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Project success assessment – business and individual perspectives

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Synopsis

The evolution of project success assessment started with Barnes' Iron Triangle, which was one of the first attempts to evaluate project success based on time, cost and performance. Those criteria were expanded over time, focusing on the satisfaction of stakeholder groups. The question arises whether this focus is also manifest in practice. This article aims to find out whether companies use satisfaction criteria to assess project success and whether different internal project participants are satisfied with project success assessment within their companies.

Research design

To obtain new information about project assessment in practice, we chose a qualitative research approach and conducted expert interviews. Experts from different corporate hierarchy levels were asked about the project assessment method applied within their companies, and their opinion about this approach. The interview roadmap was fine-tuned in a pretest at a randomly selected company to ensure its handiness and understandability. The field study was conducted between January and March 2016 with 21 persons interviewed face-to-face and one telephone interview. To improve the quality of digitalized transcripts and protocols, we

eliminated redundancies and mistakes, gathered scattered and similar information, compiled information by content, and reduced data needing analyzing.

Relevance for practice and education

Practitioners know about the importance of soft criteria; however, the utilization rate of soft criteria to assess project success in the companies they work at is still low. This paper could help trainers step up their efforts to demonstrate the importance of soft criteria, and practitioners to start and continue the assessment of projects by using soft criteria.

Main findings

The findings of our empirical study show that project success assessment varies from company to company. Some companies' focus is on Barnes' Iron Triangle exclusively, while others factor in the satisfaction of different stakeholder groups like customers or project members. Half of the interviewees would like to add satisfaction criteria to the success assessment system used within their companies. Some of them wish to use additional satisfaction criteria to take the satisfaction of further stakeholder groups into account, and others would like to consider soft criteria for first-time project success assessment.

Keywords

Project success assessment; soft project success criteria

Type

Empirical

Introduction

Tasks in day-to-day business are becoming more and more complex (Kledt, Evers, & Benson 2016). Many different people are responsible for, or affected by, the execution of complex tasks, forcing companies to change their organizational structures to handle increasing complexity. Many firms pool employee skills in project teams to cope with complexity and cover incoming tasks (Bakker 2010; Shenhar & Dvir 2007). By doing this, organizations intend to increase their chances to stay on top of the market (Scott- Young & Samson 2008). Therefore, project work changes the way people collaborate, and influences company structures fundamentally. Proponents of the agile movement even foresee the full replacement of traditional organizational set-ups by highly adaptable and self-organizing teams (Kurki & Wilenius 2016; Oswald & Müller 2017). But even in more traditional organizational structures, project work is replacing routine work in the day-to-day business more and more. Nevertheless, if there is more and more project work, the question arises: *How can the successful implementation of this way of working be measured?* Using the same procedures and criteria for measuring project work success forms a sound basis for scrutinizing project success. Transparent procedures and criteria for assessing project success also support project managers and project team members in making the 'right' decisions during project execution (Christenson & Walker 2004).

Project success is a topic frequently discussed in project management research; however, researchers are far from agreeing on its definition (Cao & Hoffman 2011). The only commonality of nearly all approaches is that Barnes' so-called 'Iron Triangle' serves as a basis

(Chan & Chan 2004; Chang, Chih, Chew, & Pisarski 2013). Barnes developed the Iron Triangle to improve communication between production engineers, executive managers and cost managers by visualizing the dependencies between time, budget and performance (Delo 2013; Weaver 2007). This fundamental insight still influences the development of other approaches to assess project success (Howsawi, Eager, Bagia, & Niebecker 2014; Milis, Meulders, & Mercken 2003).

Building on Barnes' Iron Triangle, a rising number of articles covering project assessment (Kloppenborg & Opfer 2002) have criticized the limiting expressiveness of the three success dimensions (Baker, Fisher, & Murphy 1997; Berssaneti & Carvalho 2015; Creasy & Anantatmula 2013; Williams, Ashill, Naumann, & Jackson 2015). For instance, one aspect of this limitation is the focus on the company running the project, instead of putting customer satisfaction into center stage (Morris 2013; Pinto, Rouhiainen, & Trailer 2000). Another point is that stakeholders have different motivations to run a project and, therefore, different bases for project evaluation (Aaltonen 2011; Bakker, Boonstra, & Wortmann 2011; Mir & Pinnington 2014).

Authors distinguish between hard and soft criteria in scientific articles on project assessment (Baccarini 1999; Pinto & Slevin 2006). Hard criteria such as time, budget and performance are rather objective and can be measured very well (Baccarini 1999). In contrast to hard criteria, soft criteria take into account the perception of the stakeholders involved in a project or affected by it (Davis 2014; Freeman & Beale 1992) and assess the so-called human factor (Chiocchio & Hobbs 2014). They are scarcely objective and rather difficult to measure (Hussein 2013; Pinto & Slevin 2006). Nevertheless, soft criteria are an important part of project success assessment (Briner, Geddes, & Hastings 1990; Pinto & Slevin 2006). Müller and Jugdev (2012) even argue that soft criteria account for half of a project's success.

The explanations above outline the controversial discussion on project success criteria in literature and the importance of soft criteria for project success assessment. However, it is not clear whether the importance of soft criteria for project assessment has reached practice. The aim of this study is, on the one hand, to find out on the basis of randomly selected companies whether soft criteria are considered when assessing project success in practice. On the other hand, we intend to find out whether stakeholders within a company want to take soft criteria into account, regardless of whether they are capable of making such a change or not.

Different facets of project success

Project success is a multidimensional concept. It means different things to different people, can be viewed from different angles, and depends on the context (Davis 2014; Jugdev & Müller 2005; Unterkalmsteiner et al. 2012). This is precisely why this section aims to contribute to a better understanding by referring to various classifications and interpretations propounded in the literature (Chan & Chan 2004).

PROJECT SUCCESS FACTORS AND PROJECT SUCCESS CRITERIA

The first step to provide clarity on the multidimensional concept of project success is a differentiation between project success factors and project success criteria (Cooke-Davies 2002). Project success criteria assess the success of a project, whereas project success factors can be understood as levers to increase the probability of project success, being neither part of a project's mission nor explicitly defined tasks (Ashley, Lurie, & Jaselskis 1987; Atkinson 1999; Müller & Jugdev 2012; Westerveld 2003).

Piscopo, Sbragia, and Thamhain (2010) argue that the company-wide utilization of identical project success criteria facilitates comparable assessments, and enables organizations to choose the project from a stock of ideas that will provide the highest benefit to the organization's success. Customer satisfaction, adherence to budget, and economic success are examples of project success criteria. Disregarding project success factors increases the probability that a project fails (Bansal 2011; Belassi & Tukel 1996; de Wit 1988). Project success factors include, for example, project spirit, user advocacy, or communication among project parties (Aronson, Shenhar, & Patanakul, 2013; Tam, Shen, & Kong, 2011; Wang, Chang, Jiang, & Klein, 2011).

According to Ashley et al. (1987), there is a connection between project success factors and project success criteria. However, since the assessment of project success is in the spotlight of our study, only project success criteria are considered here. Project success factors are not taken into account because they cannot be used to evaluate project success. (Baker, Murphy, & Fisher 1997; Jacobson & Choi 2008; Khan 2014).

HARD AND SOFT PROJECT SUCCESS CRITERIA

Another possibility to classify project success criteria is the distinction between hard and soft criteria (Baccarini 1999; Pinto & Slevin 2006). As mentioned above, hard criteria are rather objective and can be measured very well. In view of this delineation, the concept of hard project success criteria in this study includes the dimensions of the Iron Triangle (time, budget and performance) as well as economic success and quality. Although it can be argued that the dimension of 'budget' already considers the economic success of a product, we decided to highlight it as an additional criterion. This is due to the fact that we want to avoid assessing technical achievements developed within a budget as success, as keeping a budget is not a prerequisite for subsequent market success (Wateridge 1998). We define quality as a hard criterion, because performance is replaced by quality in some publications referring to the Iron Triangle (Atkinson 1999; Tukel & Rom 1998). There is, however, no agreement on the use of the term 'quality' instead of 'performance', because it is rather unspecific, used in different ways, and leaves leeway for interpretations (Turner 1999).

As mentioned before, soft criteria consider the so-called human factor and, therefore, are rather difficult to measure. Many people are involved in, or affected by, project approval, project planning, project execution, or utilization of the project product and, thus, can influence project success assessment (Belout 1998; Cserháti & Szabó 2014). All this leads to the necessity to consider various stakeholders when deliberating on project success. Soft criteria should handle these requirements. Each soft criterion should be defined in detail, and consist of a combination of various elements with different weightings. Moreover, individual elements could be made up of different soft criteria (Rashvand & Zaimi Abd Majid 2014). To sum up, soft criteria include all criteria related to the satisfaction of people involved in, or affected by, a project.

Field study about project success

The previous section presented different facets of project success. This section covers theoretical principles, implementation, analysis and interpretation of the field study. The methodological fundament of our study follows the suggestions of Przyborski and Wohlrab-Sahr (2010) for designing empirical research processes shown in Figure 1. According to Diekmann (2009), a researcher should choose the most appropriate method in each step of the research process, always considering the research objective, research resources such as time available, human

resources and materials, as well as his own assessment of research objective accessibility. In general, there is no panacea for achieving a research objective, thus researchers need to develop a research design depending on the respective research question. In the following subsections, we present decisions made while conducting our research.
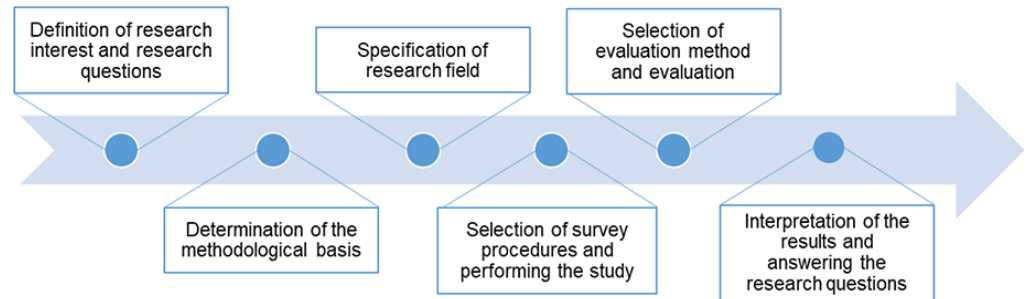

Figure 1   Design of empirical research processes (own representation based on Przyborski & Wohlrab-Sahr 2010, p. 15)

RESEARCH INTEREST AND RESEARCH QUESTIONS

Two meta-studies about project success assessment, undertaken by Kloppenborg and Opfer (2002) and Ika (2009), indicate the increasing relevance of soft criteria. However, the authors only considered research articles. The implementation of research findings into practice was disregarded. In the present paper, we want to investigate the utilization of soft criteria in practice to figure out whether the scientific research discussion on the importance of soft criteria for project success assessment has already influenced the practical application within industrial companies and, in consequence, formulate the following research question (RQ):

RQ 1: Do companies consider soft criteria when assessing project success?

Besides the identification of the status quo of project success assessment in practice, we also want to consider a future perspective. Changes in organizational processes often take some time, but the awareness that changes are unavoidable is on hand. It is up to management to define currently valid regulations and instructions. Therefore, those regulations and instructions represent the way they want to assess project success. Nevertheless, the current view of management on project success evaluation need not be the view of other project stakeholders. Therefore, the question arises whether people within a company are satisfied with the way project success is assessed. This leads to the following research question:

RQ 2: What suggestions do project managers and other project team members come up with to change the way of project success assessment within their companies?

DETERMINATION OF THE METHODOLOGICAL BASIS

Based on research interest and research questions, the next decision to take within empirical research processes is to determine the methodological basis. In general, researchers distinguish between quantitative and qualitative methods. Quantitative social research aims to confirm a hypothesis made at the beginning of the research. In contrast, qualitative research aims to discover information and correlations so far unknown and based on real-life observations. (Mahoney & Goertz 2008)

We chose a qualitative research design because we want to obtain new information about project assessment in practice. The aim of our study is to gain detailed data and not to compare

different companies and their way of assessing project success. In detail, to answer research question 2, we want to identify new project success criteria practitioners want to use in future.

SPECIFICATION OF RESEARCH FIELD

Specification of the research field deals with the observability of the research subject in the field (Przyborski & Wohlrab-Sahr 2010). Qualitative research cannot be conducted under laboratory conditions, qualitative research needs to be done in the field (Mayring 2014). Following this, it should be noted that, due to a high number of correlations with other fields, it is impossible to draw a clear line between the field to be considered and its surrounding environment (Przyborski & Wohlrab-Sahr 2010).

In our field study, companies serve as source for information retrieval. Yin (2014) divides field research based on the dimensions 'data collection source' and 'design'. Distinguishing between 'individual' and 'organization' in both dimensions, four quadrants shown in Table 1 could be defined. We took both categories of an individual as data collection source into consideration. This is because we decided to ask people within different companies about the way project success is assessed in their companies to answer research question 1 and about their opinion on this way of assessment to answer research question 2. Furthermore, we decided to interview experts on different hierarchy levels in different companies to gather different demands for, and perspectives of, project success assessment.

Table 1   Further detailing of research field based on 'data collection source' and 'design' (Yin 2014, pp. 92–93)

Design	Data Collection Source	
	From an Individual	**From an Organization**
About an Individual	Individual behaviour, attitudes and perceptions	Individual employee records and interview with individual's supervisor and other employees
About an Organization	Individual interviews on how and why organizations work	Personnel policies and organization outcomes

SELECTION OF SURVEY PROCEDURES AND PERFORMING THE STUDY

Next, we chose the most appropriate method to collect data depending on research interest, research questions, methodological basis, and research field.

Survey procedures

Researchers distinguish between collection of primary data and utilization of secondary data (Vartanian 2011). If there is no secondary data available to suitably answer a research question, researchers are forced to conduct a study on their own and decide between the methods of observation and questioning (Bryman 2015). Observation allows looking at processes, people executing these processes, and items affected by process execution. Researchers are only able to collect information on how a process is conducted, but they do not obtain information on the intentions of each person for doing something in the process. In contrast, conducting

interviews opens up the possibility for researchers to ask people about their motives, intentions and interpretations. However, it should be noted that interviewees tell how they perceived the situation and, therefore, interpret the situation influenced by their own perception.

We decided to choose the interview method, because the information necessary to answer the research questions could not be obtained by observing. Taking into account the various survey methods, we further decided to conduct expert interviews instead of handing out questionnaires to answer the stated research questions. In general, it is possible to communicate with interviewees in person, by telephone or by electronic communication (Flick 2013). Even though carrying out interviews personally generates higher costs compared to other ways of communication, we chose this type. Our decision was based on the advantages of the method: high flexibility, the possibility of raising additional questions, and personal contact in a familiar environment.

Selection of interviewees

Researchers always decide on the basis of the respective research interest whether a person is an expert or not. Characteristic of an expert is that he or she has a research interest-specific advantage in terms of knowledge compared to other people. In addition to advanced knowledge, further aspects such as limited time, availability and willingness of interviewees and effort, proportional to the number of interviewees, affect the selection and the number of interviewees in a proportionate way (Blaikie 2010; Flick 2013).

In view of all these considerations, we decided to conduct an intentional selection of suitable experts, defining experts as people having advanced knowledge of assessing project success within their companies. Other possible selection criteria such as experience in project management or educational attainment were of minor importance. Balancing time availability of the interviewees and our research interest, we determined an interview duration of one hour. Twenty-two out of 153 selected experts declared their willing to participate.

Performing the study

According to Sudman and Bradburn (1982) and Presser et al. (2008), survey instruments should be fine-tuned in a pretest as a fundamental requirement for a successful study. Pretests ensure handiness and understandability of single questions and the complete survey instrument, show the time required to answer all questions, and provide for new questions to be generated or new topics to be identified. For pretesting, one interview partner was chosen randomly. The pretest lasted more than one hour and revealed some inconsistencies and duplicate questions. These findings led to a reduced number of questions, an optimized sequence of questions, some additional filter questions, and changes in wording.

We conducted our field study from January to March 2016 and interviewed 21 people face-to-face in their companies. One interview was conducted on the telephone because of the significant distance between the interviewee and us. We recorded 19 interviews on an electronic voice recorder, with the consent of the respective interviewee. Subsequently, we transcribed each record to allow for scientific analysis (Lapadat & Lindsay 1999). The level of detail of the transcription depends on the matching of economic reasons and research interest. However, all information necessary to answer the research questions has to be considered (Noaks & Wincup 2006). As three interviewees did not consent to recording, the information gained from the hand-written records of these interviews were taken into consideration after digitalization.

SELECTION OF EVALUATION METHOD AND EVALUATION

The purpose of this phase is to make available all empirically collected data which are necessary to answer the research questions stated in the beginning of research projects. There are no standard evaluation patterns to reveal the necessary information because every empirical study has its own objectives and research questions. One common goal of every research project in this step is to improve the quality of digitalized transcripts and records through methods such as elimination of redundancies and mistakes, or gathering of scattered and similar information. Furthermore, evaluation includes ordering information according to content aspects and reducing data which needs to be analyzed (cf. Mayring 2014). We chose qualitative content analyses to prepare the digitalized transcripts and records.

INTERPRETATION OF THE RESULTS AND ANSWERING THE RESEARCH QUESTIONS

This section aims to create links between the evaluation results of our field study and the theoretical findings. Furthermore, these linkages are interpreted and evaluated. To sum up, this section aims to answer the research questions stated in the beginning.

Demographic data

In the following, we show some demographic information about the interviewees and their companies to demonstrate that we considered a balanced range of participants. First of all, we subdivided the companies according to their number of employees and turnover into small and medium-sized enterprises and large companies (cf. European Commission 2003) as shown in Table 2. Eight people work in small and medium-sized enterprises, whereas 14 interviewees work in large companies.

Table 2   Assignment of participating companies by company size

Name	Number of employees	Turnover	Total
Small and medium-sized enterprises	Up to 249	Up to € 50 million	8
Large companies	Over 249	Over € 50 million	14

The industry affiliation of the participating companies according to the Statistical Classification of Economic Activities in the European Community (cf. European Commission, 2008) represents another possibility to avoid biased observation. As Table 3 shows, we did not focus on one industry only; rather, we included companies from different industries. Although most interviewees belong to manufacturing companies, we also included the mining and quarrying industry; financial and insurance activities; professional, scientific and technical activities; administrative and supportive service activities; and human health and social work activities.

Table 3   Industry affiliation according to the Statistical Classification of Economic Activities in the European Community

Abbreviation	Sector	Total
B	Mining and quarrying	1
C	Manufacturing	14
K	Financial and insurance activities	2

Table 3   continued

M	Professional, scientific and technical activities	2
N	Administrative and supportive service activities	2
Q	Human health and social work activities	1

At the beginning of the paper, we stated that people involved in, or affected by, a project have different perspectives on project success. Considering this, we tried to interview people on different hierarchy levels to ensure that different perspectives on project work are taken into consideration. Figure 2 depicts the allocation of our interviewees based on hierarchy level and project participation. The bulk of hierarchy levels taken into account belong to management level. In addition, we also interviewed two project managers, two project team members, and one staff member of a project management office. More than 80% of the interviewees are managers outside the project and, therefore, assess projects from a business perspective. A high ratio of project managers and project team members would have resulted in a project-internal focus. The numbers on the Figure show the relevant number of interviewees.
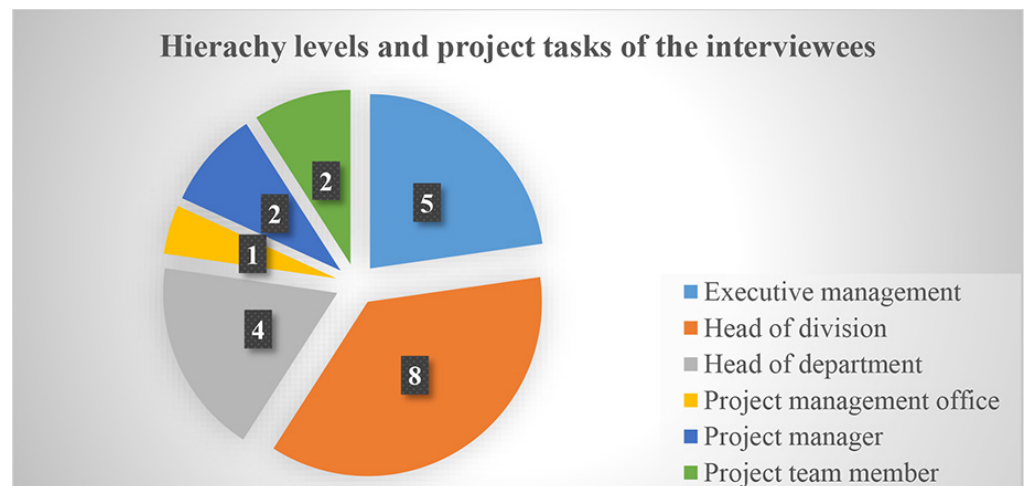

Figure 2   Hierarchy levels and project tasks of the interviewees

We interviewed a balanced participant field of different stakeholder groups, different company sizes, and different industries. Although our study does not contain all combinations of company size, industry, and hierarchy level, it still puts us in a position to answer our research questions.

Answering research question 1

Research question 1 focuses on the utilization of soft project success criteria in practice. The consideration of soft project success criteria needs to be analyzed for two aspects. The first touches the question whether soft criteria are used to assess project success, and the second aspect addresses the weighting of soft criteria for project success assessment.

One of the results is that soft criteria are taken into account to assess project success in 12 of the 22 companies. In contrast to those 12 companies, nine companies assess project success solely according to hard dimensions, and one company assesses project success based on subjective evaluation. As shown in Table 4, further analyses revealed that the dimensions

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of Barnes' Iron Triangle are the project success criteria mentioned most frequently. Only four companies do not deem it necessary to use any one of Barnes' Iron Triangle criteria to assess project success. Although customer satisfaction is the soft project success criteria mentioned most frequently, it is only taken into consideration in less than 50% of the selected companies. Furthermore, relatively few interviewees mentioned additional soft criteria like employee satisfaction or corporate image.

Table 4   Selection of the project success criteria mentioned in the study.

Project success criteria	Allocation	Mentions	Percentage
Budget	hard	15	68%
Time	hard	14	64%
Performance	hard	12	55%
Economic success	hard	9	41%
Customer satisfaction	soft	9	41%
Quality	hard	7	32%
Corporate image	soft	2	9%
Employee satisfaction	soft	2	9%

Besides the utilization of soft criteria to assess project success, we asked the interviewees about the importance of soft criteria for project success and whether there is a change of this importance during the project. According to the interviewees, the importance of customer satisfaction is comparable to the importance of the dimensions of the Iron Triangle. That means, if the soft criterion customer satisfaction is taken into account, its importance is at least comparable to the adherence of time, budget, or performance goals. It is not possible to make a reliable statement on further soft criteria because they are only used to a limited degree in the considered companies.

The second aspect we investigated was the change of the importance of individual success criteria during project execution. The analysis of the interviewees' answers showed a mixed picture. Importance changes took only place in roughly one third of the companies and they took place for different reasons. In most cases, a change was necessary to compensate for plan deviations, tracing back to the fact that problems were not considered during project execution. For instance, adherence to budget is considered more critical if the project manager can foresee a budget overrun, and adherence to customer satisfaction is considered more important if the customer is unsatisfied with project execution. The interviewees also noted that the importance of success criteria depends on strategic considerations. Assessing one single project, a company can decide that customer satisfaction is the most crucial success criterion, whereas a company must produce profit to ensure its long term existence. That means, in the long term, economic success stands for the most critical success criterion.

Answering research question 2

In order to answer research question 2, we asked the interviewees about their opinion on the way projects are assessed in their companies. In general, they are satisfied with the applied success criteria, and none of the interviewees wanted to remove any criteria. However, as Table 5 illustrates, a central finding is that half of the respondents want to add criteria to the way project success assessment is undertaken within their companies. These companies can be categorized into companies which have so far not considered soft criteria and companies which use soft criteria and are striving for adding further criteria. Only three interviewees recommended ignoring soft criteria, and assessing project success solely based on hard criteria.

If soft criteria were taken into account, eight interviewees recommended maintaining the current way project success is assessed in their companies.

Table 5   Connection between project success assessment in the company and suggestions of interviewees

Suggestions of interviewees	Total
Recommends taking soft criteria into consideration	7
Recommends adding further soft criteria	4
Recommends maintaining existing hard and soft criteria	8
Recommends disregarding soft criteria	3

It is particularly interesting to note that nearly all criteria recommended for adding are soft criteria. Only five out of 29 suggested criteria belong to the dimensions of the Iron Triangle, economic success, or quality. Two respondents suggested these five hard criteria. Furthermore, project success assessment in one of those two respondents' company is not based on success criteria, they perform subjective assessments. For instance, the interviewees suggested adding follow-up orders as a hard criterion and stakeholder satisfaction or further development of project members as additional soft criteria to ensure holistic project success assessment. The suggested stakeholder satisfaction criteria were the satisfaction of top management, project members, end users and subcontractors.

We tried to identify connections between demographic data and the interviewees' responses. To be more specific, we tried to find out whether hierarchy level or company size influence the intention to add further project success criteria. As shown in Table 6, there is virtually no apparent connection between hierarchy level and intention to add further criteria. It is of no relevance whether a project team member or a member of executive management is asked about his or her intention to add further criteria to assess project success.

Table 6   Connection between hierarchy level and intention to add project success criteria

Hierarchy	Additional criteria	No further criteria
Executive management	2	3
Head of division	5	3
Head of department	1	1
Project management office	0	1
Project manager	1	1
Project team member	2	2

As shown in Table 7, we could not find any connection between company size and intention to add further project success criteria.

Table 7   Connection between company size and the intention to add further project success criteria

Company size	Additional criteria	No further criteria
Small and medium-sized enterprises	3	5
Large companies	8	6

Along with the investigation of the importance of individual success criteria in the companies, we asked the interviewees about their ranking of success criteria. The answers to this question were heterogeneous. In fact, if the interviewees suggested adding customer satisfaction, they recommended attaching great importance to these criteria. Adding other criteria did not result in more homogeneous patterns concerning the importance of project success criteria.

Further findings

Some interviewees mentioned that project success assessment by means of soft criteria is not so widespread because of measuring issues. On the one hand, it is very time-consuming to define soft criteria in detail and, on the other hand, gathering the necessary detailed data is time-consuming. The reason is that the composition of soft criteria can easily change from project to project due to changing customers. Thus, the requirements and targets of this often heterogeneous stakeholder group change as well. According to some interviewees, the effort needed to define and measure soft criteria justifies the benefit by no means.

Conclusion

The starting point of our investigation was that the current definition of project success varies within companies. Soft criteria related to the satisfaction of different stakeholder groups are becoming more and more part of project success assessment. Satisfaction of customers, employees and corporate image are the soft project success criteria mentioned most frequently in the field study undertaken. Suggestions for additional future criteria to assess project success largely depended on the individuality of the respective interviewee. Neither company size nor hierarchy level of interviewees were responsible for their suggestions. Most of the interviewees agree on the importance of soft project success criteria as such.

This field study has its limitations. First, the interviewees did not represent a cross-section of the population. We only considered twenty-one companies from Germany and one joint venture of a German company located in Russia. The majority of the companies taken into account operate in the manufacturing industry, while other industrial branches were disregarded. Furthermore, the vast majority of the interviewees could be assigned to the management level. Research findings could be different if the majority of the interviewees were project managers or project team members. Another limitation to be taken into account is the interpretation of qualitative data gathered from the interviews.

Without any doubt, more research is necessary to establish a shared understanding of project success in particular with regard to the needs of future generations.

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Mapping the success dimensions of the infrastructure projects in Germany

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Abstract

Megaprojects and infrastructure projects are historically associated to cost overruns, time delays, and often fail to achieve the expected values and revenues. In order to bridge this gap between project stakeholder expectations and project outcomes this research attempts to map the success dimensions for infrastructure projects in Germany and provide a wider understanding of project success. However, the definition of project success varies from stakeholder to stakeholder. This research claims that a successful project should be a multi-win project, and provide a win-chance to each participating stakeholder. Therefore, the research presents project success as a multidimensional framework, including technical and managerial aspects as well as economic and strategic targets. This will provide a suitable success framework, so the success of infrastructure projects can be evaluated with focus on project success definitions from the project's own point of view.

Keywords

project success, success criteria, success factors, multidimensional framework, multi-win

Introduction

The project management related literature widely examined project success, and since 1960s many authors used multidimensional concepts to describe it and to integrate many views of project success. "Most projects have multiple stakeholders with different views on the project's purpose and different expectations of what the project must achieve" (Lyytinen & Hirschheim 1987). The stakeholders' evaluation of project success potentially varies "as circumstances change" (McLeod, et al. 2012). Literature linked the concept of project success to achieving stakeholders' expectations arguing, "Project is not an end it is a means for an end" (Bannerman 2008). Furthermore, the literature presents project management as a growing subject (Davis 2014), and the "definition of project success has changed over time" (Badewi 2016) from focusing on the technical aspects in the 1970s (Davis 2014) to a more stakeholder oriented viewpoint (Davis 2014).

This article will focus on the definition of the project success from the project's own viewpoint, and derive a model to enable other stakeholders to measure and evaluate their participation in project success. Project success can create a multidimensional "win".

Particularities of infrastructure project in term of project success

Infrastructure projects are different from other projects. In order to define their success, we need more dimensions to consider these differences for a wide range of stakeholders, and manage a high budget influenced by political decisions, long time span for planning and executing … etc.

Mega-infrastructure projects are characterized as "uncertain, complex, politically sensitive and involving a large number of partners" (Clegg, et al. 2002) and "when complex projects go wrong they can go horribly wrong" with several financial consequences (Turner, et al. 2009). In Germany, Riemann and Spang (2014) claimed that most of these projects "end up in huge cost overruns".

In terms of project ownership and project investment Olsson, et al (2008) claimed that "project ownership was found to have nuances for the governmental projects". Furthermore, Turner & Zolin (2012) define the "owner and sponsor as separate roles".

The quality of infrastructure has a big influence on improving the economic conditions (Spang, 2016)[1]. Improving economic conditions includes the organizational capabilities and business conditions.

Infrastructure projects are strategic projects meant to last and function for many years and serve special strategic objectives. Strategic success was defined by Bannerman (2008) as highest level of benefits achieved by a project.

Project success as a multidimensional construct

Within the project management literature, "there is a lack of consensus on how to define success" (McLeod, et al. 2012), and defining success depends on which success criteria have been met (Baccarini 1999). However, these criteria vary rapidly among the project stakeholders (Baccarini 1999). Turner, et al. (2009) argued that project success can not be evaluated from "only one perspective at one point in time". Further, Pandremmenou, et al. (2013) suggested

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1   Spang 2017, Page 7: Quantität dieser Infrastruktur haben einen großen Einfluss auf die Funktionsfähigkeit der Wirtschaft und auf die Wirtschaftskraft eines Landes

two models for project success regarding time. Micro level covers "the development of project, and macro level is after the completion of the project". Therefore, many authors e.g. Keller (1994) and Sauser, et al. (2009) claimed that instead of all projects having similar success measures, they each require specific outcome measures that are peculiar to the "organizational context in which the project is taking place".

To overcome this problem, the literature defined project success as a multidimensional construct (Shenhar, et al. 2001; Shenhar & Dvir 2007; McLeod, et al. 2012; Carvalho & Rabschini 2014), yet the project management literature lacks the definition of project success from the project's own perspective.

In order to apply this approach on infrastructure projects, this research defines projects success dimensions as shown in Figure 1 as functional success, management success, investment and ownership success, organizational success, business success and strategic success.

Figure 1   Dimensions of project success

FUNCTIONAL SUCCESS / OPERATIONAL SUCCESS

Any project is initiated to deliver a certain value through successfully fulfilling certain functionalities. The project might be completed with delay and cost overruns and yet fully or partially deliver the aspired functionalities. Furthermore, if the project fails to achieve the functional success, the project will mostly be considered an unsuccessful project even if it was finished within time and planned budget.

