



<http://www.diva-portal.org>

This is the published version of a paper presented at *20th Annual Conference of The Production and Operations Management Society (POMS), Orlando, Florida, USA, 1st-4th May, 2009.*

Citation for the original published paper:

Danilovic, M., Winroth, M. (2009)

Rethinking the platform approach in automotive industry.

In: Mark D. Hanna (ed.), *POM 2009: 20th Annual Conference of the Production and Operations Management Society : Programs and proceedings, May 1-4, Orlando, Florida, U.S.A.* (pp. 1-17).

Orlando, FL: Production and Operations Management Society

N.B. When citing this work, cite the original published paper.

Permanent link to this version:

<http://urn.kb.se/resolve?urn=urn:nbn:se:hh:diva-22113>

011-0502

Rethinking the platform approach in automotive industry

Track title: Product Innovation and Technology Management

Danilovic Mike ⁽¹⁾, Winroth Mats ⁽²⁾

(1) Jönköping International Business School, Jönköping University, P.O. Box 1026,
SE-551 11 Jönköping, Sweden, Phone: +46 36 10 18 30, Fax: +46 36 16 10 69, E-
mail: mike.danilovic@jibs.hj.se

(2) Chalmers University of Technology, SE-412 96 Göteborg, Sweden, Phone: +46
31 772 12 17, Fax: +46 31 772 11 94, E-mail: mats.winroth@chalmers.se

POMS 20th Annual Conference

Orlando, Florida, U.S.A.

May 1 to May 4, 2009

Rethinking the platform approach in automotive industry

Track title: Product Innovation and Technology Management

Danilovic Mike ⁽¹⁾, Winroth Mats ⁽²⁾

Abstract

In many industrial areas, such as in automotive industry, the development of joint technology platforms is seen as an enabler for improving efficiency, facilitating frequent and rapid new product and technology introductions, as well as transfer of production between units.

During the present financial recession especially in the automotive industry, it has become obvious that there might be extensive drawbacks from using integrated platforms for several brands if different companies within large industrial groups are extremely integrated in terms of organization, technology, and know-how. In integrated product structures, major product changes, however, become more difficult and more expensive to carry out. If companies have products based on very different technologies, integration

is also not easily achieved and it may be almost impossible to merge several brands into one group and one platform.

In this paper we identify implications of widely implemented integrated technology platform thinking in automotive industry.

- 1) Jönköping International Business School, Jönköping University, P.O. Box 1026, SE-551 11 Jönköping, Sweden, Phone: +46 36 10 18 30, Fax: +46 36 16 10 69, E-mail: mike.danilovic@jibs.hj.se
- 2) Chalmers University of Technology, SE-412 96 Göteborg, Sweden, Phone: +46 31 772 12 17, Fax: +46 31 772 11 94, E-mail: mats.winroth@chalmers.se

Keywords: Platform approach, integrated technology, integration, disintegration

1 Introduction

The automotive industry has for a number of years gradually developed their technology platform philosophy. The reasons have been many, but the strongest ones have been reduction of the lead-time to market of new models, development cost, and manufacturing cost. It has however shown that platform thinking reduces the flexibility when integrating acquiring other brands and integrating them into an existing platform. An example of this is the failure when trying to merge Volvo and Saab a number of years ago. Another problem is when a company wants to sell off one brand and disintegrate it from the common platform. This has been brought up-to-date now as General Motors wants to separate Saab Automobile from the group and make it into an independent company. This paper aims at highlighting the consequences, especially the constraints that are linked to a far-reaching platform-thinking thinking.

Today, automobile industry is working according to the so-called platform thinking. Car manufacturers use a common base where they build up the entire car. This common base is known as platform. The car manufacturers share it among different models in order to reach higher volumes and to achieve economies of scale. Several brands, owned by major car manufacturers, are built on common platforms thus enabling larger volumes.

