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The Implementation Of Flexibility Enablers In Refurbishment Construction Project Management

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ABSTRACT

This paper investigates the implementation of flexibility enablers in managing project to overcome project complexity or uncertainty. This research is using Q Methodology and in-depth interview with project management experts to understand practitioners' perspective on flexibility and the implementation in project management practice. This research finds that there are 4 different perspectives on flexibility among refurbishment construction project practitioners and rank of flexibility enablers from the most important to the least important. It is shows that the top ranked flexibility enablers are always applied in construction projects in Indonesia except one flexibility enabler.

ABSTRAK

Penelitian ini menginvestigasi implementasi faktor pendorong fleksibilitas dalam mengelola proyek untuk mengatasi kompleksitas atau ketidakpastian proyek. Penelitian ini menggunakan metodologi Q dan wawancara dengan para ahli manajemen proyek untuk memahami perspektif praktisi tentang fleksibilitas dan implementasinya dalam praktik manajemen proyek. Penelitian ini menemukan bahwa terdapat 4 perspektif yang berbeda mengenai fleksibilitas di antara para praktisi proyek konstruksi renovasi dan peringkat faktor pendukung fleksibilitas dari yang paling penting hingga yang paling tidak penting. Hasil penelitian menunjukkan bahwa faktor pendorong fleksibilitas yang menduduki peringkat teratas selalu diterapkan pada proyek-proyek konstruksi di Indonesia, kecuali satu faktor pemungkin fleksibilitas.

INTRODUCTION

Construction projects significantly contribute to economic development by creating jobs, stimulating investment, and enhancing infrastructure. These projects not only drive direct economic activity through the construction process itself but also induce wider economic benefits, including boosting local industries, enhancing property values, and improving the overall quality of life (Muhlis & Windiasari, 2023, pp. 3, 5–20).

To manage a construction project, project management is required. Project management is a branch of management science that is still developing as a growing research subject. Project management requires a paradigm shift to meet project management challenges in the future and to be in accordance with practice and modern needs (Cooke-Davis et al., 2007; Fernandes et al., 2015). Conventional project management that emphasizes on project management practices and strict controls (Larsson et al., 2018), requires more flexible practices for managing inevitable project changes, that is formulated based on collaboration, exploratory learning, and adaptation (Eriksson et al., 2017). Dynamic management practices are also required considering the entire project basically has a degree of dynamism represented by "constant change characteristics" (Collyer & Warren, 2009).

Regarding project complexity as a cause of project failure (Kaming et al., 1997; Mansfield et al., 1994; Meng, 2012; Qazi et al., 2015), Sohi et al conclude that the combination of lean construction and agile project management is a promising solution to overcome complexity and improve project performance(Sohi et al., 2016). The next study examines the effect of project complexity on final project performance as well as the role of flexibility in mediating the negative effect of project complexity on final project performance. As a result, research confirms that project complexity is negatively related to final project performance and flexibility in project management mediates the negative effect of complexity (Sohi et al., 2020).

Refurbishment construction projects involve the process of upgrading, changing, renovating, developing, rehabilitating, restoring, modernizing, converting, retrofitting, and building repairs carried out in previously existing buildings for various reasons (Egbu et al., 1998), two of the reasons are concerning social sustainability (improving quality of life) and economic sustainability (increase productivity in the construction process) (Jensen et al., 2018). This type of project has its own characteristic that differ from other type of construction project which require more flexible approach (Egbu et al., 1996; Noori et al., 2016; Ranasinghe et al., 2023).

To implement flexibility in project management practice, it is important to understand what factors make the projects more flexible and practitioners' perspectives regarding this concept. Jalali Sohi et al. (2020) formulated 23 flexibility enablers in project management to deal with project complexity from extensive literature studies and interviews. There is a positive relationship between flexibility in managing project management and improving project performance, especially flexibility in attitude and organization (Sohi et al., 2020). Jalali Sohi et al. (2019) explored practitioners from clients and consultancy organizations perspectives on project management flexibility, resulting three perspectives: "trust," "scope flexibility by contractual flexibility," and "proactive management."

Considering the major paradigm shift towards more flexible and dynamic approach in project management, and increasingly discussion in the project management flexibility topics, flexibility enablers in managing complexity of construction project has been evolved recently particularly. The unique characteristic of refurbishment project management practice and the need to implement flexibility in it also result in curiosity on how project practitioners' implement flexibility in their projects. This study answers these gaps and considering the following research questions: (1) What are refurbishment construction project practitioners' perspectives on flexibility? (2) How is the implementation of flexibility enabler in dealing with project complexity/uncertainty?

This research will be useful for scholars, project management practitioners and company management. For scholars, this research can be used as a reference for further research, especially regarding project management flexibility. For project management practitioners, this research can be used as additional reference in managing projects. For company, this research can be used as reference for developing internal company policies regarding the adoption of more flexible project management practices to achieve competitive advantage in every project undertaken.

LITERATURE REVIEW

Project management is the application of knowledge, skills, tools and techniques in project activities to meet project requirements (Institution, 2021b, p. 4). To achieve project success effectively, there are set of interrelated activities that form an integrated system called the Project Performance Domain. The first domain is stakeholders, consists of individuals, groups, or organizations who influence or are affected by decisions, activities, or results of the project (Institution, 2021a, pp. 7–9). Both PMBOK and PRINCE2 have the same goal, that these two standards provide guidance in increasing the effectiveness of project delivery (Zubon & Taher, 2021).

Regarding with poor final project performance, project complexity is widely studied due to its contribution to the project failure in terms of cost overruns and time delays (Kaming et al., 1997; Mansfield et al., 1994; Meng, 2012; Qazi et al., 2015). From several reports of poor final project performance, project complexity has been proven as an integral aspect of the system and one of the important factors in project failure (Ackermann et al., 2014; Bakhshi et al., 2016).

PMI defines complexity as the characteristic of a program, project, or environment that is difficult to manage, caused by human behavior, system behavior, or ambiguity. Project complexity is part of uncertainty, where projects are always in an environment with varying degrees of uncertainty. This uncertainty raises both challenges and opportunities. The project team must explore, study and decide how to handle it (Institution, 2021a, pp. 116–117, 2021b, pp. 50–51). Floricel et al. noted that complexity as the main source of uncertainty and risk will affect project costs and performance if it is not addressed properly from the project planning phase (Floricel et al., 2016).

There are many views regarding complexity factors, how to measure complexity, or what indicators are involved in project complexity in the literature and practitioner opinions.

Table 1 *Elements of Complexity from Literature*

Reference	Element of Complexity	Description
Bakhshi et al. (2016)	127 complexity factors, 7 categories	Context, autonomy, belonging, connectivity, diversity, emergence, and size
Hertogh & Westerveld (2010)	6 elements (practitioners), 2 elements (literature)	Technical, social, finansial, legal, organisational, and time detail dan dynamic
Bosch-Rekveldt (2011)	47 elements: 3 categories, 14 subcategories	Technical, Organisational, Environmental
Geraldi et al. (2011)	5 complexity dimensions	Structural, uncertainty, dynamism, pace, and sosio-political complexity
Dao et al. (2022)	27 indicators in 3 management level	Inter-organisational, organisational, and project management level
Noori et al. (2016)	7 conditions causing complexity and uncertainty	Unforeseen site conditions, site access, lack of space, availability of material, design change, defective design and plan, and lack of information during design stage

Refurbishment construction project has its own characteristic that differ from other type of construction project especially in the aspects of complexity, uncertainty, and dynamism of change, because this project may be carried out in pre-existing building and has an uncertain building structure (Ali & Rahmat, 2009). Complexity occurs not only from the complexity factor inherent in the design to be implemented, but also uncertainty factor added in managing this type of project, which requires more flexible project team attitudes

to achieve final project performance (Egbu et al., 1996; Noori et al., 2016; Ranasinghe et al., 2023).

The larger and more complex a project, the greater the uncertainty (Institution, 2021a). Refurbishment construction projects are identified as having quite a lot of uncertainty factors. Ranasinghe et al. (2021) conducted a literature study and found 23 uncertainty factors in refurbishment construction projects clustered into four main categories of project uncertainty, and 12 managerial strategies that are usually used to overcome these uncertainties. In general, learning processes and flexible work environments are strategies often mentioned by practitioners in dealing with uncertainty in refurbishment construction projects (Ranasinghe et al., 2021).

