

Efforts to Accelerate Development by Winning Companies

— Case Examples of Reforms by Japanese Carmakers —

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Japanese carmakers—generally known as winners in the global market—took up the acceleration of development as an important management issue in the latter half of the 1990s. In doing so, they have built up development processes that have overwhelmed competing companies.

Japanese carmakers have achieved a speed of development three times faster than their competitors in Europe and the US. Thus, they have achieved a superior competitive edge that enables them to release large numbers of hot-selling cars into the global market at the right time. In addition, Japanese carmakers have promoted the growth of superior engineers in a short period by having their personnel gain experience on a large number of projects. Thus, Japanese carmakers have superior human resources as well.

Japanese carmakers are currently starting to make efforts to increase the speed of decision making in order to accelerate development even further. Their decision making process that has both high speed and strong points, where related departments gather, discuss and render a conclusion, will strengthen the global competitiveness of Japanese carmakers.

In the future, there is a strong possibility that accelerating the development process will become an important management issue for companies that must release more products aimed at local areas in the global market. It is possible that the reforms of Japanese carmakers will receive much attention from those companies.

I Merits of Accelerating Development

Developing an automobile is a large-scale project that involves several hundred staff members from many departments, including product planning, design, vehicle development, unit development, resource development, electronic technology, cost planning, production technology, test product evaluation, sales and service. The development process is made up of six steps, and Japanese carmakers have been concentrating their efforts into accelerating the development process in the steps from development goal setting to the start of mass production (Figure 1).

By increasing the speed of new automobile development, Japanese carmakers have been able to enjoy the following four advantages.

- (1) By decreasing labor and test product expenses, it is possible to curb development investment.
- (2) Since it is possible to conduct product studies very close to new vehicle release dates, there is a higher possibility of being able to introduce the right product at the right time in the global market.
- (3) Compared to competing companies with slow development speeds, it is possible to introduce more new cars to the market.
- (4) Since engineers can gain experience on a large number of development projects in a short period, the time required to promote the personal growth of engineers can be shortened.

Development acceleration began when, as the scale of new development projects of aircraft and finished car manufacturers tended to become increasingly large, manufacturers aimed to curb development investment by proceeding with computer-based digital design. In particular, the US company Boeing enhanced the level of digital design environments very rapidly with large-scale investment in computer development for digital design. This enabled efforts to accelerate development

to go into full swing in automotive and other manufacturing industries.

After the bubble burst, Japanese carmakers found it hard to come up with images of new vehicles that would sell well so they decided to enhance product planning and proceeded to accelerate the development process. From that time onward, Japanese carmakers viewed accelerating the development process as an important management issue, not only investing in digital design but also starting to undertake drastic reforms on the processes involved in development.

In the latter half of the 1990s, Japanese carmakers began full-fledged global development. The target areas for product planning expanded from Japan and North America to include Europe, Asia, China and South America, and the number of development projects increased overnight (Figure 2). In contrast, the number of engineers working at automobile manufacturers did not grow as much as the number of projects. Thus, accelerating development by increasing each engineer's productivity became even more important.

Afterwards as well, the number of new vehicle development projects continued to increase faster than did engineer productivity. Thus, there became a greater need for activities to improve engineer productivity and simultaneously promote the personal growth of in-company engineers in a short period. Japanese carmakers succeeded in fostering excellent and experienced engineers over a short period by selecting engineers and concentrating their work on projects involving the development of new vehicles.

II Differences between Successful and Unsuccessful Reforms

Through the efforts to accelerate development undertaken over a little more than the last ten years, the development time for new vehicles has been cut in half. The fastest development to date has been the NOTE by Nissan, released in January of 2005. The development of

