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Practitioners' Perspectives on Flexible Project Management

Afshin Jalali Sohi [iD], Marian Bosch-Rekveldt, and Marcel Hertogh

Abstract—Literature defines two main streams in project management: mechanistic and organic. Mechanistic reflects the traditional waterfall approach and organic reflects a more adaptive approach. The organic approach became known by the awareness of dynamic project environment and changing requirements. The organic approach is characterized by flexibility. Accordingly, scholars and practitioners tried to define flexibility and find ways to make project management more flexible. However, scientific literature about practitioners' perspectives on making project management flexible is lacking. Therefore, this paper explores practitioners' perspectives on project management flexibility by the use of Q-methodology. The scope of the paper was narrowed down to the front-end phase of infrastructure projects. Two types of organizations were targeted: client and consultancy organizations. Data were gathered from 43 respondents from six organizations (three client and three consultancy organizations) in The Netherlands. The results of the study reveal three distinct perspectives on flexibility for both organization types (client and consultant): flexibility by trust, flexibility by scope management, and flexibility by proactive management. These perspectives partly support defined flexibility categories in literature. Further research could focus on exploring the perspectives in different project phases, operationalizing the perspectives in practice, and team composition taking into account these perspectives.

Index Terms—Agile project management, construction industry, flexible project management, planning phase, Q-methodology.

I. INTRODUCTION

PROJECT management as we know it today, emerged in the 1950s in the defense and aerospace sectors, which were little flexible and little complex at that time [1]. The "new-born" project management assumed that project management is rational and normative, that there is only one reality based on causal relationships, and that scope management by decomposition, for example, by means of a work breakdown structure, should be the main concern [2]. Such a project management approach, also named conventional project management, is aimed at predetermining time, budget, and performance goals by extensive front-end analysis. This results in a "blueprint-type scope description"

specifying the tasks which need to be performed and a planning based on this scope description, which both will be "frozen and strictly controlled during execution" [3]. A more elaborated description of conventional project management is provided by means of the commonly used guidelines as described in the Project Management Body of Knowledge (PMBOK) guide [4]. The PMBOK guide [5] states that a project in general consists of two types of processes, which are to be performed by the project team: the project management processes, which focus on creating sufficient flow, and the product-oriented processes, which focus on the specification and creation of the end product. The PMBOK guide mainly focuses on the first group of processes [5]. Project management has been dominated by the hard paradigm in which reductionist techniques such as work breakdown structures and critical path analysis are used to manage projects [6]. Winter *et al.* [7] emphasized the need to investigate new models and theories (new ontologies and epistemologies), which recognize and illuminate the reality of complexity and project management practice.

Starting in the 1990s and still growing is the awareness of the changing and dynamic project environment [8]. Collyer and Warren [9], in their paper on project management for dynamic environments, used the term "dynamic" to represent the "constantly changing characteristic." They argued that all projects have some degree of dynamism. It is recognized that the complex and changing context of a project makes it impossible to make reliable predictions, and instead of predicting and correspondingly avoiding changes, changes need to be incorporated in the project [10]. This asks for a broader approach, which Koppenjan *et al.* [3] named the "prepare and commit" approach. This approach recognizes that scope changes are inevitable, due to the many unknowns and the client's learning curve, and thus acknowledges the uncertainty and complexity of many infrastructure projects [3]. Both uncertainty and complexity could be managed by this "prepare and commit" approach in order to be effective [11]. In several research works [3], [12]–[14], it is argued that project management should evolve or mature in this direction, without completely losing the conventional origins. Geraldi [13] stated: "*projects demand both mechanic and organic paradigms, both order and chaos*." In this statement, "order" is reflected by conventional project management and "chaos" by the awareness of complexity and uncertainty. Combining both approaches means that a certain degree of flexibility is needed or, in other words, a balance needs to be found between controlling complexity and uncertainty and maintaining flexiblility in order to cope with complexity and uncertainty

[3], [13]. This is in line with what already was recognized in earlier years by Burns and Stalker [15]. They proposed two contrasting management systems: mechanistic and organic. A mechanistic system, which is characterized by a high level of control, specialized differentiation, hierarchical structures, and the importance of individual knowledge and skills, is considered to be appropriate in stable environments. When there is a high level of uncertainty, a more flexible approach is needed. The organic system, which is characterized by a network structure, spread of commitment, and informative communication, would therefore be more appropriate when there are changing conditions.

Hertogh *et al.* [16] noted that there should be a fine balance between control and interaction. Too much control can impose excessive bureaucracy upon project management, resulting in diverging of project management resources from achieving project objectives [17], [18]. When followed by a response of more bureaucracy and control, this could invoke a vicious circle of bureaucracy and demotivation and inflexibility [19], [20]. Cooke-Davies *et al.* [21] argued that a paradigm shift is needed from the traditional project management concepts in order to deal with future project management challenges and the requirements of modern practice.

Increasingly, it is argued that nowadays a pure project management approach (the traditional project management approach) is no longer effective [10], [22]. Although PMBoK is recognized as a conventional project management guideline, the later version of this project management guide acknowledged the adaptive project management in adaptive project lifecycle [5]. Nevertheless, most of the current project management methodologies still seem to underestimate the influence of the dynamic environment [5].

Bringing all that was discussed in this section together, project management is an emerging field, both in practice and research, with attention for moving from conventional project management (mechanistic) toward a more flexible approach, which takes the organic nature of project into account. In this movement, it is important to know the practitioners' point of view regarding such a flexible approach. Or, in other words, what practitioners find most/least important in "flexible" project management. Hence, this paper aims at exploring different perspectives on project management flexibility among practitioners.

This paper first presents a literature review on project management and (more) flexible project management in Section II. Next, the research methodology for exploring the perspectives is explained in Section III. The data collection and analysis are covered in Section IV. Section V presents the discussion, and Section VI concludes this paper.

II. LITERATURE REVIEW

This section provides the literature review, which will form the base of the research. It starts with a brief introduction to project management and its two main distinct approaches (mechanistic and organic). Next, flexibility as a new evolvement in project management will be discussed. The section will be concluded by providing the formed base for the empirical research.

A. Project Management

Project management is the disciplined application of certain knowledge, techniques, tools, and skills to create a unique product or service [23]. Project management is a growing subject and is defined by an expanding body of professional associations, standards, methodologies, and tools seeking to reduce failure. It has developed into a discipline alongside other management disciplines such as operation, information technology (IT), or finance [24]. Klein *et al.* [25] believed *"Project management is complex and therefore a fruitful ground for creative, spontaneous and intuitive application of particular theories to meet the stated objectives in a constantly changing environment."* With all the growth in project management science, in a recent study in 2014, Davis claimed that project management is immature as a research field, although project management processes must be in place for a project to be successful [26]. That there is room for improvement in project management practice is also stated by Sanjuan and Froese [27]. They concluded that weak project management practices continue to be commonplace, particularly among project owner organizations [27]. They recognize two contributing factors to poor PM practices: 1) project organizations are unaware of how their PM practices compare with best practices; and 2) project organizations are unaware and unconvinced about the value offered by various PM practices. Fernandes *et al.* [28] believed that realizing effective project management still is a challenge, although project management has developed and spread significantly in science, visibility, and importance as a powerful way to reach better project and (project-oriented) organization's performance [28].

The project manager can choose from a range of recommended approaches to manage any particular project: from very ad hoc to methodologies that completely and formally define all processes [28]. Traditionally, the project management process does not distinguish between different types of projects [23]. Differentiation in projects' size, uniqueness, and complexity potentially emphasizes on the necessity of a tailored management method. The choice of which particular processes will be employed in any situation is left to the judgment of the individual project manager [23].

Different scholars highlighted the recognition of required flexibility in project management: Smith and Irwin [29] by questioning the ability of traditional approaches to effectively deal with complexity and irrationality [29], Harvett [30] by emphasizing the need for a move toward an "uncertainty management paradigm," Priemus and van Wee [10] by arguing the ineffectiveness of a pure project management approach for nowadays projects, Hertogh and Westerveld [22] by emphasizing the required balance between control and interaction, Klein *et al.* [25] by recognizing that mechanistic, absolute, and universal conventional project management does not suit to address modern-day complexity, and Collyer and Warren [9] by emphasizing the required project management for dynamic environments.

