Project manager-to-project allocations in practice: an empirical study of the decision-making practices of a multi-project based organization

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Empirical studies that examine how managers make project manager-to-project (PM2P) allocation decisions in multi-project settings are currently limited. Such decisions are crucial to organizational success. An empirical study of the PM2P practice, conducted in the context of Botswana, revealed ineffective processes in terms of optimality in decision-making. A conceptual model to guide effective PM2P practices was developed. The focus of this study is on

deploying the model as a lens to study the PM2P practices of a large organization, with a view to identify and illustrate strengths and weaknesses. A case study was undertaken in the mining industry, where core activities in terms of projects are underground mineral explorations at identified geographical regions. A semi-structured interview protocol was used to collect data from 15 informants, using an enumeration. Integrated analysis of both data types (using univariate descriptive analysis for the quantitative data, content and thematic analysis for the qualitative data) revealed strengths in PM2P practices, demonstrated by informants' recognition of some important criteria to be considered. The key weaknesses were exemplified by a lack of effective management tools and techniques to match project managers to projects. The findings provide a novel perspective through which improvements in working practices can be made.

Keywords: decision-making practices, human resource management, multi-project environment, project.

Introduction

Seminal work of researchers such as Pinto and Slevin (1988), Brown and Eisenhardt (1995), Dainty *et al.* (2003) have demonstrated the importance of choice of project manager as one of the critical project success factors. The seminal work of these researchers has formed a basis upon which other researchers such as Patanakul, expanded on, in relation to PM2P allocation practices and the negative impact on organizational performance. For example, Patanakul *et al.*'s (2007) empirical study, which expanded on the seminal work of these researchers, was

found to be the only relevant study in this area, conducted predominantly in USA high-tech industry and directly applicable to PM2P practices in multi-project environments. The emphasis of the current study is to expand our understanding of PM2P practices in other regions, other than North America.

Allocation of project managers-to projects is an important topic because of the significant impact of this decision on organizational strategic value, particularly in a multi-project environment. A multi-project environment (also known as multiple project management) can be defined as the management of multiple concurrent projects (from an organizational perspective). Several possibilities exist in the management of multi-projects. Examples include: (1) portfolio management - management of a group of projects such that projects in each group may not necessarily be related in terms of goals, (2) programme management - management of several programmes comprising projects such that all the projects in each respective programme are related in terms of goals for each programme (Pellegrinelli, 2002; Patanakul and Milosevic, 2009), (3) management of a combination of either single projects with portfolios or programmes of projects – which may be referred to as complex multi-projects. Multi-project environment in this context is characterized by number of concurrent projects to be implemented as a vehicle to deliver the organization's strategic goals. Examples of industries where a Multi-project environment may be found are construction and mining.

Research aim

The aim of this study was to increase our understanding of the PM2P practice in other countries and industries (using Botswana as a context). This involved use of the most up to date and comprehensive conceptual model developed in Seboni and Tutesigensi (2014). The

absence of empirical studies on PM2P practices of a multi-project setting, conducted in the context of other regions such as Botswana, is considered a knowledge gap.

Literature review

Practitioners in project-based organizations make PM2P allocation decisions informally in practice, on the basis of intuition (Patanakul *et al*., 2007, Seboni *et al*., 2013). This informal PM2P practice is despite the crucial role played by such allocation decisions on project success (Pinto and Slevin, 1988; Brown and Eisenhardt, 1995; Seboni *et al*., 2013). For example, Pinto and Slevin (1988) conducted an empirical study to examine the importance of factors that influence project success over the project's life cycle. Given the basis of a scientific approach that followed a random sample of six hundred project managers, leading to a key finding that the choice of project leader (in terms of his/her competencies) was one of the critical factors that impact on project success, we believe the work of these authors is notable because it justifies the significance of the PM2P allocation decision in terms of influencing project success.

The key reasons for the informal PM2P practice are said to be lack of management tools and techniques to objectively match project managers-to-projects, lack of sufficient information and lack of time (Kabli, 2009). This suggests that the PM2P practice can be improved by developing formal and objective tools to match project managers to projects.

A plethora of articles published over the period 1969 to 2014 (e.g., Archibald, 1975; Payne, 1995; Project Management Institute, 2008; Seboni and Tutesigensi, 2014) has shown us that the choice of project manager is one of the crucial project success factors. The evidence from

these articles is unified in highlighting the importance of project manager selection as one of the critical project success factors.

Empirical studies on PM2P allocation practices, applicable to multi-project environments (the principal focus of this study), are currently limited and focussed predominantly on one country and industry. This is evidenced by empirical studies of Patanakul (Patanakul, 2004; Patanakul et al., 2007), which were found (as of 2013) to be the only relevant studies to the specific topic PM2P allocations in multi-project environments. For example, six empirical studies were conducted by Patanakul that directly propose PM2P allocation models in the context of USA high-tech industry alone. The closest to these six studies are four studies conducted in Israel (Hadad et al., 2013), Iran (Sebt et al., 2010), Thailand (Ogunlana et al., 2002) and Egypt (El-Sabaa, 2001), in the context of the construction industry. However, these four studies are not explicit to multi-project environments, which demonstrate the absence of more relevant empirical studies on PM2P practices that are applicable to multi-project environments. We argue that the absence of empirical studies on PM2P practices of a multi-project setting, conducted in the context of other countries such as Botswana, is a knowledge gap. This is based on the view that this research is among the first to empirically examine the PM2P practices in Botswana, currently unknown in relation to existing body of knowledge. For example, an understanding of how managers make PM2P allocation decisions (working practices in Botswana) does not exist, due to absence of publications in the context of Botswana. We believe that obtaining and explaining "new" insights on PM2P practices in the context of other regions of the world is important to build on existing project management body of knowledge.

Conceptual model for understanding the PM2P allocation process

The conceptual model used in this research is shown in Figure 1.

Insert Figure 1 here

Figure 1 Conceptual model for PM2P process - Source: Seboni and Tutesigensi (2014)

In terms of a description of Figure 1, the contents of a conceptual model for understanding the PM2P practice were brought together (using the theory of process mapping) and displayed under three categories of a total of thirty-sevenidentified criteria (labelled A, B and C) to be considered in effective PM2P practices. A, B and C represent the inputs to the project prioritization process, recognition of constraints process and project manager-to-project matching process respectively (see Figure 1). A full description of these identified criteria is given in Seboni and Tutesigensi (2014). The three categories of criteria are inputs to three sub-processes (the blocks labelled 2, 3 and 4) within the overarching PM2P process. The numbers 1 to 6, along with the direction of arcs, depict the sequential flow of information from inputs to outputs. The number 1 signifies (explicitly) the context in relation to a specific country, industry, organization and project types, which influence the inputs to the PM2P practice. Using set theory, it follows that the general theme of inputs in blocks A, B and C are subsets of context (labelled 1). This represents a departure from previous studies in terms of explicitly acknowledging the contextual factors that influence the PM2P approach under

consideration. The numbers 5 and 6 signify two outputs in terms of effective PM2P process (labelled 5), which will ultimately lead to project and company success (labelled 6).

