Collective Innovation and The Future of Work

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ABSTRACT

As people increasingly innovate outside of formal R&D departments, individuals take on the responsibility of attracting, managing, and protecting capital (ex. social, financial, human, and information) rather the departments. With technology playing a central role in how individuals work together to produce something that they could not produce alone, it is necessary to understand how online technologies are shaping the innovation process from start to finish. We bring together human-computer interaction researchers and industry leaders who have worked with people and platforms designed to support collective innovation across diverse domains. We will discuss the current and future research on the role of platforms in collective innovation, including topics in social computing, crowdsourcing, peer production, online communities, gig economy, and online marketplaces.

KEYWORDS
Collective innovation; action; intelligence; social computing; crowdsourcing; peer production, online communities; gig economy; online marketplaces; future of work

INTRODUCTION
Internet technologies have long been praised for offering unprecedented support for collective innovation – the ability of individuals to collaborate to produce a novel public or provide good. This includes being able to rapidly discover, re-use, recombine and evaluate opportunities (e.g. online communities, blogs, crowdsourcing, online manufacturing, A/B testing) [9, 10, 11, 12, 15], using artificial intelligence to create initial drafts [14], and develop social capital with diverse collaborators (e.g through professional networking platforms or online problem-solving communities)[6, 13]. Internet technologies also help individuals access critical human capital to complete tasks (e.g. through online marketplaces)[2], secure financial capital to manufacture product (e.g. through crowdfunding) [3], recognize different types of participation, and share risk [5]. Connectivity and autonomy are extending individual innovators' capabilities.

And yet, we still see a widening divide in who, how, and why people are able to successfully participate in collective innovation in meaningful ways using these technologies. While many platforms have low costs to participation, many platforms assume skills in management and planning, design and manufacturing, and communication and negotiation which many people lack [6]. Managing interdependencies among individuals can be difficult as well as keeping coordination costs down when transitioning between different platforms throughout the innovation process [4]. Relatedly, conditions for entry, exit, and ending are unclear [5]. Many do not have the initial connections needed to develop productive relationships or ask for critical resources online [1, 7]. Further, norms for transparency and intellectual property sharing are unclear and free-riding can occur [5].

To develop platforms that support broad participation in innovation of all types, we must closely examine and discuss the role of technology and how it can facilitate rather than exacerbate existing challenges in innovation. Moreover, for all participants, there is the risk of alienation, as the generation of new products falls to systems in which humans play a role only at the meta-level, manipulating parameters, while artificial intelligence generates the products [14].

THEMES
The panel discussion will be framed around the following themes:

- · For whom and under what conditions do online technologies impact the rate and breadth of innovation?
- · How have design features of online platforms (e.g. algorithms, forums, assessment tools, live feedback, dashboards) created more or less opportunities for innovation?
- · How do online technologies influence relationship development between collaborators and partners?
- · How can online technologies interact with existing R&D departments in formal organizations?
- · How have online technologies influenced which resources people can or cannot access?
- · How do AI technologies and algorithmic decision-making tools affect the way people experience innovation?
- · How have online technologies changed how people learn new skills needed for innovation?
- · What other research domains, outside of CSCW, should we include in future research on collective innovation?

PANEL FORMAT

Panelists
We have invited CSCW researchers and industry leaders studying and building platforms to support collective innovation.

Panel Preparation
We will invite questions from the CSCW community through Twitter hashtag, #CSCW2019 and #CollectiveInnovation, two months prior to the conference to inform the direction of the panel and start an active discussion of the topic.

During the Panel
The moderator will first introduce the topic including a brief historical summary of the topic in CSCW and related domains. Next the moderator will introduce Sli.do, a question and answer platform used for events, as a way to support equitable participation in question asking throughout the panel. The moderator will then ask each panelist to provide a brief overview of their work and perspective as it relates to collective innovation research and practice. The moderator will then ask a set of prepared questions around each theme, followed by questions posed during the Twitter conversation. One student volunteers will collect and filter questions from the Sli.do platform to share with the moderator. The remaining time will be spent responding to these audience questions.

Additionally, a student volunteer will be capturing the dialogue and the other will be tweeting to the CSCW community and beyond using hashtag #CSCW2019 and #CollectiveInnovation.