Table 2 *Uncertainty Factor Model*

Classifications	Factors/Determinants
Uncertain information	Imprecise: multiple and conflicting interpretations of the same information
	Information is totally unavailable
	Volatility: information can change rapidly at execution
	Ambiguity with regard to available information (multiple documents/sources)
	Insufficient communication of information across interfaces
Uncertain complexity	Space limitations in building or on site
	Difficult in access to building or site
	Structural issues with an existing building
	Many trades or parties working in close proximity (building users/public)
	Technological complications
	Design complications/errors
	Interdependency between project elements
Uncertain temporal	Speed of changes in project methods, tasks, team, structure, and deliverables as project progress
	Speed of changes in project goals
	Time scale
	Speed of change in the external environment as a project progresses (building occupants/uses, technological advancement, legislative changes, and weather conditions)
	Speed of change in project environment (unforeseen site conditions related to existing/neighbouring structures) as a project progresses
Uncertain understanding	Lack of uniformity and novelty in work task
	Lack of a clear specification of project scope and objectives
	Difficult to anticipate events and modify decisions at the right time
	Work activities with no well-defined procedure
	Lack of experience of this particular activity/experience of the project team
	Clarity of construction methods employed

Awareness of the changes and dynamics of the project environment in project management development has grown since the early 1990s (Bosch-Rekveldt, 2011). Complex and changing project contexts in response to changing and dynamic environments make predictions less reliable, which result that prediction and change avoidance mindsets must be replaced with change acceptance mindsets to incorporate change in projects (Priemus & Wee, 2013). The transition from a change-avoidant (control-oriented) approach to change-acceptance is reflected in a broader approach in management called the 'prepare and commit' approach (Koppenjan et al., 2011). Their new approach embraces the uncertainty and complexity of infrastructure projects by recognizing that scope changes are inevitable due to uncertainty and complexity. The 'prepare and commit' approach aims to manage uncertainty and complexity in an effective way. This approach appreciates the soft paradigm of project management that is neglected in conventional project management (Atkinson et al., 2006).

In the classical literature, the definition of flexibility is discussed as a requirement to face change and manage uncertainty (Kreiner, 1995; Sarger, 1990), while uncertainty challenges the stability of conventional project management (Kreiner, 1995). In subsequent

developments, various research on project management broadly defines flexibility as the ability to adapt effectively to change and uncertainty during the project life cycle. This concept has become a trend in project implementation today and is an important factor in achieving project success (Atkinson et al., 2006; Cobb, 2011; Institution, 2021a; Koppenjan et al., 2011; Priemus & Wee, 2013).

Project Management Institute (PMI) as a non-profit organization that issues the project management standard PMBOK (Project Management Body of Knowledge) made "evolutionary" changes in PMBOK sixth and seventh edition. PMI included new key concepts and new trends to anticipate the need for more adaptive projects through agile concepts in PMBOK sixth edition (Institution, 2017), and enforced more flexible project management practices through project management principles "embrace adaptability and resilience" as one of the new principles which was introduced in PMBOK seventh edition (Institution, 2021a, p. 5, 2021b, pp. 55–57).

Jalali Sohi et al. (2020) defines flexibility in project management as readiness to adapt to project conditions, which is characterized by a certain level of dynamism, and identifies 23 flexibility enablers grouped into 5 groups (what, how, who, when, where).

Research on project management flexibility since then is growing rapidly. To update the list of flexibility enablers, we conducted systematic literature review of 196 articles from 10 leading project management journals (Aarseth et al., 2017) and construction management journal from Scopus Q1, i.e. International Journal of Project Management (IJPM), Project Management Journal (PMJ), International Journal of Managing Projects in Business (IJMPB), Construction Management & Economics (CME), Journal of Cleaner Production (JoCP), Journal of Construction Engineering and Management – ASCE, International Journal of Construction Management (IJCM), Engineering, Construction and Architectural Management (ECAM), Architectural Engineering and Design Management, and Built Environment Project and Asset Management, which met criteria TITLE-ABS-KEY ("flexibility OR adaptability OR resilience AND project") and published between 2019-2023.

Adopting the method used by Seuring and Müller (2008), i.e. collecting material, descriptive analysis, selecting categories, and evaluating material, the result of SLR is below.

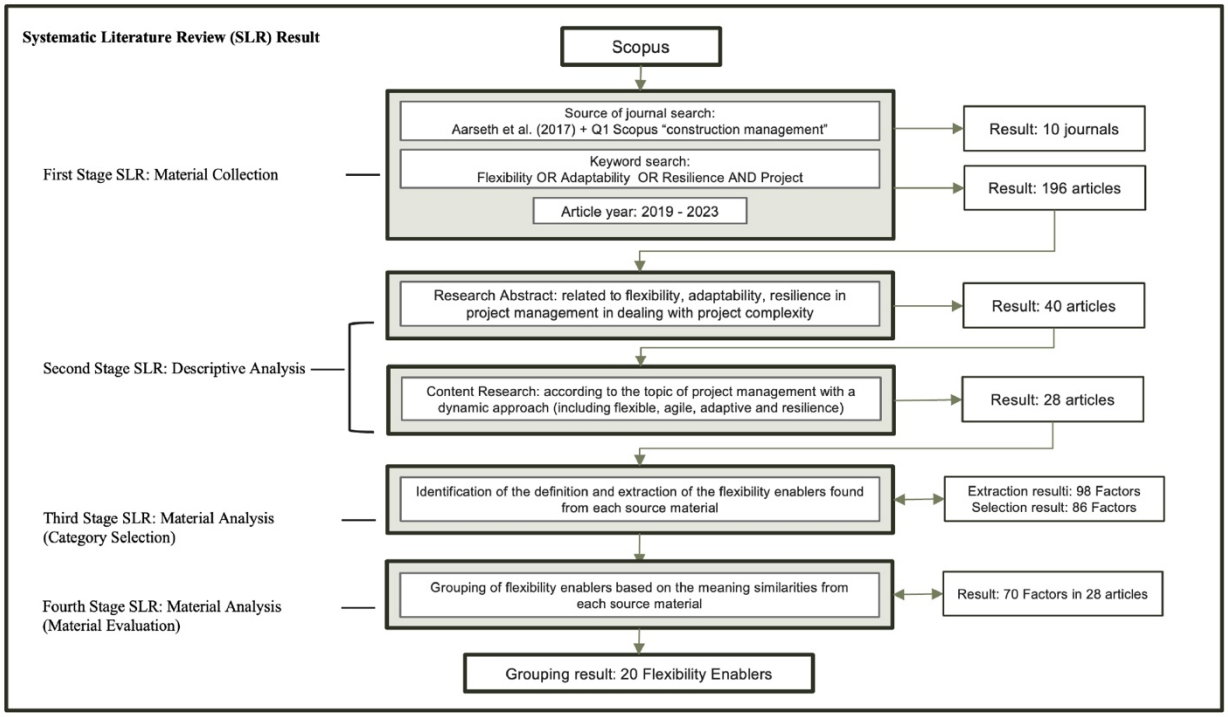

Figure 1 *Systematic Literature Review (SLR) Protocol and Result*

So, The final result is 20 flexibility enablers.

