Analyze word-of-mouth effect in terms of macro-behavior: The herd behavior in Chinese market

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Abstract

Though world-of-mouth (WOM) communications is a pervasive and intriguing phenomenon, little is known on its effect in terms of macro-behavior. The purpose of this study is to investigate the WOM effect on macro-level marketing to explain the herd behavior of Chinese consumers. To achieve our goal, the system dynamics was applied build a simulation model for a popular herd behavior happening in Macao, Hong Kong, and Taiwan, i.e., buying Portuguese custard tarts. Both micro-behavior and macro-behavior were considered in this model and the linkage between micro-behavior and macro-behavior was specially emphasized. The results showed that the market of Portuguese custard tarts would crash quickly under fast distribution of WOM and herd behavior while considering the limitation of capacity.

Keywords: Swarm, System Dynamics, Herd Behavior

1. Introduction

Today, the importance of consumer-to-consumer interactions and word-of-mouth (WOM) is getting emphasized. Since the society has transformed from production-oriented to consumer-oriented, consumer power is growing. As the customer's participation is getting important in creating value (Prahalad and Ramaswamy, 2000), consumer-to-consumer interactions and WOM become vital for customers' purchase decisions. Moreover, messages received from WOM are usually viewed as more creditable than firm-initiated promotional activities. According to Gladwell's (2003) research, about two-thirds of all consumer product decisions are influenced by WOM. Therefore, more and more marketing researchers emphasize the behavior changes caused by consumers' interactions. Now, consumer-to-consumer interactions and WOM become the major foundation of developing marketing strategies (Ozcan, 2004).

Though consumer-to-consumer interactions and WOM communications are pervasive and intriguing phenomena, little is known on their effects in terms of macro-behavior. Existing researches about WOM usually observe consumer behaviors at micro-level and ignore the dynamics of the consumer communication. Moreover, the results aggregated from individual behavior are not necessarily equal to the presentation of the macro-behavior. Macro-behavior may distort what most individuals believe or come to believe (Chen and Liao, 2005). The illustration for behavior changes at macro level aggregated from micro-behavior is lack, and hence, is a substantial gap in marketing research.

As to the linkage between micro-behavior and macro-behavior, the mediating mechanisms between the micro- and macro-level WOM processes are still quite vague (Ozcan, 2004). WOM at the aggregate level is not just the aggregation of individuals' WOM processes. The individual WOM episodes sometimes would lead to consumers' wish for similarity and consensus with others and this wish can be

rather dangerous if not based on actual similarity and consensus. Therefore, to study how individual WOM episodes aggregate into a widespread macro-behavior is valuable. The major purpose of this study is to discuss the symptoms of the macro-behaviors caused by WOM effects.

Why is the WOM effect on macro-behavior so important? When people share their consumption experiences through WOM communication, the flow of WOM within the marketplace will lead to consumers' convergent behavior, which is so called "herd behavior." According to Rook (2006), "herd behavior refers to the phenomenon of people following a crowd for a given period." The basic cause of herd behavior is that individuals face similar decision problems, which fact means that people have similar information, face similar alternatives, and face similar trade-offs (Bikhchandani et al., 1998). Consequently, people make similar choices and led to the swarm phenomenon. Usually, the result of herd behavior would result in terrible consequences, and even sometime cause the market broken.

In Greater China (including Mainland China, Hong Kong, and Taiwan), the terrible consequence caused by herd behavior is quite widespread. For example, when China has achieved a remarkable economic upswing, the stock market is facing the problem of herd behavior. Recently, the stock prices in Shanghai Stock Market showed a heavy slump in prices and herd behavior is found in the down market: many Chinese bided lower without reference to stocks' true values. These people appear to be driven by a herd instinct and don't seem to be aware of the costs involved. Another example is the visiting of the Hong Kong Disneyland. In 2006, Disney underestimated the number of people who would visit during Mainland China's weeklong Lunar New Year holiday, and hence, vacationing crowds poured in, filling the park to its maximum capacity. The worse thing was that the HK Disney officials ordered the gates shut, and hundreds of angry guests from China who held valid tickets found themselves unable to enter. Some excluded guests engaged in shouting with park

staffs, and some tried to climb over the park's wrought-iron fence. The harmful information has hurt the image of HK Disneyland, and, further lead to negative WOM and relatively low intention to visit.