Figure 1. Automobile Development Steps

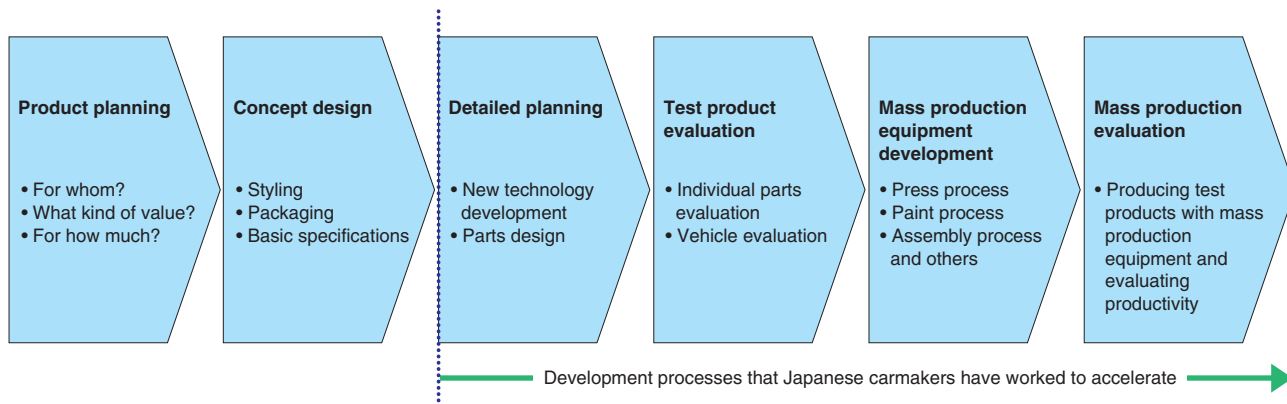
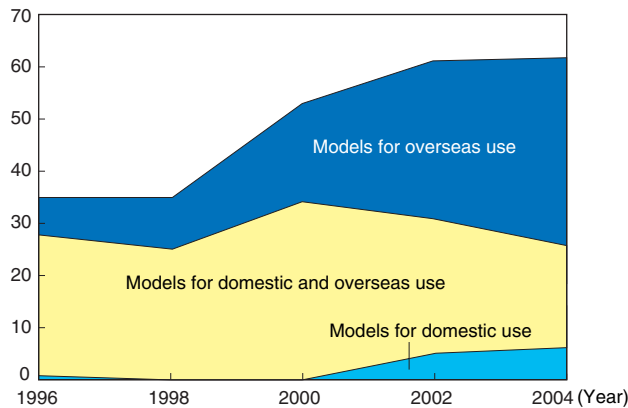


Figure 2. Number of New Car Models of Japanese Carmaker A



Source: Compiled from publicly available information.

this compact car was completed in 10.5 months, approximately a third of the average development time for the “Big Three” US carmakers.

In contrast, due to the need to respond to globalization, companies that are determined to accelerate development can even be seen outside of the automobile industry. However, more than a few of these companies are failing.

What determines whether a reform is successful? If we ask companies that have failed, many would point out the lack of latitude in development workplace, saying that “because the key persons in development are very busy, it is not possible to develop products that meet the fiscal year’s sales objectives and conduct development reforms simultaneously (Figure 3).” Those companies feel they have no choice but to rely on a small number of key employees in development for increasing sales or carrying out reforms due to insufficient human resources.

Why is there no latitude in development workplaces? At Nomura Research Institute (NRI), we believe that the cause lies in not conducting the development

process reforms in a way that corresponds to a company’s expanding scale (Figure 4).

The first reform required is converting “individual player development” into “team player development.” If the scale of a company expands, the number of new car development projects increases. If global development is carried out, the number of new projects increases still further. Meanwhile, since time is required to promote the growth of engineers, it becomes difficult to provide enough skilled project leaders and project members for the increasing number of projects. Thus, latitude in the development workplace is lost. To break through the limits of individual player development, development tasks should be divided into smaller tasks to make it easy to develop leadership. It is also desirable that multiple task leaders cooperate in the development process.

However, when conducting projects by dividing tasks and transferring sequential tasks, there is a possibility that the development period may be prolonged. If the number of projects increases, each task team becomes busier with its own work and consideration for previous and following tasks might be lost. Also, if a department is established for each project, communication among departments suffers and department members think only about their own projects. Consequently, although tasks are passed on in sequence, development speed drops when problems arise during a task and teams go back to previous tasks and also when insufficient time is allotted to a task. What is sought in that case is a second reform of the process of sequential development where tasks are passed on in sequence. The process must be changed to one of “advanced development” where tasks are passed forward independently.