Table 3 *SLR Result*

No	Flexibility Enabler	Description	References
1	Leadership Capabilities	Guidance, mobilizing resource, inspiring, encouraging, strategic response, improvisation, promote collaboration flexibility and adaptability	Dewulf & Garvin, 2020; Mamédio & Meyer, 2020; Petermann & Zacher, 2021; Ram & Dolla, 2023; D. Wang, Zhao, et al., 2023; Zaman et al., 2020; Zhang et al., 2023
2	Visionary Capabilities	Understanding future state, willing to change decision, aware of crisis and have anticipation plan, knowing precursor of crisis, proactive approach	Jalali Sohi et al., 2019; Lavicka et al., 2019; Nachbagauer & Schirl-Boeck, 2019; Petermann & Zacher, 2021; Ram & Dolla, 2023; Rodriguez-Rivero et al., 2020; A. Wang, 2022; Zhang et al., 2023
3	Self Efficacy	Confidence in the self-ability to do tasks	D. Wang, Zhao, et al., 2023
4	Responsive Decision Making	Making flexible and adaptable decision in timely manner, with regard of risks and opportunities	Jalali Sohi et al., 2019; Malucelli et al., 2021; Mamédio & Meyer, 2020; Nachbagauer & Schirl-Boeck, 2019; Petermann & Zacher, 2021; Saeed et al., 2021; Zhang et al., 2023
5	Making and Accepting Alternatives	Open mind to alternatives and making decision interactively	Jalali Sohi et al., 2019; Nachbagauer & Schirl-Boeck, 2019
6	Management Support	Senior management commitment to support project flexibility	Jalali Sohi et al., 2019
7	Organizational Continuous Learning Culture	Organization continuously collecting knowledge and information, learn from experiences from project to project to respond environmental changes	Jalali Sohi et al., 2019; Petermann & Zacher, 2021; Ranasinghe, 2023; D. Wang, Zhao, et al., 2023; Zhang et al., 2023
8	Organizational Flexibility	Despite established structure, organization accomodates changes in procedure, willing to changing and delegating role and responsibility to obtain suitable strategy	Dewulf & Garvin, 2020; Jalali Sohi et al., 2019; Nguyen et al., 2023; Rosander, 2022; D. Wang, Huang, et al., 2023; Zhang et al., 2023
9	Project Approach Flexibility	Different approach to project: systemic and pluralistic approach, stability and flexibility, adaptability and conformance, flexiblity and adaptibe	Costantini et al., 2021; Gorod et al., 2021; Mamédio & Meyer, 2020; Muruganandan et al., 2022; Nachbagauer & Schirl-Boeck, 2019
10	Work Resilience	Informed and empowered team members, problem-focused work environment, stable project team	Jalali Sohi et al., 2019; Kadenic & Tambo, 2023; D. Wang & Wang, 2023
11	Interpersonal Trust	Interpersonal trust between leader, team member, and organization	Kadenic & Tambo, 2023; Pavez et al., 2021
12	Group Potency	Positive cognitive state and confidence of the group, valued team members as important stakeholder	Jalali Sohi et al., 2019; Pavez et al., 2021
13	Self organization	Committed, self organized and self steered team members	Jalali Sohi et al., 2019; Kadenic & Tambo, 2023; Mamédio & Meyer, 2020; Petermann & Zacher, 2021
14	Relational Beyond Contractual Approach	Participative and relational approach, which employs voluntary non-contractual response behavior between parties	Dewulf & Garvin, 2020; Lin et al., 2020; Morkan et al., 2023
15	Intense and Fast Communication	Intense, responsive and fast communication, share the same language and structured communication	Jalali Sohi et al., 2019; Nachbagauer & Schirl-Boeck, 2019
16	Collaborative Networking Capability	Willing to make agreements and adherence to these agreements, manage and leverage network of relationships	Manurung & Kurniawan, 2022; Petermann & Zacher, 2021
17	Effective Open Communication to Stakeholders	Communication to internal and external using effective means of correct tools, interface, and visualization	Jalali Sohi et al., 2019; Zhang et al., 2023
18	Trust Among Involved Parties	Building trust among parties through cooperation and joint action, mutual support, creating transparency, admitting mistake, asking for help	Jalali Sohi et al., 2019; Petermann & Zacher, 2021; Zhang et al., 2023
19	Continuous Iterative Progress	Doing planning and delivery in stepwise manner and improved gradually and continuously	Jalali Sohi et al., 2019; Petermann & Zacher, 2021
20	Stakeholder Centricity	Prior relationship among stakeholders bring close involvement, better feedback and response from stakeholders	Jalali Sohi et al., 2019; Petermann & Zacher, 2021; Ram & Dolla, 2023; Yang et al., 2022

RESEARCH METHOD

This research is conducted in two stages: 1) Q-Methodology and 2) In-Depth Interview. To answer question what refurbishment construction project practitioners' perspectives on flexibility, data collection was carried out through a Q-Methodology study. Meanwhile, to understand how the implementation of flexibility enabler in dealing with project complexity/uncertainty, in-depth interview was conducted on refurbishment construction projects expert.

Q-methodology is an integration of qualitative and quantitative techniques for researching subjectivity (Brown, 1980; Webler et al., 2009). As one of the oldest statistical methodologies that was originally used in the field of psychology (Brown, 1980; Webler et al., 2009), Q-methodology has now demonstrated its usefulness in research in the field of project management (Cuppen et al., 2016; Jalali Sohi et al., 2021; Sastoque-Pinilla et al., 2022; A. J. G. Silvius et al., 2017; G. Silvius & Schipper, 2020).

Q-Methodology study was carried out to understand the perspective of project management practitioners in implementing flexibility enablers. The sample selection (P-set) was purposive (according to qualitative research) to obtain richness and diversity of views, they are selected to represent the breadth of opinion in a target population (Webler et al., 2009). Thus, sample sizes tend to be smaller than random sampling to achieve representativeness as in quantitative research (Jalali Sohi et al., 2021). Webler et al. (2009) even emphasize to have fewer Q participants than Q statements, with normal ratio 3:1, for example a study with 45 Q statements, the ideal number of Q participants would be 15.

The list of statements selected as concourse (Q-set) at this stage was twenty flexibility enablers based on the SLR results. The respondents (P-set) in this Q-Methodology study were project management practitioners from project implementation team (contractors). To get diversity of perspectives, we added project owner/customer. Respondents will be asked to rank the Q-set statements, i.e. the flexibility enablers, from "most important" to "least important", regarding the need to deal with the complexity of each refurbishment project management.

In this research, instead of manual sorting using card as was done in the past (Brown, 1980, pp. 195–197) we used an application that allows interviewees to sort statements and put them into a quasi-normal distribution online via https://app.qmethodsoftware.com/ that was saving more time (Lutfallah & Buchanan, 2019). To help with the sorting process, the respondents carried out a pre-sorting process first by sorting each flexibility factor into one of three categories: most important, neutral, and least important. At the final sorting stage, respondents could use the categorization that was carried out in the pre-sorting stage so that the sorting process became easier. The Q-Sort distribution design must be able to accommodate the entire Q-Set (20 flexibility enablers). Therefore, a distribution design was made from +4 to -4. The number +4 indicates the position of the flexibility factor that is perceived to be the most important, while the number -4 indicates the position of the flexibility factor that is perceived to be the least important. Meanwhile, 0 is the limit for the flexibility factor with a neutral perception.

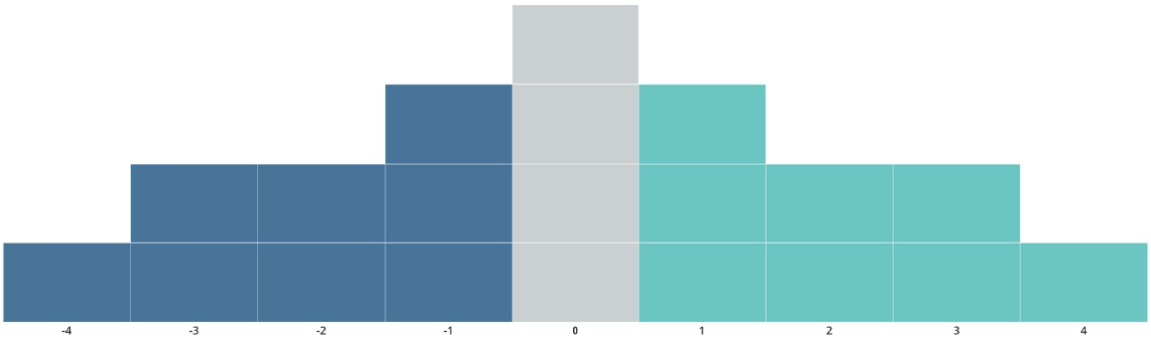

Figure 2 *Q-sort Normal Distribution of 20 Flexibility Enablers*

These Q-sort or ranking results represented the subjective views of each respondent regarding the flexibility enablers from the most important to the least important. These Q-sort then were analyzed to identify patterns of similarities in views of the respondents, i.e. respondents who gave ranks in the same way (Cuppen et al., 2016; Jalali Sohi et al., 2021). This analysis produces several "factors", which are a certain arrangement of Q statements. These factors are in the form of Q-sorts, which are called "idealized sorts" because they are produced by analysis, not by respondents/informants, and are also called "social perspectives" because they consist of the subjective expressions of many people (Webler et al., 2009).