Among the existing PM methodologies, a number of them are widely known, such as PMBOK, PRojects IN Controlled Environments (PRINCE2), and a guidebook for Project and Program Management (P2M) for enterprise innovation. These PM

methodologies are known as traditional waterfall approaches. However, even the project management guides and standards, which are known as conventional project management approaches, recognize the need for flexibility. For example, in the sixth edition of PMBoK [5], the project lifecycle has been grouped as phase to phase lifecycles, predictive lifecycles, iterative and incremental lifecycles, and adaptive lifecycles. In the later editions, the flexibility of project management is been acknowledged.

The development of Agile project management in IT is providing new views on flexibility in other industries [31]–[33]. The recognition of agility was leading to the introduction of new updates in some of the abovementioned well-known PM guides by combining the strength of both approaches. For example, PRINCE2 in 2015 introduced a new update, which is a hybrid version of waterfall and Agile [34].

To conclude the developments in project management: conventional project management approaches and practices are rational and linear, which is proven to be ineffective in successfully managing project complexity and the entire project life cycle [30]. The inflexibility of project management shows to be a deficiency in current practice and consequently, adding/increasing flexibility in project management attracts scholars' and practitioners' attention. Section II.B further elaborates on recent literature about flexibility in project management.

B. Flexibility in Project Management

Apart from highlighting the necessity of flexibility in project management (see Section II.A), a few other aspects strengthen the idea of making project management more flexible.

1) During the project life cycle, unknown unknowns will be (partly) transformed to knowns, which is called progressive elaboration. As a result, project scope and consequently time, cost, and relevant plans should be adapted periodically. It means that during the project life cycle, more detailed information about the project is being identified and being acted upon [35].

2) Changes are an unavoidable part of any project and (partially) should be incorporated in the project. The longer the contract period, the higher the chance that major changes will arise [16], [20].

3) Project managers are challenged to keep their projects focused and at the same time support their organization's need to adapt to changes and uncertainty in the business environment [36].

The above aspects emphasize the need for flexibility in project management. What is this flexibility? Flexibility can be defined as a competence of the project manager, as discussed by Turner [37]: *"the project manager should be empowered with flexibility to deal with unforeseen circumstances as they see best, and with the owner giving guidance as to how they think the project should be best achieved."* Flexibility may be described as a way of making irreversible decisions more reversible or postponing irreversible decisions until more information is available [36]. This refers to the following definition of flexibility of Olsson *et al.* as *"the capability to adjust the project to prospective*

consequences of uncertain circumstances within the context of the project" [36]. Flexibility can be related to the degree of modularity in projects. Modularity refers to the possibility to divide the project into more or less independent subunits [36].

All these definitions pinpoint similar facts about flexibility. What can be concluded from these provided definitions is unanimity about "adaptation to project circumstances and to the dynamics of the environment." This concluded commonality from the provided definitions forms the base definition of flexibility for this paper.

Some scholars put a step further and have researched the areas in which project management can become flexible from a theoretical point of view. In her research about the balance between order and chaos, based on a literature review, Geraldi [13] found four categories of flexibility (what, who, how, and when). She then, on the basis of practice, grouped flexibility of project management into six categories, adding "how much" and "where" to the general categories: what (scope and goals of project), how (process of project), who (team of project), when (scheduling of project), how much (budget responsibility and the hierarchical level of decisions), and where (where the tasks have to be realized). Osipova and Eriksson [38] recognized five categories using the categorization suggested by Geraldi [13]: what, how, who, where, and when.

C. Enablers of Flexibility

In order to operationalize flexibility in practice, it needs to be translated into managerial practices. By managerial practices in terms of flexibility, we refer to enablers, which, if applied in practice, make project management flexible. Recent literature focused on identifying the flexibility enablers of project management [36], [38]–[40]. In those research works, however, the focus was either on the effect of a single flexibility enabler such as flexible working spaces [39] or more general on flexibility practices [37], but a compilation of flexibility enablers was lacking.

Previous research of the authors compiled the enablers of flexibility in project management based on literature review and interviews with practitioners [41], [42]. Flexibility enablers were grouped into the areas of flexibility suggested by Osipova and Eriksson [38]: what, how, who, where, and when. This categorization issued for exploring patterns among the practitioners' perspectives in this paper. In Section V, in the figures different patterns are used to recognize the categories of flexibility enablers.

The first area of flexibility is "flexibility of what" including three enablers, which focuses on the way the scope needs to be defined contract-wise and also the attitude toward the changes. The second area of flexibility is "flexibility of how," which focuses on the project management processes. Open attitudes toward exchange of information [3], preparing for the unexpected situations by, for example, contingency planning [36], keeping more alternatives open [10], and network project organization [43] are some examples related to flexibility of the project management processes. The third area of flexibility is "flexibility of who," which includes the enablers contributing to flexibility

TABLE I
FLEXIBILITY ENABLERS (BASED ON SOHI *ET AL.* [41], [42])

Category		Flexibility enablers	Main Source
What	1	Broad task definition	[3]
	2	Embrace change as much as needed	[36], [10]
	3	Functional-realization based contract	[3]
How	4	Self-steering of the complete project team	[3]
	5	Open information exchange among different groups	[3]
	6	Shared interface management	[3]
	7	Contingency planning	[36]
	8	Seizing opportunities and coping with threats	[45]
	9	Trust among involved parties	[11]
	10	Standardize the process and design	[14, 46]
	11	Visualized project planning and progress	[43]
	12	possible alternatives	[10]
	13	Network structure rather than hierarchical structure	[43]
	14	Continuous learning	[14, 46]
Who	15	Consensus amongst team members	[44]
	16	Stable teams	[43]
	17	Self-assigned individuals to tasks	[44]
	18	Team priority over individual priority	[43]
	19	Team members as stakeholders	[43]
When	20	Late locking	[36] [47]
	21	Short feedback loops	[44]
	22	Continuous locking (iterative)	[36]
	23	Iterative planning	[44]
	24	Iterative delivery	[43]
Where	25	Joint project office	[38]
	26	Have flexible desks	[38]

of the project team. Stable teams [43] and self-assigned individuals to tasks [44] are two examples of how the flexibility of project management in terms of project team can be increased. The fourth area is focused on schedule flexibility and named "flexibility of when." Iterative planning [44], iterative delivery [43], and late locking [36] are some examples in this category. The last area of flexibility, "flexibility of where," includes two enablers, which focus on where the tasks have to be done: joint project office and flexible desks [38]. All flexibility enablers are presented in Table I.

III. RESEARCH METHODOLOGY

In this section, first an overview of Q-methodology as the used research methodology is provided. Next, the profile of respondents (P-set) who are the participants in this paper is discussed.

A. Q-Methodology

After a thorough literature study on flexibility in project management and interviews with practitioners, 26 elements of flexibility were concluded. In order to apply these flexibility elements in practice, it is important to know what practitioners find most/least important among these elements, or more precisely, what ranking practitioners give to certain elements. To reach this target, the Q-methodology was chosen as a research methodology. By Q-methodology, a great deal of emphasis is put on the importance of having an inquiring attitude (exploratory research) rather than simply testing one's reasoning (hypothesis testing) [48]. Q-methodology allows a researcher to explore the subjectivity of human being opinion on a complex problem, which is done by giving weight (importance to statements in q-sorting exercise) [49]. Thereby, the results of a

Q-methodological study can be used to describe a population of viewpoints [50]. Q-methodology was created by psychologist-physicist William Stephenson in the 1950s to provide the basis for a scientific approach to human subjectivity, and he subsequently presented an in-depth description in his book that was published in 1953 [51]. Davis and Michelle [52] claimed that Q-methodology is a research method that effectively combines qualitative and quantitative dimensions in a truly hybrid manner. It systematically uncovers and analyses similarities and differences in the subjective viewpoints of individuals. It is an exploratory, interpretation-intensive methodology, suitable for small populations of respondents, and is "fortified" [53] through resources to the statistical operation of factor analysis. One of the characteristics of Q-methodology is, unlike survey designs that will often consider minority voices as insignificant, all voices of respondents are "heard" and have equal relevance in Q-methodology [54].

