The Voice of the Product: Templates of New Product Emergence

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The paper presents a new framework of analyzing the product itself to infer about future market demands. This framework consists of past regularities that were identified to underlie the emergence of successful new products. By identifying templates of innovation an innovator may be able to predict the future product even before the market signals the needs or when the market information is not accessible. If successful in predicting new products by inspecting the product itself, innovation can be supported by the proposed knowledge system (i.e., the self catalytic dynamics of product evolution) which is invariant to market information. When market information is not accessible (typically in case of latent needs, genuinely new products) the product-based information is sufficiently effective to help in predicting future demands. The conclusion is that reflective practitioners should actively listen to the product and its trends as another source for ideation, because there is more relevant information embedded in the internal dynamics of product evolution than previously recognized in marketing practice.

Keywords: Creativity, ideation, templates, new product development.

Introduction: Regularities in New Product Emergence

Considerable research in marketing suggests that marketing forces drive the evolution of new products and services. Market driven new product ideas are often inferred from market needs and many product ideas emerge from asking customers to describe their problems with current products. This suggests that market-based information should be considered early in the stage of new product ideation. Furthermore, the concentration on market demands has led to the formation of methods devised to predict the success of new product innovations and performance measures such as sales and market share. The market, according to this view, impacts the product in many ways including development, rate of innovation, etc.

Recently, Goldenberg, Mazursky, and Solomon (1999 a) questioned whether new products should evolve solely on the basis of knowledge derived from *market-based* information, or whether there is an intrinsic *product-based* scheme stimulating development of products which complements market-based processes. The main thesis advanced in that research was that certain *regularities* in product-based trends are identifiable, objectively verifiable, generalizable across products, and learnable, and that these regularities, can serve as a facilitative tool that channels the ideation process.

Natural selection mechanisms

The idea behind this approach can be conceptualized by viewing the relations between products and their markets as consisting of *Natural Selection* mechanisms: products which fail to fulfill the needs of the customer disappear while products that satisfy consumer needs survive until the next change takes place in market demands. According to this axiom markets can be viewed as an *environmental pressure,* which forces products to constantly evolve. This view of *surviving of the fittest* is not inconsistent with the prevailing approach in which listening to the "voice of the customer" (environment inputs) is crucial for inducing changes that ensure success of the product.

According to our proposition, years of development yield a considerable amount of

information about customer needs that is accumulated and embedded in the product itself. Moreover, since failures in need satisfaction do not leave any traces, this information represents an effectively selected knowledge. The structure of the product then becomes a representation of past processes of the market. Accordingly, the question becomes can *we hear the voice of the customer by listening to the product?*

The Market as a Source for New Product Ideas

Over the past generation, marketing experts have developed valuable strategies and tools for predicting the success or failure of new products. They also developed methods for planning and designing products in response to "the voice of the customer" (e.g. the Conjoint Analysis or the House of Quality see detailed review in Urban and Hauser, 1993; Griffin and Hauser, 1993). We are accustomed to assuming that the use of these evaluation and prediction methods reduces the rate of failure of new products.

The concept that "the market determines the path of the product to success or failure" is also at the heart of the practice that considers consumers' preferences as the primary tool in planning a new product (e.g., Srinivasan 1997). This paradigm has lead to the current belief that the source of ideas for new products lies solely with those responsible for product success – the customers.

New ideas recently voiced note that genuinely innovative products, ones that take the market by surprise, are foreseen neither by the market nor by competitors. Marketers' disappointment in the market as a dry source of innovative products is aptly expressed by Urban and Von Hippel (1988), who claimed that the customer of a present product is in an inferior position to supply the researcher with information about his future needs They believe that while customers may be able to express their opinions about a product set before them and even predict whether or not it will succeed, they will be unable to foresee what new product they may require in the future.

Market research is indispensable

Griffin (1993) expressed doubt about consumers ability to foresee which products exactly should the firm develop, the details and features of the future blockbuster products, and more generally, they can not provide reliable information about anything with which they are not familiar or have not personally experienced.

