

# Use the concept of the social capital to search enterprise's competitive environment

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**Abstract**—The motivation of this study is based on the potential strategies of industry are difficult to be found. Therefore, we propose the model to find the enterprise's strategy. The purpose is to obtain valuable concept and strategy early. The analysis data of this study are cell-phones which Taiwan in 2002. First, collect the specification of cell-phone into structural files through the principle of open coding of the ground theory. And then it produce the strategically graph. Finally, utilizing the principle of social position (The initial position is best) to calculate the position of each node and used for judging the value of concept. From the experiment result, this study could discover the products development strategy of enterprises with scenario that combine from cell-phone data. Besides, it can find the powerful concept through the position. The contribution to this study is offer a method lets decision maker to find the productive strategy from product's data on the market. These strategies can cause user's interest in products and develop the bigger product market.

**Keywords**—social capital, text mining, grounded theory

## I. INTRODUCTION AND RELATED WORK

The general product development procedure has six steps, including planning, concept development, system-level design, detail design, testing and refinement, and production ramp-up. Among them concept development includes confirming customer's demand, setting the objective specification, produced the concept, chose the concept, and so on. And set objective specification is the clearly description products detail in order to accord with the customer's demand. Therefore, these describe that though contribute to understanding the project that customers are interested in the products, but unable to offer precise leadership in design and manufacture. Thus, have a lot of products getting used for testing the market (especially the electronic product). In order to reduce the step which to produce the test product and accords with customer's demand at the same time. The enterprises must have better methods to support.

### A. What is business's chance

The 80/20 rules observed while implementing Customer relationship management (CRM) of enterprises, it means have a few customers that majority contribute regard to enterprise as the VIP guest. However, when the internet can link all persons

and things together, enterprise will find the products that in the past very difficult to sell out can find consumers through various kinds of ways too. All people may become consumers and needn't lock the special group to propagate at this time. The most important to enterprise should produce some products and meet the consumer's demand.

The product life cycle is shorter and shorter if the speed of information flow is faster and faster. It is a very interesting study problem how enterprises compete with other enterprises and not lose the advantage. If they want maintain the competition advantage, should understand the rival's production strategy first. Only by understanding their strategy can it make a response immediately. Therefore, this study will build the competitive scenario first and then helps to find out their chance.

### B. What is the chance

According to the Wikipedia [2] definition, chance commonly refers to probability, luck, randomness and contingency. (1) Probability, or chance, is a way of expressing knowledge or belief that an event will occur or has occurred. (2) Luck (also called fortuity) is a chance happening, or that which happens beyond a person's control. Luck can be good or bad (as in; Good fortune or misfortune). (3) Randomness is a lack of order, purpose, cause, or predictability. Randomness, as defined by Aristotle, is the situation when a choice is to be made which has no logical component by which to determine or make the choice. (4) In philosophy and logic, contingency is the status of propositions that are not necessarily true or necessarily false. (5) Ancient Greek philosophy had two concepts of chance, both causes of effects that happen incidentally. (6) One of the surviving fragments of Leucippus says: "Nothing occurs at random, but everything for a reason and by necessity".

In the past, chance cannot be operated. Until 2003, professor Ohsawa defined the term "chance" is such a rare event or a situation, which provides opportunities or risks for human decision making or problem solving [3][4]. Furthermore, professor Ohsawa proposed an algorithms "KeyGraph" that discovery chances builds a significant dimension to intelligence [5].

### C. How to find business's chance

In the past, a lot of methods were used for finding the opportunity of enterprises. In accordance with the distinguishing structurally of data, the structural data rely on the data mining analyses, and the non-structural data are analyzed with text mining. The famous example is a retailer Wal-Mart finding the relationship of Thursday, Diaper, and beer. It is analyzed and found by the market basket analysis of data mining, that appear is consumers will buy diaper and beer at the some on Thursday according to data. Such a discovery has offered Wal-Mart to associate it with more marketing ideas. In fact, the market basket analysis is reaching and crossing the marketing analysis method. What merits an attention is though found the rule it does not mean causality. The example of non-structural data is Google combine text mining and PageRank to calculate likelihood of two documents. They offer an accurately result of searching to users; this lets it establish and set up the leading position of search.