In other words, the success in the permitting procedures does not always mean delivering a successful facility e.g. Berlin Airport (BER). The construction process was approved in 2004 after four years of planning processes (Ministerium für Stadtentwicklung, Wohnen und Verkehr des Landes Brandenburg 2004), but the airport has failed to cope with the testing and commissioning procedures because of technical problems. The project company has announced many opening dates e.g. 31 October 2011, 3 June 2012, 17 May 2013, 27 October 2013 and finally they announced that they couldn't set up an opening date because of many technical problems (Fiedler & Wendler 2015b).

It is important to point out that other criteria can strongly affect functional success e.g. safety, quality of the provided services and competitiveness. Granting all this, the functional

success must support more criteria e.g. sustainability, life cycle cost efficiency and client acceptance as well as satisfaction.

MANAGEMENT SUCCESS

Management is the process of dealing or controlling things or people (Oxford Dictionary 2017) and managing infrastructure projects is a big challenge because they are technically complex, with many uncertainties and stakeholders.

In order to manage an infrastructure project, companies sometimes have to establish a joint venture, alliance contracts or follow a special form of public–private partnership (PPP) contracts. Consequently, in the last few years, project management has re-emerged as part of the organic organizational and management paradigm (Gareis 2004). The organizations that participate in an infrastructure project usually have a sophisticated management hierarchy, with different management and authority levels e.g. project governance, supervision board, executive board, program management, portfolio management, area management, project management etc.

Literature distinguishes between project management and process management, and claims that process management approaches are more capable of coping with the complexity of projects.

Project management success

Project management success was defined by (Bannerman 2008) as "the immediate performance of a project against its main design parameters: schedule (time), budget (cost), scope, and/or quality". Yet implementing projects on time and within cost "does not necessarily mean delivering the expected benefits and stakeholders' satisfaction from them" (Badewi 2016). Further, McLeod, et al. (2012) claimed that the well-known iron-triangle (cost, time and quality) "has been criticized for its exclusive focus on the project management process and for not incorporating the views and objectives of all stakeholders".

The PM Body of Knowledge (PMBOK) provides a more integrated project management framework through ten knowledge areas: "integration, scope, time, cost, quality, human resources, communication, risk, procurement, and stakeholder management" (PMI, 2013). Furthermore, safety is a major factor in managing an infrastructure project in construction and operation phases.

This research claims project management success to be measured over the whole project, or at the best case over each stakeholder's contract. Due to the infrastructure projects' long duration and massive number of stakeholders' contracts, process management success is required to keep the project well controlled and managed.

Process management success

"Process is a series of actions or steps taken in order to achieve a particular end" (Oxford Dictionary 2017). Because of the long time needed to plan and construct an infrastructure project, these projects are usually divided into different phases and these phases are divided into various processes in order to maintain clear and achievable goals.

The criterion is defined within the project management concept to identify, control and manage the different processes of the project. In the infrastructure projects, each stakeholder should design his own process in line with his responsibilities and expectations.

The importance of having criterion was also discussed in literature. Bannerman (2008) argued that the "absence of such a criterion makes it difficult for a stakeholder outside the project to know whether a project was late because of poor schedule management or some

other embedded process within the project". Moreover, to cope with the PMBOK procedures of management, project managers need to set up clear processes.

INVESTMENT AND OWNERSHIP SUCCESS

For many projects, the project sponsor is the project owner, but for infrastructure projects they might differ from each other depending on the contract form and project size. To achieve project success, the project needs to have a clear finance policy and has to be carefully allocated to the right owner.

Investment success

The literature defines project sponsor or investor as the organization that finances (sponsors) the investment project (Pandremmenou, et al. 2013). Sometimes it does not differentiate between owner and sponsor. However, for infrastructure projects it is important to see and identify the difference between project owner and project sponsor because of the different mechanisms used to finance them e.g. government funds, cooperation (on balance sheet) and project finance (PPP or off balance sheet project company) (World Bank 2016). In some of these forms, the project owner definitely is not the project sponsor, and they do not share the same motivations, responsibilities and expectations.

The sponsor is one of the key players in executing an infrastructure project, regardless which finance mechanism is used. A survey carried out by Demirag, et al. (2011) claimed that 75% of PPP projects would not go ahead without a direct agreement between the senior debt holder and the government.

This article suggests the payback period (Figure 2) as a core evaluation method to measure the success of a project and to cover the multiple perspectives of the project stakeholders. Therefore, each stakeholder should develop his own analysis to create his own payback period. Not all stakeholders will have the same payback mechanism e.g. engineering offices, contractor will achieve his payback period using owner's payments, and the owner will achieve his payback period using project revenue.
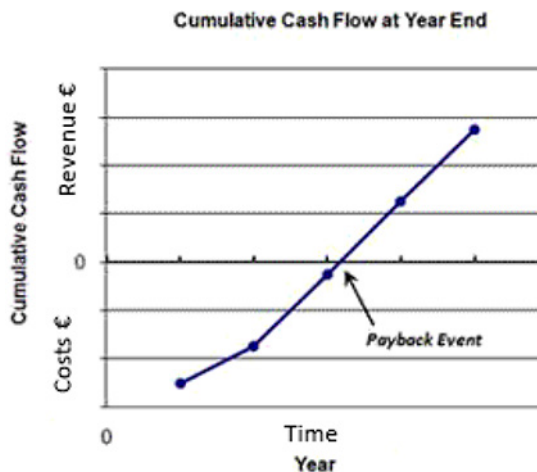

Figure 2   Payback Period

The project will be judged according to this dimension a couple of years after completion, since the project might have been subjected to time delay and cost overruns and yet classified as a success investment e.g. The Sydney Opera House and Thames Barrier (Morris & Hough 1987).

Being a successful investment project does not mean that all stakeholders will achieve their investment targets or get their payback period. For example, the contractor will pay for extra costs and time delay with or without cost recovery according to the contract conditions. A project may be successful for some stakeholders, but not for others. For example, Kassel-Calden Airport was described by the president of federal association of German airlines as a complete investment mistake[2] (Teckentrup 2013a), however, all the extra costs were payed and the some other project stakeholders reported it as an investment success.

Ownership success

"There is no universal definition of project ownership" (Ahola, et al. 2014). Although the literature provides a definition of project owner as "a stakeholder who takes the risk related to both cost and future value of the project. Such a stakeholder has incentives to analyze and follow up a project based on weighting the costs against the benefits" (Olsson & Berg-Johansen 2016). "For governmental projects, this is usually at the ministry level, but two or more ministries can be involved (for example the New Opera House and the Gardermoen project)" (Olsson, et al. 2008). From another prospective, infrastructure projects can be carried out as a PPP project, and the ownership will be divided between different stakeholders from both public and private sectors, or the private sector will hold the ownership for a certain "period of time and then transfer it back" to the public sector.

The decision of who shall own the project plays a great role in selecting the project contract type and the project success. For example, in Elbphilharmonie in Hamburg the project governance decision to use a forfeit model instead of an investment model transferred the whole risk to the public side and made it fully responsible for massive cost overruns (Fiedler & Schuster 2015a).

Along with this, the "use of natural resources" often generates conflicts among stakeholders (Matilainen, et al. 2017), since natural resources are traditionally perceived by local people as "their own" (Peltola, et al. 2014). The psychological side of ownership can also causes problems and affects the project success e.g. Stuttgart 21 where the local people of Stuttgart demonstrated against the project, requesting more participation rights in the decision-making process (Brettschneider & Schuster 2013) [3] since the project was financed from tax money. For the sake of achieving a successful project, the ownership responsibilities and strategies have to be clearly defined and each stakeholder understand his duties regarding project ownership.

ORGANIZATIONAL SUCCESS/ ASSESSMENT

"Without projects, organizations would become obsolete", irrelevant, and "unable to cope" with today's competitive business environment. (Shenhar, et al. 2001). Further, PRINCE 2 defines projects as organizations. That's why project success "has also been extended to encompass the achievement of a broader set of organizational objectives" (McLeod, et al. 2012) e.g. creation of added value, innovation, employee satisfaction, social responsibility, customer loyalty, market share and gross value… etc.

Typically, infrastructure projects include many stakeholders with different organizational structures and targets. An infrastructure project should provide a chance for these organizations to develop their capabilities and achieve their targets.

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2   Als „eine komplette Fehlinvestition" Ralf Teckentrup.

3   Stuttgart 21 ein Großprojekt zwischen Protest und Akzeptanz; Page 108: Einerseits findet die Hoffnung auf eine stärkere Partizipation der Bürger und damit auf eine Stärkung der Demokratie Erwähnung.

The literature introduced two main aspects to measure and assess organizational performance: organizational effectiveness and efficiency. "Efficiency is oriented towards successful input transformation into outputs, while effectiveness measures how outputs interact with the economic and social environment" (Bartuševičienė & Šakalytė 2013).

These two aspects are exclusive, yet they can influence and affect each other. Pinprayong & Siengthai (2011) differentiated "between business efficiency and organizational efficiency", defining business efficiency as comparing and revealing the performance of outputs and inputs ratios, and organizational efficiency as reflecting the improvement of internal process of the organization e.g. organizational structure, culture, trust and community.

Table 1 Findings from Zokaei & Simons (2006) and Bartuševičienė & Šakalytė (2013).

Table 1   Organizational performance assessment

Organizational assessment and success Effective		Effectiveness ($): outputs, sales, quality, creation of value added, cost reduction ... etc.	
		Effective	Ineffective
Efficiency: Strategies, culture, organizational structure, decision making processes, Know-how, Employees' motivations, skills and motivations.	Efficient	"Succeeds at minimum cost. The company thrives." "High performance entities" "Operational performance as well as strategic planning"	Cost under control but no success Slowly Bankruptcy. Difficulties to achieve business targets.
	Inefficient	"High cost" success. "The company exists." The project hardly breaks even Little profit.	"An expensive failure." The company is going bankrupt fast.

According to Table 1, the organizational efficiency characteristics will influence the project acquisition and execution, and the project economic outputs will affect the organization profit, ability to improve its efficiency and existence.

The project organizational success concerns all project stakeholders and could be influenced by the project ownership strategy. Furthermore, the project stakeholders' organizations might have different organizational targets and their organizational performance should be evaluated.

BUSINESS SUCCESS

A project is not an end, it is a means for an end (Bannerman 2008), and any project is meant to support and enhance a certain type of business. "Business success has traditionally been measured by financial returns" (Simpson, et al. 2004; Howard 2006). Other authors defined some other aspects that concern project owners when they assess the success of their business e.g. sense of achievement and sense of pride (Getz & Carlsen 2000; Walker & Brown 2004) e.g. the Sydney Opera House is always considered as an iconic building, and in 2007 was recognized as a UNESCO World Heritage Site.

A comparison between Munich Airport (MUC) terminal 2, Berlin Airport (BER) and Kassel-Calden Airport (KSF) states clearly the meaning of this dimension.

The Munich Airport terminal 2 was awarded the praise of the world's best terminal[4] (Rittberger 2017). Moreover (Kerkloh 2017) the airport manager announced that the revenue of the airport has reached a record high in 2017, and served 42.3 million passengers.[5] The case of Munich Airport is defined according to this research as a complete business success.

On the other hand, the Kassel-Calden Airport (opened in April 2013) has reported annually loses in 2016 of 6.17 million euro and around 6 muilliom euro in 2015. Moreover, it has failed to attract more than 4,822 passengers[6] (capacity is 700,000 passengers), although the cargo transportation is a growing business in KSF from 168.10 ton in 2015 to 1.861,99 ton in 2016[7] (Ernst 2017).

Berlin Airport (BER) is still failing to match releasing conditions and reported massive losses. The BER still cannot deliver the expected revenue, pride or enhance the air traffic business, and always has been described as a catastrophic project. That supports the previous assumption "without functional success, projects are mainly classified as unsuccessful ones".

STRATEGIC SUCCESS

A broader understanding of project success demands organizations include "more strategic objectives and benefits, including impacts on markets and competitors, business development or expansion, and ability to react to future opportunities or challenges" (Bannerman 2008; Jugdev & Müller 2005; Toor & Ogunlana 2010).

Infrastructure is the foundation upon which our economy is built (Infrastructure and Projects Authority UK 2016) and infrastructure projects are usually a part of a strategic plan, which includes different programs and projects e.g. Federal Transport Infrastructure Plan (Bundesverkehrswegeplan BVWP) in Germany and National Infrastructure Delivery Plan 2016-2021 in UK. Therefore, they serve some strategic economic target e.g. supporting growth and creating jobs, raising the productivity capacity of the economy, boosting international competitiveness and increasing the investment attractiveness e.g. the effect of Sydney Opera House on increasing the number of visitors to Sydney over the past few decades (Colbert 2003). This dimension enables the participation of more stakeholders than those in the investing organizations, and the creation of more benefits than intended from the project.

However, Bannerman (2008) claimed that few projects achieve strategic success. A strategic plan is essential for infrastructure project. The president of federal association of German airlines Teckentrup (2013b) claimed that one major factor of Kassel-Calden Airport is the absence of a strategic plan for air traffic and airports in Germany[8]

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4   Der Flughafen München und Lufthansa dürfen sich über eine äußerst begehrte Auszeichnung freuen: Bei den World Airports Awards 2017 des Londoner Skytrax Instituts wurde das Terminal 2 am Münchner Flughafen zum besten Terminal der Welt gewählt.

5   Wie Flughafenchef Michael Kerkloh heute mitteilte, stiegen Umsatz und Gewinn auf ein neues Rekordhoch. Auch die Zahl der Passagiere stieg im vergangenen Jahr um 3 Prozent auf 42,3 Millionen, die Luftfracht legte um 5 Prozent zu. Dieser Trend werde sich voraussichtlich fortsetzen.

6   Das Geschäftsjahr 2016 kann voraussichtlich mit einem Jahresfehlbetrag von 6,17 Mio. Euro und damit in etwa auf dem Niveau des Vorjahres abgeschlossen werden.

7   Die Luftfracht stieg im Vergleich zum Vorjahr um mehr als das Zehnfache auf 1.861,99 Tonnen an (2015: 168,10 Tonnen).

8   "Kassel-Calden ist für mich das Paradebeispiel dafür, dass wir in Deutschland eine zentral geplante Infrastrukturentwicklung für Flughäfen brauchen."

The project strategic targets differ widely from the project's stakeholders strategic objects, yet a multi-win project is supposed to provide stakeholders the chance to enhance their strategic assets that "give firms competitive advantages over rivals and afford them the accrual of superior performance" (Barney 1991; Zheng et al. 2016) e.g. reputation (Deephouse 2000), employee engagement (Men 2012) and know-how.

Success criteria and success factors

"Criteria are the measures by which projects can be judged in terms of failure or success" (Cooke-Davies 2002), and they vary from success factors. Koops, et al. (2016) claimed that "success criteria need to be separated from success factors." Moreover, "projects differ in size, uniqueness and complexity, thus the criteria for measuring success vary from project to project" (Müller & Turner 2007), from stakeholder to stakeholder (Baccarini 1999; Jiang, et al. 2002) and according to when the project success is measured (Pandremmenou et al., 2013).

However, the "project success criteria and project success factors" are widely discussed by many authors. "Most studies focus on the success criteria relevant for executing party" (Koops, et al. 2016). To obtain a multi-win project where all or most stakeholders achieve their goals, and the project delivers the expected functionalities, values and revenues, this research claims that the success criteria and factors have to be defined for each project, and each and every stakeholder needs to define their own success criteria and factors, and report them to the project management and governance team.

PHASES AND STAKEHOLDERS OF THE INFRASTRUCTURE PROJECTS

Spang (2016) divided infrastructure projects into many phases: project concept, planning, tendering, executing and operation. Each of these phases includes different stakeholders. The involvement, as well as the influence, of the same stakeholder vary from one phase to another phase. During these phases, the success criteria and factors will vary not only for the project but also for the stakeholders.

Infrastructure projects take many years from the project idea to project completion. Just the planning period can take more than 10 years, and in the worst case up to 20-29 years (Spang & Sözüer 2014). The execution phase will take several years until the project reaches the operation e.g. Berlin Airport. Therefore, the project team needs to define different success criteria and factors to cope with changing project requirements during the different phases.

However, the six success dimensions should be considered, and traced from the start of the project. Some of them cannot be clearly measured until the end of the project e.g. function success and management success. Investment and ownership success, as well as organizational success, can be achived during the project operation phase's near future, and other dimensions like business success and strategy success can only be achieved and measured over the long term project operation.

Summary

Projects differ in size, complexity and stakeholders' expectations. Infrastructure projects have certain uniquenesses that make it more difficult to define project success. They are often associated with cost overruns and time delays, yet they might be considered successful according to other aspects e.g. Sydney Opera House. This research presented the term

of project success as a multidimensional framework considering special dimensions for infrastructure projects to reflect their economic and strategic effect.

Because of the uniqueness of infrastructure projects, this research maps their success into seven dimensions. Functional success and management success to measure the project performance during the execution and operation. Investment and ownership success to measure the success of finance and ownership strategies. Organizational success to assess the development of participating organizations in the project. Business success and strategic success to reflect the project's effect on a higher economic and strategic levels.

Project stakeholders will not consider all of these dimensions equally, although the project itself has to consider and trace all of them during the whole project life cycle, since success criteria as well as success factors vary from project to project, stakeholder to stakeholder, project phase to project phase and from time point to time point.

Potentially fruitful areas for future research include testing and validation of the presented conceptual model in actual projects, and development of mechanisms to define and integrate the stakeholders' success criteria and factors within project success criteria and factors.

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CONFERENCE PAPER

Projects, success, and complexity

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Synopsis

All projects need an understanding of success. Without one, any project outcome would do. Measures of success are needed for the fundamental navigation of projects.   Projects have notoriously struggled with the definition of success. One main reason for measuring success is to understand how to do things better the next time. Therefore, the success of a given project needs to be seen in relation to how difficult the project was. Project complexity is a relevant measure of the difficulty of a given project. In other words, project success should be seen relative to the complexity of the project. This paper analyzes relationships between Project Success and Complexity using the Cynefin framework as a lens.

Relevance for practice/education

A better understanding of both project success and project complexity, and the application of this in a discussion of how to measure project efficiency and effectiveness in a relevant manner.

Research design

Literature review.

Main findings

Project efficiency can be measured in relation to project complexity. Project complexity functions as a link between two kinds of project success: efficiency and effectiveness.

Research implications

Further study of the relations between project success and project complexity is needed.

Keywords

Project Success, Efficiency, Effectiveness, Project Complexity, Cynefin framework

Introduction

Do we need a wider understanding of project success? The answer depends on whether we want to validate, improve or compare the projects. Depending on which of these three purposes we are aiming for, the measures might be very different.

The answer also depends heavily on how we define a project. One definition is "*a temporary endeavour undertaken to create a unique product, service or result*" (PMI, 2013). The International Project Management Association (IPMA) research conference 2017, however, defines it differently: *Projects are the means for delivering and implementing beneficial strategic change in organizations and societies*. Two very divergent definitions.

The first definition is rather inward looking (based on what we can create), while the latter is more outward looking (how we can benefit organization and societies). One reflection is that this might underlie a shift, where we are going from an introverted to an extroverted way of managing projects. Is the second better than the first? This is very much dependent on stakeholders' expectations of the specific project.

Researching the success of projects has an extensive history, as illustrated by a paper from NASA: "*While many determinants of project mission success were identified, a somewhat unsettling finding was that effective cost performance was not uniformly associated with mission success. In fact, the data revealed that mission-successful projects more often than not show a cost overrun, often a very substantial one*" (Murphy et al. 1974).

More unsettling might be that the very construct of "mission success" can be questioned: *In summary, labelling a project outcome as a "success" or "failure" is convenient but overly simplistic. A degree of conceptual and definitional ambiguity surrounds project success. Further, evaluations of project success are necessarily perceptual and (inter)subjectively constructed* (McLeod et al. 2012).

However, even accounting for the concept that evaluations are perceptual and subjectively constructed, we must assume that the evaluation process is better off with measures of project success than without them. One measure could be Key Performance Indicators (KPIs). *By measuring project success according to the defined KPIs, we can achieve a more comprehensive evaluation of the project* (Todorovic 2015).

KPIs, as mentioned by Todrovic, are synonymous with success criteria, namely the measurement of the purpose of the project, often formulated at the beginning of a project. This should provide a sound foundation for the evaluation of project success; however, "*In contrast, our study demonstrates that success criteria – which are formulated and agreed upon at the start of a project – are hardly objective and change as the project progresses through various phases.*

The perceived success also depends on the perspective of various stakeholders and project roles, and thus indeed lies in the 'eye of the beholder'" (Neves et al. 2017). Evaluations of project success can be a subjective and social construction, based on ambiguous definitions and constantly changing with time.

In addition to this, it is relevant to investigate the relationship with project complexity, since a study shows a "*… strong relationship between project complexity and project success is augmented by the standardized coefficient value of –0.254 between them.*" (Lou et al 2016). Among the many parameters investigated the most significant in this study was: "*Trust among project organization*" and "*Sense of cooperation*" in this study. (Lou et al 2016).

There are clearly interesting relationships between concepts of project complexity and project success, worth more investigations. To widen the perspective, this paper, therefore, asks: How can we use project complexity to widen our understanding of project success?

The remaining paper is structured as follows. In the first section, the method is described, followed by the findings in the next section. Then a discussion sector is followed by a conclusion and further research suggestions.

Method

The research question is answered by a literature review followed by a comprehensive discussion on project success and complexity based on various project management methodologies.

SEARCH AND SELECTION

The first stage of the literature review was an explorative search that attempted to distinguish patterns in the newest papers, followed by a structured process, with clear selection criteria and evaluation methods.

The explorative search revealed that the search strings 'definition of project success' and 'definition of project complexity' would offer a coherent set of publications upon which to base the review of 'understanding.' The selection was limited to five years, starting with 2012. The search on project complexity returned 74 titles on Google Scholar, and 494 titles for project success. From these, 20 were selected, including the ten newest plus the ten most quoted in the available publications. This method does not provide an exhaustive list of the potential findings, but it is of sufficient significance to offer sound conclusions. The papers were searched for clearly articulated definitions, and if none were found, the paper was excluded.

A THEORETICAL LENS

For the purposes of discussion, the Cynefin Framework is used as a theoretical lens. This is a sense-making framework intended for strategy work (Snowden 2007). Recently, the Cynefin framework has gained attention in papers on project complexity. By using this framework, the paper will reach beyond the usual boundaries of the project domain, as requested in the call for papers.

The framework consists of five domains, see Figure 1. On the right side, there are two ordered domains; complicated and obvious. On the left are two un-ordered, complex and chaotic. The fifth domain is the red area in the middle, called disorder, where you are if you do not know what type of system you are dealing with.
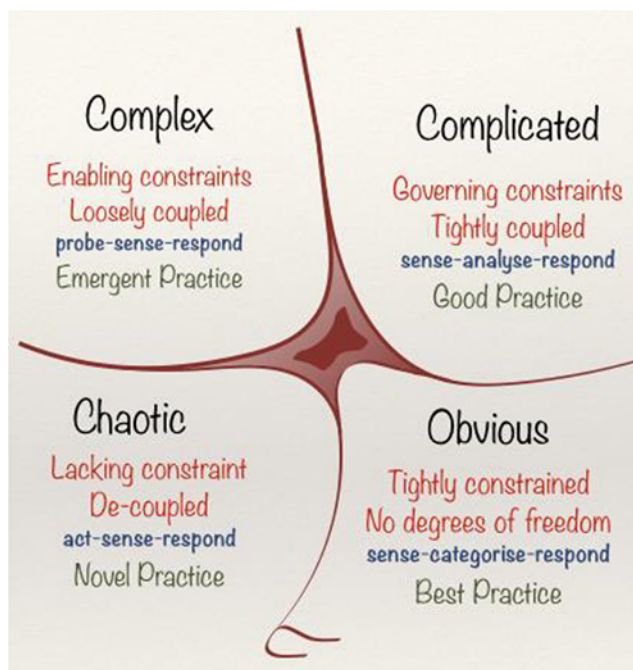
Figure 1   Cynefin Framework. Source: www.cognitive-edge.com

The four domains:

1. In the obvious domain, the systems have cause and effect, that are obvious to all, and there is a best practice to follow. Originally the obvious was called simple, but this was changed in the later version of Cynefin Framework.
2. In complicated scenario, there are also direct connections between cause and effect, but further analysis is needed. More options are available, hence good practice is recommended rather than an all embracing best practice being available.
3. In complex systems, the cause and effect can only be seen in hindsight. This gives emergent practice.
4. In a chaotic system, everything is random according to Cynefin framework's use of the term. Here, we have novel practice in the sense that no two situations are alike.

Findings

The findings are divided into:

1. Findings concerning the definition of project success, and
2. Findings concerning definitions of project complexity.

PROJECT SUCCESS

Among the 20 selected, seven had explicit definitions of project success. These are displayed in Table 1.

Column A describes the part of project success concerned with the triple constraints, scope, budget, and deadline. This covers process success, project efficiency, project process, project efficiency, tactical performance, efficiency dimension. These terms can be consolidated in the term: project efficiency. Only one of the seven did not mention project efficiency. One added safety and cash-flow to the triple constraints. There is a commonly accepted content of the term project efficiency.

Table 1   Seven definitions of project success

Author, year	Quotes on definitions of project success			
	Column A	Column B		
McLeod et al.2012	*Process success. (project management) On time, within budget to scope / specifications*	*Product Success (project objectives) Product use, Client satisfaction, Client benefits*	*Organizational Success (organization's objectives) Business benefits Strategic benefits*	
Mir & Pinnington 2013	*Project Efficiency meeting schedule and budget goals*	*Impact on customer customer benefits in performance of end products and meeting customer needs*	*Business Success project benefits in commercial value and market share*	*Prepare for the future, creating new technological and operational infrastructure and market opportunities.*
Howsawi et al 2014	*Project process: This level contains the criteria used to judge the actions taken to provide the required deliverables. Examples of such criteria are meeting budget and schedule, and efficiency of execution.*	*Products and deliverables: This level contains the criteria used to judge the technical requirements and qualities of the products or deliverables resulting from the project. Examples of such criteria are technical validity, manufacturability, and technical performance.*	*Business: This level contains the criteria used to judge the benefits and returns (or losses) of the project to the stakeholders. Examples of such criteria are the contribution of the project to the strategic mission of the firm, preparing for the future, and satisfying the needs of the users.*	*Context and externalities: This level contains the criteria used to judge the project based on compliance with the contextual circumstances and externalities that affect it, such as the political situation, regime, and climate. The project team or organization has little or no control over these externalities.*
Serrador, & Pinto 2015	*Project efficiency: meeting cost, time and scope goals*	*Stakeholder success: satisfying the expectations of project stakeholders, who are the best judges of overall success*	*n/a*	

Table 1   continued

Samset & Volden 2015	*Tactical performance cost, time, quality*	n/a	*Strategic performance relevance, effectiveness, Sustainability*
Silva 2016	*Efficiency dimension cost, time, quality, safety, cash-flow*	*Effectiveness dimension environment performance, client satisfaction, employee satisfaction, probability, learning and development*	
Joslin & Müller 2015	*Project success is a multidimensional construct where project stakeholders can select a number of project success criteria they believe are important to judge on success*		

The content of column B is more diversified than the content of column A. In column B is mentioned such terms as product, organization, business, impact on customer, benefits, prepare for the future, context, sustainability, stakeholder satisfaction, strategy, and effectiveness. The dimensions under column B are much less homogeneous than column A, but in order to have one term covering the lot, the term is chosen to be effectiveness.

The choice of efficiency and effectiveness as a dichotomy, explaining project success, is at the same time an acknowledgement to the quote often attributed to Peter Drucker: "*Efficiency is doing things right; effectiveness is doing the right things.*"

PROJECT COMPLEXITY

The search for a definition of project complexity revealed that there is no commonly accepted definition to be found. More than half the papers offered statements similar to the three examples given below:

- *However, there still was no commonly accepted definition of project complexity, despite a large number proposed. Each author had a different perspective on defining project complexity* (Dao 2016).
- *Project complexity as a concept is often used but also rarely understood, many different definitions and interpretations are available resulting in difficulties when discussing the topic* (Swinkels 2016).
- *Despite the many existing studies on project complexity, there is no universal agreement on the definition of project complexity* (Zhu et al. 2016).

Because of this, there is no table to compare definitions of project complexity in the way in which Table 1 documents project success.

Instead, we follow the reference back, to obtain a brief historical overview.

Brief historical overview

Most sources agree that the starting point is: *It is proposed that project complexity is defined as 'consisting of many varied interrelated parts' and can be operationalized in terms of differentiation and interdependency*. (Baccarini 1996).

Subsequently, the understanding of project complexity took many routes. To illustrate the variation, we have chosen: *Complex projects, like complex adaptive systems, are characterized by high levels of Uncertainty, Ambiguity, Decreasing levels of trust. (Remington 2009).*

A systematic literature review was conducted in 2011. The conclusion was that project complexity has evolved to encompass five dimensions: S*tructural complexity, Uncertainty, Dynamic, Pace, and Socio-political.* (Geraldi et al. 2011).

A similar literature review performed five years later showed further development, and expanded the understanding to eight dimensions: *Structural complexity, Uncertainty, Emergence, Autonomy, Connectivity, Diversity, Socio-political, and Element of context.* (Bakhshi et al. 2016)

From the selected papers, the following dimensions can be added (non-exhaustive list); *stakeholder management, social, trust, product/service, quality, client, finance, legal, social, cultural, cognitive, operative, external and business environment.*

Many of the models/frameworks have the aim of creating assessment tools, such as the IPMA assessment tool for certification on Level B, which has 41 dimensions. (In Scandinavia, an assessment of 12 dimensions is used for all IPMA certificates). It is worth noting that, for some unknown reason, the IPMA assessment tool has not yet attracted the attention of researchers.

The chosen definition of project complexity

For this paper, we have selected a definition of project complexity which carries sufficient commonality to capture the heart of the scientific field. Furthermore, this is the only definition that is referred to in at least some of the other papers.

Project complexity is the property of a project which makes it difficult to understand, foresee and keep under control its overall behaviour, even when given reasonably complete information about the project system. Its drivers are factors related to project size, project variety, project interdependence. (Merle & Vidal 2016)

Discussion

Table 1 provides the impression that efficiency and effectiveness are separate. In practice, however, there is often a trade-off between efficiency and effectiveness. As an example, scope creep is often used to satisfy stakeholders, increasing effectiveness, but it costs in terms of reduced efficiency.

In a study measuring the gap between "true project management success" and "perceived project management success" (judged by the stakeholder), it was found that "expectations management" is the most significant factor to explain the "unjustified hurrah" (= stakeholders happy, but the iron triangle is not met). The second most important factor was "sponsor commitment." (Neves et al 2017)

In this study, like many others, the iron triangle carries an aura of objectivity. However, in practice, it is a tool for the management of expectations. It is the result of the initial negotiation of the project (Davis 2017), often carried out between the project manager and the sponsor, or between the salesperson and the client.

In spite of the connection between efficiency and effectiveness, the two dimensions will be handled separately.

PROJECT EFFICIENCY – WITH CYNEFIN FRAMEWORK AS A LENS

Looking at project efficiency (so-called project management success), through the Cynefin framework, we only use three out of the five domains: obvious, complicated and complex. Chaotic and disorder domains are not included since they are transitional phases (Snowden 2015). To nuance the discussion, two further levels are added: borderline complicated

and borderline complex. This provides more fine-grained levels of complexity in which to investigate project efficiency, since we have five levels instead of only three if we did not use the borderline complexity levels.

