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Managing Diversity for Project Performance

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Executive Summary

An increased multigender and multicultural workforce in project teams has become an emerging trend. At the same time, the future of project management entails stronger integration through all project phases, breaking out of individual silos, and increased focus on partnering between the various actors as the way forward. Therefore, future project managers need to be able to communicate, understand, and work with a large variety of disciplines, cultures, and backgrounds.

In this research, the hypothesis is that more diverse project teams will deliver better performance, because these diverse teams are known to have a broader perspective and are generally more adaptive to changing situations. To make the most of the diversity in the project team and even strive for more diversity in the team composition, project managers must learn to recognize the various types of diversity. If recognized, the project managers are able to come up with different approaches, fitted to the type of diversity that is prevalent in the project team and to mitigate the potential negative effects of diversity.

The research adopts a mixed-methods approach consisting of quantitative and qualitative methods, including surveys and semistructured interviews. The sectors of interest are the process industry (e.g., manufacturing industry, chemical industry, oil and gas, pharmaceutical, and food industry) and the civil construction industry, as well as engineering consultants. The process industry participated via the Dutch Process Industry (NAP) Network. Also, construction and engineering consultancy companies based in the Netherlands have been approached. In total, a selection of 20 companies has been targeted. Firstly, the research identifies means to assess the diversity and its origin. Subsequently, fit-for-purpose practices and tools have been developed to support project managers in making the best use of the diversity and mitigate potential negative effects of diversity. Examples of these are the use of the Relational Capability (RECAP) tool and a survey to assess the diversity composition of a team.

Introduction and Research Question

In contemporary projects, the participation of many parties from all over the globe seems to be more standard than exception. Consequently, the project manager is dealing with a wide variety of people from various backgrounds, not only in their own project team but also as integrated/collaborating parties during the whole life cycle of the project. Making the best use of this broad offer of experience, knowledge, and values for the good of the project is the challenge during the management of the project.

For some years already, the focus of project management has been moving from the pure management of technology, tasks, and activities toward the management of people's interactions and relationships. Behavioral skills and the building of teams have already received attention (Pelled, 1996; Wu et al., 2019), but making the most of the diversity in a team is not that well researched yet. The literature (Edwards, 2002; Ancona & Caldwell, 1992) is inconclusive about the net effect of diversity on project performance: Would it be positive or negative?

In this research, we hypothesize that more diverse project teams may deliver better performance, because these have a broader perspective and can be more adaptive to changing situations. To make the most of the diversity in the project team and even strive for more diversity in the team composition, project managers must learn to recognize the various types of diversity. This enables them to come up with approaches fitted to the type of diversity prevalent in the project team and to mitigate the potential negative effects of diversity (see Table 2). Our central research question is: How can diversity improve project performance?

In the earlier literature, the main emphasis has been on cultural diversity (Watson et al., 1998). Over the years, the attention has shifted to other types of diversity (which might overlap), including cultural diversity, workforce diversity, informational diversity, knowledge diversity, value diversity, gender diversity, functional diversity, tenure diversity (Powers-Twichell & Murphy, 2011; Saxena, 2014; Pelled, 1996). Workforce diversity is believed to encompass age, religion, gender, language, professional qualifications, and geographical origin (Pelled, 1996; Ancona & Caldwell, 1992). As definitions are ambiguous, we first explored the literature to set the boundaries for the empirical research, considering that some of the diversity categories are probably easier to handle for a project manager than others.

This paper is structured as follows: After the literature review, we present our research design, including different methods for data gathering. We present the results of each of the different methods (quantitative

survey, social network analysis, and RECAP) that inspired our framework for implementing more diverse teams. After discussing the implications of the framework and limitations of the study, we draw conclusions and provide recommendations for practice as well as further research.

Theoretical Background

Over the past few decades, there has been a growing level of attention paid to team diversity, its characteristics, and its impact on team and project performance (Pelled, 1996; Wu et al., 2019). Project performance in this paper is defined as the measurement of how well a project has met its objectives and requirements, which goes beyond the traditional key metrics of scope, schedule, and cost, but also includes client satisfaction, delivered quality, and safety (Bakker & de Kleijn, 2018b). Research on psychological and social aspects of project teams is a relatively new necessity, since studies have shown the need for a more integrated approach to project management (Bakker & de Kleijn, 2014, 2018a). Project teams are usually comprised of a plethora of members with heterogeneities in their knowledge, expertise, values, and skills. The temporariness of the teams and selection of the team members, usually following the project life cycle and the needs of each project phase, are also parameters that should be considered. Therefore, the goal of creating a high-performing team, aiming to maximize project performance, requires the creation of a new paradigm for project managers, focusing on and embracing project human resource management (Edwards, 2002). The interaction of the abovementioned parameters with diversity and their connection to team and project performance constitutes a dynamic mechanism which has not been fully investigated yet.

Definitions of Diversity

Earlier studies, which were usually focusing on demographic diversity, tended to follow two different approaches for diversity: either considering it a broad mix, like heterogeneity, or focusing on specific dimensions, since not all dimensions affect the team processes in the same way (Pelled, 1996). According to the *Cambridge Business English Dictionary*, diversity is defined as "the fact of there being people of many different groups in society, within an organisation, etc." This means that team members bear characteristics such as cognitive skills or personality traits along with their identity characteristics (age, race, gender, etc.) that differentiate them from the rest of the team. Regarding workforce diversity, it is the projection of this definition in the workplace and means similarities and differences among employees in terms of age, cultural background, physical abilities and disabilities, race, religion, gender, and sexual orientation (Saxena, 2014). Globally, there is a tendency of embracing diverse project teams, since despite the challenges that heterogeneity creates in the aim to form an integrated team, such teams are believed to be better at complex problem-solving and design of innovative solutions (Edwards, 2002). At the same time, the proper management of this diversity within organizations and project teams is of critical importance (Watson et al., 1998).

Trying to identify the reasons why there is this driving force toward diversity, the main aspect seems to be the effects of globalization. The constantly evolving global economy has forced organizations toward the highest performing workforce, leaving no room for discriminatory behavior in the recruitment process. This ensures that they remain competitive and keep progressing (Saxena, 2014). Considerable emphasis is given to promoting equal opportunities and eliminating gender or age inequalities (Armstrong et al., 2010) by creating more diverse workplaces, where everyone is equal with equal opportunities. Nonetheless, the management of this diverse workforce can be challenging since a new balance must be achieved. The management of these softer aspects of projects includes the consideration of diversity and employee development, while the organizational objectives will still have to be achieved (Saxena, 2014). Literature studies have also recognized that there is an influence of diversity on group interactions and outcomes, and they have tried to identify these relationships. Even though researchers define the concept of team diversity in different ways, there is a consensus that it is a multidimensional concept, encompassing a variety of heterogeneities (Wu et al., 2019; Pelled, 1996). An overview of these diversity dimensions, roughly categorized, is presented in Table 1.

Ancona and Caldwell (1992) chose two broader diversity dimensions: the mix of functional specialties and the organizational tenure. According to them, when professionals of different expertise constitute a group, the direct access to this expertise facilitates the processes and provides useful insights, but at the same time, the different ways of thinking and perceptions

Table 1. Overview of Diversity Dimensions in Previous Studies

Powers-Twichell & Murphy, 2011	Saxena, 2014	Pelled, 1996	Ancona & Caldwell, 1992	Wu et al., 2019
Age	Age	Age		Value diversity
Gender	Gender	Gender		
Physical attributes	Different perception and attitude			
Race/religion	Caste and religion	Race		
Language	Language			
Family structure				
Sexual orientation				
Political views				
Profession	Experience	Functional background	Mix of functional specialties	Knowledge diversity
Income	Professional qualification	Organization tenure	Tenure (organizational)	
Nationality/culture	Origin from different geographical location	Group tenure		
Education		Education		

may create obstacles and difficulties in the development of a shared purpose. Similarly, organizational tenure, which refers to the timing when members joined the organization, is based on the perception that individuals who join an organization in a certain period develop similar understandings and apprehension on the way of working and of social integration. Wu et al. (2019) considered two wider dimensions as well: value diversity and knowledge diversity. Value diversity refers to the cultural values of the members and their inclinations that can affect the common goals, the prioritization of objectives, and the social integration. Knowledge diversity, which is similar to the functional diversity that was previously mentioned, refers to the core knowledge characteristics, including profession, expertise, and way of thinking.

Effects of Diversity

Several researchers have investigated effects of diversity in earlier research. Ancona and Caldwell (1992) analytically investigated the relationship between team diversity and performance. They considered tenure diversity and functional diversity as their main dimensions and introduced two mediating variables: task processes and external communications. Task processes are all those procedures that aim at organizing members to get the work done. Their effectiveness is hampered by diversity because diversity increases conflicts, lowers cohesion and coordination, and constitutes more complex internal communication. Conversely, external communications are enhanced by diversity, due to the wide range of expertise and contacts that these members have. There is more direct access to a plethora of networks, which facilitates external processes. Their study showed that each variable operates in different ways, with direct and indirect effects. The direct effects seemed worse than the mediating effects and were all negative: Tenure diversity leads to more mild effects compared to functional diversity. In terms of innovation, even though diversity brings more creative potential to problem-solving and more innovative ideas, progress is being impeded during their implementation because of decreased flexibility and capability for teamwork.

