

## **Correlation Between Diversity and Type of Skills for Innovation Management: A Theoretical Model**

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### **Abstract**

*The right mix of diversity and skill sets can help a better management of innovation. The nature of diversity and innovation is multidimensional in terms of their applications in the business environment. In this paper, diversity is studied across six demographic verticals: gender, age, race and ethnicity, sexual orientation of employees, religion and beliefs, and disability. The paper is an attempt to uncover the underlying relation between diversity and type of skill sets required for the management of innovation. The research methodology includes a literature review and analysis of key publications relating diversity and type of skills required for management of innovation. Variables have been studied under (a) diversity attributes—demographic verticals: gender, age, race and ethnicity, sexual orientation, religion and beliefs, and disability and (b) skill set attributes – communication skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills. In addition to the literature review, a few individual interviews, serving as personal communication, were conducted in three sectors: education (primary education), hospital (pediatrics) and information technology (software development) to conclude the study. The three selected sectors are knowledge intensive sectors. The result shows that there is correlation with respect to age, gender and skill sets in the selected sectors. No correlation was found in other diversity attributes like race and ethnicity, sexual orientation, religion and beliefs, and disability.*

*Keywords:* diversity, innovation, management, skill set, leadership

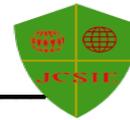
### **Introduction**

Both diversity and innovation are multidimensional terms. Their application is varied and interrelated. Herring (2009) has defined diversity as a concept that is not limited by gender or race, as usually defined. But it also includes differences with respect to attributes like age, ethnicity, religion, sexual orientation, among others. Diversity is explained across six demographic attributes: gender, age, race and ethnicity, sexual orientation, religion and beliefs,

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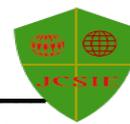
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and disability. Innovation includes processes of creativity and new thinking. Management of innovation implies the search of new ideas that could generate positive outputs. There is an ongoing quest to find out better ways of managing innovation to serve diverse customers. Markets and businesses are becoming more diverse in terms of products, services, and customer preferences (The European Institute for the Management, IEGD, 2013). Organizations need to hire diverse set of employees with diverse skill set to manage diversity in markets. This calls for a study on diversity and types of skills for managing innovation. The present paper is an attempt to uncover the underlying relation between diversity and type of skill set required for management of innovation. Past research has shown positive relationship between diversity and innovation in business contexts. Hajro et al. (2015) found that teams with cooperative and assertive knowledge were more effective. It is more common in organizations with diverse climate focusing on engagement. In the past, there has been no study that correlates the two parameters. Also, it is important for organizations to hire employees with a particular skill set for better growth. Through this study, there is a scope to shed light on three variables (i.e., diversity, skill set, and innovation). Management of innovation depends on who manages innovation and how innovation is managed. The *Who* part is about individual with the given skill sets having diversified traits that help in management of innovation. The *How* part is about the different process or new process used by individuals to manage innovation. It is important to understand what skill sets are required and how skill set is related to diversity among individuals. The relation between performance and gender has been debated often, giving different versions to the relation.

Some researchers have claimed that the difference in individual biological and psychological characteristics influences research output. A study by Van der W. Inge et al. (2012) suggested that young female researchers tend to outperform young male researchers. But often it is observed at all levels of education that girls tend to outperform boys (Buchmann et al., 2008; Pekkarinen, 2008). The influence of age on management of innovation has been an old issue for employers. A general belief is that productivity decreases with age. However, in the consultancy business, more experience and wisdom may add to better performance. The study focuses on diversity attributes like race & ethnicity, sexual orientation, religion & beliefs, and disability. It relates them with the type of skill set for innovation management. The type of skill may be communication skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills. Employees with diversified traits may possess all or some of these skills that enhance management of innovation in organizations. For example, females are better in handling and managing customer service or managing kids in primary schools. By and large, we find female nurses in the hospitals as they are better in taking patient care. Moreover, older employees are mostly contributing more knowledge and wisdom in an organization, even though researchers have claimed that productivity declines with age. If organizations employ such diverse set of employees, it may contribute towards better management of innovation. This may be true in certain cases but cannot be generalized as management of innovation depends on many factors like availability of skilled manpower, attitude of senior managers, the vision of a company, and conducive government policies. Cost cutting is one of the techniques for



managing innovation. So, organizations may hire a younger staff at a lower cost but may not get a skilled employee. The study is an attempt to explore the relationship between diversity attributes and skill set attributes in the three aforementioned selected sectors.