The four descriptors T1 to T4 represent the flow of information from contextual factors to project and company success (forward loop) and back to the three categories of criteria that are inputs to each of the sub-processes. T1 denotes the influence of context on the inputs to each of the three categories of criteria. T2 denotes the influence of inputs to each of the three sub-processes. T3 represents the influence of an effective PM2P process on project and company success. T4 denotes an important starting point for a feedback loop in terms of an indication of the effectiveness of the PM2P approach and the level of project and company success, on the basis of all the inputs considered. This represents another departure from existing empirical studies on PM2P allocation models, in terms of recognizing the important need to provide opportunities for continuous improvement in the process. The dotted block denotes the boundaries for this conceptual model in relation to the point of interest (i.e., where data was collected). The labels 5 and 6 represent two outputs to the inputs in blocks labelled A, B and C. The input labelled "6 unofficial criteria" in block B is part of explicitly acknowledging the softer issues that play a role in the allocation. These "6 unofficial criteria", which could not be exhausted in Figure 1 due to space limitations, are: project manager's age, gender, marital status, health condition, nationality and religious beliefs.

The conceptual model was developed in January 2013 for use by project management practitioners responsible for allocating project managers to projects (e.g., portfolio managers, project directors and program managers). It was deployed in May 2013 to examine the PM2P practice in Botswana. Typically, the time interval from evaluating all the decision criteria contained in the conceptual model to making PM2P allocation decisions will take a similar amount of time as internal deployments or re-deployments that require information to be

collected and made available to the appropriate authorities (in this case the portfolio managers making the allocations). Assuming that there are constant updates regarding all this information, within a given organization, the time interval between evaluating the information and making a decision will be short. For example, if the information is updated monthly, then the time interval is at least a month.

We developed this conceptual model from:

- Critical appraisal of specific but limited literature concerning PM2P allocation models and broader literature surrounding the PM2P allocation process.
- Industry expert reviews from the United States of America, United Kingdom and Botswana, in relation to validating the generic nature of the model structure and content, as part of complimenting the evidence from literature with industry practice.

In terms of broader literature, other theories used to support the identified criteria contained in the conceptual model are: project critical success factors (Pinto and Slevin, 1987; Pinto and Slevin, 1988; Wit, 1988; Fortune and White, 2006), competencies and competence (Boyatzis, 1982; Crawford, 2003; Cupin *et al*., 2006; ECI, 2011), leadership in projects (Brown and Eisenhardt, 1995; Briner *et al*., 1996; Muller and Turner, 2007) and human resource management (Hoobler and Johnson, 2004). For example, human resource management is viewed as a subset of resource management because it focusses on one type of resource (i.e., people). In the context of this research, the selection of project managers in view of allocating them to projects, constitutes one functional task of human resource management.

The role of the conceptual model deployed in this research as a theoretical lens was to illuminate a complete picture of the PM2P allocation practice of the case study in question. This complete picture arose out of quantitative measures of a comprehensive list of criteria (contained in the conceptual model) that theory suggests should be considered in effective PM2P practices, as well as qualitative themes to complement quantitative measures. The quantitative measures and the qualitative themes are brought together as part of identifying and illustrating the strengths and weaknesses in working practices. The conceptual model is a model to help understand the PM2P allocation process (applicable to multi-project environments) in terms of effectiveness in decision-making regarding resource allocations. It is generic in nature and can be used by project management practitioners and researchers, subject to contextual factors that influence the identified criteria. These criteria fall under three categories of inputs to the PM2P decision-making process, split into three processes namely: project prioritization, recognition of constraints and PM2P matching. Each individual criterion was supported by a wide range of theories and authors from different context. The conceptual model contains a total of thirty-seven criteria considered to be important for consideration in effective PM2P practices. These thirty-seven criteria have been validated from both literature and industry expert reviews, in terms of their role in the PM2P allocation decision. It was developed as a framework that can be used by project management researchers and practitioners to guide effective PM2P practices.

The word "others", under each category of inputs (Figure 1) was used to appreciate scope for inclusion of additional criteria that may emerge from data collection. The context (labelled 1) influences the general theme of inputs in blocks A, B and C. Using the theory of process mapping, the outputs from project prioritization process (labelled 2 in figure 1),recognition of constraints process (labelled 3 in figure 1), and evaluation of the inputs in block C (i.e.,

project manager capability process) become inputs to the project manager-to-project matching process (labelled 4 in figure 1). The output from project manager-to-project matching process ultimately leads to performance related outcomes labelled 5 and 6. The six unofficial criteria in block B are: project manager's age, gender, religious beliefs, marital status, health condition and nationality. The phrase "unofficial criteria" is used in the context of recognizing important criteria that play a role in the PM2P allocation process but not explicitly and openly discussed by practitioners, due to issues such as labour laws and human resource regulations in relation to employee rights. For example, a project manager's health condition will play a role in PM2P allocation decisions but may not be openly discussed by a practitioner as having contributed to the decision. The practitioner is likely to consider issues of sickness absenteeism (Bockerman *et al.*, 2011) and impact on project performance, particularly during critical stages of the project in which the project manager is needed most but may be absent from work due to his/her health condition. Details of how the contents of this conceptual model were translated into a research instrument for this study are discussed under research method.

Seboni and Tutesigensi's (2014) conceptual model, developed from modifications of prevailing models in the context of broader reviews of literature, was considered the most up to date and comprehensive model. A sensible approach of studying the PM2P practice in Botswana was therefore, to use Seboni and Tutesigensi's (2014) conceptual model. This leads to the research questions for this study.

Research questions

Two research questions were constructed to focus on different aspects of the PM2P practice. These research questions were: (1) to what extent do practitioners in the case organization

consider the list of thirty-seven criteria within the conceptual model in their PM2P allocation practices? and (2) what are the strengths and weaknesses in the practitioners' PM2P practices on the basis of the conceptual model content? For the purpose of anonymity, the case organization will be referred to as organization X.