Most companies that have failed in reforming their development processes have not reformed these two development processes. In particular, if reforms are entrusted to the development workplace, the reforms become suboptimizations where the employees engaged

Figure 3. Reforms Do Not Proceed without Latitude in the Development Workplace

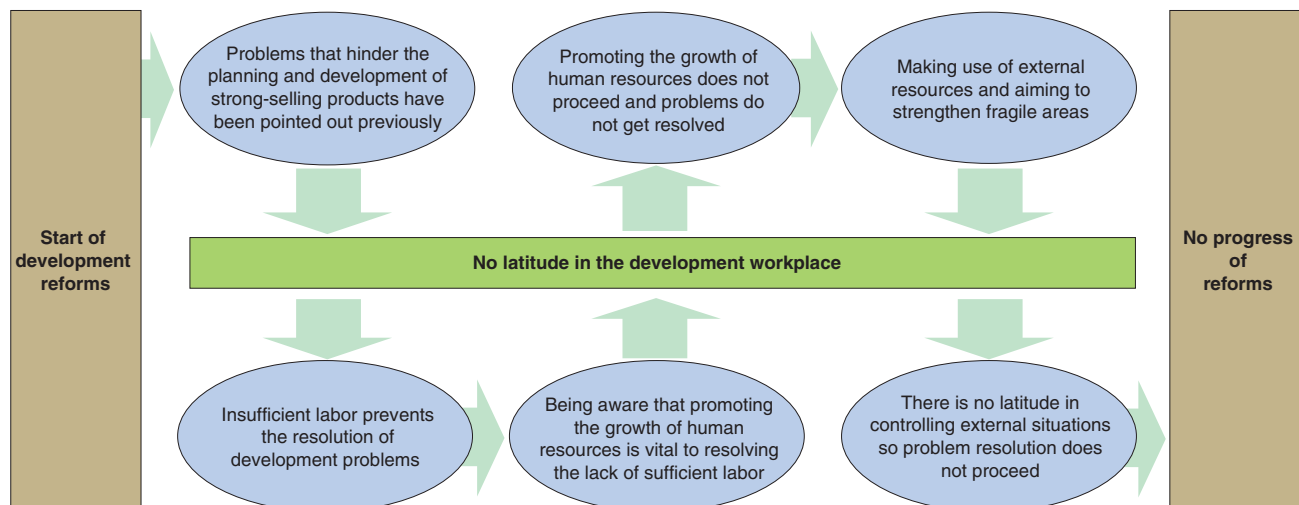
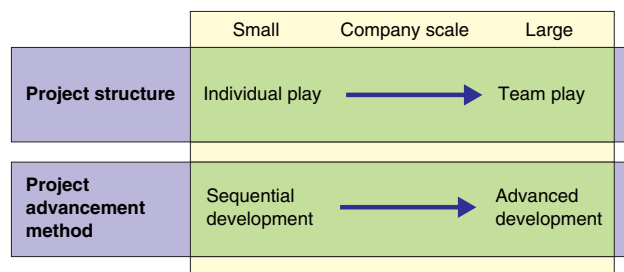


Figure 4. Reform Points for Providing Latitude in Development Workplaces



in development have fewer obligations. The reforms end at the improvement of activities premised on the current methods for advancing development (issue resolution).

In contrast, in successful companies, development process reforms have been advanced by teams and departments that view all development activities as an interdepartmental undertaking and can thus conduct overall optimization.

III Methods for Accelerating Development

For companies that conduct development process reforms, in order to bring a new development process to a successful conclusion while continuing current new vehicle development activities, it is necessary to have the reform capability to simultaneously carry out both processes successfully and to circumvent risk during the period of reform transition. Most companies that have

