REVIEW ARTICLE

REVISION AND VERIFICATION OF “SEVEN TOOLS FOR NEW PRODUCT PLANNING”

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Abstract: We propose a methodology that can be usefully employed to generate creative new products satisfying the objective needs of customers by systematizing the product planning process and combining marketing and originally developed methods with QC methods. In particular, the “impact” found commonly in hit products is an important feature. From this viewpoint, we introduced QC methods formulated to realize the ideal product planning system instead of the traditional QC approach. Furthermore, we have revised “Seven Tools for New product Planning” consisting of an interview survey, questionnaire survey, positioning analysis, conceptualization (idea generation), evaluation and selection analysis, conjoint analysis and quality tables. This article argues the verification of “Seven Tools for New product Planning”.

Keywords: *New product planning, Seven Tools for New Product Planning, Total quality management (TQM)*

1. INTRODUCTION

The former article¹⁾ introduced “Seven Tools for New Product Planning”. “Seven Tools for New Product Planning” is a set of tools to create hit products appealing to the *Kansei* of consumers. It is designed to be used systematically as if it contains the story.

We achieved many satisfactory results since “Seven Tools for New Product Planning” was published²⁾. The increase in practical applications raised some issues. Working out a new concept based on these issues, we propose a revised “Seven Tools for New Product Planning” in this article on the basis of a new formulation which can be practically applied to product planning.

There was a significant and positive public response to “Seven Tools for New Product Planning” and it was widely reported in the press³⁾. In the light of these facts, it is expected that publication of the revised edition and a series of practical applications presented in three volumes³⁾⁻⁴⁾ will give a fresh impetus to seven tools in the future. This article also introduces the results of many practical applications since the publishing of “Seven Tools for New Product Planning”⁵⁾.

2. “SEVEN TOOLS FOR NEW PRODUCT PLANNING (former edition, P7-1995)

There are many new and improved products those

have been created by merely redesigning or developing new applications for existing products. But we believe that developing truly new products based on fundamental innovation is also important.

The Working Group for Product Planning and Marketing (renamed Working Group to Address Problems Associated with New Product Planning in 1998 and whose representative is Professor Noriaki Kanda of Seijyo University. The author is a member of this working group.) in the TQM (Total Quality Management) Research Group is affiliated with the Union of Japanese Scientists and Engineers. It has recommended some useful tools which can be applied in product planning and these have been selected from among tools that have a wide range of uses and which are, moreover, free from traditional QC (Quality Control) and marketing approaches. It is the intention of the group to promote their widespread use. In order to develop new products based on these concepts and to thoroughly grasp consumer needs (meaning something truly required by consumers), seven tools were selected which are referred to as “Seven Tools for New Product Planning” (P7 for short. P means planning.). These were published after exhaustive research into useful tools for product planning when it became obvious that a single tool approach was inadequate.

Although all seven tools are not always essential, we named the project “Seven Tools for New Product Planning” because seven is a lucky number, the seven

Table 1: “Seven Tools for New Product Planning”: P7-1995 (former edition) and P7-2000 (new edition)

Steps of development	P7-1995 (former edition)	P7-2000 (new edition)
Discovering needs → Researching what customers want	group interview	interview survey.(group interview, Grid Evaluation Method)
Examining needs → Verifying whether customers truly want	questionnaire survey	questionnaire survey
Modeling positions of products → Studying Relations with other products and searching "niches"	positioning analysis	positioning analysis
Generating ideas → Producing unique ideas fluently and effectively	idea generation method I (checklist for idea generation) idea generation method II (table-type idea generation method)	Idea generation method (Analogy Idea Generation Method, Focus Idea generation Method, Combination Idea Generation Method, Checklist Idea Generation Method, Seeds Idea Generation Method)
Selecting ideas → Evaluating from several criteria and selecting ideas synthetically	—	idea selection method (Weighting Evaluation Method, Paired Comparison Evaluation Method (AHP))
Making concepts optimally appropriate → Determining concrete images of product	conjoint analysis	conjoint analysis
Linking with design → Developing the concept to quality characteristics	quality tables	quality tables

tools of Benkei are famous and we wished to acknowledge our antecedent which were Q7 (Seven tools for Quality Control).

“Seven Tools for New product Planning (P7-1995, former edition)” initially consisted of group interview, questionnaire survey, positioning analysis, idea generation method I (checklist for idea generation), idea generation method II (table-type idea generation method), conjoint analysis and quality tables.

These seven tools were selected from among the many tools that can be used in product planning on the basis of their reliability in each step of product planning and possibility that they will be popularized or that we will want to popularize them in the future.

