

Team diversity: Review and implications for future research

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Abstract. Team diversity has been proved to be an important predictor of team performance. In recent years, there has been a gradual increase in the number of literature on team diversity. As there is no comprehensive review of team diversity so far, the domestic and foreign literature has been systematically reviewed so far in this study. By reviewing the literature, this study summarized the definition, classification, measurement and related research of team diversity, summarized the research frontiers of team diversity, and proposed prospects for future research directions.

Keywords: team diversity; definition; classification; measurement; related research.

1. Introduction

Since the 21st century, the uncertainty of the business environment makes enterprises tend to carry out business in the form of team, and individual learning in team has attracted more and more attention from the academic and practical circles. Team diversity has been proved to be an important predictor of team performance. In recent years, there has been a gradual increase in the number of literature on team diversity. The domestic and foreign literature has been systematically reviewed so far in this study. More specifically, given the current state of knowledge about team diversity, this review aims to achieve three objectives: (1) identify various ways of defining (or conceptualizing) team diversity; (2) operationalize this construct (by measuring it); and (3) provide better information about the impact of team diversity is studied.

2. Definition of team diversity

Diversity, also known as difference or heterogeneity, is the focus of this study on diversity within teams. As for the definition of team diversity, Blau (1977) [1] proposed that team diversity is the degree of demographic dispersion of team members. Jackson et al. (1995) [2] defined diversity as actors have different preferences for certain attributes, and then revised the definition of team diversity by analyzing the studies on diversity from 1997 to 2002. The revised definition of team diversity refers to the differences in attributes among interdependent members in a work team. Van Knippenberg et al. (2004) [3] pointed out that team diversity is the difference between individual members of a team in certain attributes, which can make members feel the difference between themselves and others. Jia Liu & Yan Xu (2006) [4] believed that team diversity refers to the distribution of team members' personal characteristics, that is, the degree of differences among team members in gender, age, education background, personality and values.

So far, there are many definitions of team diversity, and the definition accepted by most scholars is: within the team, individuals are different in some attributes, and these different attributes lead to differences in perception between individuals, and these different attributes constitute diversity.

Table 1. Summary of definition of team diversity

Definition	Source
the degree of demographic dispersion of team members.	Blau(1977)[1]
Differences between individual members of a team in attributes that make them feel different from others	Van Knippenberg et al. (2004)[3]
The distribution of team members' personal characteristics, that is, the extent to which team members differ in terms of gender, age, education, personality and values	Jia Liu & Yan Xu(2006)[4]

3. Classification of team diversity

Researchers classified team diversity from different perspectives, and some scholars divided team diversity into two dimensions. For example, Jackson (1995) [2] divided team diversity into task-related diversity and relationship-oriented diversity according to the content of diversity. Task-related diversity refers to job-related educational experience, professional background, working time and other aspects that reflect knowledge and skill level, while relationship-oriented diversity refers to demographic variables such as age, gender, race and hometown that affect interpersonal relationships. Harrison&Bell (1998) [5] divided team diversity into surface diversity and deep diversity. Surface diversity refers to the apparent differences in observable characteristics of team members, such as gender, race, age and other demographic characteristics; Deep diversity is the level of difference in hard-to-observe, underlying traits such as personality, attitude, motivation, or values. Pelled (1996) [6] according to the relevance of the task with the team, team diversity can be divided into high job related diversification and lower diversity, including high diversity refers to the job and needed to complete the work is directly related to the characteristics, such as professional knowledge and skills, education background, working time, the competence level and the cognition to the task, and so on; Low job-related diversity mainly refers to the characteristics with low correlation with the team task to be completed, such as demographic variables such as gender, age, hometown location, etc., which are more reflected in social relationships. Shuxiang Li et al. (2012) [7] divided the diversity attribute into actual diversity and perceived diversity according to whether the diversity attribute can be directly observed. Actual diversity refers to the external objective attribute that can be directly observed, such as gender and age. Perceived diversity refers to the characteristics perceived by team members that can represent the degree of similarity among members. For example, similar experiences and common interests are perceived diversity.

