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Insight, Importance, Implementation and Improvement**

Jalali Sohi, Afshin; Bosch-Rekvelde, Marian

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# Four Stages of Making Project Management Flexible: Insight, Importance, Implementation and Improvement

Jalali Sohi, Afshin<sup>1</sup>; Bosch-Rekvelde, Marian<sup>1</sup>; Hertogh, Marcel<sup>1</sup>

<sup>1</sup>*Delft University of Technology, Netherlands, The*

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## **Abstract:**

Increased project complexity, project dynamics and changes in clients' requirements are a few examples that suggested the necessity of flexibility in project management to deliver successful projects. Despite the fact that literature suggests adding flexibility to project management, there is no existing framework which provides a practical process of how to add flexibility into the practice of project management. Therefore, this research aimed at investigating how project management could become flexible and whether such flexibility would improve project performance. The research question is: how to embed flexibility in the practice of project management in early project phases? To answer the research question four sub-questions were formulated which have been separately researched. This main question was answered by proposing a flexibility framework. This framework comprises four stages: understanding the current situation, practitioners' perspectives on flexible project management, choosing enablers to become flexible, applying selected enablers to improve project performance. It can be concluded that trust appears not only to be an enabler of flexibility in project management but an existing perspective among the practitioners regarding the concept of flexibility. This perspective puts the emphasis on 'trust' as the most important enabler of flexibility. Moreover, the positive contribution of 'trust' to project performance is acknowledged in this research. Considering the movements towards flexibility and adaptability concepts, this research fills the gap in the literature by providing a practical project management flexibility framework. Moreover, it provides a step-by-step guideline for practitioners to embed flexibility in practice.

*Keywords: flexible project management, Agile project management, early project phases, project performance;*

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## **1. Introduction: 'flexibility' as a paradigm shift in project management**

Projects are influenced by their complexities in two ways: positively in terms of defining new opportunities and negatively in terms of threats. Therefore, management of project complexity can focus on maximising the opportunities and minimising the threats (Vidal et al., 2011). Such project complexity needs to be managed well in order to add value to the project. The first approach to manage project complexity is to keep projects simple as suggested by Giezen (2012). The uncertainty in projects will be reduced by diminishing the project's complexity. This way it becomes easier to better predict the project and consequently better manage the project. However, reducing a project's complexity has also some disadvantages like ignorance of the project's strategic potential. Therefore, instead of focusing on the complexity itself, the alternative approach concentrates on the project management capabilities in managing project complexity.

Nowadays, a pure project management approach is no longer effective (Hertogh and Westerveld, 2010, Koppenjan et al., 2011). Smith and Irwin (2006) were one of those who questioned the ability of traditional project management approaches to effectively deal with complexity which is not rational and linear. Cooke-Davies et al. (2008) argue that a paradigm shift is required away from conventional project management, to enable the management of nowadays modern practice

challenges. Conventional project management is known as a rational and linear approach (Williams, 2005) which makes it ineffective in the management of project complexity in the project lifecycle (Harvett, 2013). On top of that, most of the current project management approaches still seem to underestimate the influence of the dynamic environment (Priemus and van Wee, 2013). This viewpoint questioned the capabilities of conventional project management approaches in managing the fundamental sources of uncertainty which asks for a complementary management approach (Atkinson et al., 2006). In contrast to the control conventional project management poses over the projects, literature suggests increasing the flexibility of project management in order to cope with complexity and uncertainty (Koppenjan et al., 2011). Kreiner (1995) mentions that flexibility is required to deal with changes and uncertainties in the changing business environment. Control implies the parameters should be fixed and stuck to, while flexibility implies accepting the required changes.

Having said so, the importance of bringing flexibility into project management to deal with project complexity and uncertainty requires much attention. Olsson (2006) states that “*while flexibility was frequently needed in studied projects, it was rarely prepared for*”. Therefore this research aims at making the project management flexibility explicit by 1) recognizing the degree of flexibility in the practice, 2) find the practitioners perspective regarding flexibility, 3) embedding the flexibility into the practice, and 4) focusing on improvement of project performance and management of complexity by implementing the flexibility. To fulfil these four objectives, four research questions were formulated .

- 1) What is the status of flexibility in current practice?
- 2) What are the enablers of flexibility?
- 3) What are the practitioners perspectives regarding project management flexibility?
- 4) What is the contribution of flexibility on project performance?

By answering the four questions a conceptual framework is proposed in this paper. To develop the framework, four separate researches were performed as part of a PhD thesis (Jalali Sohi, 2018).

In Section 2 the literature review on project management flexibility is covered. Section 3, 4, 5, and 6 in order provide the answers to the four formulated research questions. Section 7 elaborates on the proposed flexibility framework. The discussion and conclusion are covered in Sections 8 and 9.

## **2. Literature review: what is flexibility in project management?**

One of the early definitions of flexibility is provided by Bateson (1972). He defined flexibility as “*uncommitted potentiality for change*”. He argues the ability to harmonize with the environmental flexibility in advanced urban civilizations which has the highest degree of flexibility in his opinion. He emphasised that the context conditions should be taken into account while talking about flexibility.

Flexibility can be defined as a competence of the project manager, as discussed by Turner (2004): “*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 (Olsson, 2006). This refers to the following definition of flexibility of Husby et al. as: “*the capability to adjust the project to prospective consequences of uncertain circumstances within the context of the project*” (Olsson, 2006). Flexibility can be related to the degree of modularity in projects while modularity refers to the possibility to divide the project into more or less independent sub-units (Olsson, 2006).

All these definitions have two main facts about flexibility in common: taking the dynamic context

into account and readiness for changes. What can be concluded from these provided definitions is unanimity about 'ability to adapt to project context and to the dynamics of the environment'. This concluded commonality from the provided definitions, forms the base definition of flexibility for this research: "the ability and readiness to deal with dynamics in a project".