Table 2 summarizes effects of diversity concluded from earlier research. The visible dimensions that Pelled (1996) considered can be approximated to the value diversity from Wu et al. (2019), and both researchers concluded that these sets of diversities increase tension and friction among the team members, triggering relationship conflicts.

Table 2. The Effects Caused by Diversity

Effect	Description
Cohesion and coordination	Because of conflicts, internal communications become more complex and lower cohesion and coordination.
External communications	Wider expertise and backgrounds increase the network.
Creativity	More attitudes and experiences assist in a more creative way of working and finding solutions.
Cooperation	The ability to cooperate can be either enhanced or reduced, due to the different ways of thinking.
Innovation	Variety in the way of thinking leads to more innovative ideas and solutions.
Decision-making	Either enhanced due to constructive criticism, or impeded due to the difficulties in reaching a decision.
Support of complex systems	Because of knowledge diversity, complex systems like the team are supported.
Problem-solving	Enhanced by the constructive character of conflicts and the various experiences and viewpoints.
Task conflicts	Their constructive character fosters the exchange of opposing views and creative criticism. Enhanced performance on cognitive tasks.
Relationship conflicts	Because of disagreements on interpersonal issues, leading to negative emotions, frustration, anxiety.
Process conflicts	Based on disagreements about the logistics of a task, and are harmful since the real reason is deeper.

When diversity is present, multiple effects are triggered and observed. Some of them—conflicts—tend to cause more negative effects. Undoubtedly, conflicts influence all projects to a greater or lesser extent. They emerge in every group of people due to the coexistence and interaction and need to be properly managed to avoid any undesirable influence (de Wit et al., 2012). Conflicts act as intervening processes on a team's activities and actions (Pelled, 1996; Wu et al., 2019), and their effects can be constructive as well as destructive, depending on the type of conflict, its causes, and how it is dealt with (Eisenhardt et al., 1997).

As mentioned, early research on diversity and its relationship to project performance has led to pessimistic results (Ancona & Caldwell, 1992; Pelled, 1996). Over the years, the concept of diversity has evolved, leading to the consideration of more dimensions that open new horizons. The effects that are triggered are identified better (Power-Twichell & Murphy, 2011; Wu et al., 2019), already indicating that some effects can be employed in favor of project performance. Therefore, the relationship between diversity and project performance still constitutes a gray area. As Wu et al. (2019) mentioned, resource exchange and knowledge interaction are required in systems like project teams, and that being the case, the varied insights and the knowledge range that exist in diverse teams positively contribute to the needs of a successful project. Nevertheless, in their conflict-based model that was created representing the mechanism, the result showed that higher levels of both types of diversity lead to all types of conflicts but also contributed in many ways to project performance. This perception is related to the observation that task conflicts can be considered as constructive criticism, setting the basis for new ideas, opinions, and decisions, while at the same time the conflict does not evolve to a process conflict. On the other hand, process and relationship conflicts are the ones which have a negative impact on project performance, because the focus is often shifted to the interpersonal relationships, hindering the processes and the optimal performance.

Despite the aspects and dimensions that seem to positively affect the desired outcomes, a wider picture shows that the destructive effects of the relationship conflicts were larger than the constructive effects that diversity promotes. Therefore, this dynamic relationship is yet to be clarified.

A Matrix of Diversity Dimensions

Although a plethora of dimensions can be present, these dimensions can be clustered in two broad categories based on the triggering of effects. The first is related to values, the personal and cultural characteristics, and inclinations. These dimensions are not directly related to the work and the team processes, but through their influence on the personality. Emotional reactions can create tension and friction in interpersonal relationships. Wu et al. (2019) claimed that this is the reason why collaboration among the team members is affected, whereas Pelled (1996) highlighted that these dimensions are the ones that are visible, and therefore, their recognition and perception predispose the team members. The second broad category refers to the job-related dimensions, which are the dimensions that directly affect the team processes, such as decision-making, ability to solve complex problems, and the cognitive tasks of the team. Ancona and Caldwell (1992) named this category functional diversity: the mix of functional specialties that are present, which provides access to multiple networks, expertise, ways of thinking, and procedures. In a similar logic, Pelled (1996) included the dimensions of team and organizational tenure, education, and functional background.

Based on the existing literature, the two broad categories seem similar, and the use of a matrix like the one that Pelled (1996) created could be handy to define and organize diversity. In a first attempt, see Figure 1.

The dimensions that are not directly related to the workplace were characterized as low in the job-relatedness index, by their simultaneous characterization as visible or not. The race and religion dimension and the ones that are related to the family structure, sexual orientation, and political views score low both in visibility and in job relatedness, in accordance with the iceberg of Powers-Twichell and Murphy (2011). Similarly, dimensions that are more visible but not directly job related were inserted in the upper left quadrant of the matrix. These are language, age, gender, physical attributes, and nationality/origin. Even though this group of dimensions can be easily

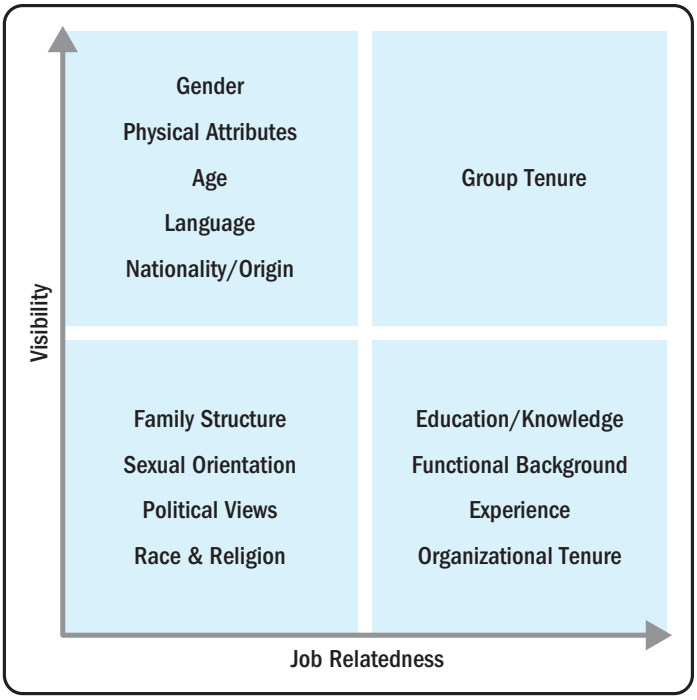

Figure 1. Matrix of the diversity dimensions from Pelled (1996).

recognized, they are not expected to influence the team processes; yet, they may affect the interpersonal relations (Watson et al., 1998). The rest of these dimensions may affect the atmosphere in the team and the relationships among the members. The lower right quadrant includes the dimensions that are closely related to job but are not visible. These are education/knowledge, indicating the dimensions describing the educational background, the functional background, and experience, which refer to the mix of functional specialties and the experience of different levels and functionalities respectively. Also, organizational tenure is in this quadrant, referring to the seniority and the experience of the team members within the organization. The upper right quadrant includes one dimension that is both job related and visible, which is team tenure. It implies the period that the members entered the team, and whether they participated in the same group development stages (Tuckman, 1965) or joined the team separately. The high job relatedness that characterizes the two right quadrants potentially makes them most influential for the team processes. Of course, the other dimensions also influence all procedures; for example, the nationality/origin dimension may be characterized as low in job relatedness, but different cultures employ different ways of perceiving conditions and reacting to them

(Hofstede, 1991), which may affect the team in various ways. This is the reason why researchers also study the dimensions that are not job related, usually influencing the interpersonal relations between the team members.

Managing Diversity

Several researchers have mentioned the criticality of proper recognition and management of diversity (Powers-Twichell & Murphy, 2011; Armstrong et al., 2010). Improved problem-solving, community relations, creativity, and enhanced company image are only a few of the advantages that diversity encompasses. In their study, Armstrong et al. (2010) refer to the companies that are actively engaged in promoting diversity, mentioning that these companies also utilize certain procedures, such as monitoring and reporting, concerning diversity targets and their proper management. The interaction of conflicts with team processes should be further explored, as current results are inconclusive. For instance, Pelled (1996) correlated visibility dimensions to relationship conflicts and job-related dimensions to task conflicts, while Wu et al. (2019) correlated both value and knowledge diversity to task, relationship, and process conflicts.

The goal of managing diversity is twofold: the control of the problematic aspect that diversity encompasses and the attempt to address diversity as a component of an integrated management system (Armstrong et al., 2010). In their study, Powers-Twichell and Murphy (2011) highlighted the importance of attitude and described with the See-Do-Get model the way the beliefs drive the behaviors. First, at the See stage, beliefs, attitudes, and paradigms lead to the formation of perceptions about others, resulting in behaviors and actions in the Do stage. These actions can either be restrictive and biased or proactive and encouraging. At the Get stage, the results differentiate. Team members may feel that there is no space for their opinions and follow the team's way of thinking, or they may feel comfortable, with their ideas and opinions being considered, leading to better collaboration and more open, honest exchange of ideas. Therefore, it is not only a matter of diverse characteristics, but also the approach that the project manager and the members themselves follow to manage this diversity. Watson et al. (1998) mentioned that the process tasks that are increased due to diversity can be managed through feedback about interpersonal behaviors. The importance of proper periodic process feedback may be the key to balance between process issues as well as between self and team orientation.