Obvious: When cause and effect are obvious, we know in advance what is needed. One might argue that this might not even be projects, since the newness might be too small. However, in such cases, the project model can be: *"Just Do It!" In this reactive mindset, schedule and budget dominate the measures of project success* (Poli er al.2003). The project's lifecycle might be a simple waterfall model, as this is the best practice for this kind of project. As illustrated in the Cynefin framework, the constraints are rigid. If the projects are done properly, by applying best practice that have been developed by repetitions of many similar projects, we can expect a 100% success rate in terms of efficiency for this kind of projects. If not, we can blame "best practice".

Borderline complicated: Projects are not quite as obvious at this level. Cause and effect are clear, but some kind of analysis is needed. Not all aspects are 100% known, and therefore we can expect changes to the iron triangle as we go along with the project. This calls for change control (PMI 2013, section 4.5). Change Control gives the project's decision-makers the opportunity to keep stakeholders satisfied even when new needs and ideas emerge during the product's lifecycle. A project governed by change control is on the borderline between obvious and complicated. The final iron triangle will be different from the initial triangle; a simple calculation of efficiency based on the initial triple constraints can therefore never reach 100%.

Complicated: If the uncertainty is too extensive to be handled by simple change control, a stage-gate model will be more suitable than the waterfall model. A stage-gate model can divide the project execution into several stages, each separated by a gate, where the direction for the next stage is re-evaluated and committed. We have, what is called "governing constraints" in the Cynefin Framework. In PRINCE2, this is called "control stage," followed by "giving direction" (Axelon 2009).

Borderline complex: The prerequisite of the above complicated model is that the content can be analyzed beforehand. If this is not possible, an agile project model will be more appropriate to use. Planning the entire project does not make sense. Instead, we can apply an agile project methodology, for instance, PRINCE2 agile. The so-called Agile–Stage-Gate Hybrids are *"adding elements of Agile to traditional Stage-Gate structures to add flexibility and speed while retaining structure"* (Cooper 2016).

Even though Scrum (Sutherland 2014) is not a project management methodology, it can here be used to illustrate the borderline complex situation. *Scrum is a "complex" to "complicated" transition device* (Snowden 2015). The prioritization of the backlog items is in the complex domain. The sprint planning will be in the complicated domain, and the sprint itself might be in the obvious domain with ridged constraints because all sprint items must be performed before the end of the sprint (Sutherland & Sutherland 2014).

Complex: Cause and effect can only be seen in hindsight. The constraints are applied to make something happen, for example, a deadline for an experiment – or a budget to be used on a hypothesis. Frequently, the project will only exist in the complex domain, in the beginning, the fluffy front end of innovation. The PMagile has a phase designed specifically to handle this kind of complexity, called the foundation phase (APMG 2014). Snowden recommends the use of parallel "safe-to-fail-experiments" (Snowden 2015). The point is not only that it is safe to fail, but also the speed of development, because of them being parallel – compared to the serial sprints in Scrum or the serial timeboxes in PM agile and PRINCE2agile.

To sum up, the levels are displayed in Table 2.

Table 2   The five levels of project complexity matched with a suitable PM method and relevant measures of project management success.

Level of project complexity based on Cynefin framework	Project management methods for coping with the complexity	Relevant measuring of project management success (efficiency)
Obvious - rigid constraints	"just do it" / simple waterfall	Measure against initial triple constraints relevant
Borderline complicated	Waterfall with change control	Measure against final triple constraints relevant (but not the initial version)
Complicated - governing constraints	Stage-gate model, such as PRINCE2.	Measured stage by stage; final triple constraints for the stage – not for the project
Borderline complex	PRINCE2 agile or PM agile (or Scrum)	Measure against the deadline and the budget (Scope is flexible, and therefore not a relevant measure)
Complex - Enabling constraints	PM agile, safe-to-fail-experiments, and suchlike	Measure against either the deadline or the budget

PROJECT EFFECTIVENESS – STAKEHOLDERS' EXPECTATIONS FOR THE PROJECT

Based on McLeod's definition of project success, the project effectiveness can be divided into five elements: product use, client satisfaction, client benefits, business benefits and strategic benefits.

With the Cynefin framework as a lens, seen from the perspective of the project, the realization of the client and bBusiness benefits are complex, because agents operate without constraints. (Since behaviour is not random, but under some influence from the project, it is "only" complex, not chaotic). However, realizing the strategic benefits may seem random from the project's perspective, and therefore in the chaotic domain. Product use and client satisfaction are more predictable in terms of cause and effect from the project's perspective, and are therefore in the complicated, but probably never in the obvious, domain.

Project effectiveness can be seen as a struggle between the project – a temporal organization – and the permanent organization/the client organization. One question is:

Do the stakeholders of a given project expect the project to

A) "*create a unique product, service or result*" or do they expect

B) "*delivering and implementing beneficial strategic change in organizations and societies*?" (With reference to the definitions from PMI versus IPMA research in the introduction).

Project expectation A will – all things being equal – result in a lower project complexity than B. This follows from the fact that B is both delivering and implementation, where A is only delivering (i.e., creating) the product, service or result. There will be higher uncertainty, more socio-political aspects, interaction with a business environment, etc. (from the list

of dimensions mentioned under "definitions of project complexity"). In other words, the stakeholders' expectations influence the level of project complexity.

Project Complexity is a consequence of decisions made in the organization owning the project. The borders of a project are not given by nature, but by decisions in and around the project. Each of the dimensions listed under Project Definitions will be the result of decisions on how to set up, organize and run the project. Furthermore, we can expect that: "*Complexity does not remain constant over the lifespan of the project… In the end, the aim is to reduce it by decision-making*" (Brockmann & Kähkönen 2012).

One central decision is should the project stand alone and be evaluated on its own merits against the effectiveness measures? Organizations could instead improve the Benefits Management (Badewi 2016), which will reduce complexity for the project since a complex part herby is moved out of the project and placed with the benefits manager.

Another decision could be to place the project in a program. Managing successful programmes (MSP, see Figure 2) describes the cause and effect process from project to corporate objectives, namely project outputs lead to capabilities in the organization, which create outcomes that lead to benefits. (Axelos MSP 2011)

| Project output | Capabilities | Outcomes | Benefits |

Figure 2   Process based on MSP

The responsibility of a program, defined by MSP, is almost equal to the five elements of effectiveness mentioned above. With a program, the measure "project effectiveness" would, however, be almost obsolete, and substituted with measures of "program success."

Inside a program, the project can focus on delivering the agreed upon output; thus, many of the dimensions of project complexity will give a lower score, making the project less *difficult to understand, foresee and keep under control* (definition from Merle and Vidal), thus lowering the project's complexity.

We have hereby demonstrated how the introduction of a program and/or use of a benefits manager will reduce the complexity of the project. The introduction of a program and/or use of a benefits manager is equivalent to lowering the stakeholder expectation of effectiveness of the project.

SUMMING UP THE DISCUSSION:

We have shown how increasing levels of project complexity reduce the relevance of measuring project efficiency by triple constraints. Furthermore, we have shown how stakeholders' focus on project effectiveness leads to increasing complexity. These two statements compounded are illustrated in Figure 3, where we have used the three complexity domains from Cynefin framework to illustrate increasing project complexity.

When a project is forced to focus on effectiveness (see Table 1), there is an increase in one or more of the dimensions of project complexity. Therefore, the level of project complexity increases. When project complexity increases, the project efficiency becomes less relevant as a measure of project success (See Table 2).

Figure 3: Illustration of how project complexity can serve as an explanatory link between project effectiveness and Efficiency.

The more stakeholders expect effectiveness (the independent variable), the more the project becomes complex, which leads to the lower relevance of the project efficiency measure based on the triple constraints (The dependent variable).
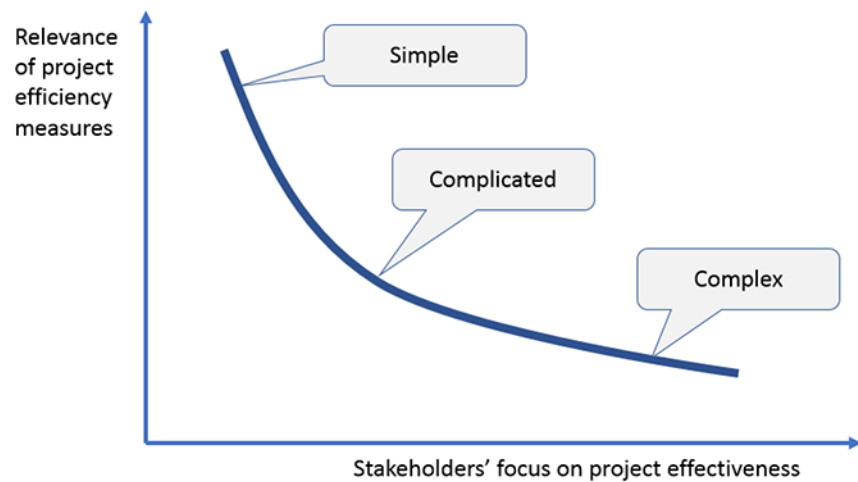

Figure 3   Relationship between project effectiveness and efficiency

The relationship shown in Figure 3 is interesting because we now have an indication of the correlation of focus on effectiveness and the relevance of efficiency as a measure of success.

Conclusion and further research

The common definition of project success often consists of:

1. The project efficiency, based on the triple constraints, and
2. The project effectiveness, which can be divided into the product/client dimension and the organizational dimension.

There is no commonly accepted definition of project complexity. Given that the field is more than two decades old, it is relevant to research why there are no commonly accepted definitions. Moreover, many different models of project complexity exist based on dimensions similar to the IPMA assessment tool exist, which ought to be further researched.

By using the Cynefin Framework (a complexity theory based model for strategy work) as a lens, the paper has argued for dividing project efficiency (project management success) into five different measures.

Another topic of relevance for further research is that the Cynefin Framework also can be used to categorize the many different models and dimensions of project complexity.

Furthermore, the paper has argued that project complexity can be used as a description of the link between the two project success parameters: efficiency and effectiveness.

Based on this, it is relevant to consider the third definition of success, namely project complexity success, which can serve as a link between the project success and project management successes. There is a need for further research to explore the relationships between efficiency, effectiveness, and complexity. Based on the development of the definition of both project success and project complexity, further research might ask if coping with complexity is equal to achieving project success?

Further research is needed to make an evidence-based verification of the relationship between the focus on effectiveness and the project complexity and the relationship between the project complexity and the relevance of project efficiency measures.

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About the Author

MSc Mogens Frank Mikkelsen has 15 years as practitioner of Project Management; is certified in PMP, IPMA, Prince2 and Scrum; he has worked 12 years as trainer and instructor in the field of Project Management; he has published many articles for practitioners in the journal of Danish Project Management Association as well as a handbook for practitioners in Danish "Ledelse af komplekse projekter", 2016 (title translate to: Leading complex projects). He has also published: "How to cope with complexity? - A review of project complexity literature using the Cynefin framework as theoretical lens", IRIS conference paper, 2016; and has enrolled in a PhD study at IT University of Copenhagen.

CONFERENCE PAPER

Project ethics: The Critical Path to Project Success - applying an ethical risk assessment tool to a large infrastructure project

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Abstract

A project ethics tool was applied to review a major infrastructure project in Iceland. The tool is based on the four principles of "virtue" based ethics, "utility" based ethics, "duty" based ethics and "rights" based ethics. The tool uses perspectives of *five key stakeholders*: "the project leader, the project team, the project organization, the society in which the project is based, and future generations that the project might influence". New ethical aspects of the project were discovered, which has led to a more ethically mature consideration of projects within the company. An ethical risk assessment is a valuable add-on to the more conventional engineering risk assessments usually performed in projects of this sort. Furthermore, the tool helps to expand the horizon when defining success by looking at projects from the perspectives of distinct clusters of stakeholders, whom we can better understand by applying the four ethical theories.

Keywords

Project management, ethics, risk

Introduction

Ideas of project success have evolved, but the standard model applied in basic project management teaching is still the iron triangle, and the critical path in projects has to do with tasks and duration. However, it is well understood that project success is, in the end, measured against a variety of criteria that have to do with the project outcome, the interest of the permanent organization involved, the perceptions of the project team and different stakeholders, to give a few examples (Judgev & Müller 2005; Shenhar et al. 2001; Cooke-Davies 2002; Pinto & Prescott 1990). A growing awareness about sustainability and social responsibility has called for a rethinking of the traditional project success concept (Silvius et al. 2012) and impact on the environment is included as an evaluation criterion in the International Project Management Association (IPMA) Project Excellence Model (www. ipma.world/awards/project-excellence/the-pe-model/, assessed on 5 February 2018). The ethical dimension of project management has been discussed in academic journals (Loo 2002; Helgadóttir 2008). Professional project management associations have developed Codes of Ethical and Professional Conduct and made them available on their websites. It is understood that we can talk about a critical project path without dwelling too much on the tasks and their duration. We define project ethics as "the moral deliberation and the self-actualization processes that professional project management should require" (Jonasson & Ingason 2013)

The "modern project manager operates in a complex" and often turbulent environment, s/he works with different stakeholders and "is often faced with difficult decisions" (Ingason 2015) and s/he deals with all kinds of risks that change shape through the project life cycle. An important part of these challenges of project managers are the numerous commitments to project owners and different interested parties, for example, "to avoid real or perceived conflicts of interests and to respect confidentiality". In addition, project managers have different "commitments to co-workers and employees, to ensure the highest level of health and safety measures and provide a healthy and safe working environment" (Ingason 2015). Last but not least, "the responsibility of project managers towards wider society, for instance not to participate in undermining or harming communities, societies, and economies" (Ingason 2015).

The so-called project ethics tool (PET) (originally named project ethical risk assessment tool (PERIA) in Jonasson & Ingason 2013) is based on the idea that project risk "can be identified through ethical deliberation, and the mirroring of project management objectives and processes in moral theory". It presents five different layers of risk and key ethical decision making agents in project management, i.e., the project leader, the project team, the project organization, the society and future generations. The model challenges the project manager to ask critical questions to identify potential risks in projects. If this assessment is done in a structured way, it can provide the project manager with valuable insights into some of the fundamental preconditions for the project and thereby increase the likelihood of project success, by reducing project risk.

This paper shows how the PET was applied in the context of a large infrastructure project—the laying of a new electrical line—in Iceland; a controversial project that had been faced with strong opposition within the local community. The controversy stemmed from increased public awareness regarding environmental stakes, local interests and foreseen environmental interest of future generations. The owner of this project under scrutiny is a public utility company. The project was still in the concept and planning phases, i.e., no actual construction took place in this project. In fact, this project never entered the construction phase. The application of the PET matrix helped to shed light on various aspects of the

project, previously not identified. The advantages and disadvantages of the model and its applications are discussed, as well as how the model could be simplified and applied in a more effective way.

Theoretical review

A distinction is commonly made between "project success and project management success" (De Wit 1988; Baccarini 1999; and Munns & Bjeirmi 1996). 'Project success' refers to the *outcome* of the project, while 'project management success' refers to the *project process* as such, and projects are constrained both by project outcome and project processes (Bryde 2005). It has been argued that improved "scheduling techniques" will lead to increased project success, and if a project exceeds its budget or due date, or the outcome does not satisfy the performance criteria, the project is commonly "assumed to be a failure" (Belassi & Tukel 1996). More recent papers have focused on new thinking around measuring success on a business and strategic level as well, and a good example is a paper by Shenhar et al. on long range planning from 2001.

In their book *Project Ethics*, Haukur Ingi Jonasson and Helgi Thor Ingason (2013) ask from an ethical perspective what would constitute a virtuous project leader, project team or project organization. They wonder if the needs of a few are sometimes allowed to override the needs of the many in projects, and if sometimes actions in projects are taken according to a vague, biased or overly rigorous sense of duty. Last but not least they ask about the situation when a "project violates the rights of stakeholders, interested parties" or society. The answers to these questions, according to Jonasson and Ingason, also determine project success and project management success. The book outlines *four ethical principles,* the normative or prescriptive principles of:

- virtue based ethics, considering how the outcome of the action taken will reflects on the character of the doer, see for instance Aristotle [1999],
- utility based ethics, considering if the action will create more wellbeing for the many, see for instance Mill (1863),
- duty based ethics, considering how the action will stand up to a universal moral principle, see for instance Kant 1785 [1953])
- rights based ethics (considering the social contract and the rights of others, see for instance Locke (1689).

Using the term agent as a synonym for the project manager, team, owner, and sponsor, the four ethical principles can be put in simple context with project management as follows:

- The agents should behave in such a way that their actions can become a moral standard for others in the same position.
- The agents should act in such a way that indicates the utmost respect for the rights of all interested parties.
- The agents should measure the project against their moral standard and act in such a way that they can be content.
- The agents should take into account the increased wellness of the many in their project, and act accordingly.

The Project Management Institute (PMI) has defined its Code of Ethics and Professional Conduct (www.pmi.org/~/media/PDF/Ethics/ap_pmicodeofethics.ashx, accessed 10 September 2013). It was developed by PMI volunteers, and all PMI members and credential holders are to sign it. Its purpose is to guide project management practitioners towards what

is right and honourable. Its chapters are on responsibility, respect, fairness, and honesty and they describe the expectations that PMI members have of themselves in the global project management community.

An ethical tool, the 'PMI Ethical Decision-Making Framework' can be found on the PMI webpage (www.pmi.org/About-Us/ethics/Ethics-Resources.aspx, accessed 10 September 2013). This is a five-step process that the user can apply when faced with an ethical dilemma: (1) Assessment; (2) Alternatives; (3) Analysis; (4) Application of ethical principles and (5) Action. In step (4) the user applies ethical principles by asking three questions: (i) Would my choice of action lead to the greatest good? (ii) Would the choice treat others the same way the user would like to be treated? (iii) Would it be fair and beneficial to all concerned?

On a similar note, the IPMA addresses ethics in several contexts in the most recent version of its competence baseline (IPMA 2015a). IPMA has issued the IPMA Code of Ethics and Professional Conduct (IPMA 2015b). This is the outcome of an extensive research project by the authors of this article, concluded in 2015 (Ingason 2015).

The British Association for Project Management (APM) has a code of professional conduct where the responsibilities of members are defined under the headings 'honesty', 'respect', 'the duty to act in the best interest of employers and clients', 'keeping professional skills up to date', and 'claiming expertise only in appropriate areas'. Finally, responsibility to the profession and the association is addressed (see www.apm.org.uk/about-us/how-apm-is-run/apm-code-of-professional-conduct/, accessed 20 July 2017).

An initiative by Alberta Innovates Health Solutions (AIHS) is also worth mentioning. AIHS supports researchers and collaborative research activities focusing on improving health, wellness and health services. AIHS has developed *A pRoject Ethics Community Consensus Initiative* (ARECCI), an ethics decision support tool for projects (http://www.aihealthsolutions.ca/arecci/areccitools.php, accessed 10 September 2013). The tool focuses on research, and quality improvement projects in the health sector. Its ethical guidelines enable users to identify and integrate ethical considerations in their projects; to determine the level of risk for project participants; to appropriate ethical review requirements and to use an online 'ethics screening tool.' In the ethical guidelines, the user is urged to justify how the knowledge gained from the project will be useful, to state how the user will ensure that the participant selection process is fair and appropriate, and to confirm if informed consent is needed in the project.

The Markkula Center for Applied Ethics at Santa Clara University has published general guidelines for making ethical decisions (www.scu.edu/ethics/practicing/decision/making.pdf, accessed 10 September 2013). The guidelines are a five-step process. In the first step, the user is to recognize ethical issues. Secondly, he is urged to get the relevant facts of the case, identify what is at stake in the outcome and what options for acting are at hand. The third step is to evaluate the alternative actions. This is the critical step, where the user must identify which option will do "the most good and the least harm (utilitarian approach), which option best respects the rights of those who have a stake (rights approach), which option treats people equally or proportionately (justice approach), which option best serves the community (common good approach)" and which option leads the user "to act as the sort of person" he wants to be (virtue approach). The fourth step is to make a decision and test it, and the fifth and final step is to act and reflect on the outcome.

A similar process, 'Five Steps of Principled Reasoning,' has been published by the Josephson Institute of Ethics (www.ethicsscoreboard.com/rb_5step.html, accessed 10 September 2013).

This process consists of the following five steps: clarify, evaluate, decide, implement and finally, monitor and modify. The third step, decide, is where an ethical deliberation takes place. The user makes judgements about the most likely consequences, evaluates alternatives according to his or her personal conscience, prioritises his or her values, determines who will be helped most and harmed the least, considers the worst case scenario, considers whether ethically questionable conduct can be avoided and finally, applies three ethical guidelines: a) Are you treating others as you would want to be treated? b) Would you be comfortable if your reasoning and decision were to be publicised? c) Would you be comfortable if your children were observing you?

Research method

In 2013 the authors of this article came up with the project ethical risk assessment tool (PERIA), that was described in their book *Project Ethics* (Jonasson & Ingason 2013). They later renamed and now call the tool project ethics tool (PET). In the book, four classical ethical principles are presented through a list of critical questions about different aspects of the project/programme under consideration. Navigating through these questions should enable the project "leader—or anyone else interested in the project"—to identify, contemplate and make decisions regarding ethical risks in the project. This boils down to some fundamental ethical principles from the western intellectual history as to identify ethical risks, encourage ethical reflection and to make sound ethical decisions. The PET uses perspectives of *five key stakeholders*: the project leader, the project team, the project organization, the society in which the project is based, and future generations that the project might influence. The *four ethical principles* laid out in the PET questions are the normative or prescriptive principles of virtue based ethics, utility based ethics, duty based ethics and rights based ethics.

More specifically, the PET model applied in this research is shown in Figure 1.

The purpose of the research was to apply the PET analysis to make an ethical risk assessment within a large infrastructure project; an electrical infrastructure and power transmission project in Iceland. The project had been the centre of some public debate, and the project steering committee wanted to assess the project in retrospect and learn from this experience, for the benefit of future projects.

According to PET, the project was viewed from the perspective of five different stakeholders or interested parties; all of which, besides the last one, are also regarded as decision makers:

- The project manager.
- The project team.
- The project organization.
- The society.
- The future experiences that the project affects (not present as a decision-making agent).

The PET analysis took place in two workshops, which the authors of this paper coordinated. Each workshop was a half day session with seven days interval. The reason for breaking the work into two sessions was that due to the intensity of thinking we expected that half a day was a maximum time for effective work with the group, and also that the scope of the discussions called for two such sessions. The research method applied here falls under the category of action research. We are applying a democratic, participatory process, with the objective to develop practical knowledge. The process is designed to facilitate understanding, followed by improvement, and the people affected by the improvement are a part of the

PERIA *		Categories of key agents (agents/stakeholders/interested parties)				
		Individual Identifies potential risks (including ethical risks) imposed on the project leader.	**Team** Identifies potential risks (including ethical risks) imposed on the project team.	**Organisation** Identifies potential risks (including ethical risks) imposed on the project organisation.	**Society** Identifies potential risks (including ethical risks) imposed on the society that hosts the project.	**Future generations** Identifies potential risks (including ethical risks) imposed on future generations.
VIRTUE ETHICS Risk identification based on project outcome for one(self)	Fully informed and with a clear conscience, are you sure that the project outcome will contribute to the long-term well-being of the following key agents?	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!
UTILITY ETHICS Risk identification based on project outcome for many	Fully informed and with a clear conscience, are you sure that the project outcome will contribute to the long-term collective (accumulated) well-being (more satisfaction/less pain) of the many, including, but not limited to, the following agents?	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!
DUTY ETHICS Risk identification based on process in terms	Fully informed and with a clear conscience, are you sure that the project process (everything that happens in the project) is managed in such a way that it could define a universal principle with regards to how projects should be conducted by agents in the same role as the following key agents have for the current project?	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!
RIGHTS ETHICS Risk identification based (equal) process of the many	Fully informed and with a clear conscience, are you sure that the project process (everything that happens within the project) fully values/respects all the essential rights of the following key agents?	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!	Yes ( ) No ( ) Justify!

*PET is the intellectual property of Nordica Consulting Group ehf.

Figure 1   Project ethics tool (PET).

process (Pasian 2015). The PET tool applied in this research is merely a vehicle to facilitate the knowledge sharing and discussion in the group. The concepts included in the PET tool are not common to the participants in the workshop, and as a consequence, the coordination of specialists in ethics was needed to lead the workshop.

The participants were six men who had been active participants and leaders in the project. They were a representative from the planning department of the company, a representative from the company project management office who provided assistance to all of the company´s project managers, the project manager for this project, the design manager for the project,

a representative from the division responsible for general planning and environmental assessment, and a representative from the main external consultant that supervised the writing of the environmental assessment report, and negotiations with owners of land and other stakeholders. The choice of participants was made by the coordinators and the representative of the company that asked for the ethical assessment. The choice was based on creating a balanced, yet not too large group of people who could reflect on different interests and different perspectives that had been raised in the project.

The role of the coordinators in the workshops was to lead the working group through the PET discussion process, enabling them to examine the project thoroughly. This included, among other things, to explain different forums to participants, to conduct a discussion in the group and to balance the meeting. The role of the coordinators was not to interfere with the discussion, but sometimes it was necessary to stimulate it or to ask for explanations of statements and information submitted. As coordinators, the authors gathered detailed minutes in the workshops and processed a detailed report. Both coordinators wrote their own notes, they were compared, and in the rare instances of discrepancies, they were clarified. The outcome was a singular comprehensive report that gives a good overview of all the moral issues related to the project.

Results

We divide this section into two parts. First we give a very brief overview of the outcome of the workshops, and then we elaborate on the experience of applying the PET model, as perceived by the participants and ourselves. The PET analysis leads to the following conclusions that can be drawn:

Virtue based PET analysis: A moral agent should always act in such a way that he/she/it can be content with his/her/its actions.

1. The project manager for the project initially started the project without having sufficient knowledge about project management. This inevitably caused him a feeling of discontent and was hence **not in accordance** with the principles of virtue.
2. By the time the PET exercise was conducted, the project manager and the project team had gained much experience and knowledge; the project manager had been certified by IPMA as a senior project manager (level B) and felt much more content; the project manager and the team had acquired the skills needed to take on a project of this scale. This was deemed as **in accordance** with the principles of virtue.
3. The project manager and the project team felt content as they had made a continuous effort to find solutions, plan, and consult with stakeholders. This was deemed as **in accordance** with the principles virtue.

Utilitarian based analysis: A moral agent should always act in such a way that his/her/its action leads to increased wellness (less suffering/more happiness) of as many as possible.

4. The project manager and the project team strove to ensure the effectiveness and performance of the project. This was deemed as **in accordance** with the utilitarian principle.
5. The lack of experience and knowledge of the project manager and the project team at the beginning of the project may have led to waste and compromised the interests of professional project managers, i.e., the interests of the project management profession. This was deemed as **not in accordance** with utilitarian principles.

6. External conditions in Iceland (e.g., the economic situation) delayed the project work, and the consequence of this was that work delivered earlier in the project was undermined which led to inefficiency. This was deemed as **not in accordance** with utilitarian principle.

7. The project had time and time again been postponed and extended, due to in countless consultations with particular stakeholders, and this had undermined the interest of other stakeholders. This was deemed as not in accordance with utilitarian principles.

8. The project manager and the project team have not put the consulting work for the project out to tender. This may have led to waste. This was deemed as **not in accordance** with utilitarian principles.

9. The project manager and the project team did seek counsel from technical consultants to ensure efficiency. This was deemed as **in accordance** with utilitarian principles.

Duty Based Analysis: A moral agent should always act in such a way as your behaviour could become a universal moral standard of an agent in the same role as you are in.

10. The project manager and the project team did with time try to fulfil their professional obligations according to professional project management standards (IPMA, PMI). This was deemed as **in accordance** with the duty principle.

11. Documentation and definitions of roles within the project are lacking. This was deemed as **not in accordance** with the duty principle.

12. The project manager and the project team had gone rather far in their outreach to interested parties and stakeholders. This well-intended consultation to ensure everyone was happy had led them astray, and had become counterproductive. This was deemed as **not in accordance** with the duty principle.

Rights Based Analysis: A moral agent should always act in such a way that his/her/its actions indicate outmost respect for the rights of all stakeholders and interested parties.

13. The company had failed to fulfil its legal obligation to ensure the right to clients in the area to safe and secure provision of electricity. This was deemed as **not in accordance** with rights based principles.

14. The company has strived to ensure the rights of landowners and local authorities in the area through extensive consultation. This was deemed as **in accordance** with rights based principles.

15. The company claims that environmental aspects are taken into account as much as possible, it was pointed out that the laying of the electricity transmission line is reversible. Taking this into account this was deemed as **in accordance** with rights based principles.

Discussion

We divided the section in two. First, we summed up and commented on the direct outcome of the workshops, and then we elaborated on the experience of applying the PET model, as perceived by the participants and ourselves.

OUTCOME OF THE PET ANALYSIS

Some of the more interesting findings of the PET exercise are the fact that the knowledge and experience of the project manager and his team was not sufficient in the beginning. This had led to waste and compromised the interests not only of the company but also of project management as a profession. Furthermore, it is shown that the delay of the project

as a consequence of too many consultations with some stakeholders had led to waste. An interesting contradiction was revealed as it was pointed out that not putting consulting work out for tender violates utility principles, but at the same time seeking counsel from trusted technical experts increased efficiency and was considered positive from a utilitarian aspect. The analysis revealed that the documentation and definition of roles in the project were lacking, and this is not according to the duty of a professional project manager, professional project team, and a project oriented organization. One interesting observation is that the extreme to which the project manager and the project team went in consultation with stakeholders to ensure that everyone was satisfied was in fact not deemed as in accordance with the utilitarian principle. This was seen as having a larger weight than the perceived duty of the project manager to consult with stakeholders. One of the main drivers for the project was the need to provide electricity to clients in the area, and thereby fulfil legal obligations of the company. By prolonging the project and thus postponing the delivery of power, the company hence violated the rights of their clients.

The practical relevance of the four ethical principles is mainly that they illuminate the ethical issues (risks) at stake. Using them to evaluate a project or managerial actions shows that different theories will gain more importance than others, depending on the issue at hand. In principle, all of them have equal standing, but their relevance turns out to be case sensitive. The ability to deploy the theories and explore their relevance in each case takes practice, so we suggest that management teams consult with a practically oriented expert on ethics, and also invite the appropriate experts to the table in the process of identifying and tackling ethical issues.

THE EXPERIENCE OF USING THE PET, AS PERCEIVED BY THE GROUP AND COORDINATORS

All participants in the work had technical backgrounds and discovered that the theoretical background for this research was new to them. It was hence necessary to use some time to explain the four different ethical theories upon which PET is based. It was also necessary to ensure that the discussion was focused and according to the different sections of the PET model. Explaining the conceptual difference between virtue, utility, duty, and rights took some time and helping the participants to view the project from the different perspectives of the project manager, the team, the organization, the society and the future generations required a focused effort. One of the two coordinators facilitated the meeting, but the other took notes, and this proved to be an efficient method.

For most of the time, the participants could discuss the project from the different ethical perspectives after the premises had been explained by the facilitator. The facilitator did not have to interfere too much in the discussion. Sometimes the discussion dried out and the facilitator needed to inspire the participants, offer remarks, or even provocative comments to kick-start the discussion again.

The format of the workshop was such that there was good time to discuss each and every aspect of the PET model, and one topic of the model was never left until the groups were satisfied with the content and agreed that nothing more was to be said. Then the group moved on to the next topic. The time we applied for the analysis could not have been shorter without jeopardizing the outcome.

The group was open minded and inspired from the beginning to the end. A short retrospective discussion towards the end of the second session revealed that the participants

were in general very happy with the work, but tired because this challenged them to think in new ways. All of them agreed that the workshop and the application of PET had opened new doors to them, and shown them some new aspects of the project that they had not considered before. In a written note sent to the coordinators after delivering the final report, the project manager expressed his sincere thanks, and said that he was confident that this exercise would lead to better and more ethical evaluation of future projects at the company.

In our own retrospective after delivering the final report, we agreed that this version of the PET model was rather heavy, and required a lot of effort and guidance on behalf of a coordinator well trained in ethical reflection. We concluded that a modified version of the model might be of use for organizations that wanted to apply the PET method without the assistance of external consultants. We have now developed a simplified version of the PET model.

