

RESEARCH ON THE MODULARIZATION STRATEGY AS A KEY FACTOR FOR THE SUSTAINABILITY IN A GLOBAL COMPANY

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Abstract

The modularization strategy is widely spread in a variety of industries and might play an important role in the future. The increasing importance will therefore also have impact on the automotive industry (Wildemann, 2014b).

The reason for these processes is a conflict of objectives which is highly relevant for the automotive industry. Customer and market demands such as individualization stand up against standardization which companies are particularly aiming for (Wildemann, 2012, 2014a).

The objective of this paper is the identification of the modularization strategy as a relevant factor for the sustainable organization of global companies. In addition to a broad process of investigating literature, 50 interviews with managers and professional buyers of a global company are taken into consideration in order to ensure the sustainable relevance.

As a result, the positive influence of the modularization strategy on the sustainability of global companies will be evaluated. The authors therefore underline the statement of Horst Wildemann of 2014 regarding the advantages of the modularization strategy. Additionally the interviews underline that without the modularization strategy the handling of the complexity and volatility of current business processes appears to be impossible. The applied research consequently provides with additional input and results for business analysts.

Keywords: modularization, module, advantages and disadvantages of modularization, sustainability in companies

JEL Classification: M20, M21

Introduction

The strategy modularization is widely spread in a variety of branches and industries and might play an important role in the future. The increasing importance will therefore also have impact on the automotive industry (Wildemann, 2014b).

The reason for these processes is a conflict of objectives which is highly relevant for the automotive industry. Customer and market demands such as individualization stand up against standardization which companies are particularly aiming for (Wildemann, 2012, 2014a).

Individualization in this context is defined as the production of a vehicle, based on a variety of unique, individually manufactured components (Herlyn, 2012). In contrast, standardization is defined as the manufacturing of a vehicle with standardized components and modules (Herlyn, 2012, S. 208; F.A. Brockhaus, 2012; tqm.com, 2012).

Individualization should be pursued due to the fact that a variety of technical specifications of the manufacturer need to fit the demand of the market. For example the individual request of unique customers regarding the design and equipment of the vehicle plays a crucial role in this context (Baum and Hüttenrauch, 2008; Starr, 1965). These specific requests are given rise by the competition, the media and trends in social media. A survey which took place in 2014 indicates that 93% of the users actively participate in Facebook during their free time (Faktenkontor, 2014). Based on this assumption a future surge in the utilization of social media is expected which is underlined by a prediction of eMarketer (eMarketer, 2014). The survey indicates that the number of users of social media platforms will globally increase by 0.5 Billion during the next three years. Using social media platforms enables consumers, in addition to other media sources (Guinipero, et al, 2010), to acquire exclusive information on purchasing vehicles which meet their individual preferences. The trend therefore reflects the current and future increasing challenge for vehicle manufacturers (Baum and Hüttenrauch, 2008; Stang, Hesse und Warnecke, 2002). Besides, the increasing transparency and additional sources for customers, different markets represent different specifications and requirements. (Wildemann, 2014a; Starr, 1965). For example there is a specification regarding the reduction of CO₂ emission (European Parliament and Council, 2009; Hab and Wagner, 2012; Die Story im Ersten: Das Märchen von der Elektro-Mobilität, 2015; Deutsche Presse Agentur, 2015), certain regulations referring to the length and amplitude (§32 Abs.1 StVZO) or requirements regarding a scalable airbag systems and high-tech developments (Geissler, 2008).

In contrast to the individualization, standardization will enable economies of scale thus decreases the average costs per vehicle (Glück, 2011; Stang, Hesse and Warnecke, 2002; Starr, 1965). These developments will ensure companies a higher profit in the long-term. Additionally an increase in the return on sale (RoS), the ratio of profit and revenue (Döring and Wöhe, 2010), and the production output can be achieved. The reason is the increased time-efficiency which derives from the production with similar modules and components. Furthermore relationships might enable professional buyers to achieve lower prices by purchasing a larger quantity of products. These savings will lead to a decrease in the sales price for the end-consumer (Waltl and Wildemann, 2014). Moreover the utilization of common platforms ensures the availability of a variety of vehicles and the individual components which are required (Waltl and Wildemann, 2014). As a consequence companies are able to enlarge their customer base. Another aspect which should not be neglected is the positive impact on the brand image.

Therefore the conflict between individualization and standardization plays an important role in modern business. In line with the conflict a survey has been initiated over the course of five month.

