TOWARDS UNDERSTANDING THE BUSINESS VALUE OF DIVERSITY IN INFORMATION TECHNOLOGY

Rajni Goel, Howard University, USA (rgoel@howard.edu)

ABSTRACT

The value-in-diversity perspective contends that a diverse work in beneficial for business in terms of aspects as corporate profits and earnings, and improved quality of products and services. But, little work has been done to test this perspective in the IT domain. This concept paper explores the current state of practice and challenges in diversity in technology teams: an extensive of research on diversity and inclusion, why diversity is so difficult to implement and why software engineers should care about diversity. By analyzing current errors in technologies and applying the logic of diversity research, we validate how an organization's bottom line and competitive advantage depends on having diversity of thought and approach in their functional teams creating new technologies; a workplace that is inclusive is directly correlated to better problem solvers.

INTRODUCTION

The under-representation of minority groups in the Information Technology (IT) field is a well-known and persistent problem. It has been well documented that diversity is a critical driver of excellence in research and innovation in STEM. Researchers and industry professionals are continuously addressing the term "IT skills gap," which has been identified as the inequity in the supply versus demand of professionally trained IT workers. Computing education has in recent years been beleaguered with declining enrollment, which places an additional focus on the need for participants from a variety of backgrounds. Increasing the participation of under-represented groups can also be perceived a business driven decision. Outlining the technology-related issues due to under-representation of minorities and a value-in-diversity competitive advantage could indirectly encourage more businesses to invest in minority participation in STEM. Based on this situation, more research and documentation stating the impact of diversity in technical fields must be an ongoing endeavor.

This concept paper explores the current state of practice in diversity in technology teams: an extensive review of research on diversity and inclusion, why diversity is so difficult to implement and why developers should care about diversity. By analyzing current errors in technologies and applying the logic of diversity research, we validate how an organization's bottom line and competitive advantage depends on having *diversity of thought* and *approach* in their functional teams creating new technologies. Technology development leaders must realize the value of diversity of *"thought"* in assisting a team of engineers to collectively create the best products and innovation. And since innovation and creativity naturally tends to stem from and be a reflection of creators background experiences, a workplace that is inclusive is directly correlated to better problem solvers.

We develop a business case that outlines the competitive advantage of an organization having a diverse IT workforce. Specifically, we identify the subsequent technology-related issues that exist because of the under-representation of minority groups in IT by outlining the problems that arise in specific phases of the systems development life cycle. IT artifacts and processes benefit from different perspectives, backgrounds and experiences. Therefore, both computing education and technological innovation benefit from including a myriad of people and is a necessary prescription for the success and continued growth. Our research demonstrates how diversity in IT functions clearly strengthens the bottom line. Furthermore, we indicate how organizational leadership must strategically invest to ensure this strong diverse infrastructure.

BACKGROUND AND MOTIVATION

Diversity in the workforce has been a global subject for years. Organizations spend millions on diversity training, outreach and inclusion. Much of the public interest in diversity has focused on issues of fairness and representation, whereas we are focused in the benefits of diversity. Computing education has in recent years been beleaguered with declining enrollment, which places an additional focus on the need for participants from a variety of backgrounds. The context of diversity encompasses not just gender and ethnicity, but goes deeper into the differences in thoughts, education, and sexual orientation. However, focusing on increasing enrollment is only important factor for increasing the participation of under-represented groups.

In an effort to understand underrepresented groups in technical fields, an important starting point is to investigate the value of diversity of thought and life experiences in assisting engineers to collectively create the best products. To validate the business value of diversity in software development domain, we use as a foundation the well developed value-in-diversity theory. Advocates of this perspective, such as Taylor Cox [1] claim the diversity has business value; a diverse workplace in general helps better understand consumer needs and improves the quality of services and products.

Furthermore, research by Scott Page [2,3] demonstrates how problem solving and predictive tasks can better be performed by a collection of individuals with diverse set of backgrounds outperforms collection of high "ability" individuals. Proven mathematical logic indicates that diversity can improve the bottom line. In any problem solving situation, two people with different perspectives test different sets of potential improvements and increase the probability of innovative ideas. Research has shown that diversity underpins innovation and successes in organizations. In its recent rating of diversity and inclusion in companies, Diversity Inc. recently evaluated companies in the consulting, pharmaceutical and service sectors as topmost in diversity. Only one company in the technology sector was in this category. In the hospitality and healthcare industry, diversity has been shown to be relevant especially when considering that people visit facilities not paying particular mind to who renders the service but more so how well the service is rendered.

Much of the advancement that started at the end of the 19th century was brought about by innovations in STEM, and these innovations show the work put into research which leads to inventions that satisfy the needs of humans in different ways. Some of these inventions were brought about by a unique group of individuals that started out as a homogenous group but in time developed into a group that consists of people with different perspective, ways of solving problems and thoughts. Intuitively, diverse IT development teams from different backgrounds will collectively create a larger pool different ways to solve problems, providing a set of tools to be more innovative in creating solutions.

We explore the current state of practice in diversity, research on diversity, why diversity is so difficult to implement, why software engineers should care about diversity and what organizations and teams can do to increase diversity and get benefits. Initially, diversity of *thought* of benefits include:

- ✓ Groups comprised of members from different ethnicities, and who possess average ability at solving problems, have more collective intelligence than groups of same ethnicities who are intelligent
- ✓ Eliminate bias of an engineering team - currently reflected products
- ✓ Better problem-solving and increased creativity are positively associated with a variety of diversity attributes
- ✓ Facilitates Innovation
- ✓ Increased knowledge formation, patents and product offering

COMPETITIVE ADVANTAGE: DIVERSE TECHNOLOGY TEAMS

It is commonly understood that diversity in a group of people (team of engineers or developers) refers demographic characteristic uniqueness among team members, unique cultural identities or characteristics related to ethnicity, as well as differences due to educational and environmental background. The changing

demographics within US mandate that for companies to remain competitive, they must have a strategic plan to court the evolving market customers by including diversity of thought in product and service development. Engineers will also want to work with great talent, and recruiting widely in order to work with fantastic team members will also enhance the workplace for everyone and help avoid "groupthink" situations. While diversity is primarily viewed through a gender and ethnic minority lens, what companies are aiming for is a diversity of life experiences to contribute to solving a problem and building a product.