Q-methodology relies on a small sample [53], [55]–[57] of purposively selected respondents rather than random sampling or large sample sizes. A small sample of respondents is sufficient as far as they represent plausible diverse opinions regarding the topic under investigation [53]. Donner [49] stated that even one participant is worthy of review and hence meaningful but discernible groups can be found with as few as a dozen participants. The number of participants (P-set) usually is smaller than the Q-set [58]. The aim is to have four or five persons defining each anticipated perspectives, which are often two to four. The P-set is not random but a structured sample of respondents who are relevant to the subject [53].

The method can be used in any research field where subjectivity is an issue, including attitude measurement [51], [59]. Q-methodology has been employed in different research areas since 1960s [52], [60]–[67].

To apply Q-methodology, a number of steps should be taken. The first step is gathering the statements. The statements are often presented as multiple possible answers to a given umbrella question. The Q-statements of this study are those 26 enablers of flexibility derived from the literature study and interviews. For the umbrella question, the respondents were given a sentence that they should complete while doing the sorting exercise. For this study, respondents were asked to do the sorting by completing the following sentence: "*In order to make project management in the planning phase of infrastructure projects more flexible, it is important to have/do _ _ _ _.*" In the next step, each participant assigns the statements to each potential value that ranges from "least agree" to "most agree." filling a predefined distribution sheet (typically in the form of a quasi-Normal distribution). Each person uses his/her own subjective criteria to evaluate the relative agreement on each statement. Since the same Q-sorting exercise is given to different people, a researcher can look at the patterns of responses to uncover and name distinct "points of view." The factor analysis was carried out by means of the freeware program named PQMethod [68]. The outputs of Q-analysis consist of the following.

1) Which criteria or statement were rated at the same level (either high, low or neutral) by most participants.

TABLE II
SUMMARY OF FACTOR ANALYSIS FOR CLIENT AND CONSULTANT DATA

	Extracted factors	2	3	4	5	6	7	8
Client	Cumulative % of explaining variance	45	54	62	69	76	80	84
	Number of acceptable factors	-	3	4	5	4	3	3
	Number of defining sorts	-	17	18	15	16	14	14
	Number of non-loader(s)	-	2	-	-	-	-	-
	Number of confounder(s)	-	2	3	6	5	7	7
Consultant	Cumulative % of explaining variance	41	51	60	68	75	80	95
	Number of acceptable factors	-	3	4	4	6	3	3
	Number of defining sorts	-	19	18	18	19	13	12
	Number of non-loader(s)	-	2	-	-	-	-	-
	Number of confounder(s)	-	1	4	4	3	9	10

2) Which statements are distinguishing, meaning that they were agreeable to some participants and disagreeable to others.
3) What the distinct subgroups (or perspectives) are within the set of participants who have a similar pattern of responses.

B. P-Set

Since the scope of this paper is narrowed down to the front-end development phase of infrastructure projects in the construction industry, the sample of respondents is limited to those who have experience in this phase of such projects. In most projects, there are two main parties involved in this phase: client and (engineering and management) consultant. It can be the case that a design and build contractor takes the role of a consultant but this is not very common yet. Therefore, only respondents from clients and consultants were targeted.

In order to investigate the differences between these two roles in projects, the same number of respondents from each group was targeted. To also investigate the potential influence of organization culture, three different organizations were invited from each role (client and consultant). From each organization, a minimum of six respondents was required. Data were gathered from 44 respondents in total. Since one of the respondents did not complete the questionnaire correctly, 43 questionnaires were included in the data analysis. In total, 22 out of the 43 respondents belonged to consultancies and 21 respondents to client organizations.

IV. FACTOR ANALYSIS

In this section, the analysis of the gathered data is presented. For comparing the perspectives of clients to consultants, it was decided to run the analysis in parallel for each data set. Such split enables to study a potential link between identified perspectives and organizational culture or project role (client/consultant).

Using the earlier-mentioned PQMethod software for factor analysis, principal component analysis and varimax rotation were chosen to extract the factors. According to Kline [69], "a factor is a dimension or construct which is a condensed statement of the relationships between a set of variables." In order to find the right number of distinguished perspectives (factors)

in our study, different factor-solutions were extracted. Table II summarizes the results of factor analysis from 2 to 8-factor solution per data set.

Next, the number of meaningful factors (perspectives of practitioners toward flexible PM in our study) were identified. According to Brown [53], some rules should be applied. Each acceptable factor should be defined by at least two significant Q-sorts whereby

1) a q-sort x is loaded significantly at $p < 0.05$ on a factor y if its factor loading, $f_{xy} > (1.96/\sqrt{N})$ where N is the number of statements. For our setup, this results in $f_{xy} > 0.38$;
2) its highest square factor explains more than half of the common variance.

Additionally, the following criteria apply.

1) Amount of nonloaders preferably is low (nonloaders are those respondents who do not belong to any of the extracted factors).
2) Amount of confounders preferably is low (confounders are those respondents who belong to more than one extracted factor).
3) Cumulative % of explained variance is more than 50%.

The results of the factor analysis in this study are summarized in Table II. First, the steps to select the optimal number of factors for the client data set are explained.

1) The first criterion to check is the cumulative explained variance, which should be higher than 50%. According to Table II, the minimum number of factors is 3.
2) The second criterion is the number of acceptable factors. The number of *acceptable factors* should be equal to the number of *extracted factors*. The 6-, 7-, and 8-factor solutions show a low number of acceptable factors. Hence, the preferred solution has 3, 4, or 5 factors.
3) The third criterion is the number of defining sorts. The 5-factor solution is rejected because compared to 3- and 4-factor solutions, it is defined by a lower number of sorts. The 5-factor solution is explained by 15 out of 21 respondents, compared to 17 for the 3-factor solution and 18 for the 4-factor solution.
4) The last criterion to select the optimal solution is the distinguishing statements per factor (qualitative data analysis). For a decision between the 3-and 4-factor solutions,

distinguishing statements were analyzed. It was concluded that the 3-factor solution was more outspoken than the 4-factor solution. Hence, the 3-factor solution was selected for the client data set.

A similar process was followed with the consultant data set.

1) Based on the information given in Table II, also for this data set, the minimum acceptable number of factors is 3, given the cumulative explained variance.

2) The 5-, 7-, and 8-factor solutions show a low number of *acceptable factors* compared to extracted factors (based on criterion of at least two defining sorts per factor).

3) Next, the distinguishing statements for each solution were analyzed. The 3-factor solution is more outspoken than the other acceptable solutions. Hence, the 3-factor solution was selected for the consultant data set.

According to Table II, two respondents from consultant organizations and also two respondents from client organizations do not belong to any of the perspectives (nonloaders). According to literature [53], [57], the nonloaders should be removed from the data set since they cannot be assigned to any of the revealed perspectives. Therefore, the three perspectives of client organization are defined by 19 out of 21 respondents and the three perspectives of consultant organizations by 20 out of 22 respondents.

In the next section, the three perspectives of the client organizations and the three perspectives of the consultant organizations are elaborated in more detail.

V. CLIENT PERSPECTIVES AND CONSULTANT PERSPECTIVES

In this section, first the derived perspectives of client organizations are described, followed by a description of the derived perspectives of the consultancy organizations.

A. Client Perspectives

Based on the factor analysis, the client respondents are grouped into three perspectives. The perspectives are named inspired by the distinguishing statements and the ranking of the flexibility enablers in the perspectives. The three perspectives are: trust, scope flexibility by contract flexibility, and proactive management.