Conclusion of the Literature Study

After examining the literature and the way diversity has been construed, a broad definition for diversity can be sketched. It constitutes the first part of the framework that will be designed, forming the basis for recognizing the diversity dimensions. Diversity in working teams encompasses all characteristics that the team members bear and that differentiate them from others. To be more precise, these could be personal traits and characteristics like age, gender, physical attributes, language, nationality/origin, race/religion, family structure, sexual orientation, or political views, which are connected to the personality of an individual and determine the way they perceive issues and conditions and react, and which affects the interpersonal relationships. Characteristics and conditions that are closely related to the job are among the most influential diversity parameters. These are education/knowledge, functional background/experience, organizational tenure, and team tenure.

Methodology

Throughout the different phases of the research, a mixed-methods design was adopted (Blaikie, 2009). The main reason for the mixed-methods approach is the intent to look at diversity from several angles. For efficiency, the initial focus was on companies based in the Netherlands, preferably working nationally as well as internationally.

After exploring the literature, diversity in practice was explored by a quantitative survey study. A questionnaire answered by professionals provided insights on what dimensions of diversity are recognized in practice, how they are perceived, and which of them have actual effects on the project teams. The questionnaire was comprised of closed and open questions, to allow more in-depth exploration. The participants were project managers and members of project teams. The survey findings were discussed with two representatives of each company along with the literature findings. This evaluation process allows for a better understanding of the view of diversity in project practice.

Next, relationships that exist or are missing in a project team and their link to diversity were investigated. Relationships were investigated by conducting a social network analysis (SNA), using nine cases from the civil construction industry, the engineering consultancy sector, and the process industry. Cases were selected

to include both diverse and nondiverse teams. Since this could not be known up front, a wide variety of companies from different sectors working in national and international projects were invited to suggest projects that would be willing to participate in the survey. The SNA (Bakker et al., 2016) was combined with interviews into the quality of the relationships and the diversity of the teams. The results included data about the number of people involved in the project team and their relationships, resulting in a sociogram that presents the actors of the network and their connections. The sociogram, the links between the actors, and the interview findings allowed for an accurate investigation of the interactions, the quality of the relations, and their link to diversity. The related survey for gathering the data consisted of four parts. The first part was about the personal background and experience of the respondent. The second part addressed the project and the project team, serving as a transition to the aspects that are of particular interest. The third part aimed to identify the diversity dimensions that are present in the project team and the way they are perceived. The last part of the questionnaire addressed some statements about the company. The quantitative analysis of the networks was done using NodeXL, including four centrality measures (Yan & Ding, 2009): degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality. The results of the SNA already pinpoint potential improvement areas.

The next phase of the research revolved around a deeper exploration of the relationship quality using RECAP (Eggermont, 2017). The RECAP tool of Suprapto (2016) was employed to assess the quality of those relationships from the perspective of the two parties in a collaboration. In the past, the RECAP tool has been used by companies in the engineering and construction industry to improve collaboration between owner and contractor(s). Only the two most extreme cases of diverse and nondiverse teams, as found in the case study, were selected for these analyses, acting as a direct juxtaposition of the two extremes.

The final phase was dedicated to combining all findings into a framework to operationalize diversity and its effects, including suggested tools and processes that allow for a fitting approach. The goal would be to maximize team performance by better collaboration between the actors and the parties (e.g., contractors, subcontractors, clients), ultimately leading to maximized project performance.

Data is collected at one point in time, reflecting the current conditions and practices, as the main goal of the research is understanding the present. The participants in both the surveys and the interviews were selected through nonprobability sampling, which fits the nature of the research and the involved parties.

Results

Part 1: The View on and the Value of Diversity in Practice

To explore how diversity is perceived in practice, a quantitative survey study was performed. The target group of the respondents included project managers and team members involved in an ongoing or recently completed project. These teams could belong to the construction industry, the process industry, or the life sciences or technology industry. The roles of the companies which these teams belong to could be contractor, consultant, or client. Six companies were invited to participate in the survey, of which five responded positively and participated: two contractors, one technical consultant, and two management consultants. In total, approximately 350 emails were sent to project managers and team members in these five companies. With 150 responses, a response rate of about 43% was reached, which is satisfactory (Walters, 2021). Nonetheless, some of the respondents answered only parts of the questionnaire, and the full questionnaire was filled in by 76 respondents. This response rate of 21.1% is still satisfactory. Furthermore, the uncompleted responses were chosen to be part of the analysis to make the results richer, on those parts that were answered. In this way, the maximum insights from the professional practice were gathered.

Quantitative Survey

By means of a four-point Likert scale, the participants were asked to rate each dimension on the degree to which it is recognized in their project team (Figure 2). Based on the mean values of the results, the dimensions functional background and experience constitute the most present and frequently recognized dimensions of diversity in the project teams. On the other side, the dimensions language, nationality/origin, and race/religion were recognized little or very little.

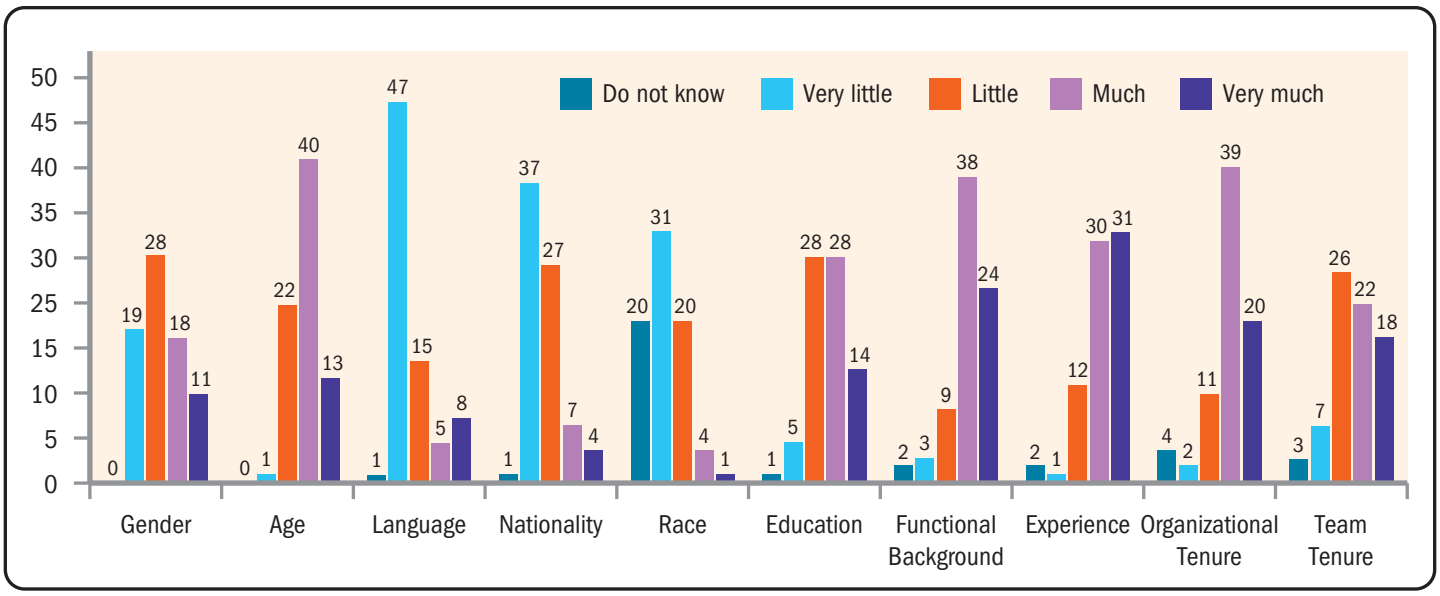

Figure 2. Recognition of diversity dimensions in practice (n = 76).

When visibility (Figure 3) and job relatedness (Figure 4) are examined in detail, it shows that age, gender, and experience are the most visible dimensions. On the other hand, nationality/origin, race/religion, and operational tenure collected the lowest visibility scores. The dimensions that score highest on job relatedness are education, functional background, and experience/knowledge. When the diversity dimensions matrix was created based on literature, these dimensions were considered less visible but highly job related. This empirical finding may mean that the respondents perceived visibility as a broader notion, calling for a revision of the initial matrix. The lowest scoring dimensions were gender, nationality/origin, and race/religion, in line with what was originally assumed about their job relatedness. Another observation is that gender and language are considered visible only. They were only rated as job related by 18% of the participants.