Although the methods that data mining and text mining have already been applied to different fields. But in a situation that the environment is more and more complicated, the regular rule to appear has already been turned into the vicious circle that a market dismembered. It is very difficult to bring more interests to enterprises, so they begin to look for the direction that seldom appear but have development potentiality. How to find as for wanting? One of methods is KeyGraph that combined text mining with graph theory and proposed by Dr. Ohsawa in 1998. Then he called this method as "Chance Discovery" extensive applying to a lot of fields further.

### D. How to find customer's demand

Since the process of producing the products is complicated and consuming time. It is a big problem how to produce the products that can sell on the market to make the enterprise not lose. And analyze the specification of the products that perhaps can know customer's opinion and marketing strategy on enterprises. So this study is to analyze the cell-phone specification and attempting to distinguish the marketing strategy and position for every company. If enterprises want to get higher interests must obtain the occupation rate of market. And the products produced can attract consumers to be helpful to improving the occupation rate of market.

## II. METHODOLOGY

We are unable to get the consideration's factor of product design in the company and to analyze. However, in order to know the customer's preferences for products, we can analyze the market on sales of products. So from the Web search on cell phone specification information can be obtained such a result.

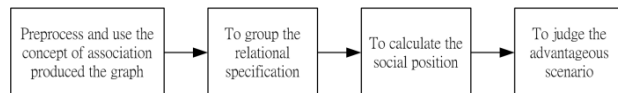


Figure 1. Step of study

### A. Step 1 -- preprocessing

The specification of cell-phone must be preprocessed to the same test format. Since companies in the web to place the

specifications of cell-phone are not exactly the same way. Sometimes the same function may have to use a different word. For example, "directory" and "address book" should be the same meaning must be reunified. Other specifications may also have the scope of information. We will be the average and standard deviation to determine the extent of them. Finally, use these data to generate the graph.

### B. Step 2 -- concept emerged

There is a situation can be found in the graph. We can understand which specification of cell-phone is importance for different company. We hoped that can after observing the graph be possible to obtain such preliminary result.

### C. Step 3 -- the importance of concept

In this step, we used the concept of social capital to calculate the social position of each specification on the graph. The specification has the different position because of the affiliation between specifications.

$$\begin{aligned}
 \text{Business Social Capital} &= \sum_{b \in S} \text{assoc}(a, b) \\
 &1, \text{ if } a \in S \text{ and } b \in S \\
 &0, \text{ if } a \in S \text{ or } b \in S
 \end{aligned} \tag{1}$$

where a and b means different specification of cell-phone. S means sentence.

### D. Step 4 -- value emerged

After obtaining the specification's position, it can carry on the strategy analysis. For example, observed present environment and decide next occupies market. Or decide to cooperate with other companies to strengthen their own shortcomings.

## III. EXPERIMENT AND EXPLANATION

In this study, we collected the specification of cell-phone from web during 2002. The data only contain in the Taiwan going on the market and the website has the provision. After preprocessing, uses the association graph to present it. In this study, the association means connect the brand with specification / function. The data structure presents as follows "NOKIA 3650 MemoryCards Store Picture Image File Game." In the data, separates the different specification word by the blank space. Finally, our analyze data altogether has 314sentences.

First presents the association graph of market scenario to be as follows.

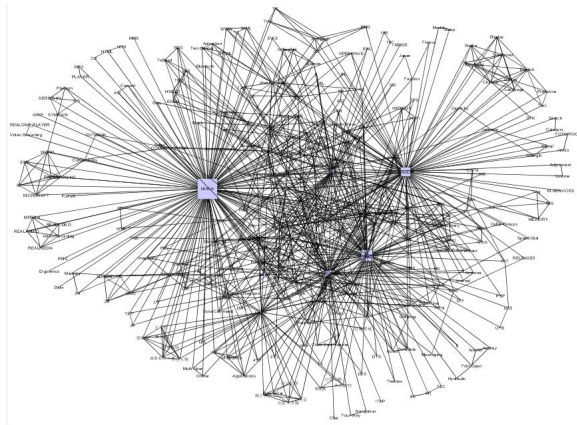


Figure 2. The graph of all data

From figure 2, these points (Motorola, Nokia, NEC, Samsung, and Sagem) are all names of the brand. We can see from graph that form different cluster through the association of specification / function. This graph must classify according to people's cognition of cell-phone. So the next step to cluster these specification / function.