Apart from defining what flexibility in project management is, some scholars have looked for practices of flexibility. Sager (1990) found two main aspects of flexibility in order to prepare the management to deal with uncertainty and its effect on the project in urban planning: future choice opportunities and capacity for adjustment. He defines robustness, resilience and stability as other related qualities to flexibility. Flexibility in the planning and implementation phase of a project may be accomplished not only by flexible decisions, but also through the possibilities for adjustments in the entire planning system: departing from plans, changing them, or side-stepping them altogether (Sager, 1990). According to Gupta and Rosenhead (1968), robustness in sequential investment decisions is defined as "*Robustness of a decision or decisions must be measured in terms of the numbers of the good end-states for expected external conditions which remain as open options*". Hashimoto et al. (1982) define resilience as the quality which describes "*how quickly a system is likely to recover or bounce back from failure once failure has occurred*". Stability of a plan or a project was defined as "*the maximum deviation between predicted and realised value of the key variables which renders the planning product satisfactory*" (Sager, 1990).

Hertogh (2014) discussed the fact that project managers should be open for opportunities, not only at the start, but also during the course of the project. This so-called opportunity framing is supposed to be a recurring, iterative process, aiming at maximum value creation. However, usually project managers stick to their scope, hence missing possible enrichment of their projects. Sager (1990) stated that keeping options open is the crucial concern, and this is what flexibility is aimed at.

Aaker and Mascarenhas (1984) argue while the intention of the control-oriented approach is reducing undesirable changes, flexibility enables incorporating required changes which might happen because of the uncertain and changing environment. Control versus flexibility approaches is what Koppenjan et al. (2011) defined as 'command-and-control' versus 'prepare-and-commit'. The difference between these two approaches lays in their attitude towards managing uncertainty and complexity. The command-and-control approach aims at eliminating the uncertainty and complexity by imposing strict planning and control over the process, while the prepare-and-commit approach aims at managing both uncertainty and complexity by close cooperation between the project actors and hence, increased flexibility.

Perminova et al. (2008) stated that reflective learning and sense-making is required in order to increase flexibility. Reflective learning can be done by standardisation or repetitiveness of procedures. Standardisation helps to react to possible changes by providing flexibility in choosing among a number of alternative actions. However, it is not possible to reduce all the uncertainty by standardisation. While uncertainty can be decreased to some degree, some uncertainty is wished for to grab opportunities. Evolution is tied with opportunities and the elimination of all uncertainties hinders the evolution of the project. Similarly, Collyer and Warren (2009) identified one of the management approaches in dynamic environments as 'environment manipulation: making dynamic static'. This can be done by fixing objective and design, refusing change requests, reducing or delaying adoption of new technologies or techniques and extending the life of existing systems. The approach of making dynamic static also has disadvantages like lost opportunity and productivity through delayed implementation of new approaches. On top, it is not always possible to reduce complexity or making dynamic static since we do live in a dynamic environment.

Similar to flexibility, adaptability in project management is a term emphasising the adaptation of project management to the (changing) context of projects. Giezen (2012) defines adaptability as the ability of adaptation to changes. Priemus and van Wee (2013) argue that adaptability is needed. They argue that complex projects require adaptations in their management in order to deal with threats and opportunities to overcome the internal deadlocks and external changes.

This brief literature scan suggests that in order to manage the project's complexity and dynamics an ideal project management approach should take the following into account:

- Redundancy in terms of keeping alternatives open and making a decision at the last responsible moment (Priemus and van Wee, 2013),
- Achieving reflecting learning by standardisation of process and design to the degree that fits the project's context (Perminova et al., 2008, Giezen, 2012),
- Being open to change by understanding that change is unavoidable, coping with threats and seizing opportunities (resilience) (Priemus and van Wee, 2013),
- Defining the project's scope into required functions (Koppenjan et al., 2011),
- Establishing stakeholders' close collaboration (Koppenjan et al., 2011),
- Self-steering of the complete project team (Koppenjan et al., 2011),
- Having an open attitude for information exchange (Koppenjan et al., 2011),
- Building trust among the parties involved in the project (Atkinson et al., 2006).

The aforementioned characteristics point out some features of flexibility in project management. However, flexibility is not only limited to these items.

So far the need for flexibility in project management, definition of flexibility and some recognized practices of flexibility were discussed. The next section focuses on current practice regarding flexibility in project management.

### **3. Flexibility in current practice of project management: Agile project management**

First step in adding flexibility to project management is the recognition of current flexible approaches. This section elaborates on the current flexible project management approaches by means of literature review and empirical study on application of such flexible approaches in practice.

Agile Project Management is the most-known flexible project management methodology. It is defined as *“a style of project management that focuses on early delivery of business value, continuous improvement of the project's product and processes, scope flexibility, team input, and delivering well-tested products that reflect customer need”* (Owen et al., 2006). Agile approach was developed in the software industry but many other industries, including the construction industry, have also adapted the Agile approach (Owen et al., 2006). Agile project management lets software project managers and employees adapt to changing circumstances, rather than trying to impose rigid formal controls, as in traditional linear development methods (Augustine et al., 2005). Agile core values are: *“high-quality deliverables are a result of providing customer value, team interactions and adapting to current business circumstances”* (Layton, 2010). In contrast to Agile, traditional software development methodologies can be characterized as reflecting linear, sequential processes, which can be effective in developing projects with stable, known, consistent requirements (Augustine et al., 2005) which mismatches with dynamic systems. Highsmith (2002) stated that Agility is the ability to balance flexibility and stability. Agile methodologies have sought to focus on rapid iterative delivery, flexibility, and working software projects (Abrahamsson et al., 2003) mutual interactions among a project's various parts and steering the them in the direction of continuous learning and adaptation (Augustine et al., 2005). Conventional project management approaches promise predictability, stability, and high assurance which is in contrast to Agile promises being higher customer satisfaction,

lower defect rates, faster development times and a solution to rapidly changing requirements (Boehm and Turner, 2003).