Another argument that was presented in Goldenberg Mazursky and Solomon (1999b) can be illustrated by the following virtual experiment: Consider two market researchers representing two competing banks, hired to analyze market structures and benefits in order to help design two separate new savings plans for the banks. Also assume that they have similar abilities and qualifications, and both would sample the market using the same marketing research methods. The odds that one researcher will come across valuable information for a new product idea are associated with the chances that a person that is aware of the relevant need will fall into their sample. Since both marketers use approximately the same sample size (as they have similar research budgets), they have equal chances of capturing the same information bearer.

The chance of exposing a valuable information bearer will increase as demand for the product increases. Thus, where demand exists for a certain product – market research will be more successful in producing an idea likely to succeed. However, in such case, the market is already expecting this new product, and it is very likely that competitors are concurrently developing similar products given the high awareness. Thus, the battle for market innovation has shifted from the creative thinking arena to the professional mode where the bank must be able to prepare a more desirable plan, topped possibly by its introduction of the plan a few weeks ahead of the competition.

We may conclude then that in order to take the marketplace by surprise, a marketer must advance an unpredicted idea – one that does not yet exist in the marketplace. Such an idea must be captured even before the market submits strong signals to its need, rendering market research methods (for eliciting ideas) less effective.

Our above conclusion may be interpreted to mean that market research is of little value. In fact, the opposite is true; market research is indispensable. It can determine the best design of a product given market preferences, predict the product's success and ascertain the most appropriate time to launch the new product. Market research would become yet even more valuable, however, if we were to discover another source of ideas for new products, a source that would be able to predict accurately the possible future or latent needs. This source has to be invariant to the market based information, in our virtual example an innovative product that might catch competitors off-guard must be explored within a new source of ideas and information outside of the market itself.

Product-based Information as a Source for Product Ideas

A product that does not fulfill a vital need disappears, just as a living creature unable to compete for food dies out. Analogous to Darwin's theory of Natural Selection, this reasoning states that *given the changing needs of the marketplace over time, the products that will survive are those that adapt to the changing environment through alterations in their own attributes.* This implies that over time, the market needs are "mapped" or "encoded" into a product, which continues to accumulate properties that enable it to remain competitive. The product becomes a physical representation of the market benefits structure, and it contains all the information about the evolution of the needs. If correct, we should be able to infer market needs by "encoding" the product-based information.

For example, the moisturizing trait of a skin ointment attests to the lack of moisture in the skin where the ointment is used. We can reach this conclusion without having to ask the dry-skinned customer even a single question.[1] As another example, consider the sports shoes: The change from rigid soles to more pliable ones points to athletes' needs for their shoes to absorb the shock of their feet hitting the pavement while running or playing basketball. We may deduce this need without consulting orthopedic doctors or professional basketball players.

Just as market researchers attempt to identify trends in the marketplace on which to base a new generation of products, we can identify market trends by analyzing a product itself in order to predict the basic attributes of a new product. A trend embedded in a product can be described as a series of discernable and measurable alterations, that when analyzed can be used to predict the next alteration in the series.[2]

The templates that were identified in Goldenberg, Mazursky and Solomon (1999a), are, in fact, a well-defined sequence of operators that manipulate the product based information. The evidence that 70% of the successful new products can be pertained to one of 5 templates, along with the evidence that in failure products less than 8% can be pertained to a template (Goldenberg, Lehmann and Mazursky, 1999) implies that the search of new ideas within the bounded scopes of a templates may be an efficient exploration. Because the templates consist of a source of information which is invariant to the market at least potentially one can predict a new product emergence even before the market provides the necessary signal. This argument is discussed in detail in Goldenberg, Mazursky and Solomon (1999b).

