.

Now what would happen if when implementing an innovation project, a manager applies the MGPs? In other words, what would be the level of SIPI, if the PGA tool is more applied? The work of Zwikael and Smyrk (2012) answers this question. The results of their research indicate that PGAs have a positive and significant effect on the success of investment in innovation projects (SIPI). Indeed, according to the results of their study, the different PGAs (monitoring-control of benefits, skills of the person in charge of benefits, etc.) strongly explain the variance of the success of the investment in the innovation project (SIPI) and not those of the success of management of the innovation project (SGPI). Approaching from the same perspective, some works (Pinget, 2012; *Contribution of management practices to the success of innovation projects (*Renaud et al., 2012; Robeveille, 2015) argue that PGAs are factors that explain the success of the investment. However, these results do not support this hypothesis. For their part, some authors in project management (PMI, 2017) Bertheau and Garel, 2015) argue that PI's success is the crowning achievement of PGA and PGA. And PMPs are more effective at building management success. Other work shows that PMPs promote both IPMS and SIPI.

Based on these arguments, 12 variables were selected to apprehend three constructs as indicated in Table 1.

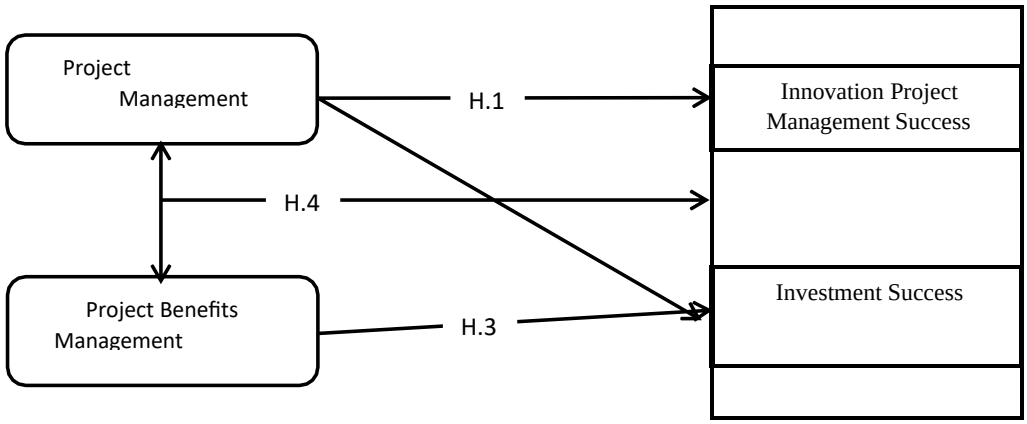
TABLE 1
LISTE OF VARIABLES UNDER STUDY

Built	**Independent variables/indicators**	**Concepts**	**Dependent variables/indicators**
Project Management Practices (PMP)	– Existence of the management manual – Cash flow plan – existence of chronogram – Communication management – Audit Service – Management of the specifications	Innovation Project Success (SPI) – innovation project management success (SGPI) – success of the investment in the innovation project (SIPI)	– Respect of the timetable – Respect of the budgetary framework – New lessons learned – Achievements of benefits – Stakeholder satisfaction
Benefits Management Practices (BMP)	– Existence of those responsible for the realization of benefits – Application opportunities – Monitoring and evaluation of effects – Management of collective intelligence – Information sharing		

Source: compiled data from the literature, author (2023)

Based on the variables in Table 1, the theoretical model is proposed as shown in Figure 1.

FIGURE 1
INNOVATION PROJECT SUCCESS MANAGEMENT



Source: inspiration of the doctoral thesis, author, 2023.

Elaboration of Research Hypotheses

The suggested model shows the causal links between the SPI and the PMPs and BMPs. Under this model, it should be expected that ip success will be more successful when an organisation employs both practices separately but also simultaneously in the same management sequence. Is this the case? Does the separate and combined use of PMPs and PGAs significantly increase PI's success? The answer to this

question could lead to a better understanding of the phenomenon of IP success by PMPs-PGAs and thus contribute to the development of innovation project management strategies within the consortium of universities.

The purpose of this article is therefore to test the general assumption that two complementary management practices:

1. PMP
2. BMP, improve the SPI more than just one.

This general hypothesis brings out four adjacent hypotheses to validate the general model.

- *Hypothesis 1:* management practices improve the success of managing innovation projects.
- *Hypothesis 2:* management practices contribute to successful investment in innovation projects.
- *Hypothesis 3:* benefits management practices support successful investment in innovation projects.
- *Hypothesis 4:* the combination of PMPs and BMPs increases innovation project success.

To ensure that these theoretical and managerial relationships between these variables echo the concerns of theorists and practitioners, an appropriate methodology is essential. This is the subject of the following sequence.

RESEARCH METHODOLOGY

Approach

PMP and benefits management practices are constructed with multidimensional characters, but also interdisciplinary. Therefore, proposing and testing a model of success resulting from these two factors calls for the mobilisation of a hybrid methodological framework. As a result, the mixed approach (Creswell, 2013) combining, simultaneously, qualitative and quantitative methods, was advocated. Indeed, initially, the literature review was applied, because it is the method par excellence, to understand the different facets of innovation management practices and the production process of project success but also to understand the manifestation of practices of managing the benefits of innovation projects. We analysed the most relevant articles on the management of innovation projects. These various exploration activities have made it possible to:

1 draw a portrait of the management practices of innovation projects carried out by universities and companies as well as their success.
2 understand the different theoretical currents around project management.

