Diversity in measuring different dimensions of diversity: A literature review

04. Gender, Diversity and Indigeneity
Competitive Session

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ABSTRACT

Although organizational researchers have shed light on the topic of diversity and its performance outcomes, the literature has not exclusively studied the various dimensions of diversity researched and the different ways these dimensions have been operationalized. The present paper reviews diversity literature focusing on diversity and organizational performance outcomes from nineteen top-tier journals. We identify the diversity dimensions researched, the way it has been operationalized and methods used to aggregate these diversity dimensions in the literature. The findings of the review indicate that, predominantly, studies have used a single dimension compared to multiple dimensions, and gender, race and age were the top three dimensions researched. Three future research directions are discussed to encourage diversity research.

Key words: diversity dimensions, measures, aggregation diversity measures, workforce diversity,

INTRODUCTION

Increasingly, researchers are interested in the implication of workforce diversity for organizational management. Research in diversity benefits both theoretically by expanding the diversity literature through new paradigms, and practically by providing tools to manage the diverse workforce effectively. Scholars have examined a wide variety of issues surrounding diversity including diversity outcomes, equal employment opportunities and affirmative actions, and discrimination issues. Predominantly, diversity as a topic has been researched in the US. Irrespective of the research question examined, empirical studies on workforce diversity employ measure(s) of diversity to investigate its antecedents and consequences.

Extant studies on diversity have focused on both visible factors (e.g., age, gender, ethnicity, race, mental and physical abilities) and invisible factors (e.g., education, income, religion, personality and learning style). When measuring the level of workforce diversity, studies focus on one dimension (e.g. age or gender) or a combination of a few dimensions (e.g., age and gender). Recent statistics show that there is a steady increase of migrants in Australia (Department of Immigration and Citizenship, 2013) and this is reflected in Australian organizations. Due to the diverse nature of the workforce, it is important to understand the various dimensions of diversity and its impact on organizational outcomes. It is also important to understand how these dimensions are measured, as it affects the reliability and validity of the study. The growing number of articles in the areas of diversity has resulted in different researchers creatively using different approaches to measure different dimensions of diversity. Although these studies offer useful insight about the implications of diversity at
employee level and organizational level outcomes, we don’t know very much about how research can accurately capture the nature and extent of workforce diversity in organizations.

In order to fill this gap we reviewed the academic articles related to the diversity in top-tier management journals to understand the different dimensions of diversity and its measures. Increased understanding of different dimensions of diversity and diversity measures will benefit organizational researchers. Understanding the breadth of diversity measures may help researchers focus on less traditional measures of diversity (age, gender and race). Knowledge about the measurement and aggregation of diversity measures at organizational level will lead to effective operationalization of the diversity contracts. Age, gender and race are not the only ways to measure the diversity; therefore the notion of diversity has multi-dimensional characteristics. In this study we attempt to see how previous studies have dealt with the complexity of diversity.

**LITERATURE REVIEW**

Diversity is defined as ‘a characteristic of social grouping that reflects the degree to which objective or subjective differences exist between group members’ (Van Knippenberg & Schippers, 2007, p.516). Paradoxically there is no fixed definition for the concept diversity and its description remains unclear and often questioned (Jonsen, Maznevski & Schneider, 2011). The primary challenge for defining diversity is due to the usage of many different terms interchangeably by the researchers e.g. dispersion, heterogeneity, dissimilarity, divergence, and variation (Jonsen et al., 2011) this makes difficult to get in to conscience which leads to one definition. Diversity as a topic of research drew the attention of the scholars in 1990 when Thomas (1990) created the term ‘Managing Diversity’ which changed the notion of the diversity perspective and included not only women and minorities but also physically challenged and whites.

The diversity literature has generally focused on two major areas- diversity climate and diversity management practices. Diversity climate refers to ‘the aggregate member’s perception about the organisations diversity related formal structures, characters and informal values’ (Gonzalez & Denisi 2009, p. 24). Yang and Konrad (2001, p.9) defined diversity management practices as ‘any formalised
practices intended to enhance stakeholder diversity, create a positive work relationship among diverse set of stakeholders, and create value from the diversity’. These studies on diversity typically addressed two questions: (1) to understand what diversity does and (2) to understand how to manage diversity effectively.