After the panel
We will synthesize the notes taken during the panel and submit a workshop proposal to CSCW 2020 to develop a research agenda for the future of Collective Innovation.

MODERATOR AND PANELISTS

Elizabeth M Gerber
Elizabeth is the Charles Deering McCormick Professor of Teaching Excellence and Associate Professor of Design at Northwestern University where she directs the Design Research Cluster and serves as core faculty for the Technology and Social Behavior Program. Elizabeth's research looks at how technology is designed to support collaboration across informal and formal organizational structures, including crowdsourcing and crowdfunding platforms. Elizabeth founded and serves as the faculty director of Design for America, a distributed network of innovation teams and the recipient of the Smithsonian Cooper Hewitt Design Institutional Excellence Award in 2018.

Position statement: As innovation activity moves outside of traditional R&D departments, the relationship between the individual and their network becomes increasingly important and complex. Individuals need new skills and resources to leverage their networks. We must build socio-technical systems to support skill development and resource exchange between individuals who have diverse skill sets and overall needs.

Jeffrey Nickerson
Jeffrey is Professor and Associate Dean of Research in the School of Business at Stevens. His research focuses on collective design: the ways crowds and communities produce and share knowledge. He has studied remixing in the 3D printing community Thingiverse, as well as coordination in Wikipedia. He is a co-PI on an NSF-funded project to build a Research Collaboration Network, bringing together scholars and practitioners to study the effects of artificial intelligence on the design of future work.

Position Statement: Human work changes when autonomous tools and other manifestations of artificial intelligence become ready-at-hand. For example, in several work situations we are studying, the workers with access to autonomous tools move to a meta level, exploring parameter spaces of the tool rather than doing the work that directly creates designs or other knowledge artifacts. This is happening in many different fields: chip design, game design, statistics, and, eventually, most forms of knowledge work. Understanding the nature of these changes are important for understanding the design of future work. In addition, these changes may affect the nature of designs and knowledge we produce, because the algorithms work.

Mira Dontcheva
Mira is a principal scientist and research manager at Adobe leading research in Human Computer Interaction (HCI). Her research focuses on building new tools that make creative tasks easier, more fun, and more accessible to a wider audience. She is passionate about multimodal interaction and experiences at the intersection of the physical and digital world.

Position statement: Online creative communities offer an opportunity for creating, sharing, and learning with others. The democratization of video streaming has brought live video access to these communities. Now more than ever it is possible to look over the shoulders of experts as they create their next masterpiece. These trends change the way people learn skills and connect with others as they grow their careers and become experts themselves.

Laura Dabbish
Laura Dabbish is a social technologist and design researcher. She directs the Connected Experience Lab in the Human-Computer Interaction Institute at Carnegie Mellon University, and has a joint appointment in the H. John Heinz III College of Public Policy, Information Systems, and Management. Her research connects social and organizational psychology with technology and design.

Position statement: Diversity of teams and organizations increases innovation and productivity. At the same time representation of women and minorities in many collective innovation environments is disappointingly low. Collective innovation settings are gateways to professional opportunities and may represent the future of work. As researchers and designers, we must consider how to foster equitable participation in and benefit from collective innovation environments.

Charlie Hill
Charlie Hill is a software product designer at IBM leading work on the design of IBM's hybrid multi cloud platform. In 2012, he co-founded IBM Design with the mission to build a sustainable culture of design and design thinking at IBM. Previously he led the design of a series of innovative web-based collaboration and enterprise social networking software products, and before joining IBM worked as a designer in research settings in the Human Interface Group at Apple and at the Royal College of Art, London.

Position Statement: As risk-averse (and highly regulated) industries such as finance, healthcare, and government seek to take advantage of open software innovation processes, better platforms are needed to support these partnerships by meeting stringent requirements for trustworthiness and serviceability over extended solution lifecycles. We therefore need to design platforms that not only connect providers to consumers with the right incentives to create locally thriving networks, but also respond to all stakeholders in the eventual outcome.

CONCLUSION
To effectively develop platforms that support broad participation in collective innovation, we must discuss the opportunities and limitations of technology. We must set a research agenda for the future of collective innovation to create the equitable, inclusive, and collaborative future in which we want to live.

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