According the above discussions, the purpose of this study is to conduct a generalized simulation model to discuss the herd behavior happened in Greater China. We try to explain why people tend to converge on similar behavior (i.e., herding) and why mass behavior is prone to error and fads. System dynamics is considered as a suitable tool to analyze the herd behavior in Chinese market to offer implications of economics and business strategies. The remainder of this paper is structured as follows. The next section is to review related literature, including consumer-to-consumer interactions and WOM, herd behavior and the application of System Dynamics to WOM. The basic model is presented in Section 3 and analyzed in Section 4. Finally, the results, several extensions and management implication are discussed in Section 5.

2. Literature Review

2.1 Consumer-to-Consumer Interactions and WOM

Until now, most marketing researches have discussed the issues about firm-to-firm and firm-to-consumer interactions to understand the market's operating structure and dynamics (Ozcan, 2004). While the role of the consumer shifts from a traditional passive role to an active player, the society transforms from supplier-oriented into consumer-oriented. Consumers often exchange interpersonal information when they recommend products or services such as the purchase of a new computer or restaurants for special occasions (Argo et al., 2006). Therefore, consumer-to-consumer interactions (CCI) and word-of-mouth (WOM) are getting emphasized for both theory and practice in marketing (Ozcan, 2004). There is increasing interest in studying CCI and WOM, which are as the processes by which

consumer-to-consumer interactions occur.

To date, research investigating CCI has primarily been conducted in service settings or in network society and viewed other customers as either a characteristic of the services cape such as crowding effects (e.g., Eroglu and Machleit, 1990; Grewal et al., 2003; Hui and Bateson, 1991) or an independent part of the experience of the service (e.g., Grove and Fisk, 1997; Moore and Moore, 2005). However, one facet of consumer-to-consumer communication that has been largely overlooked is to systematize and formalize CCI and WOM at macro level. Although many researches indicated that WOM has a significant effect on consumers' attitudes and purchasing behaviors (e.g., Bansal and Voyer, 2000; Bone, 1995), surprisingly, there is little research that examines its power at macro-level.

Why should CCI and WOM be observed at macro level? It should be noticed that most existing researches use WOM effect as the behavior after certain marketing effort and ignore the psychological aspects of WOM (Sundaram et al., 1998). While people share their consumption experience through WOM communication, the flow of WOM within the marketplace could reduce consumers' perceived risk and hence, lead to swarm behavior. In addition, most of the studies that have investigated the consequences of WOM focus on purchase intention or actual purchase behavior. As to Ozcan's (2004) opinion, until now, little is known on the mediating routes and mechanisms, through which WOM might exert its influence on a market system.

At a broader level, WOM would affect the consumer welfare since information asymmetries are alleviated through the contributions by opinion leaders and market mavens (Price et al., 1987). When we observe WOM at macro-level, what everyone else is doing may reflect information that they have and we do not. It then turns out a possible consequence that people try to use other ones' information. This phenomenon is so called herd behavior—"everyone doing what everyone else is doing, even when their private information suggests doing something quite different" (Banerjee, 1992).

Therefore, we propose that shifting the focus of WOM research from micro-level to macro-level would allow us to link micro-macro WOM effects.

Except the gap of research directions, existing studies also exhibit methodological limitations on CCI and WOM communication. A great majority of studies on WOM used subjective self-report methods (such as field survey and observation, experimentation, or game theory) to conduct related researches on consumers' WOM behaviors. To the extent that they reliably tap into previously experienced states and behaviors, self-reported measures can claim to have some ecological validity. Unfortunately, as is evident from methodological choices, the lack of external validity with respect to the true phenomenon at hand is the main problem, even though the obtained internal validity looks remarkable (Ozcan, 2004). Significant breakthroughs in our knowledge of WOM behavior could be expected to come from studying WOM from macro level.

Based on the above discussion, we have known that consumers' herd behavior, which focuses on consumers' macro-behavior rather than micro-behavior, caused by consumer-to-consumer interactions and WOM is ignored. In the following, literature on herd behavior will be discussed.