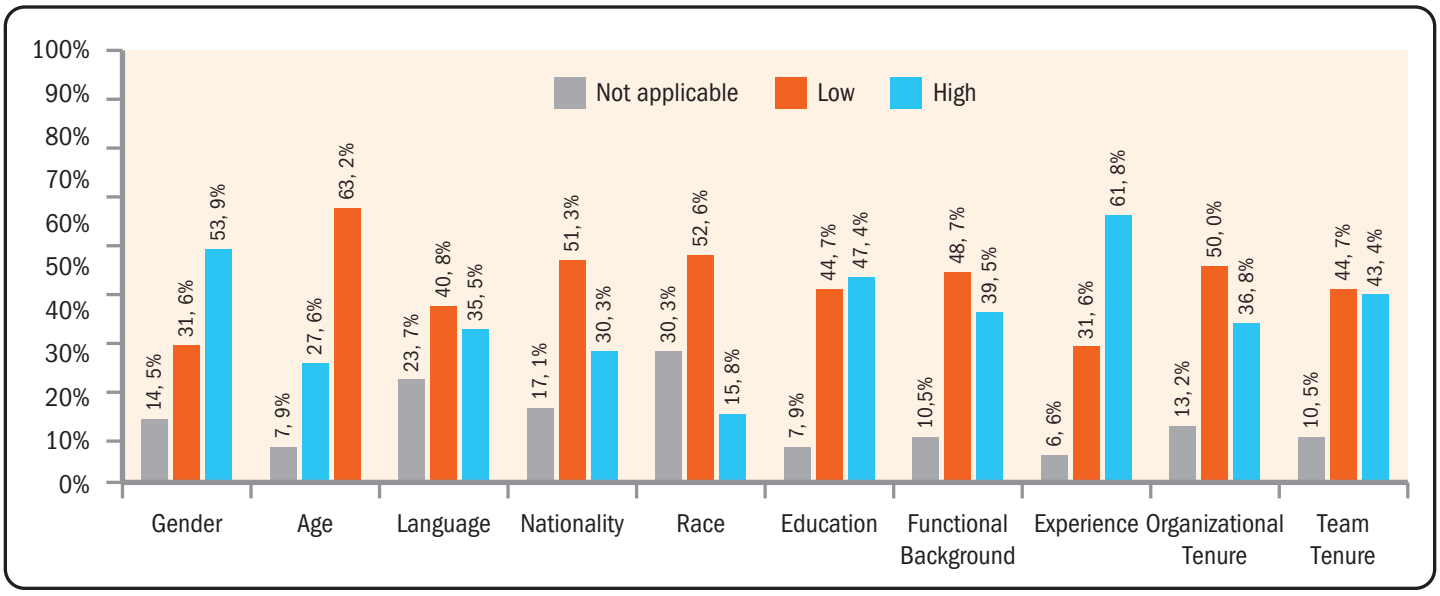

Figure 3. Characterization of the visibility level of each dimension (n = 76).

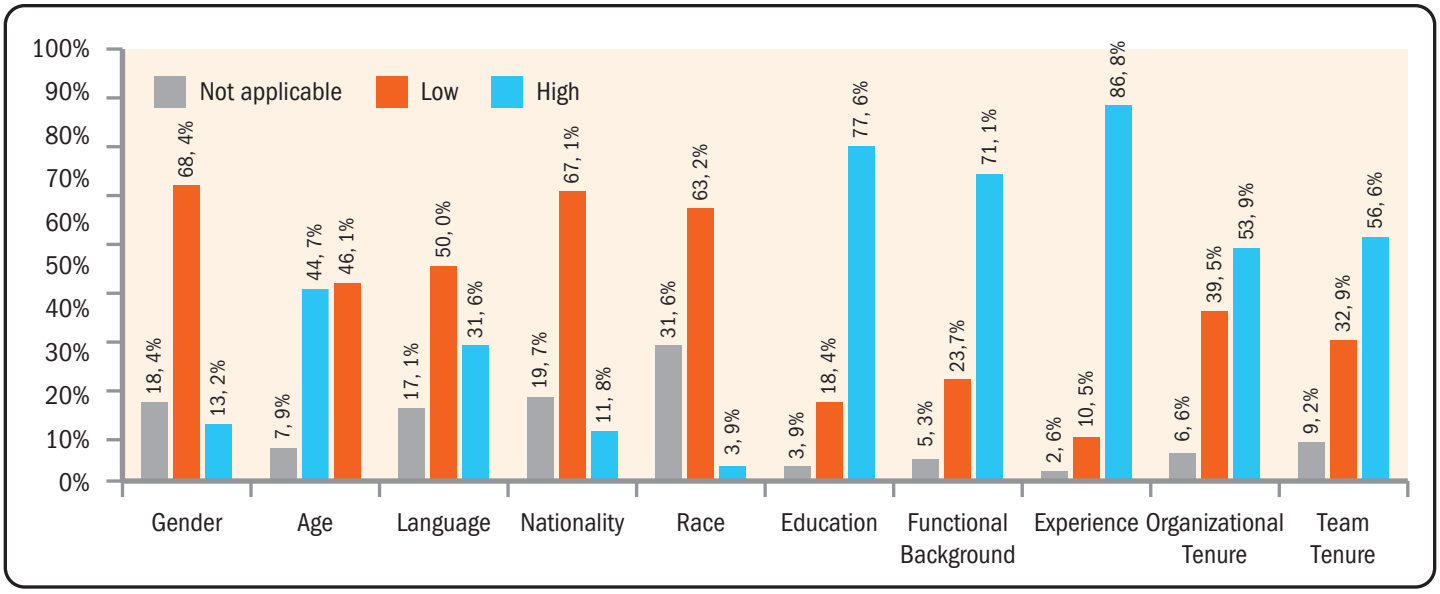

Figure 4. Characterization of the job relatedness level of each dimension (n = 76).

To assess the location of the dimensions in the matrix, the responses to the respective questions were examined based on the mean values and the general tendencies observed. For instance, the presence of the race/religion dimension was assessed with a mean value of 1.14 which indicates that most of the responses, 51 out of 76, indicated very little/little presence, and 20 respondents did not even know whether the dimension was present or not. It can be concluded that this dimension is almost insignificant, since even if it is present, it cannot be considered crucial or influential to any aspect of the project team.

Following this logic, the diversity dimensions were divided into three categories: high, medium, and low perceived importance (Table 3). Next, the empirical assessment of the visibility and job relatedness of the dimensions was combined with these findings. The questionnaire included a question in which the respondents were asked to assess each dimension as high or low in terms of visibility and job relatedness.

The empirical findings differ from the starting point of the study following Pelled (1996), who first made the categorization as described in the literature section. For example, experience that was initially considered high in job relatedness and low in visibility was surprisingly rated as high in visibility too. The main reasoning behind this finding is probably that even if not directly visible, these dimensions could be perceived as visible since they are present and easily observed in the first interactions of a recently formed team. A highly experienced team member has highly visible attitude and opinions related to their expertise, which can be recognized even during a short introduction of themself. As a result, this experience will be perceived by others as a visible dimension and not as a merely job-related characteristic. Based on a closer look at the results, the dimension experience was moved to the upper right quadrant, with 61.8% of the responses indicating high visibility, while the dimension of language should be considered as low in visibility,

Table 3. Categorization of Diversity Dimensions Based on Survey Responses

Low Perceived Importance	Medium Perceived Importance	High Perceived Importance
Race and religion (1.14)	Gender (2.28)	Functional background (3.04)
Language (1.63)	Team tenure (2.59)	Experience (3.14)
Nationality/origin (1.68)	Education/knowledge (2.64)	
	Age (2.86)	
	Organizational tenure (2.91)	