A number of research studies have focused on the consequences of diversity. Empirical research shows that workforce diversity results in positive and negative outcomes (Jayne & Dipboye, 2004). Diversity in terms of gender, race and ethnic heterogeneity can result in increased productivity (Gonzalez & Denisi, 2009), culturally diverse workforces creates competitive advantage (Cox & Blake, 1991) and ethnic diversity can gain access to a broader market (Chan, 2006). On the other hand a diverse workforce may also result in negative outcomes. Racial diversity leads to lower career satisfaction, lower organizational commitment, and employee perception of promotion as unlikely (Greenhaus Parasuraman & Wormley, 1990).

Given the fact that empirical studies found both positive and negative implications for employee-level and organizational-level outcomes, researchers have endeavoured to identify factors that influence the relationship between diversity and performance. The three factors identified were: positive impact (Kearney, Gebert & Voelpel, 2009; Ling & Kellermanns, 2010; Miller & Del Carmen Triana, 2009), no impact (Ely, 2004), and negative impact (Fisher, Bell, Dierdorff, & Belohlav, 2012). The articles reviewed for this paper looked in to the performance outcomes at the individual level (such as organizational attachment, affective organizational commitment, organizational identification and employee satisfaction at work), group level (such as, team’s performance, team’s financial performance, merit based performance, and team creativity) and the organizational level (such as, firm’s performance, return on profit, return on income, productivity, and organizational innovation).

Most diversity research has focused on the diversity dimensions as independent variables. Predominantly, studies have used a single dimension (Kunze, Boehm & Bruch, 2013) and in some case multiple dimensions (Stewart & Johnson, 2009). The above studies the focus is on the outcomes rather the dimensions which obviously lead to a gap in the literature.
Measuring these diversity dimensions could be challenging in many ways as each dimension could be operationalized in different ways. For instance, measuring race/ethnic diversity in the US is straightforward compared to Australia, as the US has the simple classification of ethnicity initiated by the federal department over the years. The classification includes White, Black or African Americans, American Indians or Alaskan native, Asian, Native Hawaiian or Other Pacific Islander (US Census Bureau, 2013). This straightforward approach has lead organizations to maintain records for their employees under these classifications and researchers have relayed on this information’s. Measuring the educational diversity will differ according to the education system of that country. For example, the German education system has fourteen different educational backgrounds (e.g., pharmacology, chemistry, medicine). A clear understanding of how each dimension of diversity could be measured in different ways will help researchers to use the best approach for that research.

In addition to the primary and secondary dimensions, research has also studied these diversity dimensions at an individual, group, and organizational level. Diversity research conducted at group and organizational level raises the question of aggregation of individual respondent’s data to gain group and organizational levels data. Under the back drop of the above discussion, the paper answers three research questions as stated below:

1. What are the various dimensions of diversity studied?
2. How are the different dimensions of diversity measured?
3. What are the different techniques used to aggregate the diversity measures?

Answering these three questions will improve the understanding of the different dimension of diversity researched and effectively operationalizing these dimensions. This in turn may encourage researchers to use these dimensions in their research.
RESEARCH DESIGN

Literature search


Inclusion rules and samples

We included empirical papers that included workforce diversity related to performance outcomes at individual, group and organizational level. We excluded review papers and meta-analyses. The selection of diversity related to performance outcomes also includes studies which tested the relationship with mediators and moderators. After carefully excluding the above mentioned criteria the final sample was 45 articles.

RESULTS

The finding of the literature review of 45 articles indicated that 53% had used single dimensions of diversity and 47% used more than one dimensions of diversity. The findings are discussed in detail in the below section.