Basically, the analysis is carried out through the steps: 1) correlation matrix, 2) factor extraction, 3) factor selection, 4) factor rotation, then reading each factor (Brown, 1980; Webler et al., 2009). In this research, we used qmethodsoftware.com (Lutfallah & Buchanan, 2019) that automatically processed the q-sort collected from the respondents, without having to manually entering data or uploading MS Excel files containing q-sort data from the sources. The result is practitioners' perspectives regarding flexibility enablers.

From the results of Q-sort data analysis, we also calculated average rank of flexibility enablers (Z-score). The top ranked enablers then be followed up with in-depth interviews which aimed to gain insight from the selected respondents regarding the implementation of each factor.

RESULTS and DISCUSSION

We shared the study to 65 project practitioners as respondents who have project experience in managing refurbishment construction projects in Indonesia, especially renovating and converting of existing buildings to new functions which completed in the last 3 years, through email and online message, but only 41 responses returned and considered valid, consisted of 28 project implementation teams and 13 project owners/customer.

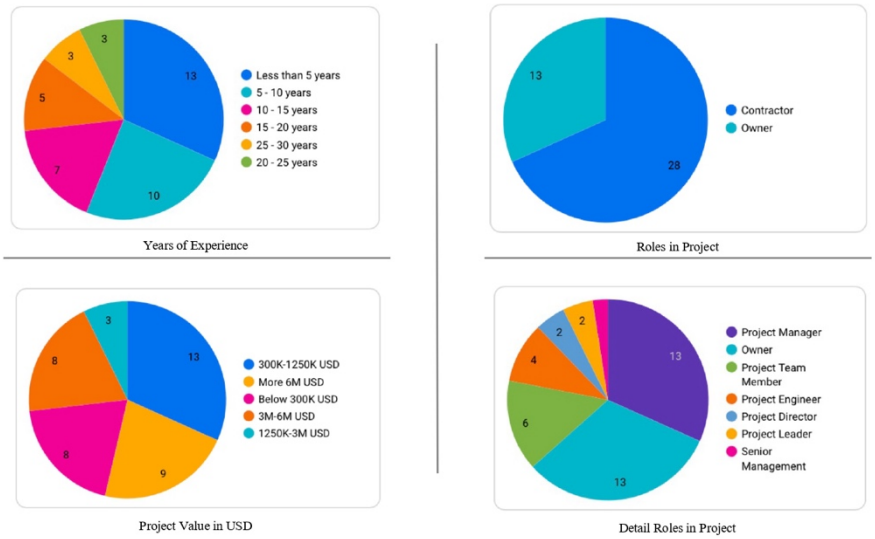

Figure 3 *Respondent Profile of Q-Methodology*

For factor extraction, we used the Principal Component Analysis (PCA) method. From a total of 41 respondents who provided their subjective perspectives in this study, 8 factors or perspectives were obtained with a summary of the results from the application as follows:

Table 4 *Factor Extraction Using PCA Method*

Variable	Factor							
	1	2	3	4	5	6	7	8
EigenValue	8,25619	4,98862	3,83455	3,48596	2,87042	2,48995	2,28541	2,15294
% Explained Variance	20,13704	12,16737	9,35256	8,50234	7,00103	6,07306	5,57416	5,25107
Cumulative Variance	20,13704	32,30441	41,65697	50,15931	57,16034	63,2334	68,80756	74,05863
Humphrey's Rule	0,61848	0,5201	0,3884	0,38899	0,45378	0,41878	0,21534	0,32405
Standard Error	0,15617	0,15617	0,15617	0,15617	0,15617	0,15617	0,15617	0,15617

To select factors to be researched as respondents' perspectives, we used Brown (1980) criteria: 1) high number of loaders (q-sort which has a significant factor loading), 2) low number of non-loaders (q-sort which are not included in any factor/perspective) and confounders (q-sort which is part of more than 1 factor/perspective), and 3) the cumulative % of variance explained reaches more than 50%. Based on these three criteria, we chose 4 factors/perspectives to rotate, which had a cumulative variance value of 50% or more with an estimated number of sources who were loaders of 34 sources consisting of 28 sources of sorts defining and 6 confounders sources.

Table 5 *Factor Selection using Brown*

Variable	Factor						
	2	3	4	5	6	7	8
EigenValue	4,98862	3,83455	3,48596	2,87042	2,48995	2,28541	2,15294
% explained variance	12	9	9	7	6	6	5
Cumulative % of explained variance	32	42	**50**	57	63	69	74
Number of defining sorts	26	27	**28**	26	27	27	27
Number of nonloaders	14	10	**7**	6	3	2	1
Number of confounders	1	4	**6**	9	11	12	13

We used Varimax rotation instead of manual rotation as we didn't aim for testing particular hypotheses about how certain individuals' perspectives (Webler et al., 2009). After rotation of the 4 factors, we got factor matrix with flag indicating defining sort, i.e. which respondents agreed with each factor, and by how much. We could identify that Perspective 1 was supported by 13 respondents (respondent 1, 2, 7, 9, 10, 20, 21, 27, 34, 35, 36, 38, and 39), Perspective 2 was supported by 7 respondents (respondent 8, 15, 23, 25, 31, 33, and 37), Perspective 3 was supported by 7 respondents (respondent 4, 6, 12, 16, 19, 32, and 41), and Perspective 4 was supported by 5 respondents (respondent 11, 18, 22, 28, and 40). Meanwhile, the rest 9 respondents (respondent 3, 5, 13, 14, 17, 24, 26, 29, and 30) are non-loaders. Normalized factor scores were basically idealized Q-sorts for each perspective (Webler et al., 2009) and treated as separate Q sorts representing distinct (uncorrelated) attitudes or perceptions (Brown, 1980). Factor scores for 4 rotated factors in this research with their distinguishing and consensus statements were summarized in table below:

Table 6 *Summary for Each Perspective*

Perspective 1. *Good Management*			Perspective 2. *Strong Collaboration*			Perspective 3. *Strong Teamwork*			Perspective 4. *Collaborative Decision Making*		
Rank	Statement	Value	Rank	Statement	Value	Rank	Statement	Value	Rank	Statement	Value
1	**1. Leadership Capabilities**	1,827	1	**11. Interpersonal Trust**	1,773	1	**3. Self Efficacy**	2,112	1	**4. Responsive Decision Making**	2,31
2	**6. Management Support**	1,526	2	**16. Collaborative Networking Capability**	1,412	2	**13. Self Organisation**	1,671	2	15. Intense and Fast Communication	1,176
3	15. Intense and Fast Communication	1,324	3	**17. Effective Open Communication to Stakeholders**	1,404	3	**19. Continuous Iterative Progress**	1,356	3	3. Self Efficacy	0,95
4	**17. Effective Open Communication to Stakeholders**	0,883	4	15. Intense and Fast Communication	1,094	4	12. Group Potency	1,03	4	2. Visionary Capabilities	0,742
5	2. Visionary Capabilities	0,815	5	3. Self Efficacy	0,985	5	**18. Trust Among Involved Parties**	0,958	5	10. Work Resilience	0,7
6	**4. Responsive Decision Making**	0,734	6	1. Leadership Capabilities	0,767	6	7. Organisational Continuous Learning Culture	0,531	6	7. Organisational Continuous Learning Culture	0,634
7	16. Collaborative Networking Capability	0,597	7	10. Work Resilience	0,671	7	1. Leadership Capabilities	0,188	7	12. Group Potency	0,604
8	**18. Trust Among Involved Parties**	0,444	8	**6. Management Support**	0,345	8	5. Making and Accepting Alternatives	0,148	8	1. Leadership Capabilities	0,479
9	5. Making and Accepting Alternatives	0,287	9	12. Group Potency	0,066	9	16. Collaborative Networking Capability	0,145	9	**8. Organisational Flexibility**	0,423
10	20. Stakeholder Centricity	-0,012	10	**4. Responsive Decision Making**	-0,138	10	6. Management Support	-0,25	10	5. Making and Accepting Alternatives	0,253
11	7. Organisational Continuous Learning Culture	-0,31	11	18. Trust Among Involved Parties	-0,336	11	20. Stakeholder Centricity	-0,32	11	18. Trust Among Involved Parties	-0,21
12	**12. Group Potency**	-0,481	12	**2. Visionary Capabilities**	-0,36	12	**11. Interpersonal Trust**	-0,33	12	16. Collaborative Networking Capability	-0,25
13	19. Continuous Iterative Progress	-0,503	13	13. Self Organisation	-0,452	13	**15. Intense and Fast Communication**	-0,36	13	19. Continuous Iterative Progress	-0,3
14	10. Work Resilience	-0,616	14	**8. Organisational Flexibility**	-0,544	14	17. Effective Open Communication to Stakeholders	-0,54	14	9. Project Approach Flexibility	-0,68
15	8. Organisational Flexibility	-0,626	15	7. Organisational Continuous Learning Culture	-0,756	15	10. Work Resilience	-0,86	15	13. Self Organisation	-0,8
16	9. Project Approach Flexibility	-0,755	16	20. Stakeholder Centricity	-0,974	16	9. Project Approach Flexibility	-0,92	16	6. Management Support	-0,8
17	13. Self Organisation	-0,871	17	9. Project Approach Flexibility	-1,059	17	**4. Responsive Decision Making**	-1,03	17	17. Effective Open Communication to Stakeholders	-0,83
18	**3. Self Efficacy**	-1,186	18	5. Making and Accepting Alternatives	-1,148	18	14. Relational Beyond Contractual Approach	-1,05	18	20. Stakeholder Centricity	-1,39
19	11. Interpersonal Trust	-1,274	19	14. Relational Beyond Contractual Approach	-1,22	19	**2. Visionary Capabilities**	-1,11	19	14. Relational Beyond Contractual Approach	-1,45
20	14. Relational Beyond Contractual Approach	-1,803	20	**19. Continuous Iterative Progress**	-1,532	20	**8. Organisational Flexibility**	-1,38	20	11. Interpersonal Trust	-1,57

