

The prototype used in the implementation of the “Need-Solution Pairs”

- The prototype use of single-user and multi-user to relate “Need-Solution Pairs”

Akimitsu Hirota, Kindai University (Osaka Japan)

1. Abstract

This study is to examine the mechanism of pair joining process in Need-Solution Pairs. Need-Solution Pairs is a framework of a dynamic viewpoint that needs and solution are simultaneously created while mutually exploring. The feature of this research is to grasp the mechanism of Need-Solution Pairs from two viewpoints. First, pay attention to the role of the prototype. Second, pay attention to the effect of using the same prototype by multiple users. These investigations were conducted for the product development process of a car pedal called “Naruse pedal”. “Naruse pedal” is a pedal in which the accelerator and the brake are integrated. Therefore it is called "one pedal". There are few reports of user innovation cases of automobile products belonging to scrape type (Clark and Fujimoto 1991). In this research, we consider the promotion of Need-Solution Pairs by prototype based on the survey of “Naruse pedal” development process.

2. Background and motivation

This study is to examine the mechanism of Pairing process in Need-Solution Pairs (Von Hippel and Von Krogh 2016). Need-Solution Pairs is a framework of a dynamic viewpoint that needs and solution are simultaneously created while mutually exploring. The feature of this research is to grasp the mechanism of Need-Solution Pairs from two viewpoints. First, pay attention to the role of the prototype. Second, pay attention to the effect of multiple users using the same prototype. These investigations were conducted for the product development process of a car pedal called “Naruse pedal”. "Narcepedar" is a pedal in which the accelerator and the brake are integrated. Therefore it is called "one pedal".

Literature and research question

3. “Need-Solution Pairs”

Von Hippel and Von Krogh (2016) point out that innovation may combine needs and solutions before defining the problem. According to Von Hippel and Von Krogh (2016), needs and solutions each have a region indicated by a two-dimensional (XY axis) plane in which needs and solution information called "landscape" is distributed. Furthermore, those regions have a height indicated by the Z axis. The height of the solution is indicated as the necessary cost by the benefit of being satisfied by the satisfaction. Problem solving is realized by pairing specific points in the two landscapes.

In the model of Von Hippel and Von Krogh (2016) , combinations thereof depending on the state of the needs and landscape of the time the Need-Solution Pairs is (needs distribution areas of information) and the solution landscape (distribution area of the solutions information) It can be thought of as a model to be determined.

In the model of Von Hippel and Von Krogh (2016), we pointed out the existence of problem solving in a state where the problem definition was ambiguous and showed the structure for mutual coupling using the concept of landscape. It does not mention about dynamism (dynamic viewpoint) in joining.

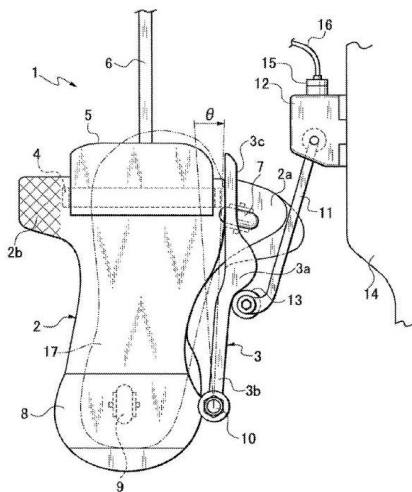
4. “Naruse pedal”

“Naruse pedal” is a user innovation developed by Mr. Masuyuki Naruse. Mr. Naruse is the president of a company developing industrial machinery such as the fishery industry. Mr. Naruse mistook the brake pedal and the accelerator pedal on a private car about 30 years ago. It was an experience I felt the danger of life though it did not become an accident. However, he himself did not intend to make a mistake. This experience is the motivation for “Naruse pedal” development.

Mr. Naruse has experience in the development and production of industrial machinery. Therefore, it possesses the technical skill of mechanical products (Ogawa 2000).

Remove the accelerator pedal and brake pedal attached to a commercially available car. While driving, drive with the right foot on the brake pedal. Therefore, even if you stepped on your right foot unintentionally, the car brakes. Do not accelerate against the intention of the driver.

Fig. 1 “Naruse pedal”



Source: United States Patent Application Publication US 2011/0107870 A1,,Naruse Equipment Co.Ltd,

The current of “Naruse pedal” is the third generation. The chance of this “Naruse pedal” being born was a remark (information) at the time of use by an automobile manufacturer's engineer. Engineers of car manufacturers have development experience. And I have a

different solution landscape than Mr. Naruse. We combined the needs arising from the "using" behaviour by such users with a solution landscape consisting of their own knowledge and experience.

5. Conclusion

- ①The use of the same prototype by different users may accelerate the implementation of Need-Solution Pairs. This is a new role of prototype in innovation.
- ②This may lead to a comparison of user innovation characteristics between single users and multiple users.
- ③The quality of different users is a problem in realizing Need-Solution Pairs. That clue is the solution landscape. A combination of users of different solutions and landscapes is required. This is related to the discussion of the user community (Von Hippel 2005). The combination of users based on the similarities and heterogeneities of solutions landscapes according to individual product areas may lead to quality and promotion of innovation.

On the other hand, there is also a problem. It is a matter of the prototype level and the timing of multiuser use. In other words, it is a question of to what extent the prototype level should be performed by a single user, and at which stage the use by the multiuser should be considered.

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