Next, we advocated the semi-directive interview, widely used in management science (Evrard et al., 2009). In this type of interview, respondents have a range of freedom to provide detailed and more complete information. For example, ten semi-directive, one-on-one, face-to-face and telephone interviews were conducted with each Head of Mission and coordinator of the project teams who voluntarily agreed to lend themselves to the questions. These ten respondents come from the universities and organisations that took part in the project.

The implementation of the interview is preceded by the construction of the semi-directive interview guide. This guide, acting as a real common thread, was built based on the information generated from the literature. It is structured according to the following four themes:

- Theme 1: innovation PMP.
- Theme 2: benefits management practices of innovation projects.
- Theme 3: successful management of innovation projects.
- Theme 4: successful investments in projects.

It should also be noted that our respondents were easily familiarised with the three themes of the interview. This advantage favoured the achievement of the saturation threshold after conducting the 14th interview, mostly, for convenience, with an average duration of 35 minutes per head of mission and the coordinator. Table 2 presents the characteristics of interview respondents.

TABLE 2
CHARACTERISTICS OF INTERVIEW RESPONDENTS

Position of responsibility	actual	Research experience (year)	Average interview duration (in minutes)
Project Manager	2	20 to 25	48
Head of Mission	3	10 to 15	51
coordinator	3	25 to 25	53
Operations Managers	2	3 to 5	58
total	10		

Source: Interview, 2022-2023

As for the analysis technique, we borrowed lexical and thematic analysis. Table 3 shows how the two qualitative analysis techniques were applied. Then, an analysis grid was developed according to the four themes from the interview guide initially developed for the need. This grid has been filled in according to the code of the interviewees and the units of analysis, which are subjected to vertical and horizontal analyses, accompanied by a summary table.

TABLE 3
ANALYTICAL TECNIQUES

Nature of qualitative analysis	Components	Relevance indicators
Lexical	Words used, sentences	Type and quality of vocabularies used. *E.g., frequency of appearance of words, average number of words per sentence, etc.*
thematic	Sentences, paragraphs, themes	Thematic breakdown *E.g., frequency of appearance of themes, frequency of association*

Source: Inspired by(Evrard, Pras, Roux, & Desmet, 2009)

Lexical and thematic content analyses have made it possible to highlight new facets of management practices applied to innovation projects and their success. The results therefore confirmed the dimensions of different types and areas of innovation projects. Similarly, lexical and content analysis helped identify words and themes frequently raised by respondents to inform the generation of success of innovation projects.

Thirdly, it is the explanatory phase based on the hypothetical-deductive approach. We previously formulated four research hypotheses from the literature review. The choice of hypothetical-deductive reasoning is motivated by the immensity of knowledge on management practices and the success of innovation projects, which are remarkably enriched by semi-directive interviews. The data was produced through face-to-face and online surveys (on a five-point Likert scale) from November 2017 to January 2019. The formulation of the items preceded the development of the questionnaire, which is composed mainly of the emerging variables and verbatims supplemented by the exploitation of the documentation from the literature. The questionnaire developed was pre-tested with 12 researchers and students who took part in both phases of the project. These respondents were selected since criteria for participation in both project campaigns.

TABLE 4
CHARACTERISTICS OF SAMPLE

Profile	Actual	Percentage	Year of research experience & innovation (year)
Teacher-researcher	22	18,33	5 to 19
researcher	14	11,66	8 to 22
doctoral student	28	23,33	5 to 7
Master's student	56	46,66	0 to 2
total	120	100	

Source: Interview, 2023

To determine the sample size, we followed the path recommended by d'Igalens and Roussel (Igalens & Roussel, 1998), who recommended that the sample size should be proportional to the number of items, five to ten times as many respondents as there are items describing the constructs under study. Twelve items were formulated to measure the three constructed. Thus, we have 5 □ 12 and 10 □ 12, or between 60 and 120. We opted for the high bound, $n = 120$ respondents, considered as reporting units. The 120 respondents (teacher-researchers and students) come from seven universities and research institutes, randomly selected from the project base. The representativeness of this sample is since it has the same characteristics as the population studied, i.e., the stakeholders in innovation projects. Secondly, the quota technique deployed made it possible to strengthen representativeness. Finally, for the two innovation projects studied, about 150 participants, divided according to the profile in Table 4, took part. After two reminders, a total of 98 questionnaires were received, or about 82% were used in the analysis. Table 4 presents the characteristics of the respondents.

Variables and Measures

The measures adopted in this research are based on previous qualitative and quantitative studies (Agarwal and Rathod, 2006; ; Alias et al., 2012; Alias and Yusof, 2014; Antoine, 2007; APM, 2015; Badewi and Shehab, 2015; Belout and Gauvreau, 2004; Berssaneti and Carvalho, 2015; Chih and Zwikael, 2015; Cooke-Davies, 2002a; Gemuenden and Lechler, 2011). We have adapted them to the context of the Gelt project.

