

International Complexity Management in the Automotive Industry (Part 2)

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Abstract:

Creating commonalities is a powerful approach for international companies to reduce the product complexity. Commonalities can be achieved on a local, regional or global level. This article describes the different types of commonalities. In addition, the „Onion-peel Model“ is presented as a tool to implement commonalities within international companies.

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International Complexity Management in the Automotive Industry (Part 2)

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Commonality

The first part of this article „International Complexity Management” introduced the creation of commonalities in order to reduce product complexity. Commonalities were defined as synergies between products such as shared parts, technologies or design characteristics. We also distinguished between commonalities that can be realized between product variants of a shared product generation or of subsequent product generations.

Commonalities between product variants of a shared product generation are called simultaneous commonality. They are created by interlocking of components, parts, technologies and design characteristics. Interlocking means that product variants of the same product generation share components, technologies and design characteristics.

Commonalities between subsequent product generations are referred to as temporal commonality. Temporal commonality can be describes as components, technologies and design characteristics that are shared between successive product generations. For example, well established parts of an existing product can be used for a subsequent product generation.

International Commonalities

The implementation of commonalities in international companies can be achieved locally, regionally or globally (commonality levels). We therefore differentiate between Intra- and Inter-brand Commonalities, Inter-regional and Global Commonalities.

Figure 1 depicts the brands and sites international companies may possess and how commonalities on the different levels can be developed and leveraged. Commonalities (for example common parts) can be realized between different brands (Inter-brand Commonality), in different regions (Inter-Regional Commonality) or globally (Global Commonality).

Intra-brand Commonality is the „classical” form of commonality between product families or variants of a brand or a national product program.

The next step on the “Commonality Cascade” is Inter-brand-commonality where commonalities are realized between products of different subsidiaries within a region.

Inter-Regional Commonality on the other hand is the common use of product platforms, technology platforms or design platforms across geographical regions. An example of Inter-Regional Commonality is the usage of the same air conditioning units in all midsize cars in Europe and the USA.

The final level of the Commonality Cascade is Global Commonality. Here the Commonality is not restricted to certain countries or regions. An example for Global Commonality is the concept of a “world engine” where all cars that are produced worldwide have the same engine no matter which country they are produced or sold in.

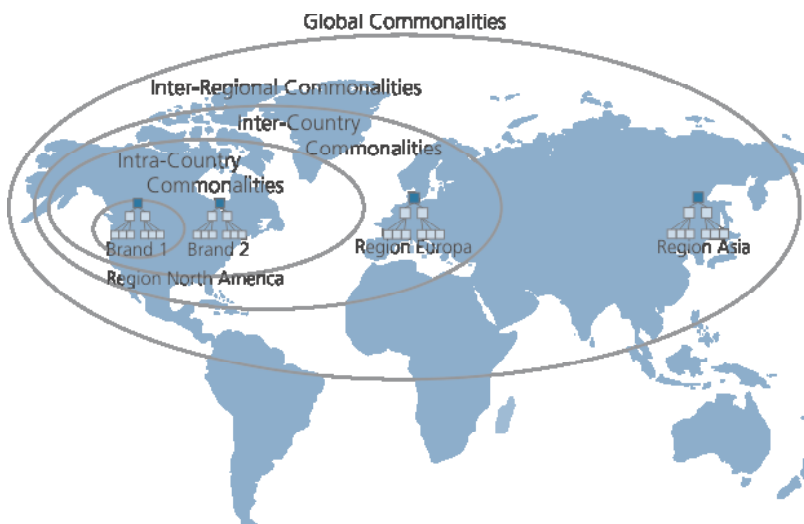


Figure 1: Cascade of Commonalities

Figure 2 depicts the different types of commonalities. It illustrates that brand commonalities as well as regional and global commonalities can be used to reduce global product complexity.

The Onion-Peel Model

Creating and implementing commonalities requires the close cooperation of international R&D departments. Only coordinated R&D activities can develop common parts, technology platforms or design platforms and implement them later on.

The following mechanisms are proposed to help guide R&D departments when managing the product development process:

- **Declare Obligatory:** The R&D headquarters declares a certain component obligatory for all products in a country or region. The R&D departments in the different countries and regions must use the component in the development of future products.
- **Assure availability:** The R&D headquarters develops a commonality (e.g. component) and assures the availability of this component for all countries and regions. The R&D headquarters “fills the shelf” with proven components and the R&D departments can use them voluntarily.
- **Organize Information exchange:** The R&D departments are encouraged to communicate and discuss innovations and solutions amongst each other. The continuous flow of information leverages the innovation potential, fosters the use of best practices and prevents overlapping developments.

The coordination mechanisms can be used to manage the global R&D organization and are the basis for the creation of international commonalities.

The Onion-Peel-Model for Planning and Implementation of Commonalities

The Onion-Peel-Model combines the Commonality Levels and the Coordination Mechanisms to plan and implement commonalities. The benefit of using the Onion-Peel-Model is that it visualizes, characterizes and prioritizes commonalities.