Legend

	Attitude
	Inner Organization
	Outer Organization

bold	*distinguishing statement*
underlined	*consensus statement*

In Q methodology, interpretations are primarily based on the factor scores, therefore we noticed the distinguishing statements (statements that were ranked significantly differently between a given factor and all other factors) and the consensus statements (statements were not ranked differently by any factors). From distinguishing statement for each factor, we could understand the specific point of view for each group.

In Perspective 1, the top ranked distinguishing statements are “Leadership capability” and “Management support”. Meanwhile, distinguishing statement “Effective and Open Communication to Stakeholders,” “Responsive Decision-making Process,” and “Trust between Related Parties” which were ranked in top 10 importance were also represent organizational process. Different with other perspective which put “Group Strength” in their top 10 rank, Perspective 1 put it in rank 12. Practitioners who supported perspective 1 also put “Self-efficacy” in lower rank. The ranking of this perspective is represented by the keywords "leadership", "management", and "communication", therefore we named perspective 1 as "Good Management." We conclude that in this perspective, practitioners consider the importance of flexibility enablers which supported by good management in leading project implementation—both in the context of resource management and providing encouragement to the team—, providing management support, and demonstrating effective and open communication skills to all project stakeholders. These can be used to deal with complexity and uncertainty of refurbishment construction projects.

Perspective 2 emphasized “Interpersonal Trust,” “Ability to Build Collaborative Networks,” and “Effective and Open Communication to Stakeholders”. It also put “Management support” and “Responsive Decision Making Process” in top 10 rank. Practitioners who supported Perspective 2 viewed managerial and organizational enabler like “Visionary ability,” “Organizational Flexibility,” and “Continuous Iterative Progress” in less priority. From the keywords "trust", "collaboration", and "communication" in this perspective priority, we named Perspective 2 as "Strong Collaboration". We conclude that in perspective 2, practitioners consider the importance of flexibility enablers which are built on interpersonal trust by utilizing collaborative cooperation networks and supported by effective and open communication to all stakeholders, which can be used to deal with complexity and uncertainty of construction projects refurbishment.

Perspective 3 viewed “Self-efficacy,” “Self-organization,” “Continuous Iterative Progress,” and “Trust between Related Parties” as the most important enablers. While organizational aspects like “Interpersonal Trust,” “Intensive and Fast Communication,” “Responsive Decision Making Process,” “Visionary ability,” and “Organizational Flexibility” were put in less important. The dominant internal aspects in this perspective made us name this third perspective as "Strong Teamwork". We conclude that in perspective 3, practitioners consider the importance of flexibility enablers which are built on strong teamwork supported by self-efficacy and self-organization of the project team which carries out the project management process in stages and continuously. Strong teamwork is also based on the trust built between the relevant parties. These things are perceived to be able to be used to overcome the complexity and uncertainty of refurbishment construction projects.

Perspective 4 is determined by the top ranked distinguishing statement “Responsive Decision Making Process.” It also viewed “Organizational Flexibility” as top 10 priority. Therefore, by considering these additional keywords, we named perspective 4 "Joint Decision Making". We conclude that in perspective 4, practitioners consider the importance of having a fast decision-making process without leaving behind the communication process with various parties because each party has the ability to contribute (efficacy) in achieving project goals. Thus, teams can use these flexibility enablers to deal with the complexity and uncertainty of refurbishment construction projects.

Meanwhile, Enabler 9 (“Project approach flexibility”) and Enabler 14 (“Relational Beyond Contractual Approach”) were the consensus statements. It was ranked low in any factor. We noticed that in all perspectives, “flexibility in approach during project” was considered less important in realizing flexibility in project management.

We compared the result with previous research conducted by Jalali Sohi et al. (2019) which revealed three similar perspectives between client organizations and consultants; "trust", "scope flexibility by contractual flexibility", and "proactive management" (proactive management). Our research included contractors as research subjects, a group whose perspectives had not been explored in previous research. We noticed that the results of this study have similarities and differences with previous research. Some practitioners emphasized attitude and internal organization related to management (Perspective 1) and teamwork (Perspective 3), which is in line with the "trust" and "proactive management" perspectives in previous research. Respondents from both the contractor and project owner groups appeared to share this opinion.

Meanwhile, Perspectives 2 and 4 which focused on communication and collaboration between stakeholders showed that some practitioners considered flexibility from outer organizational as important. These two perspectives were relatively different compared to the perspective findings in previous research (Jalali Sohi et al., 2021). Respondents from the contractor group tend to this perspective than respondents from the project owner group. This new finding is possible because the culture in refurbishment projects is more complex in the project implementation phase, so that collaboration between stakeholders becomes a prominent perspective. In contrast to the general construction project setting studied by Jalali Sohi et al. (2019) that emphasizing flexibility in the initial phase of the project.

From all q-sorts, an average (z-score) resulted list of the most important flexibility enablers:

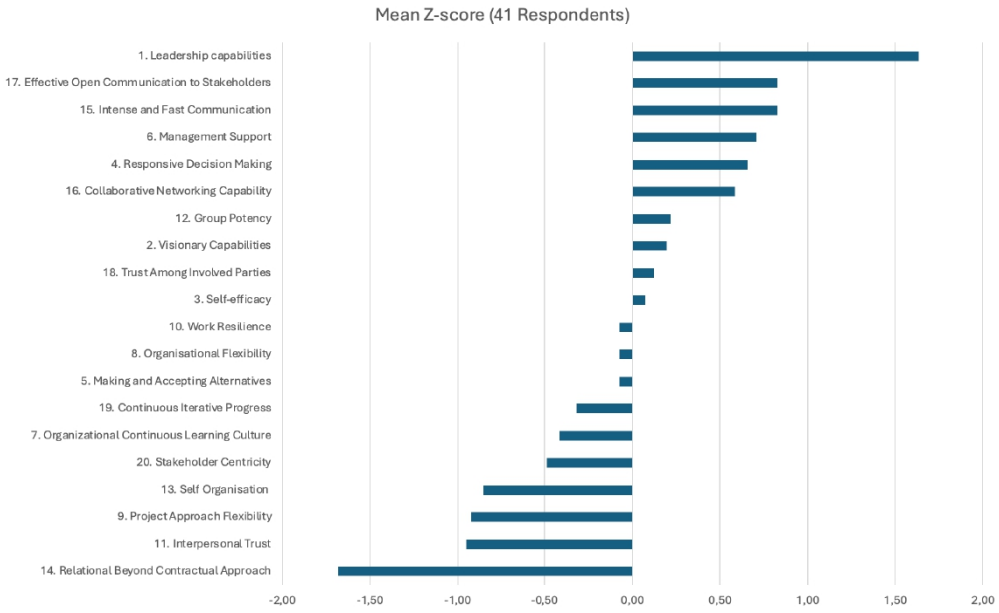

Figure 4 *Z-Score from 41 Respondents*

The five top flexibility enablers were "Leadership Ability," "Effective Open Communication to Stakeholders," "Intense and Fast communication," "Management support," and "Responsive Decision Making Process."