For an explanation of each tool, see bibliographies 3)-4).

3. REVISED “SEVEN TOOLS FOR NEW PRODUCT PLANNING” (new edition, P7-2000)

Since publishing this edition in 1995, several problems have become evident with its increasing use in actual practice. Therefore, a revised edition (P7-

2000, new edition) was proposed in 2000 as follows:

3.1 Interview Survey

The Grid Evaluation Method added to better identify consumer needs and the group interview have been combined to now form the interview survey.

The group interview used to elucidate consumer needs is a useful tool for generating hypothetical ideas. However, there are some instances where it has been difficult to analyze the opinions of consumers in a structured manner because the success of the group interview largely depends on the skill of the chairperson and other problems arise because this approach has yet to be standardized.

Therefore, the Grid Evaluation Method was added to P7-2000 (new edition). The Grid Evaluation Method is a method by which consumers evaluate ready-made products comparatively in their own words, and it makes it easier to structure their opinions. However, we need to use either or both the group interview and Grid Evaluation Method appropriately depending on the purpose. These two methods are complementary to each other.

3.2 Idea Generation Method

“Checklist for idea generation” included in the Idea Generation Method I in P7-1995 (former edition) is poor in content and not well balanced with other tools. It is not evident in P7 which method should be chosen from among a variety of methods including the Combination Idea Generation Method, Analogy Idea Generation Method and Seeds Idea Generation Method included in Idea Generation Method II.

Therefore, the checklist for efficient idea generation has been renamed the Checklist Method for Idea Generation. This method and table-type idea generation method is integrated into the Idea Generation Method I. The Focus Idea generation Method, which was well received, has also been added to the revised edition.

We consider each idea generation method contained in P7-2000 (new edition) to be a sub-method. We recommend that top priority be assigned to the Analogy Idea Generation Method and to use other methods in a complementary fashion including the Focus Idea generation Method, Combination Idea Generation Method, Checklist Method for Idea Generation and Seeds Idea Generation Method.

3.3 Idea Selection Method

It is often true that it is difficult to evaluate and select (narrow down) good ideas generated using the idea generation methods in P7-1995 (former edition). Nevertheless, there was no tool to cope with these situations.

Therefore, tools which allow ideas to be evaluated from several criteria and then selected synthetically have been added as ways of narrowing down ideas. Specifically, the Weighting Evaluation Method and the Paired Comparison Evaluation Method (AHP) have been adopted.

The Weighting Evaluation Method is a way of rating each idea generated by customers or persons in charge of evaluating products. The ideas are weighted alongside each evaluation criteria including charm, originality, practicality, level of technical difficulty and cost. Although this method is easy to apply, products are likely to be weighted or rated from a personal point of view.

The Paired Comparison Evaluation Method (AHP) is a way to estimate weight and scores by comparing a

pair of products or evaluation items. In the case where there are many evaluation items and ideas, the number of aired comparisons increases and their objectivity also increases correspondingly.

4. APPLICATION OF “SEVEN TOOLS FOR NEW PRODUCT PLANNING”

4.1 Selection and Order of Tool Use

We do not recommend that all of seven tools mentioned in P7-1995 (former edition) and P7-2000 (new edition) should necessarily be used and the correct order for using these tools should be determined on a case-by-case basis. We also do not exclude the application of other tools. Taking new products and consumer goods into consideration, the selection and the order in which the tools should be used are unrestricted when devising a strategy for second developed product, imitation, production goods and services. The selection of the correct tools and their order of use should be carried out in accordance with the industry, business and properties of the product.

We do not feel it would be useful to impose limitations on the use of these tools such as “this tool should be used for planning” or guarantee that “everything will go well when all of these tools are used”. We firmly believe that the use of these tools will greatly enhance product planning. For example, you would be advised to use the conjoint analysis at the very least when you realize the usefulness of this analysis for optimizing a concept.

4.2 Products excluding Consumer Goods

Although it was recommended that the tools for planning the production of goods and services should be selected and used properly, P7-1995 (former edition) provided no concrete examples.

P7-2000 (new edition) recommends that the Grid Evaluation Method should be used instead of the group interview in order to properly understand the needs of consumers in relation to production goods and makes the point that the questionnaire survey is not essential.

With regard to the use of these tools in relation to services, the problem is that we cannot show concrete examples of a service. A new service requires good ideas in order to visualize it. The process is the same as that for consumer goods.

4.3 Small and Medium-sized Companies

P7-1995 (former edition) introduced tools for big companies and no concrete examples for small and medium-sized companies. There are many cases where it is difficult for small and medium-sized companies to carry out surveys and analysis due to limitations in human resources and funds.