In addition to two-dimensional classification, some scholars divide team diversity into three dimensions, represented by Jehn, Northcraft and Neal (1999) [8] 's three-dimensional classification. They divide team diversity into information diversity, social category diversity and value diversity. Information diversity refers to the differences in knowledge, skills, experience and expertise brought by individual members of a team, as well as the different views and views on work tasks, mainly focusing on the differences in educational background, professional skills, cognitive ability, cognitive style and cognitive level. Social category diversity refers to the differences in demographic variables such as gender, age, race, etc. The diversity of values refers to the differences in team members' perception and recognition of team goals, team missions, team culture and team values. Molleman (2005) [9] divided team diversity into three aspects: the biographical attributes of team members, the ability level of individual team members and the personality of team members. Biographical attributes refer to demographic variables such as age, sex, race, etc. The ability of individual team members refers to the knowledge, skills and educational background needed to complete the task. Character and personality refer to the deep diversity of the team, mainly focusing on the differences in the five personalities of team members, as well as the deep diversity of attitudes, motivations, values and beliefs.

4. Measurement of team diversity

team diversity has two attributes: objective existence and subjective perception. The diversity degree of objective existence (gender, age, native place, function, etc.) can be calculated by formula. For example, the coefficient of variation formula $CV=S/M*100\%$ is used to calculate the diversity degree of continuous variables such as age and education years. Blau coefficient was used to calculate the degree of diversity of gender, position, major and other category variables (Hongying Li, 2014) [10].

The diversity of subjective perception is generally obtained through the scale, and currently there are three types. The first type, general measurement, is designed to assess the overall degree of diversity that team members perceive in their teams, without referring to specific attributes of

diversity (Zanutto, Bezrukova & Jehn, 2011) [11]. Hentschel et al. (2013) [12] asked team members to what extent they automatically considered differences between members when describing their work teams]. The second type asks members to rate how diverse their group is in terms of specific attributes such as gender, race and values. With this type, researchers use fixed sets of categories to derive measures of perceived differences (or similarities) between groups. For example, Cunningham, Choi, and Sagas (2008) [13] inquired about perceived diversity from an ethnic perspective, and Jehn&Bezrukova (2010) [14] inquired about subgroup formation of perceptions based on race and gender. The last type, hybrid measures of perceived diversity, refers to measures that contain both general types and elements of a specific type. Most commonly, this approach attempts to assess overall diversity by summing or averaging diversity attributes. Van Dick et al. (2008) [15] believed that perceived diversity is the average of perceived differences in age, gender, ethnic background, educational background, values, work attitude and learning goals. Liao et al. (2008) [16] asked participants how similar they were to their colleagues in personality traits, personal values, work attitudes, education, and lifestyle. They then averaged perceptions of these specific attributes into a single measure of perceived deep diversity. Cunningham et al. (2008) [13] inquired about perceived differences in social category similarity and work style similarity, and comprehensively measured cultural background, race and other similarities.

5. Research on team diversity

Team diversity has both objective existence and subjective perception, but individuals may lack the necessary information to accurately assess diversity, especially for less obvious attributes. Perceived diversity rating may be biased due to the influence of social approval and out-of-group homogeneity. Therefore, perceived diversity may have a closer explanatory power than actual diversity (Harrison & Klein, 2007) [17]. More and more studies have proved that the relationship between objective diversity and perceived diversity is inconsistent and depends on a long list of accidental events (Giambatista & Bhappu, 2010) [18]. Another characteristic of conceptualization is the use of perceived diversity as an intermediary between objective diversity and group performance. Studies have shown that the substantial impact of diversity is realized through perception, "if members do not notice, differences in specific characteristics are unlikely to affect group behavior" (Zellmer et al., 2008) [19].