1) Perspective 1. Trust: Fig. 1 shows the ranking of flexibility enablers given by the seven respondents who form Perspective 1. Trust is the most important enabler of flexibility for these people. Respondent 3 believes "a good project result starts with trust." "Short feedback loops" and "open information exchange" are other high-ranked enablers, which inherently help in building "trust" among parties and team members. Statement 10, "standardization of process and design" is given least importance in this perspective. Respondent 2 states: "standardization focuses on defaults instead of content/process." Respondent 18 states: "Flexibility demands tailor made processes and products." Additionally, "self-steering of team" is ranked low in this perspective. Respondent 10 believes: "For flexibility direction/process, control is required. I wonder if this could happen with self-steering teams." The observation made by this respondent regarding required control for being flexible

is also mentioned in literature [44]. Cobb [44] believed that there is no contrast between control and flexibility (agility). In his opinion, the contrast is between being "overcontrolled" and flexibility.

Different colors (patterns) were used to differentiate between the clusters of flexibility in the following figures. Fig. 2 shows the used colors (patterns) for each cluster of flexibility enablers.

Level of education, field of study, work experience, and current position for the respondents in Perspective 1 presented in Appendix 1. B.Sc. and M.Sc. respondents loaded on this perspective, with a diverse background in terms of field of study. The total years of experience for the respondents in this perspective ranged from 11 to 30. The dominant position in this perspective is "project manager" (five out of seven respondents).

2) Perspective 2. Scope Flexibility by Contract Flexibility: The second perspective of client respondents is summarized by

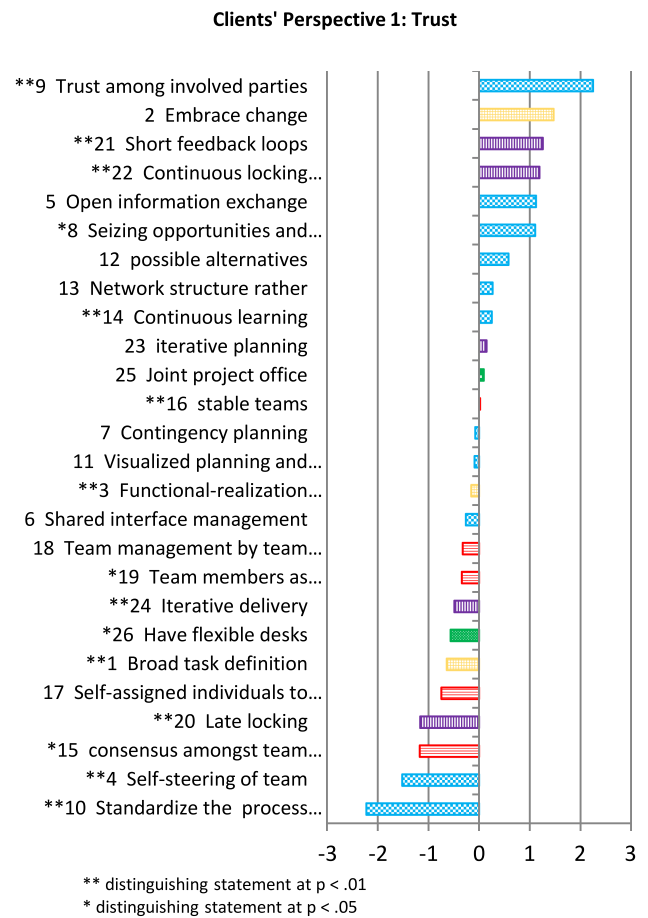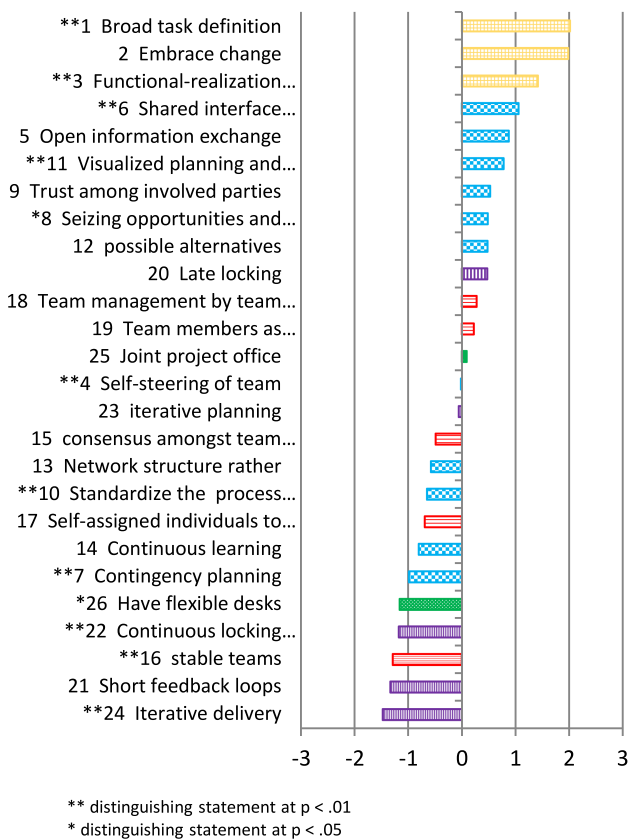**Clients' Perspective 1: Trust**

Fig. 1. Ranking of flexibility enablers from clients' perspective 1 point of view.

Fig. 2. Colors (patterns) used for clusters of flexibility enablers.

Fig. 3.   Ranking of flexibility enablers from clients' perspective 2 point of view.

Fig. 4.   Ranking of flexibility enablers from clients' perspective 3 point of view.

"flexibility through scope management and contractual flexibility" (five respondents). The ranking of the flexibility enablers in this perspective is shown in Fig. 3.

This perspective gives the highest rank to those enablers, which contribute to scope flexibility by contract. The statements of "broad task definition" and "functional-realization contract" are among them. Respondent 9 states: "broad task definition offers space at the highest abstraction level to ask or drop parts to provide value for money as much as possible to all stakeholders." Regarding functional-realization contract, he also states: "think as much as possible in terms of values instead of solutions and prevent speed thinking." Respondent 8 states: "functional specification does not provide a specific solution and increases flexibility with regard to the final solution." Flexibility enablers of planning such as "iterative delivery" and "continuous locking" are ranked low. Respondent 9 states: "iterative delivery limits the solution for the remaining parts of the project at an early stage."

The dominant role of respondents in perspective 2 is on management level (project manager, program manager, project leader/director, and assistant project manager). Total years of experience of respondents ranges from 11 to more than 30 (see Appendix 1).
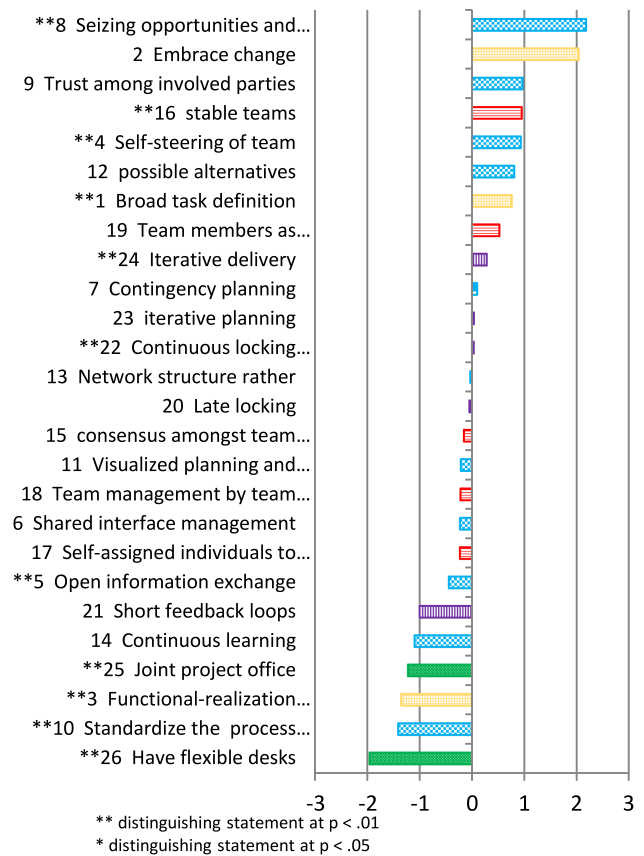
3) Perspective 3. Proactive Management: Perspective 3 is characterized as "proactive management." In total, seven participants form this perspective. The ranking given to flexibility enablers by this perspective is shown in Fig. 4. "Seizing opportunities and coping with threats" is the most important enabler of flexibility from their viewpoint. "Contingency planning" is also important for this perspective. These flexibility enablers emphasize the way that management could be proactive. Another distinguishing enabler ranking high in this perspective is "stable teams."

