

# BMW i - User Integration in the development of the BMW i3

## 1. The Company

BMW is a multinational company headquartered in Munich. It is one of the most successful manufacturers of cars and motorcycles worldwide and among the largest industrial companies in Germany.

## 2. Sustainability Innovation

BMW i3 is the name of the group's first mass-produced electric vehicle and the first series car under the sub-brand BMW i. BMW i3 also became known as the megacity vehicle, since it is tailored to the use in urban traffic areas. The vehicle is powered by a lithium-ion battery, which gives the car a range of 130 to 160 kilometers under everyday driving conditions. The focus on sustainability is not restricted to the operation of the vehicle itself but widened over the overall value chain. Over its entire life cycle, the BMW i displays significantly less global warming potential than other highly efficient combustion motorcars in the same segment. Besides the electric operation, lightweight construction material (carbon-fiber-reinforced plastic), highly energy-efficient manufacturing processes and recycling of materials play a large role in improving the environmental footprint.



The BMW i3 is offered in conjunction with a comprehensive 360° ELECTRIC service package that includes for instance the installation of charging stations at home. Since an electric car can only reach its full potential when it runs on electricity from renewable energies, BMW offers customers as part of 360° ELECTRIC portfolio the possibility to purchase a suitable green electricity package for charging their electric vehicles at customer homes.

According to company information, the global warming potential of BMW i3 is at least a third lower than the one of a conventional highly efficient combustion-engine vehicle in the same segment, if the BMW i3 is run on the European Electricity Mix (EU-25). This potential can even be reduced by half when run on electricity produced from renewable sources only (BMW Sustainable Value Report 2013). The independent technical agency TÜV Süd has certified the Life Cycle Assessment of BMW i3 against ISO14040/14044. The inspectors looked at the entire life cycle from extraction of raw materials and manufacture, through usage to recycling, in order to take account of all environmental aspects (BMW Sustainable Value Report 2013).

The innovative aspects of the product with regard to sustainability can be summarized as follows:

- Significant reduction of the global warming potential over the product life cycle
- 80% of the aluminum used is either recycled or produced with renewable energy
- 25% of the weight of thermoplastics used is replaced by recycled or renewable raw materials
- 50% CO<sub>2</sub>e emissions in BMW i CFRP production compared to conventional CFRP production
- New environmental standards in production of BMW i models in Leipzig: use of 50% less energy and 70% less water; use of 100% renewable energy

### **3. Engagement of End Users and Other Stakeholders**

The development of the BMW i3 shows a high degree of end-user and stakeholder involvement throughout different phases of the innovation process:

#### ***Ethnographic study:***

The exploratory research phase dealt with mobility questions and customers' future needs. The core team of project i travelled to twenty mega-cities all over the world, in order to meet mobility experts as well as people who indicated that they had a sustainable lifestyle. The overall aim was to get information on current mobility needs of the urban population and their expectations for the future

#### ***Co-Creation Lab:***

In 2010, BMW run an online idea contest called "Tomorrow's Urban Mobility Services". The contest took part in the framework of the BMW Co-creation lab and had the overall aim to capture the ideas and topics that were considered relevant and discussed outside of the company. BMW wanted to find out, whether there were new ideas out there, and in which directions the people outside the BMW network think. Between March 3 and April 14, 2010, individuals could share and discuss their ideas on a special website. The contest focused on different categories including the infrastructure for electric cars, parking spaces in urban areas, and the linkage of different mobility concepts.

#### ***Field trials:***

Project i initiated large-scale field studies with conversion electric vehicles, in order to perform in-depth customer analysis regarding the usage of electric vehicles. The aim of the field trials was to explore customers' needs and expectations towards electric vehicles. The trials were conducted in several countries and addressed questions on the everyday usage patterns, expectations, reactions to special and typical electric vehicle characteristics and additional aspects like the perception of the importance of ecological added value of driving an electric vehicle. Field trials included travel and charging diaries, face-to-face interviews, focus group discussions and online questionnaires.

#### ***Stakeholder collaboration inside-and-out:***

When outlining the role of third party actors, one has to differentiate between the two major user integration projects, namely the Co-Creation Lab and the field studies:

- **Co-Creation Lab by HYVE:**

BMW cooperated with the open innovation agency Hyve. The main reason for the cooperation was the expertise and technical know-how of Hyve. The agency was responsible for the technical set-up and maintenance of the Co-Creation Lab as well as the facilitation of activity on the Co-Creation Lab in the role of a community manager. The latter included, for instance, the interaction with users, asking for comments, answering questions and a first review of ideas.

- **Field studies:**

The field trials were accompanied by university partners, who facilitated data gathering and analysis. University partners showed a high level of knowledge in behavioral and psychological science as well as human-machine-interface.

Partners from the energy and infrastructure sector also held a key role in the smooth implementation of the field trials. Their tasks included, for instance, the set-up and installation of charging facilities and the determination of impact on electricity network.

#### **4. User-Centered Development of Business Models in Electric Mobility**

The case study shows that the development of new green products and services in the context of electric mobility benefited from extensive user and stakeholder involvement throughout all stages of the innovation process. In the early stages of the innovation process, company representatives collaborated with users, in order to explore future mobility needs, validate internal ideas about EV solutions and get to know new ideas for product-related services. During the latter stages, user collaboration mainly served the refinement of the mobility solution under development. BMW wanted to understand customer needs, fears and expectations, in order to assure that the final mobility solution fits customer needs and wants, thereby increasing the chances of market success. This extensive user involvement in highly technological industries can be attributed to the fact that BMW developed a comprehensive electric mobility solution with characteristics of product-service systems.

At the same time, the user-centric development approach allowed BMW to gain distance from traditional more incremental innovations and overcome risk aversion towards very novel innovations that can also be identified as business model innovations. Constant user involvement seemed to be a form of risk management by minimizing the chances of market failure.

Moreover, the study identified several factors that have facilitated the user-centric development process. A key finding is the set-up of a rather independently acting innovation team with a strong cross-functional character, which is backed by top management and has access to sufficient funding. There are indications that this innovation team represents a new form of innovation advocates that share similarities with traditional R&D teams and intrapreneurs at the same time.

From a managerial point of view, this study provides some important insights. First and foremost, it illustrates that users are a valuable sources of innovation throughout the overall innovation process of green products and services. BMW's perception of the innovative potential of users had changed when engaging with users. The work therefore can serve to set an example and diffuse the learning process across the boundaries of the company.