1. Theoretical aspects

Definitions

A module describes a sub-system, whose functionalities are restricted by the manufacturing process. The objective of the system is, to be designed, certified and constructed individual from the overall system (Feldhusen and Gebhardt, 2008; Walzl and Wildemann, 2014).

Modularization is a method for structuring products based on defined aspects. Modularization ensures the independence of the individual elements by diminishing their interdependence and decreases the amount of interfaces (Koller, 1998; Göpfert, 2009; Canales Salacerry, 2006). The method can be compared to the construction of a Lego vehicle. The method indicates that the construction process requires a certain amount of components (Starr, 1965).

Therefore, the strategy is defined as the *Modularization strategy*.

Challenges, borders and potential of the Modularization strategy

Having defined modules, modularization and the modularization strategy, the challenges, borders and the potential of the modularization strategy can be evaluated. These are significantly complex and depend on a variety of factors (Wildemann, 2014b). In order to distinguish and evaluate the individual potentials and risks, a analysis will be described during the next paragraph, followed by the borders and challenges.

Comparing the individual advantages and disadvantages (Figure no. 1) consequently reveals that it is impossible to formulate general statements regarding the utility of the implementation of the modularization strategy in companies. Therefore, there is no definite cost/benefit ratio. Referring to Wildemann (2014) it can only be stated that strategic management is a key requirement for the success of modularization (Wildemann, 2014b).

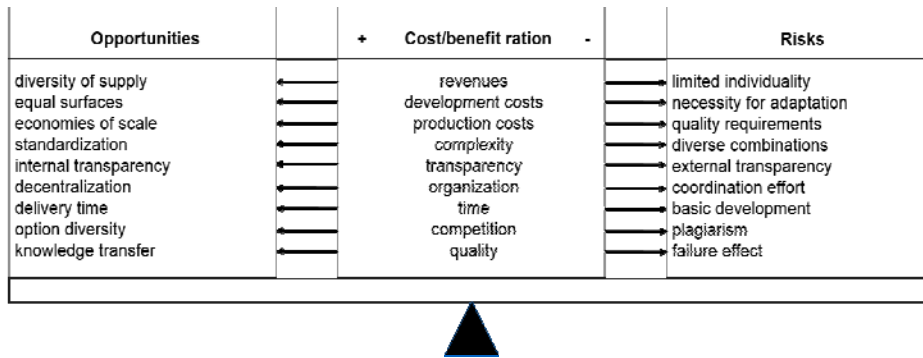


Figure no. 1: Risk/Opportunity analysis of the modularization strategy

Source: Wildemann, *Modularisierung in Organisation, Produkten, Produktion und Service*, 2014b, p.56

2. Methodology

Based on the statements of Wildemann (2014b) the utility of the modularization strategy will be evaluated. For this practical research 50 interviews have taken place. 25 of the participants have been experts on the field of the modularization strategy and 25 have been professional buyers in order to examine the importance and correlation between the

modularization strategy and sustainability. The interview includes 8 unique questions. The questions are aimed at general statements regarding the modularization strategy and concrete questions referring to the explicit advantages and disadvantages of the modularization strategy. (Table no. 1)

Over the course of the period of October 2016 to February 2017 the authors have examined a global company with multiple production facilities and subsidiaries. The activities of the company are aiming for profitable growth and a sustainable increase in value in order to ensure the long-term success. The customers, suppliers, and society recognize the company as a competent and reliable partner regarding the entire, common value chain.

Table no. 1: Questionnaire

Question	
1	How long are you working on the field of the modularization strategy?
2	How do you define the modularization strategy?
3	Which points of contact have you had with the modularization strategy?
4	How did the importance of the modularization strategy for companies during the last 5 years?
5	Which experiences have you had with the modularization strategy (positive/negative)
6	How success-promising would you rate the modularization strategy as a company strategy? (Characteristics: certainly not; probably not; maybe; probably yes; certainly yes)
7	Which positive aspects have you noted due to the implementation modularization strategy?
8	Which negative aspects have you noted due to the implementation modularization strategy?
9	How important would you rate the significance of the modularization strategy for the sustainability of the company? (Characteristics: unimportant; neutral; important)

3. Results

The interviews reveal that the interviewees are working on the field of the modularization strategy for 4.3 years on average. Additionally, it can be stated that the participants are familiar with the term modularization strategy. Therefore, no further detailed definitions from the authors were required during the course of the interview.