2.2 Herd Behavior

Herd behavior referring to "the phenomenon of people following a crowd for a given period" (Rook, 2006) has been studied by many economists and sociologists. Machiavelli (1514) wrote that "men nearly always follow the tracks made by others and proceed in their affairs by imitation." As to the reason of following others' actions, Fiske and Taylor (1991) argued that is because human beings are "cognitive misers," meaning that people tend to act in rational and consistent ways but also prefer less effort to much effort. As a result, people often prefer simple to complex solutions. "One simple solution is to rely on heuristics such as 'the majority is always right,' or

‘consensus is good’” (Rook, 2006). Following such heuristics would lead to groupthink. The concept of groupthink illustrates that satisfying solutions sometimes lead to detrimental decision making in groups, while people do not engage in careful inspection of arguments. It, thus, clearly illustrates how important it is in analyzing herd behavior to account for the limited rationality of individuals.

When the herd behavior shows up? Bikhchandani et al. (1998) proposed that “herding may arise when payoffs are similar even if initial information is not”. In this regard, people communicate with each other or observe others’ actions – or the consequences of these actions. In other words, while individuals face similar decision problems with insufficient information, they make similar choices. In the herding process, the key issue is how individuals determine which alternative is better. Each individual could decide based on their analysis of the alternatives, but this way usually is recognized as costly and time-consuming (Bikhchandani et al., 1998). A plausible alternative is to rely on the information of others through direct communication and discussion with, or observation of others.

Although there have been many studied discuss herd behavior, especially in financial markets, little is know about its effect on consumer behavior. “Studies that have attempted to document and quantify the presence of herding in the market have obtained results that are far from conclusive” (Cipriani and Guarin, 2003). Based on Cipriani and Guarin’s research, most existing works are studied both at a theoretical and at an empirical level. Moreover, the result of herd behavior may result in terrible consequence and sometime even cause the market broken, but the terrible consequence is still unknown about why and how it happens. Heuristically, herd behavior requires smart opinion leaders’ prediction, but nobody knows who is the right leader or if the one that most people follow is smart. Many examples diffused in financial markets could support this point. For example, some individuals buy stocks simply following the herd in a bull market, or sell stocks when the market diffuses the

wave of pessimist. However, from individual viewpoint, there is somebody to be “the last victim,” who not only does not earn money under herding, but may lose much. Sine nobody want to be the last victim, they will follow the majority behavior all the more.

Therefore, this study is devoted to shed light on the phenomenon of herd behavior in consumer behavior, which is happened in China market with a special tool, System Dynamics. The reason to use System Dynamics as research method is based on the limitation of existing methods on marketing research. In the following, we will introduce System Dynamics and illustrate its suitability for this study.

2.3 Apply System Dynamics to WOM

According to Manski’s (2000) survey of the state of empirical research on social interactions and the difficulty of drawing inferences about the nature of an interaction process from observations on its outcomes, he argued that “structural analysis of markets remains a subtle inferential problem and econometric methods do not, indeed cannot, resolve the basic identification problem.” The data commonly brought to bear to study such interactions has only limited power to distinguish among alternative believable hypotheses. Observations on market transactions and their prices only can reveal the factors determining the choices of market participants (Bikhchandani and Sharma, 2001). Therefore, analyzing social interactions requires strong assumptions that may diminish the credibility of the conclusions about behavior. This is the current limitations faced by marketing researchers.

System Dynamics is usually used to understand the behaviors of complex systems over time. The features of System Dynamics, that make it different from other approaches to studying complex systems, is the use of feedback loops and stocks and flows. These elements are helpful to describe the phenomena that seem to be simple systems but truly with baffling nonlinearity.

Reviewing past literature in System Dynamics, most researches about WOM (e.g., Rabelo and Speller Jr., 2005; Yeon et al., 2006) are based on Bass's (1969) model about product diffusion. A diffusion model is based on the beliefs that good sales practice with hyped technology is expensive but leads to a high proportion of satisfied users, which is positive for subsequent diffusion; and that high choice probability makes new customers increase and in turn accumulate into total customer. But there are some missing pieces that show the relationships between WOM effect and herd behavior. Existing works on diffusion models are ignored the limitation of capacity or supply. Therefore, this study would try to extend the existing marketing models by adding the capacity consideration into the new start-up entry structure.