Analysis of responses to these questions could then be used to identify and illustrate the strengths and weaknesses in practices, using the conceptual model as a theoretical lens through which the strengths and weaknesses can be identified. The research carried out is classified under quantitative research at a macro level, on the basis of the use of a conceptual model to build on existing theory rather than creating new theory.

Research method

The research reported in this particular case involved the collection of both quantitative and qualitative data (used in a complementary manner), within a deductive study or a quantitative research approach at a high level of abstraction. This means that the work carried out is classified as quantitative research, on the basis of building on existing theory by using a conceptual model that has been validated from both literature and industry.

Using a case study research approach, the contents of the conceptual model were translated into an in-depth semi-structured interview protocol (research instrument), containing both quantitative and qualitative questions that are complementary in relation to a thorough understanding of the different aspects of the PM2P allocation process. Figure 2 is an illustration of the research instrument (semi-structure interview schedule) derived from the conceptual model deployed in this study to illuminate the PM2P practice in the context of Botswana.

Insert Figure 2 here

Figure 2 Research instrument

The above figure is a demonstration of the questions asked to examine the practitioners' PM2P practices, on the basis of how they consider the importance of the different aspects of the conceptual model factors in their practices.

The questions in the research instrument were structured into four main themes. Theme 1 was concerned with measuring the importance score for each of the thirty-seven criterion contained in the conceptual model, using a 1 to 9 Likert scale (1 = not important, 5 = average importance, and 9 = very important). In terms of validity and reliability of measures, the 1-9 Likert scale used, which includes anchor statements with explanations in relation to objectivity in measurements, has been validated in the field of decision-making (Saaty, 2008). Theme 2 focussed on a reflection of the given importance scores to determine how each criterion was taken into account in the actual PM2P decision-making practice (Yin, 1984). Theme 3 explored the outputs to the decision-making process. Theme 4 examined how the output to each process was used in reality. These four themes represent different aspects of the issues surrounding the PM2P allocation process. The research questions warrant a mixture of quantitative and qualitative questions, informed by a pragmatist philosophical perspective, which was adopted on the basis that it is suited to this type of design (Cresswell and Clark, 2011). The importance of this approach lies in the need to fully address the research

questions, with a view to provide a complete understanding of how managers make PM2P allocation decisions.

A case study research approach to examine the PM2P practices of the chosen organization (major unit of analysis) was considered appropriate to address the research aim for two reasons namely: (1) the need to obtain in-depth descriptions of the PM2P allocation practice and not generalizations, and (2) the complexity of the unit of analysis in terms of the large number of variables involved, including the different qualitative aspects of the issues surrounding the PM2P process.

The PM2P practice was studied through an in-depth semi-structured interview survey of two groups of informants (embedded unit of analysis) in different organizational levels. Organization X was selected on the basis of its eagerness to be used as a case for the current study, including commitment, timely participation and cooperation demonstrated in a previous study (Seboni *et al*., 2013).

Organization X is a global leader in the mining industry in terms of annual value and quality of minerals produced. For example, the estimated value of minerals produced by organization X as at 2013 was over £0.96 billion (Kitco, 2012).The core activities in relation to projects are underground mineral explorations involving operations such as geotechnical drilling, blasting, hauling and processing of the extracted minerals to world class finished products. The portfolio of projects implemented per year is typically thirty-four to forty-seven and range in budget and duration from £1 m to over £4 m and twelve to forty-eight months respectively. Organization X has three project management offices in different locations, with a total of eighteen project managers, each managing between one to two projects (large projects) and one to five projects (small projects). Typical large projects include strategic expansion

projects such as building a new mining plant or increasing the capacity of an existing plant. Typical small projects include resource evaluation to sustain existing mine business and give confidence to the investment community regarding the types of mineral resources being mined in terms of changes in volumes and grades as depth of mining increases.

Selection criteria for informants

Senior level executives were required to provide detailed information about five criteria (see figure 1) pertaining to   project prioritization process at organization X, while project directors were required to provide detailed information about thirty-two criteria (see figure 1) that pertain to the PM2P matching process. Both quantitative and qualitative data were required from different informants within the hierarchy of the unit of analysis, in a complementary manner that treats both data types equally, to uncover a complete understanding of the PM2P allocation process of the entire case.

The thirty-seven criteria demonstrated in figure 1 formed the basis of an interview schedule (semi-structured), one for informants responsible for organizational strategy and the other for informants directly responsible for PM2P allocation decisions (see Figure 2).

For example, the criteria labelled "Category 1: Inputs to block 2" were used as a basis to derive both quantitative and qualitative questions to capture a complete picture about the project prioritization process from informants (senior level executives) responsible for organizational strategy. An example of the quantitative data was the use of a Likert scale (1=Not important, 5=Average importance, 9=Very important) to rank the extent (importance level) to which the five criteria are considered in the project prioritization process, under theme 1. Examples of the qualitative data was asking the informants to explain the following

under theme 2: how the importance score they give for each of the five criteria was reflected in their actual project prioritization process, how they determine project priorities, what tools and techniques they use to determine project priorities, who is involved in the prioritization process and how often they do it. The qualitative data for theme 3 was about asking the informants to explain what comes out of the project prioritization process. An example of the qualitative data for theme 4 was about asking the informants to describe how the output from their project prioritization process is used.

Similarly, the nine criteria labelled "Category 3: Inputs to block 4" were used as a basis to derive both quantitative and qualitative questions to capture a complete picture of the project manager-to-project matching process, from informants directly responsible for PM2P allocation decisions. The twenty-three criteria labelled "Category 2: Inputs to block 3" were used in a similar manner to derive quantitative and qualitative questions about the recognition of limitations process, from the same informants who make PM2P allocation decisions. An example of a quantitative question (under theme 1) was asking the informants to rank the importance of a total of thirty-two criteria (nine criteria for the project manager-to-project matching process and twenty-three criteria for the recognition of limitations process) using the same Likert scale of 1 to 9. An example of the qualitative data for theme 2 was about asking the informants to describe how the given importance score for each criterion is reflected in each of the two processes (i.e., project manager-to-project matching and recognition of limitations). For theme 3, an example of the qualitative data was about asking the informants to describe what comes out as an output to each of the two processes and how that output (for each process) is used, under theme 4. Analyses of responses to both quantitative and qualitative data collected from two informant groups, under each of the four themes, formed a basis for providing a complete picture of the PM2P allocation process.