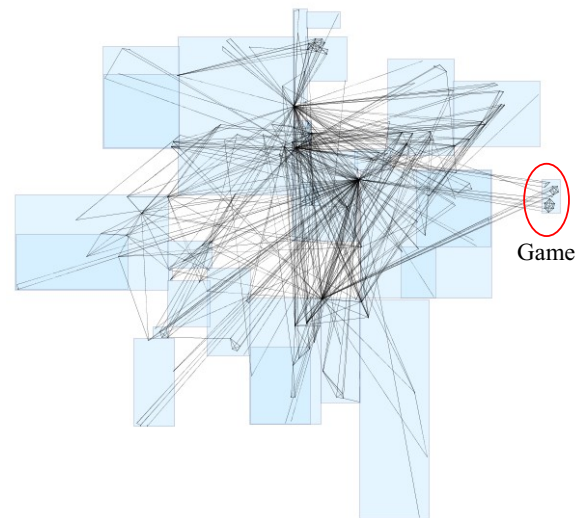


Figure 3. Fining the group of "Game"

Figure 3 is the result after clustering. We utilize inherent knowledge from people to classify specification / function. For example, mp3, midi, and wav are all group of audio format. Each group represented the similar specification or function. The purpose is enabling the decision maker to see the degree of attention to specification and develop the situation of every enterprise. If lock the goal in one group of "Game." We can get figure 4.

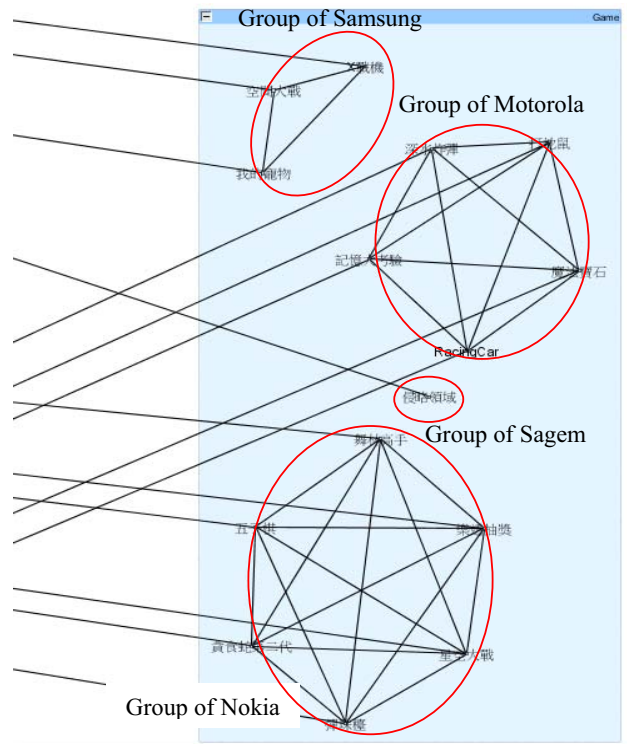


Figure 4. The result after group "Game" enlarged

Figure 4 is the group "Game" enlarged; we can see that there are 4 sub-groups in group "Game." And these groups to represent the items of game develop in each company. According to the ability of game's development can get the following rank, Nokia > Motorola > Samsung > Sagem > NEC. However, we know the ability of enterprises can't be only compared by the single item. So this study attempts to display the competition relation among enterprises in terms of macrocosm. Figure 5 is another graph layout (Circular) according to the figure 3.