A recent study by McKinsey [4] surveyed executives that had the responsibility of Diversity and Inclusion in their respective organization. These executives recognized that having a diverse workforce fostered innovation, serves as a competitive advantage, and is crucial to achieving the bottom line. Additional reasons for having a more diverse workforce are; (1) most organizations now operate in more than one country hence creating a global strategy is essential to achieving organizational objectives, (2) it is essential for companies to have a workforce that is representative of the community it serves, and (3) the workspace has moved from individual to a team oriented perspective.
For example, the auto industry, with smart secure cars and Internet of Things, recognizes that we need to support both formal and experiential platforms to allow auto engineers, designers, tech and communications security experts to coalesce. This problem will not be addressed by the industry alone looking at itself. We need diversity of thought from people outside the automotive industry, people who are not engrained in the car or security culture. How else can we stay a step ahead of hackers, who by definition will try a broad range of approaches? The factors outlined below demonstrate how diversity in IT functions clearly strengthens the bottom line. Specifically, we identify the subsequent technology-related issues that exist because of the under-representation of minority groups in IT.

Factors such as the following correlated to competitive advantage:

1. **User Driven Innovation** – who influences consumer decisions? Including variety of ethnic groups in the technical design process leads to products that are more competitive in the market place. Katherine W. Phillips, the senior vice dean of the Columbia Business School and one of the leading researchers in diversity and innovation, has argued that diverse groups are more creative because creativity is usually a reflection of people's backgrounds. "People who are different from one another in race, gender and other dimensions bring unique information and experiences to bear on the task at hand," she wrote recently in Scientific American.

2. **New lines of innovation and business** – blacks and Hispanics bring new markets and new technological applications to the design process and can market effectively in that market space, opening up new lines of business. In 2012, when YouTube, a Google subsidiary, created a mobile app that allowed people to upload videos from their phones, it noticed something odd. About 10 percent of the videos being uploaded were upside down. When designers looked into the problem, they found something unexpected: Left-handed people picked up their phones differently from right-handed people, leading to upside-down videos.

   The issue here was one of lack of complete perspective; the engineers and designers who created the YouTube app were all right-handed, and none had considered that some people may pick up their phones differently. It's a small example, but a telling one. If Google's designers couldn't anticipate the needs of left-handed people with an all-right-handed product team, how could they anticipate the needs of women with a staff composed overwhelmingly of men?

3. **Diversity brings benefits to an organization's image -** The product is going to reflect its makers. Having a diversity of thought and life experiences is going to help engineers create the best product and avoid horrible situations such as when the Google Photos app mistakenly tagged African American people as gorillas in their algorithm. The algorithm for Google Photos may have looked different if it had been trained on a more diverse group of images. The bias of an engineering team will be reflected in the product. Engineers will often design products for a demographic that look and think differently from them and the diversity of life experiences and backgrounds will really help them to close empathy gaps and ultimately create a better product. Two examples include:

- Google's photo app mistakenly tagged black people as "gorillas"
- Flickr's faced complaints over offensive auto-tagging of photos. For instance, black people were automatically tagged as "ape" or "animal", the Auschwitz concentration camp photo was tagged as "sport". Flickr's auto tagging system placed potentially offensive tags on images including mislabeling concentration camps as 'jungle gyms' and people as apes.

The business value of diversity in technology development teams must be realized, just as it has been for leadership and management. As the 2015 McKinsey report (4) mentions that 366 public companies found the top quartile companies for ethnic and racial diversity in management were 35% more likely to have financial returns above their industry mean, we have exemplified how similar trends can be speculated for development teams. Diverse teams may more likely decrease ingrained biases, remaining objective in decision making and encouraging greater scrutiny of each member's actions. By breaking team homogeneity, you can allow your employees to become more aware of their own potential biases, leading to products less prone to errors as by photo app mentioned above.

CONCLUSION

The business case for ethic diversity in technology is established on proven theories of value of diversity and diverse problem solvers ourperforming. Diversity can also help the company come up with ideas that it would not have otherwise. But it's not just that diverse teams can let Google identify issues important to certain segments of its audience. Research has shown that diverse groups outperformed homogeneous groups on creative problem-solving exercises. For instance, in one study, when given a murder mystery exercise, three-person groups with racial diversity tended to solve the puzzle better than groups with only white members. Having a diversity of thought and life experiences is going to help engineers create the best product and avoid horrible situations.

REFERENCES

1. Cox, Taylor. 1993. *Cultural Diversity in Organizations: Theory, Research, and Practice.* San Francisco, CA: Berrett-Koehler.
2. Page, Scott. 2007. Making the Difference: Applying a Logic of Diversity, ACAD MANAGE PERSPECT, November 1, 2007, vol. 21 no. 46-20.
3. Hong, Lu, and Scott Page. 2004. Groups of diverse problem solvers can outperform groups of high-ability problem solvers, PANS, November 16, 2004 vol. 101 no. 46.
4. Mckinsey Report 2015, Why Diversity Matters, https://www.mckinsey.com/business-functions/organization/our-insights/why-diversity-matters