The research indicates that professional buyers have had experience with the modularization strategy regarding the individual purchase volume, while managers have mainly had contact with the strategy for the organization and coordination of appointments and appointment inputs such as the determination of module agreements in individual committees or the with contact persons. Moreover, the surveys provide further guidance referring to the development of the importance of the modularization strategy as 40 out of 50 participants have noted an increasing significance of the modularization strategy. (Figure no. 2)

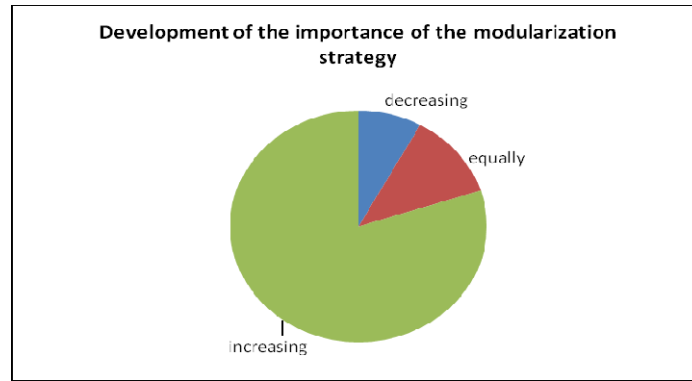


Figure no. 2: Development of the importance of the modularization strategy

Another clear result of the survey regarding the experiences and success-promising perspective of the modularization strategy as a company strategy is that 86% of the participants (43 out of 50) have had positive experience as well as they see a significantly successful perspective for the modularization strategy (4,26 out of 5 Pkt.).

The results of contrasting the positive and negative aspects of the modularization strategy can be summarized by the following main categories.

Negative: Organizational problems (coordination of appointments, Filling presentation slides, inter-divisional communication, stringent examination of the results - potential restrictions)

Positive: Cost savings/ economies of scale, variant reduction, weight reduction, construction time reduction, material savings, increased flexibility, storage savings (especially for spare parts), interdisciplinary collaboration, standardized surfaces, control of the complexity (detailed description in Figure no. 3)

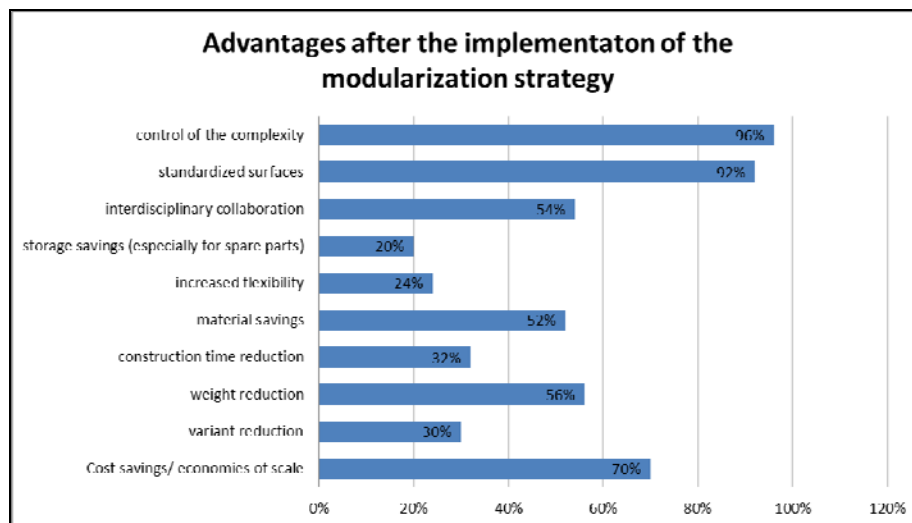


Figure no. 3: Advantages after the implementation of the modularization strategy

The last questions underline the sustainability of the companies who implement modularization. 41 out of 50 participants have stated that in this context modularization is (82%) important (4 unimportant und 5 neutral).

Conclusions

For manufacturing companies, the advantages of implementing the modularization strategy exceed the disadvantages. Based on the results of the interviews organizational issues appear to be significant disadvantages. Furthermore, the implementation of module-strategy-based processes has positive impact on the sustainability and strategic future orientation of the company. These results supplement and stand in line with the statement of Horst Wildemann of 2014.

This paper underlines and identifies the significance of the modularization strategy for the sustainable organization of global companies and therefore supports future research on the field of sustainable company strategies.

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