The importance of different skills may vary with respect to the sectors. For example, technical skills are more important in the information technology sector than in the education sector. On the other hand, skill sets like technical skills, analytical skills and communication skills are important in all three selected sectors.

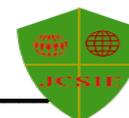
The other attributes of diversity, like race and ethnicity, sexual orientation, religion and beliefs, and disability may be linked with the different type of skill sets. This paper addresses the gaps that highlight the relationship between diversity attributes and skill attributes required for the management of innovation. The present study is an attempt to propose a theoretical model to correlate diversity and type of skills for management of innovation. Specifically, the paper will address the research lacunas to understand degree of correlation between diversity attributes (gender, age, race and ethnicity, sexual orientation, religion and beliefs, and disability) and skills attributes (skill set of employees – communication skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills). The scope of innovation depends on the ability of employees to produce ideas and apply them. The Organization for Economic and Cooperative Development (OECD) countries are increasingly trying to understand the types of skills needed for innovation and the best ways to build them, although it is difficult to make explicit links between specific skills and innovation (OECD, 2011). This study attempted to understand the relationship between diversity and the required skills for innovation.

Clearly, there is a need to study the link between diversity attributes and skill set attributes that might result in better management of innovation. Often, technical skill set has more impact on management of innovation than non-technical skill set. The skill sets may vary on the basis of gender, race, religion, age, disability, and sexual orientation. The study proposes a theoretical model in which diversity is the *source*, skill set is the *mediator*, and the management of innovation is an *outcome*.

The article starts with a brief introduction about the topic. This is followed by the methodology. The next section of the paper is an analysis, which includes a literature review to address the issues in the study. This further helps in understanding the diversity and skills set attributes for management of innovation. Then, the findings are reported and analyzed in the light of diversity attributes and skill set that help in managing innovation.

## **Methodology**

The research process started with an evaluation of the literature on the topic. The literature was reviewed to analyze diversity attributes and skill sets. The study involves three knowledge intensive sectors - education (primary education), pediatrics hospitals, and information technology (software development). The diversity attributes and skill sets are defined as (a) Diversity – demographic verticals: gender, age, race and ethnicity, sexual-orientation, religion



and beliefs, and disability and (b) Skill set of employees – communication skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills. Several individual interviews (personal communications) were analyzed from sectors like education (primary education), pediatrics hospitals, and information technology (software development) to understand the relationship between diversity attributes and skill set attributes and how they influence the management of innovation.

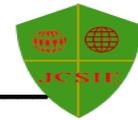
As already mentioned, in this paper, the scope of the education sector includes primary education; the hospital sector includes pediatric hospitals, and the information technology sector encompasses software development companies. The scope is limited to these specific sectors due to the short duration of the study and the use of a convenient sampling. The three different sectors are considered to analyze the correlation across sectors. All three sectors are knowledge intensive sectors. Knowledge intensive sectors depend more on the talent pool within an organization. Grant (1996) has defined knowledge-based venture as the venture where knowledge is the firm’s most valuable asset. He further proposes that firms create their competitive advantage by integrating knowledge held by individuals within the firm. Highly skilled employees contribute more to management of innovation. A key finding of a report by Toner (2011) provided evidence for strong causal inter-relation between the supply of higher levels of education, training and skills and increased demand for and supply of technical and organizational innovation. The market size of the respective sectors is given in Table 1 below:

**Table 1: Sector and its Market Size (wrt India)**

| S. No. | Sector  | Market Size  |
|--------|---|--|
| 1.     | Education (Primary)                           | US\$ 91.7 billion in FY18 and is expected to reach US\$ 101.1 billion in FY19.                 |
| 2.     | Hospitals (Pediatrics)                        | The healthcare market can increase threefold to Rs 8.6 trillion (US\$ 133.44 billion) by 2022. |
| 3.     | Information Technology (Software Development) | US\$ 181 billion in 2018-19, expected to expand to US\$ 350 billion by 2025.                   |

Source: India Brand Equity Foundation (ibef.org)