3. Research method

In Greater China (including Mainland China, Hong Kong, and Taiwan), the phenomena that has been called herd behavior is quite widespread. Some well-known examples are stock market bubbles, overheating property market, Tamagotchi (which is a handheld digital pet created in 1996 by Aki Maita and sold by Bandai), Portuguese custard-tart, fried donut, croissant, and so on. The purchasing behavior of these things has a common feature: in the beginning, these things are sold as the hottest star and the leading seller in Greater China heated battle among a dramatically increased number of competitors; and, egregiously, the enthusiasm for these things cool down quickly. Furthermore, when a new popular product/service shows, people would have doubt that if this new product/service is just another passing fad like the Portuguese custard-tart.

No matter which herding phenomena that we have found, the purpose is to build a simulation model to generalize the concept of features about these phenomena. Based on this purpose, two requirements should be taken account in this model: first, the phenomena which are suitable for this model must involve herd behavior; second, the market breeding herd behavior will bust from boom.

3.1 The basic model of herd behavior

Now, we will take the purchasing behavior of Portuguese custard-tart as the example to build the basic model of herd behavior. Originally, Portuguese custard-tart came from Macau. When Portuguese custard-tart was exported to Hong Kong and Taiwan, it got highly addictive to the customers and hence, inspired long queues at shops and restaurants where sold Portuguese custard-tart. The purchasing behavior of Portuguese custard-tart is a typical example to introduce herd-behavior in Greater China.

In order to explicate this case, we divide into two parts to describe in detail how it happened. The one part is micro-behavior, the others is macro-behavior as follow.

Micro-Behavior

Does the result would be worse, while individual make the best decision that he think? When someone desires to introduce some new products or services, in order to attract peoples' focus, they would adopt some ways such as promotions, artist advocate and so on. Customer would stand long queues at store in order to buy this products or services.

Regard to herd behavior, for instance, Portuguese custard-tarts or pasteis de nata, was very popular in 1998, in Taiwan. It had been highly addictive to Taiwan People. Andrew Stow, famed promoter of Portuguese custard-tart, founded Lord Stow's Bakery in 1989 and from the 1990s. Stow's creation inspired long queues at shops and restaurants, including such unlikely venues as Kentucky Fried Chicken (KFC) outlets in Hong Kong.

In 1998, someone found that Portuguese custard-tart was a highly profitable business, and he introduced into Taiwan immediately. The first branch store of Andrew's Bakery was opened on March, 1998. In order to produce topicality, they

just provided about a half production capacity to make tarts per day, even though they can provide sufficiently. And it was resulted long queues at shop. As you can see, figure 1 shows that the loop which so called share from WOM. When the pilot Andrew's bakery began to open, people queued up for Portuguese custard-tart sequentially at the time. The early generated favorable word of mouth, the more adoptions the more WOM and the more potential adopters in a positive feedback loop. This loop is named share from WOM to capture the process of herd contagion.