Gender diversity is the highest percentage with 35%, followed by racial diversity (26%) of and age diversity (20%). Various dimensions of Top Management Team (TMT) diversity such as functional
diversity, interpersonal and dominant functional diversity, cognitive diversity and family firm specific sources of TMT diversity has been used as a predictor in 13% of the articles. Different dimensions of team diversity have been used as a predictor in 11% of the articles. These include team ethnicity, age group, race, tenure, team temporal diversity and team cognitive diversity. Educational background has been used as a predictor in 6% of the articles. The details of the different dimensions of diversity studied and the number of times it has been studied in the reviewed papers is presented in the table 1.

<table>
<thead>
<tr>
<th>Diversity dimensions</th>
<th>Total number of times used in the papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>16</td>
</tr>
<tr>
<td>Race</td>
<td>12</td>
</tr>
<tr>
<td>Age</td>
<td>9</td>
</tr>
<tr>
<td>Top Management Team diversity</td>
<td>6</td>
</tr>
<tr>
<td>Educational background</td>
<td>3</td>
</tr>
<tr>
<td>Others (e.g., Tenure diversity, Education diversity, Functional diversity, Cognitive diversity, and Expertise diversity)</td>
<td>1</td>
</tr>
</tbody>
</table>

Other dimensions like interpersonal functional diversity and dominant functional diversity of a team, tenure diversity, racial and ethnic diversity, cognitive diversity, nationality and expertise diversity have been studied in 2% of the studies respectively. To aggregate the diversity at group and organizational level three different indexes were used: Blau index (1977), heterogeneity index (Metzner, 2003) and entropy-based diversity index (Teachman, 1980).

**RELATIONSHIP BETWEEN DIVERSITY AND ORGANIZATIONAL OUTCOMES**

The review of these articles confirms that diversity leads to positive outcomes in the majority of the papers. But these positive outcomes are heavily influenced by the moderators and mediators. In a
study conducted to understand the relationship between diversity and outcomes at individual and organizational level found a positive outcome when relationship was moderated by diversity climate (Gonzalez & Denisi, 2009). The level of moderators also influenced the diversity outcomes. For instance, in one study, when levels of transformational leadership were high, nationality and educational diversity were positively related to team leaders’ longitudinal ratings of team performance (Kearney & Gebert, 2009). The same study also noted these relationships were non-significant when transformational leadership was low. In relation to transformational leadership as a moderator, Kearney and Gebert (2009) found age diversity was not related to team performance when moderator was high, and it was negatively related to team performance when the moderator was low. Other mediators include elaboration of task-relevant, negative age discrimination climate, reflexivity and elaboration of task-related information. Other moderators include visionary leader behavior, top management negative age stereotypes, racial composition of the community where the organization is located, creative self-efficacy, varying levels (high/low) of collective team identification, and diversity friendly human resource policies.

**MEASUREMENT OF DIFFERENT DIVERSITY DIMENSIONS**

Gender diversity or sex diversity is measured through two categorise men and women. Racial diversity has been measured using categorical variable. This ranged from 3 to 5 categories. The different types of races include, White, Black, Hispanic, Native-American, Caucasian, African-American, Asian and Pacific-Islander. Age diversity is measured by obtaining the actual age from the respondents or through cohort data. This diversity information was obtained from the respondents, archival sources and the census data.

Educational diversity was measured through the countries education system based on different industry representation in the sample, and in some cases the respondents were requested to self-report their educational background. Functional background was a categorical variable and it was measured as administrative, marketing and customer service, finance, and operations function. Nationality diversity was measured by giving the option of 27 different nationalities. Tenure was measured
through continuous variables measured in years. TMT diversity was measured based on the diversity of functional backgrounds.

Team diversity was measured by team ethnicity, age group, race, tenure, team temporal diversity and cognitive team diversity. Team temporal diversity measured variation in members’ was measured through time urgency, pacing style, and time perspective. Cognitive diversity was measured through diversity of models. An organizing model is comprised of an internally consistent set of beliefs and assumptions about what an organization are, purposes the organization should pursue, and the best way of organizing to fulfil those purposes. An average of four clinic-level standard deviation scores on the mental model scales such as Community model, Market model, Profession/patient model and System model was taken to measure the diversity of the models. The details of the diversity dimensions and its corresponding measurements are listed in the Table – 2.