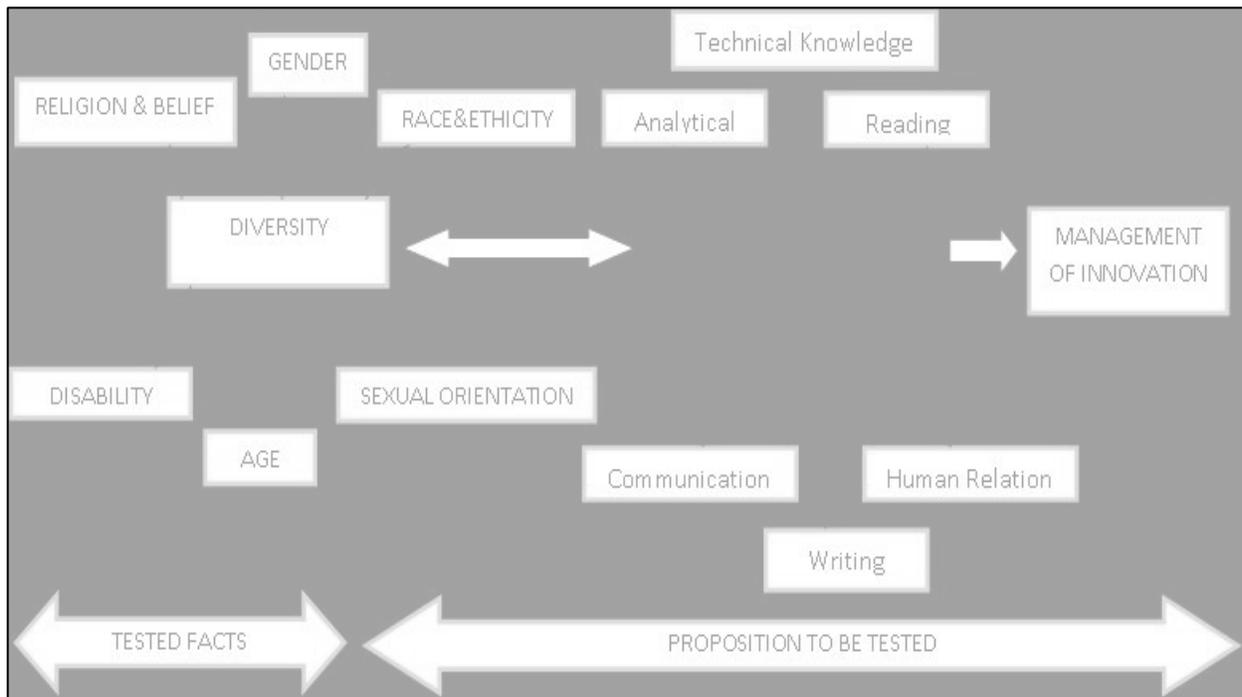
Table 2 presents the sector and the importance of respective skill sets. Among the given skill set attributes, communication skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills are more important for the education sector (primary level). In the case of the information technology (software development) sector, programming skills are more important than communication skills. In hospitals, technical knowledge is more important than the race, religion and sexual orientation of an employee. In general, technical knowledge and analytical skills are more important in comparison to race, religion, ethnicity or sexual orientation for the knowledge intensive sector.



**Table 2: Sector and Skill Set Importance**

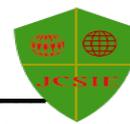
| S.No. | Sector  | *Skill-Set Importance  |
|-------|---|--|
| 1.    | Education (Primary)                           | Communication skills, reading skills, and writing skills and human relation skills and analytical skills.  |
| 4.    | Hospitals (Pediatrics)                        | Technical knowledge (Medicines and medical), analytical skills, reading skills, writing skills, human relation skills, and communication skills, |
| 5.    | Information Technology (Software Programming) | Technical knowledge (Coding, programming), analytical skills, reading skills, writing skills, human relation skills and communication skills.    |

Source: Author (2020) \* Skills are mentioned from increasing to decreasing order.



**Figure 1 Correlation between Diversity Attributes and Skill Attributes**

Figure 1 describes the model through correlation between diversity attributes and skill attributes. The **dependent variable** in the model is *Management of Innovation*. There are two **independent variables** in the proposed model: *diversity attributes* and *skill attributes*. The paper addresses the correlation between diversity attributes and skill attributes for better management of innovation. The subset of diversity attributes includes gender, age, race and ethnicity, sexual orientation, religion and beliefs, and disability. The subset of skill set includes communication



skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills. The two attributes are studied to explore whether they result in better management of innovation or not. The diversity attributes have been tested by past research studies but there are research gaps with respect to study of the relationship between diversity and skill set attributes for management of innovation. The paper addresses the research gaps through literature review and sectoral data collected through personal communication from three sectors: education (primary education), pediatrics hospitals, and information technology (software development).