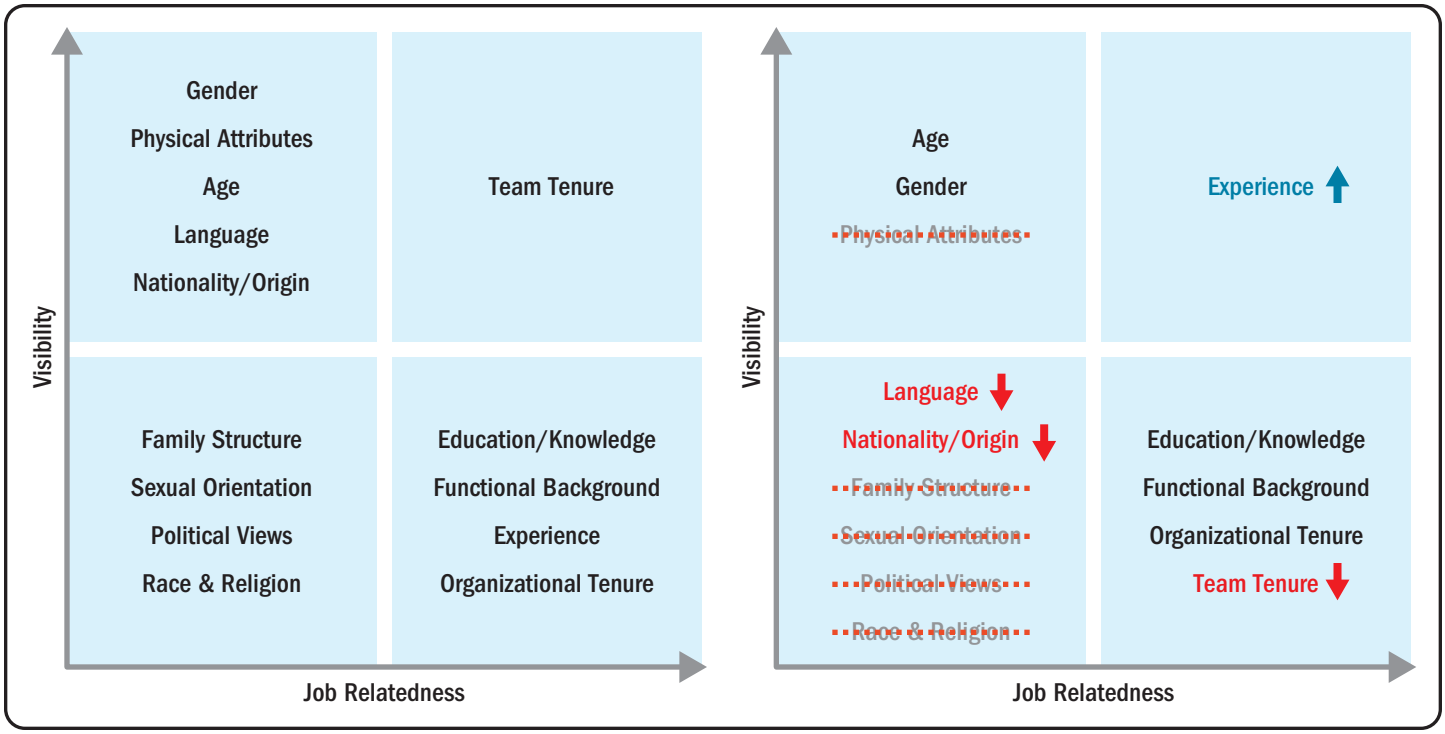

Figure 5. The original (left) and adjusted matrix based on the survey results.

receiving 40.8% of the responses. Another dimension that was not perceived as visible as initially perceived is nationality/origin. Since 51.3% of the responses indicated that it is low in visibility, it was moved to the lower left quadrant. As mentioned, race/religion was removed, since the vast majority do not recognize this dimension in the workplace. The same holds for family structure, sexual orientation, physical attributes, and political views, which were, therefore, also removed from the matrix. The new matrix can be seen in the right-hand side of Figure 5.

Impact of Diversity

When focusing on the impact of the existing diversity and its effects, according to the observations, both the atmosphere in the project team and the performance of the project are affected, either positively or negatively. An encouraging element is that most effects create a positive influence. The only effects with a negative influence on both the atmosphere of the project team and the performance of the project are the relationship conflicts and the process conflicts. A condition worth mentioning is the positive attitude toward task conflicts, being considered even desirable for the enhancement of team and project performance, as long as task conflicts are not evolving into process conflicts.

Conclusion of the Survey

In conclusion, the view on the value of diversity in practice reflects the current perceptions and the positive attitude toward diversity that have been cultivated through the years. The relationships between the effects and the dimensions could be confirmed in most cases, but some of the effects were not realized until now, and as a consequence, the matrix has been reordered. The claim is that diversity shapes the project teams, which are usually unconsciously benefiting from the positive effects that are created, but also suffer from the presence of conflicts. The relationship and process conflicts seem to be the main obstacles for a balanced collaboration.

Part 2: Investigating Relationships

In general, a social network emerges when there is an interaction on a regular basis between people working together (Haythornthwaite, 1996). The value of social network analysis (SNA) is in its ability to identify the relationships and the interactions that are developed and to reveal patterns of social ties (Wang, 2015). It is an approach rooted in anthropology, sociology, and social psychology for assessing social structures at different levels (Erçetin & Neyişci, 2016): micro-, meso-,

or macro-level networks, depending on the focus of the analysis. Organizations represent meso-level networks, and SNA is able to investigate both intraorganizational and interorganizational relationships (Erçetin & Neyişci, 2016). These relationships do not necessarily reveal the formal or contractual structure that organizations have but rather focus on the actual relations, including the informal ones. Depending on the desired quality of outcome, the network analysis can either detect only the existence or not of a relationship, or dive deeper into the quality of this relationship (Cross et al., 2010). It can, therefore, provide a deep understanding of the team's network.

As part of the SNA, the participants were asked to evaluate their communication with each of their colleagues within the project team. This is achieved using four criteria in which the respondent acts as the contactor and the team members act as the receiver. The criteria assess the frequency of communication, the responsiveness of the receiver, the effectiveness of the communication, and the impact of this interaction on the energy levels of the contactor. This assessment uses an ascending 6-point Likert scale, with 0 to represent the "not applicable" option and 5 to be related to the best performance on each criterion. For each project case, the resulting networks were created, including assessment of scores on the four criteria.

Description of Relationships

In total, nine cases were studied. It goes too far to discuss all these cases in detail within the scope of this white paper. What will be presented, however, is an example of the information that is retrieved and analyzed by means of the SNA data: the communication matrix and the centrality plots on an individual level. Using NodeXL, four centrality measures were quantitatively analyzed. A brief description of the definition of each index follows (Yan & Ding, 2009):

- **Degree centrality:** Refers to the number of ties (direct contacts) that an individual has with the other vertices.
- **Closeness centrality:** It is a social distance measure, emphasizing the distance of a vertex when it comes into spreading information to others in the network (closeness is indicated by the size of the circles in the graphs).
- **Betweenness centrality:** It is based on the frequency in which the vertex lies in the shortest path between two others.

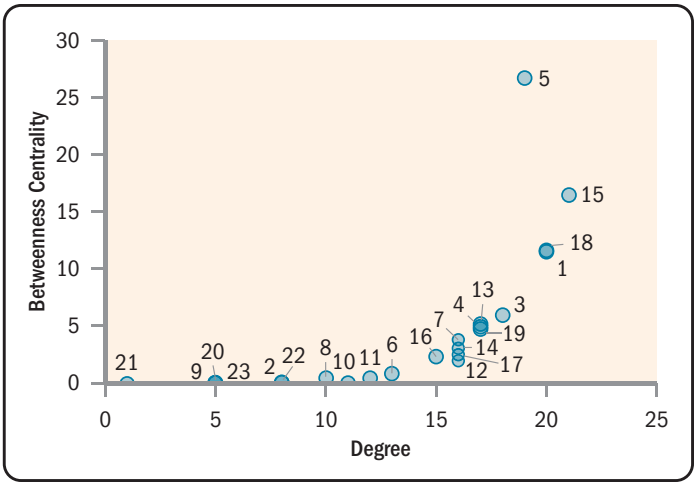

Figure 6. Centrality results on individual level for Case 1.

- **Eigenvector centrality:** It is based on the principle that the connectivity of a node can be dependent on the importance of its neighbors.

An example of the individual measurements for the centrality measures is graphically presented in Figure 6. In the specific example of Case 1, the project leader and the team leads are the ones who have the higher rankings. The second project manager is coming after them, as well as one of the client representatives. The low values of some members also provide insights. For example, some members score very low in all measures, which can be directly related to their roles that do not require many and frequent contacts. These findings will be further discussed after the cross-case analysis.

Cross-Case Analysis: Diversity Versus Performance

In the cross-case analysis, only seven out of nine cases could be considered, as the projects in two cases were not completed yet, so final performance was not yet known. First, the average diversity scores per case are plotted against the project performance (see Figure 7).

Following the definition of Bakker et al. (2010), the projects are considered successful with a performance score of 4.5 or higher. From a more detailed analysis, it can be concluded that the highest variation in diversity dimensions exists for language, gender, and education/knowledge, with highest overall scores for Cases 2, 4, and 6 (Figure 8). So, this suggests that the more diverse teams obtain a better performance.

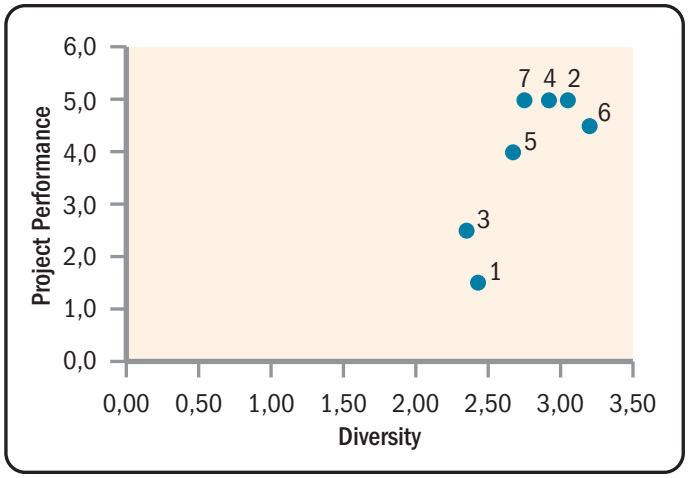

Figure 7. Diversity versus performance for seven out of nine cases.

Furthermore, Case 6 has the highest score on four of the diversity dimensions (language, nationality, organizational tenure, and team tenure). Case 2 has the highest score on age and gender, and Case 4 has the highest scores on education, functional background, and experience. What can be seen from a comparison between the survey outcome in the previous section (the perceived importance) and the outcomes of this cross-case study (the actual diversity) is a difference in the views on diversity (through the survey) and the actual practice (in the cases). This difference is clearly seen when we look at the scores for age and gender in practice: 1.48 and 1.46, respectively, whereas the scores in the survey were 2.86 and 2.28, respectively. So, gender and age are perceived to contribute to diversity (survey results) but in the actual practice, these diversity dimensions are not that well represented.

