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Increasing Diversity in Innovation

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The world is embroiled in a global innovation race. Both countries and companies have recognized that innovation is a clear driver of national competitiveness (defined as economic and technological competitiveness) and national security.

In the 1970s, the United States accounted for roughly 70% of global research and development (R&D). Today, the U.S. accounts for only 16%, well below China's 25%. The National Science Board recently reported that in addition to lagging behind China in R&D output, the U.S. share of international patents dropped from 15% to just 10% from 2010 to 2020. In contrast, China's share of international patents increased from 16% in 2010 to 49% in 2020.

How can we compete with China and other emerging nations in the area of innovation? By embracing and nurturing diversity and inclusivity and their impact on innovation teams.

According to the U.S. Patent & Trademark Office's Progress and Potential report, looking only at gender, innovation teams primarily consist of men. The women inventor rate – that is, the share of women among all U.S. inventor-patentees– only grew from 12.1% in 2016 to 12.8% by 2019.[1] While this was an improvement, it suggests we are essentially keeping many of our innovators on the sidelines. At this rate, the United States will not be able to compete effectively in the global innovation race.

Diversity efforts have been underway at most large corporations for the past 5 to 10 years, so why haven't things improved? This question is at the heart of a new initiative between the U.S. Intellectual Property Alliance (USIPA) and the University of California Berkeley's School of Engineering called The Diversity Pledge. The pledge aims to create a set of best practices to help companies Increase diversity in innovation.

Over the past year, we have been working with companies on this issue to understand the issues they are facing and the successes and failures they have experienced. Here are a few things we have learned about how teams invent and innovate and how to increase under-represented inventor (URI) participation.

HOW INNOVATION OCCURS

While we tend to think of innovation as a "Eureka" moment, for most inventors, innovation rarely happens that way. Instead, within companies, most innovations are the result of problem-solving brainstorms, often called "innovation sprints." We define "innovation sprints" as the generation, by a person or group of persons, of an idea previously not conceived by the person or persons.

There are numerous ways that innovation sprints are conducted and categorized. For purposes of this article, we categorize innovation sprints/brainstorms into three

different groups based on who generates an idea: (1) an individual person ("individual brainstorming"); (2) a group of persons ("group brainstorming"); and (3) a combination at different times of an individual person and a group of persons, possibly including that individual person ("hybrid brainstorming"). We have found these different approaches to brainstorming useful, depending on the situation and the people involved.

Individual brainstorms are typically beneficial in situations where (1) attendees think better in silence, (2) the issue/problem is controversial, (3) there's an existing conflict between attendees, (4) there's a need to address multiple problems/features in one meeting, and/or (5) attendees dislike structured ideation.

Group brainstorming is helpful where at least some attendees are new to a team or company, a core problem exists that needs to be solved, ideation meetings occur frequently, or team members do not prepare ideas in advance.

Finally, **hybrid brainstorming** is particularly beneficial where some attendees are more vocal than others, there are concerns around implicit bias (e.g., for an underrepresented population), attendees typically are not engaging, a large quantity of ideas is needed, there's a power-imbalance between facilitator and attendees, or coverage of competitor products is sought.

As we've worked with the companies that have signed the Diversity Pledge, we've learned that the vast majority use group brainstorming in their innovation sprints to try to generate important new innovations, expand their innovator population, and grow their IP portfolios. In these sprints, first described and popularized by Alex Osborne in the 1950s, an existing team or a specially created group will be brought together to synchronously ideate. Such sessions will typically adhere to a set of brainstorming "rules" the participants are supposed to follow, such as no criticism of ideas, strive for a large quantity of ideas, build upon ideas put forth by others, and welcome wild ideas.

An intellectual property (IP) lawyer commonly serves as both a facilitator and scribe to capture the ideas put forth by the group and subsequently helps determine which idea(s) warrant further development or IP protection. Anecdotally, a 45- to 60-minute session containing 6-10 participants can be expected to explore 15-20 discrete ideas, of which 1 to 2 may warrant patent protection. The results can vary greatly based on factors such as the topic explored and the dynamics of the group.