A relevant population of fifteen informants was identified on the basis of characteristics such as appropriate business units in which the informants work and eligibility to provide the required data relating to the PM2P process. For example, within the project management function, the selection criteria for informants was based on direct involvement with the PM2P allocation process (i.e., PM2P matching process and recognition of limitations process), including at least three years experience in making PM2P allocation decisions. Outside the immediate scope of the project management function, the selection criteria for relevant informants was based on direct involvement and at least five years experience in making strategic decisions related to the project prioritization process, in the context of determining project priorities (an outcome which informs the PM2P matching process). This second group of informants are not directly involved in making PM2P allocation decisions but responsible for making strategic decisions on project priorities that influence the choice of project manager, in terms of required competency levels to respond to the varying complexities and demands of the projects.

Following prior meetings with company contacts and review of the most up to date organizational structure (e.g., organization chart and employee lists), as part of the documentation provided for review to identify all eligible informants as per the stipulated selection "criteria," the target population was enumerated. Initial decisions on whether or not to sample, on the basis of factors such as target population size (i.e., fifteen), resources, time and costs, led to a decision to enumerate the population (Kervin, 1992). This population was enumerated given its manageable size in terms of the required time and resources to conduct interviews. Enumeration implies that there was no sampling, since all fifteen informants, who represent the entire population in the context of the participating organization, were interviewed.

The issue of data quality was addressed by careful selection (Fellows and Liu, 2008) and logging of relevant company documents, which were reviewed to complement interviews, to substantiate the constructs being studied. All documents reviewed were logged in a systematic manner (using document type, date collected source), and hosted in a qualitative data analysis software, using memos. The documents and transcripts were coded appropriately. Examples of the relevant company documents reviewed and logged were: organogram in relation to business units and relevant informants' roles and organizational levels, project management processes, competency dictionary, process flow charts for various mining related operations and policy documents.

Data collection and analysis

Following pilot testing of the research instrument on a group of people not directly involved with the study, feedback was used to refine the instrument. The refined instrument was used to collect both quantitative and qualitative data from all fifteen informants, in relation to different aspects of the PM2P process. The research instrument contained questions that were complementary, some of which were quantitative and others qualitative. The quantitative data involved univariate descriptive statistics (Blaikie, 2003), representing quantitative measures in terms of importance scores for the thirty-seven criteria. Analysis of the quantitative data, in terms of the extent to which the managers consider the list of thirty-seven criteria that theory suggests to be important in effective PM2P processes, was used to provide a picture of the working practices. Analysis of the qualitative data, which involved thematic (Ritchie and Lewis, 2003) and content analysis (Krippendorf, 2004) of the open ended responses, represented the qualitative measures to uncover words and phrases that are indicative of strengths and weaknesses.

A computer assisted qualitative data analysis software was used to facilitate analysis of the qualitative data (Bazeley and Jackson, 2013), following the use of framework method as part of data management within the software. For example, summary links were created to link respective summaries of informants' responses back to their original data context (i.e., interview transcripts), a key element of the framework method.

Analysis of quantitative data in relation to measures of central tendencies (e.g., mean) was conducted. Qualitative data analysis software was used to facilitate management and analysis of the qualitative data (Bazeley and Jackson 2013), in relation to exploring different themes associated with the PM2P allocation process. The two strands were analysed independently, as a starting point to reduce bias. The findings from quantitative data analysis were intellectualized to examine the extent to which the managers consider the list of thirty-seven criteria. The findings from qualitative data analysis were intellectualized using models built from both case and theme-based analysis of the whole data, to demonstrate the strengths and gaps of PM2P allocation practices of the case study in question. For example, models were generated to facilitate analysis of words and phrases that reflect weaknesses in the PM2P practice. Figure 3 is an illustrative summary of the qualitative data analysis relating to gaps in practices, on the basis of a content analysis of identified words and phrases that are indicative of weaknesses in practices, as used by the two informant groups.

Insert Figure 3 here

Figure 3 Content analysis results to depict ineffective PM2P practice indicators

Figure 3 reveals that "superficial alignment" is the most dominant indicator (among 15) of ineffective PM2P practices that reflects gaps in organization X's working practices, based on responses from both project directors and senior level executives. The second most dominant indicator was the phrase "Nature of business dynamics". This was followed by the word "Delays", which is indicative of delays in the PM2P allocation processes. The word "mismatches" came sixth, which indicates that mismatches in PM2P allocations are also dominant. In terms of further analysis of the themes in Figure 3, a matrix coding query was invoked to perform a content analysis of the indicators for weaknesses in existing PM2P allocation processes, using the theme 'No tools and techniques' as an example. The result reveal that 275 references (linked directly to the original text segments from participants verbatim) from 23 data sources support the theme 'No tools and techniques,' which demonstrates the absence of usage of management tools and techniques to assist practitioners in matching project managers-to-projects.

Following a review of several analytic strategies for integrating the two strands during analysis rather than when making conclusions, the appropriate analytic strategy, proposed by Brewer and Hunter (2006) and supported by Green (2007), Cresswell and Clark (2011), was adopted for further integration of the outcomes of each analysis (see Figure - 4).

Insert Figure -4 here

Figure -4 Approach for data collection and analysis

The approach for data collection and analysis depicted in Figure 4 shows the analytic strategy used to collect and integrate both the quantitative and qualitative data. The left hand side demonstrates the procedures for collecting and analysing the quantitative data independently, along with the associated outcomes in terms of rating scores, mean and standard deviations. Similarly, the right hand side demonstrates the procedures for collecting and analysis the qualitative data, independently from the quantitative data. Examples of the associated outcomes from qualitative data collection and analysis are transcripts (from data collection), models for strengths and weaknesses (from data analysis). Following independent analysis of each data type, the quantitative and qualitative results were then combined at both micro and macro levels and the results integrated while treating the two results equally. The outcome from equal integration of the two data types was new insights from combined analysis of the results. In the absence of combined analysis, new insights would not have been revealed from independent analysis of each data type. Finally, the integrated results from combined analysis were interpreted, resulting in a complete understanding of the PM2P practice at the case organization.This integration, concerned with combining different aspects of the issues surrounding the PM2P allocation process, rather than data comparisons appropriate for similar aspects to determine concordances and discordances, was chosen because it is consistent with the purpose of this study. The integration was performed at micro-level (each individual criterion in the conceptual model) and macro-level (summaries of the findings). This integration, performed during analysis rather than conclusions (Brewer and Hunter 2006), revealed new insights discussed in the next section.

Results and discussion

Based on the research aim and questions, the results are discussed under three sub-sections namely: verification of the deployed conceptual model, new insights from complementary

analysis of both data types, and identified strengths and weaknesses in the PM2P approach. The three sub-sections address the research aim and questions.