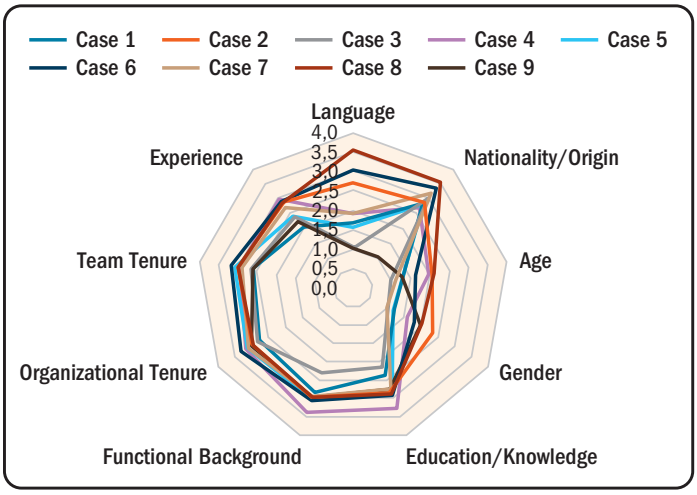

Figure 8. Diversity dimension scores for all cases.

Cross-Case Analysis: Diversity and the Network

With the aim to compare the communication levels and networks within the project teams, the quantitative findings of the centrality measures were coupled to the diversity measures. As mentioned, the graphs with the centrality measures combine the degree centrality on the horizontal axis, representing the total number of members with whom each member interacts, with the betweenness centrality on the vertical axis, that is a measure that detects the amount of influence a member has over the flow of information. On top of that, the size of the nodes represents the closeness centrality of the members.

The normalized degree centrality was used to compare equal intervals. The betweenness centrality measure remained intact, since it is a measure that cannot be normalized due to the large variation in scales. For both measures, intervals of thirds were used to divide the graph into quadrants to reveal patterns. This approach was followed for all nine cases. These findings will be further discussed after the cross-case analysis.

In all cases, the members are in quadrants 1, 2, 3, 6, and 9 (Figure 9). Quadrants 1, 2, and 3 belong to the lowest third of betweenness centrality, whereas quadrants 6 and 9 are the ones with average and high betweenness centrality, respectively. More specifically:

- Members belonging to Q1 are the ones who are not well connected to the network, having limited contacts. Most likely, they are members that are not involved in the decision-making and their tasks are limited, receiving information when needed.
- In all cases, a group of members is concentrated in Q2, being members that have an average amount of connectivity with the rest of the team, communicating with about half of the team members, and being averagely connected. Members with these characteristics are mainly subteam members, having clear roles, implementing and executing the tasks assigned to them, and can reach most of the members.
- A similar condition applies to the members in Q3, with the difference that the larger number of contacts (degree) should increase their betweenness centrality too. This is not the case; therefore, even if they have many contacts, they are not centers of information or communication bridges, indicating that their ties are not effective

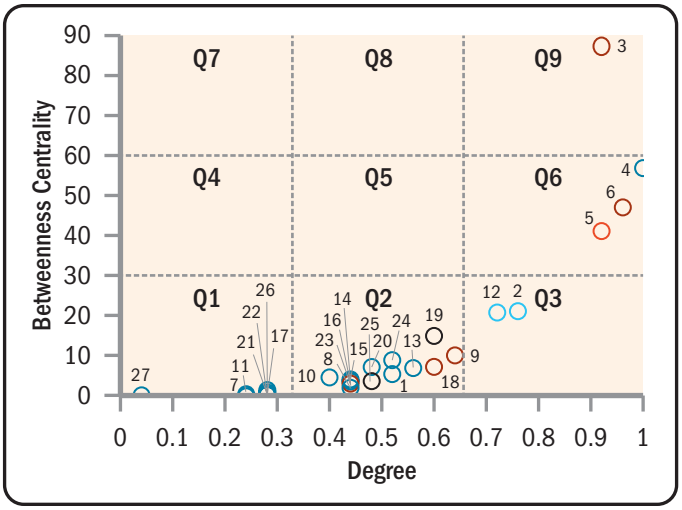

Figure 9. Centrality measures of Case 6, an example of the comparative approach.

enough and/or potentially impeding the effective flow of information in the team.

- Members that are in Q6 have more targeted ties, are likely to be subteam leaders or centers of communication, and their role is crucial in the information flow of the team.
- Finally, the members in Q9 are the main bridges of communication in the team. Depending on the size of the team and the organizational structure, one to eight members are in this cluster, being identified as the project manager or the subteam leaders, belonging to multiple clusters.

These conclusions apply to all the project teams that were compared. The graph is slightly different for Case 2, which is the team that follows a matrix organizational structure, having eight members in Q9 and three members in Q6. This is expected, since both the subteam leaders as well as the project leaders have a strong role in communicating with the members.

The individual observations of each diversity dimension were combined to provide meaningful conclusions. On top of that, the performance of the projects was used to determine whether these can be considered "best practices" or not. However, before drawing more general conclusions, some specific findings are discussed.

Regarding gender diversity, it is observed that the teams that are more diverse have a better gender balance in terms of connectivity, since both genders recorded in this study are more or less equally present in all quadrants. When age diversity is considered, in most cases, the most connected members that run the communication flow (Q6 and Q9) are 30 to 50 years old, with the rest of the age groups to act mostly in supporting roles. The most diverse team in terms of age is Case 2, in which many young leaders are employed to run the subteams and the subprojects. This is projected in the chart as well, with some older members/experts to concentrate in low centrality measures, probably intervening only when needed. The same medium to low connectivity of older members is present in Cases 4 and 6. Similarly, when experience diversity is considered, project teams 2 and 4 are slightly different. In Case 2, the high and medium connected members are very diverse in terms of experience, where in Case 4, the most connected members are all very experienced. Similarly, in Cases 8 and 9, a lot of members with diverse backgrounds are concentrated in Q3. This is not very positive, since they may have many contacts which are not targeted. On the contrary, Cases 2 and 4 consist of a diverse group of people concentrated in Q2, indicating more targeted communication.

Conclusions of the Cross-Case Social Network Analysis

Some teams managed to have more targeted communication, with their members avoiding developing too many ties with low connectivity. Representative examples are Cases 2, 4, and 6, in which there are no (Cases 2 and 4) or just limited members (Case 6) in Q3. Overall, the members are either very well connected, acting as bridges of communication, or have targeted connections.

Based on the centrality measures of Cases 8 and 9, when members are clustered in more diverse subteams, they achieve more balanced communication. Even if the cases concentrate some of these diverse members in Q3, which is not the desired quadrant, all informal clusters have members that cover all quadrants, allowing for smooth flow of information.

Diversity in age, gender, and experience positively affects the performance of the project. Representative cases are, again, Cases 2, 4, and 6. The cases are performing well based on the performance measurements, and these diversity dimensions are significantly present in balanced distribution among the communication lines of the teams. On the contrary, Case 1 is the least diverse team with minimal

experience and gender diversity, and age diversity is concentrated in Q3, meaning that communication is not targeted. The performance of the project of this nondiverse team is poor.

Patterns reveal that more targeted communication is achieved in project teams in which the leaders/connectors are diverse. The observations are becoming clear when comparing the Cases 2, 4, and 6 to the Cases 1, 5, 8, and 9. In the former, the members that are well connected (in Q6 and Q9) are more diverse in terms of all dimensions. In these cases, no members are in Q3 in sharp contrast to Cases 1, 5, 8, and 9. In the latter cases, many members are concentrated in Q3, while the most connected members are less diverse, indicating a disrupted flow of information.

Another main conclusion is related to the very experienced members (more than 30 years of experience). Once again, in cases in which there is no diversity between the leaders/connectors (Cases 1, 5, and 7), a pattern is noticed, where the very experienced members are trapped in Q3. This indicates many ties, however, without these members being well connected. The high number of ties indicates the need to provide guidance and support, but these ties would be more effective if they were scoring high in betweenness centrality too. Cases 2, 4, and 6 do not fall in this category, and their good performance indicates that the group of leaders/connectors is more diverse, and the targeted communication of the experts benefits the project performance.

One last observation is related to the existing conflicts in the project teams. Task and relationship conflicts are mainly triggered by team tenure, organizational tenure, and gender dimensions. The presence of team tenure and organizational tenure diversity is quite high in the high-performing project teams. All teams have task or relationship conflicts to some extent, none of which is considered serious. The comparison between the teams shows that it is the organizational tenure and team tenure diversity that mainly trigger the conflicts and not gender. Cases 1 and 2 both have considerable presence of relationship conflicts (18% and 17%, respectively), but with different male/female ratios (Case 1: 88.2/11.8, Case 2: 80/20). And in Case 6, the male/female ratio is 75/25, and the percentage of considerable presence of relationship conflicts drops to 12.5%. These findings could point in the direction that gender diversity is not responsible for relationship conflicts, but there could be other influential factors contributing.