DRAWBACKS OF TRADITIONAL APPROACHES

A small but growing number of Diversity Pledge companies, however, have moved away from such traditional brainstorming approaches toward hybrid approaches. Consistent with brainstorming literature[2] (see, e.g., Girotra), these companies have seen that synchronous brainstorming presents several inefficiencies and drawbacks that particularly affect URI participants, as follows:

First, when working in groups synchronously, only one person can speak at a time, leading to **production blocking** that naturally limits the number of ideas that can be explored.

Second, **free riding and regression to the mean** are commonly observed, whereby participants either do not contribute strongly if they feel that others are already contributing for the team or scale back their output to match that of their peers.

Third, **evaluation apprehension** often prevents participants from surfacing the ideas that they do have.

Fourth, many innovators simply don't enjoy presenting their ideas in front of a group, so **the pool of willing participants may be limited by the format**.

Finally, groups can gravitate toward–or away from–a contributed idea because **the identity of the speaker overshadows the merits of the idea**, owing to unconscious

biases, existing team dynamics, or other such factors.

Each of these drawbacks of traditional brainstorming affects the extent to which the innovation sprints generate important new innovations for the company, the company expands its innovator population and increases URI participation, and the company grows its IP portfolio.

ADVANTAGES OF HYBRID APPROACHES

Companies that have moved to hybrid methods to better achieve the objectives of their innovation sprints have generally employed one of two related approaches. In the first approach, a group is brought together for a session in which individuals first work independently to generate as many ideas as they can to solve a given prompt, commonly recording their ideas either on Post-It notes or electronically in Google Docs. The ideas are then collated and grouped by a facilitator, who then leads a discussion of a subset of ideas for further refinement and improvement by the group at large.

In the second approach, a structured idea generation method such as the 635 method is employed in a first phase to generate and record a very large number of diverse ideas, which the group can then further develop and refine in the second phase. In the 635 method, 6 innovators attempt to individually propose 3 ideas apiece to a problem prompt every 5 minutes, with the solutions captured on a shared document. Every 5 minutes, each innovator either adds 3 new ideas or builds on ideas previously proposed by others. In 30 minutes, 6 innovators potentially can propose 108 discrete ideas using this approach.

The approach used to generate initial ideas is often driven by factors that include the nature of the problem statement, the location of the participants, and the number of participants. A 635 approach may be preferred, for example, when the problem statement lends itself to being "solved" by 3 ideas in 5 minutes, the participants are all co-located and able to work off of shared hard copies or able to access the same collaborative document, the size of the group is 4-7 people, and a facilitator is not present.

The self-reported results from companies that have shifted to a hybrid approach show significant advantages over traditional group brainstorming, especially in terms of increasing URI participation. These advantages include the following:

Hybrid approaches **generate significantly more ideas**, with some reporting three times as many ideas per unit time compared to group brainstorming. We attribute this increase to less production blocking, free riding, and evaluation apprehension as well as to the increased efficiency of the 635 method. By extension, this means that companies are also likely to get significantly more ideas from URI participants per unit time using hybrid approaches.

Hybrid approaches also generate a **greater diversity of ideas**, owing both to the increased number of ideas generated as well as to less evaluation apprehension and a reduced tendency for the group's later ideas to norm to those already surfaced. As these trends can often affect the contributions of URI participants, moving to a hybrid approach can make it more likely that companies benefit from diverse ideas. Anecdotally, the diversity of ideas generated when the first phase is conducted using Post-Its or Google Docs can be even greater than when using 635, as individuals often have no visibility into others' ideas while generating their own.

The ideas generated by hybrid approaches also are of **higher quality**, consistent with literature suggesting the best ideas from a hybrid approach have average quality 30% greater than those from other group ideas. We attribute this to the greater number of ideas and greater diversity of those ideas as well as to the important second phase, in which the group seeks to discuss and improve upon the best subset of ideas that were generated during the first phase.

