With software updates, Tesla upends product life cycle in the car industry

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Traditionally, cars are sold as finished and complete products, with a price premium attached to the specification and quality of design and craftsmanship. The buyers do not expect new cars to improve or change once they are rolled out of the dealer's premises. Only occasional maintenance services, software updates or repairs are carried out to keep cars functional. To stay competitive, car makers design and introduce new models to market every four to seven years. The models are refreshed with minor functional and cosmetic changes around halfway through a model's life cycle.

This traditional model is challenged by the Californian car company Tesla. Similarly to your smartphone, Tesla releases frequent software updates to improve and change functionality of the cars they have designed and manufactured, thereby modifying cars continuously even if they are already sold and in use. To examine Tesla's digital innovation practices, the authors looked into how and how often Tesla updated their best-selling Model S and outlined potential implications of continuous development to product and marketing strategies.

The frequency and characteristics of change

Data was gathered from various online sources and covers the period from 22 June 2012 to 26 February 2016 (1344 days). During this period, Tesla made five major software releases, which were complemented with 23 minor and 89 maintenance ones, totalling 117 releases. The distribution of the total number of releases (117) across the period (1344 days) shows that the Model S cars received new updates every 11.5 days on average.

After establishing the frequency of updates, we examined the changes in features and functionalities and classified them into seven categories. The categories are listed below with representative examples:

- Information management (maps, navigation, communication, calendars),

- Entertainment (radio, music player, Spotify streaming),
- User interface design (changes in look and feel),
- Energy and performance (battery and motor management, mileage, acceleration),
- Ancillaries (behaviour of windscreen wipers, door handles and locks),
- Connectivity (Wi-Fi and 3G improvements), and
- Self-steering (cruise control, automatic lane keeping, self-parking).

In addition, the following qualitative aspects captured out attention. While updates generally aimed at improving and enhancing functionality, bugs were also introduced. Also, some typical computer problems were reported, such as flashing screens, the need for rebooting and occasional unexpected shutdowns. A few times functionality was changed or removed as a response to safety risks or regulatory intervention. For example, Tesla raised ride-height (ground clearance) when battery fires were under investigation in 2013 and when Hong Kong's Transport Department told Tesla to temporarily disable the Autosteer and Auto Lane Change functionality. Also, as functionalities can be changed and activated by updating software, Tesla is able to sell additional features throughout a car's lifetime.

Implications for product and marketing practices

The results above show that a product, which is traditionally seen as a finished and complete, can become open-ended and be continuously in the making if a company decides to make use of the modifiable character of digitally controlled components and functionality. This brings upon novel avenues and challenges for innovation and product management practices.

To begin, companies would have a larger spectrum of choice in their product and marketing decisions. To lower the upfront costs of product design, a company could decide to enter the market with a product that is good enough to get traction and subsequently improve and maintain it until the end of the product's lifecycle. Also, marketing messages could be tailored to emphasise the promise of continuous innovation and improvement instead of focusing on fine-tuned and complete products. This can give choices to consumers as well. They could choose to purchase a complete product that is fully known at the point of purchase, or, alternatively, to buy into a stream of updates, which not only enable new features and improve existing functionality but also request users to keep up and learn new features and settings.

While opening up the spectrum of choice, the idea of incompleteness and continuous improvement also blurs the boundaries of control between product owners and manufacturers. After the purchase, it has traditionally been a matter for the owner to decide how the product he or she owns is going to change. With the more iterative approach this aspect may no longer be valid. Since the manufacturer can alter a product, it also retains a significant portion of control over specifications and functionalities.

This might not be much of a problem as long the software updates are seen as improvements. However, occasionally, the verdict on whether a particular software update is considered as an improvement or not might be difficult to make. Also, if software release cycles are short, the question as to how much change and updating an average user is willing to accept should be raised. The constant change may place users in a continuous learning mode, which can affect the overall satisfaction with a product. What works for early adopters may not be suitable for a more conservative clientele.

While computers and smart phones have long benefitted from continuous development, this open-endedness and modifiability is currently making its way to a larger spectrum of products. In order to bring customer needs and organisational capabilities together, product and marketing managers and strategists should plan for the modifiability of a product throughout its life cycle by reflecting upon the hardware and software configurations, software development timelines and practices, cloud-based infrastructures that are required to support modifiability as well as

the legal and contractual arrangements. In the academic front, more research is needed to study the managerial and strategic implications brought upon by continuous product modification and the longevity and shift of control in customer relations.

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Notes:

- *This blog post is based on the authors' paper The Ambivalent Characteristics of Connected, Digitised Products: Case Tesla Model S.*
- *The post gives the views of its authors, not the position of LSE Business Review or the London School of Economics.*
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