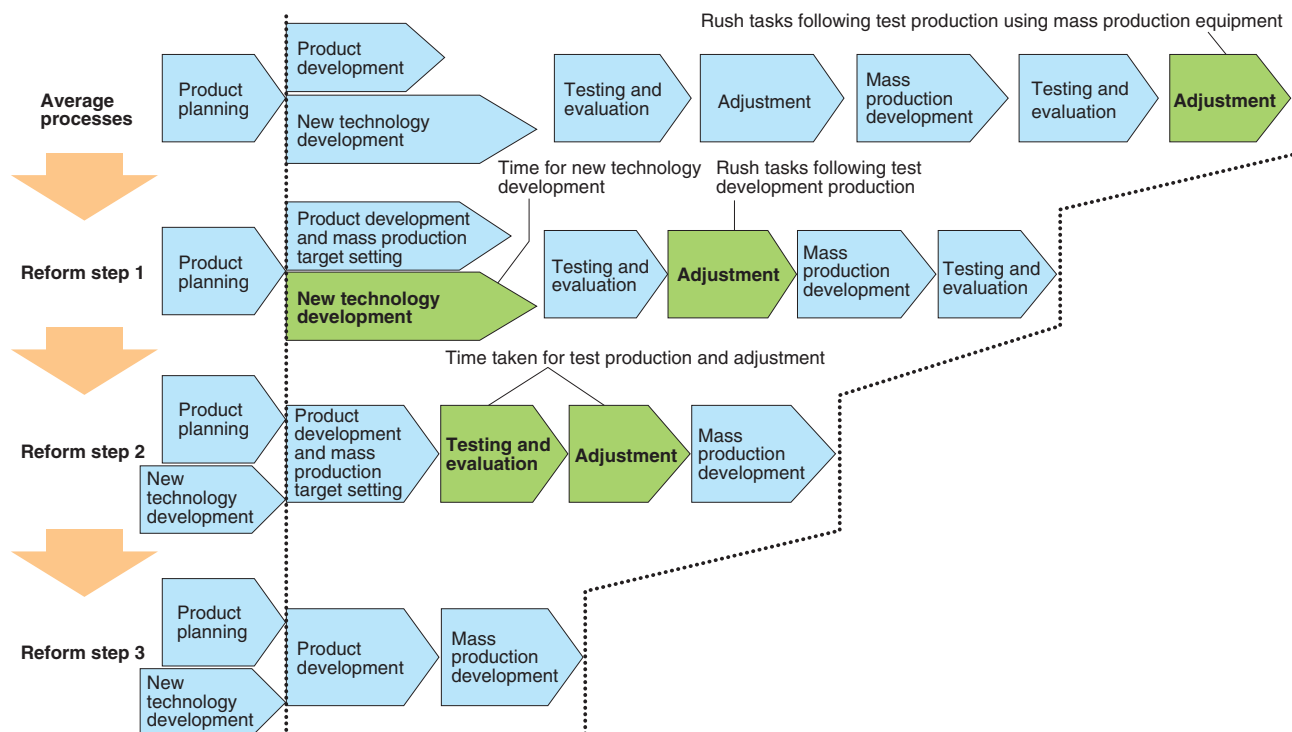
succeeded in implementing development process reforms have reduced the amount of power required for reforms, separated reforms into multiple tasks, and then executed those tasks independently to reduce risk.

In many cases, the fundamental process of new vehicle development proceeds according to the following order of processes: (1) single product development; (2) new technology development; (3) test production of single items; (4) evaluation and adjustment; (5) development of mass production equipment; (6) production of test products using mass production equipment and (7) evaluation and adjustment (Figure 5).

The first step in accelerating development is “concurrent development,” or moving the discussion of the development of mass production equipment to the product development stage. Companies that have succeeded in this enhancement have been able to greatly reduce the amount of labor required for evaluating and adjusting test products produced using mass production equipment. The Japanese manufacturing industry has superior production and manufacturing technologies, and reforms to concurrent development have been fundamentally easy policies to undertake.

The second step is “advanced development,” or moving the development of new technology to the phase of product planning. As the time required for new technology development is difficult to predict, it has been a major factor in the difficulties in accelerating the development for new vehicles. Carmakers that conduct numerous new vehicle development projects concurrently have implemented “advanced development,” separating unpredictable development of new technology

Figure 5. Development Acceleration Methodology



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from development of new vehicles because there is the possibility that disorder in the development plan of any one project may spread to the entire development project.

Currently, carmakers that have achieved the fastest speeds of development are moving on to a third step of “digital design.” The point of digital design reform is to organize the tacit development knowledge of engineers in the form of explicit knowledge in a computer. By incorporating past information on defects and the best design expertise in a design system, it becomes possible for the computer to indicate designs with a high probability of defects and to easily obtain lacking design information from a database, increasing design efficiency.

In addition, since it is possible to complete design, test production and evaluations on the computer, the development period for new vehicles has been reduced all at once. Digital design, in cases where testing and evaluation are not conducted with actual products at all, has enabled reducing the period by seven to nine months. Compared to previous methods, development costs have also been reduced by approximately 60 percent.

IV Reform Points to Increase Development Speed

Carmakers have set out to accelerate the development process from the establishment of development objectives to the beginning of mass production. To further expedite the development process, carmakers are focusing on accelerating decision making for establishing development objectives. One of the strengths of Japanese carmakers is that representatives from each functional department hold group discussions, and solutions to high-level issues are well thought out. Conversely, group discussions require long periods, which have been obstacles to accelerating the development process.

Leading companies are taking two different approaches in attempting to accelerate the decision making process. The first approach is reducing the number of decision makers. To achieve swift decision making while utilizing the strengths of the conventional decision making process, some companies have successfully accelerated decision making by adopting an autocratic group discussion decision making structure in which the people associated with a new car (representatives of functional departments) hold group discussions, valuable proposals are gathered, and decisions are made by a small number of decision makers (the president and project leaders).