Respondent 4 believes that "seizing opportunities and coping with threats" is working closely with enabler number 2 "embracing change." He believes that by seizing opportunities, the project team can look for the bigger project goal and they also could turn threats to opportunities. Respondent 7 states that "contingency planning" keeps the project team sharp about the project by reminding them the question: "do we do the right things or is plan B maybe good or even better?" Respondent 14 states "good opportunities and risk management help you to look forward to seeing where you should anticipate changes and helping you determine where you will be flexible in the future." "Joint project office" is ranked low from this perspective point of view. Respondent 17 states "by having joint project office you create an island for your project." "Functional-realization

Fig. 5. Ranking of flexibility enablers from consultants' perspective 1 point of view.
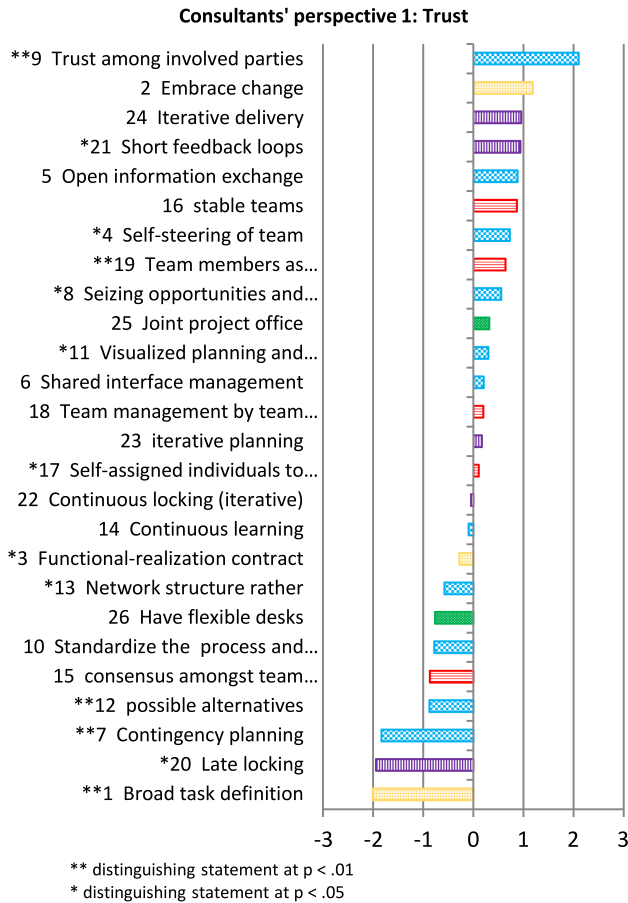

Fig. 6. Ranking of flexibility enablers from consultants' perspective 2 point of view.

contract" is one other low-ranked enabler. Respondent 12 states "functional specification should provide room for change. But the process of reaching a package of functional requirements within the set-time is often so tight."

The profiles of the respondents who form this perspective are very diverse (see Appendix 1). Overall, their dominant function is "project manager" and the dominant duration of working experience is 21 to 25 years.

B. Consultant Perspectives

The respondents from the consulting organizations are also grouped into three perspectives: trust, scope flexibility by contract flexibility, and proactive management.

1) Perspective 1. Trust: In total, 7 out of 19 respondents loaded on this perspective. The ranking of flexibility enablers from perspective 1's point of view is shown in Fig. 5. This perspective finds "trust" the most important enabler of flexibility. Respondent 25 states "If there is little/no trust, a situation arises where one party try to control the others. Then flexibility in processes will be hampered." "Short feedback loops" also ranked high. Respondent 26 states "Short feedback loops allow you to quickly change. Therefore, there will be little loss of time when something goes wrong."
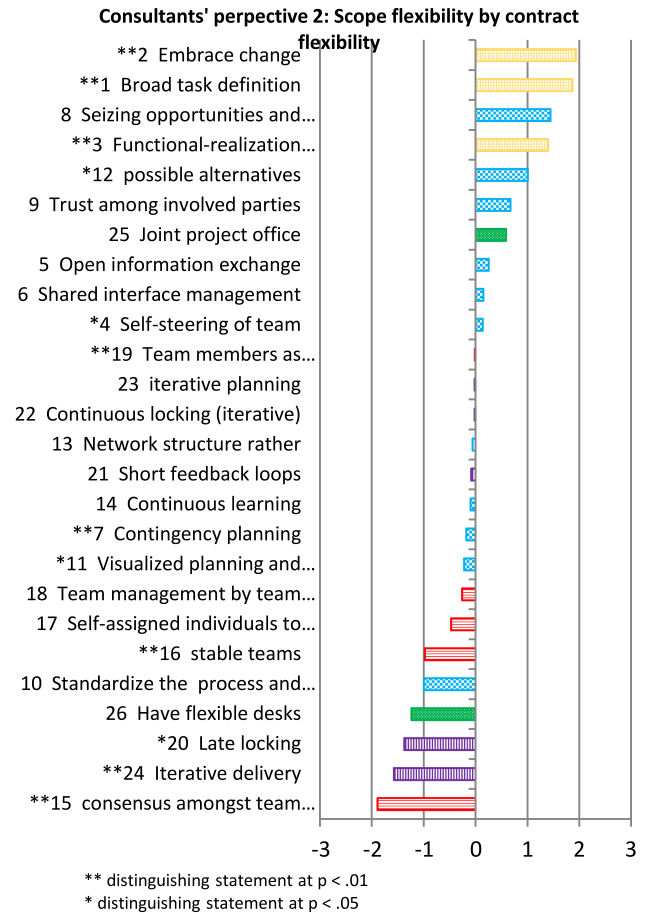
For perspective 1, flexibility in contractual agreements is not important as we can see from Fig. 5 (enablers 3 and 1 were ranked low). Respondent 32 explained: "detailed work packages make it possible to determine the lead time. Hence little uncertainty, and planning at maximum flexibility." "Late locking" is also ranked very low from perspective 1's point of view. Respondent 30 illustrated: "fixing the design at early stage gives flexibility in the process later."

For this perspective, the respondents are very diverse in terms of current position. The total years of experience ranges from none to 25 years. The respondents have educational background in only two fields: civil engineering and environmental sciences, where civil engineering is the dominant background study for this perspective (see Appendix 1).

2) Perspective 2. Scope Flexibility by Contract Flexibility: Perspective 2 of the consultant data is similar to perspective 2 of the client data. Both find contractual flexibility very important. "Embracing change" is the highest ranked enabler from their viewpoints, see Fig. 6. Respondent 44 stated: "an open attitude towards change is necessary to be flexible. Flexible project management stands or falls with the willingness of project team members to change." He also explained that "functional specification is important because this encourages to look for the best

design and use the creativity and knowledge of the project team members. If everything is precisely described, it leaves no room for flexibility." Respondent 40 illustrated that "it is important to know what needs to be done. This translates into a functional specification and clear requirements for deliverables, services, etc. The way in which these products, services, etc. are delivered is to the project manager."