The in-depth discussion that came out of applying the PET led to deeper considerations and provided the participant with more value in terms of information than a simplified version (without the coordination of experts) would have done. The most important aspect is the process itself; the discussion and reflections by a panel of people that know the project and understand its boundaries and content. Such reflexivity within the project team, and the role of learning and doing this as a collaborative practice is the key.

Conclusions

We applied the project ethics tool (PET) to a major infrastructure project in Iceland in hindsight. New ethical aspects of the project were discovered in this process. This has led to a more ethically mature consideration of the projects in the company. The PET ethical risk assessment is, therefore, a valuable add-on to the more conventional engineering risk assessments usually performed in projects of this sort. The tool can also be applied in the design and planning process, and thus provide valuable information that can be used to reduce risk by taking into consideration aspects of the project that would not otherwise be considered. The tool is not simple in the present version, and requires facilitation by specialists. However, the PET tool in a simplified version should be a standard tool in the toolbox of every project manager.

This paper has given examples of the findings when applying the PET model to a real major infrastructure project. It can safely be concluded that this exercise has shown to new aspects, new perspectives and new ways of assessing a project. From a risk assessment point of view, this makes good sense, but we also point out the wider implications. This links well to the way we define success, and we can safely conclude that the PET model helps to expand the horizon when defining success. It does this by looking from the perspectives of well-defined clusters of stakeholders, whom we can now understand in a better way by applying the four ethical theories, virtue, utility, duty and rights.

More work is needed to integrate the ethical principles and extend the definition of success. Further research might include the application of this tool in different types of projects and also in different cultural environments, e.g., in a non-western society, i.e., Africa, South America or Asia.

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CONFERENCE PAPER

Exploring Project Management Research Trends for Project Success

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Synopsis

Given relentless global competition, project management (PM) success has become more vital than ever. In response to the gravity of PM, a large volume of PM research has been conducted in a broad context in recent decades. Despite the increasing volume of literature, the evolving research trend in PM has not been able to broaden understanding of PM success and respond to the dynamic change in a global PM.

Relevance for practice/education

This research provides an insight for industry and academia to forecast future direction of PM research and practice based on the past PM trends.

Research design

This research conducted desktop literature research as the primary research method to identify the PM research trends. In order to appreciate PM research trends, research articles published in the International Journal of Project Management from 1983 to 2016 were examined. A comparative analysis was used to explore the reciprocal relationship between the PM research

trends and socioeconomic trends. In order to identify global issues, reports released by the United Nations from 1980 to 2016 were reviewed, and keywords search for matching PM research and global issue trends.

Main findings

A total of 70 countries contribute to publishing 2,015 articles, and the most frequently researched topics are HR, communication, and procurement (53% of total research topics). The first occurrence of International PM and Programme management research was 1983, and the global PM body of knowledge development for PM success started from 1995. However, 41% (828 articles) of total articles are written based on developed countries including the UK, US and Australia. For a better understanding of global PM insights, more global collaboration among researchers in both developed and developing countries is required.

Research implications

This research will contribute to understanding PM research trends in conjunction with socioeconomic perspective, and serve as a stepping stone to develop further research on PM research trends and correlation with socioeconomic events in a quantified manner.

Keywords

Project Management, Research Trends, Knowledge Area, Project Management Success

Introduction

Given relentless global competition, PM has become more vital than ever. PM provides great value to various industry, organizations, and countries. It is a methodology to improve collaboration among key project stakeholders and enhance timely integration of essential project information based on better communication. PM is perceived as an organizational enabler to deliver business value to stakeholders and achieve their strategies effectively and efficiently (Crawford & Pennypacker 2001). PM has been increasingly recognized as a process and a method to achieve growth and improvement in government organizations (Archibald 2003).

Indeed, it is forecasted that project oriented jobs will grow by an average of 33% by 2027 in 11 countries such as UK, US, China, and India (PMI 2017). The growth of project management practice and project managers is expected to contribute to a nation's productivity, since project management skills are essential to achieving project success that is not easily obtained by outsourcing human resources (Aron 2005). PM practices have evolved to accommodate the needs of new industrial fields and countries, and PM research for new application of PM knowledge continues to grow and evolve (Crawford et al. 2006).

In response to the importance of PM knowledge, a large volume of PM research has been conducted in a broad context. Academic PM research supplies new ideas for industrial fields to improve process and practice, and trends of PM research are presented as industry continues to adopt and implement the ideas. As the reciprocal relationship is presented between the academic research and industrial practices, there has been little research to identify emerging and future research questions based on the research trends and patterns, and also to establish cumulative insights and knowledge to support strategic decisions of industrial sectors (Crawford et al. 2006).

The evolving PM research trends have been incompletely identified after 2006. Hence, this research aims to broaden understanding of PM research trends and the dynamic changes in a global PM context by examining the mutual influences between the PM research and society. This research will contribute to establishing an up to date understanding of PM research trends, so researchers can adjust their research focus toward more practical and timely issues, and provide a better understanding about the correlation between global socioeconomic events and PM research trends to the relevant PM professionals.

Previous Research and Data Analysis

To enhance organizational and national competitiveness, it is important to forecast PM research agenda into the future to select relevant and meaningful research direction and questions. (Jeong & Kim 2012). Crawford et al. (2006) found that various PM research has changed the approach to projects in various industrial fields, and contribute to developing new methodologies to fill the practical gaps in knowledge of PM.

Researchers argue that understanding trends and patterns in PM research can give an in-depth understanding of holistic perspective regarding PM. Although it is important to obtain a holistic viewpoint of PM research trends, Evaristo and Fenema (1999) recognized that the most of PM research has been conducted in the construction industry, on large capital investments with diverse stakeholders (Betts & Lansley 1995). Ilter and Ergen (2015) assert that more research focus should be given to under-researched sectors or topics that can lead to new ideas and approaches for a project.

In order to appreciate how PM research has evolved over time and across industry, it is essential to identify how PM research has addressed new challenges, with tools, techniques, and approaches. However, past research on PM mainly focused on specific domain knowledge such as communication, human resource, and risk management (Shenhar 1996; Stretton 2000). Other researchers mainly focused on general research topics in a specific period (Pascale 1990; Clarke & Clegg, 1998). Consequently, researchers began to investigate PM research trends and patterns over time to obtain more meaningful insights from the historical data (Urli & Urli 2000; Themistocleous & Wearne 2000). Particularly, more extensive research on PM trends and patterns over time was carried out by various researchers to predict future trends.

In 2000 Kloppenborg and Opfer (2000) conducted research covering the period 1960 to 1999, supported by the Project Management Institute, and Themistocleous and Wearne (2000) conducted similar research focusing on published articles in International Journal of Project Management from 1984 to 1998. While researchers contribute to revealing the trends of PM research topics, the relationship between PM research trends and events or issues within society has not been discovered. This research aims to identify PM research topics and trends over 35 years, and more importantly reveal a correlation between global socioeconomic events and PM research trends that can practically support industry and academia. This research will provide insights into academia and industry to guide future directions of their research and corporate strategies based on the PM research trends.

Methodology

This research conducted a desktop literature research as the primary research method to identify PM research trends and the socioeconomic events that influence industry globally. Based on the findings from the literature review, a comparative analysis was conducted to examine the relationship between PM research and industry by mapping PM research trends

and socioeconomic events. The scope of research was 35 years of research articles (1983 to 2016) published in the International Journal of Project Management (IJPM). IJPM was selected as a data source for the desktop literature research to minimise biased perspective, as the IJPM is one of the most prestigious academic journals (Lu et al. 2015). Furthermore, the IJPM is written in English, which is the most familiar language adopted as a de facto standard, although there are various prestigious journals in other countries including German, France, and US. More importantly, since various previous research covering global PM research trends has been reviewed and published in the IJPM, it is evident that the research scope of IJPM is highly aligned and relevant to the objective of this study. Volk et al. (2014) recommended investigating one specific reliable journal to secure the consistency of research topics and identify meaningful trends rather than including a wider domain of journals in data selection. A keyword and abstract reviews were carried based on the global PM standard ISO 21500 (ISO, 2012) because there is a possibility that a researcher could interpret the trends based on personal perspective and experience. The information regarding socioeconomic events was retrieved from reliable professional research organization and academic research databases, such as the Economic and Social Research Council UK, Elsevier, and Taylor & Francis.

Result and Discussion

The number of research articles has continuously increased, as shown in Figure 1. In 1993, the number of articles was the lowest (26), and the largest volume of research was in 2015 (146). As more lessons from the past projects have been accrued and technology has advanced, more PM research has been conducted on various research topics.
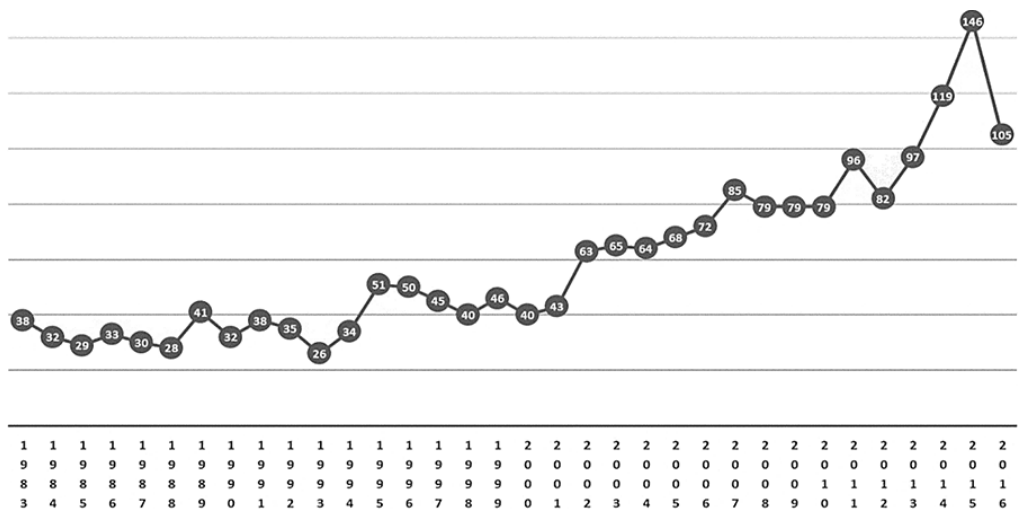

Figure 1   Trend of the volume of research publication

A total of 70 countries, based on nationality of the first author, have contributed to publishing 2,015 articles over 35 years as shown in Table 1. 828 articles (41%) of total research has been conducted by the three major developed countries – the UK, US and Australia, and 39 out of 70 countries published only 106 articles. Developed countries have engaged much more actively in PM research and influence other developing and developed countries.

Table 1 Number of articles and country in IJPM

Country	Number of articles	Country	Number of articles	Country	Number of articles
UK	504	South Africa	16	Slovenia	3
US	164	Belgium	14	Bangladesh	2
Australia	160	Malaysia	14	Croatia	2
China	96	Austria	12	Cyprus	2
Hong Kong	79	Iran	12	Zambia	2
Canada	75	New Zealand	12	Armenia	1
Netherlands	71	Egypt	11	Bulgaria	1
Finland	70	Portugal	9	Fiji	1
Taiwan	70	Russia	8	Haiti	1
Sweden	69	Jordan	7	Iceland	1
Singapore	55	Kuwait	7	Kenya	1
German	54	United Arab Emirates	7	Libya	1
France	40	Chile	6	Mozambique	1
Italy	40	Ireland	6	Nepal	1
Norway	38	Turkey	6	Oman	1
Denmark	36	Greece	5	Poland	1
Israel	33	Japan	5	Principality of Liechtenstein	1
India	28	Hungary	4	Qatar	1
Spain	26	Indonesia	4	Serbia	1
Saudi Arabia	24	Pakistan	4	Ukraine	1
South Korea	20	Yugoslavia	4	Vietnam	1
Switzerland	20	Czechoslovakia	3	Zimbabwe	1
Thailand	17	Ghana	3		
Brazil	16	Nigeria	3		

Based on the findings, it can be extrapolated that more active global research networks among researchers in both developed and developing countries are required for better understanding and dissemination of global PM insights and experience. Indeed, various international projects requiring the utilisation of a global resource pool have been increasingly initiated, and research related to an international project started gaining attention from academia from 1999 onward. Consequently, global research collaborations to tackle issues in various international projects where various global workforces were involved have gained the momentum, and it is reflected in the trend of research publication as shown in Table 2. More research has been conducted in collaboration with developed and developing countries to apply project lessons learned from projects that developed countries have already carried out before developing countries begin similar work.

Table 2   Research Collaboration Profile led by Three Major Developed Countries

Australia	UK	US	Note
Canada	Canada	Canada	Countries collaboration with all three major developed countries
China	China	China	
German	German	German	
Hong Kong	Hong Kong	Hong Kong	
Saudi Arabia	Saudi Arabia	Saudi Arabia	
United Arab Emirates	United Arab Emirates	United Arab Emirates	
Norway	Norway	Norway	
Croatia	Australia	Australia	Countries collaboration with UK and US
France	Brazil	Brazil	
Finland	Finland	Armenia	Countries collaboration with Australia and UK
Indonesia	Indonesia	Belgium	
Malaysia	Malaysia	Denmark	
Netherlands	Netherlands	Egypt	
South Africa	South Africa	Israel	
Spain	Spain	Jordan	
US	US	Kuwait	
Chile		Chile	Countries collaboration with Australia and US
South Korea		South Korea	
Sweden		Sweden	
Switzerland		Switzerland	
Taiwan		Taiwan	
UK		UK	
Ireland	Italy	Cyprus	Collaboration with one country
Kenya	Jordan	Ghana	
New Zealand	Mozambique	Greece	
Russia	Nepal	Pakistan	
	Palestine	Singapore	
	Portugal	Turkey	
		Vietnam	
26	22	29	Total number of countries in research collaboration

The authorship has been evolving from a homogeneous research group comprised of a single country to a research team comprised of worldwide multiple nationalities. As shown in Table 2, the three major developed countries have collaborated with 47 other countries, which is 67% of total countries involved in the PM research over the 35 years. Although an increased number of global research collaborations has been presented in the IJPM, there is no clear indication in research trends that more research has been conducted by multi-national research teams. Thus,

there is still room for collaboration and integration in creating a global PM knowledge asset, and tackling global PM research challenges.

The most frequently researched topics are Human Resource, communication, and procurement management, which is 53% of total PM research over 35 years as shown in Table 3. Integration management indicates almost similar volume of research to procurement management, and it counts 65% of total PM research if the integration management is included. As shown in Figure 2, scope management does not indicate a consecutive research trend, as there were no explicit research topics or keywords related to scope management in 1983, 1987, 1990, and so on. Most of PM research has a fundamental relationship with the scope management, and the relationship has not been explicitly addressed or expressed in the research. For example, a research project examined a new risk management approach or communication processes for better scope validation. In this case, the keywords were mainly related to risk or communication management, although the ultimate goal of the research is to improve scope validation. The ambiguity of keywords cause made it difficult to interpret scope management research trends, and thus it is recommended to explore an article further if there is any ambiguity in PM domain knowledge. In addition to the research trend of the scope management, it counts only 16% of total PM research when the triple constraint or iron triangle (scope, time, and cost management) are only counted.

The quality management gained a momentum in research between 1994 and 1995. As there are needs to develop a quality standard in PM that can be used as a communication base for a global project, the global PM Body of Knowledge and Standard was researched in Australia, Canada, Netherlands, UK, and US in 1995. As a result, quality management gained much attention from PM researchers in various countries. From 2013 onward, quality management has been researched actively in the research topics related to knowledge management. By utilising lessons learned from historical data, a company or industry can strive to improve the quality of their projects, and enhance skills and knowledge of human resources. Subsequently, there is a reciprocal research relationship with quality and HR management, and this reciprocal relationship is fostered and flourished by the technological advancements in ICT tools, including project management information systems and data repository systems. Stakeholder management was added in PM domain knowledge defined by the PM Body of Knowledge 5th edition in 2012. Although stakeholder management is explicitly defined and included in the PM domain knowledge, PM research related to stakeholder engagement and management has been conducted as a subcategory of HR management or communication management before 2012.

The PM research pattern is presented as it requires more integrated perspective of research questions such as quality and HR management or risk and scope management. Furthermore, it is important to examine PM research trends based on a holistic perspective by escaping from an ad hoc and black and white approach. It is evident that there is a correlation between PM research and industry or society. Therefore, the influences of PM research and industry, and how PM research leads industry to project successes by tackling issues can be more clearly understood by comparing the PM research trends to socioeconomic events over the year. As shown in Table 3, there have been global issues and technological advances that have influenced societies and the world. In order to identify the global issues, reports released by the United Nations from 1980 to 2016 were reviewed, and keywords search for matching the PM research and global issue trends was utilized.
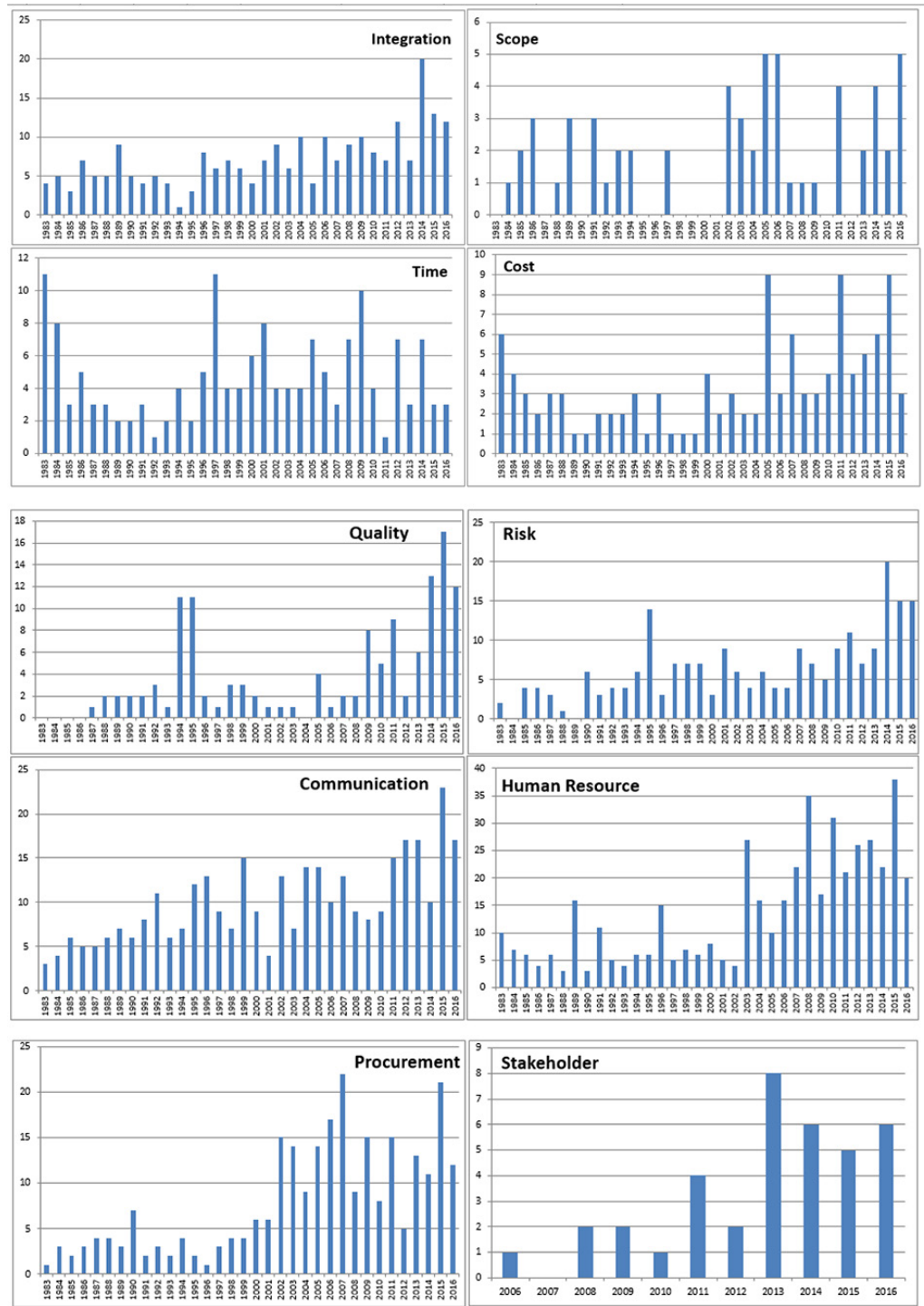
Figure 2   Trends of PM Research based on PM Domain Knowledge

Communication has been researched frequently, and research questions were mainly focused on a specific location or an organization based project, until the internet has become the main medium for communication in the industry. In particular, incremental developments of communication technologies related to the internet were made between 1992 and 1999, and a project team could be dispersed as, they could communicate via internet and video telephone. As a result, research to improve communication among a dispersed project team started,

and the amount of research focusing on communication indicates the increasing pattern in accordance with the events such as the invention of world wide web and the installation of the transatlantic fibre optic communication system. In addition, as there was a prediction that failure of computer based systems may lead the entire world to destruction due to the Y2K bug, increased research on communication management to mitigate miscommunication of information was carried out between 1998 and 2000 as shown in Figure 2.

Various construction projects were initiated, requiring global HR and collaboration, such as the Channel tunnel construction project in collaboration with UK and France in 1986. The terms 'international project' and 'mega project' were presented for the first time in the IJPM in 1991 and 1994 respectively. As new approaches to international projects and mega projects are required, research in industry, HR and project delivery methods for the context have been conducted actively. Consequently, international project management was researched in relation to various PM knowledge domains, including communication, procurement, and quality management in Sweden 1991, and Singapore, UK, and the US in 1992, and this research trend continued from 1994 to 1996 in a broader range of research topics related to quality, integration, risk, HR, and communication management. In alignment with global projects, the global PM Body of Knowledge and Standard researched in Australia, Canada, Netherlands, UK, and the US in 1995.

Table 3   Research trends and socioeconomic events over 35 years

	Integration	Scope	Time	Cost	Quality	Risk	Comm	HR	Procurement	Stakeholder	Socioeconomic Events
IBM released the first PC using MS DOS, and the term 'Internet' mentioned for the first time in 1981.											
1983	4	0	11	6	0	2	3	10	1	0	MS Word released for the first time
1984	5	1	8	4	0	0	4	7	3	0	Apple Macintosh released in the market
1985	3	2	3	3	0	4	6	6	2	0	
1986	7	3	5	2	0	4	5	4	3	0	UK and France announced a plan for the Channel Tunnel
1987	5	0	3	3	1	3	5	6	4	0	
1988	5	1	3	3	2	1	6	3	4	0	The first transatlantic fibre optic cable system installed
1989	9	3	2	1	2	0	7	16	3	0	
1990	5	0	2	1	2	6	6	3	7	0	16-megabit memory chip released

Table 3   continued

Year											Notes
1991	4	3	3	2	2	3	8	11	2	0	a) The first web browser introduced b) The term 'International Project' used for the first time by Sweden
1992	5	1	1	2	3	4	11	5	3	0	AT&T released the first video telephone
1993	4	2	2	2	1	4	6	4	2	0	a) World Wide Web invented b) Human embryo cloned for the first time in US
1994	1	2	4	3	11	6	7	6	4	0	a) The Channel Tunnel project completed b) The term 'Mega Project' used c) Portfolio management mentioned for the first time in IJPM
1995	3	0	2	1	11	14	12	6	2	0	a) Global PM Body of Knowledge and Standard researched in Australia, Canada, Netherlands, UK, and US b) Ebay started the online auction and shopping
1996	8	0	5	3	2	3	13	15	1	0	
1997	6	2	11	1	1	7	9	5	3	0	
1998	7	0	4	1	3	7	7	7	4	0	a) Google founded b) E-commerce via internet began
1999	6	0	4	1	3	7	15	6	4	0	The year 2000 issues as known as Y2K millennium bug became the most critical world wide issues to be tackled
2000	4	0	6	4	2	3	9	8	6	0	
2001	7	0	8	2	1	9	4	5	6	0	Wikipedia went online

Table 3   continued

| Year											
2002	9	4	4	3	1	6	13	4	15	0	The Mars Odyssey (NASA Mars Exploration) found signs of water and ice on the Mars
2003	6	3	4	2	1	4	7	27	14	0	Human genome project successfully completed
2004	10	2	4	2	0	6	14	16	9	0	Building 'Taipei 101' opened in Taiwan
2005	4	5	7	9	4	4	14	10	14	0	
2006	10	5	5	3	1	4	10	16	17	1	
2007	7	1	3	6	2	9	13	22	22	0	Apple introduced the iPhone
2008	9	1	7	3	2	7	9	35	9	2	Bankruptcy of Lehman Brothers
2009	10	1	10	3	8	5	8	17	15	2	The 3rd generation (3G) mobile network continue to grow and enhanced
2010	8	0	4	4	5	9	9	31	8	1	
2011	7	4	1	9	9	11	15	21	15	4	
2012	12	0	7	4	2	7	17	26	5	2	a) Stakeholder Management added in PM Domain Knowledge for the first time b) Project Governance (Program and Portfolio Management) mentioned for the first time
2013	7	2	3	5	6	9	17	27	13	8	Project governance started gaining attention
2014	20	4	7	6	13	20	10	22	11	6	Project governance mainly researched in various countries.
2015	13	2	3	9	17	15	23	38	21	5	
2016	12	5	3	3	12	15	17	20	12	6	
Total	240	58	157	115	129	217	337	463	262	37	Total number of research conducted in each domain knowledge over 35 years
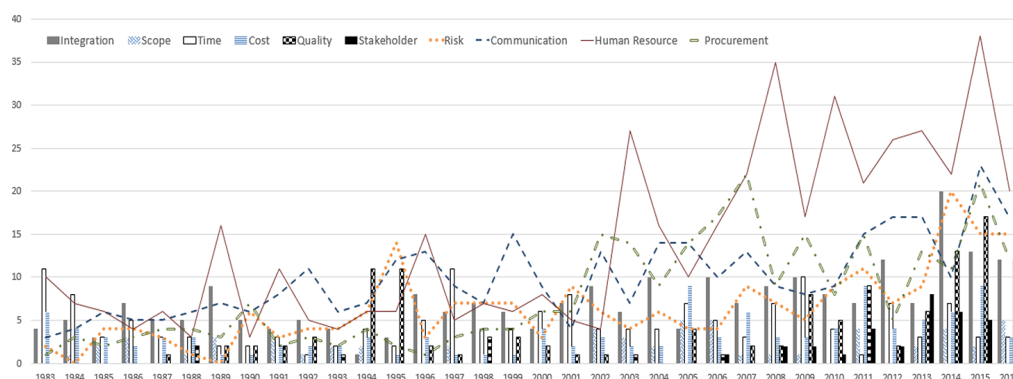
Figure 3   Research trends of PM domain knowledge

Information exchange among project team members through a technological medium was researched in the UK in 1984, and computer based learning for the systems engineering was an outcome of the research. With technology advancements, industry rapidly adopted technologies in their practices, and as one of engineering disciplines, system engineering adopted the computer based learning system for more effective and efficient engineering works in the manufacturing and engineering sectors, such as a fighter jet engineering. As the alignment of project(s) with corporate strategy has become more important, the term 'project governance' has been mentioned for the first time in the IJPM in 2012. Project governance is essential to align various projects with corporate strategy. It requires stakeholder and risk management in conjunction with scope management for portfolio and programme level. To provide a methodology for industry, various methodological scope management research has been conducted. Consequently, the practical needs and demands for industry foster PM research related to project governance, including the integration, risk, stakeholder, and communication management as shown in Table 3. Thus, it is important to recognise a research question in a holistic viewpoint by integrating different PM domain knowledge, and tackle issues in the industry. In doing so, more integrated and practical PM research can be conducted, and contribute to establishing more globalised perspective and practical solution to the industry and society that can enhance the productivity of the industry.

Conclusion

This research attempted to broaden understanding of PM success, and respond to dynamic changes in a global PM context. In order to appreciate PM research patterns and establish a better understanding about PM success, this research aimed to identify PM research topics and trends, and reveal a correlation between global socioeconomic issues or events and PM research trends. A total of 70 countries contributed to publishing 2,015 articles, and the most frequently researched topics were HR, communication, and procurement. 41% (828 articles) of total articles were written based on developed countries including the UK, US and Australia.

For a better understanding of global PM insights, more global collaborations among researchers in both developed and developing countries are required. Based on the finding, it can be considered that PM research topics and the socioeconomic events have a correlation, although the quantified level of correlation is not fully examined in this study as it is outside the research scope. PM research trends have become more globalised, and head toward a multi-national research collaboration. The continuous technological advancements in ICT, which is particularly related to communication, foster research collaboration and emphasize more on the effective HR research through better communication.

It is expected that more integrated and practical PM research will be conducted by various researchers with various nationalities, and contribute to establishing a more globalised perspective and practical solutions to industry for productivity enhancement. This research will contribute to understanding the PM research trends in conjunction with socioeconomic perspective, and serve as a stepping stone to develop further research on PM research trends and correlation with socioeconomic events in a quantified manner.

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CONFERENCE PAPER

Project Creativity: Using Active Imagination for Project Innovation

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ABSTRACT

Project management is essentially about solving problems and getting things done. The ability to imagine is a crucial ability when it comes to finding solutions and actualizing them. This paper looks at how creativity can, on an individual, team and organizational level, be fostered in project, program, and portfolio (PPP) management. The paper defines the human imagination as an essential component of higher order thinking—creative, critical and ethical thinking. It is essential to initiate new projects, deal with problems, enhance job satisfaction and give meaning to work life. The paper investigates a suggested use of Carl Jung´s 'active imagination' as a cognitive method to spark individual creativity and promote "a higher level of personal and collective self-actualization" in project work. It explores how to foster collective creativity in project teams, project management offices (PMOs), departments and organizations. The paper then argues for the centrality of creativity as a means to foster a more critical, ethical and sustainable approach to future challenges faced both in PPP management and for humankind in general.

Keywords

Project Management; project, program and portfolio management; PPP; creativity; imagination

Introduction

PROJECT MANAGEMENT AND CREATIVITY

We are all, including those of us who find ourselves working professionally in project environments (executing strategies through projects, program and portfolio management), constantly thinking about something, except perhaps in those moments when we manage to calm our minds into relaxation. For most of us, however, thinking is rarely a genuinely active and reflective process. The greatest minds among us do more than just to think, they also think about their thinking, and about the thinking process itself. This ability to reflect on our reflections as they are taking place uses our ability to imagine, and our imagination is crucial in managing problems, creating solutions and innovating. The *human imagination* allows for the "synthesis of mental images or content into new ideas and as the process of forming a mental representation of absent objects, an effect, a bodily function, a memory, a situation or an instinctual drive, etc., producing images, symbols, fantasies, dreams, ideas, thoughts and/or concepts. It differs from fantasy, in not being adverse to reality, but instead providing an active means of adaptation to it" (Jonasson 2006).

Those project managers who were responsible for many of the wonders of human history, are not necessarily those most associated with creativity. In fact, many program and project managers see themselves as dedicated process workers. They see the higher order reflection associated with the awareness required for creativity, critical and ethical thinking as something made on a higher strategic level. We can even say (just to rub it in a little) that many project managers do not see creativity as their responsibility. Their preoccupation is with getting things done, providing processes and control, none of which they associate with being creative, innovative nor fun. This leads to a professional limitation as project, program and portfolio management are one of the greatest opportunities for pragmatic higher order thinking. And imaginative higher order thinking is one of our most important tools for innovation and problem solving. In this paper, we will explore how project managers could think about their thinking in the interests of project creativity and innovation.