**TABLE – 2: DIVERSITY DIMENSIONS AND MEASUREMENTS**

<table>
<thead>
<tr>
<th>Dimensions of diversity</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male and Female</td>
</tr>
<tr>
<td>Age</td>
<td>A cohort of (&lt; 30 years; 31–40 years; 41–50 years; 51–60 years; &gt; 61 years) or five year increments (i.e., 25-30, 31-35, 36-40, etc.).</td>
</tr>
<tr>
<td>Racial and ethnic</td>
<td>White, Black, Hispanic, Native-American, Caucasian, African-American, Asian and Pacific-Islander.</td>
</tr>
<tr>
<td>Educational</td>
<td>Some school, high/trade school graduate, courses beyond high school, college courses but no degree, bachelor degree, postgraduate courses but no degree, master’s degree and doctorate degree.</td>
</tr>
<tr>
<td>Tenure</td>
<td>Continuous variables measured in years</td>
</tr>
<tr>
<td>Functional</td>
<td>Administrative, marketing and customer service, finance, and operations function.</td>
</tr>
<tr>
<td>Nationality</td>
<td>From the option of 27 different nationalities.</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Diversity of models. Average of four clinic-level standard deviation scores on the mental model scales such as community model, market model, profession/patient model and system model was taken to measure the diversity of the models.</td>
</tr>
<tr>
<td>Expertise</td>
<td>(A) Geoscience, petroleum engineering, field engineering, production engineering, well engineering, information and communication technology, administration, and other areas. Furthermore, each category included a number of specializations. Geoscience, for example, consisted of 12 different specializations, such as regional evaluation (basin and plan evaluation), production geology (field evaluation and static res environ modelling), seismic data acquisition, and geo information management. (b) Based on the disciplinary areas of the team members.</td>
</tr>
<tr>
<td>Cognitive Team diversity</td>
<td>Measured by a four-item scale developed by Van der Vegt and Janssen (2003).</td>
</tr>
<tr>
<td>Team temporal diversity</td>
<td>Time urgency scale (Landy Rastegar, Thayer, &amp; Colvin., 1991) Pacing style (Gevers, Rutte &amp; Van Eerde, 2006) and Future Consequences Scale (Strathman, Gleicher, Boninger, &amp; Edwards, 1994).</td>
</tr>
</tbody>
</table>
AGGREGATION OF DIVERSITY DIMENSIONS

It is important to aggregate the responses of diversity dimensions when the study explores at organizational and group level outcomes. These methods of aggregation such as Blau index, heterogeneity index and entropy-based diversity index are used in the review papers.

**Blau Index**

The aggregate diversity levels can be identified using the Blau index (Blau, 1977). Blau index is the simplest and most straightforward method to find the level of ethnic diversity present among groups of individuals. It is calculated as \((1 - \sum p^2 i)\).

where \(p\) is the proportion of group members in a given group and \(i\) is the number of different groups of the feature across all clusters. A perfect homogeneity will score 0, and a perfect heterogeneous group will receive a score of 1. For example if all employees are white then the Blau index will be 0. If 20% were Asians, 20% were Africans, 20% were Middle Eastern and 20% were Caucasians the Blau index will be 0.80 indicating the highest level heterogeneity.

**Heterogeneity Index**

In one of the researches gender heterogeneity was calculated by heterogeneity index (HI) based on the work of Metzner (2003). Gender HI is calculated by the number of persons in the majority of one or the other women or men divided by the total number of group members, subtracted from 1.

\[
\text{Gender HI: } 1 - \frac{n(\text{majority gender})}{n(\text{total})}
\]

Gender HI ranges from 0 to 0.5, where 0 relates to a gender homogeneous group (e.g., 10 men and no women in a group or 20 women and no men) and 0.5 to a gender heterogeneous group (e.g., 10 men and 10 women in a group). For gender HI, a homogeneous group in represented by a smaller value, and a heterogeneous group is represented by a larger value, regardless of group size and of which gender is in the majority within the team.
An entropy-based diversity index

In a study which tries to measure the team diversity in terms of age, gender, education, and team tenure, an entropy-based diversity index was applied, which demonstrates the degree of distribution in the team using the mathematical equation suggested by Teachman (1980) by \( H = P_i \ln P_i \).