Since Agile is an umbrella name, in itself, cannot be seen as a tool. Therefore it is more recognized by its tools like Scrum (Agile-Methodology, 2014).

In an empirical exploratory case study research (Yin, 2002) the application of Agile project management and its tool Scrum in the context of infrastructure projects in construction industry is studied (Jalali Sohi et al., 2016). In total 9 interviews were performed, including respondent from 3 projects managed using Scrum. All interviewees were at the project level and assigned to the project in different roles including project manager, project engineer, Scrum master and Scrum coach. During the interviews several themes were covered which were extracted from the literature regarding the characteristics of Agile project management. The themes were: performance of project, value delivery, client satisfaction, project team, role of Scrum master, interaction among the parties involved in the project, reporting, project planning and management of scope changes.

The practice of Scrum versus the theory of Scrum is presented in Table 1.

Table 1: The practice of Scrum versus the theory

Explored items	Scrum based on the theory	What is happening in practice at the company (3 projects)	Aligned	Misaligned	Neutral
The overall success of the project		Successful from the client point of view, successful from projects teams, not successful from the company point of view.	N/A		
Time	Time is fixed.	Mostly projects delivered within time, for those that delivered with delay, it was acceptable by the client because the client was the source of delay.	×		
Cost	Maximum budget is fixed.	One of the negative aspects of Scrum within the company; mainly because of learning costs.	N/A		
Quality		Accepted by the client, delivery of products with high quality (company strategy).	N/A		
Client satisfaction	Main value driver of Scrum.	Clients were satisfied.	×		
Conditions of client satisfaction	Conditions of client satisfaction should be known and addressed explicitly in the project.	There was a set of quality criteria as client satisfaction conditions but overall there was no common sense what the client satisfaction conditions are.		×	
Team	Team building	Scrum team should be constant /fixed and the project will be assigned to the team.		×	
	Multidisciplinary team	Team should be multidisciplinary.	×		
	Multitasking in team	It should be avoided.		×	
	Integration	Working in one room rather than individually in separate offices.	Scrum teams were integrated. In case of multitasked people in the team, the level of integration decreases considerably.	×	
Exchange of information/ knowledge	Working in one room rather than individually in separate offices.	Easy/doable in face to face communication.	×		
Documentation	Proper/enough documentation over too much paperwork.	Enough for the project itself but not enough as lesson learned for another project. In case of multitasked people in the team, the amount of documentation increases.			×
Overall picture of the project	Visualising the overall project.	Scrum creates the big picture of the project. The inconsistency of the Scrum team is a problem here.		×	

Explored items		Scrum based on the theory	What is happening in practice at the company (3 projects)	Aligned	Misaligned	Neutral
Meeting	Within team	Daily stand-ups/sprints' meetings.	Different opinions. Examples are: difficult when a team member is a multitasker, waste of time, saves time according to team alignment.			x
	With stakeholders/client	Client involvement/participation in weekly/every sprint meeting.	Not enough client involvement/ no interest from client side to participate in all meetings.		x	
Value	Definition	Value should be defined at the beginning.	No definition of value.		x	
	Tracking	Value should be traced during the project.	Since there is no value definition there won't be any tracking of value.		x	
Planning	Product backlog	Work is done in small batches which are listed in the product backlog.	Product owner defines the product backlog.	x		
	Sprints	Value orientation over process orientation; delivering something that has value for the client in 2 to 4 weeks' time.	It worked well in doing the tasks but there is doubt if something that has value for the client delivered in each sprint.		x	
	Duration of tasks	Realistic time planning by means of poker game.	Estimation of the duration of tasks (products) by poker game.	x		
Reporting	Within team	More face to face, less paperwork.	Informal face to face discussion rather than official reporting, digital Scrum board which updates regularly.			x
	With client	Client involvement/ close cooperation with client.	Monthly report to client/ NO client involvement in the Scrum process.		x	
Time buffers		Is needed.	Because of tight deadlines there were no planned buffers.	x		
Response to scope change		Responding to change (scope change).	In contrast with contract conditions, it results in request of extra budget and time.		x	
Problem solving		Problem solving should be planned/clear. Impediment resolving.	Not really planned; product owner/project manager was a source of problem solving.		x	

This exploratory research revealed a number of positive outcomes by using Scrum in the management of infrastructure construction projects. The impression obtained during the interviews was that most of the practitioners who work in Scrum were generally very positive about it. In frequent occasions they expressed their positive opinion about the methodology:

- Scrum presents a very structured way of working (product backlog, daily stand-ups are some examples)
- Working together in the same room provides the team members an environment of continuous motivation and team satisfaction.
- The mix of different specialties in the Scrum teams is key in order to achieve maximizing the value of the project.
- There is a high level of intensity while working with Scrum which makes it efficient.
- Scrum reduces the amount of rework (early detection of problems).
- Working in an Agile environment does require high client participation in the project which focuses on the client satisfaction.



There was also a number of challenges faced while Scrum had been used in practice. Some aspects of Scrum that were perceived as dilemmas and that might have affected the result of the project are mentioned:

- Multitasking of team members affects the efficiency and also excess of required documentation/communication for those who cannot attend such events.
- Team members would be uncertain about the benefits of Scrum if they are asked to use it without educating them.
- There should be a balance between the amount of time spent in Scrum meetings and the intensity of the project (days per week).
- High level of commitment of the client is required while it is not in place.
- There is still no quantitative analysis done on how Scrum affects the end results of the project (cost).
- There should be a match with contract type if the project would be managed by Scrum (contract flexibility).

By reviewing all observed positive aspects and faced challenges of Scrum and also looking back at the comparisons made between theory and practice it is concluded that the application of Scrum in practice is not fully aligned with theory, but still it showed positive results in some areas: especially scheduling, interactions, and communications. In all case studies it was observed that the applied project management is a hybrid version. The Scrum projects follow Scrum on the basis of a waterfall approach.