LITERATURE REVIEW

Creativity or the ability to use the imagination has traditionally been associated with individual geniuses who possess something of a godly inspiration (Berman 1999; Montuori & Purser 1995; Wittkower 1973). Ziauddin Sardar argues that "The most important ingredients for coping with post-normal times are imagination and creativity" as these are our only ways for "dealing with complexity, contradictions, and chaos." Alfonso Montuori argues "Imagination is the main tool …, the only tool, which takes us from simple reasoned analysis to higher synthesis. While imagination is intangible, it creates and shapes our reality; while a mental tool, it affects our behavior and expectations." And he argues that we need to imagine ourselves into a new future, in which quality will at times "depend on the quality of our imagination." Sardar suggests "given that our imagination is embedded and limited to our own culture, we will have to unleash a broad spectrum of imaginations from the rich diversity of human cultures and multiple ways of imagining alternatives to conventional, orthodox ways of being and doing." (Sardar 2010). Traditionally "research on creativity focused on the three Ps: person, process, and product" (Runco 1999; 2004). The "person was mostly a lone, eccentric genius". Traditionally it was the individual who was the creative *force* while groups, organizations, institutions, and society stood for a convention, conformity and compliance. To

become creative, the individual would have to transcend these obstacles (Montuori & Purser 1995). The creative function (the creative *how*) "consequently occurred exclusively inside the individual, and the creative process was viewed as a solitary process. In this individualistic view, relationships and interactions were not taken into consideration" (Montuori 2011). The innovative product (the creative *output*) "was typically a major contribution to physics, a symphony or transformative work of art". The arts and sciences were creative venues or the creative *medium*, and it did not belong in others (Montuori 2011). Such a notion of individual creativity is poorly applicable to creativity in project teams, project management offices, and project driven organizations.

These ideas of creativity see it solely as an individual subjective phenomenon during moments of inspiration (Montuori 2011). The scientific world view focuses on objectivity and order, whereas and creativity was associated with the subjectivity and disorder (Toulmin 1992). Science struggled to account for creativity until in the 1950s, and Karl Popper focused on scientific justification, undermining the speculative, subjective and introspective as non-scientific (Popper 2002). Even though in classical Greek the terms for art (gr. arte) and technique (gr. techne) are synonymous, historically there has been a division between arts and sciences: with supposed reason and objectivity on the one hand and the intuitive, subjective, speculative on the other. So for the majority of that time, the individual was the source of investigation when it came to creativity, and the collective creative environment was not (Montuori & Purser 1995; 1999). The creative, innovative genius emerged and instructed others to implement their innovative projects and programs.

Creativity can also be inconsiderate and even harmful. It is, of course, questionable whether we should call a creative undertaking 'creative' if these 'creative' ideas involve undermining and hurting others, not to mention ignoring the needs of our natural environment and ultimately damaging our planet. The purpose of engineering has been to apply and exploit an understanding provided by the natural sciences of how nature operates. At its best this creativity aimed at making the world a more accommodating place for all; sometimes benefitting many, at other times only the malicious and selfish who use technological advancement to oppress, destroy and kill. It is relatively recently that engineering has come to the acknowledge that many of its creative ideas have in fact, in the long run, been ethically borderline and undermine sustainable living on planet Earth. We have yet to see engineers turn their back from undertakings associated with the arms industry and do something ethically creative. Academically little has been done as to apply the method of *active imagination* to the world of management; whereas the management world has taken fascination with mindfulness as an approach for better self-management and stress relief.

It was that Swiss psychiatrist Carl G. Jung who defined the active imagination method in his essay 'The Transcendent Function' published in Vol. 8 of his Collected Works under the heading *The Structure and Dynamics of the Psyche* (Jung, 1916/1970). More references to the method as a psychological process can be found in Irvine 2010; Franz 1997; Chodorow 1997; Hannah 1981; Johnson 1986; and Punita 2013) and Patricia H. Werhane talks about the importance of imagination management ethics in her book *Moral Imagination and Management Decision-making* (1999).

Creativity and innovation demand that we look at things from both a subjective and an objective perspective. The PPP management profession has linked itself with objective and order driven scientific culture. This shift in our understanding of the creative process might indicate a transcendental shift in human history. "When there is full parity of the opposites, attested by the ego's absolute participation in both, this necessarily leads to a suspension of

the will, for the will can no longer operate when every motive has an equally strong counter-motive. Since life cannot tolerate a standstill, a damming up of vital energy results, and this would lead to an insupportable condition did not the tension of opposites produce a new, uniting function that transcends them. This function arises quite naturally from the regression of libido caused by the blockage." (Jung 1970). On the same line, "The tendencies of the conscious and the unconscious are the two factors that together make up the transcendent function. It is called "transcendent" because it makes the transition from one attitude to another organically possible" (Jung 1970).

So, in the same way as the transcendental function described by Carl Jung, psychology kicks in within the individual psyche. In situations where the dissonance associated with reconciling these opposing ideas and the consequent tension will force a mental shift, independent of whether or not the person wishes to change. We speculate given the current state of affairs whether we might see a similar transcendental change at a more collective level; in the collective psyche of humankind. Research into all kinds of creativity, innovation, deeper understandings of psychology, online interconnections militates increasingly for a more relational and open approach to creative collaboration (Morin 2008). This trend was started by postmodernism, which "led to new ways of conceptualizing self, society, production, art, science, and creativity". Building on these foundations, the 21st century holds strong promise for creativity and innovation that is paradoxically based both on more intimate personal exploration and at the same time in a more inter-relational interplay (Kearney 1999; Rosenau 1992; Sardar 1999). Biomimicry and ecological design is creativity and innovative engineering inspired by nature. The intention to dominate and exploit is transformed to learning and "collaborating with nature to deal with our future challenges" (Todd 2006; Montuori & Conti 1993). Such creativity is both relational and contextual, and the environment becomes integrated with creative process and product (Montuori 2011). Such an approach could be fascinating in the context of future PPP managing of creative work.

Individual Creativity in Projects

A very creative mind is not necessarily innovative. If imagination is to be used for innovation, there must be a balance between the creative process and the application of creativity outcomes. Innovation demands both creative ideas and their implementation; as innovation is translated into a reality where things get done. Those who succeed in the cultural domain, such as writing, painting, dancing, acting, and the fine arts do not just sit and think. They perform and make things happen. All creative work requires planning, even if the planning is directed towards organizing creative moments and inspirations in an "off-time" from daily routines. One method (of many) that can be used to manage the creative process, and a method that project managers can use to stimulate their creative thinking is the so-called *active imagination*. Active imagination is a psychological method that uses the human imagination for understanding and creativity, a method that correlates with many within philosophical, religious and spiritual traditions. But even though well known since antiquity as a method to delve deeper into the deeper layers of the mind, the term was defined by the Swiss psychiatrist Carl G. Jung in his essay on 'The Transcendent Function' published in Vol. 8 of his Collected Works under that heading *The Structure and Dynamics of the Psyche* (Jung, 1916/1970). Patricia H. Werhane talks about the importance of imagination in her book *Moral Imagination and Management Decision-making* (1999). When discussing Adam Smith´s *Theory of Moral Sentiments* (Smith 1759), she says: "The role of Imagination is crucial in understanding Smith´s concept of sympathy and, indeed, his whole moral psychology. Smith claims that each

one of us has an active imagination, which enables us to recreate another's feelings, passions and point of view. In this imaginative process of sympathy one does not literally feel the passion of another; rather one understands what another is experiencing from that person's perspective" (Werhane 1999). According to Jung, "active imagination is a meditation method where the contents of one's unconscious get translated into mental images" of various kinds (symbols, personas, things, etc.). It creates a "bridge between the conscious ego and the creative self" through the means of the human imagination. Active imagination is a method that enables its practitioners, both for more intrapersonal and interpersonal maturity. It is hence an add on to the more popular method of practicing mindfulness, enabling for a more advanced psychological exploration.

To explain the practical application of the method for project managers and project teams, let us begin with a brief definition of two concepts of classical psychiatry, namely the concepts of *primary process thinking* and *secondary process thinking*. The thinking mode usually deployed in conventional project management, and in the world of management in general, would be classified as *secondary process thinking*. This thought process is conscious, logical, orderly, critical, purposeful and goal oriented, and directed towards planning, task achievement and problem solving. These are the characteristics of our conscious mind; in many ways significantly limited when compared to the sub-consciousness because we constrain it with the requirements of our environment and to the resolutions of specific tasks. In that context, our thoughts remain generally linear, and we keep our awareness free of creative diversion which is a further drain on our creative energy. In fact, we are therefore not very creative or free in this conscious state, which focuses instead on the need to plan, organize, and behave appropriately. Secondary process thinking is good for its purpose, and essential to deal with our lives, and in managing teams, organizations and society.

However, to use *active Imagination*, the manager would be encouraged to connect with what is called *primary process thinking*. The content of the primary process thinking is the primordial, unruly, mythical and sometimes surreal thoughts we associate with our fantasies and our nighttime dreams. *Primary process thinking* is not logical (even though it has its logic); it is not time bound. The link between cause and effect is often blurred; it may combine and mix elements that are in no way related. In the primary process experience, anything can happen. This process, processing or experience can range from being frightening to being exceedingly creative and rewarding. In fact, many people experience the primary processes not so much as actual thoughts (associated with ideas and language) but more as mental images that seem to enter consciousness spontaneously; and in the most troublesome cases and psychosis, where these processes take totally over, and that is not ideal for practically minded project managers.

So, how to make use of this in project management? On an individual level, the practical application of the active imagination involves first making use of the creative power of primary process thinking and then using the secondary process to apply new mental material that surfaced from the sub-consciousness and invent something new. This new thing can be new products, new processes, new decorations, new approaches or it can even enable a spontaneous shift in your take on life. Also, when dealing with problems where the project manager feels totally stuck, it can be wise to hand the issue over to the primary processes to deal with it. This would mean to really fill the cognitive mind with the relevant information and then take a total break from the problem; and see if the internal processes of the involuntary mind brings a solution. This means allowing the mind to work on the issue on a deeper level and this is, in fact, what Albert Einstein did when struggling to find a solution to a problem, a solution that we now know as the theory of relativity, and this might be the idea behind the expression

"sleep on it". What the conscious mind could put together, might come together in the subconscious.

The active imagination method takes advantage of the links that exist in the creative life of our sub-consciousness. If you, as an individual (PPP manager or PPP team member), want to become more creative by harnessing your active imagination, then follow these steps that are inspired by a take on the subject by Ann and Barry Ulanov (Ulanov & Ulanov 1991), and let us name the project manager who is eager to master the active imagination method Susan:

1. The active imagination process begins as Susan tries to discover how best find a quiet time and space where she can shut out the noise of everyday life and allow herself to get in touch with the primary process thinking within her mind. This is what is often referred to connecting with the 'unconscious', 'sub-consciousness' or the 'dream world', which is the subjective reality that most of us experience mainly in our dreams (if we dream at all or can remember our dreams) or when in between being asleep and awake (such as when snoozing). Once Susan´s conscious mind—her thinking mind—quiets down, she tries to pay attention to anything that surfaces into her consciousness; any thoughts, effects, or mental images. The connecting process is essentially passive; Susan is not 'doing' anything, and not trying to 'do' anything, she is—just like when practicing mindfulness—relaxing and emptying her conscious mind and then waiting to see what happens. With a bit of practice, Susan will gradually decrease the activity of the secondary process thinking and increase its primary process activities, and it is then that new things start to surface. For many objectively and practically oriented people, it is challenging to stay on in this level of consciousness; but the key is to simply watch what appears and frame any imagination, involuntary thoughts, emotions, and new ideas.

2. Once Susan becomes able to adopt her primary process thinking mode, she should be encouraged to practice it regularly, for instance, once a day. She will then gradually learn to the recognietion that once she surrenders her attention and abandons the need to be constantly in a secondary process thinking mode, imaginary wonders start to appear. In this state, anything can happen, and creative ideas surface and flood the mind. Susan may see interesting things, meet strange characters, and things, people and places might fuse together. Ideas, or mental images, of new approaches, new tools, and artefacts of all sorts can appear, and all kinds of incidents occur. Susan should also be advised to be careful not to fall asleep, as she will need all her available attention to be able to grasp the activity streams that are taking place. So, Susan should simply relax into the dream world, but stay attuned and be wary. An integral part of this step would be for Susan also to focus on remembering her dreams by writing them down as soon as she can after she awakens, and take some time to explore their content. Once the ability to enter this inspirational dreamlike stage has been mastered, Susan will be able to enter this dream world for new ideas whenever they are needed.

3. We have seen that in steps (1) and (2) Susan was supposed to be relatively inactive, but the inactive part of the work is now finished. In this stage, Susan is advised to become active by looking at each of the mental images, ideas and inner experiences that surfaced as something very real and meaningful that should now be given an external form. Susan can do this in a variety of ways: by discussing the experience with others, by writing it down, by drawing it as a picture or a chart and (for the wildest of project management practitioners such as the authors of this paper) she can express it as music, in a motion such as dance, or in any kind of a playful act. If Susan is shy towards the arts and wants a more down-to-earth perspective, she should try to design or construct

the imaginings as an object, model it, build it, and so on. In other words, translate the psychological material into an expression of the idea, and then see how it might benefit a current project; or even lead to another project.

4. On the same lines, Susan should take time to record in writing any dreams or even daydreams, and describe the various feelings and fantasies she is experiencing. Primary process thinking generates imagination, emotions, and thoughts as a mish-mash of imagery and impressions. Susan should consider these carefully, not simply to interpret their meaning, but also to just examine the images, emotions, and feelings they provoke. All of this activity is connected, albeit in Susan´s subconscious to her living reality; a dream can have a strong connection to reality, as a mean of mental processing of your experiences during the day (the remains of the day). The dreams also seem to make compromises to instinctive expressions (such as sexual or aggressive tendencies) through symbols, they seem to process experiences and work through problems and even proposes solutions to the conscious mind. In particular, Susan should be alert for any clear symbols (for instance 'the boat', ´the bus', 'the river' etc.), images of all kinds (or whatever), feelings and emotions (such as delight, fear, uncertainty, etc.) and for any new insights that might enhance creativity. Further, Susan should try to sharpen these imaginations by amplifying them as symbolic manifestations; that is take them seriously as a *reality* and try to work with them in her waking life (for instance, as has been mentioned draw pictures of them, but also read about them, Google them, find pictures of them in magazines, etc.). Most of all, Susan should try to be as open to whatever she can be learn from these imaginings; and this effort also helps her to remember their creative and innovative contents. Susan, hence, now not only approaches her work with only an engineering mindset but also as an artist that can take full advantage of creative in her daily professional life.

The practice of active imagination does not have to take long, and once Susan has mastered the skill, she can benefit greatly from just 10-15 minutes a day dedicated to this purpose. Her goal is now to harness the uncritical layer of her mind and explore its unconscious knowledge through an intimate engagement with primary process thinking; it is only after the primary processes have had their say that the creative content generated should be practically evaluated and developed by using the secondary thinking mode.

Some people who are very creative people, such as a guy that we will name John, can get stuck in the primary process thinking, leaving very little space for secondary process thinking. This has clear disadvantages, as it may negatively impact John´s ability to take advantage of the unconscious for personal growth, professional development, creativity and the innovation of new things. In the most serious cases, such as if John suffers from a mental health issue that relates to the ability to manage the borders between the conscious and unconscious mind; the primary processes could take over completely, and John falls prey to the early stages of psychosis. It is very dangerous when a person has no control over unintentional thoughts, emotions, and actions. The consciousness that has a natural ability to deal with reality by maintaining a balance between the primary and secondary processes of the mind can even collapse under such influence, and lead John astray from others. This is not very common, but it can happen; anyone who tries to use active imagination for creative purposes should be well aware of that, and seek professional support if needed.

Having said that, the advantage of getting in touch with the subconscious mind is that it can be very creative, and this creativity is precisely needed to encourage and stimulate innovation. Caution is needed in deploying primary process thinking to approach the

unconscious. You need both to be very receptive and also have enough stamina to take advantage of the unleashing creativity. If the stamina of the consciousness is sufficient, secondary process thinking will be able to utilize primary process thinking as a creative aspiration, and use its ability to design, plan, execute, control and testing, for the more innovative part of the process.

Project Team Creativity

We have described the active imagination as an individual activity. It can also be expanded to project teams, PMOs, organizations and even larger communities. We do not simply have access to the creative fountains of the unconscious mind as individuals. People can also tap this resource collectively, and for the rest of the paper, we will look at the prerequisites for more collective project creativity.

Teams, organizations, and societies do—just as individuals—operate on two levels: the conscious level and the unconscious level. Social convention and natural reticence encourage most of us to contain, hold back and even completely dismiss the disordered thinking, feeling, and emotional subconscious forces that are ever present when people are working together. Again, explorations into this creative realm are left to the 'artist' and are rarely associated with project management and the management of organizations. This is understandable, and we need order and the secondary process mode of thinking to get things done collectively. However, it might be more rewarding, more meaningful, more exciting and more motivating to open ourselves up together a little to the gifts of the primary processes.

As stated before, creativity research is increasingly focused on everyday creativity that can potentially take place everywhere. There is also an increasing interest in group creativity, creativity in teams, collaborative creativity, and the collective, the wisdom of crowds (Sawyer 2006; Montuori & Purser 1995; Montuori 2003; Barron 1999; Paulus & Nijstad 2003; Surowieck 2005).

New online networking technology that enables global collaboration can take such creativity to a whole new level (Jenkins 2008). The implications of deeper (active imagination) and collaborated project creativity can be seen in sciences, business, the arts and in sustainable development. (Amabile 1998; Amabile et al. 1996).

Traditionally project management is originating in management by objectives which were rarely creative or innovative. Taylor "discouraged communication, essentially working on a divide and rule principle". The Organization as Machine was Taylor's guiding metaphor, and at that time machines were required neither to innovate nor to collaborate (Montuori 2011). The beauty, however, of project based work is that it is grounded on team participation and networking. Project management is a relational approach to management, and that in itself can lead towards more creativity. If well managed with acknowledgement of the reality of the primary process, project teams are a very natural platform for creativity and innovation. Highly innovative organizations encourage "creativity that is a distributed, participatory process", and ideally every member can innovate (Sawyer 2006; Shapero 2004; Schrage 1999).

Collaborative imagination stimulates collective team creativity. It requires a very open relational approach where, for instance, special consideration should be paid to inclusive individual participation that otherwise convention might hold back, such as involving women, less-experienced members, minorities, young or old people. The focus in sessions that aim for collaborative creativity should primarily be on the creative process and active imagination, and not on plans, technology, and utility. Then when new ideas have been worked with solely for

a creative purpose, they should be critically analysed and their ethical implication carefully examined. The deployment of critical and ethical thinking adds then to the creative process; and this circular iteration from the primary process (creative thinking) to the secondary process (critical and ethical reflection) can be repeated over and over again. In this way, the critical and ethical mindset of the secondary process thinking becomes an aspiration that sparks even more creativity. What we suggest is to encourage collaborative community sessions, where individual project team members share creative insights that are then openly discussed and common themes mined. Scenarios can open the team to creative outcomes and spark the collective imagination. Creativity, based on the human imagination, is a vital human capacity for the professional project team. In depth individual creativity through active imagination and collective, collaborative, participatory creativity can contribute on a team and/ or an organizational level.

The role of modern professional project management could be to encourage this 'everyone,' 'every day', 'everywhere' creativity towards what Montuori describes as "worthy human aspirations." The emerging contextual, collaborative, and participatory forms of creativity have implications for the future, and for how the project management profession should envision the future.

The project management profession is in a key position to impact decision making on the road towards the future, and give direction to understanding within businesses, NGOs, industry, institutions, and government of what success, progress development, and sustainable future mean. The discipline can use the understanding of the human capacity for complexity through professional education and imagination (Morin 2001.; Morin 2008). *Complex Thought* is a form of "thinking that embraces paradox, complexity, and uncertainty" which looks at complexity without simplistic reduction, polarization, and engagement in complex dialogue (Morin 2008).

When project managers and project teams face complex, chaotic, and contradictory issues, they need to have a supreme ability to dialogue in a creative, critical and ethical way. Project managers should reinvent themselves as experts in creative participatory collaboration, involving simultaneously use of the primary and secondary thinking processes that are at play. To do so, they do need to navigate, and make innovative and constructive use of their imagination, and understand well how it works in others.

Conclusion

We have argued for a stronger focus on creativity in project management, both individually and collectively. PPP management should aim for an approach to creativity that makes the broken whole, respects diversity and shows awareness of interdependencies. PPP should aim for higher order thinking where a creative, critical and ethical approach goes hand in hand. Active human imagination is crucial in dealings with a modern worldview and the creation of a sustainable future. Creativity is one of the three pillars of sophisticated human deliberation, the others being critical thinking and ethical thinking. What we are suggesting is to encourage community collaborative creativity sessions where individual project team members share creative insights that are then openly discussed and common themes mined. Creativity is not simply limited to artists, geniuses, architects and innovative designers. It is a fundamental ability that should be an integrated part of all PPP management, and strongly linked with critical and ethical reflection and decision-making ability.

The creative project leader develops as he or she begins to read their feelings and examines their premise by logic, and when he or she can use creative pictorials of the mind constructively. This is a form of creative work that makes the project leader more capable of making decisions; decisions that are informed by both the conscious and subconscious, the rational and the creative. Once we have learned to activate our original thinking, we take a moment at any time and seek new creative insights. But plugging into the primary process thinking mode is not enough. In order for creative endeavours to become innovative, we need to mobilize our creative powers and then make use of the insights that emerge. That is where new programs and projects; and new paths for both personal and collective self-actualization are born. An active imagination can be used for creativity, innovation, inspiration and ultimately self-realization; a process that involves recognizing what makes each one of us individually, while at the same time enjoying the common qualities that characterize the soul of all people. It leads to an in-depth conversation on the very private, intrapersonal level as well as a collaborative interpersonal level. Through our imagination, our mind can distinguish, discern, connect, fuse, and reframe the world we inhabit in ways that both surprising and useful.

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Impact of Project Managers' Positive Ways of Thinking on Project Success - A Case Study of a CSR Project of Incheon Bridge Company

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"Life is one big project, the trick is in managing it" (Maylor 2010). Life is one big project that draws upon various projects filled with hopes and dreams. Human beings want to realize their dreams through Project Management (PM). PM has been developed and spread around the world for decades, with international organizations such as IPMA founded as a way to realise uncertain future possibility as concrete reality (Bredillet et al. 2014).

However, existing studies of PM present several issues, because their focus is only on empirical studies of management methodologies to achieve goals, i.e. analysing the outcome of substantive phenomena (Smyth & Morris 2007). This is largely due to a dependence outcome. A lack of consideration of the project manager's perception is the cause of the phenomena (Kim 2015). Because a project manager is, in fact, the principal actor who plans, executes, and manages an overall project, the non-inclusion of the project manager's perception has caused the outcome of PM to fall short of expectations and has inhibited its growth (Bredillet et al. 2014; Kim 2015).

To overcome the factors that limit the growth of PM and then to resolve issues, it is necessary to include the project manager's perception in the management domain and study the manager's ways of thinking along with the existing empirical management methodologies.

First, the study of the project manager's way of thinking can complement existing empirical studies of management methodologies, which have presented limitations in fulfilling the developmental desires of project managers (Ahlemann et al. 2012; Ellmann et al. 2007). Second, recently the definition of project concept has expanded to include project managers' worldviews and their ways of thinking, but this is still in the initial stage of development. In that sense, the newly developing concept can be a basis for overcoming the inhibiting factors of PM and resolving relevant issues (Ellmann & Månsson 2009; Kim 2015). Third, the new approach can contribute to expansion of perspective and the sustainability of PM by embracing a more multi-dimensional and comprehensive thinking. This can be viewed as an entire process, apart from existing empirical management methodologies which are dependent mostly on the outcome of project phenomena (O'Leary & Williams 2013; Söderlund 2003; Kim 2015).

Based on the needs described above, this paper uses a literature review on human perception to identify the positive way of thinking that a project manager should have, and the impact of ways of thinking on project success. This paper seeks to highlight the importance of a project manager's way of thinking through the case study of Incheon Bridge's Corporate Social Responsibility (CSR) Project.

Characteristics of the CSR Team of Incheon Bridge Company

Incheon Bridge is connecting "Yeongjong Island, where Incheon International Airport is located, to Songdo International Business District", with the overall length of 21.4 km (Incheon Bridge Co., Ltd. 2018). Incheon Bridge Co., Ltd. manages the Incheon Bridge Project as a single project, and yet it embraces three projects which are financing, construction, and operation and maintenance (Kim 2015).

Incheon Bridge Co., Ltd. organized the CSR Team in 2015 with the intention of assuming full corporate social responsibility by interacting with local communities. The team comprises six people (three men and three women). According to a division of work based on PM methodologies, each member of the team is a project manager who is involved in planning, execution, and monitoring of their respective responsibilities about CSR.

Incheon Bridge Company's CSR Projects

Incheon Bridge Company's CSR activities can be largely divided into regular and non-regular projects. The Animal Sanctuary, created to promote a sense of empathy for animals among local residents, and the Therapeutic Horsemanship Centre, designed to improve the quality of life of mentally and physically challenged people, are permanent projects. The Animal Sanctuary (locally called *Dodam Dodam Dongmul Nuri*) of Incheon Bridge Company offers a shelter for animals in crisis, such as those who have been abandoned or abused, to ensure their happiness, comfort, and activity. The sanctuary offers animal welfare education for local elementary school students and other local community groups, and allows people to volunteer, be a part of the healing process of the injured animals, and share joys and sorrows. The Incheon Bridge Therapeutic Horsemanship Centre helps mentally and physically challenged children and teenagers improve their cognitive, social, and physical health through activities with horses. In addition, local residents and employees of Incheon Bridge Company volunteer at the Therapeutic Horsemanship Centre to provide love and care.

The company is also involved in a variety of CSR activities, including the annual kimchi sharing event organized by employees, the Donation of Mufflers of Love event, in which

employees and their families give hand-made mufflers to the disadvantaged, free legal counselling services for local residents, local tideland preservation activities, and an orchestra comprised of mentally and physically challenged people.

The CSR projects of Incheon Bridge Company are great examples of how a project manager's ways of thinking influences project success because, despite the entire process of planning, execution, and management following the PM methodology, the projects' potential (purpose and goal) is not always matched by their practicality (outcome).

Literature Review

Albert Einstein overthrew the Newtonian world view that dominated western thinking for two hundred years, causing a paradigm shift to the new science of the 20th century. Through the statement "We cannot solve our *problems* with the same *thinking* we used when we created them," Einstein underscored the importance of ways of thinking. In addition to Einstein, leaders of the era that led innovation for the growth of human community studied human perception to find how ways of thinking can help to improve and develop a given situation. Such movements can also be found in the PM domain.

IPMA's Individual Competence Baseline (ICB) is used as to develop the individual competence of managers and enhance project outcomes (IPMA 2018). Changes in the competence elements of the ICB and their breakdown are indicative of the concern about reflecting manager perception in PM. The following table tracks ICB's changes in the breakdown of competence elements and the elements related to perception.

Table 1   Changes in elements related of perception in various versions of IPMA's ICB

Classification	ICB 2.0 (1999)	ICB 3.0 (2006)	ICB 4.0 (2016)
Breakdown of competence elements	1) Knowledge & experience 2) Additional elements	1) Contextual competences 2) Behavioural competences 3) Technical competences	1) Perspective competences 2) People competences 3) Practice competences
No. of elements	42	46	29
No. of elements related of perception	1	6	3
Percentage of elements related of perception	2.38%	13.04%	10.34%

- Looking at the changes in the competence elements, there was only one element related to perception in the ICB 2.0, but this number increased to six in version 3.0, and then went down to three in version 4.0. But in the ICB 4.0, the perceptual aspect was deepened by the addition of self-reflection, a philosophical element.
- The percentage of elements related to perception in the overall competence elements is over 10% in ICB versions 3.0 and 4.0. Compared to the 2% in ICB 2.0, this reflects the deeper consideration given to elements related to perception.

- Looking at the changes in the breakdown method, what was empirically expressed as knowledge, experience, and behaviour in ICB 2.0 and 3.0 is expanded into perspective and people domains in ICB 4.0.

However, despite changes in the IPMA's ICB, there are limitations in view of a small proportion of the elements related to perception and a lack of in-depth study of managers' ways of thinking. Though managers' ways of thinking clearly have an effective impact on project success, the current PM domain does not consider it a variable, leaving it in a blind spot (Scharmer & Kaufer 2013). From a philosophical and business perspective dealing with the importance of thinking, this paper seeks to investigate the positive ways of thinking and the process that project managers should use.

Emotional Thinking – Intelligent Thinking – Rational Thinking

In the branch of epistemology dealing with human perception, much research has been conducted on how human consciousness works, including aspired ways of thinking. Through analytical research into human thinking, the epistemology of the Western philosophical tradition—encompassing the works of René Descartes, David Hume, Immanuel Kant, and Georg Wilhelm Friedrich Hegel—broke down cognitive activities into several stages to explain how human consciousness works.

Hegel perceives our spirit as a phenomenon, and that viewpoint is perceived as a concept (Hegel 1807/1977). Hegel depicts the process by which perception attains truth through experience, stating that consciousness, which starts from sense certainty, undergoes a number of phases including scientific knowledge and rational social consciousness (Hegel 1807/1977). As the source and the first step of consciousness, the senses are important in that they assist with the making information of memory. However, judgment that depends upon the pure subjectivity of the senses can cause errors of perception that can trigger behaviours based solely on partial and superficial aspects of phenomena. Scientific intelligence shows the limits of mistaking the universal concept as the essence of the concept. Thus there is a need to develop a sense of certainty and scientific intelligence that can cause errors of perception in rational thinking through the dialectical movements of consciousness and self-consciousness.
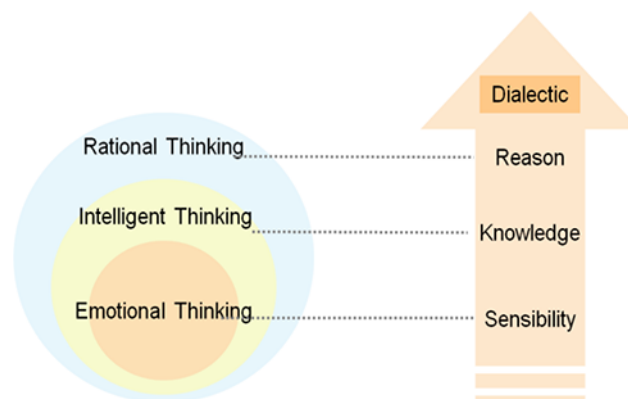

Figure 1   Drawing showing growth from a sense of certainty to scientific knowledge and rational social consciousness

Open Mind – Open Heart – Open Will

Professor Scharmer, Dr Senge, and other pioneers in business administration innovation interviewed more than 150 leaders and entrepreneurs over 18 years, and became actively involved in the transformations of various businesses, government organizations, and local communities. What they learned from their work is that "the quality of our results in a system is a function of the perception from which the people in that system operate" (Senge et al 2008). Because social systems show completely different structures and movements depending on people's perception levels, one must change current thinking patterns to create a fundamental change for the emerging future (Scharmer & Kaufer 2013).