Verification of the deployed conceptual model

The verification of the deployed conceptual model in the context of its structure and content as a framework that is comprehensive and capable of standing up to scrutiny in relation to practical application is a key building block in relation to providing a strong basis to justify the identified strengths and weaknesses. This means that the identified strengths and weaknesses in the PM2P approach can be seen to come from a solid foundation as part of reliability and validity, following two sources of evidence that validate the deployed conceptual model.

The first source of evidence that validates the deployed conceptual model lies in extensive appraisal (see Seboni and Tutesigensi, 2014) of both the depth and bread of literature surrounding the research topic (out of scope for the current study in terms of extensive details). As regards depth, critical reviews of the limited literature on the specific topic of PM2P allocation processes and models applicable to multi-project environments (e.g., Patanakul *et al*., 2007) were conducted, the outcomes of which were used to support each individual criteria in terms of conceptual model content. In terms of breadth, extensive reviews of cognate fields of broader but related theories associated with the specific topic of PM2P practices in multi-project settings were conducted and encapsulated into the development of the conceptual model deployed in this research (see Seboni and Tutesigensi, 2014), in terms of the important criteria to be considered in effective PM2P allocation processes, as part of verification from the source of evidence in the literature that supports each of the thirty-seven criteria. For example, the development of the deployed conceptual

model (in terms of its theoretical verification) encapsulated a wide range of literature sources from different fields of inquiry, in relation to the important criteria considered to have an influence on effective PM2P allocation processes (see details in Seboni and Tutesigensi, 2014). These important criteria, which form components of the developed conceptual model deployed in this research to study how managers make PM2P allocation decisions, also encapsulated different aspects of the issues surrounding the PM2P allocation practice. Furthermore, industry expert reviews from three continents (UK, USA and Botswana) were included as part of the verification exercise in relation to the structure and content of the developed conceptual model, in the context of a framework that can be applied to industry practice (prior to its deployment through a case study approach). The above account is considered to demonstrate evidence of the comprehensiveness of the deployed conceptual model in terms of its content, on the basis of the first source of evidence (i.e., literature and industry expert reviews). The comprehensiveness of the model was also demonstrated by no new additions from the collected data, under the label 'others' in Figure 1.

The second source of evidence that validates the deployed conceptual model relates to absence of significant structural modifications to the deployed conceptual model, including no new additions from emerging data (which demonstrates comprehensiveness of the deployed model). For example, all the collected data from informants' in-depth descriptions of their views in relation different aspects of the PM2P allocation process were covered in the conceptual model contents.

Therefore, the absence of significant structural modifications to the developed conceptual model, following its application to real-life industry practice (the main focus for this study), demonstrates its verification in terms of both literature (first source of evidence) and industry practice (second source of evidence that is empirically based).

New insights from complementary analysis of both data types

The importance of having collected both quantitative and qualitative data is demonstrated in a typical result presented in Table 1, following integration of the results at micro-level. The quantitative data (left-hand side of Table 1) show typical results for three variables measured on a 1 to 9 Likert scale from four project directors, in terms of mean scores. The qualitative data (right-hand side) display the open ended responses from the project directors (only one response per variable shown for illustration) as regards the issues surrounding each variable.

Table 1 Typical result from project director's data set for integration at micro-level

Insert Table 1 here

The integration in the analysis of both the quantitative and qualitative data revealed new insights. These new insights are presented under three things to facilitate a discussion of the insights as follows:

- Four criteria (gender, age, health condition and marital status) were not considered important on the basis of context. For example, project manager's gender was rated relatively low because it was not applicable to the conditions of the case being studied. Whilst the absence of female project managers was attributed to a "hostile mining environment", the interpretation from the findings, is that context (country, industry, company and nature of projects) plays a role in determining important criteria to be

considered in the PM2P approach, as supported by a similar study of the important factors to be considered in matching project managers to construction projects in Thailand (Ogunlana *et al.*, 2002). Analysis of either data type on its own would probably have resulted in a misleading finding regarding these four criteria, hence giving an incomplete pictureof the PM2P approach. The above findings justify the approach taken to collect both quantitative and qualitative data, including an integration of the combined analysis from both the quantitative and qualitative data, which led to new insights that provide a complete understanding of the PM2P practice as per the research aim.

- Ten criteria were not given sufficient attention by the managers, in terms of extent of consideration, despite their importance. These criteria were: contribution of projects to goals, location of project, location of project manager, team dispersion, self-interests of decision maker and project manager, nationality of project manager, organization's rules and regulations, number of project managers and projects. This is despite evidence from literature (Patanakul *et al.*, 2007, Hadad *et al.*, 2013) which suggests that these issues are important contributors to effective PM2P allocation decisions.

- Five criteria were rated highly (quantitative measures) but their importance were not reflected in the qualitative descriptions of the issues surrounding those criteria. These criteria were: project manager competencies, organizational goals, organization's projects, contribution of projects to goals and contribution of goals to organization's mission. This represents another justification for the approach taken to collect both the quantitative and qualitative data as well as integrating both data types during analysis rather than when making conclusions. For example, the approach of collecting and analysing either data type individually would not have revealed the above insights.

Given the thirty-seven criteria contained in the deployed conceptual model, in terms of effective PM2P allocation practices, the above criteria constitute only twenty out of thirty-seven, which reveals that seventeen (i.e., 45.9%) important criteria to be considered in effective processes are missing from the working practices of the case study in question. On this note, it is evident that there are areas for improvement in view of the extent to which the practitioners consider the criteria deemed to be important in effective PM2P practices. Insights relating to bullet points 2 and 3 above were used as a basis for identification of weaknesses in the PM2P allocation process of organization X, along with the missing criteria (45.9 %) from the practitioners' practices on the basis of the conceptual model contents. The next section is a summary of the strengths and weaknesses that emerged from integrated analysis of both strands.

Identified strengths and weaknesses in the PM2P approach

The strengths in PM2P practices were demonstrated in two main ways. Firstly, the use of management tools at strategic level to forecast project implementation costs. Secondly, the informants recognized some important criteria to be considered in the PM2P allocation process. For example, the importance of allocating project managers with relatively high competency levels to projects which make the biggest impact on organizational goals and mission. This finding concurs with empirical studies conducted in USA (Patanakul, 2004) and Thailand (Ogunlana *et al*., 2002).