Enabler #20, "making decision at the last responsible moment" is ranked low. Respondent 40 stated: "it is not a good idea to make decisions at a late moment. Meanwhile, decisions are also needed. If you do not take it, then you introduce big risks …." "Stable team," which is a distinguishable statement for this perspective is ranked low. Respondent 44 mentioned: "it's nice if the core team is constant. But fresh blood is also important because it prevents tunnel vision and challenges again to think further (are we still on the right track?)." "Iterative delivery" is also ranked very low. Respondent 38 stated: "delivery in parts directly limits variations/alternatives with those delivered parts, with which the flexibility decreases instantly."

According to the demography of respondents in this perspective (see Appendix 1), the total years of experience and current position of respondents are diverse, whereas their field of study is limited to civil engineering and planning.

3) Perspective 3. Proactive Management: Perspective 3 in the consultant data set gives a high ranking to enablers, which contribute to proactive management such as "possible alternatives," "contingency planning," and "seizing opportunities and coping with threats." The ranking given by perspective 3 to flexibility enablers is shown in Fig. 7.

Respondent 33 explained about the statement of "possible alternatives": "Flexible management does not mean you should not have a plan. It is important to consider some scenarios: what if …? So that it can be quickly dealt with deviations." Unlike other perspectives, "continuous locking" ranked very high prom perspective 3's point of view. Respondent 37 stated "In a plan study there are many external influential factors. By iterative locking of decisions, they can be kept updated." "Functional realization contract" is a low-ranked enabler of flexibility from perspective 3 point of view. Respondent 33 stated: "the specifications do not affect the manner of management."

In all, 20% of respondents from consultancy organizations are in this perspective. As can be seen from the figure in Appendix 1, there is no outstanding characteristic, which describes the respondents of this perspective.

VI. DISCUSSION

Having presented the perspectives identified in data subsets (client and consultant respondents), now the perspectives of the two data subsets are compared. Next, the overall ranking given to the flexibility enablers by each group of respondents is discussed. Finally, the findings are connected to current literature.

A. Comparison of Perspectives Between Client and Consultant Respondents

As mentioned in Section III, the respondents were selected from client and consultancy organizations since these
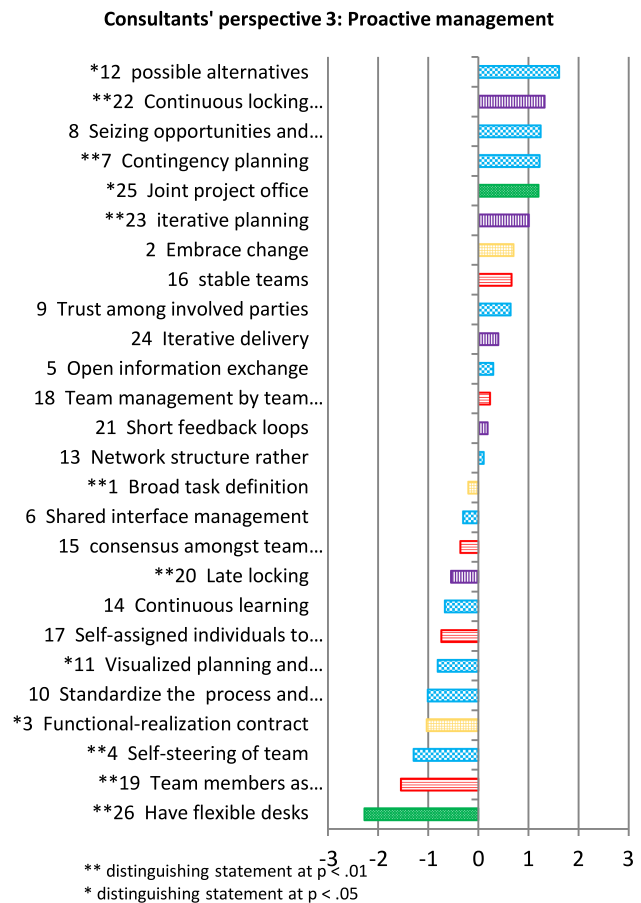

Fig. 7. Ranking of flexibility enablers from consultants' perspective 3 point of view.

organizations play the biggest role during the front-end phase of infrastructure projects. The analysis resulted in three perspectives per data set (see Section V). These perspectives showed considerable parallels, which are now discussed in more detail.

The Perspective "Trust" appears in both data sets (Perspective 1 in the client respondents and Perspective 1 in the consultant respondents), which means "trust" and its related enablers ranked high as distinguishing statements for group of practitioners regardless of the fact that they work for client or consultant organization (see Figs. 2 and 5). However, also some differences were found. All team-related enablers (bars in red color in the figures) ranked relatively low from clients' point of view but from consultants' point of view some of these enablers (such as enabler #16 "stable teams") ranked high. One other main difference between these two is regarding enabler #4 "self-steering of team." For consultant respondents, it was ranked medium high but, for client respondents, it was ranked very low. Hence, the consultant respondents intend to keep working with the same team for different projects, which for them contributes to flexibility. Client respondents find it less important to have stable teams. Both "stable teams" and "self-steering teams" are recommended by Agile project management [43], [44]. So to conclude: the way the project team is organized seems much more important for respondents from consultancy respondents than for the client respondents who share opinions in the "trust" perspectives.

The second shared perspective between both data sets was "Scope flexibility by contractual flexibility. Looking at the overall ranking of flexibility enablers of this perspective, there are not many differences between the client respondents and the consultant respondents in the corresponding perspectives. The enablers #20 "late locking" and #11 "visualized planning and progress" were the two that ranked differently (high for client and low for consultant respondents). "Visualized planning and progress" is more important for the client respondents than for the consultant respondents. Although the client typically is not the party who performs the project, they like to have the overview of what is happening in the project at a glance. The enabler #20 "late locking" incorporates the changes that might happen during a project. Client respondents rank it higher than consultant respondents, probably because they favor a more open attitude in fixing the design and the plan.

The third perspective for both data sets was "Proactive management." The enablers that contribute to a proactive approach, such as "seizing opportunities and coping with threats," "possible alternatives," and "contingency planning" ranked high in this third perspective. Additionally, some differences were found. For consultant respondents, the "when" category of the enablers ranked higher compared to the client respondents' viewpoint (purple bars in Figs. 4 and 7). This means that consultants favor a more iterative approach in their scheduling. In a case study research on scrum projects, it was found that clients showed less interest in participation in scrum meetings [70], whereas the client collaboration is a core value in Agile [43] and client collaboration would be accomplished by intense involvement in the process. This implies that although close collaboration among parties is desired, the iterative process is not favorable as a way to operationalize close collaboration. From the category of "where," enabler #25 "joint project office" was another outstanding difference. Client respondents seem to have less willingness in having a joint project office. This might be also related to the fact that most people at client organizations are multitasking and have to deal with different projects at the same time. Indeed, in earlier research, multitasking was observed to be a problem in practice [70].

The overall conclusion made by comparing the two subsets of data (clients and consultants) reveals that although the same three perspectives exist in both client and consultant organizations, there are differences in parallel perspectives. For example, if the perspective "trust" is the shared perspective for both groups of respondents, not necessarily the same importance is given to all flexibility enablers. Why do these similar perspectives exist in both data sets? The first explanation is that there is a close relationship between client organizations and consultancies in the front-end phase of projects. Close relationships and collaboration might have an effect on the mindset of people who work in this context. Consultancies provide services for client organizations and hence they more likely adapt their approach to be consistent with their client organizations. The second explanation is that the perspectives might be influenced by the context of the industry (in this case construction industry) or the type of project (in this case infrastructure projects). Therefore, the hypothesis here is that the people who work in same context have same perspectives, which could be tested in further research.