Professor Otto Scharmer proposed the *U Theory* as a process to change old thought habits. According to the *U Theory*, the first instrument is an *open mind* to take in objective and factual information and "suspend old habits of thought"; the second is an *open heart* to have the "capacity to empathize, to see any situation through the eyes of someone else"; and the third is an *open will* to have the "capacity to let out the old and let in the new". On that journey, at the bottom of the U, people sense the possibility of the upcoming future, realise it, and acknowledge "presencing" (presence+sensing) (Scharmer & Kaufer 2013).
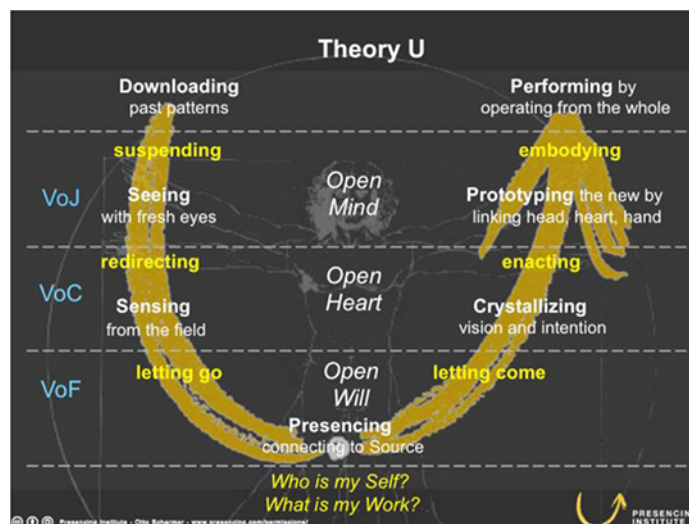

Figure 2   Drawing expressing the U Process of sharing and creating together. Source: *Leading from the Emerging Future (From ego-system to Eco-System Economies)* by Scharmero & Kaufer (2013)

Based on the above literature review, this paper made a case study of a CSR project of the Incheon Bridge Company to see how project managers' positive thinking processes and habits of thought are effectively applied in the PM domain, and how they impact project success.

Methodology

RESEARCH METHODOLOGY

To understand the impact of a project manager's positive way of thinking, Incheon Bridge Company's CSR project managers were interviewed in order to analyse how they think their perceptions have changed when overcoming difficulties. Based on the results of the interviews, the interviewees' most challenging experiences of the past year were selected, and in-depth

interviews were conducted, focusing on their perceptions and changes in their thoughts in order to develop a cognitive approach.

Results

PROBLEMATIC SITUATION

As stated above, one of the Incheon Bridge Company's CSR projects is operating the Therapeutic Horsemanship Centre to improve the welfare of mentally and physically challenged people in local communities. The CSR team considers taking care of the horses and keeping them healthy to be very important. This is because participants in horsemanship activities need to interact with healthy horses with balanced gaits and good temperaments. However, some employees in the same company denigrated the team by defining the CSR team as doing a petty job, and publicly stated that taking care of horses is just cleaning the horses' manure.

This situation was not only a serious problem for the CSR team, but also for all the other employees. Therefore, every employee perceived the problem seriously, defined it as a 'whole company' issue, and put effort into preventing the reoccurrence. Though the problematic situation itself presented a significant challenge to the project managers, the managers were able to overcome the situation through positive ways of thinking. This paper seeks to analyse the entire process with a cognitive approach.

PERCEIVING PROBLEMS - SHIFT IN THOUGHTS – WILL TO CHALLENGE

The case study showed that the managers' perceptions, which were mainly emotional in the initial stages, began to change as they underwent a process of frustration and introspection through communication with the community, and *perceived the problem*. Through *shifts in thoughts*, managers were able to see the problem in terms of universal values, and the shift made managers feel more empathy, then raised the possibility that the community would reach a consensus. The managers' perceptions go to self-reflection from the overall viewpoint of the community. Managers recognised that they are subjects and objects at the same time as a member of community. Afterwards, the managers reached to a point where subjectivity and objectivity became one in a new cognitive aspect. The managers gained the instinctive *will to challenge* to resolve the problem and drove the projects to success through the processes of setting a goal, carrying out the execution and management plans, and monitoring the outcome.

This paper seeks to present in detail the results of a case study on Incheon Bridge Company's CSR project by looking at how the managers' thoughts have developed after a problem occurred; from *(1) perceiving the problem, (2) shift in thoughts, (3) will to challenge*, and lastly project success.

PERCEIVING PROBLEMS

The CSR project managers viewed the operation of the Therapeutic Horsemanship Centre as an important project for enhancing the welfare of mentally and physically challenged people in the local communities, and had worked hard to achieve their goals. They were quite shocked when they first encountered the problem and couldn't get away from emotional thinking. They were experiencing several negative emotions, such as a sense of being betrayed by their colleagues, unpleasant feelings that their hard work had been underestimated, and a sense
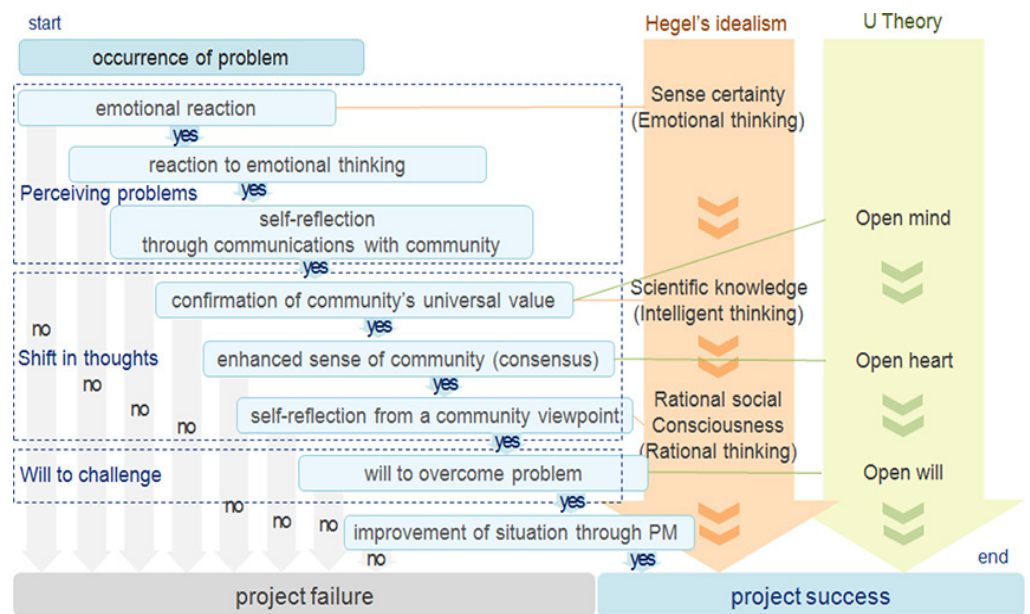
Figure 3   Concept map comparing the results of literature review and case study, and
matching perceiving problems, shifts in thoughts, and will to challenge

of being misrepresented, as well as doubts about work they had once been proud of, loss of enthusiasm, anger, sorrow, depression, and resentment.

In general, a project manager can choose one of two courses when faced with a problem. They can either shrink or return to a past behaviour pattern that is sure to end up in failure, or *open their hearts* and lead change in the direction of future possibilities (Scharmer & Kaufer 2013). The CSR project managers opted for the second course and expressed themselves in response to the situation.

This led to active communication within the company, including the CSR team. In that process, the project managers became aware of the need for self-reflection, which they were unaware of when their thoughts were emotionally driven. To their surprise, they realized that some members of the community did not share the purpose and values of the CSR project. By perceiving this problem, the managers were able to shift away from the negative emotions about those who had belittled their project to more positive and universal thoughts that a solution was necessary.

SHIFT IN THOUGHTS

Through a shift in thoughts, the project managers were able to see the problem based on the universal values of the community. This process allowed them to *open their hearts* to the community domain and gain increased empathy (Scharmer & Kaufer 2013). The managers examined themselves and realized that, from the community's perspective, they were both subjects and objects as one of community, they were able to reach the stage of rational social consciousness where subjectivity and objectivity become one in a new aspect (Hegel 1807/1977).

In this process, the managers were able to see members of the community as part of a larger picture, which was something that they could not see before. They realized that those who had belittled their project were also members of their own community and that, if they had shared the values and visions of the project, the incident would never have happened in the

first place. The managers couldn't bring empathy through communicating proactively with the community due to their uncertain awareness of purpose, caused by lack of confidence. Also, the managers' *will to challenge* naturally developed to solve problems and ensure the success of the project through self-reflection based on rational thinking perspectives.

WILL TO CHALLENGE

The project managers underwent a cognitive process whereby thoughts of negative emotions shifted to positive and universal thoughts, naturally gaining a renewed *will to challenge*. They were able to start PM afresh and from a new light by resolving immediate problems. Armed with positive thinking, the managers renewed their strategic goals and established an execution and management plan that specified and quantified the goals with procedural content. By managing and monitoring the results of project execution from a time, budget, and goal perspective, they allowed individuals and the entire organization executing the project to share purpose awareness (Kim 2015).

The project managers renewed the goals and purpose of their project to gain empathy from all members of the company community, and, to strengthen purpose awareness, they reorganized their work relationship, connecting upper and lower tasks with goals and execution.

As shown in Figure 4, the new arrangement shows the upper tasks as the goals of the lower tasks, and the lower tasks as the means to achieve the upper tasks. This reorganization allowed project managers to not lose sight of the meaning of each task, and to gain purpose awareness within the larger picture. By highlighting the contribution of ordinary work such as feeding horses and cleaning dogs' ears to overall project success, this approach was designed to increase the managers' pride in work and strengthen purpose awareness (Kim 2015; Scharmer & Kaufer 2013).

Figure 4   Concept map connecting upper/lower tasks with goals/execution to strengthen awareness of purpose. Source: "A philosophical approach to project management: Project as a phenomenon and the case of Incheon Bridge," (Kim 2015)

Based on strengthened purpose awareness, CSR project managers established a plan for action and management to form a consensus with the company as a community, and monitored the plan and its outcome on an annual, monthly, weekly, and daily basis. By doing

so, it was found that everyone, including individuals and the organization, could perceive the results successfully.
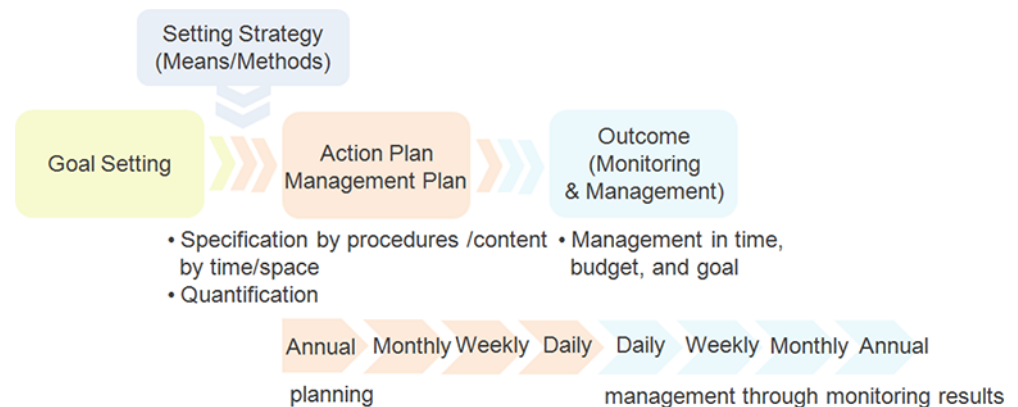

Figure 5   Concept map on PM procedures. Source: "A philosophical approach to PM: Project as a phenomenon and the case of Incheon Bridge," (Kim 2015)

The project managers improved their perception in three steps, which were *(1) perceiving a problem, (2) shift in thoughts,* and *(3) will to challenge*, and this led to consensus on project success. While progressing the project systematically, the managers have gained greater pride in their work, and as community members, the more they consented to the project, the higher rate of participation they had. With stronger community support, thousands of students now take part in the animal welfare education programme every year, and quality of life has improved for hundreds of disabled local residents and their guardians through the therapeutic horsemanship programme.

Conclusion

By introducing the elements related to perception of ways of thinking as a way to project success, the case study of a CSR project of Incheon Bridge Company showed that managers' positive ways of thinking have an effective impact on project success.

The case study showed that the project managers created an opportunity for shifting their thoughts by perceiving problems. They underwent frustration and self-examination as they interacted with the community, changed their thoughts to see the problem based on the community's universal values, and ultimately reached a consensus with the community. The managers reflected upon themselves from the community's viewpoint, reaching a new perspective in which that they were both the subjectivity and objectivity as one of community members, and in that process instinctive *will to challenge* was triggered to drive the project to success. The key point is the *shift in thoughts*; this uplifts managers' perceptions to a higher level. Therefore shifting from emotional thinking (depending on sense certainty) to intelligent thinking based on universal values, and rational thinking whereby subjectivity and objectivity become one in the development of a *shift in thought* perception, a premise f project success (Hegel 1807/1977).

The initial negative, emotional thinking shown by the project managers of the Incheon Bridge Company are realistic problems that anyone can experience when a sudden, unanticipated change occurs while planning, executing, and managing a project. If negative ways of thinking cannot be changed, a project that started off with the goal of developing the human community may lose its original intent, and the journey to success will stop.

The inclusion of manager perception in the PM domain, which had hitherto been relatively neglected, complements empirical management methodologies. This approach seeks to establish a cognitive foundation for resolving the existing problems of PM, and ultimately to present some directions for enlarging and sustaining the perspectives of PM.

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About the Author

Jung-hyun Kim was born in Seoul and majored in Politics, Theology and minored in Business at Yonsei University, Korea. Kim is a government-certified horse riding instructor and a therapeutic horse riding instructor. Now Kim is currently managing various social contribution projects in Incheon Bridge Company, such as animal sanctuary, animal welfare education, and horsemanship activities for mentally/physically challenged people.

CONFERENCE PAPER

A Philosophical Approach to Project Management (2): Project Success from an All-Embracing Perspective based on the Project Phenomenon Theory

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Abstract

Throughout several million years of history, human beings have achieved being actualization through creative intervention in reality by means of consciousness activities and consciousness-based physical activities (Lacko et al. 2014). The world has continuously developed and evolved from human's being actualization through epistemic and physical activities, creating new values (Abbasi & Al-Mharmah 2000).

This paper identifies successful episteme as the origin of project success from the perspective that the vocation of mankind is being actualization, which is project actualization in history. It completes the conditions for project success from an all-embracing perspective by identifying the intrinsic characteristics of the truthful episteme oriented towards the absolute knowing, applying them to the project and overcoming the limitations caused by emotional convictions of the project managers' own episteme, which is differentiated from the truthful episteme. This paper confirms that the development of project identification, project action and management

plan is the successful episteme for achieving successful results and processes by proposing Project Identification and Categorizing Structure (PICS) and Project Logic of Division and Convergence (PLDC).

The value-based results of all fields that appear in the project phenomenon, such as science, technology, politics, economy, society, culture, education, and so on, and its meaning of success are realized within the possible extent of the episteme. Therefore, this approach emphasizes the importance of the exploration of episteme that could realize the meaning of project success, and hence realizing project success in the fourth industrial age that will lead human relationships based on complex social relations and new lifestyles.

Keywords

Project phenomenon; Project success; Successful episteme; Episteme; Consciousness; Self-consciousness, Being actualization, Project actualization; All-embracing perspective

1. Introduction

Mankind has made ceaseless efforts to survive and thrive under the law of nature, and created this world through being actualization while growing its population to seven billion. In order to achieve being actualization (Figure 1), which is mankind's vocation, human beings have actualized projects through a process by which spirit and body intervene in reality, pursuing civic value (Stroud, 1986; Lacko et al. 2014). In this sense, mankind's development is project development, and the pursuit of civic value is the aim of project success.

Figure 1   Phenomenon of human being actualization

Human beings' desire and need for project success, the vocation of mankind, has broadened the perspective of project success from results oriented success to the process of the phenomenon and its origin. To succeed in projects that have been enlarged, convoluted, and diversified with changes triggered by the industrial revolution and technological advancement, project management (PM) has expanded from independent and individual project management to program and portfolio management, which allows the management of convergent and complex projects. A variety of PM methods, skills, and tools have been subdivided, specialized and developed accordingly. Throughout this process, there have been diverse perspectives on project success, and there has also been the need for a comprehensive and all-embracing exploration of knowledge on project success (Shenhar et al. 1997; Meskendahl 2010; Jugdev & Muller 2005; Valverde, 2015).

Project success is the successful execution (project's actualization process), and its result supersedes successful planning. Successful episteme on the concept of project is a precondition for successful planning (Dvir et al. 2003). Therefore, in order to achieve project success, the identification of successful episteme is necessary and inevitable.

Hegel stated in the *Phenomenology of Spirit* that consciousness activities, based on the dialectical logic principle of consciousness and self-consciousness, complete the absolute

spirit by reaching absolute knowing, in which the reality of spirit corresponds with the one of nature within the spirit itself through the concept of logic. This paper approaches the matter of project success from an epistemic perspective, differentiates the form, means and mechanism of the truthful episteme oriented towards absolute knowing, and investigates each of the intrinsic contents of the form, means and mechanism to apply them to project phenomenon. Through application, project managers can overcome the limitations of their episteme caused by emotional delusion, which appears as sensory conviction, conviction derived from the abstraction of concepts, and erroneous conviction of their physical activities. The design aimed at project actualization unfolds from project identification, establishment of project action and management plan, sublating towards the project success of all-embracing perspective.

2. Literature Review

The history of industrial development contributed to the creation of the present physical world, is the history of project actualization in the phenomenal perspective and has grown, derived, and expanded in the direction of pursuing the civic value. As humanity marks the fourth industrial revolution, where information participation and exchange of the community is expanding, mankind is experiencing the evolution towards a generation that requires creativity for convergent and complex designs, such as the smart cities.

Although in the past 60 years or so, the history of project management development within the history of the industrial development had centred around international organizations like IPMA, PMI, APM, etc., and developed into structures, such as the ISO, PMBOK®, PRINCE2®, IPMA ICB (Individual Competence Baseline), etc., there is a lack of consensus on a consistent interpretation and clear definition regarding project success (Ika 2009; Stretton & Crawford 2014; Milind & Gopinath, 2016). Disputes on the extent of project success have expanded from results oriented success perspective, to the perspective of successful process and to episteme as its origin (Radujkovic & Sjekavica 2017). Just as the 'perspective' of the Eye of Competence from IPMA ICB 4.0 (IPMA 2016) is put forward as a case that emphasizes project managers' epistemic aspects, the importance of the project managers' episteme has been accentuated and expanding (Shaw 2010). From the perspective that human's episteme is the origin of industrial development, which is a result of various project actualization, and the development of PM's body of knowledge, PM as an instinctive managerial consciousness for bringing projects to success has an apodictic relationship with projects, as the vocation of mankind.

The philosophical effort of pursuing the truth of episteme made great progress in German idealism. Kant's critical philosophy (1781/1998), which distinguishes consciousness and object and dualizes spirit and material, and identity philosophy of Schelling (1797/1979) and Fichte(1800/1987), which suggests that everything in nature is one within the spirit, was compiled by Hegel's dialectical logic philosophy, unifying duality with the dialectical logic of consciousness and self-consciousness. By the dialectical logic development of consciousness and self-consciousness, the being corresponds with the concept and the truth corresponds with conviction in the absolute knowing driven towards the absolute spirit, according to Hegel's *Phenomenology of Spirit*. As the absolute spirit and its episteme and logic are the truth, this paper seeks to identify the characteristics from the intrinsic elements of truthful episteme and apply them to project actualization, aiming towards the absolute knowledge (Kant 1781/1998; Schelling 1797/1979; Hegel 1807/1977).

The exploration of the truth on the phenomenal episteme has been providing an important academic basis for PM, and the improvement in quality of episteme to achieve project success brought realistic management methodologies, such as Critical Success Factor (CSF), Key Performance Indicator (KPI), and so on (IPMA 2016). The rise of the importance of epistemic administration and management in PM, a practical field, is an instinctive and apodictic result, displaying the potential of integrating all disciplines. From such a perspective, by defining the project phenomenon's intrinsic characteristics, I previously presented that PM's area expands by growth, derivation, and expansion beyond the areas of science, technology, politics, economy, society, culture, and to nature within the sustainability of history (Kim 2015; PMIAA 2015).

This paper identifies the intrinsic elements of the episteme, as the epistemic form, means, and mechanism, and presents PICS and PLDC that resolves the confusion in episteme from the complexity caused by the two opposing logic between project identification and action which appear in the consciousness activities of project phenomenon, proving that projects could be oriented towards project success from an all-embracing perspective.

3. Methodology

The conceptual episteme of phenomenon is the origin of all being actualizations as the representation of the intrinsic contents inherent in episteme. In human history, the creation of the world through being actualization is the history of projects, as well as the vocation of mankind and the reaching point of our instinctive activities. The purpose of this paper is to differentiate the truthful episteme oriented towards the absolute knowing as the form, means, and mechanism to identify its inherent characteristics and propose the conditions for project success from an all-embracing perspective that subdues the limitations of the project executors' episteme caused by the delusion of the emotional conviction.

3.1. FORM OF PHENOMENAL EPISTEME

The form of the episteme is a fundamental condition for all phenomenal episteme and refers to, in a conventional sense, time, space and category (Kant 1781/1998; Hegel 1807/1977; Hessen 1964). Phenomenal episteme is conceptual episteme and since a project is a phenomenon, it is recognized as a concept. A concept is the content that results from the temporal-spatial categorization of feelings and emotions where the meaning and significance are given. All concepts obtain sameness from the associated structure of the characteristics based on the temporal-spatial categorical form (Kant 1781/1998; Hegel 1807/1977; Kim 2015).

As in Whitehead's (1927/1979) proposition that "The past has an objective existence in the present which lies in the future beyond itself" and in Fichte's (1800/1987) notion of the repetition of precedents and Heidegger's (1927/2008) notion of projection from the past to the future, the temporality inherent in all concepts manifests itself in history as sustainability through the dialectical principle of logic. Just as Hegel (1807/1977) presented a conceptual space that logically encompasses all of nature, and as Schelling (1797/1979) said in one of his famous quotes, "Nature is visible Spirit; Spirit is invisible Nature," all spatiality is comprehensively relational within nature. As temporal-spatial characteristics mutually inherent in concepts, all time and space manifest themselves merged in a single phenomenon in history and nature.

Project goals and objectives, from the perspective of realization, are spatial contents where time remains still, and it is an abstract potentiality. The concept of a project, for the realization of goals and objectives to fulfil dreams and visions, attains actuality when both temporal procedures and spatial contents from the beginning to the accomplishment of a project become specified. The concepts and their elements that become specified in the procedures and contents of the project phenomenon possess sameness in their intrinsic contents, and lie in mutually-associated temporal and spatial relations. In this perspective, the area of PM expands beyond science, technology, politics, economics, society, culture, and to nature.

3.2. MEANS OF PHENOMENAL EPISTEME

The consciousness activities, in the means of phenomenal episteme, based on the development of concept's dialectical logic, unfold into emotional thinking reliant on feelings and emotions, intellectual thinking that captures the meaning and significance of contents as a concept, and logic-oriented rational thinking that identifies logical relations among the concepts, sublating towards the absolute spirit.

Concept is the content that the meaning and significance are given to temporal-spatial categorization of feelings and emotions. One concept divides into many and essentially becomes concrete as intrinsic contents. These concepts integrate into a single concept through the dialectical principle of logic. Hegel elaborates the dialectical activities of consciousness and self-consciousness through the three "moments" of the concept: universality, particularity, and individuality. Thus, this is plainly expressed in the proposition "The one becomes many; and the many becomes one" (Whitehead, 1927/1979; Hegel, 1807/1977). From a subjective perspective, a concept connotes many concepts within itself, and the concept becomes transformed into an objective perspective through the relations with other outside concepts; the subjective and objective perspectives on the concept manifest themselves as sameness through the dialectical principle of logic of the absolute spirit.

As such, in project phenomenon, many projects exist within one project, which itself exists as an object in relation to a variety of other external projects. The project goals and objectives develop from abstract to universal and the conceptual elements and items related to the realization of the goals and objectives are driven from diversity to unity through the dialectical principle of logic, and the logical interrelations among the concepts that form a project develop from contingency into necessity.

3.3. MECHANISM OF PHENOMENAL EPISTEME

I suggest in this section the mechanism of phenomenal episteme, and define the intrinsic contents of being actualization based on the temporal-spatial characteristics and properties of the concept of being, which were identified from the form and the means of episteme.

In the process by which the form and the means of episteme function, the conceptual information attained from actuality experience and ideation experience goes through the process of appropriation of data according to logical principles, which enhances the quality of information by having its data of experiences matrixed by logical order, sort, and arrangement. This improves the future design capability of being actualization (Figure 2). The project that aims at being actualization manifests itself as sustainability in history as time and relationality in nature as space. Such consciousness activities reconcile project design with actuality and affirm project success from an all-embracing perspective. This can be explained as an example, such as predictive analysis through big data, weather forecasts from a meteorological

administration, and future forecasts by means of the self-learning of AI (Artificial Intelligence) (Makridakis 2017; Mayo & Leung 2018).

❖ Episteme continues to memorize and informationize ideation experience and actuality experience, enhancing design capability through the accumulated information and its quality improvement.

Figure 2   Epistemic mechanism of phenomenon (EMP) (Kim 2015)

Based on the intrinsic contents inherent in episteme, that are defined from the mechanism of phenomenal episteme through its form and means, the conditions for project success from an all-embracing perspective are suggested as follows.

First, as temporal-spatial categories is inherent in the form of project, the project goals and objectives must be dualized and studied as temporal procedures and spatial contents. Second, based on the logical characteristics by which one project connotes many projects and many projects are subsumed as one project, the concept of project goals and objectives must become concrete as a detailed set of objectives and their contents, while the intrinsic contents of project must be defined within the unified associated structure of temporal-spatial categories. Third, the project goals and objectives must comply with the logical principles of procedural sustainability of time and the relationality of contents in space (Robertson & Williams 2006).

Phenomenal Episteme	Form	Means	Mechanism
Inherent Essence of Episteme	Temporal-Spatial Categorization	Essence and Property	Sustainability, Relationality

Figure 3   Inherent essence of form, means, and mechanism of episteme

By unfolding from project identification and implementation of project action and management plan that comply with the aforementioned three conditions, project executors overcome the delusion of sensory conviction, delusion derived from the abstraction of concepts (Hegel 1807/1977; Hessen 1964), and delusion from erroneous conviction of physical activities, which are the limitations of emotional delusion that is inherent in their episteme itself, affirming success from an all-embracing perspective.

4. Project Phenomenon

The consciousness of project managers in regards to being actualization of dreams and visions, gains potentiality from project identification that meet the conditions for project success from an all-embracing perspective, which is drawn from the episteme that is the truth, finds conviction of actuality through the project's action plan, and gains certainty from the management plan of the project executors, through which the conviction of project success from an all-embracing perspective is self-realized (Kim, 2015) (see Figure 4).
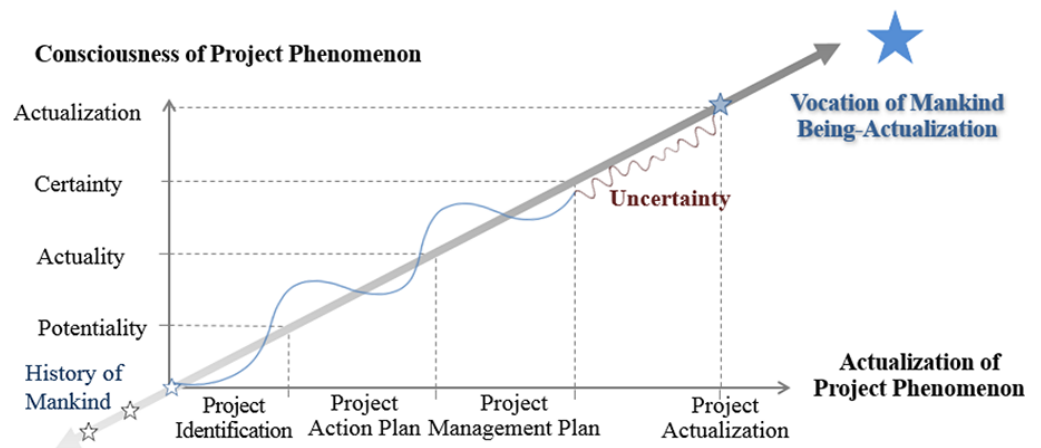
Figure 4   Development of project episteme and phenomenon

4.1. PROJECT IDENTIFICATION

Project identification is the identification of the universal meaning and significance of the concept of project and its intrinsic contents. It is figuring out, based upon analyses like the SWOT analysis, project environment, and stakeholder analysis, the intrinsic contents of temporal procedures and spatial contents from the beginning to the accomplishment for project goals and objectives that meet the expectations of stakeholders (Pinto & Slevin 1988; Cox 2016). This develops in the following phases: (1) determine strategic objectives, (2) differentiate procedures and contents from the beginning to the accomplishment of project objectives, (3) identify procedural objectives and define the associated elemental objectives as well as item objectives within the elements, and (4) all projects, objectives, elements, and items are concepts, and as such, they possess sustainability within history and logical relationality in pursuing the civic values as a goal.

Many projects exist within a single project, which also may serve as an element that constitutes a larger project (Kim 2015). In the dimension of the fourth industrial revolution, where projects are becoming increasingly complicated and larger in scope, like smart cities, there is a gradual increase in the need for new and improved management tools and knowledge. Moreover, projects continually change, and the management of such changes and risks has been emphasized as a crucial element for project success of an all-embracing perspective. From this sense, I propose PICS for the design of project phenomenon.

In project identification, the intrinsic contents of temporal-spatial procedures and contents develop as (1) objective projects within the project, (2) objective elements within the objective projects, and (3) objective items within the objective elements. In Figure 5, a project such as a national agenda is categorized and subdivided into the projects of departments, divisions, and organizations on temporal procedures, of which intrinsic contents develop as elements and items. PICS provides important standards for the decision of project, program, or portfolio management, and predicts CSF from identifying the changing goals, elements, and items of each procedures and its phases of the project, designing KPI that manage such changes. Therefore, PICS, as the management of the project's temporal-spatial identification of the truth and its actualization, has an apodictic development of project success from an all-embracing perspective.
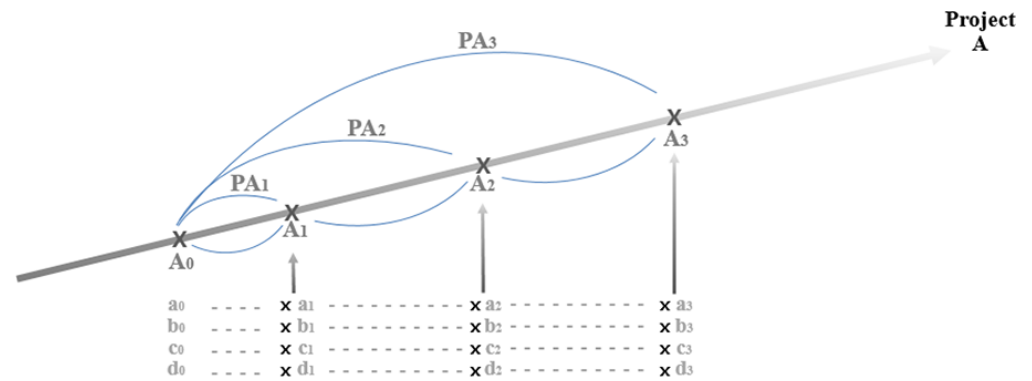
- Temporal objectives of A0~A1, A1~A2, and A2~A3 are distinguished by intrinsic contents of a, b, c, and d, and identified as PA3 that encompasses A0~A3.
- A project such as National Agenda is categorized and subdivided into the projects of departments, divisions, and organizations on temporal procedures, of which intrinsic contents develop as elements and items.

Figure 5   Project identifying and categorizing structure (PICS)

4.2. PROJECT ACTION PLAN

The actuality perceived through project identification is driven towards potentiality from the perspective of project actualization, and becomes fulfilled through the establishment of the project action plan. In the phase where the project action plan is established, the optimal means and methods to realize CSF, which is a set of core elements and items numerically subdivided through PICS, are determined, and tasks and KPI are assigned to project executors and executing organizations. The project executors and executing organizations then manage CSF and KPI as core elements and performance indicators needed for successful implementation of the project's strategic objectives. At the same time, project managers manage the outcomes related to procedures and contents of the project's strategic objectives, as well as examine and manage CSF and KPI associated with such processes.