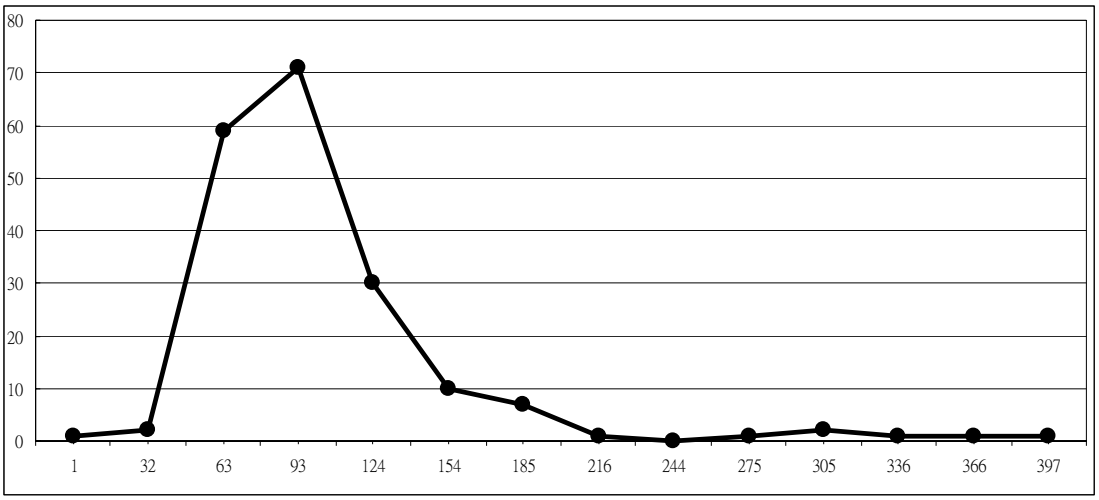

Figure 1. Amount of media reports

In this case, another positive feedback loop which also increased the potential adopter named share from media reports. As the media ecology is becoming more and more competitive, so-called topical news is defined to the new information about specific and timely events. People were curious about long queues at the time. And the medium interested in this event and reported as possible as they could. So the more people queue, the more Portuguese custard-tarts they buy, and the higher media reports soar. When media reports increased, it generated more potential adopters further. As Figure 1 shows, in Taiwan, the census is a report that the main medium reported about Portuguese custard-tart from June in 1998. After one month, as we can see, Portuguese custard-tart begun to sell on the quiet in Taipei. It would be the most dramatic thing that some famous artists followed this current. The medium were

particularly intrigued by these followers. The amount of media report peaked in September and has been declining ever since.

Macro-Behavior

In addition to all of the above, there is another point of view that we can discuss. At micro-level, we can understand the cause and effect between media report and adoption, but we can't have deep understanding about how the market crashed so suddenly. So we have to broaden our horizons from micro-level to macro-level. In order to recognizing, we might to take suppliers into consideration. Suppose supply and supply price were fixed, but demand density would increase as demand increased. People who noticed that demand density was increased; they would developed an interest to invest this business. The more people desire to invest, the more bakeries would be created. After the bakeries were created in a while, the supply of Portuguese custard-tarts would increase. This loop was formed in a balancing feedback loop, so-called star-up boom. Because of stagnancy and media over-hype and people who

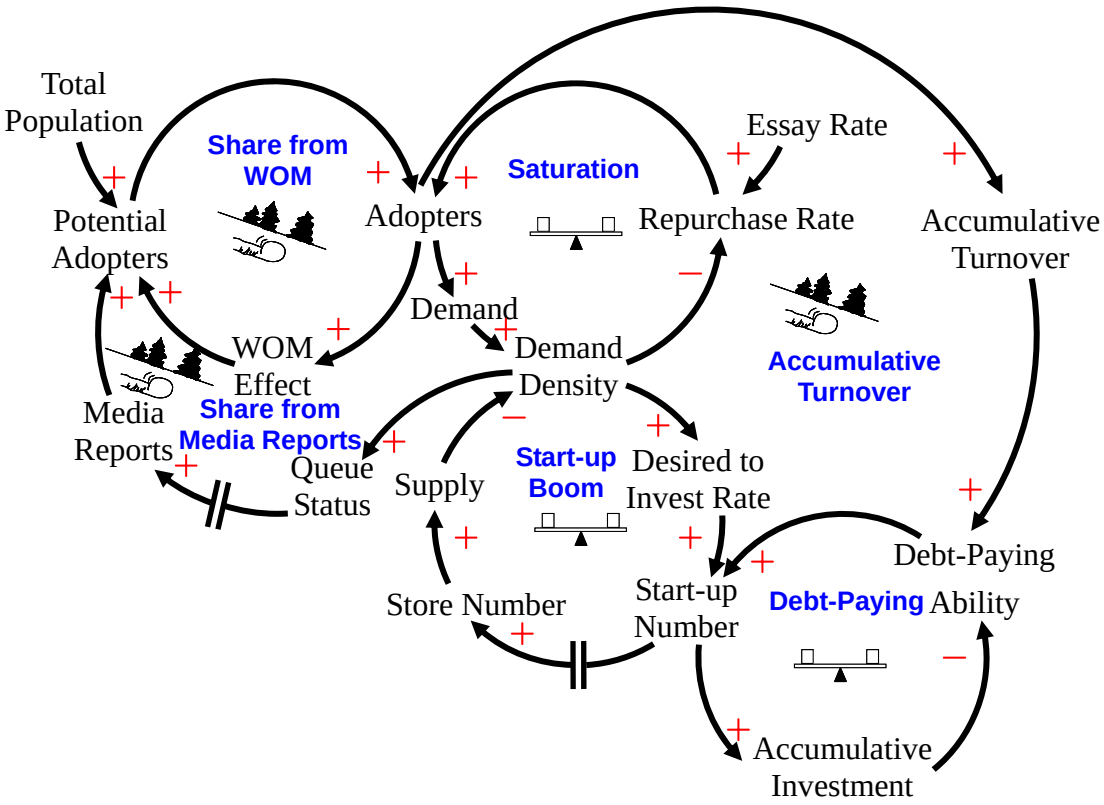

Figure 2. The model of herd behavior

desired to enter this market had shot up during that time.

