TINKER, TAILOR, SOLDIER, SPY: PRIVATE-COLLECTIVE INNOVATION IN OPEN HARDWARE ENTREPRENEURSHIP (INTERACTIVE PAPER)

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TINKER, TAILOR, SOLDIER, SPY: PRIVATE-COLLECTIVE INNOVATION IN OPEN HARDWARE ENTREPRENEURSHIP

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Principal Topic

Despite the depiction of the private-collective innovation model as combining the best-of-both-worlds (von Hippel and von Krogh 2003), the act of freely revealing intellectual property as a public good is seldom sufficient to sustain continuous contribution. This paper aims to reconceptualize private-collective innovation as the creation and replenishment of common-pool resources, which are subject to the subtractability of resources, and that can lead to problems in collective action. This paper puts private-collective innovation in the context of open hardware entrepreneurship to explore the cyclical relationship between subtraction and contribution among different actors in an online design community. By doing so, we explore the dynamic interplay between private and public interests, specifically the significance of entrepreneurship in open hardware business models of the maker movement and the 3D printing industry.

Method

We studied design contributions and portfolios of 3748 designers on an online platform for open design called Thingiverse (http://www.thingiverse.com/). Thingiverse is used by the online 3D printing communities as a place where designer-innovators can share designs and create derivatives. It has the facilities to archive and also to document design activity in such a way that users can trace back by following acknowledgement of prior design/artifact and understand the social history of a particular collection of design.

Results and Implications

I identify three different innovation trajectories. When designers intertwine private and public resources through the interdependent tinkering of 3D design artifacts and printing firmware, a trajectory with the highest level of collective contribution results. This trajectory significantly outperforms the other two trajectories comprising a purely independent or purely dependent private use of public resources. Four variant types of designer innovators within a coreperiphery structure characterize these trajectories. They are hobbyists, superstars, and entrepreneurs. To increase novelty, platform leaders use contest and competition to selectively incentivize design contributions, and also through granting nominal status to users as superstars. The ways each type of designer innovator uses and combines private and public resources are unique. Hobbyists and superstars contribute to the creation of public resources. Hobbyists contribute mostly to the core aspects of 3D printing through pushing the limits of procedural design and printing firmware. Yet superstars through tinkering the peripherals of printing firmware engage in making and fabricating physical objects. Entrepreneurs seek to reuse and mashup existing design resources, and mostly make finished objects available for sales.

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