Participants who use hybrid approaches are also **better able to discern idea quality** than participants in a traditional group structure. The individual portion of the hybrid approach forces participants to be highly engaged in the problem-solving task, thereby increasing the acuity of their judgments when evaluating the quality of ideas in the group phase. Further, in the group portion, evaluating an idea without knowing its history/origin may result in more accurate judgments and has great benefit in reducing implicit biases.

It is also generally **easier to introduce new individuals to innovation sprints and have them participate** when using a hybrid approach, as the format obviates the reluctance participants may feel about presenting their ideas in front of an unfamiliar group. With hybrid approaches, the origin of an idea generally isn't known to the group for the second phase. In fact, as only the best ideas are discussed within the group setting, participants whose ideas are selected are generally more willing to speak up, as their contributions have already been validated. Indeed, one approach tried by several companies is to have past participants invite someone new to an upcoming innovation sprint as a way to further expand the reach of the innovation process.

Hybrid approaches also **improve the documentation and capture of each idea generated** during the session, as the first phase necessarily includes a "brainwriting" portion in which each idea is captured. In contrast to group brainstorming, in which an individual attempts to capture the ideas generated verbally by the group, a significantly greater percentage of ideas generated are captured in a hybrid approach. This makes it substantially easier for the full breadth of ideas to be distributed to product teams for possible implementation, helping companies turn the ideas into actionable innovation. Further, those ideas can also be shared with other innovators in the company who can further improve upon them asynchronously, further expanding the impact of the innovation session.

Finally, hybrid approaches allow teams to **conduct the first phase in the absence of a facilitator**, particularly when employing a 635 method. That is, any group of 4-7 individuals could readily follow a 635 method once introduced to it and could, in a 30-minute session, create a significant number of ideas that could be further refined (with the help of an IP lawyer facilitator) during a subsequent second session. This can help make the overall process of innovation sprints more scalable for IP teams.

CONSIDERING LESSONS LEARNED

Companies report that these advantages, taken together, have meaningfully increased URI participation in their innovation sprints. By adopting a hybrid format, companies generally received a greater number of contributions—and a greater diversity of contributions–from their URI participants on a unit time basis. The format also seems to better lend itself to getting URI participation in the first place, which we attribute to greater comfort owing to reduced evaluation apprehension. Anecdotally, companies have found that individuals who participate in a hybrid innovation sprint are far more likely to participate in subsequent sessions, which we believe stems from the participants seeing the value of the sessions in terms of the amount of ideas generated, as well as comfort with the format. At some companies, URI innovation teams have even self-assembled and conducted 635 sessions independently, with a second session then held with IP lawyer facilitators.

That said, a lack of awareness of company holds such innovation sprints was reported as a challenge in securing URI participation. There may be many willing participants within a company who do not participate simply because they have not previously engaged with the innovation sprint process and are unaware of such opportunities.

While there are a significant number of benefits reported by companies that have adopted hybrid approaches, companies considering trying a hybrid approach should nevertheless be aware of some lessons learned. First, while the format naturally lends itself to surfacing a greater number of diverse ideas from each participant, group dynamics and unconscious biases may still be extant and affect the willingness of URI participants to engage, particularly during the group discussion section. Effective facilitation and transparency as to how ideas are selected for discussion or ultimate patenting can potentially help.

Second, while we've seen that hybrid approaches can lead to quantifiable benefits (such as an increased number of patent filings or ideas considered for implementation by the business), participants need to see the value and understand the importance of innovation sprints to consider them an effective use of their time. Individuals whose ideas are not further explored or patented may grow discouraged and not participate.

The Diversity Pledge has highlighted the need for companies to evaluate and measure who is innovating in their company and to create, measure and reward processes that provide more inclusive access and participation by under-represented inventors. Companies and our nation can no longer afford to lose good ideas by not including everyone in the innovation process.

Identifying bias in the innovation and invention system and then eradicating it helps all, and adopting hybrid brainstorming approaches appears to be one way to help eliminate such bias. Additionally, measuring the patenting output of the process is a new way to independently verify the inclusivity of a company's invention process. With this new metric, inventors can determine where they want to work and how their participation will be utilized.

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