TABLE III
DISTRIBUTION OF RESPONDENTS PER ORGANIZATION PER PERSPECTIVE

	Perspective 1	Perspective 2	Perspective 3
Client organization 1	3	1	2
Client organization 2	2	3	3
Client organization 3	2	1	2
Consultancy organization 1	6	2	1
Consultancy organization 2	1	5	-
Consultancy organization 3	-	2	3

Looking back at the demography of the respondents per perspective, it is concluded that there is no relationship between the identified perspectives and the profile of the respondents. Distribution of respondents from each organization throughout the perspectives was observed, though. The three perspectives of clients have representatives from all client organizations. The distribution of respondents from consultancies into perspectives has some patterns: Table III shows that six out of nine respondents from consultancy organization 1 are belonging to perspective 1. Additionally, five out of six respondents from consultancy organization 2 belong to perspective 2. This suggests an influence of the organizational culture of consultancies on their view regarding flexible project management. For example, consultancy organization 2 has no respondents in perspective 3 "proactive management" and they mostly loaded in perspective 2 "scope flexibility by contractual flexibility." The resulting hypothesis here is that the management culture in such organization puts less emphasis on "interactive management" or "trust" than the other two perspectives. This could be a future research direction. Needless to say that organizational culture is a very broad topic. Therefore, it was not possible to explore the effect of organizational culture on practitioners' perspectives in this research. However, the results suggest that the organization culture in consultant organizations might have an effect on the mind-set (perspective) of people who work in those organizations.

B. Overall Ranking of Flexibility Enablers

Previously, it was discussed that there are three corresponding perspectives per data subset. Hence, the overall ranking of flexibility enablers per data set must rather similar. Fig. 8 illustrates the overall ranking each group of respondents (clients or consultants) gave to the flexibility enablers. It can be seen that indeed the defining enablers were given similar priority but some were ranked differently. For example, enabler #25 "joint project office" is ranked high for consultants but low for clients.

The three top ranked enablers from clients' point of view are "embrace change," "seizing opportunities and coping with threats," and "trust." The enabler "embracing change" was ranked high in all perspectives, which means unanimously respondents from client organizations believe for flexible project management it is needed to embrace change. The enablers "seizing opportunities and coping with threats" and "trust" both appeared as distinguishing statements for separate perspectives. Although "trust" as such was a distinguishing statement for one of the perspectives, it was ranked relatively high also for the other perspectives. The same applies for "seizing opportunities and coping with threats." It can be said that regardless of the
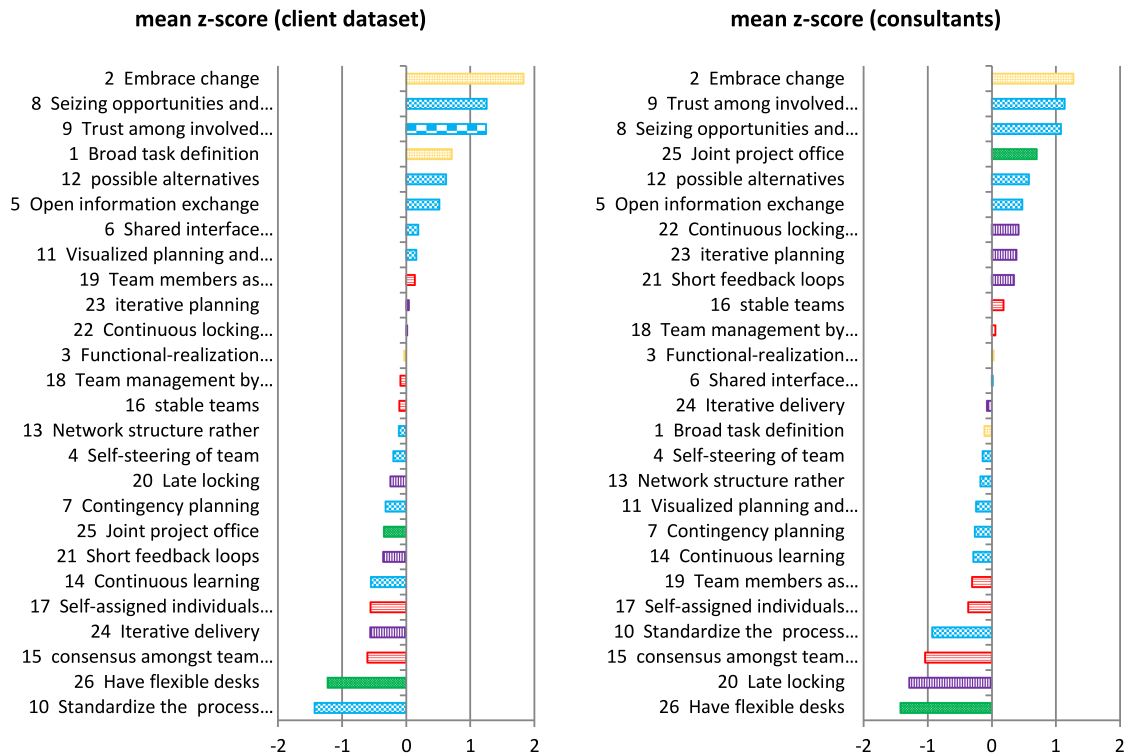
Fig. 8.   Overall ranking of flexibility enablers from the two data sets' point of view.

existence of different perspectives in any organization, the top three enablers of flexibility are the aforementioned ones.

The three top ranked flexibility enablers from consultants' point of view are the same ones as the client respondents' point of view, albeit in different order: "embrace change," "trust," and "seizing opportunities and coping with threats."

The top ranked enablers and also derived perspectives for both clients and consultants are the same. Based on this observation, it can be concluded that the general mindset of practitioners who work in client and consultant organizations regarding flexibility in project management has the same line of thoughts. This empowers the hypothesis that the role of the organization (client or consultancy) as such has no influence on the studied subject (flexible project management). Particular company culture, however, could influence the results.

C. Scientific Contribution and Managerial Implications

In this section, the contribution of this work to theory of project management and its applicability in practice is discussed.

Some research highlights the necessity of studying the flexibility of project management specifically for infrastructure projects in construction industry [3], [13], [36], [71]. But very little research is done in how flexible project management can be defined or implemented. An important step is to identify the mindsets of practitioners regarding flexibility. By using Q-methodology as a powerful research method to study the subjectivity, we looked into the practitioners' perspectives on

the flexibility of project management. By contributing to bridging the gap in literature, this research forms the base for further studies on the appropriateness of flexible project management. Therefore, this paper initiates a research stream about flexibility in project management. The outlook of this paper will include studying the operationalization of flexibility enablers in practice based on the revealed perspectives and practitioners' preferences, investigating the effect of flexibility on project performance and project success.

Understanding the different practitioners' perspectives sometimes misleads to giving priority to certain statements (in this paper, the flexibility enablers), which should not be the case. Still, the results help in understanding the different viewpoints that exist on the studied topic, including their similarities and differences. The existence of different perspectives hence is not conflicting but should be considered as complementary.

The results of this study reveal three perspectives per organization type, rather similar for client respondents and consultant respondents. This yields a first managerial implication: the existence of these similar perspectives facilitates the relationship between client and consultant. Next to that, as it was discussed in Section VI.B, the overall ranking of flexibility enablers are almost the same for both clients and consultants (same top three enablers and same perspectives).

The first shared perspective for both clients and consultants was "Trust." We can say that "Trust" as such is a must-have property for flexible project management since it turns out as a perspective for both parties. It is not only "Trust" as a single enabler but the existence of a group of related enablers (for

example, "open information exchange"). The second shared perspective was "Scope flexibility by contractual flexibility." This group intends more toward flexibility in hard aspects of project management and more specifically in project scope definition and contracting. The third shared perspective was "Proactive management," which is distinguished by predictive management actions such as "seizing opportunities and coping with threats," "possible alternatives," and "contingency planning" among others.

From the common five identified categories of flexibility (what, who, how, when, and where) by literature [13], [38], only the "what" or scope category reveals as a perspective in this study. The other four clusters of flexibility enablers suggested by literature did not appear as perspective of practitioners indicating the difference between the practical view and the theory regarding the clusters of flexibility enablers.