As shown in Figure 6, in the development of consciousness from 'Potentiality A' to 'Actuality B' for being actualization, the objectives in project identification are broken down into their elements, and item objectives through temporal-spatial categorization and logical subdivision of procedures and contents. The elements and item objectives, which became concrete during the phase of project action, reach convergence (Whitehead 1927/1979; Green 2003) during the process of their realization and achieve being actualization as actual deliverables that belong to the actualized intrinsic contents. I suggest PLDC, a development of opposing logic between project identification and action which appear in the consciousness activities of project phenomenon. It is the development of logical consciousness merged through the actualization process from 'Potentiality A' to 'Actuality B', distinguishing the development from 'potentiality a' to 'actuality b' in the phase of project identification and the one in the phase of project action. As there are opposing thoughts that exist as division and convergence in the project actualization process, we find it difficult and complicated if this process is viewed as one. However, PLDC resolves the problems of the confusion of episteme and the complexity of project actualization process through the conceptual dualization of the information's division and convergence, defining and combining again.
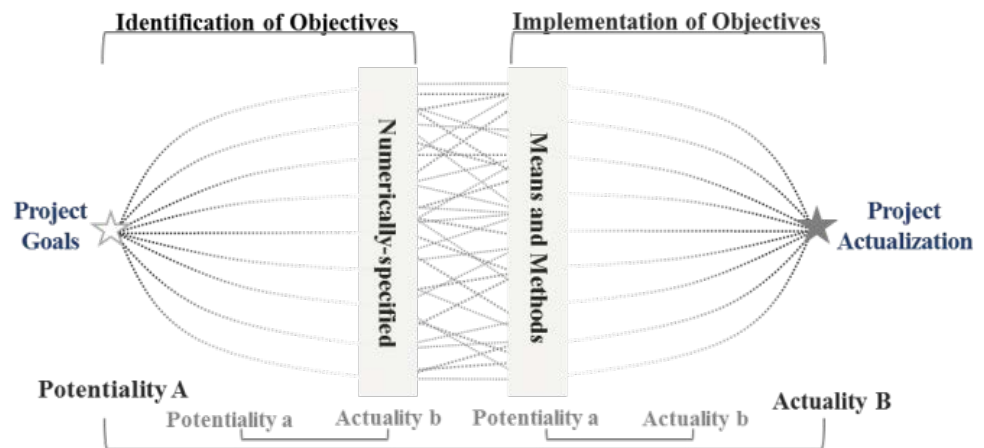
Figure 6   Project logic of division and convergence (PLDC)

4.3. PROJECT MANAGEMENT PLAN

The project management plan manages the implementation of the action plan to meet the conditions for project success from an all-embracing perspective. Under the project management plan, project managers utilize CSF and KPI drawn from PICS as core elements and management indicators, to examine and manage the implementation of the action plan in terms of factors such as time, cost, quality, safety, health, risk, and change. PICS systemizes the project management plan for project identification and actualization through the logical development of temporal-spatial procedures and contents related to the project's strategic objectives as well as elemental objectives and item objectives to meet the expectations of stakeholders, thereby leading to obtaining certainty of project success from an all-embracing perspective (Figure 7).

Humans, through the development of project identification, project action and management plan that meets the conditions for project success from an all-embracing perspective, overcome the sensory conviction, conviction derived from the abstraction of concepts, and erroneous conviction of their physical activities, which exists within the project executors' episteme itself, achieving project success in the outcome, process, the cause, and pursue civic values within the
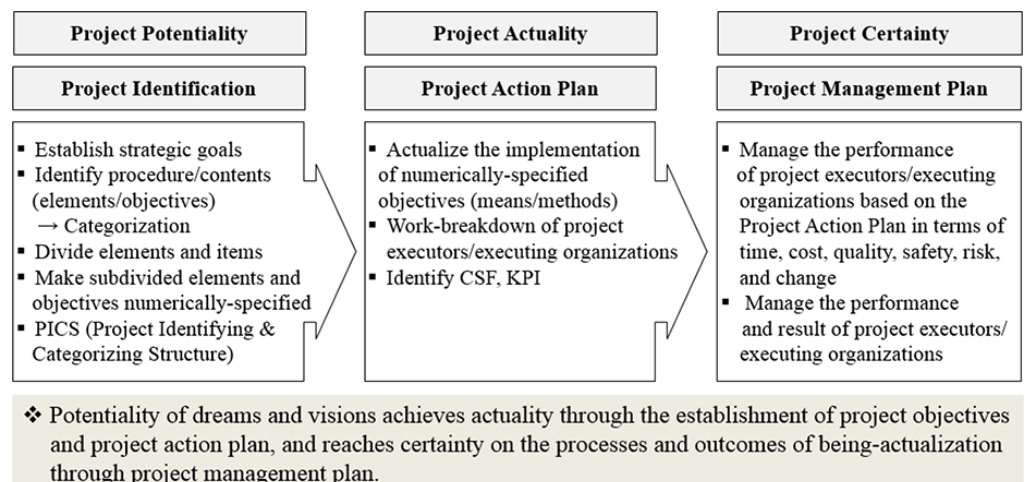

Figure 7   Development of project phenomenon from potentiality to actuality (Kim 2015)

phenomenon of sustainability and relationality, aiming towards the successful episteme that reaches project success of an all-embracing perspective.

5. Conclusion

This paper identified from history that the vocation of mankind is being actualization, which is project actualization, and that successful episteme must precede the project's process and its outcome in order to achieve project success from an all-embracing perspective. By identifying and applying the intrinsic characteristics of the truthful episteme that drives toward the absolute knowing, I brought forward the conditions necessary for an all-embracing perspective of project success to overcome project executors' delusions caused by their emotional conviction. Through the conditions, I presented a new PICS in which the project goals and objectives are distinguished as temporal-spatial categories and gain concreteness as procedures and its contents under the properties of concepts, and comply with the sustainability of history and relationality of nature from the sameness of temporal-spatial categories. It also identified that confusion in episteme and complexity of project actualization process could be resolved by PLDC which is a logical development of two opposing thinking between project identification and action that appear in the consciousness activities of project phenomenon. The project identification, project action and management plan is the development of episteme to obtain a successful plan and outcome, leading towards an all-embracing perspective of project success. The Incheon Bridge Project, designed and completed by myself, was the first to be awarded the Premium Gold from Project Excellence Award in 2015 at the IPMA 50th World Congress, being recognized as a world-class benchmark, demonstrating a real case oriented towards an all-embracing perspective of project success. (Kim 2015).

Within the history of industrial development, human beings have driven changes through intervention in reality by the spirit and body, throughout the first industrial development by which machine substituted human labour, the second industrial development that facilitated mass production, computer-based third industrial development and the fourth industrial development represented by AI (Clark & Cooke 2015). Thus diversity and complexity expanded across overall society in the areas of science, technology, politics, economy, society, culture, and so on. IoT and AI, as the core technologies of the fourth industrial revolution, are connecting humans to things, and reality to virtual reality. In this flow, the epistemic competence of project managers will expand to the orientation of successful episteme enabling success from an all-embracing perspective to be achieved. Project managers will possess future designing abilities that enable them to make design into reality, through the coexisting interrelationship of AI and spirit, as well as algorithms and logical concepts. This will provide a gateway of episteme that allows the integration of the various perspectives on the meaning of project success to be empathized. This paper is the journey of my episteme within the spirit that started from absolute knowing, self-realizing the correspondence of nature and sprit, to absolute knowledge, self-realizing that project plan corresponds with being actualization.

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Honorary Doctor Soohong Kim is the CEO of Incheon Bridge Co., Ltd. and a chair professor at Kyungnam University. He also serves IPMA Korea as a vice chairman and a member of the National Academy Engineering of Korea.

Dr. Kim has been leading the Incheon Bridge, a national project of Korea throughout all the phases from business proposal to financing, construction, operation and management so far with a remarkable success, making new records in every step of the way. For the past 15 years since when the concept of project management was not yet established in Korea, Dr. Kim has dedicated himself to analysing Incheon Bridge project from a philosophical approach to view project as a phenomenon and applying his own methodologies to Incheon Bridge construction, operation and management. As a result, Incheon Bridge became the first successful case of national policy project to which project management had been fully applied.

Dr. Kim's business management philosophy which puts theory and practice together was captured in his paper 'A Philosophical Approach to Project Management: Project as a Phenomenon and the Case of Incheon Bridge' which was published by Elsevier on Procedia. His paper was recognized by the IPMA Scientific Committee for its original contribution and was introduced to the 29th IPMA World Congress and the 3rd IPMA Research Conference.

Dr. Kim has been awarded with a number of exceptional national and international prizes including the national highest Order of Industrial Service Merit-Gold Tower Medal awarded by the President of Republic of Korea, OCEA(Outstanding Civil Engineering Achievement) Award of Merit' by American Society of Civil Engineers(ASCE), IPMA Project Excellence Award Premium Gold Winner and Project Manager of the Year (silver) for his excellent project management achievements.

Plea for a more sustainable definition of project success

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Abstract

This paper aims to raise the awareness for the impact that project managers have for successful projects. The paper also aims to reflect if the current definition of success is sufficient. Five project examples show that projects need to fulfill sustainability requirements to be declared successful. This attitude towards project success by all project managers worldwide could have the potential to change current environmental developments worldwide.

Motivation and background

Many definitions of project success have been published in the last decades; however, none of them seem to be sufficient for today. Project success indicates that a project is contributing significantly to the future, both for an organization and society. Projects are omnipresent in all parts of society and all industrial sectors, both in public and private life. Projects are unique and complex, ranging from small single person endeavours with a duration of a few weeks to mega-projects with thousands of people involved and a budget of several billion euros.

The following commentary aims to raise awareness of the question whether the traditional project success definition is sufficient for today and the future.

Definitions of project success

As per definition, "every project is a temporary endeavour undertaken to create a unique product or service" (PMI 2000). "Projects differ in size, uniqueness, and complexity; thus the criteria for measuring success vary from project to project" (Müller & Turner 2007).

"Project success is one of the most researched areas in project management" (Joslin & Müller 2015) as the meaning of "success" varies substantially (Judgev & Müller 2005). The understanding of project success has developed substantially in the last decades as Figure 1 shows. The project success definition went through four periods, as the project life cycle enlarged from the project implementation and handover (Period 1) to the critical success factors (CSF) discussion (Period 2) to the CSF framework analysis (Period 3) towards strategic project management (Period 4).

PROJECT LIFE CYCLE						
PROJECT LIFE CYCLE						
Conception	Planning	Production / Implementation		Handover	Utilization	Close Down
		Period 1: Project Implementation and Handover (1960s - 1980s)				
	Period 2: CSF Lists (1980s - 1990s)					
	Period 3: CSF Frameworks (1990s - 2000s)					
Period 4: Strategic Project Management (21st century)						

Figure 1   Evolving view of project success Source: Jugdev & Müller (2005)

"Individuals and stakeholders interpret project success in different ways" (Cleland & Ireland 2006). The following definitions show that there is no unanimous definition of project success among the researchers.

Pinto and Slavin define project success as project implementation success, meaning technical and organizational validity and organizational effectiveness (Pinto & Slavin 1988). Watt defines project success as "a high level of satisfaction concerning the project outcome among the key stakeholders" (Watt 2014). McLeod et al. go further and found out that "project outcomes are interpreted differently from different stakeholder perspectives at different times, constructed through subjective processes of sense-making". The criteria by the stakeholders for evaluating the project are "context- and perspective-dependent and reflect dimensions that variously focus on a project's process, product, and organizational objectives" (McLeod et al. 2012). Shenhar and Dvir state that the assessment of success is based on the four "success dimensions" of project efficiency, consumer impact, business success and preparation for the future, and that the content of each dimension and its relative importance changes with time (Shenhar & Dvir 2001). The most often used definition comes from Cooke-Davies who defines project success as a measure against "the overall objectives of the project, accomplished through the use of the project's output" (Cooke-Davies 2002).

All these definitions of project success cover different aspects of the project: the project implementation success, the level of satisfaction of the stakeholders on the project outcome, the context- and perspective-dependent interpretation of the stakeholders on the project

outcome, on the success dimensions project efficiency, consumer impact, business success and preparation for the future or use of the project's output. However, none of these definitions reflects on the phase after the usage of the project outcome, nor the sustainability of the endeavour, or the fit into the overall program or portfolio. This will be examined using five practical examples.

Critical analysis of project success based on five project examples

The first example is the building of a new school or hospital in a developing country in Sub-Saharan Africa. This development aid project is closed within scope, time and budget, but the local population does not expect much for specific reasons, either because of a lack of teachers, medical doctors, equipment, the supply of components, trained employees, active promotion among the parents or later mismanagement. Many well-meant humanitarian aid projects are left to rot after their opening and decay within a couple of years.

The same destiny happens to the second example, the sports stadiums built for football world championships and Olympic games. These phenomena are called "white elephants," and one famous example is the Arena da Amazônia in Manaus, in the middle of the Amazonas. The stadium cost was $ 300 million, and it was finished in time for the football championship in Brazil in 2014 and used for four football games in total. Now it is left to rot in the humid climate of the rainforest.

The third example is the building of nuclear power stations, without knowing how and where the resulting nuclear waste can be stored safely or rendered harmless, leaving this assignment for future generations.

The fourth example of unsuccessful projects is newly built bridges that are constructed without road access. In Germany, these bridges even have a name "Soda-Brücke" or "ghost bridges" because they are not a one-off phenomenon. Wikipedia currently reports eleven of these bridges in Germany, one in Switzerland, one in the Netherlands and one in New Zealand.

The fifth example is the building of new wind power farms in the North Sea in 2013, without the installation of equipment to transfer power to the countryside. To prevent damage to the new wind power wheels, additional generators had to be installed to drive the wheels.

These five examples raise the question of whether these projects can be called successful. They were all completed on time, on budget and fulfill their scope.

But in comparison to the past, people increasingly do not accept unsustainable projects any more. As a consequence, the definition of project success must be adapted to fit these different sorts of challenges.

Proposal for an enlarged understanding of project success

Referring to the five project examples, the extended definition of project success including all product lifecycle phases would already declare all of the five projects as failures, as the projects did not consider the utilization or close-down phases.

The examples of rotting schools and football stadiums in the rainforest, the rotting bridges without road access, and the nuclear power stations show that project managers must not only plan and steer, but also plan for the time after the close-down of the projects. The recycling aspect is missing in many project success definitions and consequently a broader definition

is needed, with increased understanding of project success. The project and product lifecycle perspective should be extended to the complete recycling of the product into its original materials to enable reuse of the raw material. This enlarged perspective on the project and product lifecycle, including the recycling phase builds, the first axis of the new project success triangle.

People with good general education and a profound understanding of the conception of causal relations strive for a sustainable living, where sustainability is embedded into the lifestyle, including all products and services. More and more people demand sustainable, ethical leaders who strive for making this vision coming true to leave the planet as a healthy place to live for future generations. The Institute for Sustainable Development says "sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (International Institute for Sustainable Development 1992).

During the 4th IPMA Research Conference 2016 in Reykjavik, Iceland, with the theme "sustainability in project management", 40 professionals and academics from five continents discussed the meaning of sustainability for project management. All agreed unanimously that the current short-term understanding of project success must be extended to a long-term definition, where the needs of the present are met "without compromising the ability of future generations to meet their own needs". As a consequence, the second axis of the new project success triangle consists of the need for sustainability. This new sustainable understanding of project success puts a new light on projects like the building of a nuclear power station which lacks a concept of how to recycle the nuclear waste.

The examples show that original objectives but must always be evaluated concerning their contribution to the program. The examples of the deserted school, the football stadium, the host bridge or the wind power farm show that these projects are only successful if they fit into and are part of a wider strategy.

In case of the school building, this project should be part of a general education program, e.g., to reduce the rate of illiteracy in the population under 18 years by 25% in a specific area. A successful school project should also include an education program for the illiterate mothers of the school girls, to convince them that they can prevent their daughters from having the same destiny as themselves. In case of the football stadium in an area like the Amazonas, a successful long-term program would include the support of a local football club, in addition in addition to training facilities for the young generation. In case of the bridge project, the overall program would also include the financial coverage of the construction of the adjoining roads. In case of the wind power farm project, a successful program should include the timely preparation of the electric transfer mechanism to the land.

These examples show that projects may not only be assessed against their single objectives but should also be evaluated concerning their contribution to the program success. However, a program is not a single set of endeavours but belongs to a project portfolio. Therefore, the program success should be evaluated in the light of the overall project portfolio. As a consequence, the author suggests integrating a third axis named project/ program/ portfolio perspective. As a result, we receive a three-dimensional triangle that consists of the new three perspectives that must all be fulfilled at the same time to call a project successful. Figure 2 shows this new holistic understanding of project success:
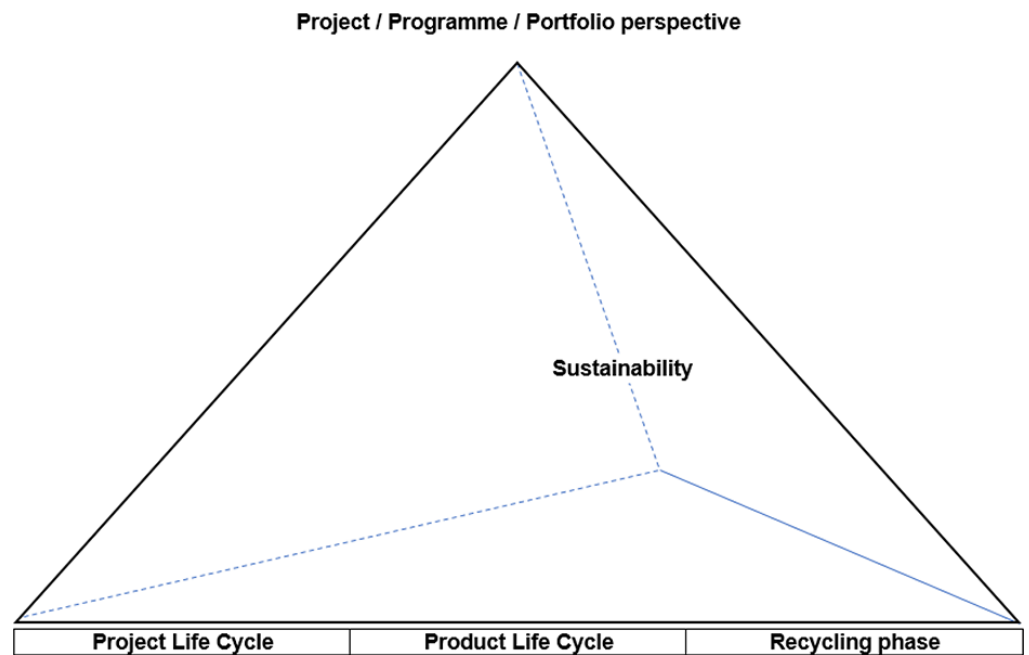
Project / Programme / Portfolio perspective

Figure 2 Enlarged, holistic understanding of project success Source: based on Jugdev & Müller (2005)

Setting of a new sustainable project success guideline

The International Project Management Association IPMA, as one of the two international project management standard-setting organizations, can have a relevant impact on its global influence on project managers worldwide.

IPMA´s Individual Competence Baseline ICB4 launched in 2015 lacks a definition of project success. It defines in detail the critical success factors for project managers and highlights the importance of success, but a definition of project success is not included. In comparison, the previous version ICB3 launched in 2006 which defined project success as follows: "To assess competence is one thing, but the ultimate goal of a project or programme manager is to be successful". For that reason within IPMA, project success is defined as "the appreciation by the various interested parties of the project outcomes." This definition is more challenging than "to produce the project deliverables within time and budget."

One could state that the previous ICB3 definition of project success was good at its time, but this definition is not sufficient as the five examples showed.

In times of global warming, depleting natural resources, overpopulation, a daily decimation of animal and plant species, increase of epidemic diseases, environmental degradation and acidification of the oceans, the quality of life today, but particularly the lives of future generations is jeopardized. The causes of the symptoms described above are all human-made. Consequently, only human beings can stop and change this development. However single actions of few people do not lead to the impact that is needed. Common, distinct measures of all people are needed for a meaningful, relevant change.

Which role could the profession of project managers play in this change process? Projects are vehicles of change. In fact, project managers are change agents (PMI 2017) both in organizations and in society. Their task is to implement the strategies of the decision makers by realizing and accomplishing the objectives of projects. What is needed is a change of values

and behaviours of the community of project managers worldwide. If project managers would start to adopt the corporate business strategies in the way to protect, sustain and enhance the human and natural resources for the future, this could create a global change.

As a consequence, the current understanding of success must be critically reflected. A new understanding of project success is needed, aiming to accomplish the objectives of a maximum of profit and sustainability. This mindset includes understanding and managing of the short- and long-term economic, social and environmental impacts of all operations in projects, programs, and portfolios. The new definition of project success should be defined and agreed with all project stakeholders at the beginning of a project, and it should include not only the project but also the overall product life cycle perspective including the close down/ reassembly and the recycling of the product.

The following figures show the situation concerning project success in general and for some industries or countries:

- More than 90% of the world´s infrastructure projects are either late or over-budget (Flyvbjerg 2011).
- For every $1 billion invested in the United States, $97 million are wasted due to bad project performance (PMI 2017).

The studies show that the majority of projects are not successfully completed within scope, time and budget, which leads to enormous financial waste worldwide. Let´s consider a mind game: the world´s Gross Domestic Product (GDP) in 2016 was $75.8 trillion (World Bank, OECD). Research on the size of projects in Western economies shows that one-third of the national GDP in European countries is created by projects (Schoper et al. 2018). Let us assume that on average 20% of world´s GDP is created by projects, then $15.1 trillion would be created by projects. If we then take the statement that for every $1 billion, $97 million are wasted due to bad project performance (PMI 2017), an annual sum of $1.4 trillion is wasted every year due to this cause. This sum corresponds to the annual GDP of Russia, with 144 million people. If this money could be saved and invested in humanitarian aid, infrastructure, education and agriculture projects in the developing countries, one can imagine that the world could be made a better place within a couple of years.

Outlook and conclusion

If all 250,000 IPMA certified project managers worldwide would agree to this new, sustainable understanding of project success and act accordingly, e.g., by refusing to manage unsustainable, unethical or resources-exploiting projects, the profession of project managers could contribute hugely to the change necessary to preserve the planet earth for future generations.

The future ICB5 by IPMA should contain a new, up-to-date definition of project success that corresponds to the requirements and needs of today´s global world. This could set the baseline for implementing a change of thought worldwide.

As a consequence, the author suggests adding to the IPMA´s Code of Ethics a Code of Conduct based on this new understanding of project success. All IPMA certified project managers should declare that they act following this ethical standard. This gives an ethical compass to all IPMA certified project managers worldwide. But also project principals would be assured that by hiring an IPMA project manager they will be provided with a sustainable long lasting successful project.

With this new understanding of project success, current projects will not only be built for a one-off event, but continue to be used, lasting for future generations. If project managers

would become more personally responsible for the success of their projects, financial waste could be dropped, and the money invested in humanitarian aid projects. The world could be made a better place within a short time-scale.

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Dr. Yvonne Schoper is Professor for International Project Management at HTW University of Applied Sciences Berlin. Dr. Schoper holds a BSc in Engineering Management, an MSc International Business and a Ph.D. in Industrial Engineering. She worked as a project manager for BMW where she was responsible for several international automotive development projects in USA and in Germany. Since 2009 she is associate Professor for Project Management at the Tongji University in Shanghai (China).

Her research interests are intercultural project management, future trends in project management, women in project management and the further development of the profession of project managers.

From 2012-2015 she was Executive Board member of GPM Germany where she was responsible for research. Since 2015 she is the delegate of Germany at IPMA´s Council of Delegates. Since 2016 she is member of the Presidential Advisory Board of GPM.

CONFERENCE PAPER

Effective Project Governance Institutions for IT Service Project Success

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Abstract

Recently, in pursuit of sustainable competitiveness, IT (information technology) service projects have been increasingly undertaken to introduce new technologies and advancements such as big data analytics, AI (artificial intelligence), Cloud Computing, mobile computing, IoT (Internet of Things), and business process changes.

However, the project success rates of IT service projects have declined because of the various kinds of risks associated with the characteristics of these projects, such as software invisibility, unclear user requirements, the complexity of IT systems and new technologies, and agency conflicts such as different goals, different risk attitude, and information asymmetry among project participants. The profits and success rates of IT service projects have fallen because of risks and agency conflicts.

In this study, we analyzed the gaps in average profits rates by revenue group for IT service companies in South Korea by one-way ANOVA (analysis of variance) analysis of SPSS V20 statistical tool. The result showed that the average profit rate of the revenue group over 1 billion USD was twice than the revenue groups of less 1 billion USD, and the gaps of average profit rates among revenue Group 1 and other revenue groups were statistically significant.

In addition, we investigated the maturity level of project governance by revenue groups of IT service companies with FGI (focus group interviews). The results showed that higher revenue groups were the higher maturity level of project governance. Furthermore, we investigated the change of failure rate of IT service projects in a company with the application of project governance institutions. The results showed that this failure rate decreased by 14.8% with the application of project governance institutions.

We recommend the application of project governance institutions such as project governance board, project steering committee, project management office (PMO), stage-gate process (SGP) in order to increase the profit rates of projects and to decrease the failure rates of projects.

Keywords

Project Governance, Institutional Analysis and Development Framework, Agency Theory, IT Service Project, Project Risk, Project Management Office, Stage-Gate Process

1. Introduction

IT service projects involve the application of business and technical expertise to enable organizations in the creation, management, and optimization of or access to information and business processes. IT services refers to the application of business and technical expertise to enable organizations in the creation, management and optimization of or access to information and business processes. The IT services market can be segmented by the type of skills employed to deliver the service (design, build, and run). There are also different categories of services: business process services, application services, and infrastructure services. If these services are outsourced, they are referred to as business process outsourcing (BPO), applications outsourcing (AO) and infrastructure outsourcing (IO) (Gartner 2017).

In South Korea, many banking and manufacture companies have outsourced IT service projects, including AO and IO, because of a scarcity of employees and competencies in software development and project management. But the success rate of IT service projects is low due to risks with software invisibility, unclear requirements, complexity of IT systems, and agency conflicts among project stakeholders. To reduce or prevent risks originating in the characteristics of IT service projects, as well as agency conflicts among project stakeholders, project governance institutions are required. Project governance institutions include project steering committee (PSC), PMO, SGP functions.

The following research procedure was adopted:

1. Collect revenue and profit rate data on IT service companies from ITSA (Korea Information Technology Service Industry Association). ITSA is the association of IT service companies of South Korea which was established in 1992 and has announced the revenue and profit rate of IT service companies annually.
2. Analyze the gaps in average profit rates by revenue group using one-way ANOVA (analysis of variance) with SPSS V20 statistic tool.
3. Conduct literature reviews about the IAD (Institutional Analysis and Development) framework, project governance, and agency theory.
4. Set the hypothesis: "Effective project governance institutions can influence project failure negatively and profit rates positively."

5. Test hypothesis through the following steps:
   - Conduct FGIs on the maturity level of project governance institutions and the status of the SGP applications by revenue groups of IT service companies in South Korea.
   - Conduct an empirical case study about changes in project failure rates through the application of project governance institutions to an IT service company.
6. Summarize research by rejecting the null hypothesis and accepting that project governance institutions can affect negatively to the project failure rates and affect positively to the profit rates of IT service projects.

Section 2 introduces background knowledge of the IAD framework, agency theory, and project governance concepts. Section 3 explains the application of the IAD framework to IT service projects. Section 4 explains the results of this application to project governance institutions. Finally, Section 5 discusses the results and limitations of this study as well as possibilities for future research.

2. Background Knowledge

2.1 IAD FRAMEWORK

The IAD framework was developed by Elinor Ostrom. It relates a set of concepts to help in the analysis of collective action problems that involves social structures, positions, and rules. Under the rational choice model, the IAD framework was devised in an attempt to explain and predict outcomes by formalizing the structures, positions, and rules involved in collective choice problems. Thus, it can be seen as a systematic method of collecting policy analysis functions, similar to analytic techniques commonly used in physical and social sciences, and understand how institutions operate and change over a period of time (https://en.wikipedia.org/wiki/Institutional_analysis_and_development_framework, 2017). The IAD framework helps researchers perceive complex social phenomena by dividing them into smaller units of readily understandable functions. The important aspect of the IAD framework is that its outcome is influenced by the institutional or rule arrangements created by local actors in a given context. The IAD framework consists of action situations such as physical attributes, community attributes, and institutional or rules arrangements, models of actors, patterns of interactions, and outcomes (Ostrom 1994), as seen Figure 1.

Figure 1 provides a schematic representation of the framework. The focus of the analysis is on behaviour in the action arena, which includes the action situation, and individuals and groups who are routinely involved in the situation (actors). One objective of the analysis is to identify factors in each of three areas that influence the behavior of individuals and groups in the policy situation: physical and material conditions, community attributes (culture), and rules-in-use or institutional arrangement. Two other objectives are to identify and evaluate patterns of interactions that are logically associated with behavior in the action arena, and outcomes from these interactions (Polski & Ostrom 1999).

Physical attributes are traits or characteristics of events that become a target of interaction for participants, and refer to the transformation of events due to interactions among participants. The variables of an action situation are also affected by attributes of the relevant physical world. The physical possibility of actions, likelihood of outcomes, linkages of action to outcomes, and knowledge of actors all depend on the physical world and its transformation. The same rule configuration may yield entirely different types of action situations depending

upon the types of events in the physical world being acted upon by participants (Ostrom 1994).

Community attributes include generally accepted norms of behavior, the level of common understanding about action arenas, the extent to which preferences are homogeneous, and the distribution of resources among members. The term "culture" is frequently applied to this bundle of attributes. Community attributes affect the structure of an action arena because the latter relates to the community in which an action situation is located (Ostrom 1994).

Institutions or rules are prescriptions that define what actions (or outcomes) are required, prohibited, or permitted and the sanctions authorized if rules are not followed (Crawford & Ostrom 1995). All rules are the results of implicit or explicit efforts to achieve order and predictability among humans by creating classes of persons or positions who are then required, permitted, or forbidden to take classes of actions in relation to required, permitted, or forbidden states of the world. The actor in a situation can be thought of as either a single individual or a group functioning as a unified corporate actor. The term "action or model of actor" refers to those human behavior for which the acting individual attaches a subjective and instrumental meaning. Individuals who calculate benefits and costs are fallible learners who vary in terms of the number of other persons whose perceived benefits and costs are important. These individuals must often make choices based on bounded rationality and opportunism with incomplete information and imperfect information-processing capabilities. Moreover, the level of opportunistic behavior that may occur in any setting is affected by the norms and institutions used to govern relationships in that setting, as well as by the decision environment's own attributes. Elements of an action situation make interactions with a model actor yield positive or negative results or outcomes (Ostrom 1998).
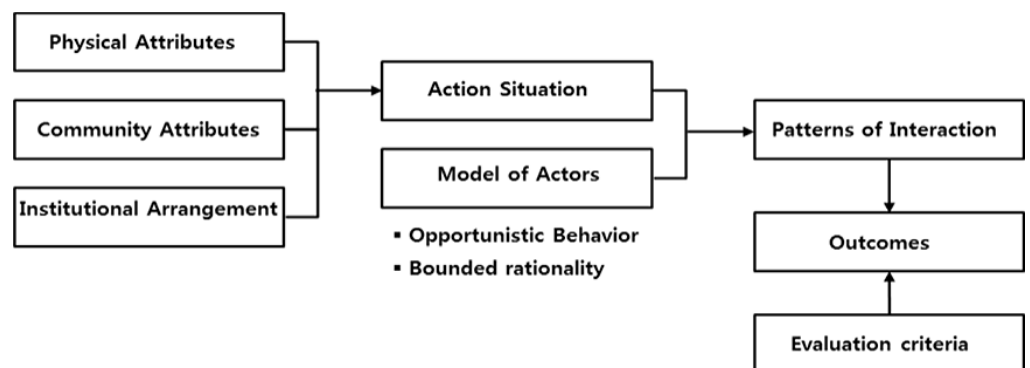
Figure 1   IAD framework (Ostrom 1994; Polski & Ostrom 1999)

2.2 AGENCY THEORY

Agency theory involves a contract under which one or more persons (shareholders) engage other persons (directors) to perform some service on their behalf, which includes delegating some decision-making authority to the agent, as seen Figure 2 (Eisenhardt 1989). If both parties to the relationship are utility maximizers, there is good reason to believe the agent will not always act in the best interests of the principal (Jenson and Meckling 1976). Agency conflicts include goal conflicts, different risk attitudes, and information asymmetries (Eisenhardt 1989; Saam 2007).