Introducing the Attribute Dependency Template via a Case Analysis: Baby Ointment

Baby ointment is designed to ease the pain from rashes on a baby's delicate skin, to heal the baby's skin and possibly to prevent the rash from reappearing. Rashes appear mostly in the groined area due to prolonged contact with the diapers that absorb babies' excretions. The ointment under discussion is composed of a fatty substance, a moisturizer for nourishing the skin and an active ingredient for healing the burn. In this case it is interesting to note that the basic concept and even the formulas used in this product remained unchanged ever since the beginning of the century.

As already stated, numerous methods deal with the important issues of product design and value enhancement for successful market penetration. Several recognized methods examine customer preferences in order to create the most preferable profile for a new ointment, which in turn helps forecast a preliminary prediction of the product's success. We emphasise again that we do not wish to refer to such methods here – not because they are inferior, rather because we present here a different perspective in approaching ideation. When the time comes to innovate, the choice of method will depend on the market situation and the internal situation of the firm.

A different approach to ideation perspective

Back to the case at hand: If a firm were to develop a strategy to launch new products in the market, it could create a pubic awakening. After all, who would the public deem the leading baby-ointment manufacturer: the company that has changed nothing in several decades or the company that delivers new advantages and responds to changing need every few months? But how could our firm come up with new product ideas? We mentioned that we must be able to "read" information embedded in a product as if we were reading a roadmap of potential changes. The most common template identified in Goldenberg, Mazursky and Solomon (1999) was Attribute Dependency, in which **two unrelated variables become interdependent.** An example of this template is a disposable diaper that changes color upon urination. Before the advent of this new product, diaper color was unchangeable. The innovative product establishes a dependency between the presence of urine and the appearance of a color. The basic color (e.g., pink) changes to a

different color (say blue) along a certain area of the diaper after a baby urinates. The structure of this template in the case of diaper is depicted in Figure 1.

Another example of other products that can be pertained to this template are eyeglasses that change color according to the level of radiation they absorb – where the color of the lenses becomes darker in the light and lighter in dark.

In order to develop a baby ointment along the Attribute Dependency template, we first must explore the product and its immediate surroundings in search of relevant *variables*. There is a distinction between internal variables and external variable. While internal variables are controlled by the manufacturer, the external variables are defined as existing in the immediate surroundings of the product yet they cannot be controlled by the manufacturer. In the case of sunglasses above, the color is an internal variable and the sun radiation is external variable. The following variables were noted by consumers in a few depth interviews:

- **Internal variables**: viscosity of the ointment; odor; amount of fatty substance; color; and amount of active substance
- **External variables**: amount of excretions at a given moment; acidity of excretion; sensitivity of the baby's skin; the baby's age; type of food the baby consumes; and time of day.

After the variables' space is outlined a forecasting matrix is constructed: the columns of the matrix consist of internal variables solely, the rows of the matrix may consist of a mixture of internal and external variables. When there is no dependence between two variables, the relevant matrix element is marked with a zero. Just as there had been no dependency in the past between diaper color and presence of urine (Figure 1) so is there no dependency here between color of ointment and amount of excretions at a given moment (element D1). Thus D1 is marked 0. A partial matrix is presented in Figure 2.

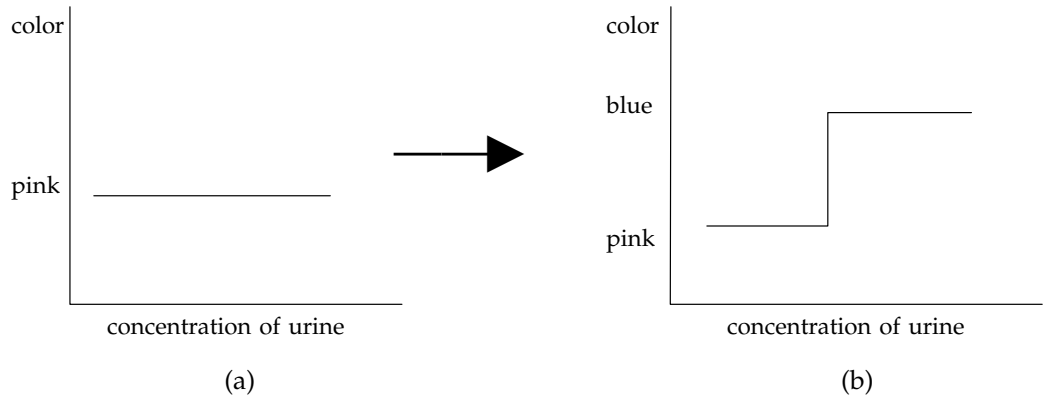

Figure 1. The outcomes of the Attribute Dependency template - a diaper's color change.