Despite being used in several industries, according to Sundgren (1999) the use of product platforms has been highlighted in automotive-, consumer electronics-, and engineering industries. The challenge for those companies is to create the desired product variety economically. In the case of the automobile industry, the idea of the platform is the one represented in the figure 1.1 below, inspired from Danilovic and Börjesson (2001):

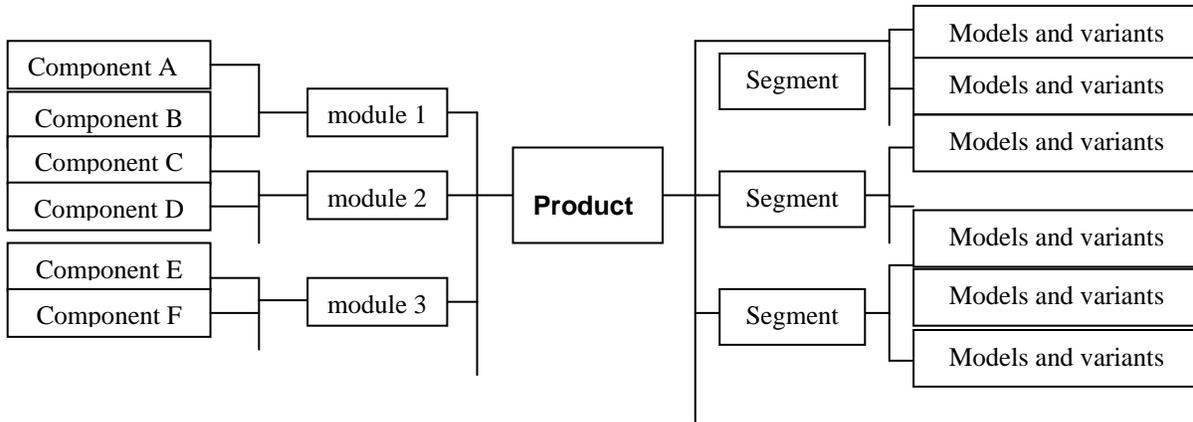


Figure 1.1. - Product platform

Source: inspired by Danilovic and Börjesson (2001)

However, platform thinking not only involves this sharing of platform but also an entire philosophy of proceeding, especially when it implies groups. The main idea of that thinking is to share. They share components, tools, processes, development, workers, strategy, etc.

According to McGrath (2000) a product platform is not a product, it is a collection of the common elements, especially the underlying defining technology, implemented across a range of products. In general, the platform is the lowest common denominator of relevant technology in a set of products or a product line. These common elements are not necessarily complete in the sense that they are something that could be sold to a customer. Therefore, the corollary with platforms is “invest one, reuse over and over again” (Kuczmariski, 2000). Since a product platform is not just a physical product, it is

primarily a definition for planning, decision making, and strategic thinking. In this way, the company, that uses a platform product, has to take into account how that family addresses a variety of customer needs and which markets or segments of customers are involved.

All this sharing searches a cheaper way to produce cars. However, this sharing has to be managed very carefully and to do it becomes very difficult. The companies have to coordinate a lot of different things. The use of global platforms leads to that developing them becomes more difficult in order to fulfill all the different requirements and constraints needed for the large range of models that they have to fit. Moreover, the complexity of the product planning grows due to the large number of cars involved. At the same time, coordination of the different production processes is really complicated. Furthermore, the fact to work with different people from different brands, even from different cultures and often in different places, makes it difficult to work together. Besides of that, too much commonality among models makes it more difficult to maintain a good level of variety in these different models based on the same platform.

2 Methodology

This paper is based on research, the theoretical knowledge written in articles, papers, conferences, books, etc. about multi-project and more accurately platforms, above all in the automotive industry.

3 Platforms in automotive industry

Many car manufacturers use common platforms for their different models. Although the concept of the platform is really accepted and used in the automotive sector, the components of the platform are not always the same. Depending on the brand, they work with more or fewer components in their platforms. Some brands have a more basic platform formed by few components, while other brands make their platform with more components included.

These variations in the components used are caused by several reasons. One of these is that for one company it could be better to add one piece to the platform and, therefore, share it among the different models and, on the other hand, another company could prefer to have this piece different for each model based on the same platform, so they do not put this piece in their platform. Another reason is the different possibilities of the manufacturing technology that each company has. Each car manufacturer uses different processes in the production and, obviously, these affect the choice of parts that he builds the platform on. For these technological reasons, there are some components that sometimes one of these manufacturers would like to have in the platform but he can not put on it because of his production process.

However, the difference among the parts that belong to the platform is not the only one. The strategy to work with platforms is not always the same in each brand either. There are companies that have totally integrated in their structure the platform meaning and, on the other hand, there are some brands that use the platform to save money but they did not adapt their strategy completely to it. The group does not only need the thinking of the

platform to be changed, it needs the money to pay all these changes too. To adopt a platform strategy the group needs to change your factories as well, which is a really expensive process.