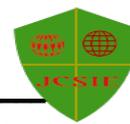
Existing literature suggests a relationship between gender and age with respect to performance. Researchers have tried to relate diversity with innovation and often debated that diversity contributes to innovation. But less research exists on the relationship between diversity attributes and skill sets. These concepts have not been studied with respect to management of innovation. Topics pertaining to the diversity attributes and skill set attributes are screened from the literature and their underlying relation with management of innovation has been reported. Dimensions of diversity (i.e., industry background, country of origin, career path, gender, academic path, and age) have been related to innovation, in terms of positive or negative relation (University of Munich and BCG, 2016). There are several studies that have linked innovation with the functional diversity of team members (Kreidler & Tilebein, 2013; Milliken & Martins, 1996). Diverse functional teams have a broad thinking, can react better in uncertain situations, and produce efficient decisions (Akgün et al., 2008; Blindenbach-Driessen, 2015; Gebert et al., 2006; Milliken & Martins, 1996; Pelled, 1996).

The time period of data collection and analysis for the research paper spans from 2015 to 2017. The author started working on the concept of correlation of diversity and skill set and its impact on management of innovation in 2015 in order to gain clarity and conceptual understanding on the topic. The reason to select these years is to cite the recent research related to the topic of the study. A conscious decision was made to analyze recent papers and have current research perspectives.

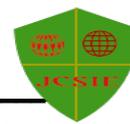
A total of twenty-one documents have been analyzed for the literature review. The number includes 11 research papers, 4 reports, 2 books, 2 research review papers, 1 working series paper by OECD, and 1 paper from conference proceedings. The diversity attributes and skill set attributes were identified from the literature and discussed. The selection of the research paper was based on the time period and topics analyzed in the paper. Topics ranging from ‘gender differences in scientific productivity; workforce diversity and innovation; diversity management - a global approach; cultural diversity and R&D activity; skills for innovation and research. Table 3 summarizes the literature analyzed for the study.

**Table 3: Summary of Literature Analyzed**

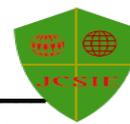
| Literature Type | Author/s (Date)              | Title  | Target population | Sector       |
|-----------------|------------------------------|--|-------------------|--------------|
| Book            | Akgün, A.E., Dayan, M., & Di | New product development team intelligence: Antecedents | U.S.-198, AUS-152 | Media and IT |



|                  |   |  |   |  |
|------------------|---|--|---|--|
| Research paper   | Benedetto, A. (2008).<br>Blindenbach-Driessen, F. (2015). | and consequences<br>The (in)effectiveness of cross-functional innovation teams.<br>the moderating role of organizational context                 | 1200 firms  | Project based firms                                    |
| Research paper   | Buchmann C, DiPrete T.A., & McDaniel, A. (2008).          | Gender inequalities in education   | Not defined   | Education (Kindergarten, High school, college)         |
| Research paper   | Gebert, D., Boerner, S. and Kearney, E. (2006).           | Cross-functionality and innovation in new product development teams: A dilemmatic structure and its consequences for the management of diversity | Not defined   | Sector not defined, cross functional teams             |
| Research paper   | Gonzales, J. A., & Denisi, A. S. (2009).                  | Cross level effects of demography and diversity climate on organizational attachment and firm effectiveness                                      | 26 units  | Regional restaurant chain                              |
| Research paper   | Hajro,A. , Gibson , B.C., & Pudelko, M. (2015).           | Knowledge exchange processes in multicultural teams: Linking organizational diversity climates to teams' effectiveness,                          | 11 companies, 48 teams, 143 in-depth interviews                 | Sector not defined                                     |
| Research paper   | Herring, C. (2009).                                       | Does diversity pay? Race, gender, and the business case for diversity  | Using data from the 1996 to 1997 National organizations survey. | A national sample of for-profit business organizations |
| Report           | India Brand Equity Foundation (2019).                     | Sector wise report   |   | Education, Healthcare, Information Technology          |
| Conference paper | Kreidler, A., & Tilebein, M. (2013).                      | Diversity and innovativeness in new product development teams addressing dynamic aspects with system dynamics,                                   | Not defined   | Not defined  |
| Report           | OECD (2011).  | Skills for innovation and research.  | Not defined   | Service and manufacturing sector                       |
| Report           | Lorenzo, R., Voigt, N., Schetelig,                        | The mix that matters, Innovation through diversity   | Not defined   | Not defined  |