- *Independent variables*: we borrowed indicators from the verbatim and those commonly used in the assessment and measurement of practical variables of management and practices of management of project benefits:
    1. For management practices, we have preferred
    2. availability of a project management manual (guidelines)
    3. review of budget planning periodically
    4. periodic review of the chronogram
    5. implementation of communication plans
    6. quality control.

  With respect to benefits management practices, we have selected the following three indicators:
    1. existence of benefits deliverables
    2. application opportunities
    3. monitoring and evaluation of effects
    4. management of collective intelligence
    5. sharing of information.
- *Dependent variable* (success of innovation projects), the indicators selected, given their regularity in the literature, are:
    1. compliance with the timetable
    2. compliance with the budget framework
    3. new lessons learned

4. achievements of benefits
5. satisfactions of stakeholders.

Responses were obtained using a Likert scales ranging from (1) strongly disagree to (5) strongly agree). The Cronbach alpha reliability of the scale is 0.77.

RESULTS

The results relate mainly to the characteristics of the project, the verbatim reports, and the testing of the four hypotheses.

TABLE 5
GELT PROJECT IDENTIFICATION SHEET

Background and Rationale	On the socio-economic level: (i) identify acceptable ways to intensify Chadian agriculture, in the face of demographic challenges and the rapid evolution of lake landscapes; (ii) Strengthen the capacities of Chadian researchers, collectively, by inserting the initiative into that of Chadian university laboratories and by welcoming Chadian doctoral students and teacher-researchers. At the scientific level: (i) lake ecosystems are environments with high productive potential and a great biological diversity still poorly inventoried and therefore explored.
purpose	Increase the performance of Chadian research and innovation projects, facilitate its orientations on themes in favor of development and prepare the future executives of institutions in charge of rural development to the challenges posed by climate change and brutal population growth.
Objectives	Train "senior Chadian officers", capable of investigating and comprehensively grasping, in its complexity, a local problem, of reporting on it (research-action/intervention), and thus strengthening the capacities of national research organizations.
GELT components	(i)-Creation of masters for students (field research) involvement of young researchers (preparation of doctoral thesis) and teachers (possibility of passing the qualification of the African and Malagasy Community of Higher Education (CAMES)) having thesis and qualification projects; (ii)-Creation of a website for the publication and evaluation of research, housed on the website of the Ministry of Higher Education; (iii) – Management and management component of the Gelt project (scientific committee, steering committee, project secretariat, technical assistant, international volunteer, three heads of mission (three project teams).
methodology	Participatory, collaborative and innovation approach, call for projects, teamwork, "steering committee", and mixing of members of Franco-Chadian teams.
Stakeholders	-Chadian side: seven Chadian universities (teacher-researchers and students); IRED researchers; ITRAD and CNRD. -French side: IRD researchers; CIRAD; University of Aix-Marseille, 3 universities (Paris 1, Lyon 2 and Toulouse 2)
budget	EUR 500 000
Source of funding	100% French Embassy in Chad/N'Djamena

Source: Compiled data from the financing agreement, December (2022)

Characteristics of the Project Under Study

The Gelt project, the maneuvering ground of this study, is carried out in a well-defined context, has purpose, objectives, components, and an implementation methodology. The table shows the characteristics.

Verbatim Reporting and Hypothesis Testing

Qualitatively, we have highlighted the full reports initially generated. Table 6 presents the portrait of these reports.

TABLE 6
VERBATIMS

Explanatory variables tested	***Verbatims***
Project management practices	– I think the existence of the project document that serves as a management manual. – for me a cash flow plan has been developed to respect the budgetary framework. – a timetable presenting the main tasks is available to allow the respect of the deadlines. – but yes, communication management is done by phone, email, activity report; French is the main working language. – audit engagements are carried out on a quarterly basis and cover financial and accounting management. – I can also add the predictive management of risks related to accounting management but the project site; – I will say that the specifications are more important also in the management of the project; – I also that the project launch meeting plays a role because it allows to present the philosophy of the project to the different stakeholders;
Benefit Management Practices	– we have set up people responsible for the realization of benefits/benefits who are none other than the operations officer, the heads of missions and their coordinator. – the results of the research find opportunities for application and thus allow to learn new lessons. – yes, the mechanism for monitoring and evaluating the effects contributes to meeting the expectations of stakeholders. – every evening, a meeting to share information and share information is held – in terms of managing collective intelligence, heads of mission and coordinators are strategists; they do not let themselves be easily carried away by their emotion;

Source: Excerpt from interview results (Author, 2023)

Analysis of the verbatim reports in Table 6 identified new concepts that act as emerging variables. Table 7 shows the result of the example.

In terms of descriptive statistics, we generated the means and standard deviations (EC). Table 8 presents the results. Thus, in general, respondents (teacher-researchers, researchers and students) perceive management practices and benefits management practices as factors that contribute significantly to the production of the success of innovation projects. More specifically, respondents say that the effective application of management practices effectively contributes to management success with an average of 4.67 out of 5 (*S.T.* = 1.47). In addition, they state that they have deployed, since the launch phase of the Gelt project, benefits management practices, with the average of 4.63 out of 5 (EcT = 1.48). Second, they note that heads of missions and coordinators contributed significantly to achieving management success, with an average of 4.33 (EcT= 1.49). They highlight the contribution of the operations managers and the project manager in achieving the success of the investment in the project, with an average of 4.69 (EcT = 1.48). Finally, according to respondents, the success of the investment in the Gelt project is satisfactory to all

stakeholders, with an average of 4.66 out of 5 (EcT = 1.47). In short, respondents consider that the collaborative leadership that impresses the direction of the project has further contributed to its overall success. These results are certainly all positive, although interviews reveal some divergent points of view, including some operational managers who are stricter in budget management. The results also show that respondents share the efforts of the project's coordination and funding partner. Indeed, they point out that compliance with the deadlines for disbursements constitutes a significant contribution in the respect of deadlines.