The weaknesses in existing PM2P allocation processes were:

- Absence of documented and specific competency descriptions required of project managers in various roles for mining related projects (e.g., mine pit design, ore processing) – the results reveal that the job profiles for all project management related roles contain a total of eight identified competencies, which are generic and not specific to each role. These competencies are: decisiveness and accountability, change management, people management, strategic business thinking, stakeholder management, values driven and technical proficiency. Whilst there is recognition of the emphasis on behavioural competencies as opposed to technical competencies by the organization, in relation to competencies that truly influence results (Draganidis and Gregoris, 2006), the absence of detailed competency descriptions is considered a weakness. For example, the phrase "technical skills" is listed under all eight identified competencies that are generic to all project management roles, without further details of what constitutes technical skills. A detailed description of specific project manager competencies is necessary to the understanding of required resource capabilities that are key to successful project delivery (Aritua *et al*., 2011; ECI, 2011), failing which it will be difficult to discern required organizational resource capabilities, in relation to effective assessment of employees' suitability to roles, in the context of a high performance organization. This includes effective identification of training needs as well as conducting performance reviews.

- Lack of formalized management tools and techniques, as well as a structured and effective approach to the PM2P decision-making process, in the context of assessing the level of match between project managers and projects for optimally – the practitioners rely on intuition and do not have objective tools, as part of a structured approach to aid decision-making. This may explain evidence of mismatches in PM2P allocations. This finding concurs with a relevant empirical study conducted in USA

(Patanakul *et al*., 2007), as well as the empirical study conducted in Botswana's public and private sector (Seboni *et al*., 2013) in relation to reliance on managerial intuition, considered ineffectiveness when majority of the decision-making variables are known (Shapiro and Spence, 1997). For example, the ineffectiveness of making decisions intuitively is more pronounced in a somewhat structured situation where majority of the criteria to be considered in the PM2P decision-making problem are known (Shapiro and Spence, 1997).

- The results indicate the presence of ad hoc projects and the ad hoc manner in which these projects are introduced, as a result of changes in business dynamics, caused by changing business priorities due to unanticipated events in the global mining industry. This implies absence of resource planning and forecasting processes in terms of current and future resource requirements (e.g., project managers) that will be required to execute current and future project portfolios, which may be a result of changing business priorities due to unanticipated changes.

- Lack of consideration of a comprehensive list of criteria that theory suggests should be considered as inputs to effective PM2P practices, as evidenced by some of the findings presented under new insights in relation to criteria that were not given sufficient attention by practitioners, including missing criteria from their working practices. For example, comparative analysis of data across project heads reveals a lack of consideration of a comprehensive list of criteria that have been identified from extensive reviews of literature (Hartman and Boyd, 1998; Ogunlana *et al.*, 2002; Patanakul *et al*., 2004; Owusu *et al*., 2007; Sebt *et al.*, 2010; Hadad *et al*., 2013) as important inputs to the PM2P allocation process.

- Lack of accountability for outputs – the practitioners could not account for differences in given scores to certain criteria in their qualitative descriptions of the issues

surrounding those criteria, from analysis of both data types. Whilst the high rating scores for certain measured criteria may indicate a strength in terms of the practitioners' recognition of the importance of such criteria (based only on analysis of quantitative data), the apparent lack of accountability for given importance scores to such criteria, on the basis of qualitative data analysis, demonstrates a weakness in the PM2P allocation practice. This justifies the importance of collecting both data types and integrating them in a complementary manner to yield a complete explanation of the phenomena being studied. The lack of accountability for outputs may be attributed to changing business dynamics, which have an impact on business priorities and practices of the case study organization.

Conclusions and future research

This study has attempted to uncover a complete description of the PM2P practice of organization X, as part of contributing to the understanding of the PM2P approach from the perspective of context in terms of a 'new' country (Botswana), industry (Mining), organization and project types (underground mineral exploration projects). For example, the outcome of this study is a complete explanation of the PM2P approach of a specific case study that has not been done prior to this study, consistent with the definition of originality as defined by Phillips and Pugh (2005) and Dunleavy (2003). The issue of drawing from several theories and demonstrating their application to the specific topic of PM2P process represents a gap in existing empirical studies (Patanakul, 2004; El-Sabaa, 2001; Ogunlana *et al*., 2002; Sebt *et al*., 2010; Hadad *et al*., 2013) on this specific topic that is being filled by this study. The following is a summary of the major conclusions drawn from this study: (1) strengths in the PM2P practice were discovered in relation to the practitioner's use of management tools for forecasting project costs at organizational strategic level, as well as an appreciation of identified criteria (as per the conceptual model contents) that play a role in effective PM2P

practices, (2) integrated analysis of both quantitative and qualitative data revealed gaps in the PM2P process in relation to several issues such as reliance on managerial intuition in the absence of formal and objective tools to optimize allocation decisions. It was evident that there were areas for improvement in view of an effective PM2P approach, which presents an opportunity to address identified gaps. These major conclusions are relevant to practitioners (at the case organization) within the immediate scope of the project management function as well as practitioners outside the immediate scope of the project management function (e.g., strategy, business improvement and Human resource functions) in relation to resource allocations.

Practical implications

The implications for practice lie in the outcome of this study, in terms of a new perspective on the PM2P working practices of the case study in question. We have provided a novel way that can be used by the managers as a mechanism to improve the practice. The word novel is used in the context of the use of a new conceptual model, which represents a new framework geared towards improving the effectiveness of the PM2P processes. For example, the managers will now be in a position to know what can be done to improve the PM2P practice, on the basis of the study findings.

A descriptive and complete study contributes to the understanding of the PM2P practices in the context of Botswana, which has been, hitherto, unknown in existing body of knowledge. For example, there were no publications that report on these practices prior to this study. The identification of strengths and weaknesses in existing PM2P practices of organization X provides significant implications for practice in relation to the need for improvement in working practices.

The results provide a strong basis upon which a decision support system (DSS) can be developed to facilitate a more effective PM2P approach that is applicable to organization X. A DSS will help to provide decision makers with readily available information required to make objective and systematic resource allocation decisions while saving time, as well as the need to occasionally reshuffle the PM2P allocations due to incoming projects (Patanakul *et al.,* 2007).

The implications of these findings highlight potential cost savings that could be made by implementing a DSS to optimize the PM2P allocation process, linked directly to organization X's strategic intent of transformation to high performance. Other organizations that undertake business in a multi-project context may benefit from this study, in the context of potential benefits associated with improved PM2P practices, leading to a reduction in human resource expenditure. For example, a number of authors (see for example Srour *et al*., 2006), assert that the increasing global market competitiveness facing organizations that compete for the same pool of human resources leads to a steep increase in human resource expenditure, which calls for organizations to manage their human resourcing activities efficiently and utilize their workforce effectively to avoid project failures, particularly in industries such as mining, where there are scarce resources with the required capabilities.