A review of the concept of platform, that the different brands of the market have, shows really clearly the idea explained above; the components of the platform are not fixed. For example, regarding Volkswagen, the platform consists on front axles, rear axles, front ends, rear ends, exhaust systems, brake systems, and numerous other elements. On the other hand, General Motors considers its platform as the union of the steering, suspension, brakes, engine and exhaust. It is necessary to say that the engines are also produced by platform, so when GM design the car platform, several engines can be used on it (Scott, 1995).

Due to this variety of concepts shown by car companies, the literature of this field does not always define the platform in the same way either. So, there are components that some authors think that they belong to the platform and others do not. In this way, in the literature there are from really general and simple definitions with few components to ones more detailed and complex with more parts.

Basically, the platform means the core framework of cars that includes the floor pan, power train, and axles (Ghosh and Morita, 2002). But, the literature has deeper definitions of the platform as a physical product. The platform is usually defined as the sum of suspensions, underbody, axles, and power train (Muffatto and Roveda, 1999). Finally, there are some definitions that include different kind of platforms depending on the strategy that the company is applying. The basic definition of a platform includes the

underbody and suspensions. Underbody is made up of the front floor, under floor, engine compartment and frame. From this basic definition of the platform three other different forms may be distinguished in the case of Japanese companies: narrow, broad and flexible (Muffatto, 1999).

Different brands on the same platform and with small differences in technology, experienced quality, and features make it difficult to convince customers that the specific car provides unique experience. Why pay for an Audi or VW when a Skoda is equal in terms of features, performance, and comfort? The platform technology will be optimized for the car model with the largest volumes.

Even so, it can be said that in average the development of a platform is around 24 months, whereas the model development is situated around 18 months.

Another important point of the concept of the platform is the number of models that shares the same platform. This number of models per platform used to be less in the past, and the tendency nowadays, and for the future, is making as much models as it is possible with the same platform. This tendency has an easy explanation: the higher the number of models spreading out from a unique platform, the heavier is the exploitation of the platform itself and the higher its effectiveness (Muffatto and Roveda, 1999). At the same time, the car manufacturers try to reduce the number of platforms that are working with, so the number of models based on one platform will increase more and more over the years.

Table 3.1 shows the year 2000 production for European market indicating the number of brands, platforms and models for several groups of the automobile sector. Table 3.2 shows the production of cars for different platforms for year 2000.

Europe 2000

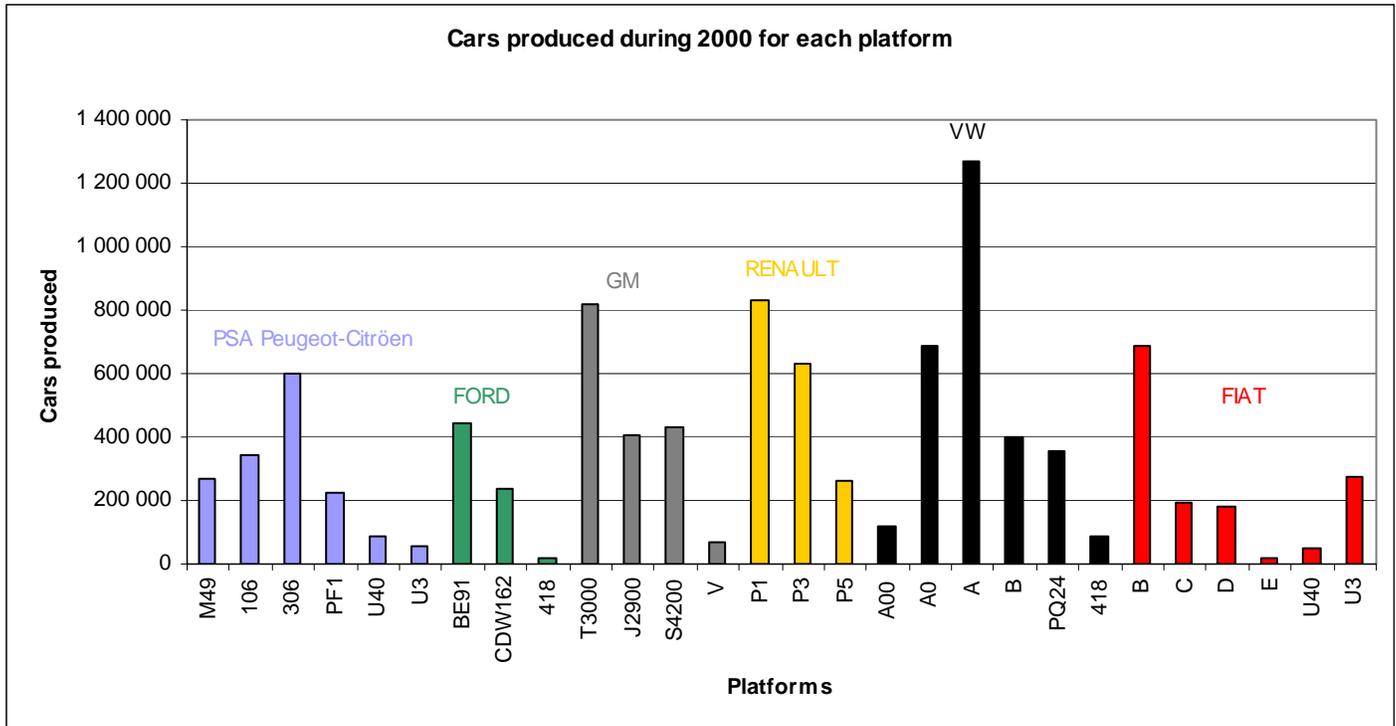
- **PSA Peugeot-Citroën – 2 brands, 9 platforms, 21 models**
- **Ford – 2 brands, 6 platforms, 10 models**
- **GM – 4 brands, 4 platforms, 11 models**
- **Renault – 1 brand, 3 platforms, 9 models**
- **VW – 4 brands, 9 platforms, 25 models**
- **Fiat – 4 brands, 10 platforms, 22 models**