TABLE 7
EXAMPLE OF FULL REPORTS

Variables tested	***Full reports***	***Emerging variables***
Management practices	– *Existence of the management manual* – *Cash flow plan allows to respect the budgetary framework* – *Chronogram promotes the respect of deadlines* – *Communication management* – *audit service*	*Predictive risk management; Specifications Kick-off meeting*
Benefit Management Practices	– *Existence of those responsible for the realization of benefits helps to generate benefits* – *Application opportunities allow you to learn new lessons* – *Monitoring and evaluation of effects helps to meet the expectations of stakeholders* – *Management of collective intelligence* – *Information sharing*	*Emotional intelligence*

Source: Excerpt from interview results (Author, 2023)

Finally, Table 9 presents Pearson's correlation highlighting the signs of the links between success (management success, investment success) and the explanatory variables including PMPs and BMPs. In general, strong correlational results between the variables emerge. More specifically, management practices have the strongest correlation ($r = 0.98$; $p < 0.01$) and statistically positive with management success. Similarly, they have a correlation coefficient ($r = 0.85$, $p < 0.01$) with the success of the investment in the project. Benefit management practices is the second variable highly correlated ($r = 0.95$, $p < 0.01$) statistically positive with investment success. These results converge with the reports from the semi-directive interviews in Table 6.

TABLE 8
MOYENNE, STANDARD DEVIATIONS AND CORRELATIONS BETWEEN VARIABLES

Variables	average	standard deviation
Project Management Practices	4,67	1,47
Benefits Management Practices	4,63	1,48
Innovation Project Success	4,33	1,49
Management Success	4,69	1,48
Investment success	4,66	1,47
Valid N (list)		

**p < ,01

TABLE 9
PEARSON CORRELATION

	Project Management Practices	Benefits Management Practices	Innovation Project Success	Management Success	Investment success
Project Management Practices	1				
Benefits Management Practices	0.64**	1			
Management Success	0.88**	0.51**	0.58**	1	
Investment success	0.75**	0.85**	0.57**	0.67**	1

**. The correlation is significant at the 0.01 (bilateral) level.

Principal Component Analysis

To examine the reliability of the measurements, Cronbach's alpha was used as a measure of reliability. About the validity of the questions, an exploratory factor analysis has been deployed. The principal component analysis with Varimax rotation makes it possible to test the divergent validity of the constructs, as illustrated in Table 10.

TABLE 10
VALIDITY AND RELIABILITY OF ITEMS

Components	1	2	3	4
Cronbach's alpha	*0,93*	*0,92*	*0,92*	*0,95*
PMP1.respect of the timetable				0,83
PMP2.on budget				0,78
PGA1.realization of benefits			0,82	
PGA2.stakeholder satisfaction			0,88	
PGA3.audit monitoring-control		0,86		
PGA4.Responsible for Delivering Benefits		0,67		
PGA5.emotional intelligence		0,63		
PMP3.project manual	0,74			
PMP4.treasury plan	0,72			
PMP5.chronogram review	0,78			
PMP6.communication management	0,72			
(n = 120)				

Quantitatively, table 10 shows that all items have communalists above the threshold of 0.5. The matrix of components shows that the factor contributions of the items are good (>0.5) and shows theexistence of a factor structure with four independent components. The reliability test, using Cronbachalpha, produces values that vary between 0.92 and 0.95. They are all greater than 0.6 according to Evrard *et al.*, (1997, p. 294).

Qualitatively, the views of Gelt's office and the steering committee corroborate the quantitative results:

> *[...] we cannot do without the guidelines from the management manual, which are explicitly set out in the Gelt convention contract, nor the timetable, the financial management because we must justify our presence and theexpenses".* Similarly, according to the steering committee: *"we cannot do without the management of the Gelt'sstakeholders, the technical*

and financial partners, the monitoring and control of the indicators to ensure the effectiveness of the activities.

Hypothesis Testing

To test the four hypotheses, we used verbatim extracts and regression analysis simultaneously. Indeed, the regression method allows the verification of the variation in the coefficient of determination R^2 of each explanatory variable added to the equation of the model (Alain, 2004). Weanalyzed the data using SPSS 23.0 software.Table 10 presents the results.

Hypothesis 1: *Project management practices (PMP) improve the success of innovation project management (IPMS).*

In terms of quality, the managers of the Gelt project are unanimous on the effectiveness of management practices:

[...] we are on our sixth research and innovation project and all of us see the importance of setting up a projectoffice with an operations manager, drawing up specifications, a communication plan, a monitoring and evaluation system and an audit department. If Gelt is largely supported by all stakeholders who agree that Geltis a total success, in terms of its management.

These opinions testify to the effectiveness of innovation PMPs. However, some officials have reservations about cash management, which is believed to be the cause of delays in the implementation of several activities:

[...] due to the slow disbursement of funds, some of our field missions had to be postponed from two to three. Similarly, delays in the submission of mid-term reports are mainly due to disbursements.