VII. CONCLUSION

Literature pinpoints the necessity of being flexible in project management but so far little research was done on the implication of flexibility in practice. We believe that if we want to embed flexibility in the practice of project management, we should first know what different practitioners' mindsets are regarding this concept. In this paper, Q-methodology was applied on data from 43 respondents (six different organizations in The Netherlands), exploring perspectives of practitioners on project management flexibility. For this paper, two types of organizations were targeted; client and consultancy organizations. This decision was made because the scope of this paper was limited to the front-end phase of infrastructure projects and this phase normally is done by consultancy organizations in request of clients.

Three similar perspectives were revealed per organization type, implying that clients and consultancy organizations have similar mindsets regarding flexible project management. The three perspectives are: "trust," "scope flexibility by contractual flexibility," and "proactive management." Although the perspectives are the same for clients and consultants, there are some differences in the counterpart perspectives. This can be explained because of different demands and requirements in client and consultant organizations. In the perspective "Trust," the team-related enablers (category of who) relatively ranked higher for consultants compared to clients. In the perspective "Scope flexibility by contract flexibility," the team related enablers ranked relatively higher for clients. In third perspective, "Proactive management," the enablers, which belong to category of "when," ranked relatively higher for consultants rather than for clients.

We observed that there is no relationship between the profile of respondents and the perspectives they belong to. The only observed relationship was between the organizational culture and the perspectives for consultancy organizations.

The theoretical contribution of this paper lays in a few themes. Although literature investigated the flexibility of project management, no research into practitioners' perspectives on this subject was reported. The use of Q-methodology as a research method in the context of flexible project management is another theoretical contribution of this paper. Last but not least, this paper explored the concept of flexibility from two viewpoints: client organizations and consultancies, whose relationship in the early phases of infrastructure project is undeniable. The similarities and differences found provide a starting point for improving their collaboration.

Practitioners can benefit from the research results by understanding the different perspectives and priorities in flexibility enablers. For empowerment of each perspective, it is recommended to operationalize the enablers, which ranked high for such perspective. Scholars can further develop research into how to embed flexibility enablers into practice, considering the different perspectives and their commonalities. Additionally, further research is suggested into the influence of the project phase on the perspectives identified. Last but not least, the inclusion of contractors as a third data set could be considered. This study was performed in The Netherlands and in Dutch organizations. Consequently, the derived perspective cannot be considered as exhaustive representation of all possible country ,cultures which might influence the results. Such limitation leaves room for future research on cultural differences.

APPENDIX 1
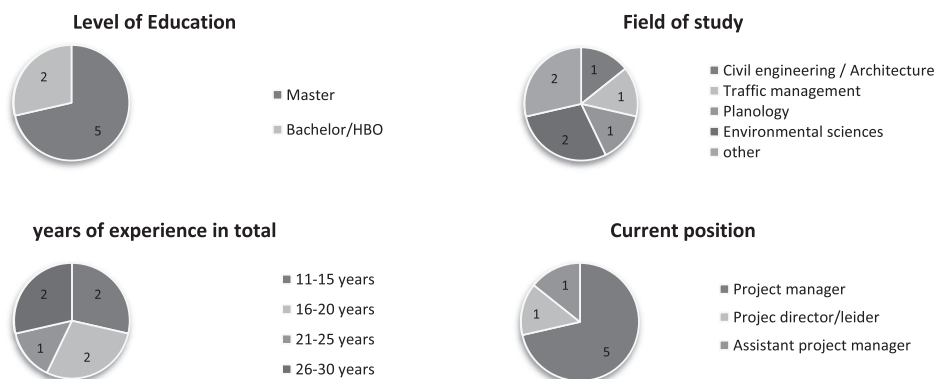### DEMOGRAPHY OF RESPONDENTS PER PERSPECTIVE

See Figs. 9–14.

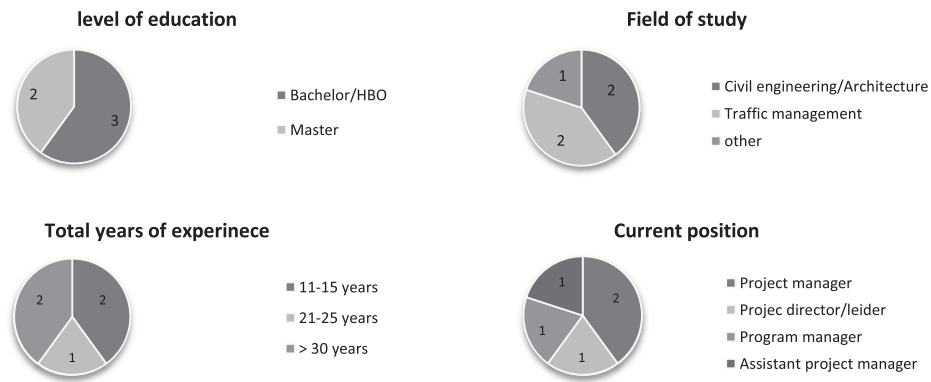Fig. 9.   Demography of respondents in clients' perspective 1.

level of education

Field of study

- Bachelor/HBO
- Master

- Civil engineering/Architecture
- Traffic management
- other

Total years of experinece

Current position

- 11-15 years
- 21-25 years
- > 30 years

- Project manager
- Projec director/leider
- Program manager
- Assistant project manager

Fig. 10. Demography of respondents in clients' perspective 2.

level of education

Field of study

- Bachelor/HBO
- Master

- Civil engineering/Architecture
- Traffic management
- Environmental sciences
- other
- not know

Total years of experience

Current position

- 11-15 years
- 16-20 years
- 21-25 years
- 26-30 years
- > 30 years

- Project manager
- Projec director/leider
- Senior manager
- Program manager
- Assistant project manager
- other management functions

Fig. 11. Demography of respondents in clients' perspective 3.

level of education

Field of study

- Master
- Bachelor/HBO

- Civil engineering/Architecture
- Environmental sciences

Total years of experinece

Current position

- 0-5 years
- 6-10 years
- 16-20 years
- 21-25 years

- Project manager
- Projec director/leider
- Project advisor
- Assistant project manager
- other management functions

Fig. 12. Demography of respondents in consultants' perspective 1.

level of education

Field of study

- Master
- Bachelor/HBO
- not know

- Civil engineering/Architecture
- Planology

Total years of experinece

Current position

- 0-5 years
- 6-10 years
- 16-20 years
- 21-25 years
- 26-30 years

- Project manager
- Projec director/leider
- Senior manager
- Project advisor
- other management functions

Fig. 13. Demography of respondents in consultants' perspective 2.

level of education

■ Master
■ Bachelor/HBO
■ PhD

Field of study

■ Civil engineering/Architecture
■ Environmental sciences
■ other

Total years of experience

■ 0-5 years
■ 16-20 years
■ 21-25 years
■ 26-30 years

Current position

■ Project manager
■ Projec director/leider
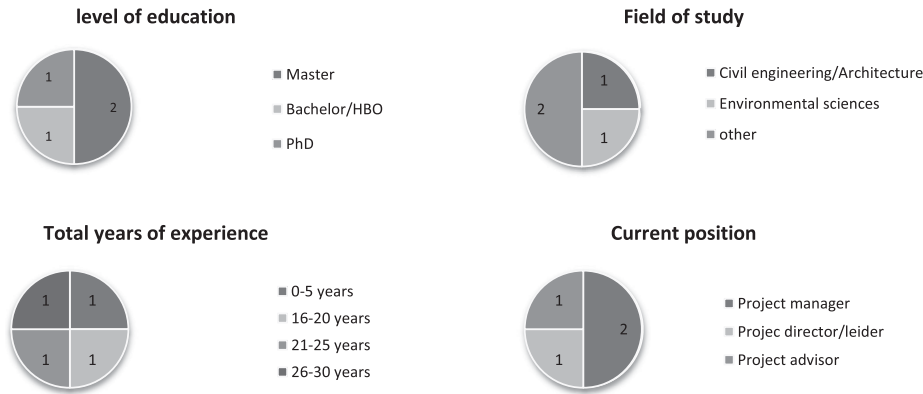■ Project advisor

Fig. 14. Demography of respondents in consultants' perspective 3.

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