#### **4. What are the enablers of flexibility?**

Apart from emphasising the importance of flexibility in project management (Section 1) and the definition of flexibility (Section 2) it is important to know what makes project management flexible. Therefore, this section elaborates on enablers of flexibility in project management.

By doing literature review on flexibility in project management, a list of literature references which directly define or identify sources of flexibility is extracted. It was concluded that some literature only sheds light on the importance of flexibility in project management without explaining further what flexibility is (Olsson, 2006, Kreiner, 1995, Koppenjan et al., 2011). Some others define areas of flexibility (Geraldi, 2008, Osipova and Eriksson, 2013). A number of studies look into flexibility as one aspect like human resource management or scheduling among others (Kellenbrink and Helber, 2015, Gupta and Rosenhead, 1968, Gil and Tether, 2011, Chan and Chan, 2010). In total 30 enablers of flexibility were extracted from all studied literature. In order to validate the flexibility enablers, 14 interviews with practitioners were conducted. In total, 13 out of the 14 interviewees had an engineering background, mostly in civil engineering. Half of the interviewees were project managers. The others were involved in projects as senior manager, process manager, project director or other roles. The majority of interviewees (71%) work in the construction industry. About 62% of them had more than 20 years of working experience.

The refined list of flexibility enablers after the data analysis on gathered data from the interviews is presented in Table 2.

Table 2: Flexibility enablers of project management

Category	Flexibility enablers	Main Source	
What	1 Broad task definition	(Koppenjan et al., 2011)	
	2 Embrace change as much as needed	(Olsson, 2006), (Priemus and van Wee, 2013)	
	3 Functional-realisation based contract	(Koppenjan et al., 2011)	
How	4 Self-steering of the complete project team	(Koppenjan et al., 2011)	
	5 Open information exchange among different groups	(Koppenjan et al., 2011)	
	6 Shared interface management	(Koppenjan et al., 2011)	
	7 Contingency planning	(Olsson, 2006)	
	8 Seizing opportunities and coping with threats	(Blom, 2014)	
	9 Trust among involved parties	(Atkinson et al., 2006)	
	10 Standardise the process and design	(Giezen, 2012, Perminova et al., 2008)	
	11 Visualised project planning and progress	(Beck et al., 2001)	
	12 possible alternatives	(Priemus and van Wee, 2013)	
	13 Network structure rather than hierarchical structure	(Beck et al., 2001)	
	14 Continuous learning	(Giezen, 2012, Perminova et al., 2008)	
	Who	15 Consensus amongst team members	(Cobb, 2011)
		16 Stable teams	(Beck et al., 2001)
		17 Self-assigned individuals to tasks	(Cobb, 2011)
18 Team priority over individual priority		(Beck et al., 2001)	
19 Team members as stakeholders		(Beck et al., 2001)	
When	20 Late locking	(Olsson, 2006) (Huchzermeier and Loch, 2001)	
	21 Short feedback loops	(Cobb, 2011)	
	22 Continuous locking (iterative)	(Olsson, 2006)	
	23 Iterative planning	(Cobb, 2011)	
	24 Iterative delivery	(Beck et al., 2001)	
Where	25 Joint project office	(Osipova and Eriksson, 2013)	
	26 Have flexible desks	(Osipova and Eriksson, 2013)	

## 5. Practitioners perspectives on flexible project management

After the identification of the flexibility enablers in Section 4, the next step is to identify the practitioners' perspectives regarding flexible project management using Q-methodology (Jalali Sohi et al., 2018). This methodology allows for studying topics with a subjective character. Two types of organizations were targeted in this research: client and consultancies. In total 43 practitioners (21 from client organisations and 22 from consultancies) from 6 organizations were participated in the research. the input for this step of the research was the list of 26 flexibility enablers concluded from Section 4.

The data analysis revealed 3 parallel perspectives per organisation type (client and consultancy). The first perspective appears in both organisation types named as 'Trust' which means trust and its related enablers ranked high as distinguishing statements for this group of practitioners regardless of the fact that they work for client or consultant organisation. However, also some differences were found. High-ranked and low-ranked flexibility enablers from each perspective's point of view are presented in Table 3. All team-related enablers ranked relatively low from the clients' point of view, but from the consultants' point of view some of these enablers ranked high. It can be said that the way the project team is organised seems much more important for respondents from consultancy organisations than for the client organisations who share opinions in the 'trust' perspectives.

The second shared perspective was 'Scope flexibility by contractual flexibility'. Looking at the overall ranking of flexibility enablers of this perspective, not many differences between the client respondents and the consultant respondents in the corresponding perspectives were found.

The third perspective for both organisation types was 'Proactive management'. The enablers that contribute to a proactive approach, such as 'seizing opportunities & coping with threats', 'possible

alternatives' and 'contingency planning' ranked high in this third perspective for both respondent groups. Also, some differences were found. For consultant respondents, the 'when' category of the enablers ranked higher compared to the client respondents. This suggests that these consultants favoured a more iterative approach in their scheduling. Another difference was found in the category of 'where': client respondents showed less willingness in having a joint project office.

The top-ranked enablers and also the derived perspectives for both clients and consultants are the same. Hence the general mind-set of these practitioners working for client or consultant organisations regarding flexibility in project management seems similar.