P7-2000 (new edition) recommends that small and medium-sized companies should reinforce the interview survey and simplify the questionnaire survey.

4.4 Software

PLANPARTNER, which is the software referred to in P7-1995 (former edition) and which is manufactured by NEC Software Co. Ltd., is low priced and includes all tools mentioned in P7. In particular, metrical tools such as the positioning analysis and the conjoint analysis are popular among persons with an arts background and beginners in the field of planning and surveys. Some people, however, pointed out the bad operability of this special-purpose software.

Taking advantage of an opportunity to publish P7-2000 (new edition), we will develop software compatible with EXCEL in file with good operability by upgrading PLANPARTNER.

5. VERIFICATION OF “SEVEN TOOLS FOR NEW PRODUCT PLANNING”

5.1 Development of Pioneer Mini-Component Stereo “MDX707”

The System Planning Department of the Home Entertainment Company AV System Group in Pioneer Co. Ltd. started to reorganize its product planning system using “Seven Tools for New Product Planning” from January 1998 and obtained a succession of excellent results.

Pioneer is a well-established audio manufacturer that has been a leader in the manufacture of speakers. Although hanging on to its lead in the stereo market until the 1980s, it began to have fewer hit products and there was a general decline in the company's prosperity. It was ranked sixth (12%) in terms of sales at the beginning of 1998. In June 2000 after the elapse of only two years, Pioneer regained its top position and its sales exceeded 20% of the industry total. In 1999,

the sales of Pioneer products were still gaining momentum month by month. This increase was particularly evident in the average sales of mini-component stereos with MDs and registered a 200% increase over the previous year. Its ability to predict the rapid popularization of this type of stereo was important. However, there was a possibility that sales of mini-component stereos developed by other manufacturers would also increase. The crucial factor which distinguished Pioneer from other manufacturers was that Pioneer introduced the “Seven Tools for New Product Planning”.

The five models of mini-component stereos planned using the “Seven Tools for New Product Planning” comprise the MDX707 and A-55MD for the young, the FILL7MD with specifications for the top end of the market, the MDX717 superseding the MDX707, and the FILL RS7 based on a concept which differs from that of its sibling FILL7MD. These five models were put on sale consecutively from the latter half of 1998 and have been a great sales success. In particular, the MDX707 enjoys unrivalled popularity because of its cute appearance and the fact that there are eight pastel variations in its liquid crystal display (LCD) color. Where ordinary models have sold ten of thousands, the MDX707 has sold more than 170,000 units at a fast pace. Unfortunately, some selling opportunities were lost due to the late procurement of parts. The MDX707 is particularly popular among young women who were the chief target. The MDX717, a beautiful mini-component stereo superseding the MDX707, has speaker panels whose parts change in color in addition to an LCD which also changes color. There are thirty two color variations in the three parts that comprise its right and left speaker panels. Sales of this stereo now appear to be going well.

Adopting the design evaluation and the conjoint analysis to maintain an overall balance, Pioneer has recently developed new products in accordance with the process for new product planning as described in “Seven Tools for New Product Planning.”

The main factors that contributed to success in this case are as follows:

- (1) We were able to meet users' expectations regarding the design, size and the changing color display of the product by thoroughly applying the group interview technique.

- (2) We verified the feasibility of the new product quantitatively using the questionnaire survey.
- (3) We created added value by applying technical innovation to create such features as the changing color LED. It was these features that struck a deep chord in consumers.
- (4) We were able to plan the best model at low cost within a short period.

5.2 Development of Ricoh Digital Copying Machine "IMAGIO MF-200"

This digital copying machine is a groundbreaking, consumer-oriented product developed entirely by adopting "conjoint analysis", which is one of tools mentioned in "Seven Tools for New Product Planning". Ricoh's recent philosophy is "collaboration" meaning development of products in cooperation with consumers. Ricoh has achieved great success in its product planning by adopting "conjoint analysis" as its main tool to realize "collaboration". IMAGIO MF-200 is typical of the products developed based on this philosophy.

Ricoh planned a new product where the copies would be produced and stored inside the machine while traditional models produce copies that are then lodged in an external tray. This innovation means that this new digital machine is much more space efficient than traditional models. The planning for this machine was presented at the company and initially met with some opposition. As it was difficult to decide exactly how a new copying machine should be developed, conjoint analysis was conducted so that users' suggestions could be efficiently and accurately reflected in the final design. In the middle of 1996, the new machine was released and recorded an astonishing level of sales. When a new model of a copying machine sells more than 100,000 units, it is called a hit product. More than 420,000 units of the IMAGIO MF-200 have been sold over two years.