|                              |  |   |   |  |
|------------------------------|--|---|---|--|
| Research paper               | K., Zawadzki, A., Welp, I., & Brosi, P. (2017). McCabe, D. (2002).   | Waiting for dead men's shoes: Towards a cultural understanding of Management innovation                             | A case study of an insurance company.                                       | Insurance sector   |
| Research review paper        | Milliken, F.J., & Martins, L.L. (1996).                              | Searching for common threads: Understanding the multiple effects of diversity in organizational groups              | Not defined   | Not defined  |
| Research review paper        | Mirbabayev, R. (2015).   | Relationship between Innovation and Cultural Diversity: Review of concepts,   | Not defined   | Not defined  |
| Research paper               | Niebuhr, A. (2010).  | Migration and innovation: Does cultural diversity matter for regional R&D activity?                                 | Cross - section of German region  | Not defined  |
| Book                         | Ozbilgin, M., & Tatli, A. (2008).                                    | Global diversity management: An evidence-based approach.  |   |  |
| Research paper               | Pekkarinen, T. (2008).   | Gender differences in educational attainment: Evidence on the role of tracking from a Finnish quasi-experiment      | Not defined   | Finnish education sector   |
| Research paper               | Pelled, L.H. (1996).   | Demographic diversity, conflict, and work group outcomes: an intervening process theory                             | Not defined   | Not defined  |
| Report                       | The European Institute for the Management of Diversity (IEGD, 2013). | Diversity and Innovation- A business opportunity for all, Focus consultancy, 'for diversity against discrimination. | Five companies – two SMEs, two large companies, and one very large company. | manufacturing, real estate and renting, and wholesale/retail trade |
| Working paper series of OECD | Toner, P. (2011).  | Workforce skills and innovation: An overview of major themes in the literature                                      | Not defined   | Manufacturing and service sector                                   |



|                |   |   |                       |                     |
|----------------|---|---|-----------------------|---------------------|
| Research paper | van Arensbergen, P., van der Weijden, I., & van den Besselaar, P. (2012). | Gender differences in scientific productivity: a persisting phenomenon? | 852 Social scientists | Scientific research |
|----------------|---|---|-----------------------|---------------------|

## Findings and Analysis

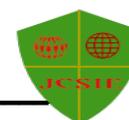
As previously indicated, the study is an attempt to explore the relationship between diversity and type of skills required for innovation management. This part has two sections, the first section presents the findings from the literature review on the topic and the second section presents the results from sectoral data collected through personal communications.

### *Findings from Literature Review*

Researchers have indicated a positive correlation between diversity and performance enhancement (Ozbilgin & Tatli, 2008). This reflects that organizations prefer a diversified workforce for better work performance. The concept of diversity refers to individual differences on the basis of any personal attribute that reflects how individuals perceive each other (LiGonzales & Denisi, 2009). Niebuhr (2006) conducted a study related to diversity and found that higher levels of research & development and innovation in regions of Germany are related to higher levels of cultural diversity in comparison to regions with lower levels of diversity. In broad terms, Herring (2009) suggested that diversity enhances the outcomes of a firm when compared to a homogeneous environment. This is because innovation depends more on the diversity of the group rather than just on intelligence.

There are different contributions of diversity in the area of innovation. Diversity can result in a better decision-making and problem-solving capability with the help of diverse expertise and critical evaluation (Bassett-Jones, 2005). A diverse team is capable to reach out to the broader network of relationships. It can bring different resources in the innovation process. There is another study by Lorenzo, et al. (2017), which confirms that companies generate higher revenue due to their higher level of diversity. But there is a considerable gap in studying the relation between diversity and type of skill set required for the management of innovation.

