Modularization: The way to Improve Product Profit under New Normal Economy
“New Normal Economy” has become a popular term as it shows the economic growth rate and the significant change of development model. Since 1990s, the government has proposed to “Adjust economic structure, increase economic profit, transform from resource-focused to saving-focused model”. However, the actual result didn’t match the government’s expectations. The authors suggest that under the ultra-high-speed development model, if companies can get high profits through this rapid expansion, the motivation for them to increase their operation effectiveness and operation quality will be insufficient, especially the motivation about how firms would use reasonable product resources to effectively satisfy market requirements.

Nowadays, the overall economy growth rate has slow down. Therefore, companies (especially manufacturing companies) have to focus on improving their operation effectiveness and quality, optimizing product resources to satisfy market requirements. Modularization, as an effective way to improve systems/parts reuse efficiency, reduce product cost, and improve product quality, has become more and more important in China.
What Is Modularization?

After discussing with some domestic automotive companies, we have found that companies all have some basic understanding about modularization. However, their understandings towards modularization are distinctive. Some companies got stuck at certain stages. For example, some companies struggle with the relationship between platform and module, while others came up with their own definition about horizontal modularization and vertical modularization based on their experience.

Actually, modularization is not a brand new concept. It has already come out and been verified long time ago. DIY computer was very popular 10 years ago. People can customize their own computers in terms of mainboard, CPU, hard disk, internal storage, fan, computer case, and audio regardless of their brands. This is a very typical application of modularization. The key factors for the application of modularization include the following:

1. The industry sets up computer framework standards
2. Each unit has a its clear function and a standardize interface;
3. Each module clarifies a clear range of application;

At this point, people won’t struggle with the relationships among platforms, brands, and modules anymore. Their focus of modularization shifts to the reuse of each independent functional component regardless of platform and brand.
From the market’s point of view, it is easy for people to understand modularization. By looking at company’s internal management, it is significant for company to consist everyone’s understanding towards modularization, to easily implement modularization, to promote and manage modularization. Specifically, the concept or the system of modularization includes the following 5 aspects:

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<tbody>
<tr>
<td>1. Product Portfolio:</td>
<td>Brand, market</td>
<td>Through product</td>
<td>Pay attention to</td>
<td>Module shelves</td>
<td>The key factors of implementing modularization involves</td>
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<td>2. Product Architecture:</td>
<td>segmentation and</td>
<td>architecture, modular</td>
<td>OEM and module</td>
<td>cycle plans.</td>
<td>Organizing, Process, Measure Indicators, Methods/Model, IT techniques etc.</td>
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<td>3. Function Strategy:</td>
<td>product to satisfy</td>
<td>installation and joint,</td>
<td>system and module</td>
<td>defining elements about</td>
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<td>4. Module Strategy:</td>
<td>different needs and</td>
<td>separate development</td>
<td>function requirement</td>
<td>modular strategy (goals, FQCW, variance, interface</td>
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<td>5. Enabler</td>
<td>product roadmap</td>
<td>of OEM and module</td>
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<td>etc.)</td>
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1. Product Portfolio: Facing the needs of different market segments, company needs to clarify what types of product portfolio that company wants to promote in order to satisfy market needs, what the product strategies are, and how company will manage the lifecycle of products etc.

2. Product architecture: How to define product architecture, how to divide product structure, where the mounting point and interface of module are, and how to separate module and product, etc.

3. Function strategy: how to apply product function strategy into system strategy step by step, and achieve the needs of the module function;

4. Module strategy: How to establish module shelves, how to plan module lifecycle, how to define different modules within the same standard, including objectives and constraints, FQCW, interfaces, deformation, and business plan etc.

5. The enabler includes the following four aspects:
   a) Organizing: the control model of module self-operation, the relationship between modular team and R&D team;
   c) Measurable indicator: how to evaluate the effectiveness of module resources
   d) IT: Standardized tools could support the business operation to guarantee the transparency of the modular-related information
Considerable Factors during Modularization Implementation

As the 5 elements mentioned above, companies need to consider its own business features, maturity and priority, accumulative practical experiences to carry out its modularization step by step. There are many global leaders have achieved certain practices including concepts, methods, templates, etc. from modularization. Thus, domestic companies could learn from their practices through implementing modularization. However, there are still some factors need to be analysed specifically under particular situations. For example:

1. The extent of standardization: Modularization is one of the approaches to reduce product complexity. There are another two approaches to do so: remove redundancy and standardization. Considering that there are still some of the domestic companies have much potential to improve their standardization levels, some modules could combine these three approaches instead of using modularization individually.

2. The extent of control on core resources: Compared with domestic companies, global companies in the auto industry, such as VW, DAIMLER, FORD, CAT etc., have a stronger capability to control core resources. Therefore, the range of modularization is wider and the depth is deeper for the global companies; such modularizations would have more impacts on the cooperation with partner suppliers. For the local auto OEM companies, their main focus is on car body, chassis, and engine. However, there is less influence on gearbox, post-treating, and electronics etc. Therefore, when making cooperative strategy with suppliers, companies need to consider their own business strategies. Moreover, companies need to enhance the cooperation with core suppliers to improve the extent of modularization together.

According to the experiences gained from industry and our service, companies can refer to the following 4 steps to start with the implementation of modularization:

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<th>Steps</th>
<th>Goals</th>
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| I. Assessment | • Collecting information that is related to modularization concept and its enabler  
• Offering interview opportunities to profit related staff |
| II. Modularization Concept Design | • Evaluation and Adjustment  
- Product and technology strategies  
- Product architecture  
- System and module architecture  
- Definition of road map and further steps to finish architecture  
- Based on the business needs and advanced experiences to design modularization strategies further define the module  
- Definition of modularization enabler  
- Module development process  
- Module organization and management mechanism  
- Set up tools and approaches to satisfied enabler’s needs |
| III. Pilot | • Module Pilot Selection  
- Improving module planning  
- Verifying module strategies and defining module  
- Verifying and completing the enabler model  
- Determining implementation process, time, and responsible person  
- Determining modularization expansion plan  
- Defining appraisal approach regarding  
- Determine communication plan  
- Prepare training materials |
| IV. Expansion | • Based on the expansion plan, achieve company’s internal expansion  
• Establish enabler instrument  
• Summarize expansion experience  
• Adjust current portfolio and management mechanism to align with modularization’s operation  
• Determine communication plan  
• Establish expansion training |
Key Factors to Success

The implementation of modularization is a long-term program and companies need to constantly stick with it. The key factors to success include:

1. Set modularization strategy as one of their vision statement
2. Define general product architecture; further decouple modules from vehicle development process
3. Integrate module and product development process
4. Adjust organizational structure to fit with module approach
5. Rigorous action on implementation and transformation management, focusing on the quick-wins.

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