Quantitatively, PMPs significantly predict SGPI. Indeed, R^2, which estimates the explanatory powerof the proposed model, shows a significant regression ($R^2 = 0.34$, $p <,00$) between the PMP and the SGPI. In other words, PMPs account for 34% of the variation in the management success of the GELTproject. While the coefficient "b" = 0.36 means that with each improvement in the PMP quality scale,the level of predicted GELT management success increases. Similarly, the standardized beta coefficient ($\beta = 0.38$) measuring the PMP variable shows that this variable contributes to the prediction of GELT. The value of the T-test (t= 8.62; $p <,00$) indicates that the contribution of PMPsto the explanation of the level of GELT ILI is statistically significant. These results confirmhypothesis 1 on predicting the success of the Gelt.

Hypothesis 2: *Project management practices (PMP) contribute to successful investment in innovation projects (SIPI).*

Qualitatively, it appears from the opinion of HR managers that:

[…] Here, management practices, including briefings, revision of the timetable, budget, stakeholder management, conflict management, etc. are among the practices that have effectively contributed to the success of GELT's investment. It was above all the communication with the financial partner that played a decisive rolein the success of the investment.

These opinions testify to the importance of PMPs as a relevant instrument for building the success of investment in the innovation project (SIPI).

Quantitatively, PMPs also predict SIPI. Indeed, according to the data in Table 9, the coefficient R^2 shows a significant regression ($R^2 = 0.27$, $p < .00$) between the PMPs and the SIPI. In other words, the PMP explains 27% of the variation in the SIPI GELT studied. While the coefficient "b" = 0.19 means that with each improvement in the PMP quality scale, the SIPI level increases. Similarly, the beta coefficient (β= 0.21) shows that PMPs contribute to the prediction of SIPI. The T-test value (t=8.72) indicates that this contribution to the explanation of the SIPI level is significant. Such results confirm hypothesis 2.

Hypothesis 3: *Benefit Management Practices (PMAs) support successful Investment in Innovation Projects (IPIS).*

The results of the interview show that Benefit Management Practices (BMPs) increase the productionand use of The Benefits of the Gelt Project by recipients.

> *[…] it is true that this had escaped the members of the steering committee, but at the level of the mission coordination office, we defined a chapter concerning the management of the realization of the benefits of the GELT project, we put in place a strategy for the application of these. To this end, a monitoring and evaluation mechanism for effects has been operationalized, strategies for sharing information from the field has been defined. Similarly, heads of mission and coordinators were sensitized on the importance of managing collectiveemotional intelligence. These provisions have been instrumental in the new lessons learned, the realization of benefits but also and above all the satisfaction of stakeholders.*

Some officials, and more specifically, heads of mission and coordinators, revealed the importantrole that the benefits management practices of the Gelt project played in the success of the investment.

> *[…] Thanks to the funding of the Gelt project, our students can define in its finest manifestation, the problem ofthe development of the community of the three sites of the Gelt project. Many of them have a perfect command of the techniques of writing study reports and academic work, in the context of cross-research.*

These opinions demonstrate the success in the investment of the project, which results from the importance of operationalizing the practices of managing the benefits generated by innovation projects.

Quantitatively, Benefit Management Practices (PGA) significantly predict the success of the Innovation Project Investment (SIPI). The R^2 coefficient shows a significant regression ($R^2 = 0.74$, $p < .00$) between the PGA and the SIPI. In other words, the PGA explains 74% of the variation in Gelt'sSIPI. While the coefficient "b" = 0.38 means that with each improvement in the PGA quality scale, the SIPI level increases. Similarly, the beta coefficient (β= 0.39) shows that PGA contribute to the prediction of SIPI. The T-test value (t= 8.82) indicates that this contribution to the explanation of theSIPI level is significant. Such results confirm hypothesis 3.

Hypothesis 4: *The combination of project management practices (PMP) and PGA increases theoverall success of innovation projects (SGlPI).*

Qualitatively, Gelt officials believe that the intelligent mobilization of PMPS and PMAS has been instrumental in the project success process.

[…] we realized that we should not only pay attention to the financial and accounting and accounting aspects ofthe Gelt but we should also see how to ensure that the teams engage, collaborate, interact and share experiences.We have managed to make team members more agile, through synchronized collaborative management but above all the management of excellence, which is part of the objectives of the Gelt project from the design phase. Because we know that this posture promotes collective learning, sharing of experience and conflict resolution. Thus, the mid-term evaluation of the Gelt project revealed that the combination of the two management practiceshas a strategy to promote in the rest of the Gelt implementation period. The satisfaction of financial partners, students, researchers, and teachers, etc. is mainly due to the combination of the two practices.

Quantitatively, when PMP and PGA are combined, they explain 92.3% of the variance of Gelt innovation project success. The T-test value (*t*= 8.82) indicates that the contribution of the combination to the explanation of the level of SGlPI Gelt is significant.

By way of synthesis, it appears from the results that THE PGA and the PMPS are important predictorsof the level of success of the innovation project and that, in fact, the explanations attributed to the PGA and PMP are due, among other things, to the monitoring and control of the benefit indicators, to the competence of the person responsible for the benefits but also to the budget management, thetimetable, communication, etc. demonstrated by the project stakeholders. The study, through these results, demonstrates the relevance of project management practices aimed at facilitating access to information related to the innovation project to increase trust.