Theoretical implications

Firstly, the conceptual model deployed in this research has been validated by two sources of evidence (i.e., literature and practice) as a theoretical framework that can be used by project management practitioners to guide the PM2P process in relation to effectiveness. The individual contribution to knowledge relates to contributing to the understanding of the theory behind effectively matching project managers-to-projects in multi-project settings. The basis

for this contribution arises from modifications of existing PM2P allocation models, drawing from broader reviews of literature in relation to several theories that existing empirical studies on this specific topic have not discussed, as well as demonstrating or explaining how these theories are applicable to the phenomenon being studied. For example, the identification of resource management as the broader theory surrounding the specific topic of PM2P allocations (currently understudied) and linking it to the concept of PM2P allocations represents a departure from existing relevant studies, geared towards improving the project management body of knowledge, in terms of managerial decision-making practices. The way in which the research is approached in view of the deployed conceptual model should be viewed to build on and add to knowledge of existing project manager allocation models. The deployed conceptual model is generic in nature but subject to contextual factors such as country, industry, case organization and project types in terms of application. For example, the conceptual model may be used by other researchers to study the PM2P practices in other countries, industries and project types, taking into account the contextual factors relevant to the specific conditions in which the research is conducted.

Future research

The next step is to develop a DSS with a view to facilitate a more effective approach to the PM2P decision-making problem, applicable to the multi-project environment of the case study in question.

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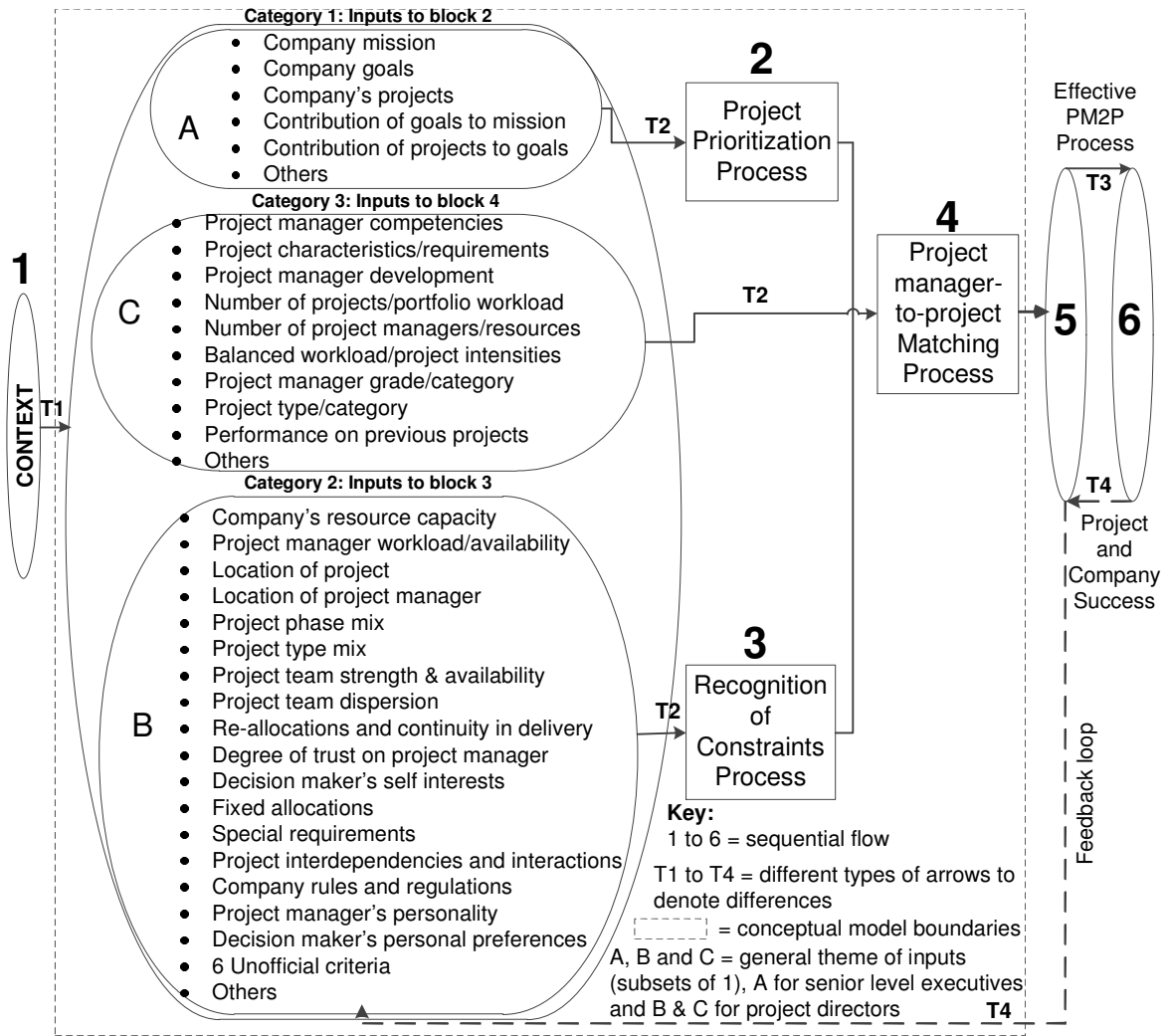Yin, R. (1984) *Case study research: Design and methods*, 2nd Edn. Sage, California.

Figure 1 Conceptual model for PM2P process - Source: Seboni and Tutesigensi (2014)

INTERVIEW SCHEDULE FOR PROJECT HEADS	INTERVIEW SCHEDULE FOR SENIOR LEVEL EXECUTIVES
Q1. How important are the following (conceptual model factors for recognition of limitations process) in your Process of recognizing limitations/constraints that influence your assignment decision, on a scale of 1 to 9 (1=Not important, 5 = average importance, 9 = Very important)? **[Theme 1]**	Q1. How important are the following (conceptual model factors) in your Project prioritization process, on a scale of 1 to 9 (1=Not important, 5 = average importance, 9 = Very important)? **[Theme 1]**
Q2. How is the importance of each input reflected in your Recognition of Limitations Process? **[Theme 2]**	Q2. How is the importance of each input reflected in your Project Prioritization Process? **[Theme 2]**
Q3.How do you determine the importance level of each constraint?.What tools and techniques do you use to do that? **[Theme 2]**	Q3. How do you determine the priority of each project for implementation? What tools and techniques do you use to do that?[Explanation of your tools and techniques to show how you actually do the process] **[Theme 2]**
Q4. Who is involved in giving input to the Recognition of Limitation's process? **[Theme 2]**	Q4. Who is involved in giving input to this prioritization process? **[Theme 2]**
Q5. How many business functions and people in total are involved in this process? **[Theme 2]**	Q5. How many business functions and people in total are involved in this process? **[Theme 2]**
Q6. What are these people's job titles and positions in the organizational hierarchy? **[Theme 2]**	Q6. What are these people's job titles and positions in the organizational hierarchy? **[Theme 2]**
Q7. How do you account for the limitations that have been recognized? What tools and techniques do you use to account for the impact of these limitations in your decision making process? **[Theme 2]**	Q7. How often do you prioritize projects? **[Theme 2]**
Q8. How often do you respond to the recognition of limitations in your Project Manager assignment decision? **[Theme 2]**	
Q9. What comes out of your process of recognizing limitations (all types/forms of limitations) that influence your Project Manager allocation decision? **[Theme 3]**	Q8. What comes out of this prioritization process? **[Theme 3]**