Table 3: High-ranked and low-ranked flexibility enablers from different perspectives' point of view (N=43)

		Perspectives		
		Trust	Scope flexibility by contractual flexibility	Proactive management
Clients organisations	High-ranked flexibility enablers	<ul style="list-style-type: none"> <li>Trust</li> <li>Short feedback loops</li> <li>Continuous locking</li> <li>Seizing opportunities and coping with threats</li> <li>Continuous learning</li> </ul>	<ul style="list-style-type: none"> <li>Broad task definition</li> <li>Functional-realisation based contract</li> <li>Shared interface management</li> <li>Visualised planning and progress</li> <li>Seizing opportunities and coping with threats</li> </ul>	<ul style="list-style-type: none"> <li>Seizing opportunities and coping with threats</li> <li>Stable teams</li> <li>Self-steering team</li> <li>Broad task definition</li> <li>Iterative delivery</li> </ul>
	Low-ranked flexibility enablers	<ul style="list-style-type: none"> <li>Standardised process and design</li> <li>Self-steering team</li> <li>Consensus among team members</li> <li>Late locking</li> <li>Self-assigned individuals to tasks</li> <li>Broad task definition</li> <li>Flexible desks</li> <li>Iterative delivery</li> <li>Consider team members as important stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>Iterative delivery</li> <li>Stable teams</li> <li>Continuous locking</li> <li>Flexible desks</li> <li>Contingency planning</li> <li>Standardisation of process and design</li> <li>Self-steering team</li> </ul>	<ul style="list-style-type: none"> <li>Flexible desks</li> <li>Standardisation of process and design</li> <li>Functional-realisation based contract</li> <li>Joint project office</li> <li>Open information exchange</li> <li>Continuous locking</li> </ul>
Consultant organisations	High-ranked flexibility enablers	<ul style="list-style-type: none"> <li>Trust</li> <li>Short feedback loops</li> <li>Self-steering team</li> <li>Consider team members as important stakeholders</li> <li>Seizing opportunities and coping with threats</li> <li>Visualised planning and progress</li> <li>Self-assigned individuals to tasks</li> </ul>	<ul style="list-style-type: none"> <li>Embrace change</li> <li>Broad task definition</li> <li>Functional-realisation based contract</li> <li>Possible alternatives</li> <li>Self-steering team</li> </ul>	<ul style="list-style-type: none"> <li>Possible alternatives</li> <li>Continuous locking</li> <li>Contingency planning</li> <li>Joint project office</li> <li>Iterative planning</li> </ul>
	Low-ranked flexibility enablers	<ul style="list-style-type: none"> <li>Broad task definition</li> <li>Late locking</li> <li>Contingency planning</li> <li>Possible alternatives</li> <li>Network structure</li> <li>Functional-realisation based contract</li> </ul>	<ul style="list-style-type: none"> <li>Consensus among team members</li> <li>Iterative delivery</li> <li>Stable teams</li> <li>Visualised planning and progress</li> <li>Contingency planning</li> </ul>	<ul style="list-style-type: none"> <li>Flexible desks</li> <li>Consider team members as important stakeholders</li> <li>Self-steering team</li> <li>Functional-realisation based contract</li> <li>Visualised planning and progress</li> <li>Late locking</li> <li>Broad task definition</li> </ul>

## 6. The contribution of flexibility to project performance

It was evident from the literature that conventional project management needs to gain flexibility to deal with dynamics of nowadays projects. Those dynamics are known as sources of uncertainty and complexity. The effect of such management flexibility on project performance in the domain of infrastructure construction projects has not been studied empirically. Therefore this section elaborates on the effect of project management flexibility on project performance. Adding flexibility into the practice of project management is assumed to improve project performance by better dealing with project complexity. To study the effect of flexibility on project performance, a survey study was performed. By doing the statistical analysis using SEM-PLS (Structural Equation Modelling-Partial least Square) method on data gathered from 111 surveys the 5 hypotheses regarding the direct effect of five areas of flexibility on project performance are tested. An overview of hypotheses is provided in Table 4.

Table 4: hypotheses regarding the effect of project management flexibility on project performance

#	Hypothesis	Results of testing
1	Project management flexibility in terms of project scoping and contracting (what) has a positive effect on project performance.	Rejected
2	Project management flexibility in terms of process (how) has a positive effect on project performance.	Supported
3	Project management flexibility in terms of project team organisation (who) has a positive effect on project performance.	Rejected
4	Project management flexibility in terms of scheduling the project and task delivery (when) has a positive effect on project performance.	Rejected
5	Project management flexibility in terms of location of team (where) has a positive effect on project performance.	Rejected

Among the five hypotheses regarding the existence of positive relationships between project management flexibility and project performance, only one was supported: flexibility of ‘how’ has a significant positive effect on project performance. The significant positive relationship here means that the higher the flexibility of ‘how’, the better the project performance.

### 7. Proposed framework

Studying the notion of flexibility in project management, its definition and enablers, the practitioners’ perspectives regarding flexibility, and the contribution of flexibility to project performance lead us to the development of a framework to embed the flexibility into practice. The so-called ‘Flexible project management framework’ (Figure 1) answers the four research questions formulated in Section 1. The framework includes four steps that logically follow each other in an iterative way. Here the four steps of the framework are explained by linking each to the section in this paper.

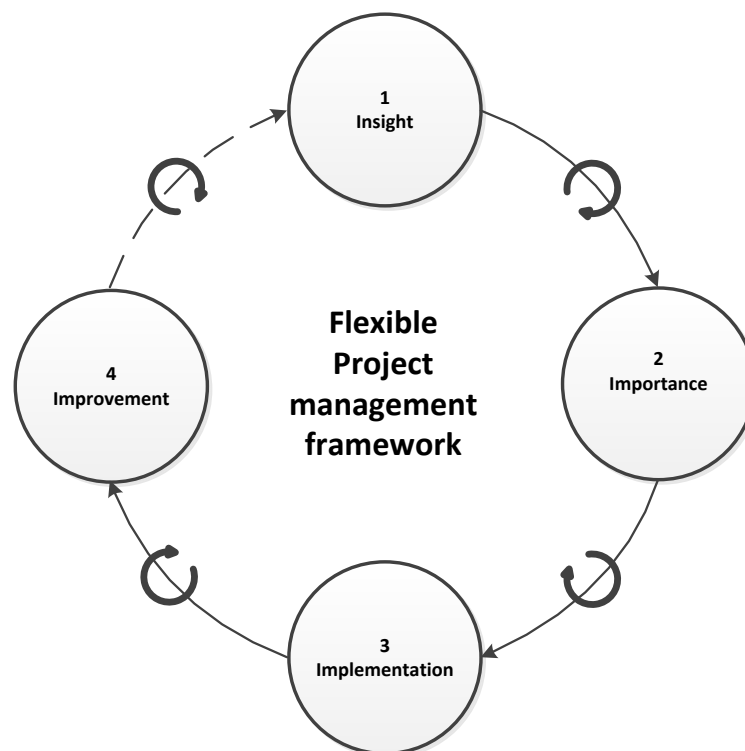


Figure 1: Flexible project management framework (main steps)