By analyzing the literature in recent years, it is found that foreign scholars tend to conduct in-depth analysis on the diversity attributes of single objective/subjective social categories such as gender, age and race (Hentschel et al., 2013) [12] and find that social category diversity has a significant negative impact on performance (Manata, 2019[20]; Ali & French, 2019[21]; Dobusch, 2017[22]); Domestic researches pay more attention to the existence of objective diversity, but the research conclusions are contradictory with western researches. Based on the Chinese context, scholars have found that executive functional diversity has a significant positive impact on firm performance (Haiyan Huang, et al. 2019) [23]. Surface diversity does not significantly increase team conflict, but deep diversity is an important factor causing conflict, which negatively affects team performance. Bui et al. (2019) [24] carried out a meta-analysis showing that differences in social categories such as age are conducive to the openness of communication, thus improving team performance.

Because of the diversity is often described as a "double-edged sword", the team diversity on the result of organization contradiction, such as in the cognitive diversity of teams, gender, age or skill diversity may be, to consider the height of scholars called on previous research results need to be further validation, to explore complex influence team diversity (Martinez, etc., 2016) [25]. Table 2 and Table 3 summarize relevant literature on the effects of different levels of team diversity:

Table 2. Summary of team/organization level outcome variables

outcome variable	Relevant scholars	Research conclusions and problems to be solved
Team learning	Creon&Schermuly,2019[26]; Rupert, et al. 2016[27]	<p>Perception subgroup is negatively correlated with team learning, and psychological safety is a mediator. Future studies can explore the relationship between perceived subgroups and team learning longitudinally. As time goes by, the negative correlation between perceived subgroups and psychological security may decrease.</p>
Enterprise performance	Haiyan Huang, Hongbin Zhang, Xiaolin Chen. 2019[23]	<p>The relationship between TMT internal network density significantly positively moderates the relationship between functional diversity and corporate performance. However, TMT members have significant differences in resource allocation ability and scope of responsibility and authority (e.g., general manager), and some situations have absolute dominance. The influence of the relationship between different TMT members on the outcome variables can be discussed in the future.</p>
Team performance	Bui, et al.2019[24]; Li, et al.2018[28]; Yongmei Liu, et al.2014[29]	<p>The meta-analysis shows that differences in social categories such as age contribute to the openness of communication, which in turn improves team performance. Based on the Chinese scenario, surface diversity does not significantly increase team conflict, but deep diversity is an important factor causing conflict, which negatively affects team performance. Future research can further explore different industries to verify the research conclusions; To further explain the complex relationship between team diversity and team performance, multiple mediating and moderating variables were explored.</p>
Team creativity	Jinghuan Zhang, et al.2016[30]; Xing-wen Chen, et al.2015[31]; Shuxiang Li, et al. 2012[32]	<p>The results show that team cognitive diversity has a significant positive effect on team creativity, and team reflection is partially mediated by team trust and team openness. The originality of professional heterogeneous team under the condition of tool support was significantly higher than that of professional homogeneous team, but the difference was not significant under the condition of emotional and material support. When group faults occur, the originality of strong fault team is significantly higher than that of weak fault team. In the future, we should focus on the cross-level research of team level input on individual level output.</p>

Table 3. Summary of individual level outcome variables

outcome variable	Relevant scholars	Research conclusions and problems to be solved
Task performance	Creon&Schermuly, 2019[26]; Rupert, 2016[27]; Zhang&Huai, 2016[33]	Research based on The Chinese context shows that information diversity, such as professional/work background, influences individual task performance through communication and connection, but social category diversity, such as gender and age, does not. Western studies have shown that social category diversity has negative effects, but from a cultural perspective social diversity will show positive effects, and the two will cancel each other out. Future diversity studies need cross-cultural comparisons to provide more detailed explanations for the diversity effects of social categories.
Creativity	Guo, Su&Zhang, 2017[34]; Zhang&Huai, 2016[33] Martinez, Zouaghi&Marco, 2016[25];	Information diversity positively affects individual creativity through communication connection/individual knowledge sharing, while gender and other social category diversity have contradictory effects on individual creativity. More research is needed on the effects of social category diversity in the future.
Learning performance	Deng&Fan, 2014[35]	Perceived differences are negatively correlated with individual learning performance. In the future, it can be extended to include individual level, department/team, and organization heterogeneity. The connotation of diversity is extended vertically, and the effects of different diversity factors (such as demographic diversity, value diversity, etc.) on individual, team and organizational levels are investigated.

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