Compared with the four perspectives discussed previously, there are similarities of two enablers in the top five rankings, "Intense and Fast Communication" (found in 3 perspectives) and "Effective and Open to Stakeholders" (found in 2 perspectives). The emergence of two enablers related to communication aspect shows that communication is a factor that is perceived as important by the respondents and contributes to their perspective, regardless of what their main perspective is and regardless of what role they are (project implementation team or project owner).

In-depth interview elaborated the implementation of flexibility enablers in the refurbishment project management. To gain insight into how project practitioners implement the most important flexibility enablers, we interviewed respondents with experience over 20 years representing their expertise. Six respondents met the criteria. However, due to limited time and willingness of the respondents to be interviewed, there were only five respondents managed to share their experiences in the interview.

The respondents were asked to choose one of the most complex projects that had been handled in the last five years and use the project as a case study to answer questions. If they implemented flexibility enablers in the project, they were asked what the real examples are, the challenges, and what tips/tricks/tools used in its implementation. If they did not implement flexibility enablers in the project, they were asked the reasons/barriers for not implementing them; the impact on costs, quality and time; and how to deal with the impact.

The result showed that all five top ranked flexibility enablers had been implemented in refurbishment projects, with exception "Management Support" which had been

implemented by Respondent 7 and 30, and were not implemented by Respondent 1, 2, and 6 in their project.

For "Leadership Capabilities", it was implemented by scheduled meeting (Respondent 1), motivation & instruction (Respondent 2 and 6), and hiring competent PM (Respondent 7 and 30). The challenges in implementation were that it needed patience (Respondent 1), needed to be a role model (Respondent 2), always have dynamic changes (Respondent 6), needed skill to assemble work relationship (Respondent 7), and needed skill to manage people to comply (Respondent 30). This enabler is implemented using scheduled offline meeting (Respondent 1, 2, and 7), setting & checking daily target (Respondent 6), and having access to strategic decision makers (Respondent 30).

"Effective open communication to stakeholders" was implemented through escalation process (Respondent 1), the use of appropriate aids and visuals (Respondent 2 and 6), digital software (Respondent 7), and report to the board of directors (Respondent 30). The tools are including drawings, perspective, freehand, isonometry, and photos from the field (Respondent 1, 2, and 6), project management software (Respondent 7), or simple software such as WhatsApp (Respondent 30). However, they kept facing information distortion (Respondent 1, 2, and 6) and other challenges like the need of shared commitment, director's concern and support (Respondent 7 and 30).

Meanwhile, "Intense and fast communication" was implemented through daily team meetings (Respondent 1, 2 and 6), detailed discussion (Respondent 6), the use of the same language (Respondent 7), and intensive communication with top decision makers (Respondent 30). Tools used by all respondents are all possible communication media, both offline and online (email, WhatsApp, telephone, software), with Respondents 2 and 6 alternately emphasize on communication channel discipline communication techniques. The challenges were that it was exhausting (Respondent 1), fast changing request (Respondent 2), there were various technical competences (Respondent 6), and it required capable and focused resources/PM (Respondent 7 and 30).

"Responsive decision making process" were applied in design changes (Respondent 1, 2, and 7), project scope (Respondent 6), or in case courage needed to take big decisions to prevent the domino effect of problems (Respondent 30). That it made the team busier (Respondent 1), required a capable project team (Respondent 2), comprehensive calculation of the new scope (Respondent 6), complete knowledge of the existing (Respondent 7), and courage to do breakthrough (Respondent 30) are examples of challenges met. To implement this enabler, they need to added resources for adjustments (Respondent 1 and 7), use the flexibility of existing tools (Respondent 2), recalculate the new scope (Respondent 6), and sometimes use confrontation methods (Respondent 30).

Enabler "Management Support" were implemented by Respondent 7 and 30, especially in the project financing aspect (Respondent 7) and through direct involvement of directors (Respondent 30). Both need senior management to support the project through discretion and sometimes providing leeway in the implementation of existing written policies. The challenges met were sometime management dares to take risks based on commitments that

are not yet official (Respondent 7) and that problems still always arise even though the line of communication has been established directly to the Board of Directors (Respondent 30).

Contrarily, "Management Support" were not implemented because management was tied by compliance rules and brought impact on delayed schedule (Respondent 1). Respondents 2 and 6 also did not implement enabler "Management support", but they gave other reason that it was not needed by the project team, the complexity could be overcome without it. Therefore, there were no impact on delayed schedule.

Based on the results of Q-Methodology and interviews, a comparison matrix can be made between project complexity and the actual implementation of flexibility enablers applied by practitioners along with their respective points of view. The perspective is the result of the Q study analysis. Because q-sort from respondent 30 is a non-loader for the four perspectives, we refer to the highest value of his factor matrix, i.e. Perspective 2. Therefore, for this analysis, we include the perspective of respondent 30 into Perspective 2.

The complexity or uncertainty encountered in the projects selected by each of our respondent was categorized according to the uncertainty categories of (Ranasinghe et al., 2021, 2023). Meanwhile, we grouped flexibility enablers to deal with the complexity into the top 5 most important flexibility enablers according to the results of the Q study and interviews.

Table 7 *Cross Matrix Summary*

Respondent and Their Perspective	Complexity Encountered	Uncertainty Category *)	Real Implementation	Flexibility Enabler
Respondent 1 Having Perspective 1 ("Good Management")	1. The scope is extensive, interrelated, and involves many subcontractors and various stakeholders, including the project owner and consultants. 2. Design changes because previous design were unable to be implemented in the field	1. Interdependency between project elements 2. Speed of change in project environment (unforeseen site conditions related to existing/neighbouring structures) as a project progresses	1. Scheduled meetings to harmonize schedules and resolve obstacles between work scopes 2. Daily team meetings to discuss and resolve issues 3. Open communication is primarily for escalation to higher management 4. Applied primarily in situations where there are design changes that need to be adapted in the field	1. Leadership capability 2. Intense and fast communication 3. Effective Open Communication to Stakeholders 4. Responsive Decision Making
Respondent 2 Having Perspective 1 ("Good Management")	1. During the renovation process, the building is still used as an active office 2. Design changes due to changing customer requests	1. Many trades or parties working in close proximity (building users/public) 2. Difficult in access to building or site 3. Volatility: information can change rapidly at execution	1. Provide motivation and direction to the team to anticipate and minimize risks 2. Daily team meetings to discuss and resolve issues 3. Appropriate use of visual aids and tools 4. Applied primarily in situations where there are design changes that must be adapted in the field	1. Leadership capability 2. Intense and fast communication 3. Effective Open Communication to Stakeholders 4. Responsive Decision Making
Respondent 6 Having Perspective 3 ("Strong Teamwork")	1. Structural analysis and proper design determination considering project cost limitations and short renovation time 2. Worker safety factors and building structure reinforcement work results. 3. Absence of existing building structure As Built Drawing documents	1. Structural issues with an existing building 2. Time scale 3. Information is totally unavailable 4. Lack of experience of this particular activity/experience of the project team	1. Provide motivation and direction to the team to anticipate and minimize risks 2. Daily team meetings to discuss and resolve issues 3. Technical work is discussed in as much detail as possible 4. Use of appropriate aids and visuals 5. Applied in adapting to changes in project scope	1. Leadership capability 2. Intense and fast communication 3. Effective Open Communication to Stakeholders 4. Responsive Decision Making
Respondent 7 Having Perspective 1 ("Good Management")	1. Research and strengthening of the building structure must be carried out to comply with stricter requirements of data center standards 2. The renovation process is parallel with the relocation process of building occupants to a new place in a short time.	1. Structural issues with an existing building 2. Many trades or parties working in close proximity (building users/public)	1. Employing project managers with leadership and technical skills 2. Use of a common language as long as project stakeholders have the same skills 3. Use of digital software 4. Management support is needed especially in the financing aspect of the project 5. Applied especially in situations where there are design changes that must be adapted in the field	1. Leadership capability 2. Intense and fast communication 3. Effective Open Communication to Stakeholders 4. Management Support 5. Responsive Decision Making
Respondent 30 Having Perspective 2** ("Strong Collaboration")	1. There were financial and technical difficulties so that the project was temporarily stopped and abandoned. 2. The project was restarted with strict supervision from the company's Board of Directors, because the project required extra effort to be completed.	1. Speed of changes in project methods, tasks, team, structure, and deliverables as project progress 2. Speed of change in the external environment as a project progresses (building occupants/uses, technological advancement, legislative changes, and weather conditions)	1. Employing project managers with outstanding leadership and technical skills 2. Intensive communication with top decision makers as an implementation of flexibility factors 3. Reporting openly and effectively to the board of directors 4. Management support through direct involvement of the board of directors with project implementation 5. Courage to make big decisions to prevent a domino effect of problems	1. Leadership capability 2. Intense and fast communication 3. Effective Open Communication to Stakeholders 4. Management Support 5. Responsive Decision Making