	Viscosity **A**	**Odor** **B**	**Amount of active substance** **C**	**Color** **D**	**Amount of fatty substance** **E**
1) Amount of excretions at given moment	0	0	0	0	0
2) pH	0	0	0	0	0
3) Sensitivity of skin	0	0	0	0	0
4) Age	0	0	0	0	0
5) Type of food	0	0	0	0	0
6) Time of day	0	0	0	0	0

Figure 2. A partial matrix of baby ointment variables.

All the elements in the above matrix are in the "zero mode". That notes that no relationship exists between the dependent and independent variables. Does the above matrix indicate anything about the product? The categories? The marketplace? Although the zero-mode matrix is composed of data about the product, it actually reflects the market situation. The ointment, which is considered to be high quality product, has not changed for decades. This lack of change is illustrated by the zero matrix above. This situation may have three possible explanations:

1. **The manufacturer accurately predicted the market a hundred years ahead.** The original designer and planner of the ointment might have understood market needs, changes in associated products such as diapers, and societal and family shifts so well that the company need not search for new products that were unavailable in his time.
2. **The market for ointment has not undergone any social or economic change.** Needs that existed decades ago have been frozen and are still relevant today.
3. **For various reasons, manufacturers have refrained from disturbing the market to search for new needs**. This inactivity has caused a kind of slumber in both market expectation and product development. As awareness of needs arises, product development occurs followed by emergence of new products.

In the complex reality of the marketing world, each of the above explanations has its place. If we were conducting this analysis in 1910 (few years after the first ointments were introduced), explanation No. 2 would be most accurate. Present-day reality, however, clearly points to explanation No. 3. Although the manufacturers have not consciously anesthetized the market, there is a reason to believe that we are standing at the threshold of the quiet before the storm – an avalanche of new products flooding the marketplace as soon as the first product is introduced.

This example is a rare and extreme case. In most cases, the picture will not be so sharp nor shall the events in the marketplace take such a dramatic turn. Even so, we argue that the matrix can be used to predict new products on the horizon – though not the best timing for their introduction to the market. Timing, launch strategy and appropriate marketing mix are not tied to the methodical search for new product ideas. Instead, they follow the process for identifying products that may seem promising at first glance. Therefore, the purpose of the matrix is to elicit promising ideas that may be introduced when the time is right.

The matrix may help us develop new ideas through the Attribute Dependency mentioned above. The procedure is outlined below:

1. For each "zero mode" element, define a new dependency, namely, how will the two independent variables become dependent on each other?
2. Preliminarily examine whether the product is able to sustain the added dependency.
3. Find and define the benefits of the new idea by searching the new product structure. What would the advantage be for the customer using the new product?

Let us review a few elements of the matrix one by one.

Matrix Cell B1: Odor and Amount of Excretion

1. **Define the added dependency.** In contemporary baby ointment products, the ointment's odor remains constant regardless of the amount of a baby's excretion. We may introduce a new dependency, whereby the ointment remains odorless as long as no excretions are present in the diaper but gives off a (pleasant) fragrance as soon as excrement is present.
2. **Ascertain product feasibility.** At this stage, we must address the question, "Is there any use in continuing in this direction?" We could probably find some way to introduce into the ointment tiny capsules containing a pleasant-smelling substance. The capsules would "explode" when they come into contact with an acidic substance such as excretion, releasing into the air the pleasant odor. If the addition of this dependency would require a substantive R&D or the addition of toxic substances into the ointment, however, the idea likely will be discarded at this point.
3. **Search for benefits.** One must tread carefully here. At first glance, we might not see a need for a fragrant ointment product. Solid excretion gives off an odor in any case, announcing its appearance. Liquid excretions, which are less odorous, are denoted already by a change in the color of the diaper.

