Exploration of Knowledge Creation Processes and Work Environments in the
Wearable Technology Industry

Deepika Raj and Jung Ha-Brookshire, University of Missouri, USA

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In a recent technology forecast made by IDtechEX, it was estimated that the wearable
technology market would grow from over $14 billion U.S. dollars in 2014 to over $70 billion in
2024 (Harrop, Das, & Chansin, 2014). However, this number can increase three times if there is
an increased collaboration between the fashion and technology industries (Fashion Focus, 2014).
Wearable technology (WT) emerged to meet the demands of people who want access to
information when they are not in a fixed place but on the move. WT can be successful with the
convergence of fashion and technology to ensure functionality and esthetics simultaneously
(Gepperth, 2012). For example, Fitbit®, an activity tracking device, offers fitness tracking while
maintaining a good design that fits the curve of the body. It has been successful due to
collaborations between product designers, engineers, and health professionals.

There is no clear definition of WT in the literature. WT is often replaced by terms such as
wearable computers, smart clothing, gadgets, wearables, and so on. According to Merriam-
Webster Dictionary (1993), 'wearable' refers to anything that is capable of being worn, and one
of the definitions of 'technology' refers to a piece of equipment or machine. Therefore, one may
say WT is a mechanical and technological device that can be worn by humans. However, we
know little about what WT means to those who are engaged in WT development and how critical
collaborations take place in the fast-changing WT industry. Consequently, the objectives of this
research were to explore: (a) the definition of WT and (b) knowledge creation processes and
work environments described by WT professionals. We used organizational knowledge creation
(OKC) theory as a theoretical framework throughout this study, as it explains how new
knowledge is created and converted from tacit to explicit, or vice versa, through effective
collaborations among team members, often occurring via socialization, internalization,
combination, and externalization process within a firm (Nonaka, 1994).

To achieve these objectives, a qualitative interview method was used in spring 2015. Upon
research approval from the Institutional Review Board, ten professionals in diverse roles in the
United States, ranging from CEO to designers in WT firms, participated in this research. The
participants' WT firms are engaged in apparel design, computer science, fiber science, electrical
engineering, mechanical engineering, and biotechnology. Three were male, and the rest were
female. Interviews were conducted until theme saturation was achieved. Two interviews were
conducted face-to-face, five were through Skype, and three were over the phone. Each interview
took 30 minutes and was audio recorded. The data were then transcribed and analyzed to gain
major repetitive themes.

The study results showed that participants defined WT not only as something to be worn and have technical functions, but also as something that "makes you do more with less" [CEO of motion sensor company], "gives you some kind of super power" [a product development engineer at an electronic and sensor manufacturing company], and "has some purposes and solves a problem" [a senior designer of a WT company]. In terms of how to create new knowledge, participants expressed that they are: (a) "using lots of experimentations and trial and error methods" [a product engineer], (b) "learning from each other and bouncing ideas off each other's head" [a product designer], and "researching by themselves and even taking online courses" [a product designer] because of the lack of on-the-job training. In terms of work environments of WT firms, participants expressed that (a) an "informal atmosphere" [a product designer] that gives more freedom in performing their task was important and (b) the risk-taking environment in which they could "constantly learn and have small deliberate failures" [CEO of a motion sensor company]. On the other hand, the very nature of diverse teams makes it difficult to have everyone on the same page. Therefore, "keeping everybody in the loop is the key and sometimes it is not done properly, due to many team members traveling and reaching out for another job" [a material specialist].

In the new era of advance technology, new businesses will give more importance to the level of application of new knowledge and innovation in the work environment (Yang, 2007). The results of this research suggest that WT means more than simply wearable garments. It solves problems and gives super power to the users. Innovation in WT firms is only happening by empowering the work force and giving them a productive atmosphere to foster creativity and collaborations. The challenges of keeping new knowledge within a WT firm are also described. The findings help WT managers and leaders understand the types of work environments that promote or hinder innovation. Further research is recommended to explore their motivation and attitude for knowledge creation and innovation in the WT industry.

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