From the matrix above, it can be seen that the respondents who have Perspective 1 ("Good Management"), implement enablers "leadership capability," "intensive and fast communication," "effective and open communication to stakeholders," and "responsive decision-making process" when encountered "dependencies between project elements," "changes in the project environment such as changes in the condition of the surrounding land/buildings," "many parties are still active around the project location," "difficulty accessing buildings/work areas," and "volatility of information." However, when the complexity encountered is "structural problems with existing buildings" which requires decision escalation, additional "management support" is needed as flexibility enablers.

Meanwhile, respondent who have Perspective 3 ("Strong teamwork") encountered complexities in the form of "structural issues with existing buildings," "time constraints," "information is completely unavailable," and "the project team is inexperienced in certain activities." There is a strong relationship between the complexity of the project team's lack of experience and the perspective of strong teamwork to deal with it. It is also interesting

to note that this complexity is sufficiently resolved with flexibility enablers related to teamwork, so that the respondent with this perspective considers that management support is not needed to deal with the complexity of the project.

In contrast to the resource person with Perspective 2 ("Strong Collaboration") who also happens to be the project owner who needs all five enablers because of the high scale of complexity, both in terms of the scale of the problem and the parties involved. with "changes occurring rapidly in methods, tasks, teams, organizational structures, and delivery during the project" and "changes in the external environment such as the environment, politics, or economy."

CONCLUSIONS

Systematic Literature Review of 196 articles from 10 leading project management and construction management journals identified 20 flexibility enablers to deal with project complexity; "Leadership Capabilities," "Visionary Capabilities," "Self-Efficacy," "Responsive Decision Making," "Making and Accepting Alternatives," "Management Support," "Organizational Continuous Learning Culture," "Organizational Flexibility," "Project Approach Flexibility," "Work Resilience," "Interpersonal Trust," "Self-Organization," "Relational Beyond Contractual Approach," "Intense and Fast Communication," "Collaborative Networking Capability," "Effective Open Communication to Stakeholders," "Trust Among Involved Parties," "Continuous Iterative Progress," and "Stakeholder Centricity."

Q-methodology applied to 41 respondents revealed 4 perspectives of refurbishment construction project practitioners regarding project management flexibility enablers: "good management", "strong collaboration", "strong teamwork" and "decision making together". Except for the third perspective which focused on the internal organization, the practitioners' perspective focused on attitudes and external organizations, i.e. communication and decision-making processes between stakeholders. It was reflected in the 5 most important flexibility enablers; "Leadership ability," "Effective and Open Communication to Stakeholders," "Intensive and Fast Communication," "Management Support," and "Responsive Decision-making Process."

The 5 most important flexibility enablers had been applied in the practice of refurbishment construction projects to support practitioners in managing project complexity and uncertainty with diverse technicalities and challenges in different projects. With the exception "Management support" enabler which is not always implemented in the practice of refurbishment construction projects, due to a certain level of complexity, project flexibility can be realized even without management support.

Respondent with perspective "Strong Collaboration" tend to implement all high ranked flexibility enablers due to high scale they faced in projects, in contrary with respondent with perspective "Strong Teamwork" consider flexibility enablers "management support" is not needed to deal with the complexity of the project. While respondent with perspective "Good management" basically need to implement all high ranked flexibility enablers, particularly "Management support" in case of escalation needed, which could give impact on bad performance when it was not implemented.

This research has two theoretical implications related to the rapid development of science and research in the field of project management, which can be used as a reference in further research. First, the SLR results update the flexibility identified by Jalali Sohi et al. (2020) in previous research. Second, perspectives of refurbishment project practitioners as Q-methodology results add theoretical contributions regarding flexibility in dealing with the complexity of refurbishment projects, which is different from the perspective of construction project practitioners in general as has been researched by Jalali Sohi et al. (2019).

While the practical implication of this research is urgency to adopt these flexibility enablers into construction project management practice to deal with complexity/uncertainty. Practitioners and management should prioritize implementation of top ranked flexibility enablers, i.e. leadership flexibility, communication and collaboration in project implementation. Company management should support and be involved in resolving complexities in the projects and adopt more flexible project management in company policy. The limitation of this research is that this research covers construction projects with the type of refurbishment projects in Indonesia. Different results may be found in other types of projects. Further research can be carried out to dig deeper into the implementation of flexibility in other type of construction project and in other culture setting.

REFERENCE

Aarseth, W., Ahola, T., Aaltonen, K., Økland, A., & Andersen, B. (2017). Project Sustainability Strategies: A Systematic Literature Review. *International Journal of Project Management*, *35*(6), 1071–1083. https://doi.org/10.1016/j.ijproman.2016.11.006

Ackermann, F., Howick, S., Quigley, J., Walls, L., & Houghton, T. (2014). Systemic risk elicitation: Using causal maps to engage stakeholders and build a comprehensive view of risks. *European Journal of Operational Research*, *238*(1), 290–299. https://doi.org/10.1016/j.ejor.2014.03.035

Ali, A. S., & Rahmat, I. (2009). Methods of coordination in managing the design process of refurbishment projects. *Journal of Building Appraisal*, *5*(1), 87–98. https://doi.org/10.1057/jba.2009.13

Atkinson, R., Crawford, L., & Ward, S. (2006). Fundamental uncertainties in projects and the scope of project management. *International Journal of Project Management*, *24*(8), 687–698. https://doi.org/10.1016/j.ijproman.2006.09.011

Bakhshi, J., Ireland, V., & Gorod, A. (2016). Clarifying the project complexity construct: Past, present and future. *International Journal of Project Management*, *34*(7), 1199–1213. https://doi.org/10.1016/j.ijproman.2016.06.002

Bosch-Rekveldt, M. G. C. (2011). *Managing Project Complexity: A Study into Adapting Early Project Phases to Improve Project Performance in Large Engineering Projects*. Delft University of Technology.

Brown, S. R. (1980). *Political Subjectivity: Applications of Q Methodology in Political Science*. Yale University Press.

Cobb, C. G. (2011). *Making Sense of Agile Project Management: Balancing Control and Agility*. John Wiley & Sons, Inc.