\( P_i \) represents the proportion of the team that has the demographic characteristic. The diversity index ranges from 0 to 1, where a higher score indicates a greater distribution of this characteristic within the team. If a characteristic is uniform in the team, the value assigned is zero; if a characteristic is evenly distributed within the team, the value assigned is one. For example, if one is assessing gender diversity and the work team is composed of nine individuals, two male and seven female, their diversity index is 0.76; if all members are female, the diversity index is 0.00.

DISCUSSIONS AND CONCLUSIONS

Our review shows that diversity research is conducted at an individual level (Peccei & Hyun Jung, 2005), group or team level (Bunderson & Sutcliffe, 2002; Buyl, Boone, Hendriks, & Matthyssens, 2011) and organizational level (Van de Ven et al, Rogers, Bechara, & Kangyong, 2008). These studies used single dimensions (Peter & Karren, 2009; Richard & Shelor, 2002) and multiple dimensions of diversity (Kurtulus, 2011; Stewart & Johnson, 2009) to understand its performance outcomes. These studies offer mixed findings about the effect of workforce diversity on performance. While some studies found that diversity positively impacts performance (Chan, 2006; Cox & Blake, 1991; Gonzalez & Denisi, 2009; Jayne & Dipboye, 2004), other studies found that it negatively influenced performance (Greenhaus et al., 1990; Pelled, 1996; Tsui, Egan, & O'Reilly, 1992). It has to be noted researchers have used different sources to obtain data in terms of diversity.

Our study identified different diversity dimensions examined by extant diversity studies and how these dimensions are operationalized in these studies. These studies also highlighted that the relationship between diversity dimensions and organizational outcomes depends on moderators. Diversity is studied by researchers in a broad range of discipline such as bank management, hospitality, IT, health, and government. It is noted from the above review of the literature; even
though there is a marginal difference between single and multiple dimensions of diversity, the majority of the studies focus on the single dimensions of the diversity. Gender, race and age are the most frequently studied dimensions of workforce diversity. However majority of other diversity dimensions were studied only once in these studies. This raises some concerns.

Research with respect to cultural assumptions proposes that ‘one of the important reasons why diversity research is unhelpful to diversity practice is that it itself is not diverse’ (Jonsen et al., 2011, p. 37). As majority of articles focuses on gender, race and age, may be due to the fact that these dimensions are less complex to obtain compared to other dimensions. On the other hand diversity dimensions such as language, functional, educational are less complex, but only very few research has used in their research. In the Australian context, earlier researchers mostly focused on ‘gender and individuality’ lacking adequate structures to manage ethnic/racial, religious and other cultural differences in the work place (Syed and Kramar, 2010). The lack of adequate structure has been reflected in these studies as primarily the focuses of these studies were on gender, race and age.

Most of these researches are US centric, and some researchers have raised concerns about this (Jonsen et al., 2011). Researching outside the US will add diversity to the diversity literature as dimensions of diversity are viewed different in different countries. For example ethnicities have a different notion in African countries and Australia compared to the US, or educational diversity in developing countries like India may have a different set of dimensions compared to the US. Venturing into new geographical areas may also lead to the recognition of new dimensions of diversity. Research has also pointed out the lack of organizational level analysis (Jonsen et al., 2011).

We contend that future research is encouraged to address the three important gaps in the diversity literature. First, research needs to explore the understudied diversity dimensions such as ethnic and value diversity. Second, research needs to consider capturing multiple dimensions of diversity because it adds more depth to diversity research. Third, more research is needed that examines the relationship between workforce diversity and performance outcomes at the group and organizational level. These research themes have to stem from the research questions of the study. It will be a
welcome change if researchers explore these understudied dimensions like ethnic diversity, study multiple dimensions and conduct team and organizational level studies. This will increase the breath of the diversity literature and which will also add a wealth of knowledge to the diversity research.
REFERENCES