TABLE 11
PREDICTORS OF COMPETITIVE HUMAN CAPITAL IN THE WORKPLACE

Independent variables	**ΔR^2**	**b**	**Beta**	**t**	*p*
PMP	0,34	0,36	0,38	8,62	,00
PMP	0,27	0,19	0,21	8,72	,00
BMP	0,74	0,38	0,39	8,77	,00
PMP&PGA combines	0,92	PMP =0.35	PMP =0.37	8,82	,00
		PGA =0.37	PGA =0.39		

Source: Analysis generated by IBM SPSS 23 (author, 2023)

For synthesis purposes, Table 12 is expanded.

TABLE 2
SUMMARY OF RESULTS

factors	**Qualitative**		**Quantitative**		**Overall success**
	Management success	Investment success	Management success	Investment success	
Project Management	Effective	Effective	β = 0.38	Beta = 0.37	Effective
Benefits Management practices	Less effective	Effective	β =0.21	Beta =0.39	Effective
Combination of practices	Effective		β = 0.37	Beta= 0.37	Highly effective

Table 12 shows that the combination of the two practices plays a key role in the success of innovation projects. In contrast, management practices are effective in delivering management success compared to benefit management practices conducive to investment success.

DISCUSSION

From the outset, this is because the performance of the innovation project affects its success (Mir and Pinnington, 2014). In connection with the above, the four hypotheses that suggest the explanatory power of PMPs and MGPs on project success are inspired by universal but also contingent approaches to project management (Fossum, Binder, Madsen, Aarseth, & Andersen, 2019). According to the correlational results, PMPs and PGAs positively and significantly influence the management success of Gelt but also the success of the investment. Based on this positive and statistically significant relationship, we argue that, more effective is the deployment of project management tools and techniques (*budget management, chronogram management, communication management*) and benefits management (*benefits monitoring-control, benefits manager skills*, etc.), the greater the chance of success of the project. These results demonstrate that the unintended importance given to these factors by the literature explored (Ika, 2009; PMI, 2017; Serrador, 2015; NPA, 2015). Moreover, the effectiveness of PMPs-PGAS, in the context of an innovation project, can only be considered when the project manager is competent and, more generally, when there is an active participation of all stakeholders and team members in the implementation of project activities (Badewi, 2016; Breese et al., 2015).

These results support the conclusions of Badwi's (2016) quantitative study which places importance on *defining, planning, communicating, engaging stakeholders* as having an impact on project management success. These variables are strategic factors in innovation projects because they integrate human resources management.

Qualitatively, PMI (PMI, 2017) and PRINCE2 (2009) situate communication, planning, etc. within PMP that enable project management members to effectively play their key role throughout the project cycle. These practices are a significant aspect for the project promoter in its general dynamics and in the effectiveness of these practices (Mignenan, 2019).

Be that as it may, PMP-PGA's contribution to the management success and the success of the investment in Gelt is therefore vital, crucial... and if the PMPS (management of communication, chronogram, budget, etc.) are absent or failing, the project can 'break the figure'. This interpretation fits perfectly into the universal requirements for project management success (APM, 2012, 2015; APM and Sydor, 2010; IPMA, 2008; ISO21500, 2017; PMI, 2013, 2017b; PRINCE2, 2009). According to these approaches, PMPs are important factors in the management success of any type of project (Badewi, 2016; Benoit, 2016; Joslin and Müller, 2016). Similarly, according to the actors, the failure of an innovation project may be due only *to the lack of instrumental knowledge and skills of the project manager, poor practices of communication,* planning, etc. throughout the project lifecycle (Mignenan, 2019).

The authors who fit into the contingent project management perspectives but suggest the deployment of PMPs-PGA, state that flexible planning and beneficiary participation may be sufficient, in certain contexts, to generate the desired results, effects and impact (Joslin and Müller, 2015) In the same perspective, for other authors, when the context is less stable, the chronogram (plan) could undergo modifications to adapt to it (Cooke-Davies, 2002b; Mark, 2005; Mûller and Jugdev, 2012). To be seen, in fact, PMP-PGA are still necessary to build the success of project management but also the success of investment (Mignenan, 2019).

However, it is difficult to compare our interpretations with others because few quantitative researches in innovation project management has examined the contribution of PMPs-PGA so closely. Admittedly, several researches (Badewi, 2016; Benoit, 2016) had already noted that some components of PMPs (*communication management, chronogram management, budget management, teams*, etc.) are universal and positively associated with the successful management of any type of project. However, some works allude to the primacy of the instrumental aspect of project management (Garel et al., 2001) Also, Navarre (2005), when he mentions the application of meta-rules for complex projects.

However, the interpretations relating to PMPs, PGAS and the contribution of advanced PMPs-PGAS echo those of some researchers in project management, which mention that planning, organization, communication, control, etc. within the project team is not an instrument for the benefit of management but the pillar of management itself. Thus, this PMP-PGA, builders of project success, are strategic tools since project actors can draw on them as they wish for the instrumental dimensions and the technical field of the project. Bearing in mind that several studies confirm the positive influence of knowledge management on project performance, the authors intended to examine whether the benefits generated by the knowledge gained from previous projects can be linked to the recommended method for knowledge acquisition and transfer. It is in this sense that two-thirds of the heads of mission said that: "the knowledge acquired during previous missions was mainly related to: more efficient scheduling, better control of the work schedule, more efficient communication, faster execution of tasks and better problem solving, etc."