Collyer, S., & Warren, C. M. J. (2009). Project management approaches for dynamic environments. *International Journal of Project Management*, *27*(4), 355–364. https://doi.org/10.1016/j.ijproman.2008.04.004

Cooke-Davis, T., Cicmil, S., Crawford, L., & Richardson, K. (2007). We're not in Kansas anymore, Toto: Mapping the strange landscape of complexity theory, and its relationship to project mangement. *Project Management Institute*, *38*(2). https://doi.org/https://doi.org/10.1177/875697280703800206

Cuppen, E., Bosch-Rekveldt, M. G. C., Pikaar, E., & Mehos, D. C. (2016). Stakeholder Engagement in Large-Scale Energy Infrastructure Projects: Revealing Perspectives Using Q Methodology. *International Journal of Project Management*, *34*(7), 1347–1359. https://doi.org/10.1016/j.ijproman.2016.01.003

Egbu, C. O., Young, B. A., & Torrance, V. B. (1996). Refurbishment management practices in the shipping and construction industries — lessons to be learned. *Building Research & Information*, *24*(6), 329–338. https://doi.org/10.1080/09613219608727553

Egbu, C. O., Young, B. A., & Torrance, V. B. (1998). Planning and Control Processes and Techniques for Refurbishment Management. *Construction Management and Economics*, *16*(3), 315–325. https://doi.org/https://doi.org/10.1080/014461998372349

Eriksson, P. E., Larsson, J., & Pesämaa, O. (2017). Managing complex projects in the infrastructure sector — A structural equation model for flexibility-focused project management. *International Journal of Project Management*, *35*(8), 1512–1523. https://doi.org/10.1016/j.ijproman.2017.08.015

Fernandes, G., Ward, S., & Araújo, M. (2015). Improving and embedding project management practice in organisations — A qualitative study. *International Journal of Project Management*, *33*(5), 1052–1067. https://doi.org/10.1016/j.ijproman.2015.01.012

Floricel, S., Michela, J. L., & Piperca, S. (2016). Complexity, uncertainty-reduction strategies, and project performance. *International Journal of Project Management*, *34*(7), 1360–1383. https://doi.org/10.1016/j.ijproman.2015.11.007

Institution, P. M. (2017). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (Sixth Edit). Project Management Institute, Inc.

Institution, P. M. (2021a). *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (Seventh Ed). Project Management Institute, Inc.

Institution, P. M. (2021b). *The Standard for Project Management*. Project Management Institute, Inc.

Jalali Sohi, A., Bosch-Rekveldt, M., & Hertogh, M. (2021). Practitioners' Perspectives on Flexible Project Management. *IEEE Transactions on Engineering Management*, *68*(4), 911–925. https://doi.org/10.1109/TEM.2019.2914833

Jensen, P. A., Maslesa, E., Berg, J. B., & Thuesen, C. (2018). 10 Questions Concerning

Sustainable Building Renovation. *Building and Environment*, *143*, 130–137. https://doi.org/https://doi.org/10.1016/j.buildenv.2018.06.051

Kaming, P. F., Olomolaiye, P. O., Holt, G. D., & Harris, F. C. (1997). Factors influencing construction time and cost overruns on high-rise projects in Indonesia. *Construction Management and Economics*, *15*(1), 83–94. https://doi.org/10.1080/014461997373132

Koppenjan, J., Veeneman, W., van der Voort, H., ten Heuvelhof, E., & Leijten, M. (2011). Competing management approaches in large engineering projects: The Dutch RandstadRail project. *International Journal of Project Management*, *29*(6), 740–750. https://doi.org/10.1016/j.ijproman.2010.07.003

Kreiner, K. (1995). In Search of Relevance: Project Management in Drifting Environments. *Scandinavian Journal of Management*, *11*(4), 335–346. https://doi.org/https://doi.org/10.1016/0956-5221(95)00029-U

Larsson, J., Eriksson, P. E., & Pesämaa, O. (2018). The importance of hard project management and team motivation for construction project performance. *International Journal of Managing Projects in Business*, *11*(2), 275–288. https://doi.org/10.1108/IJMPB-04-2017-0035

Lutfallah, S., & Buchanan, L. (2019). Quantifying Subjective Data Using Online Q-Methodology Software. *The Mental Lexicon*, *14*(3), 415–423. https://doi.org/10.1075/ml.20002.lut

Mansfield, N., Ugwu, O., & Doran, T. (1994). Causes of delay and cost overruns in Nigerian construction projects. *International Journal of Project Management*, *12*(4), 254–260. https://doi.org/10.1016/0263-7863(94)90050-7

Meng, X. (2012). The effect of relationship management on project performance in construction. *International Journal of Project Management*, *30*(2), 188–198. https://doi.org/10.1016/j.ijproman.2011.04.002

Muhlis, & Windiasari, M. L. (2023). *Statistik Konstruksi 2022* (F. Handayani & K. Aji (eds.)). Badan Pusat Statistik Indonesia.

Noori, A., Saruwono, M., Adnan, H., & Rahmat, I. (2016). Conflict, Complexity, and Uncertainty in Building Refurbishment Projects. *International Civil and Infrastructure Engineering Conference*.

Priemus, H., & Wee, B. van. (2013). *International Handbook on Mega-Projects*. Edward Elgar Publishing Limited.

Qazi, A., Quigley, J., Dickson, A., & Kirytopoulos, K. (2015). Modelling project complexity driven risk paths in new product development. *2015 International Conference on Industrial Engineering and Systems Management (IESM)*, 938–945. https://doi.org/10.1109/IESM.2015.7380267

Ranasinghe, U., Jefferies, M., Davis, P., & Pillay, M. (2021). Conceptualising Project Uncertainty in the Context of Building Refurbishment Safety: A Systematic Review. *Buildigs*, *11*(3). https://doi.org/https://doi.org/10.3390/buildings11030089

Ranasinghe, U., Jefferies, M., Davis, P., & Pillay, M. (2023). Enabling a Resilient Work Environment: An Analysis of Causal Relationships between Resilience Engineering Factors in Construction Refurbishment Projects. *Journal of Construction Engineering and Management*, *149*(9). https://doi.org/https://doi.org/10.1061/JCEMD4.COENG-13283

Sarger, T. (1990). *Notions of flexibility in planning-related literature*. NORDPLAN.

Sastoque-Pinilla, L., Artelt, S., Burimova, A., Lopez de Lacalle, N., & Toledo-Gandarias, N. (2022). Project Success Criteria Evaluation for a Project-Based Organization and Its Stakeholders—A Q-Methodology Approach. *Applied Sciences*, *12*(21), 11090. https://doi.org/10.3390/app122111090

Seuring, S., & Müller, M. (2008). From a Literature Review to a Conceptual Framework for Sustainable Supply Chain Management. *Journal of Cleaner Production*, *16*(15), 1699–1710. https://doi.org/https://doi.org/10.1016/j.jclepro.2008.04.020

Silvius, A. J. G., Kampinga, M., Paniagua, S., & Mooi, H. (2017). Considering Sustainability in Project Management Decision Making; An Investigation Using Q-Methodology. *International Journal of Project Management*, *35*(6), 1133–1150. https://doi.org/https://doi.org/10.1016/j.ijproman.2017.01.011

Silvius, G., & Schipper, R. (2020). Exploring Variety in Factors that Stimulate Project Managers to Address Sustainability Issues. *International Journal of Project Management*, *38*(6), 353–367. https://doi.org/10.1016/j.ijproman.2020.08.003

Sohi, A. J., Bosch-Rekveldt, M., & Hertogh, M. (2020). Does Flexibility in Project Management in Early Project Phases Contribute Positively to End-Project Performance? *International Journal of Managing Projects in Business*, *13*(4). https://doi.org/https://doi.org/10.1108/IJMPB-07-2019-0173

Sohi, A. J., Hertogh, M., Bosch-Rekveldt, M., & Blom, R. (2016). Does Lean & Agile Project Management Help Coping with Project Complexity? *Procedia - Social and Behavioral Sciences*, *226*, 252–259. https://doi.org/10.1016/j.sbspro.2016.06.186

Tajuddin, I., Mahmud, A., & Syahnur, M. H. (2023, September). Determinants Strategic Factors for Digital Business Transformation in Micro and Small Business in Makassar. In *BOOK OF ABSTRACT INTERNATIONAL CONFERENCE ON HALAL, POLICY, CULTURE AND SUSTAINABILITY ISSUES* (Vol. 5, No. 1, pp. 7-7).

Webler, T., Danielson, S., & Tuler, S. (2009). Using Q Method to Reveal Social Perspectives in Environmental Research. *Social and Environmental Research Institute*.

Zubon, S. H., & Taher, M. K. (2021). A Comparison Between the International Standards PRINCE2 and PMBOK in Project Management. *2nd International Multi-Disciplinary Conference Theme: Integrated Sciences and Technologies*.