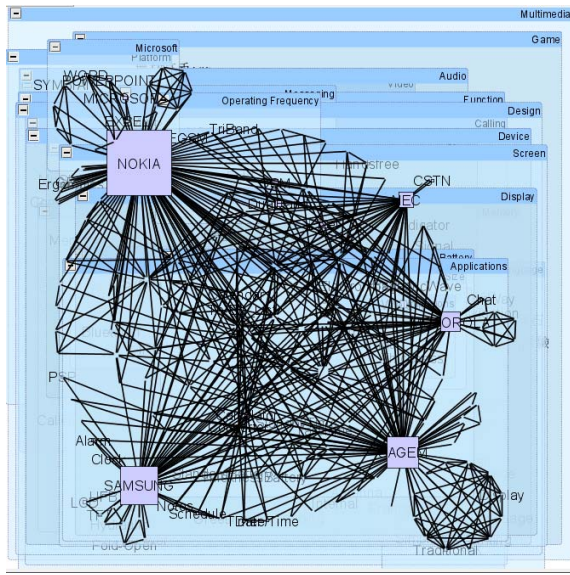


Figure 5. The resource of each company

We can see the specification linked among center is resources that enterprises have at the same time from figure 5. And the peripheral ringlet is the development in different fields of enterprise. For example, Nokia shows 3 different fields, including the office tools (Word, Excel), game, and operating platform (Symbian). The Samsung is screen (LCD), Sagem is language (such as simplified and traditional Chinese), and Motorola is equally the game.

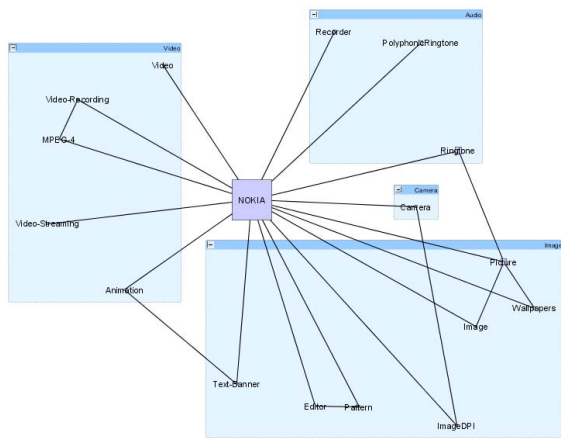


Figure 6. The specification of Nokia

If from the view point of diversity management, Nokia is a champion. However, it is not good news for other companies. So they should observe more things that Nokia want to do in the next step. And they need to try every possible strategy to vie for attacking this market and obtaining more profits ahead of time.

If Motorola wants to find the marketing strategy from resource that they have. They needs consider the multimedia development (image, audio, and video) of Nokia. We can know

this market is not still big at present through figure 7. If Motorola can develop this market actively, they should be having great benefit.

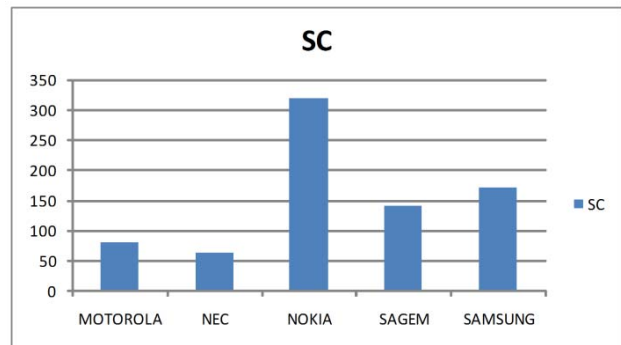


Figure 7. Association value

In the concept of the social capital, the development potentiality of having more resources of enterprises is relatively great. So, table I expresses the value of enterprises after calculating the social position (Eq. 1). We can find out the leader is Nokia and NEC is last from figure 7. Others include the Samsung, Sagem, or Motorola that the next one may catch up with Nokia.

TABLE I. THE CELL-PHONE'S SALES VOLUME IN 2002

Brand	Sales volume <sup>a</sup>
NOKIA	35.1%
MOTOROLA	16.3%
SAMSUNG	9.8%
OTHER	38.8%

a. Source: strategy analytics

This study from the point of qualitative research and social capital combine with text mining and graph theory proposed a method that observes the environment of competition for every enterprise. The purpose is hope to looking for enterprise's business model from other dimension. And the experimental result confirmed after data and graph processing can present enterprise's environment of competition effectively. Then table I can also confirm the Nokia is leader in the industry.

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