In the conventional decision making process, all of the statements made by executives become instructions (there were many irresponsible statements) and, in many cases, compiling the opinions of the executives into development objectives was difficult. Because such group discussions took a lot of time, a lot of development time was required to accomplish the highly difficult objectives that were established through the group discussions.

In autocratic group discussion decision making, executives give advice to the president, who makes the decision (Figure 6). Members freely give their ideas (people making comments take the appropriate amount of responsibility during implementation), and the president makes the final decisions through discussions between the president and the project leader. Compared to conventional group discussions, this structure facilitates swift and accurate decision making.

The second approach is reducing the number of items to be decided upon in autocratic group discussion decision making. Some companies have succeeded in accelerating decision making with hybrid-type decision making rules that combine rational decision making, which looks at the profitability of investments only through quantitative judgments, and autocratic group discussion decision making. In other words, all items to be decided upon are rationally judged with quantitative rules. Items for which there are rational objections and

Figure 6. Autocratic Group Discussion Decision Making Structure

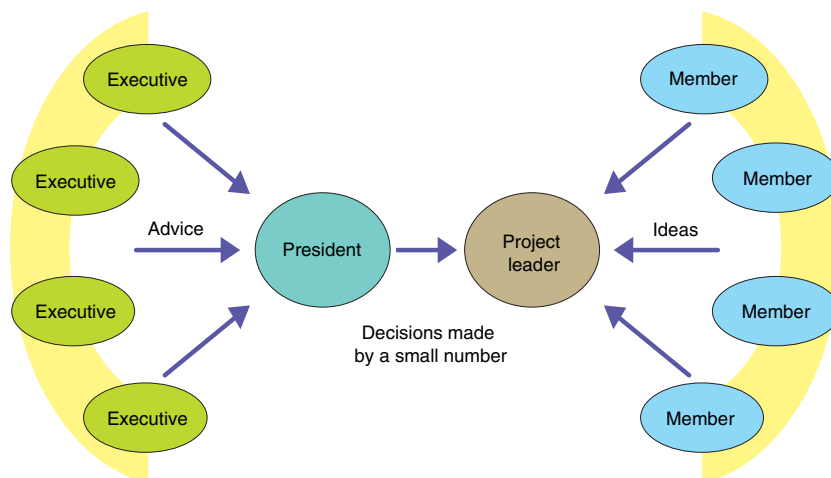
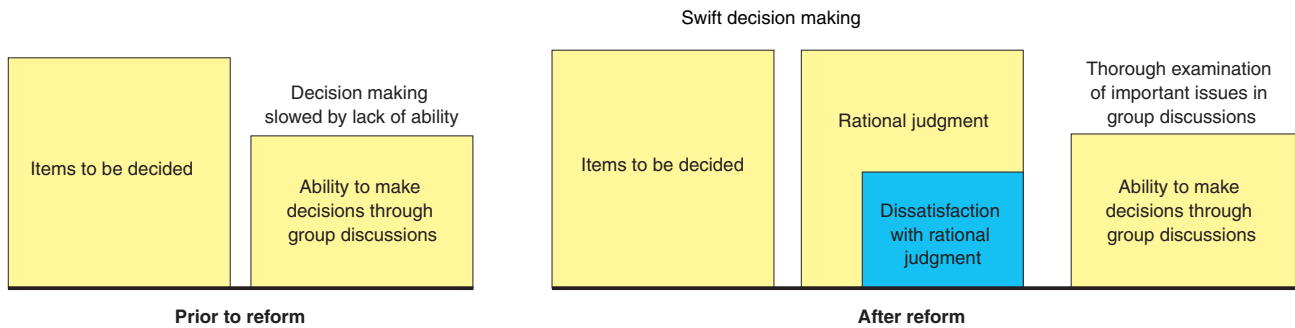


Figure 7. Reforms for Swift and Accurate Decision Making



for which the person in charge is confident that the decision maker can be convinced are decided upon through autocratic group discussion decision making (Figure 7).

The reform activities of Japanese carmakers, which have been recognized as winners in the global arena, utilize the strengths of Japanese corporate management and can be said to be the best practices (successful examples by leading companies), which enable companies to aim for even greater progress. I hope that a number of other

overwhelmingly internationally competitive industries will appear based on the examples set by carmakers.

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