Figure 2   Agency Theory (Eisenhardt 1989)

2.3 PROJECT GOVERNANCE FUNCTIONS

Project governance can be defined in numerous ways. It supports the provision of good project management and is an important element of successful projects (Muller 2009). Project governance includes th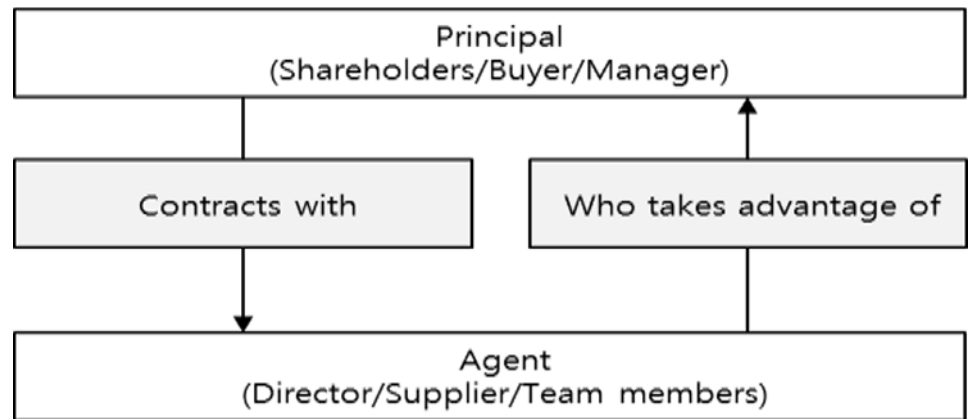e framework, functions, and processes that guide project management activities in order to create a unique product, service, or result and meet organizational strategic and operational goals (PMI 2016).

We consider that project governance is aligned with corporate governance, and serves as the framework for planning and controlling functions that align risk, performance, and communication domains. It guides project management activities and creates project outputs in order to meet organizational strategies and business objectives, and serve the best interests of related stakeholders (Dinsmore & Rocha 2012; Jeong et al., 2016b; Muller 2009). Accordingly, project governance can reduce risks in IT service projects such as those arising through agency conflicts, and agency problems among project stakeholders through the alignment of organizational strategies, business objectives, and the project's goal and objectives. Project governance also reduces goal conflicts among stakeholders, manages risks to reduce project risks, and reduces the different risk attitudes among stakeholders. Project governance functions also include control and communication functions to reduce and prevent information asymmetries among stakeholders. Consequentially, project governance functions can reduce project failure rates and increase project success rates (Jeong & Jeong 2016; Mahaney & Lederer 2003).

3. Institutional Analysis of IT Service Projects

3.1 PROFIT RATES OF IT SERVICE COMPANIES IN SOUTH KOREA

IT service company profits are low in South Korea because of project risks and high failure rates, as seen in Table 1. IT service companies with over $1 billion revenue earn higher profits compared with those in the lower-revenue groups. The profit rate of a specific IT service company showed little variance during the analysis periods. Profit gaps among IT service companies may arise because of a range of factors, but the profit gap among IT service companies may mainly depend on the application of project governance institutions or project management processes (ITSA 2010–2016).

Table 1   Revenue (Rev.) and profit rates of IT service companies in South Korea (ITSA 2010-2016)

Year	revenue & profit rate / revenue group & companies	2010		2011		2012		2013		2014		2015	
		revenue in billion (USD)	profit rates (%)	revenue in billion (USD)	profit rates (%)	revenue in billion (USD)	profit rate (%)	revenue in billion (USD)	profit rate (%)	revenue in billion (USD)	profit rate (%)	revenue in billion (USD)	profit rate (%)
group 1	'a'	3.6	10.8	4.0	8.9	4.4	10.5	4.6	7.1	4.6	8.0	5.2	10.4
	'b'	2.1	6.9	2.3	1.8	2.3	4.8	2.4	5.1	2.3	5.2	2.2	2.3
	'c'	1.5	11.0	1.6	10.8	1.5	11.8	1.8	11.6	1.5	17.6	2.0	10.8
group 2	'd'	0.8	3.0	1.0	3.1	1.0	4.5	1.2	5.5	0.9	5.2	0.8	1.4
	'e'	0.6	6.1	0.7	5.9	0.8	5.4	0.9	5.4	1.0	5.6	1.1	5.3
	'f'	0.5	4.6	0.6	4.0	0.6	4.5	0.5	4.4	0.4	2.6	0.4	5.2
group 3	'g'	0.4	5.8	0.4	1.3	0.3	0.1	0.4	1.2	0.5	4.0	0.5	8.6
	'h'	0.4	9.5	0.5	6.9	0.5	6.6	0.5	5.3	0.4	2.6	0.5	3.0
	'i'	0.09	−2.1	0.09	0.0	0.1	−1.3	0.09	1.0	0.09	2.5	0.1	3.9
group 4	'j'	0.08	3.7	0.1	6.2	0.17	7.6	0.2	6.4	0.2	3.2	0.2	3.7
	'k'	0.08	0.6	0.09	1.5	0.1	2.7	0.06	2.8	0.08	4.2		
	'l'	0.08	1.4	0.09	1.1	0.1	1.1	0.1	−0.8	0.1	0.9	0.1	0.6

The average profit rate of IT service companies shows 2.9%-4%, and number of companies over 10 million USD are 62-112 in South Korea from 2010 to 2015, as seen Table 2.

Table 2   Average revenue and profits rates of IT service companies

	2010	2011	2012	2013	2014	2015
Average of revenue (in million USD)	232.6	218.5	229.1	238.3	229.8	356.8
Average of profits (%)	4	3.7	3.5	2.9	3.1	3.6
Number of companies (586)	89	109	112	108	106	62

We analyzed the average operational profit rates of IT service companies with revenue over $10 million USD, by one-way analysis of variance (ANOVA) for the 2010–2015 periods. We divided the IT service companies into four revenue groups. Revenue Group 1 is over 1 billion USD, Revenue Group 2 is from 0.5 billion USD to 1 billion USD, Revenue Group 3 is from 0.1 billion USD to 0.5 billion USD, and Revenue Group 4 is below 0.1 billion USD. The average profit rates of Group 1 (26 IT service companies) is 8.45%, Group 2 (31 companies) is 4.51%, Group 3 (232 companies) is 3.91%, and Group 4 (297 companies) is 4.49%, as seen Table 3.

According to the results of the one-way ANOVA, the gap of average profit rates of Groups 1 and 2 is statistically significant at a 5% significance level. The gap of average profit rates between Group 1 and Groups 3 or 4 were significant at a 1% significance level. This means that gaps of average profit rates among groups are very rare under a normal distribution assumption, as seen Table 4.

Table 3   Average profit rate of IT service companies in South Korea by revenue group

Operational Profits Rates							
Revenue groups	N	Average profits rates	Standard deviation	Standard error	Confidence interval (95%)		Minimum	Maximum
					Lower limit	Upper limit		
1	26	.08454	.037910	.007435	.06923	.09985	.018	.176
2	31	.04510	.016206	.002911	.03915	.05104	.014	.090
3	232	.03911	.036335	.002385	.03441	.04381	.000	.190
4	297	.04497	.065604	.003807	.03748	.05246	.000	.624
Sum	586	.04441	.053449	.002208	.04008	.04875	.000	.624

Note: Group 1 (over 1 billion USD revenue), Group 2 (0.5 billion USD–1 billion USD revenue), Group 3 (0.1 billion USD–0.5 billion USD revenue), Group 4 (10 million USD–0.1 billion USD revenue)

Table 4   Results of average profits rates by one-way analysis of variance

Dependent variable: Operational profits							
	(I) Revenue group	(J) Revenue group	Gaps (I-J)	Standard errors	Significant	95% Confidence interval	
						Lower limit	Upper limit
Scheffe	1	2	.039442*	.014042	**.049**	.00007	.07881
		3	.045426*	.010920	**.001**	.01481	.07604
		4	.039565*	.010799	**.004**	.00929	.06984
* Gaps are statistically significant (0.05 level)							

3.2 CHARACTERISTICS OF IT SERVICE PROJECTS

In South Korea, IT service project phases can be divided into bid and contract agreement, contract performance, and contract completion. The bid and agreement stage includes request for proposal (RFP), proposal, negotiation, and contract. The contract performance phases include planning, analysis, design, development, testing, and cut-over stages. After project completion with the acceptance of project outputs, the customer makes the final payment (Jeong & Jeong 2014), as seen Figure 3.

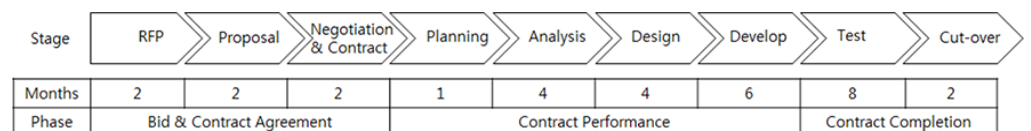| Stage	RFP	Proposal	Negotiation & Contract	Planning	Analysis	Design	Develop	Test	Cut-over
Months	2	2	2	1	4	4	6	8	2
Phase	Bid & Contract Agreement			Contract Performance				Contract Completion	

Figure 3   Project life cycle in banking IT systems (Jeong 2014)

IT projects face various risks that may lead to project delays or cost overruns. In addition, failure to comply with government laws and regulatory body recommendations may lead to legal issues and taint the company's image. Accordingly, project risks should be properly identified and managed. A project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives. Project risks can be classified by knowledge area such as time, cost, quality, legal, and suppliers or by stages of the IT service project life cycle, as seen Table 5 (Jeong, Bae & Jeong 2015; Wideman 1992).

Table 5   Risks in IT service project life cycle (Jeong, Bae & Jeong 2015)

Stages	Risks
Proposal	Lower cost estimation, violation of law and regulations
Contract	Unfair and irrational contracts
Analysis	Lack of user involvement, unclear requirement
Design	Requirements not clearly defined, requirements changed/expanded, poor design quality
Development	Delay in development and/or hardware installation, poor quality of program code
Test	Requirements changed/expanded, unclear test criteria, lack of user involvement
Cut-over to go-live	Functional errors and performance issues, delay in data migration, poor quality of data migration, lack of operational readiness

3.3 APPLICATION OF THE IAD FRAMEWORK TO IT SERVICE PROJECTS

This study aims to analyze the effectiveness of project governance institutions to mitigate risks, agency conflicts, and problems among stakeholders that would impact the project success and failure in the IT service project environment. We have studied based on the IAD framework, which consists of action situations including physical attributes, community attributes, and institutional or rules arrangement, model of actors, patterns of interactions, and outcomes.

The physical attributes of IT service projects include a lump-sum contract agreement between the buyer and the supplier. The contract relationship between buyer and supplier is established on the basis of resource dependency theory (RDT) and transaction cost economics (TCE) theory (Muller 2009), as seen Figure 4.
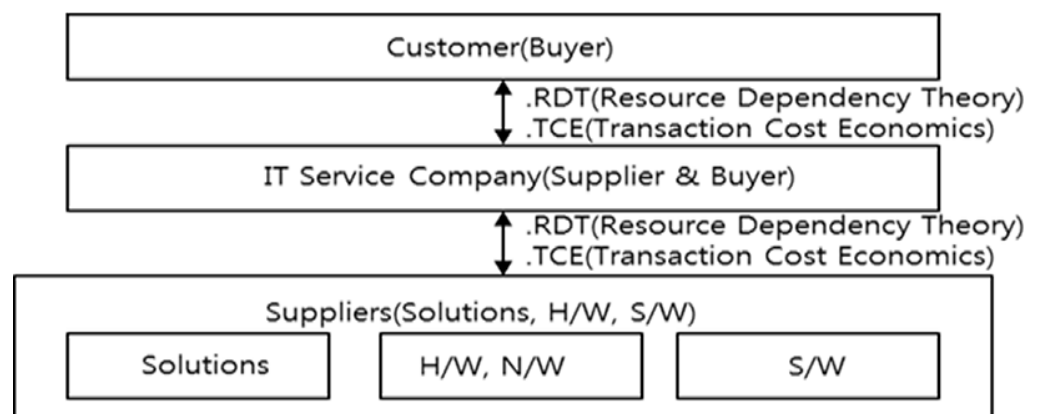

Figure 4   Contract structure of IT service projects (Jeong & Jeong 2014)

An IT service project community includes various stakeholders, all of whom have inter-relationships. These include agency relationships between the buyer and the supplier, the project board and the project manager, and the project manager and project team members. There are also contractual relationships that confer rights and obligations between buyer and supplier, as seen Table 6.

Table 6   Rights and obligations of contractors (Jeong & Jeong 2014)

Party	Rights	Obligations
Customer	Timely completion of the system	Payment to be made after inspection of deliverables
Supplier	Payments at project completion	Deliver an acceptable system on time to the user

Project stakeholders are the individuals, groups, or organizations affected by, or that affect, the project. As such, it is necessary to document relevant information regarding their interest and involvement. Stakeholders may be actively involved in the project, may be internal or external to the project, and may hold varying authority levels. Internal stakeholders include the project manager, project management team, and project team members; external stakeholders include the project sponsor, project governance board, customer, supplier, regulatory bodies, and PMO

The project governance board is a formal team consisting of executive leaders (or their delegates) from across the organization. Their mission is to direct the organization strategically, using projects to meet organization goals. Some key services provided by the PMO are monitoring and controlling project activities, aggregating and analyzing information, and reporting and making recommendations to the project board (Hobbs & Aubry 2010).

Project governance institutions of IT service projects include the PSC, PMO, and SGP for enterprise risk and contract management.

In the model of actors' behavior, actors can exhibit opportunism and have bounded rationality. Their pattern of interactions in IT service projects can be analyzed using RDT, TCE theory, and agency conflicts (Muller 2009; Williamson 2013), as seen Figure 5 and Table 7.
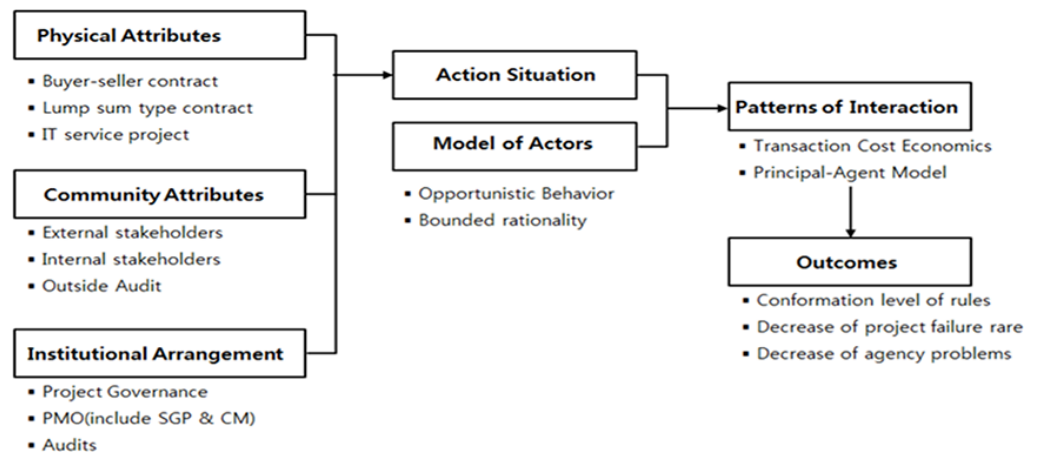

Figure 5   IAD framework for IT service projects (Modified IAD framework of Ostrom 1994)

Table 7   Application of IAD framework to IT service projects

Elements of IAD Framework		Application of IAD Framework to IT Service Project
Action situation	Physical attributes	Lump-Sum contract, characteristics of IT service projects,
	Community attributes	Contract relationship between stakeholders, Rights and Obligations
	Institutional/ rules arrangement	Project governance institutions (PSC, PMO, SGP, contract management)
Model of actors		Opportunism, bounded rationality
Patterns of interaction		TCE, RDT, agency conflicts
Outcomes		Reduction of risks, Decline in project failure rates

Note: IAD (Institutional Analysis and Development Framework); PSC (Project Steering Committee); PMO (Project Management Office); SGP (Stage-Gate Process); TCE (Transaction Cost Economics); RDT (Resource Dependency Theory)

4. Results of Project Governance Institutions

4.1 OPERATION OF PROJECT GOVERNANCE INSTITUTIONS

We conducted FGI with a total of ten professional project experts, consisting of two or three people per revenue group. Interviews sought information regarding project governance institutions such as PMO, PSC, and SGP. Group 1 showed that a PSC is mandatory, the PMO operates permanently with 20–30 people, and the SGP is crucial to rule setting. The OGC (Office of Government Commerce) has introduced a P3M3 (Portfolio, Program and Project Management Maturity Model). P3M3 can be used to understand and identify the key practices that need to be fully embedded within the organization to achieve the next maturity level. In addition, P3M3 described the Level 1 is an initial process, Level 2 is a repeatable process, Level 3 is a defined process, Level 4 is a managed process, and Level 5 is an optimized process. Also, CMMI (Capability Maturity Model Integration) defined Level 1 is an initial unpredictable process, poorly controlled, and reactive. Level 2 is managed, which is often reactive. Level 3 is defined for the organization, and is proactive. Level 4 is a quantitatively managed process which is measured and controlled. Level 5 is optimizing, which focuses on process improvement (Gonzales Marle & Bocquet 2007). According to P3M3 and CMMI, the maturity level of Group 1 is estimated to be 3-4 due to mandatory PSC and SGP operation, and permanent PMO organization. The maturity level of Group 2 is estimated to be 2-3 because PSC is optional without a permanent PMO; instead, project risks are inspected at project execution stages by 4–7 quality assurance members and the SGP operation is optional. The maturity level of Group 3 is estimated to be 1-2 because PSC is optional when a permanent PMO is absent, but risk inspections occurred at project execution stages by 1–3 persons and there was no SGP operation. The maturity level of Group 4 is estimated to be one because PSC was not available, and it operated without a permanent PMO and also lacked a SGP (Jeong & Jeong 2016a), as seen Table 8.

Table 8   Status of project governance institutions of IT service companies by revenue groups (FGI)

Revenue Group	Maturity level of Project Governance	PSC	PMO organization	SGP operation
1	3–4	Mandatory	Permanent (2–3 teams) -Risk management -Cost validation at plan stage -Cost control at execution stages	Rule setting and application (mandatory) -VRB operation -Stages (Proposal ~ Cut-over/close)
2	2–3	Optional	N/A, risk inspection at execution stages by QA team (4–7 members)	Rule setting and application (optional/ mandatory) -VRB operation - Stages (Proposal ~ Plan)
3	1-2	Optional	N/A, risk inspection at execution stages by QA team (1–3 members)	N/A, by head of department (optional)
4	1	N/A	N/A, issue management by management plan team	N/A, by head of company (optional)

Note: Group 1 (over $1 billion revenue), Group 2 ($0.5 billion–$1 billion), Group 3 ($0.1 billion–$0.5 billion), Group 4 ($10 million–$0.1 billion)

4.2 EFFECTIVENESS OF SGP APPLICATION

To verify the effectiveness of SGP in IT service projects, we conducted FGIs with seven experts in different IT service companies. The interview results are summarized in Table 9. Their answers revealed that SGPs were implemented at corporate or division levels. Final decisions were made mainly by project executives according to quality, risk, and performance criteria. The project related information for decisions was reported by the project manager or PMO. We find that the SGP can increase the levels of requirements, quality, time, and risk management. Interviewees also suggested standardizing processes, establishing objective assessment criteria and guidelines, and ensuring flexibility of operation depending on project type and size (Cooper 1990; Jeong & Jeong 2016a).

Table 9   FGI for status of application of SGP to IT service projects

Items	Survey results
Operational Organizational level	Corporate-wide (3), Division-wide (4)
Decision maker(s)	Chief executives (2), project executives (5)
Project governance board members	Chief executives, project executives, project manager, project management officer, etc.
Decision criteria	Quality (6), Risk (7), Performance (4)
Reported by	Project manager (3), PMO (4)
Increased area	Requirement management (2), quality management (3), time management (4), risk management (5)
Suggestions	Standardization of process Make objective assessment criteria and guideline Flexible operation depend on project type and size
Role of interviewees	Project manager (2), Quality manager (5)
Experience of PM (in years)	over 20 (2), 10–19 (1), 5–9 (4)

4.3 EFFECTIVENESS OF PROJECT GOVERNANCE INSTITUTIONS

A total of 109 projects for external customers were completed before the application of the project governance institutions such as SGP and enterprise risk management between 2009 and 2012 in an IT service company. A total of 27 of these completed projects during the same period failed. Therefore, the average failure rate for projects was 24.5% before the application of project governance institutions. However, 72 projects were completed after the application of project governance institutions in 2013–2016 in the same company, and seven projects failed. Accordingly, the average failure rate of projects was 9.7% after the application of project governance institutions. The average failure rate of projects was therefore reduced by 14.8% through the application of developed project governance institutions, as seen Table 10.

Table 10   Project failure rates reduce by project governance institutions (SK Holdings 2009–2016)

Year	2009	2010	2011	2012	2013	2014	2015	2016
Number of closed projects	26	22	33	28	26	20	12	14
Number of failed projects	6	5	9	7	3	2	1	1
Percentage of failed projects	23.1%	22.7%	27.3%	25%	11.5%	10%	8.3%	7.1%
Application of project governance institutions	Before application of project governance institutions				After application of project governance institutions			

Table 10   continued

Average percentages of failed projects	24.5% (27/109)	9.7% (7/72)
Percentage of improvement	14.8%	

These findings lead to the following recommendations:

- Project governance institutions are required to reduce risks and agency conflicts through enterprise risk management, cost verification, professional contract management, and project selection by portfolio management.
- A chief executive officer and executive support is mandatory for formal, sustainable, and effective PMO organizations, because PMO organizations face challenges from project execution organizations.
- The PMO's competency and experiences are important.

5. Conclusions

In this research, we analyzed the effectiveness of project governance institutions for IT service projects based on the statistical analysis of profit rate by revenue groups of IT service companies in South Korea and FGI about the relationship between the maturity level of project governance and the revenue groups of IT service companies. In addition, empirical study about failure rate change of IT service projects by application of project governance institutions for an IT service company. FGIs and empirical case study show that project governance institution can reduce or eliminate project risks, agency conflicts among stakeholders. We found that such institutions can increase project success rates through a reduction in risks and agency conflicts in agency relationships. Further, we provided recommendations about the application of project governance institutions to improve the project success rate of IT service projects.

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CONFERENCE REPORT

Report from the 2017 IPMA Research Conference on project success

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Project success is one of the most researched topics in project management. Many studies tried to find out the ingredients for project success, the so-called success factors and how to measure success, by the help of the so-called success indicators. One question is if these definitions and understandings of success are still valid for the 21st century. Therefore the theme of the 2017 IPMA Research Conference was: "Projects, Management and Success - do we need a wider understanding?"

About the IPMA Research Conference

The IPMA Research Conference was founded in 2013 and as a Think Tank it aims to bring researchers, experts, scholars and practitioners in project management together who share a common passion for their discipline. During the conference, they discuss and exchange research ideas and achievements on the topic of projects and its management. The distinctive feature of this small in size conference is the intense dialogue between practitioners and academics which can neither be found at scientific or professional conferences. The annual International Conference aims to bring together experts from all countries worldwide to increase the mutual understanding of the global challenges of project managers in various environments and industries. The special spirit of the IPMA Research Conferences can be particularly felt in the World Café sessions where the participants can gain new insight perspectives for today´s challenges in project management.

5ᵗʰ IPMA Research Conference 2017

The theme of the 2017 IPMA Research Conference was "Projects, Management and Success – do we need a wider understanding?" Project management has continuously developed in the last decades like no other management discipline. But although the requirements towards project managers further developed, the definition of success in projects and in project management has remained stable during this time.

Project Management distinguishes between project success (measured against the overall objectives of the project, and a high level of satisfaction concerning the project outcome among the key stakeholders) and project management success (measured against the measures of performance as scope, time and budget). However, success has different meanings to the people as it is linked to culture and values. Success is perceived differently by different stakeholders, and in different areas: the macroeconomic meaning of success differs from the micro-economic, success in sociology is perceived differently than in psychology or sport, and an individual perceives success differently than a group, an organization or a whole society.

The 2017 IPMA Research Conference took place on Nov 2 - 4 2017 in Incheon, Korea. It gave the 60 participants from 13 countries from five continents the opportunity to exchange their understanding of successful projects and their management.

The festive official opening ceremony in the morning of day 1 covered several congratulatory and keynote speeches from the local hosts including Dr. Han Seung-soo, the Former Prime Minister of Korea and UN´s Special Envoy for Disaster Risk Reduction, from Mr. Kyung-seo Park, President of the Korean Red Cross, and Mr. Kyoung-Soo Kim, Member of the National Assembly of Korea as well as from the IPMA president Mr. Reinhard Wagner and the chairman of IPMA Korea, Mr. Won-dong Cho. They highlighted in their speeches the meaning of projects and their professional management for the rise and success of societies like South Korea.

One challenge in the organization of this conference was to bring together the interests of the national Korean-speaking and the international English-speaking participants. The organizers solved this by offering a program that was split in the afternoon into three different streams to fit both needs. One stream was dedicated to the Korean participants, where the speeches from the international keynote speakers got simultaneously translated into Korean and two further streams that were based on the paper presentations that were selected in the 'call for paper' process. These presentations built the basis for the two parallel research streams.

The first two parallel streams covered the topics "Project success and Ethics & Philosophy," and "Project success and Sustainability." The second afternoon streams were about the topics "Project success and culture" and "Project success and value." These twelve papers are included in this special PMRP edition of the Research Conference.

The evening of day one was dedicated to the IPMA Research Awards. IPMA awards every year excellent research in the three following categories: young researcher, researcher, and lifetime achievement award. In 2017 the winners in the three categories were: for the IPMA Young Researcher Award the winner is Ms. Maude Brunet, for the IPMA Research Award the winner is Lavagnon Ika and for the IPMA Research Achievement Award the winner is Jeff K. Pinto. The winners gave presentations on their research studies and encouraged the audience to join in the field of project management research. A further highlight of the award evening was to honour Rodney Turner for his role as chief editor of the International Journal of Project Management and for bringing Project Management research in the last 30 years

to today´s academic recognized high ranked level. The award ceremony was concluded by performances by various Korean artists.

Day 2 started with five keynote speeches from Beverly Pasian, Reinhard Wagner, Carl Marnewick, Won-dong Cho and Jesus Martinez, all looking at the different facets of project success from different angles: from the benefits´ perspective, the journal editor´s perspective, from agile project management´s perspective and from the individual perspective, starting a reflection process at every participant. The morning ended with an interview with Rodney Turner on his own definition and reflection on project success. The afternoon started with two parallel creativity sessions, and one was a Six Thinking Hats workshop facilitated by Haukur Jonasson and one a Design Thinking workshop facilitated by myself. Both workshops dealt with the definition and understanding of project success and gave the participants new insights about the various ways of looking at success from the various stakeholders, a better understanding of the different attitudes towards success, but also about the shades of success. The findings in the workshops were summarized in the final World Café session. In five rounds the following five topics were discussed:

- How can we integrate sustainability into the current definition of project success?
- What are the further new aspects that project success should include?
- What can governmental institutions do to enhance project success?
- What are new research questions regarding project success?
- What is the legacy of this conference?

The second conference day was concluded by the common, unambiguous summary of all participants that the current definition of project success is not sufficient anymore given the new constraints as complexity or the need for sustainability in today´s time. However, it is not possible to come up with a proposal for a new definition yet.

The third day of the IPMA Research Conference traditionally consists of an excursion to local project sites that cover the theme of the conference and some sightseeing. The success theme fits the famous Incheon Bridge where the participants learned from the charismatic CEO and project manager Dr. Soo-hong Kim about the challenges of planning and constructing a spanning cable-stayed bridge. Incheon Bridge is the five longest of its type in the world, reducing the travel time between Songdo and Incheon International Airport by one hour. The overall length of the bridge is 22 km. In 2015 the Incheon Bridge project won the IPMA Project Excellence award, and the participants had the opportunity to understand the ingredients of this example project success. In the afternoon the participants visited Seoul and the Gyeongbokgung Palace, the antic quarter of Bukchon and the art district Insadong. The evening ended with a typical Korean barbeque dinner.

The participants again enjoyed the special character of this unique research conference with its possibilities to get to know international project managers, to see local projects and to experience how project management is applied in the various parts of the world. This combination made the 2017 IPMA Research Conference again a memorable event for all participants. Project success and the local application of the conference theme gave the participants the chance to see Incheon Bridge and its project manager Dr. Kim that will remain a landmark for the conference participants when thinking about project success in the future.

The IPMA Research Conference Coordinator thanks all authors and keynote speakers for contributing to the success of the 2017 IPMA Research Conference, the conference stream facilitators for their professional moderation of the research streams, the Korean hosting

delegation of their warm hospitality, the IPMA Research Coordinator Helgi Thor Ingason for his continuous support, Beverly Pasian for publishing the final papers in the new PMRP journal and finally IPMA for making this unique conference possible.

Berlin, February 2018

Yvonne Schoper

Note: This report has been adapted from the author's blog post that was published at blog.ipma.world.

About the Author

Dr. Yvonne Schoper is Professor for International Project Management at HTW University of Applied Sciences Berlin. Dr. Schoper holds a BSc in Engineering Management, an MSc International Business and a Ph.D. in Industrial Engineering. She worked as a project manager for BMW where she was responsible for several international automotive development projects in USA and in Germany. Since 2009 she is associate Professor for Project Management at the Tongji University in Shanghai (China).

Her research interests are intercultural project management, future trends in project management, women in project management and the further development of the profession of project managers.

From 2012-2015 she was Executive Board member of GPM Germany where she was responsible for research. Since 2015 she is the delegate of Germany at IPMA´s Council of Delegates. Since 2016 she is member of the Presidential Advisory Board of GPM.

IPMA Research Conference 2017 – Review Process

The paper review process for the IPMA Research Conference 2017 was a three stage process.

The first stage was a double blind review by the jury members of the IPMA Research Conference Steering Committee, all international academics none of them being a member of PMRP. All 28 short paper submissions went through this initial review process. In this phase the papers were reviewed using recognized academic criteria (quality; relevance; new or emerging knowledge; applicability) and were ranked in two categories:

- First Review Accept
- First Review Reject

17 short papers were accepted based on these criteria and the authors got invited to submit their long papers for the Research Conference.

In the second stage 14 long papers were presented at the Research Conference and received feedback from the eight research stream facilitators (all academics).

In the third stage the papers were ranked by the editor of the PMRP journal into the categories:

- Commentary paper
- Research paper
- Case studies

In addition each author received a detailed feedback to his long paper in a second double-blind review process from two independent external academic reviewers. This review process was steered by the editor of the PMRP journal, Beverly Pasian together with the IPMA Research Coordinator Helgi Thor Ingason and the IPMA Research Conference Coordinator Yvonne Schoper.

The resulting 14 papers are published as an eJournal by PMRP. There was no funding by any organization involved in the whole process.

The IPMA Research Conference Coordinator thanks all authors for contributing with their paper submissions to the success of the Research Conference, all reviewers for their constructive feedback to the submissions, the conference stream facilitators for their professional moderation of the research streams, the IPMA Research Coordinator Helgi Thor Ingason for his ongoing support and finally Beverly Pasian for publishing the conference papers in the PMRP journal.

Berlin, February 2018

Yvonne Schoper