In this case, market requirements were clearly grasped through the application of the interview and questionnaire surveys. The results were verified through conjoint analysis to reveal and address any possible conflicting interests. Although the number of samples used in the conjoint analysis was not great, this product was very well received and ranked highly by the focus users. The efforts of the planners were

thus rewarded and a hit product was developed.

5.3 Development of Kobayashi Kirokushi Sealed Postcard "Post de Seal"

Kobayashi Kirokushi Co. Ltd. is a manufacturer specializing in measurement recording paper, various types of paper for computers and printing paper for corporations, and has a nationwide reputation for quality for these kinds of paper. With the advent of the electronic office, the demand for these products has reached its nadir and future growth seems unlikely. Electronic communication and information exchange between companies such as a paperless system, electronic mail, electronic recording and electronic commerce, excluding direct mail for people outside the company counted against this company's success. In spring 1996, the company started its first project to develop products for private use and pursued the planning in close accordance with the process described in "Seven Tools for New Product Planning". The first project focused on the field of "personal printer applications" which will create a great demand for paper in the future. To be more specific, the project tried to plan a fun product that can be used for ink-jet printers for the young such as college students and office women. Considering the prevailing environment at the time, including the rapid spread of personal computers and the much lower prices and the penetration of ink-jet printers into the home market, the project concentrated on the ink-jet printer market.

This new product is "Post de Seal". The paper most suited to ink-jet printers was also used for "Post de Seal". Letters and images can be clearly printed on both surfaces of a seal or a postcard. Twice as much information as can be contained on a traditional postcard can be sent and privacy is guaranteed using "Post de Seal". Moreover, users can experience surprise and pleasure by seeing a photograph or an illustration that appears after peeling the seal off the postcard. This is a totally novel experience and quite different from a traditional postcard. This is a very small product, but it makes a big impression. Although credit card companies and government offices sometimes placed a seal on a postcard in order to guarantee privacy, attractive postcards with a seal that would appeal to and be used by ordinary consumers were not available. "Post de Seal" is the perfect

solution for sending a tasteful and humorous private letter to a boyfriend or girlfriend and a thrilling DM.

Based on the group interview among students that are main potential users, many ideas were created. After evaluating these ideas by the questionnaire survey, it was possible to arrive at a general concept through the positioning analysis. Product ideas based on the concept were created and examined, and its name and packaging design were decided after conducting a group interview among students. Afterwards, producing quality tables and developing a special adhesion technique were promoted and the mass production system was geared up at the end of 1997. At first, "Post de Seal" went on sale independently at major stationery stores and then at a leading volume seller of personal computers in cooperation with very able marketing companies. A new enhanced product "Kira Mail" whose surface is a glittering hologram was developed. Although not advertised extensively, "Post de Seal" has been the largest selling product among these kinds of postcards since it began to be marketed three and a half years ago. Its marketability is high. This application contributed to innovation at the level of Kobayashi's product planning and development system aimed at ordinary consumers and made them aware of the importance of the planning cycle based on ideas and their verification. While it usually takes about ten years to have a success in a field that has never been entered before, Kobayashi succeeded in developing its first product for private use through effective application of "Seven Tools for New Product Planning".

6. CONCLUSION

This article introduced some cases where corporations were able to get good results using "Seven Tools for New Product Planning". In addition, "Seven Tools for New Product Planning" contributed to developing the Ricoh CD-R/RW Drive "MP6200 series", forecasting orders for Nissan "Stagea", developing Tombow Pencil correcting tapes⁴⁾ and developing Nissan "X-TRAIL"⁶⁾. It is considered that the effectiveness of product planning by applying the systematic tools mentioned in "Seven Tools for New Product Planning" has been verified by the examples

mentioned above. Not all of the seven tools mentioned in "Seven Tools for New Product Planning" were used for each application, and the ways in which these tools were applied differed according to the specific conditions prevailing at each corporation and for each product. As products developed to date are introduced in this article, the tools used for planning these products are what "Seven Tools for New Product Planning (P7-1995, former edition)" recommends.

"Seven Tools for New Product Planning" introduced in this article was well received by the public and made the headlines in Nikkei Business. In the light of these facts, it is expected that publication of the revised edition and a series of practical editions in three volumes^{3),4)} will give fresh impetus to seven tools in the future. There are some examples where the revised "Seven Tools for New Product Planning" has already been used for actual product planning and its applications are increasing. When the revision and updating of its content are required, we intend to improve the current edition of seven tools.

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