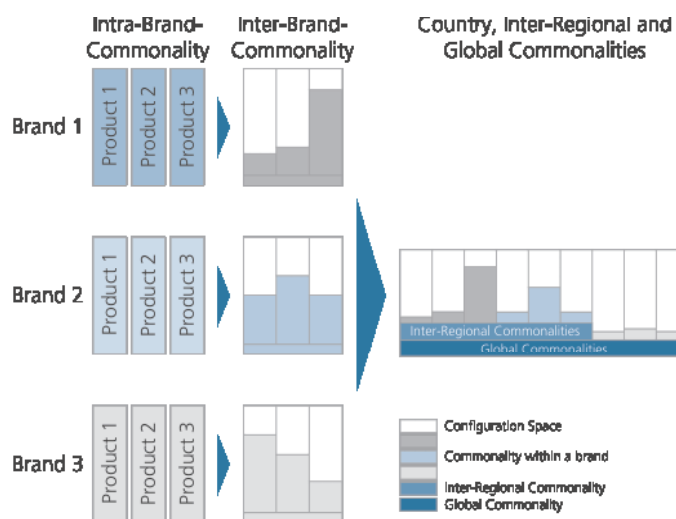


Figure 2: Realization of International Commonalities

The Onion-Peel-Model supports management decisions and is the basis to define commonalities (components, technologies, designs). Modules and components are characterized with the model and they are declared obligatory, have assured availability or an information exchange takes place (see figure 3).

Several criteria to classify the modules and components in the Onion-Peel-Model can be applied. Examples of criteria are R&D expenditures and the length of the innovation cycle. These classifications determine the way the modules and components are handled in the future. Applying the Onion-Peel-Model to the example of an international automotive manufacturer the following usage was recorded:

The innermost „peel” contains all commonalities that are globally obligatory. A global obligatory commonality is an engine that is used globally in all cars manufactured (“world engine”). The R&D headquarter determines that the use of the engine for all countries and regions is obligatory or determines rules (e.g. module dimensions) for the countries.

The second „peel“ is made up of commonalities that should be realized in two or more regions. Interregional commonalities are also determined by the R&D headquarter. An example for an interregional commonality is the braking system for all cars in Europe and Asia (but not NAFTA).

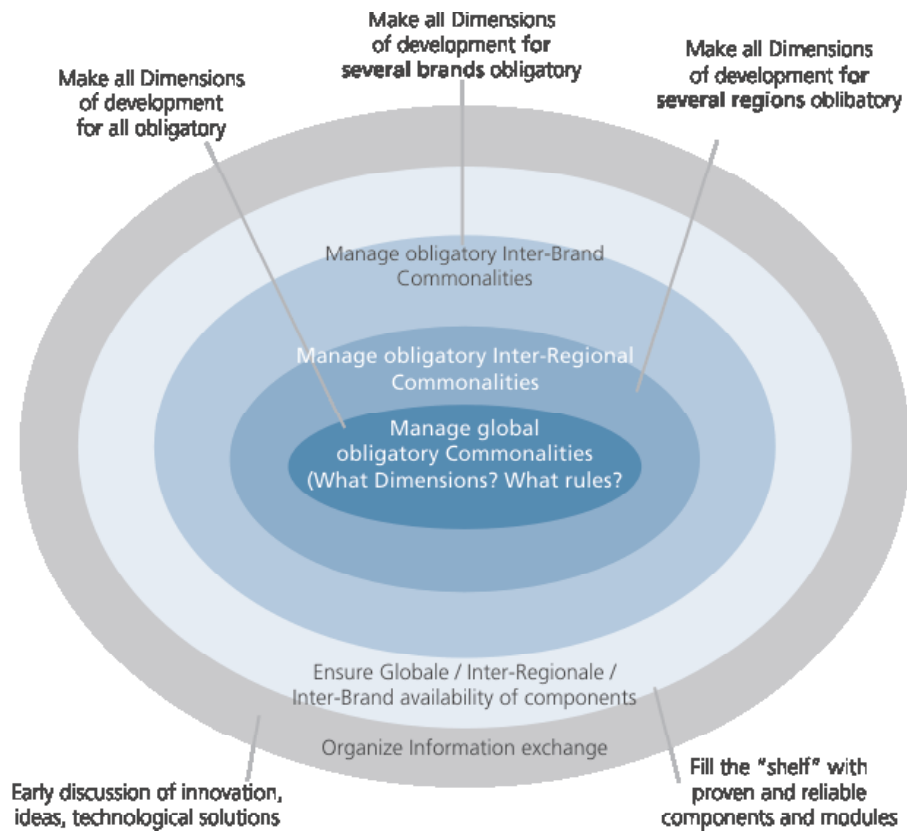


Figure 3: The Onion-Peel-Model

The third „peel” includes all commonalities between countries within one region. The R&D headquarters determines that two country organizations must use the same air conditioning units.

The fourth “peel” holds all commonalities which are offered to several countries, regions or globally. The components are proven modules or rules. This way, overlapping developments can be avoided and higher product quality can be achieved. A global commonality could be the „Intelligent Cruise Control” for all mid-sized cars.

The outermost „peel” contains all modules that rely upon an information exchange between the different countries and regions. The objective of the internal communication about module development is to find Best Practice solutions and develop modules along the competencies.

Summary

The globalization of companies is a new challenge for managing product complexity. International companies need to realize not only local commonalities but also regional and global commonalities in order to reduce product complexity. Components and technologies must be evaluated to determine where the most potential for commonalities can be found. In addition, the global product development has to be coordinated. The proposed Onion-Peel-Model is a method to support the implementation of commonalities. It can be used to prioritize commonalities and coordinate the global product development departments.

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