These statements are also consistent with those made by several researchers in project management and organisational theory suggesting that management practices represent one of the pillars of strategic or organisational management (PMI, 2016; Sanchez et al., 2017; Serrador, 2015).

The fact that the PMP-PGA combination emerges from this research as best predictors but *builders* of project management success and investment, can have theoretical and practical interpretations in project management.

Theoretically, PMPs are part of the universal approach to project management (APM, 2012; IPMA, 2008; PMI, 2016a, 2016b, 2017b; PRINCE2, 2009), which advocates for the success of project management but also the success of investment or organisation (Ika, 2007, 2009) and, *increasingly, project success*. The strong contribution of PMP-PGA to success can also be interpreted by the fact that these variables belong to the school of optimisation and modelling. Indeed, of Taylorian inspiration, the school of optimisation recommends the rationalisation and optimisation of cost-quality-duration constraints. Also, the remarkable contribution of PMP-PGA to the construction of management success is aligned with the earned value technique, which compares planned values, the actual values of the schedule and the budget. Similarly, the fact that PMP-PGA appears as confirmed predictors corroborates the recommendations of lean six-sigma and EFQM methods that strongly defend the continuous reduction of errors and defects in the process of carrying out activities to improve project results. Finally, the qualitative explanation of PMP-PGA's contribution fits very well into the contingent foundations of project success (Engwall, 2003; Gareis, 2010; Ika, 2007, 2009).

On a practical level, following in the footsteps of several researchers (Fortune and White, 2006; Shenhar et al., 2002(b), it emerges from these results that it is not the use of PMPs-PGAs that leads to Gelt's management success; rather, it is the leadership capacity and experience of the project office members, the heads of missions, the strong involvement of other stakeholders, etc. in the use of PMSPS-PGAs and the ability to adapt them to the specific PTTI ecosystem in Chad.

Finally, the fact that the PMP-PGA combination effectively promotes the success of innovation projects leads to an understanding of the importance for project managers to have complete PMP-PGA, the capacity and knowledge to deploy and adapt them to the specific organisational context. In any case, project managers are asked to know which tools and techniques from PMP-PGA applied to a given innovation project and, if necessary, complete the missing elements, in accordance with the specific context of their project.

RESEARCH IMPLICATIONS

Theoretical Contribution

The significant impact of PMP-PGA on the overall SPI may have several implications. Since the results suggest that the success of project management and that of project investment are highly correlated, PGA alone, without PMP, indicates that an organisation cannot generate the results of the innovation project on time and in budget framing. In addition, this outcome/success may not reflect the quality characteristics initially defined. Therefore, when PMAs are associated with PMPs, the SPI (management success and investment success) is significantly improved to satisfy the beneficiaries and the target group.

Components of PMP and PGA that are perceived to have a significant impact on the success of investment in innovation projects include:

1. the communication plan
2. budget management
3. the competence of the individual responsible for delivering the benefits
4. reviewing the benefits thereafter.

This refers to the theory of governance which states the relationship between the project managers, the founder of the project, which assigns the responsibility for delivering the effective result to the project manager (Zwikael and Smyrk, 2012b).

Unlike the post-project review, which aims to identify and document lessons learned and evaluate the performance of the project manager in terms of meeting deadlines, quality and costs (Sanchez et al., 2017) examining the benefits of the innovation project consists of producing socio-economic benefits, strategic positioning and notoriety.

Methodological Contribution

In general, the adoption of the simultaneous mixed method (qualitative and quantitative) is the major methodological contribution. Specifically, the adoption of new constructs (emotional intelligence, kick-off meeting, etc.) and the adaptation of the contents of the items forming the dimensions of the variables used in the context of this article represent a remarkable methodological contribution, since previous studies ignore the specific components of innovation PMP and the practices of managing the benefits generated. Indeed, the hypothetic-deductive posture deployed has made it possible to highlight items specific to the Gelt project, which is part of the context of interdisciplinary research.

Then, after correlational and explanatory analysis, several items were carried out and pertinent. These include, among others:

1. the management of the chronogram
2. compliance with the budget
3. the realisation of benefits
4. stakeholder satisfaction
5. audit monitoring and control
6. emotional intelligence
7. the specifications
8. the cash flow plan
9. communication management, etc. (see Table 9).

These are the items that have been formulated and improved based on the literature on innovation project management (Akrich et al., 2009; Antoine, 2007; Archibald and Archibald, 2016; Arnould et al., 2015; Barlatier, 2016; Bertheau and Garel, 2015). Thus, the reliability and relevance of these items are part of the range of remarkable methodological contributions.

Finally, the mixed estimate used is an undeniable methodological contribution. Indeed, this strategy has made it possible to minimise the limits of qualitative and quantitative approaches. It is a strategy that has allowed to have a finer and more complete understanding of the problem of the overall success of innovation projects. This approach was implemented in a phase in which qualitative and quantitative data were generated simultaneously and iteratively. Side-by-side analysis of the interweaving of qualitative and quantitative pathways documented little-studied concepts/variables, including ‘benefit management’ and ‘emotional intelligence’.