Table 3.1. - Production of platforms 2000

The reason to work with platforms is really clear for the *Car manufacturer*:

The main reason of the platform thinking is that you can share components, reduce costs and make more cars (Car manufacturer).

With table 3.1 shown before, it is possible to make a graph showing how many cars were built basing on each platform during the year 2000, see figure 4.1.



source: www.autoindustria.com

Figure 3.2. - Cars produced during 2000 for each platform

We can see from table 3.1 that manufacturers use a number of different platforms for car models in different segments of the market and with different production volumes. This implies that manufacturers are using production facilities in different plants, regions and countries in order to ensure requirements of scale of economy and customization.

Those aspects are to be elaborated and investigated in this paper.

An example of the introduction strategy for a new platform is shown in Table 3.3. It can be noted that VW thus spreads the introduction over 6 years. This is however not easily done, since all the suppliers need to adapt to the new platform, while still maintaining production of the old platform.

Year	VW PQ35 platform, 4 brands, 12 models
2003	Audi A3 II
2003	VW Touran
2004	VW Caddy
2004	SEAT Altea
2004	VW Golf/Rabbit V
2005	Skoda Octavia II
2005	SEAT Toledo III
2006	VW Jetta/Vento/Bora V
2006	SEAT León II
2007	VW Eos
2007	Audi TT II
2008	VW Tiguan (compact crossover SUV)

Table 3.3. Introduction of VW PQ35 platform

This platform introduction can be summarized according to table 3.4, showing the life cycle of a platform. This lifecycle also contains a number of facelifts, i.e. possibilities to make smaller changes and updates to the design and/or technology.

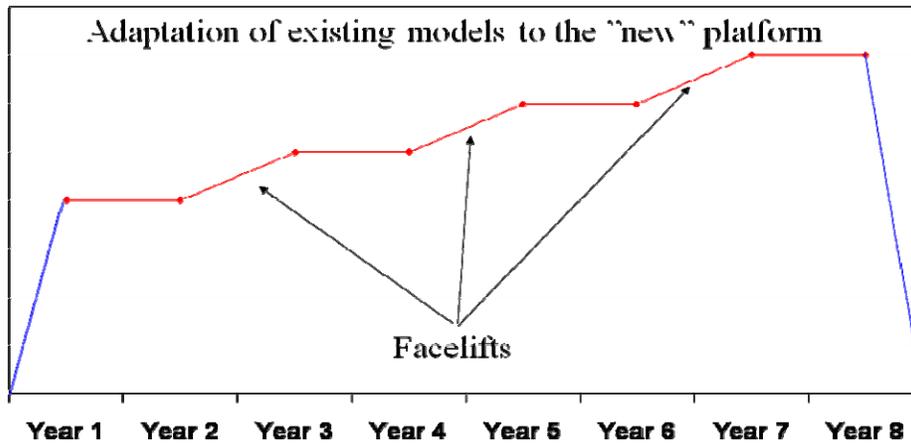


Table 3.4. Platform lifecycle.