Part 3: Relationship Quality Using RECAP

The practical use of the RECAP tool is well described by Suprapto (2016). The survey and spreadsheets developed by Suprapto have been used in this study without alterations. To investigate relationship quality, one of the best performing teams and one of the worst performing teams were invited to participate in the RECAP study. In both cases, the project manager from the contractor side and the client representative completed the RECAP survey. All four had previously participated in the SNA analysis. The results of the RECAP study are given in Figures 10 and 11 and are summarized in Figure 12. The radar chart shows that Case 6 scores higher on all criteria but one, with an average score difference of 0.47. On the contrary, in Case 1, there is more balanced contribution and higher scores for senior management trust and commitment. So, each team has its own strengths and weaknesses, and the overall relational capabilities vary. In an attempt to couple these findings to the diversity dimensions that are present, a comparative radar chart of the diversity dimensions is shown in Figure 13.

The differences in the presence of the diversity dimensions are clear, with Case 6 scoring on average 0.62 points higher than Case 1. In terms of the visible dimensions of diversity, the biggest difference is found in the language dimension along with the nationality/origin dimension. However, these diversity dimensions are not expected to create effects, neither to the atmosphere of the project team nor to the performance of the project. When considering the age and the gender diversity dimensions, the gaps are smaller, but still some conclusions can be drawn. Even though both teams have a relatively good distribution of ages and most members belong to the 40 to 50 age group, 41% and 44% for Cases 1 and 6, respectively, in Case 1, 41% is more than 50 years old, while for Case 6, this is only 19%. It seems that Case 6 is more balanced in terms of age distribution, bringing together members of all age groups, triggering the positive effects of age diversity. Regarding gender diversity, the results of the demographics showed that the male/female ratios are 88/12 and 75/25 for Cases 1 and 6, respectively, showing a higher gender diversity for Case 6. For the construction industry, this was the biggest ratio observed in our cases, indicating that the ratios in the field seem far away from a balanced 50/50. At the same time, this provides the

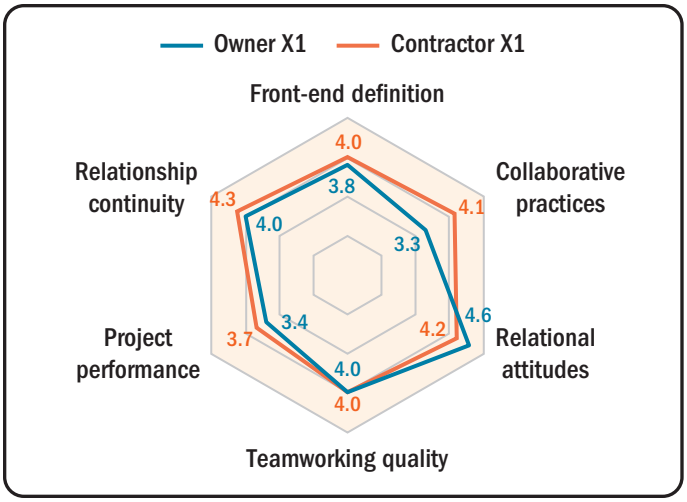

Figure 10. RECAP scores for Case 1.

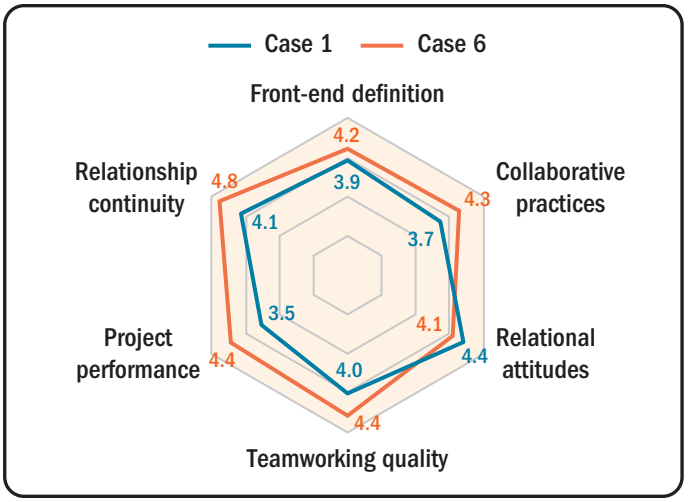

Figure 12. The Comparative RECAP results.

opportunity to examine whether relationship conflicts, the effect triggered by gender diversity, are actually an affecting parameter. The RECAP tool does not measure conflicts as such; however, some negative aspects are measured through the subcriteria scores, for instance, team communication, team coordination, and team cohesion. Both teams are scoring high in these subcriteria, with the lowest score of 3.3 for the team coordination criterion for Case 1. Hence, both teams seem not affected by the existence of conflicts, or if affected, these are constructive conflicts that assist the team processes. The assumed negative effects of gender diversity cannot be confirmed through the scores of the subcriteria, whereas the effects of age diversity seem to be significant. Age diversity positively affects team cohesion and coordination, as well as the process of decision-making, while it can also lead to less flexibility. These findings are confirmed in both cases, with the lower scores in the respective subcriteria for Case 1 to be coupled with the less balanced age diversity that is observed. Overall, Case 6 is more diverse and exhibits better collaborating. Using the results of the application of the RECAP tool can help us identify the effects of the various diversity elements to support further investigation into the importance of the various diversity elements.

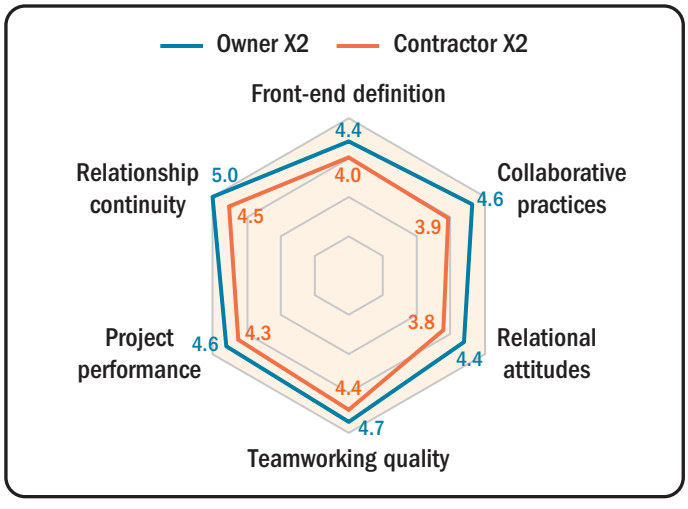

Figure 11. RECAP scores for Case 6.

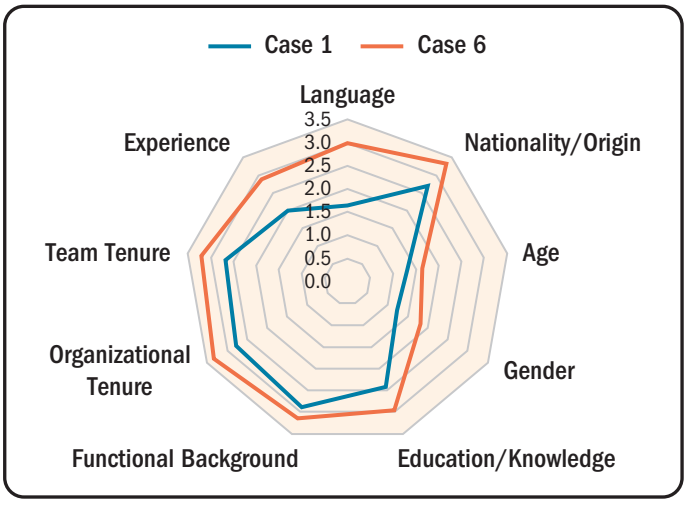

Figure 13. The diversity dimensions as observed in Cases 1 and 6.

Practical Implications: A Framework

The diversity dimensions matrix and the related effects, the outcome of the cross-case analysis, combined with the results of the RECAP assessment were all used to create a tool to introduce guidelines for quantifying and dealing with diversity in technical projects. As a first step, an overview of the effects that are triggered by diversity dimensions is depicted in Figure 14. The positive effects are indicated in green circles, while the negative ones are displayed in a red circle. As can be seen in Figure 14, the dimensions triggering undesired effects are also triggering some of the desired ones. Consider, for example, the diversity dimension of experience.

Following Pelled (1996), who was the first to consider visible dimensions and job-related dimensions, our study suggests that the visible dimensions of diversity are those that trigger relationship conflicts, and the job-related dimensions are the ones triggering task conflicts. Our adjusted matrix (see Figure 5) is based on this logic, considering the existing dimensions in the construction and process industry found in this study.

Based on our findings, a team that gives more attention to age, gender, and experience diversity will most probably deliver a better performance of the project. An overall high diversity in the other six dimensions will contribute to the diversity of the team, without triggering relational conflicts, reconfirming Eisenhardt et al. (1997) that task conflicts are, most of the time, beneficial for the development of the team.