Apart from these two main categories, other variables to be studied include the nature of the job, the business, educational qualifications, and the sector. The outcome of the study will suggest if there exists a correlation between diversity and type of skill sets of the employees. It will help in understanding the concept of diversity with respect to the skill gaps that exist among employees. Organizations can select the mix of diversity to match with the type of skill set required for managing innovation. The diversity among employees is required for performing different types of tasks within firms. It can result in firm productivity and generate spillovers. But there might also be a negative impact of diversity, as it may result in problems related to communication and behavior.



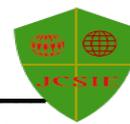
There has been an increase in heterogeneity among employees with respect to age, migration, women’s increased labour participation and technological changes (Ilmakunnas & Ilmakunnas, 2011; Kurtulus, 2012; Parrotta et al., 2012a). Thus, there is a need to study heterogeneity among employees. Very few studies have examined the correlation between diversity and skill sets required for innovation of management. There is a paucity of research on correlation between diversity, skill sets required for the innovation management. However, there is a study by BCG and Technical University of Munich (2017) that used statistical methods such as correlation and regression analyses to identify the types of companies that get the biggest innovation boost from diversity, the steps that companies can take to increase diversity’s power, and the types of diversity that matter the most. This was apart from showing a relationship between diversity and innovation.

**Table 4: The Types of Diversity that Bolsters Innovation**

| Dimension of Diversity | Direction of Relationship   | Relationship to Innovation |
|------------------------|-----------------------------|----------------------------|
| Industry Background    | Positive                    | Very High                  |
| Country of Origin      | Positive                    | Very High                  |
| Career Path            | Positive                    | Very High                  |
| Gender                 | Positive                    | High                       |
| Academic Path          | No Significant Relationship | None                       |
| Age                    | Negative                    | High                       |

**Source:** (2016) Survey of German, Swiss and Austrian companies by BCG and University of Munich. **Note:** 1. Innovation = the percentage of revenue from new products or services in the recent three-year period. 2. Very high statistical significance p value <.01. 3. High. Statistical significance, p <0.05

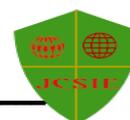
Table 4 summarizes the core findings of the study. The study did not relate race and ethnicity, sexual orientation, religion and beliefs, and disability to innovation. A study conducted by Gratton (2007) suggests that there is a positive correlation between innovation and equal gender ratio within work teams. With the unequal gender ratio, a negative correlation is observed. Niebuhr (2010) suggested that there are differences in knowledge and capabilities of workers. These differences exist for workers from diverse cultural backgrounds and it results in better Research & Development (R&D) performance. One of the most fundamental challenges in innovation management is to find ideas that are valuable for an organization. In order to implement these ideas, employees need to have the right set of skills with them. A broader range of basic skills is important to implement innovation. The basic skills are defined as academic skills (reading and writing), technical skills, soft skills, problem solving skills, as well as openness to different cultures and leadership (OECD, 2011).



Toner (2011) has studied major themes in the literature related to workforce skills and innovation. In his study, he stresses on the key workforce skills for “High Performance Work System” (HPWS). HPWS requires a commitment to innovate. This is required at all levels of an enterprise. A broad range of skills is required for implementing HPWS. In addition to technical, cognitive and behavioral attributes, there are some other skills like good social skills and communication skills, leadership, initiative taking skills, constant concerned and check on quality, teamwork and cooperation, flexibility, analytical skills, and problem-solving attitude. For the purpose of this study, we have considered- communication skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills, as the different types of skills required in an organization. Hewlett Packard’s Latex Printing Technology (Hewlett Packard, 2020) can serve as a good illustration in this context. This technology is driven by diversity. This innovation provides an alternative to print service providers. The output is durable and sharp. The images are vivid and there is less impact on the environment. The company made deliberate efforts to have a diverse team with 120 engineers across 4 different countries. They manage the diverse teams to bring out their full creative potential. Another organization, L’Oreal also relied on diversity to develop a range of skincare for Muslim women based on their expressed needs (IEGD, 2013). Edamura and Inui (2016) conducted a study and found that diversity results in increase in patent applications among researchers. A study by Mirbabayev (2015) showed the influence of cultural diversity on innovation. The study found that cultural diversity plays a significant role in increasing innovativeness among firms. This study did not relate different variables of diversity with the type of skills that are required for managing innovation in an enterprise. Management of innovation is a challenging task that requires the search of new ideas, which could result in positive outputs. The ideas have to be evaluated with respect to the right quality and feasibility. The diversity in ideas is the result of diversity in skill set possessed by employees.