Yet the experienced user of templates will notice these valuable clues: the addition of an excretion-dependent color dimension to

the diaper clearly shows both the **need and relevance** for an excretion-dependent odor dimension. A careful examination will reveal the reason. When diapers are covered with layers of clothing, a visual indication of the presence of liquid excretion will not be noticeable. An odorous ointment would provide a parent with a distinct advantage, sparing them the need to remove the baby's pants to check on the state of the diaper, and saving the baby from a long wait for a change of diaper.

Matrix Cell A6: Time and Viscosity

1. **Define the added dependency.** In contemporary baby ointment products, the ointment's viscosity is not time-dependent: it has the same viscosity day and night. We may present a new dependency, whereby the ointment will be viscous at certain times of the day and liquid at other times.
2. **Ascertain product feasibility.** At first glance, periodic changes in the viscosity of ointment might seem too complex and costly to develop, even without considering the benefits of such an ointment. The first reaction therefore might be to rule out this possibility.

Differing attribute dependencies

Here we would be prudent to note the existence of two different kinds of attribute dependencies: those **within** the product attributes, and those **between** them. In cases where it would be impossible to impose a "spontaneous alteration of the product a dependency that the customer can control directly may be added instead (e.g., as in pain relievers for day and night). Accordingly, we may present a package containing two ointments – one thick and lathery (viscous) and one light and airy (liquid) – for the parent to use at the prescribed time.

3. **Search for benefits.** Without a clear advantage, no parent will buy a double quantity of ointment or waste his/her time using different ointments at different times. A clear definition of the timing (i.e., when to use a viscous ointment and when to use a lighter, airier one) is required.

Answers to a short questionnaire (regarding this new concept) filled out by parents have shown that a viscous ointment is advantageous at night when diapers are changed less frequently, since the ointment can serve as a barrier between the excretions and the baby's sensitive skin. In the daytime, when babies' diapers are changed more frequently, we may allow the baby's skin to "breathe" by using the lighter cream.

Accordingly, the customer might be presented with this new concept by stressing the above-mentioned benefits. Parents would appreciate a viscous ointment at night so that both they and their babies will sleep peacefully. They would want the liquid ointment in the day to allow their babies' skin to breathe. When presented with a choice between this adaptive ointment and an ointment with constant viscosity, the customer may associate the adaptive ointments with other adaptive habits – day and night pain relievers, day and night diapers, etc. Thus he or she may agree to try the new product concept.

Column C

Let us now examine the possibilities in column C of the matrix. The concentration of the active ingredient in our product is currently the same for all existing ointments. Remembering that the added dependency may be delivered between the product attributes, we will ignore for the moment the difficulty of a "spontaneous" change in the ointment. Let us instead offer a series of ointments with different concentrations of the active ingredient. The change in dimension will be expressed by external variables: baby's age, type of diet and degree of skin sensitivity.[3]

Consider the connection between the concentration of the active ingredient and the baby's diet: Newborns usually begin their lives nursing on mother's milk, graduate to a synthetic milk formula, then progress to baby food. They also might receive homemade pureed vegetables or soups. Each dietary stage contributes to a different pH level in their excretions, and thus to differing exposures to skin irritation. Here, the added dependency may be expressed as a series of ointments adapted to each dietary stage. Again, the launched product may be better suited to each dietary stage via different combinations of ingredients – in contrast to an all-circumstance product – may attract the attention of a parent. Column C contains several possibilities for such ointments targeting varying circumstances.

Managing the Ideation Process Issues

A Degenerated Matrix Versus a Saturated Matrix

In this paper, baby ointment has been described through a matrix in which all

elements were in the zero mode. We may assume that in time many "1" positions will appear on this matrix. Let us define two extremes, a degenerated matrix and a saturated matrix.