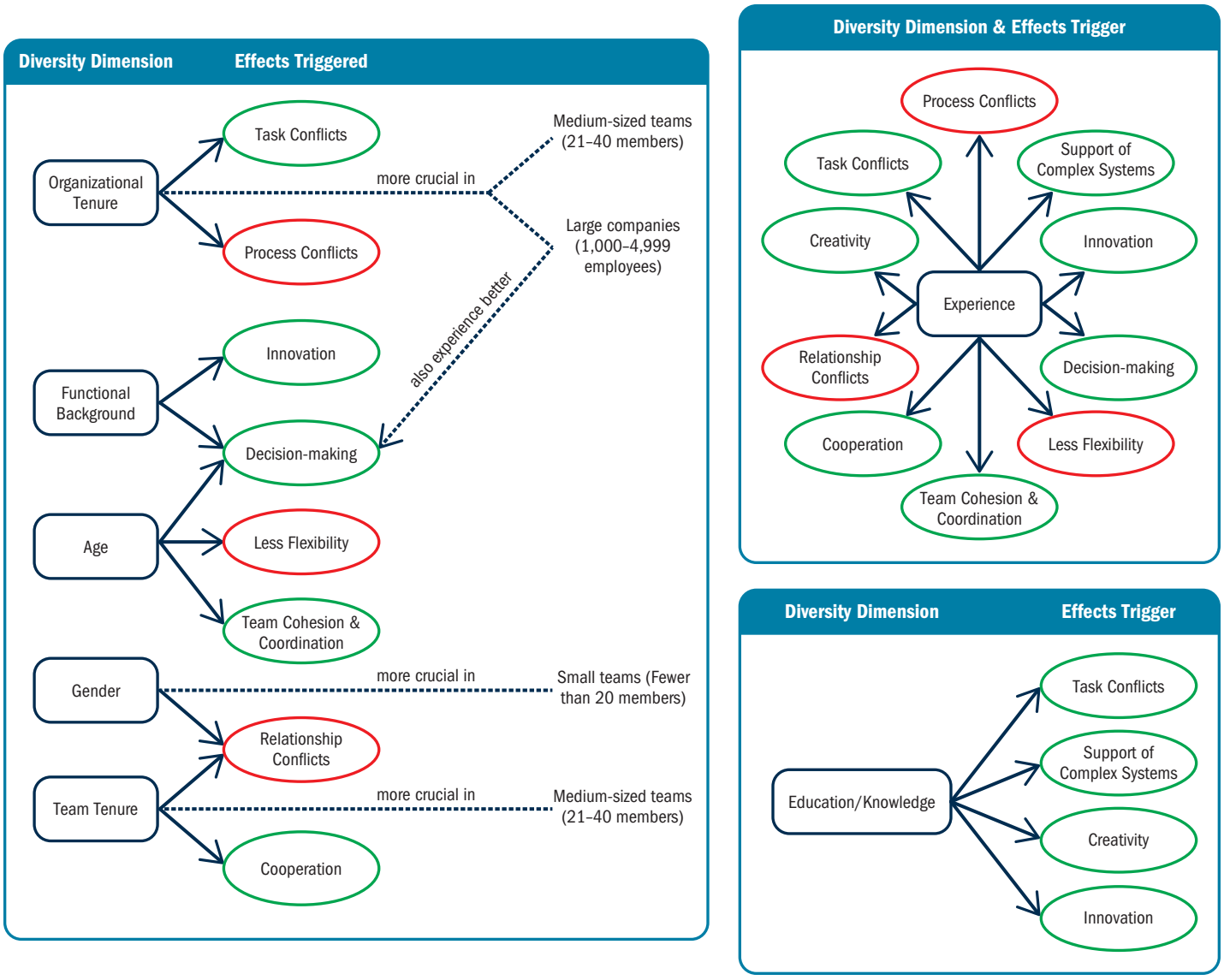

Figure 14. The effects triggered by each diversity dimension.

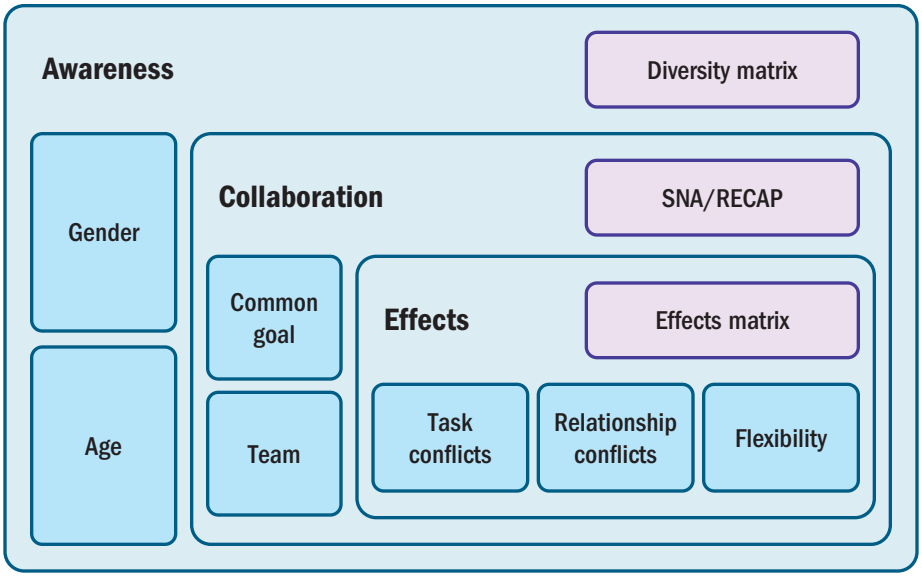

Figure 15. The proposed framework.

The proposed framework for implementing more diverse teams is developed over three levels (Figure 15). The advice is to use the framework initially during a project kickoff meeting with the team to assess the diversity and develop a way of working that suits the variety of people in the team.

Level 1: Awareness of the Existing Diversity

Assessing the diversity levels in the team is a key action that allows all members to become aware, get a clear overview of the team's composition, and prepares the strategic selection of members when changes are to be performed. This includes the recognition of the visible and the job-related aspects of the diversity dimensions through the adjusted diversity matrix (see Figure 5). Special attention should be given to balancing gender and age diversity because of the effects these dimensions trigger.

Level 2: Examination of the Intra- and Interteam Collaboration

Intra- and interteam collaboration is the next level of analysis that allows for a proper analysis of the informal organization of the team and reveals potential difficulties and problematic lines of communication. Intrateam collaboration can be examined by applying the SNA method to identify the relationships, the interactions, and the patterns of social ties. In this way, the team composition can be adjusted, ensuring that collaboration is smooth toward a common goal. Similarly, when examining the interteam collaboration, the RECAP tool can be used to assess the quality of the relationship between two collaborating parties and identify negative aspects and unaligned goals.

Level 3: Effects Triggered

The final level of the proposed approach is the recognition of the effects that are triggered based on the earlier levels of the analysis. Having identified the existing diversity dimensions, Figure 14 presents the effects that are likely to be present due to these dimensions. Following that, the conclusions of the examination of the inter- and intrateam collaboration are also employed in the investigation of the presence of the triggered effects and/or their future development.

The Importance of Rounds of Assessment

The proposed framework can, together with incidents and feedback from the team, help the manager to perform iterative rounds of assessment, depending on the project phase and changes in the team composition. It is an iterative and dynamic process that should be performed in parallel with other team assessments. Basically, the approach consists of the

following five steps, as incorporated in the framework:

1. Assess the existing diversity and how the team network looks.
2. Balance male and female members in the team.
3. Compose your team with distribution of staff over the various age groups (20–30, 30–40, 40–50, 50–60).
4. Discuss the relational capabilities between contractor and client, and focus on true collaboration working toward a common goal.
5. Effects triggered by diversity, such as task and relationship conflicts or reduced flexibility, need to get attention.

Discussion and Concluding Remarks

Combining various methods of data gathering, we attempted to investigate the effects of diversity on project performance. While our study delivered rich results and contributed to the further development of both the project management profession and the theoretical body of knowledge, limitations were also noted.

Limitations and Contributions

First, the scope of the paper did not allow for a detailed analysis of all specific findings. Rather, the overview and the most relevant findings were presented. Subsequent work could focus on either an in-depth social network analysis, or a quantitative study, or a single RECAP assessment, rather than presenting all to a limited depth. Second, our data was limited to the context of technical projects with an emphasis on the specific Dutch context. The adjusted matrix of diversity dimensions could be tested for different contexts as well.

Our scientific contribution is in the newly gathered evidence of the effects of specific diversity dimensions, such as gender, age, and team tenure. Also, our combination of methods provides a powerful research design for future, more extensive, in-depth studies.

In terms of managerial implications, our study emphasizes the importance of taking diversity serious in the quest for improving project performance. Particularly, the dimension of experience proves to be an important enabler for improving the current situation. Given the problematic status of learning in projects (Liu, 2021), careful consideration should be given to how to exploit experience in a positive way.

Concluding Remarks and Further Research

This study revolved around answering: "How can diversity improve project performance?" Our study indicates that it is important to consider and understand the effects of the different dimensions of diversity, while splitting between visible and job-related categories. Although diversity might lead to conflicts, particularly task conflicts are considered as constructive for improving the project content and/or processes, and only relational conflicts might have a negative impact. Further research could focus on expanding the scope of the study to other industries and testing the developed framework in a longitudinal setting. Included herein could be a study toward the effects of diversity in small and medium enterprises and microbusinesses. Expanding diversity, for example in terms of a mix of gender, race, and age diversity, could be included in future studies on the effects of diversity. Slightly broader, further research could look into separating questions on identity and conflict, so that a correlational analysis could determine if teams of varying levels and types of diversity are more or less prone to conflict.

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