- Step 1: Insight

As the name suggests, the goal of this step is to create insight about the project complexity and applied project management approaches in current practice. Project complexity is important to be understood and investigated to be managed well. It was studied in Section 2 the current practice has applied Agile Project Management as the existing flexible project management approach. However, the application of such methodology and its tools like Scrum is not fully aligned with literature. Whether it should be fully aligned with theory or not depends on the added value of such methodology to the practice. Therefore it is suggested to customize the application of Agile to be fitted to the requirements of the practice.

Also the two main extremes are recognised in project management: a pure waterfall approach versus a pure Agile approach. Practitioners can apply either the pure approaches or any hybrid version. Whatever approach is applied, it is important to be aware of where the current approach fits in the spectrum from pure waterfall to pure Agile.

- Step 2: Importance

This step is about investigating the practitioners' perspectives regarding flexible project management as it was discussed in Section 5. Based on what practitioners find important to make project management more flexible, three distinct perspectives were derived: flexibility by 'Trust', 'Scope flexibility by contractual flexibility' and flexibility by 'Proactive management'. Each perspective gives higher priority to certain flexibility enablers. One of the most outstanding results of this study was that the perspectives of practitioners who work as clients were the same as perspectives of practitioners who work at engineering consultancy organisations. In this step of the framework, it is suggested to understand which of these perspectives exist in the project team in order to facilitate collaboration.

Different perspectives might co-exist in any project team and perspectives might change over time. The goal is to understand which perspectives exist (make it explicit) and what is felt important for the project. While the first step in the framework was about creating insight in the awareness of the applied project management approach, the second step is about creating awareness of the practitioners' mind-sets.

- Step 3: Implementation

By getting insight in the awareness of what is in place for the project management and what the mind-sets of people are, the foundation for making project management flexible is ready, but this needs to be implemented. Section 3 presented 26 enablers of flexibility which contribute to five areas of flexibility (what, how, who, when and where). The third step of the framework is about applying those flexibility enablers into practice.

The implementation of enablers belongs to the flexibility of 'what', is about the scoping of the project: defining the project's scope into broad tasks rather than detailed work packages and based on the required function. Delivering tasks not necessarily

results in delivering the function. The emphasis should be put on the function in order to deliver the value.

The implementation of enablers belonging to the flexibility of ‘how’: decisions should be made interactively with the close involvement of stakeholders, information exchange should be open between the parties involved in the project and also information sharing should be enhanced, alternatives should be evaluated in terms of their relevance and the most relevant ones need to be kept on board, a proactive approach regarding opportunities and threats is required and also considering contingencies helps to deal with unforeseen circumstances. Moreover, the project team is suggested to be self-steered rather than being steered only by a project manager, managing interfaces as a shared task rather than being done by a project manager, building and maintaining trust among the involved parties, establishing management support from top management in the organisation and reducing the hierarchy in the organisation to form a more flat type of project organisation.

The implementation of enablers belongs to the flexibility of ‘who’, is about how to organise project team in terms of collaboration and structure. In terms of team collaboration: establishing the mind-set of team priority over individual priority and valuing team members by considering them as valued stakeholders in the team. In terms of team structure: delegating responsibilities to team members, reaching consensus in key decisions among the team members and establishing stable team rather than building the team per project.

The implementation of enablers belonging to the flexibility of ‘when’, is about having short feedback loops and locking (fixing decisions) continuously in an iterative way.

The implementation of enablers belonging to the flexibility of ‘where’, is about establishing a joint project office (either physically or virtually) for the project team.

- Step 4: Improvement

This step aims at improving project performance by application of certain flexibility enablers. In section 6 it was discussed that flexibility of ‘how’ has a positive significant effect on project performance. It means that if ‘how’ flexibility is applied in practice, the performance of the project will improve significantly. This area of flexibility includes: interactive decision making, close involvement of stakeholders, open information exchange among different groups, contingency planning, seizing opportunities and coping with threats, visualised project planning and progress, self-steering of the complete project team, shared interface management, trust among involved parties, standardise the process and design, possible alternatives, network structure rather than hierarchical structure, continuous learning and management support.

Step 2 was about practitioners’ perspectives. What do these perspectives mean for step 4? The three distinct perspectives (trust, scope flexibility by contractual flexibility and proactive management) all include some high ranked enablers from the ‘how’ flexibility enablers. For example, in the perspective of ‘trust’ from the clients’ point of view, ‘shared interface management’, ‘open information exchange’, ‘visualised planning

and progress', 'seizing opportunities and coping with treats', and 'possible alternatives' were ranked high. In the perspective of 'scope flexibility by contractual flexibility' from consultants' point of view, 'seizing opportunities and coping with treats', 'possible alternatives' and 'open information exchange' are three examples of flexibility enablers which ranked high. In the perspective of 'proactive management' from the clients' point of view, 'seizing opportunities and coping with treats', 'trust', 'self-steering of team' and 'possible alternatives' are ranked high. It can be seen that the same enablers like 'trust' ranked high in different perspectives.

So improving project performance seems possible regardless of the adopted perspective in step 2. Understanding the different perspectives among team members for any project is recommended in order to prioritize the application of flexibility enablers (Step 2 of the framework).

