

How digital/physical toolkits integrated in consumer products empower users to self-design their uses: A theoretical framework for use generation

Morgane Benade, RWTH Aachen

&

Juliette Brun, Mines ParisTech

&

Ingi Brown, Agendize

&

Pascal Le Masson, Mines ParisTech

&

Benoît Weil, Mines ParisTech

&

Frank Piller, RWTH Aachen

Today users not only want to access a wider choice of products, they also want to purchase products that correspond exactly to their needs. To address this challenge, firms develop toolkits that support users to design accurately a product responding to their needs or preferences prior to purchase (Franke and von Hippel, 2003)

Making use of the latest applications of information and communication technology in consumer products, certain firms have attempted today to develop novel approaches to better satisfy their users by means of digital/physical toolkits (e.g., Gross and Antons, 2009; Piller et al., 2010). These are set of coordinated design tools consisting of electronic components embedded in ordinary products i.e. sneakers or cars which make them smarter and more adaptable (Rijsdijk, 2006). However, the initial idea of the toolkit remains. They are here to empower users to self-design their uses (Von Hippel and Katz, 2002). Eventually, the only hurdle with these digital/physical toolkits is that, as they are parts of purchased products, they have to fully satisfy users and subsequently have to promote their abilities to design. However, to support users with variable expertise levels to become designers in terms of uses is a subtle task. Whereas most of these toolkits present in the market place are equipped with a rather small and simple solution space i.e. ADIDAS One which makes it easy to use for the users, some others on the contrary operate on the basis of a rather large and complex solution space like the Apache software. The latest toolkits are proved to be mainly used by experts with high incentives (Franke and von Hippel, 2003). Consequently, it seems to be that designing with digital/physical toolkits could be more or less challenging for users with variable skills levels. In this matter, literature has mainly focused on valuing the importance of a user community in order to increase the expertise of the users on how to employ toolkits like the Apache Software to their benefits (e.g., Lakhani and von Hippel, 2003). We proposed in this paper to extend this to a different level by examining the mechanisms of design activities carried out by products with digital/physical toolkits. We especially wondered if all toolkits support users in designing a use in the same way and what are the natures of the design tasks assigned to users. In order to understand thoroughly these mechanisms, we exploited the contemporary design theories like the C-K design theory (e.g., Hatchuel and Weil, 2009) and developed accordingly a theoretical framework for use generation. We applied this framework on two types of products with

digital/physical toolkits. The first one was the ADIDAS one running shoe which is equipped with a very small and simple toolkit and the second the EMOTIO software composed of a rather large and complex solution space. By analysing these toolkits, we identified characteristics and mechanisms proper to them. With the EMOTIO software, the tool set is typified as being rather disjunctive. That is, it incites users to explore and generate projects of new uses but without offering simple solutions on how to apply these projects of uses on the objects. The users are then entirely delegated with the design task of developing and applying new projects of uses by their own. So, it requires a high design effort from the users. On the contrary, about the ADIDAS One, it appeared to be a rather conjunctive product. It means the product barely motivate users for the exploration of new uses but instead is here to intensively guide users in its uses. Users are then here confined at understanding in details the instructions manuals in order to design uses offered by the sneakers. Overall, these results enabled us to extract knowledge on how a toolkit should be designed in order to generate uses exploration so as guide these explorations in order to create new uses for all kinds of users. With these results, we could discern then that a digital/physical toolkit must be rather disjunctive with conjunctive aspects in order to empower user to explore and self-design uses. Accordingly, we proposed managerial implications that may enable this. Among many, we relied on recent studies on the fixation effect (e.g., Agogu e et al., 2013) and subsequently suggest that firms may offer with the toolkit some examples of applications of innovative uses with digital/physical design toolset. We believe this should most probably enhance the expertise of the users and subsequently their abilities to generate uses.