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Social Product Development: The Democratization of Design, Manufacture and Innovation

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Abstract

With increasing globalization and 21st century trends such as the personalization and commoditization of technology, product design has become a level playing field for both engineering professionals and members of the maker's communities. Terms associated with this shift in the industry include crowdsourcing, cloud-based design and manufacture, mass collaboration and Open Innovation. While academics have considered the impact of these phenomena individually, there has yet to be a discussion on how these terms work together to influence the process of product development. This paper serves as an introduction to a new area of research that treats these terms as tenants of a multi-faceted term labelled Social Product Development. By considering the relationships and impacts of these modern phenomena as a group for the first time, progress can be made in evolving traditional product development frameworks to take advantage of the tools the 21st century has to offer. In this paper, the authors present an overview of the tenants of Social Product Development and discuss what they actually mean in the context of 21st century product development. Future work is then discussed which considers how an SPD framework could be formed.

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1. Introduction

Social Product Development (SPD) is a term that represents a new approach to engineering and design processes. It encompasses several exciting phenomena such as crowdsourcing, open innovation and mass collaboration [3] but is a relatively undeveloped and unexplored term within both academia and the context of technology transfer to industry. This paper aims to serve as an introduction to Social Product Development by first describing Social Product Development in the context of the post Globalization 3.0 era towards the 4th Industrial Revolution, which is often hailed to be the future of Design and Manufacturing [2]. The core concepts that surround Social Product Development and their place in this industrial change are illustrated in Figure 1. The tenants are placed chronologically, according to when the term and concept was first introduced.

Figure 1 provides an overarching view of the key tenants of Social Product Development but what encourages a true understanding of this concept is recognizing the cultural, technological and societal changes that “link the chain”. In other words, this paper will not only explore these concepts but also the interfaces between them. Furthermore, the exploration of each concept will be accompanied by modern examples; concreting the understanding of these ideas in the context of the 21st century.

After a detailed description of SPD and its context, the focus of this paper will shift to the future of SPD. This paper aims to initiate a discussion on how Social Product Development can complement traditional design methods and move from a set of ideas to a standard approach in mainstream product development and production engineering.

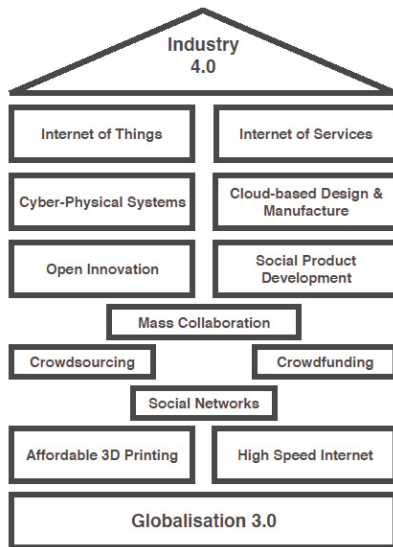


Fig. 1. The Tenants of Social Product Development in the context of the post Globalization 3.0 era (Original artwork)

2. Defining Social Product Development

Social Product Development is an overarching term for a group of technologies and approaches [3] referred to in this paper as the tenants of SPD. While its tenants are important to the concept, they individually represent types and aspects of SPD as opposed to completely defining it [18].

Abhari, Davidson and Xiao in “Measuring the Perceived Functional Affordances of Collaborative Innovation Networks in Social Product Development” [1] refer to Social Product Development in the following statement:

“The social product development model extends open innovation beyond customer-involvement models to socially-engaged individual actors fully involved in ideation and development of new products” [1]

Social Product Development is suggested here to be an extension of open innovation and this extension refers specifically to the types of participants in co-innovation. While Abhari et al. [1] do not aim to explore the definition alone, it again suggests that Social Product Development is perhaps not recognized as an individual concept, but as a group of methodologies.

In “The Rise of Social Product Development”, Bertoni et al. [3] define SPD based on the problems it seeks to solve. Several transitions in the engineering industry are described, such as the increasing geographical dislocation of design teams, and SPD is highlighted as a means to adapt to these new ways of working. As with several other investigations of this topic, however, a definition is hinted at but not explicitly stated.

This paper aims to describe Social Product Development by considering each of these tenants and how they contribute to this multi-faceted concept. Social Product Development has been defined in this case, to represent the multi-faceted nature

of the term, as “the use of social computing technologies, tools, media, influencing the product lifecycle at any stage through the use of a defined and qualified crowd” [3].

3. Globalization 3.0

Globalization 3.0 is the “globalization of the individual” [21]. While previous iterations of Globalization have mainly represented a shift in the behavior of companies and organizations [23], Globalization 3.0 represents changes in industry that have empowered the individual. As Peterson and Schaefer [16] describe, Globalization 3.0 is a product of several “flatteners” including the birth of Netscape, the first internet browser, and a trigger in over investment in fiber optic networks [16]. Other “flatteners” included the availability of open source software such as Linux, the introduction of offshoring and finally, Wireless Access and VoIP, described as the “steroids” of Globalization 3.0 [16]. The word “flatteners” itself describes the ultimate outcome of Globalization 3.0. It is a movement that has brought down towering tenants of the global supply chain such as mass manufacture, and made them accessible to the masses.

The “flattening” effect of Globalization 3.0 created an environment that encouraged the growth and expansion of Social Product Development. Traditional methodologies such as the systematic Pahl & Beitz design approach [15] support the work of a design team that works in the same vicinity, with the same members, for the duration of the project. The progress of Globalization 3.0 means that these constants are no longer enforced. For example, offshoring is one aspect of Globalization 3.0 that has caused a geographical dislocation of the product supply chain. A design team must be expected to engage with manufacturers throughout the design process which leads to, as Bertoni et al. [3] call “the virtualization of design decisions”. Traditional design processes are not optimized for global teams, hence the need for Social Product Development has arisen.

Both Globalization 3.0 and Industry 4.0 represent many shifts and changes, while other aspects of Figure 1 are more specific. The link between these concepts and SPD will therefore be described in the following sections in more detail.

4. High Speed Internet and Affordable 3D Printing

High-speed internet and affordable 3D printing are represented in Figure 1 as separate tenants in the transition from Globalization 3.0 to Industry 4.0. However, while other aspects of Figure 1 have emerged as a result of the transition, the introduction of high-speed internet and affordable 3D printing has accelerated this transition.

High-speed internet, as mentioned in the Globalization 3.0 section, was a consequence of over-investment in fibre optic networks [23]. By making it easier and quicker to connect to the internet, the size of the world was essentially shrunk. All of the terms mentioned in this paper rely on a core element; communication, and high-speed internet is the main enabler of 21st century communication. A specific example of a popular 21st century communication platform is Skype. Founded in 2003, Skype was the first mainstream example of video calling for the masses. In “The Rise of Social Product Development”

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