It was mentioned that the framework has an iterative character. This appears not only in the sequence of the steps but also backward moves are possible. The iterative character of the framework helps continuous improvement in the practice as it is indicated in the literature about Agile project management (Augustine et al., 2005, Cobb, 2011). Therefore the flexibility framework developed in this research, follows an iterative process, in a circular manner. The framework includes multiple and reverse arrows which acknowledge the iteration in any direction depending on the situational circumstances and required improvement actions.

The full proposed framework is presented in Figure 2.



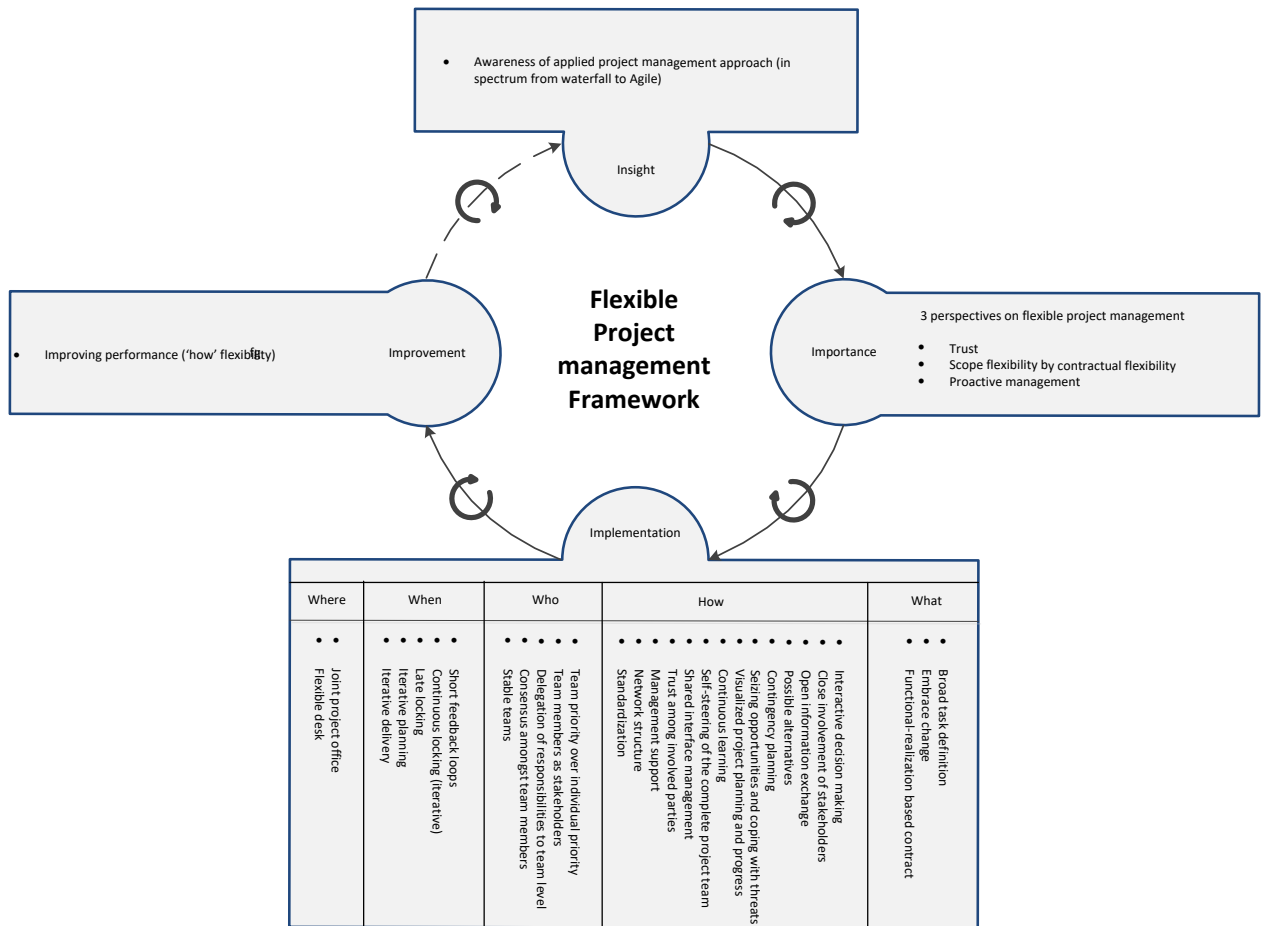


Figure 2: Flexible project management framework

### 8. Discussion

Answering the four research sub-questions on current flexible project management approaches, the enablers of flexibility, the practitioners’ perspectives and the contribution of flexibility on project performance resulted in a framework of flexibility.

Terryn et al. (2016) stated that developments in terms of projects become increasingly complex which makes the future of such developments hardly predictable. They argue that the existing theories and frameworks for evaluation and planning of such complex developments do not take into account the complexity and uncertainty. According to them, these frameworks have linear or circular logic, focused on several feedback loops and assumed causal links in organization, planning process and performance. What they propose as a solution is a situational approach based on the nature of planning issues and playing field. They believe where the playing field is highly dynamic, undefined and volatile, the developments needs to be highly open, flexible and innovative (Terryn et al., 2016, Boussauw and Boelens, 2015). In such conditions a co-evolutionary approach would be required. This, however, is not conflicting with the flexibility framework as presented in Figure 1.

In our research, the idea of flexibility in project management acknowledges the importance of iterative processes for the achievement of improvements based on short feedback loops. Therefore the flexibility framework developed in this research, follows an iterative process, in a circular manner. The framework includes multiple and reverse arrows which acknowledge

the iteration in any direction depending on the situational circumstances and required improvement actions.

The proposed flexibility framework covered both the people side of the projects as well as the process of project management into account. The people side is mainly highlighted on step 2 in which practitioners' perspectives are taken into considerations.