The platform thinking is thus spread over a large number of years and linked to a product release strategy. This makes it very hard to break if something extraordinary occurs, such as the present financial recession. Saab Automobile is right now investigating how they can be attractive to other owners than GM, who are forced to reduce their enormous losses. A number of years ago, the situation was the opposite when Volvo and Saab were discussing how they could merge and form a strong Swedish actor on the automobile arena. These efforts however did not succeed due to a number of reasons, but one of the strongest obstacles to a merger was that the two brands were not compatible in terms of technology platforms.

4 Conclusions

The automotive market is in constant evolution. The steering forces of this evolution come from different ways. Firstly, and the most important because the auto industry must be market driven, it is the customer. This one demands more different cars, for new

different uses than in the past, and at lower price. Moreover, he wants new models more often. Secondly, the increasingly worry about aspects like the environment or the safety is leading to new constraints that provoke the search and use of new materials, technologies and solutions. Finally, due to the hard competence of the sector, the brands have to innovate constantly as well as reduce their costs to have competitive prices in the market.

Because of the previous reasons, the automobile industry has to evolve constantly. In this way, the platform concept known as nowadays appeared. The main idea of it is the sharing of both components and processes among several products in order to achieve bigger volumes that allow the use of scale economy. The reason why they do that is clear: the higher volume, the higher profit. The need of achieving these volumes, as well as the platform concept itself, has favoured in the present the companies work together as world groups.

The sharing of components involves basically the base of the car where the car is building up, but also is applied in all the pieces possible. In this way, the platform thinking should try to share as many pieces the customer does not see as possible. This sharing of components, as well as the sharing of processes, makes that the carmakers can afford release of several models in shorter periods of time and at lower cost. Thus, the car manufacturer reduces the costs as well as responds quickly to the changes of the demand.

However, to achieve all the advantages of this concept is not enough with trying to share, the carmaker has to think also in platform during its strategy, as well as adapt its structure in an efficient way. Since the moment that the automakers are working more in big

groups, those groups establish the guidelines that the different brands must follow. These decisions of the group can be from the development of a global platform for several group brands to the definition of their production planning. Referring to the structure, the car producer forms cross-functional teams dedicated to each project. In the case of a global platform, this team is composed by people from the different brands of the group.

However, the platforms also involve some difficulties. The main one is the complexity in the management, from the handling of big teams composed by people of different brands to the coordination of all the processes of all the models. Moreover, the fact of designing commonly for different models makes that each model does not achieve as good performance as it could be if the platform were designed specially for it. In this way, the group can make the mistake of develop platforms too standard. Furthermore, due to sharing the same solutions and technology, sometimes it is difficult to maintain the specific characteristics of each brand. Another disadvantage is that the first model that uses the global platform increases its lead time due to all the requirements of the several brands the design has to comply, although the following models that are developed once the platform is done get this lead time shorter. Finally, the volume of units that the platform is used for is so big that the car manufacturer can not risk a lot introducing big changes with new technologies, since they could not afford the failing of a platform. Despite all of that, the advantages of platform technology outweigh the disadvantages.

We have showed that technology platform thinking is an enabler for frequent releases of new car models, without causing too large investments. Platform thinking also constitutes

a constraint when it comes to possibility to do large organizational changes, mergers and acquisitions, or separation of company groups.

5 References

Danilovic, M. and Börjesson, H., 2001, *Managing the multiproject environment*, The third DSM International Workshop, proceedings, MIT, Boston USA.

Ghosh, A. and Morita, H., 2002, *Differentiated duopoly under vertical relationships with communication costs*, University of New South Wales.

Kuczarski, Thomas D., 2000, *Innovating the corporation: creating value for costumers and shareholders*, Chapter 9, McGraw-Hill Trade, Blacklick, OH, USA.

McGrath, Michael E., 2000, *Product strategy for high technology companies*, Chapter 3, McGraw-Hill Professional Book Group, Blacklick, OH, USA.

Muffatto, M, 1999, *Platform strategies in the international new product development*, International Journal of Operations & Production Management, Volume 19 Number 5/6 1999 pp. 449-460.

Muffatto, M. and Roveda, M. 1999, *Developing product platforms: analysis of the development process*, Technovation

Scott, G. K., 1995, *IMPV New Product development series: the General Motor Corporation*.

Sundgren, N. 1999, *Introducing Interface Management in new product family development*. J Prod Innov Manag, Np. 16, pp. 40-51.