Figure 2 Research instrument

PHs	Negative impact	Delays	Reactive & inconsistent	Over-loaded	Mis-matches	Nature of Business dynamics	Resource capacity issues	No Tools & Techniques	Not optimized	Intuition	Superficial alignment	Bottom-up approach	Not Planned	Not Documented	Not Comprehensive
1	9	104	33	15	50	108	30	17	59	0	160	31	4	6	39
2	8	125	52	23	45	132	42	22	29	4	161	27	3	1	48
3	2	78	24	5	29	81	36	9	17	0	79	18	2	3	16
4	8	94	40	19	39	98	48	15	24	0	112	15	4	4	33
Total	**27**	**401**	**149**	**62**	**163**	**419**	**156**	**63**	**129**	**4**	**512**	**91**	**13**	**14**	**136**
SLEs															
1	0	18	4	1	7	17	6	4	8	0	17	6	3	0	6
2	4	22	14	2	7	30	11	3	4	0	29	10	1	0	4
3	2	19	12	2	3	21	11	3	7	0	16	0	3	1	5
4	0	20	11	1	9	19	11	1	4	0	21	3	0	0	4
5	0	21	13	3	2	17	16	3	3	0	20	4	0	1	7
6	2	16	6	2	4	17	6	2	1	0	18	7	0	0	2
7	6	43	40	1	16	39	27	2	13	0	33	22	0	1	14
8	0	19	8	2	5	24	7	1	5	0	18	6	0	0	8
9	5	31	28	7	22	44	30	19	12	0	43	24	0	2	14
10	1	40	30	12	31	45	25	11	22	0	39	9	1	2	7
11	1	24	4	0	5	24	6	1	7	0	22	8	1	2	7
Total	**21**	**273**	**170**	**33**	**111**	**297**	**156**	**50**	**86**	**0**	**276**	**99**	**9**	**9**	**78**
Totals	**48**	**674**	**319**	**95**	**274**	**716**	**312**	**113**	**215**	**4**	**788**	**190**	**22**	**23**	**214**
Rank	12	3	4	11	6	2	5	10	7	15	1	9	14	13	8

Key: PHs = project heads, SLEs = senior level executives, N/A =not applicable, 1,2,3,….= participants

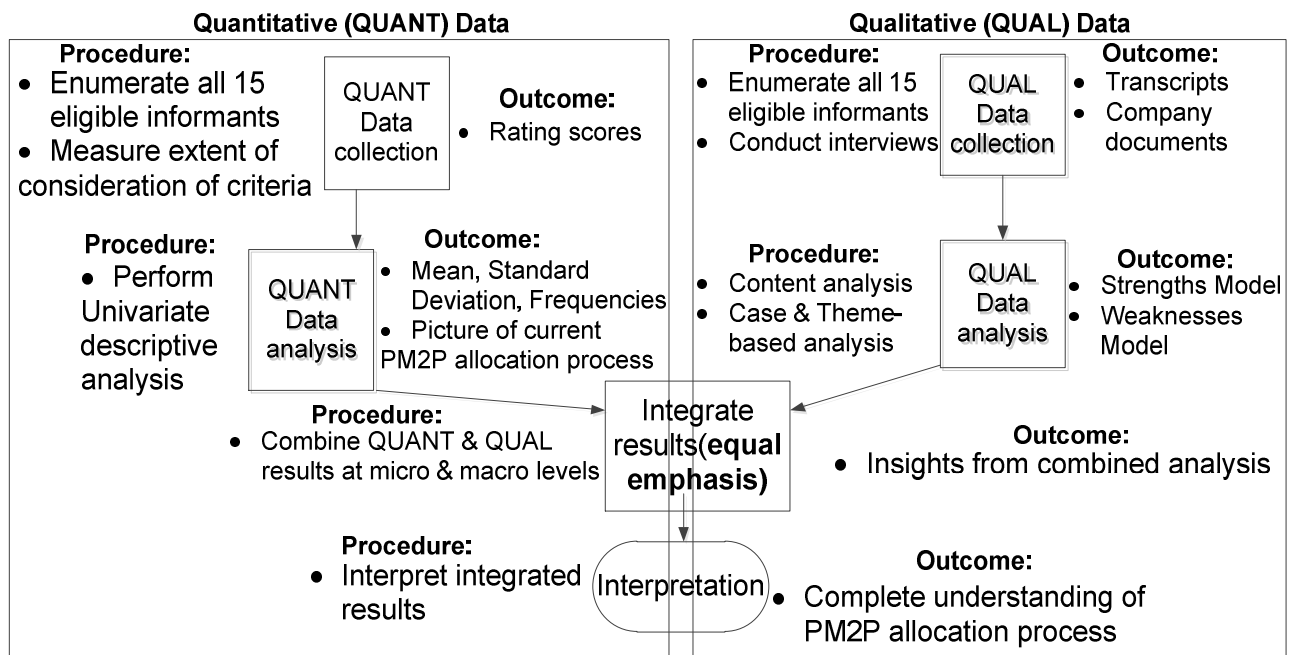**Figure 3** Content analysis results to depict ineffective PM2P practice indicators

Figure 4 Approach for data collection and analysis

Table 1 Typical result from project directors' data set for integration at micro-level

Quantitative strand				Qualitative strand
Variables (N=4)	Min	Max	Mean	Description
Importance of project manager's gender	1	3	1.5	"It doesn't matter. We haven't got female project managers…"
Importance of project manager's age	1	3	1.5	"For me it's not about age but competence"
Importance of project manager's health condition	1	5	2.5	"That's not an issue since all employees will have gone through...a full medical examination…"