### ***Findings from Sectoral Data on Diversity and Skill Set***

Data collected through personal communications from key informants in the three sectors\_ education (primary education), pediatrics hospitals, and information technology (software development) \_ are presented and analyzed in this section. The findings revealed a correlation of gender and age with the skill sets for management of innovation. The remaining diversity attributes (i.e., race & ethnicity, sexual orientation, religion & beliefs, and disability) were not found to be correlated with skill sets. The correlation was seen sector-wise. In the education sector (primary level education), it is observed that mostly female teachers are hired. This may be due to the female traits like better soft skills, caring attitude, and politeness. There is a preference of females in the teaching sector while males are preferred in administration jobs like security and maintenance. This is due to the fact that females are considered better in handling growing kids. They are generally polite and equipped with mother-like skills to manage kids. In hospitals, for clinical jobs, no diversity correlation is observed. Both females and males are employed for skills rather than for the gender. But often in the planning or designing of policies,



there is a mix of doctors, technicians and administrators. In information technology, mostly male employees are employed. This is because of more availability of male candidates with respect to experience, education, and mobility.

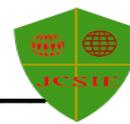
Another diversity attribute that is found to be correlated with skill set attribute is age. In the education sector (primary education), younger teachers are hired. This is due to the abundant supply and energy levels required to manage kids at the primary level. In the information technology sector, not much correlation is seen with respect to age. Both young and old employees are seen doing the same kind of job (i.e., coding, programming, or controlling). This is because of the dynamic nature of the sector where young entrepreneurs are seen working with older employees. In this sector, diversity is observed more in terms of area of knowledge rather than age or gender or other diversity attributes. The diverse teams are formed for different projects to have different perspectives. In the three sectors, we could not find any correlation in any of the sectors under study with respect to race and ethnicity, sexual orientation, religion and beliefs, and disability. The result from 5 reports, one book, and 9 research papers has been summarized in the Table 5, 6, and 7 below:

**Table 5: Diversity Attribute and Sector**

| S.No. | Diversity Attribute | Sector  | Correlation                    |
|-------|---------------------|---|--------------------------------|
| 1     | Gender              | Education (Primary level), Hospitals, Information Technology                        | Sector wise correlation exists |
| 2     | Age                 | Consultancy Business, Education (Primary Level), Hospitals, Information Technology) | Sector-wise correlation exists |
| 3     | Race & ethnicity    | Not Sector relevant   | No Correlation found           |
| 4     | Sexual orientation  | Not Sector relevant   | No Correlation found           |
| 5     | Religion & beliefs  | Not Sector relevant   | No Correlation found           |
| 6     | Disability          | Not Sector relevant   | No Correlation found           |

**Table 6. Skill Attribute and Sector**

| S.No. | Skill Attribute      | Sector   | Correlation |
|-------|----------------------|--|-------------|
| 1.    | Communication skills | Education (Primary level), Hospitals, Information Technology | High        |
| 2.    | Technical knowledge  | Education (Primary level), Hospitals, Information Technology | High        |



|    |                       |  |                |
|----|-----------------------|--|----------------|
| 3. | Analytical skills     | Education (Primary level), Hospitals, Information Technology | High           |
| 4. | Human relation skills | Education (Primary level), Hospitals, Information Technology | High to Medium |
| 5. | Reading skills        | Education (Primary level), Hospitals, Information Technology | Medium         |
| 6. | Writing skills        | Education (Primary level), Hospitals, Information Technology | Medium         |

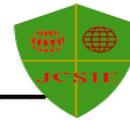
**Table 7: Correlation – Diversity and Skill Set Attribute**

| S.No. | Diversity Attribute | Skill-Set Attribute     | Correlation             |
|-------|---------------------|-------------------------|-------------------------|
| 1.    | Gender              | Communication skills,   | Sector wise Correlation |
| 2.    | Age                 | Technical knowledge,    | Sector wise Correlation |
| 3.    | Race & ethnicity    | Analytical skills ,     | No Correlation          |
| 4.    | Sexual orientation  | Human relation skills,  | No Correlation          |
| 5.    | Religion & beliefs  | Reading skills, Writing | No Correlation          |
| 6.    | Disability          | skills.                 | No Correlation          |

## Discussion

The paper has attempted to find correlation between diversity attributes and skill set attributes – communication skills, technical knowledge, analytical skills, human relation skills, reading skills, and writing skills. The literature review and personal communications suggest that there is an element of diversity in the selected sectors for managing innovation. This heterogeneity forces groups to think out of the box, resulting in innovative solutions. In the case of primary level education, younger female staff brings in energy and enthusiasm to handle young kids. This is complemented by the senior staff (both male and female) to direct performance and show direction. In hospitals, often senior doctor is supported by a staff of nurses, doctors, technicians, all contributing their share of diversity with respect to gender, age, race, and knowledge. Diversity exists in the form of any difference among employees with respect to gender, age, race and ethnicity, sexual orientation, religion and beliefs, and disability.