- *A degenerated matrix* is one in which all or most elements are in the zero mode (i.e. Figure 3A)
- *A saturated matrix* is one in which most cells are in mode "1," indicating that many variables are interdependent (Fig. 3B).

	A	B	C	D
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0

Figure 3A. A Degenerated Matrix

	A	B	C	D
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1

Figure 3B. a saturated matrix

A degenerated matrix suggests the potential to offer the market new products with several new benefits not yet materialized. The manager has to examine the market situation carefully to arrive at an appropriate decision: Should the firm introduce new products? Should the firm enter this market at all? Should he wait, and if so, how long? By contrast, a saturated matrix suggests that the firm may have "missed the boat": The communication between product developers and the market have already yielded many new Attribute Dependency based products. Now that the firm decided to join the game, a little room for maneuvering is left.

Coming across a saturated matrix situation, we must realize that analysis will be much more difficult. The number of innovations that our matrix can help us find will be smaller, and in many cases these innovations may have already been foreseen. A saturated matrix, however, contains other valuable information. The product indeed might have exhausted its potential for development, from this template's perspective. If so, no marketing efforts will change this fact. In such a case, two alternatives should be examined:

- **Analysis of another product**. Often, a firm has several products to which changes may be made.
- **Use another template.** The rules of product development obey codes other than just the Attribute Dependency.

In reality, matrices are rarely extreme, but instead exhibit intermediate situations. Therefore, the decision-making process must be carried out while at the same time considering the extent of the matrix's inclination to one or the other extreme – degeneration or saturation. Awareness of the dynamics in the categories of the products under consideration should also be maintained.

In practice, it is not always necessary to prepare a matrix for each and every product in order to practice observing products or to find new opportunities. The purpose of the matrix is to regulate our thinking by establishing an order with easy-to-follow rules. As mentioned earlier approximately 70% of the successful products follow one of five templates. Approximately 50% of them follow this template. This means that by applying the Attribute Dependency template rules as predefined paths, we may be able to predict the appearance of some 30% of successful products even before their appearance on the market.

Conclusions

A game with fixed rules

The developers of the Dominos Pizza service, the Walkman, the 3M's Post-it and so forth, did not know that they were in fact playing a game with fixed rules. The principle of templates was not known at the time, therefore they could not have used it. The relevant aspect is whether we can learn from their and others' creativity, and thus mould their examples into a new pattern of understanding to facilitate our search for innovative ideas. Preliminary examination of those ideas (such as those carried out by Concept tests) may enable us to evaluate the most appropriate next step. In essence, the tests will help us determine which ideas should be developed, and when and how to present them to the marketplace.

Those firms who engage with ideas by gleaning ideas from product based information (in addition to the traditional reliance on

market based knowledge) may gain two distinct advantages:

1. Their ability to be first to the market may be enhanced, in those cases that the competitors will be slower to develop ideas by examining market needs.
2. Manufacturers may be able to plan how to channel the imminent demands to their benefit by preparing ahead of time.

In our daily chase for solutions to current problems, we often tend to forget that we may be able to change significantly a company's direction by making only small alterations. This is, perhaps, the main advantage of creative ideas. This paper is not focusing on organizational aspects of creativity management (e.g., Rickards, 1998; Quinn, 1985), or factors that may govern the interaction between various types of organization and innovation management paradigms (e.g., Rickards and Moger, 1999). It is suggested here that further research on the ways the template approach is related to these important aspects is needed.

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Notes

1. Note that analysis of the ointment's attributes cannot teach us about the size of the market defined as "dry-skinned", nor about the habits of product consumption. This may be learned only through market research.
2. Note the difference between this approach and the product- or production-orientation. We claim that we can forecast marketplace requirements by observing changes in products, which themselves follow the market changes.
3. Indeed, series of products already exist for various skin sensitivities (e.g. shaving cream for regular and sensitive skin).

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