Although the role of trust has been studied in different aspects of project management such as contracting (Benítez-Ávila et al., 2018, Chow et al., 2012), trust and control (Kalkman and de Waard, 2017) and other soft aspects of project management (Ping et al., 2016, Rezvani et al., 2016, Ning, 2017), the role of trust in flexibility of project management is not given any attention so far. In this research it revealed that 'trust' is an enabler of flexibility in project management (Section 3). Trust contributes to flexibility of 'how'. All the interviewees who participated in validating the flexibility enablers unanimously agreed that 'trust' is an enabler of flexibility.

The overall ranking of flexibility enablers was the other outcome of the exploratory research on practitioners perspectives (Section 5). The three top-ranked enablers from the clients' point of view were 'embrace change', 'seizing opportunities and coping with threats' and 'trust'. The three top-ranked flexibility enablers from consultants' point of view were the same ones as the client respondents' point of view, albeit in a different order: 'embrace change', 'trust' and 'seizing opportunities and coping with threats'. This research showed that 'trust' is among the top-three flexibility enablers by both client and consultancy organizations. Moreover, it appeared to be a perspective by a group of practitioners pinpointing the importance of 'trust' in flexible project management.

Next, the significant positive contribution of flexibility of 'how' to project performance was confirmed in Section 6. Needless to say that flexibility of 'how' includes 'trust' as an enabler. This indicates the positive effect of trust as a flexibility enabler to project performance.

Given this study, it can be said that 'trust' has an important role in project management flexibility in different dimensions.

### *8.1 Scientific contribution and managerial implications*

It is recognised that project complexity is increasing (Bosch-Rekvelde, 2011, Bakhshi et al., 2016). Different management approaches were suggested for managing projects based on their complexity (Hertogh and Westerveld, 2010). These management approaches can be categorized into two main management streams: a mechanistic stream and an organic stream. Some other scholars stated that pure approaches, either mechanistic or organic, are not performing well (Geraldi, 2008, Huchzermeier and Loch, 2001, Koppenjan et al., 2011, Kreiner, 1995, Olsson, 2006, Osipova and Eriksson, 2013, Wysocki, 2007). Therefore a fine balance in the spectrum of management approaches is required (Hertogh et al., 2008). Such balance is referred to as flexibility in the literature (Geraldi, 2008, Osipova and Eriksson, 2013). While literature acknowledges the need for flexibility in project management, it hardly identifies the enablers of flexibility and its effect on project performance. This research bridges this gap in the literature by proposing a flexibility framework highlighting the role of 'trust' in the concept of flexibility.

For the managerial implications it is suggested to practitioners to carefully pay attention to (no specific order):

- Finding the balance between Agile and waterfall management approaches based on the specific project context. By understanding how complex the project is, the practitioners can choose the right management approach. This management approach can be a hybrid version of waterfall management and Agile project management. For example, by planning the project into iterations (short or long), organising co-located teams, focusing on value delivery rather than task delivery and establishing stable teams, they can become more Agile.
- Improving the practice of Agile (Scrum) based on the observed benefits such as structure of work, team spirit, interchange of knowledge, rework reduction and challenges like multitasking and intensity of scrum meetings.
- Recognition of different practitioners' perspectives ('trust', 'scope flexibility by contractual flexibility' and 'proactive management') about making project management flexible and giving priority to the one (including its high-ranked enablers) which fits the project context based on its requirements and complexity.
- Making project management flexible by applying flexibility enablers. In general making project management flexible can be done by enabling the flexibility in terms of the scope of the project (what), in terms of project processes (how), the project team (who), project scheduling (when) and the location the project team is organised (where).
- Focusing on enablers from 'how' flexibility to improve project performance.

### *8.2 Limitations and recommendations for further research*

The applicability of the proposed framework is the other research limitation since it was not investigated. All the stages of the framework were confirmed in different steps of the research either statistically or by doing qualitative analysis, however, the applicability of the overall proposed framework requires further research.

The newness of the studied topic of flexibility in project management leaves room for further research, even after this study. This is recognised in a few directions: the application of Agile, flexible project management and management of project complexity. Since this paper proposed a conceptual framework for flexibility in project management it is recommended to study the applicability of the proposed framework in the practice and its further development.

## **9. Conclusion**

Project management is aimed at supporting practitioners to increase the probability of the successful delivery of their projects in a way stakeholders appreciate and include both hard factors and soft factors of project management. It is developed in the 1950s and is maturing day after day but still has deficiencies which arise as consequences of environmental changes and developments. Scientists' and practitioners' attention is drawn to study and understand project complexity in order to be able to manage it. Conventional project management seems no longer effective in managing project complexity and uncertainty. Therefore to make project management capable of managing project dynamics it is suggested to increase its flexibility. The objective of this conceptual paper was to propose a practical framework to enhance the embedment of flexibility into practice of project management. By answering four research sub-

questions a flexibility framework was proposed. Four stages of the framework are: insight, importance, implementation and improvement. The first stage's goal is to get an insight into the current situation in terms of the applied project management approach. The idea is to understand if any flexible approach (like Agile project management) is being applied or not. In this stage, the preconditions for making project management flexible should be explored. The second stage is understanding what is important for flexible project management from practitioners' point of view (creating awareness for the different perspectives). The third stage is making project management flexible. The input of this stage is the list of 26 verified flexibility enablers in five areas of flexibility (what, how, who, where, and when). The fourth stage is narrowing down the flexibility enablers to those that improve project performance. It was proven that flexibility of 'how' among all five areas of flexibility had a positive significant relationship with project performance. At this stage, it is recommended to apply the enablers from the 'how' flexibility.

Talking about flexibility, the role of 'trust' is undeniable. 'Trust' appear to an enabler of flexibility in project management. Exploring the practitioners' perspectives regarding flexibility revealed that 'trust' exist as a perspective among the practitioners. This means that a group practitioners value 'trust' and its related components like open information exchange and self-steering team ranked high from this group practitioners. Studying the effect of flexibility on project performance, 'it became apparent that 'trust' among other flexibility enablers of ;how' contribute positively to project performance. Therefore, it can be said that 'trust' plays a significant role in the concept of flexibility in project management.

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