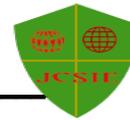
The studies in the selected sectors (education, pediatrics hospitals and information technology) suggest that there is correlation for two diversity attributes (i.e., gender and age) with the skill set attributes. For example, in the education sector, at the primary education level,



it is seen that mostly females are hired as primary school teachers as compared to males. This may be due to the fact that females have attributes like better at handling kindergarten kids, soft spoken, polite, and caring. Similarly, in the hospitality industry, we see more of the females are working as customer service employees. In the case of hospitals, we mostly find females working as nurses. This indicates that organizations hire employees with certain attributes that match with the job expectation. This results in a better management of innovation. Regarding age, in spite of a general belief that productivity decreases with age, organizations in the consultancy business prefer to hire older employees for different project. In the knowledge intensive sector, age is not a deterrent because even younger employees are hired for coding knowledge in the information technology sector. All the organizations from the selected sectors have one common practice, though the degree of its application varies. Most organizations prefer to work with teams of diverse employees, although such diversity might differ from one organization to another. And this helps in managing innovation as diverse teams bring new ideas to improve work and performance. This diversity is seen more in the case of hospitals and information technology. In the information technology sector, diversity is due more to technical knowledge than to age or gender. Often, in the case of the information technology sector, diverse set of employees work on different projects. The different nature of the different projects explains the presence of diversity in organizations. In the case of the education sector, there is a team of teachers and a coordinator. So, not much diversity is observed in this sector.

## **Conclusion**

The study has proposed a theoretical model correlating diversity and type of skills required for management of innovation. Extensive literature was studied to identify the research gaps that justify the study. Previous studies did not address the correlation of diversity attributes and skill set attributes required for management of innovation. Several researchers have explored the relationship between diversity and high performance of an enterprise. There are also studies relating cultural diversity and innovation. The methodology of the paper includes analysis of three sectors, education (primary), hospitals, and information technology. These sectors were considered because they are growing sectors and have a better scope for the future. The sectoral data show that there is a correlation between diversity attributes and skill set attributes, but only for two diversity attributes: gender and age. Such correlation has resulted in a better management of innovation. Further, technical skills possessed by employees tend to have more impact on management of innovation as compared to non-technical skills. Enterprises with more technically qualified employees were more innovative, as they generate more innovative ideas, both in terms of product and process. Correlation of diversity attributes and skill set attributes on the basis of gender, religion, age, disability and sexual orientation was not observed in management of innovation. Organizations require a diverse set of employees in terms of gender, age and technical knowledge to be more innovative. This diversity within organizations will help in developing a different approach towards management, innovation, and performance. When



different minds work together, each one will have a different perspective towards a problem. For example, in hospitals, for emergency cases, senior doctor would want to know the perspectives of all the other doctors, nurses and technicians in order to arrive at the best possible solution for an emergency case. Similarly, for project in the information technology sector, there is a need for diverse employees with diverse skill sets in order to complete a project efficiently and on time. The study is limited by the volume of data that was used to analyze the correlation between diversity and type of skill set for management of innovation. More data would have probably produced better analysis of the correlation. The study did not perform statistical analysis, which can provide better support to the result. Future research can be undertaken using statistical methods like hierarchical regression and path analysis to find out the exact coefficients of diversity and skill set attributes that help in management of innovation. The research study can also be applied to other sectors.

### **Declaration of Conflicting Interests**

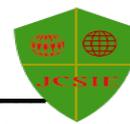
The authors declared that they had no conflicts of interests with respect to their authorship or the publication of this article.

### **Funding**

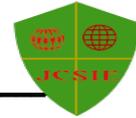
The authors declared that they received no financial support for their research and/or authorship of this article.

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