Managerial Contributions

The identification and stabilisation of the *PMP and PGA* variables, which play a significant role in the process of the success of innovation projects in academia, represents a concrete contribution for all actors involved in research and innovation. Indeed, highlighting the positive and statistically significant relationships between the PMP, PGA and PMP-PGA is an important managerial aspect on which the heads

of the administrative units of academic institutions, teacher-researchers and researchers can rely to suggest and enrich research management practices and innovation.

Similarly, this research has highlighted the explanatory power of innovation project benefit management practices on the success of investment in innovation projects. For PMP, on the other hand, the results showed that some managers are not very supportive of it in terms of aspects of cash management. As a result, and given the specific contexts of certain projects, this study recommends that managers place more emphasis on collaborative management and the management of excellence that advocate leadership, coaching, etc. Specifically, it is desirable that the emphasis be placed on the different dimensions of agility and therefore collective intelligence to promote the development of human capital, a guarantee of the success of innovation projects.

In any case, this work has shown that the PMP-PGA combination plays a more significant role in building the overall success of innovation projects than differentiated employment. This result is fundamental for the heads of laboratories and design offices whose mission is to lead interdisciplinary and transdisciplinary innovation projects. By way of synthesis, we have developed Table 13 for synthesis purposes by looking at the effect of each of the practices of the different dimensions of success of innovation projects.

TABLE 13
SIZE OF THE EFFECTS OF PRACTICES ON THE SUCCESS DIMENSIONS OF INNOVATION PROJECT

Practices/performance	*Management success*	*Investment success*	*Overall success*
Project management practices	6.1%	2.1%	3.3%
Benefits management practices	1.2%	5.5%	2.5%
Combination of the two practices	3.7%	3.8%	4.1%

The data in Table 13 show that a 1% increase in the project management practice score would produce an increase in the overall success score of 3.3%, a 6.1% increase in the management success score and a 2.1% increase in investment success. Managers can use this estimated model to benchmark innovation projects.

LIMITATIONS OF THE STUDY

In line with the belief that formulating benefits upstream of the project implementation process positively influences the success of the overall innovation project (Thomas and Fernandez, 2008; Thomas and Mullaly, 2009) this study has little solid evidence to support the idea that the determination of economic and financial profitability indicators is sufficient and essential to achieve investment success in the innovation project. In fact, these results align with the perspective that quantifying benefits is not a 'neutral' process (Breese, 2012; Breese et al., 2015). In the sense of Ward et al., this sufficiently demonstrates the inability to properly quantify benefits (Westerveld, 2003) Another explanation lies in the time and effort devoted to the preparation of the project document. This study does not show the time spent on the business case, but it is generally accepted that this time span is considered a factor that can positively affect the success of investments in innovation projects (Serra and Kunc, 2015). Finally, this research did not focus on the economic and financial business case, yet the profitability of the investment is associated with economic and financial criteria (Breese, 2012; Breese et al., 2015).

Finally, studying a single project case is also a limitation.

OUTLOOK

Considering innovation project management as a practice (Dalcher, 2018) it appears that a longitudinal study would be relevant when the benefit management practices of innovation projects are applied. This would effectively track the process of realising the benefits of the project and understand the contextual and environmental factors that affect the delivery process. In addition, multiple case studies are needed to determine the critical elements in the governance contracts of the benefits of the innovation project to realise the benefits of the project effectively.

Ultimately, several practitioners and theorists (Badewi, 2016; Badewi and Shehab, 2015; Benoit, 2016) believe that PMPs are an ideal way to leverage investments made as part of an innovation project. After testing this hypothesis using empirical evidence, it was found that AGPS had strong positive and significant impacts than PMPS on investment success. However, the combination of PMP with PGA further enhances the SPI. In other words, without a reliable result of the innovation project delivered on time, quality and within budget, the production of benefits would be hindered. To produce the overall SPI (valid and reliable), management plans must be continuously reviewed, stakeholder expectations and requirements must be carefully managed, etc.

CONCLUSION

This research shows that PMPs and PMAs are necessary to ensure management success and successful investment in innovation projects. In other words, organisations that combine PMP and PGA in a single management framework could achieve a significantly higher level of success than other organisations that implement PMPs or PMA only. However, PMAS have a greater positive and significant impact on the success of investments in innovation projects than PMPS. For AGPS, assigning responsibility for delivering benefits is the most relevant factor in considering investment success, while the business case is less impactful. Similarly, when it comes to PMPS, effective communication management and budget management are essential for the success of innovation project management, while managing the activity timeline is the least impactful factor for management success(Mignenan, 2020, 2021).

Mobilising PMP-PGA (Badewi, 2016; Eduardo and Serra, 2017; IPMA, 2008; Joslin and Müller, 2016; Kanwal et al., 2017), it appears that a longitudinal study is more appropriate to understand the profound manifestations of the benefits and values that emerge before, during and after the innovation project. Because the instruments that make up the PMP-PGA will make it possible to control the process of producing said profits and to gauge the contingency factors having a strong impact on the stages. In addition, multiple and longitudinal case studies are necessary and essential to identify relevant elements that can contribute effectively and efficiently to the production of the benefits of the innovation project.

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