As Figure 2 shows, the dominant feedback loop shifts from the positive contagion loop to the negative saturation loop. In this case because adoption requires a word of mouth encounter between an adopter in loop dominance is a fundamentally nonlinear process. The shift in loop dominance occurs at the point where the adoption rate peaks. The behavior of the system shifts from acceleration to deceleration, and the system gradually approaches equilibrium. This loop is named saturation.

At last, when many people invested into this business, they must own an ability of debt-paying, because they had to lend money from banks. The debt-paying ability could be high as they earn money, contrarily they would lose money.

The feedback loop dominance analysis

In this model, we try to identify the variable of interest that will determine feedback loop dominance. As Figure 3 shows, the dominant loop in WOM system. The variables which determine feedback loop dominance include Potential Adopters, Adopters, WOM, and so on.

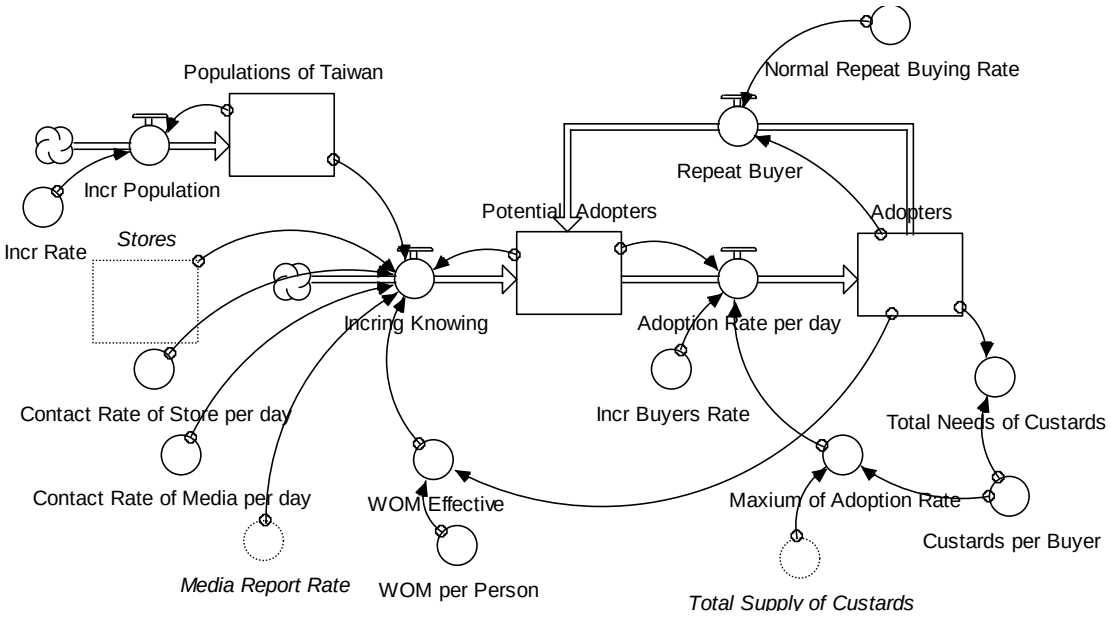

Figure 3. The micro-level of herd behavior in demand

Customer

Regard to herd behavior, the Bass diffusion model was a base that we used. The Bass model was introduced a exponential growth of initial purchases to a peak and the exponential decay (Bass, 1969; Paich, and Sterman, 1993; Sterman, 2000). In our research, we tried to use the concepts on Potential Adopters and Adopters. The purpose adoption was to represent the diffusion and adoption of new products. It is because that this kind of issue often follows S-shaped growth patterns (Sterman, 2000). Generally speaking, Adoptions would increase through Potential Adoptions and subsequently Adoptions spread WOM. As a result, the more WOM affects, the more Potential Adoptions.

After someone begun to buy the Portuguese custard-tart, he would share it with his friend. We suppose that the adaptors would share with 5 people who are his friend. The more adoptions buy the more people who might know Portuguese custard-tart. Then, the more people know it and the more potential adoptions. Besides, when people who know Portuguese custard-tart increased and the store of Portuguese custard-tart would increase too.

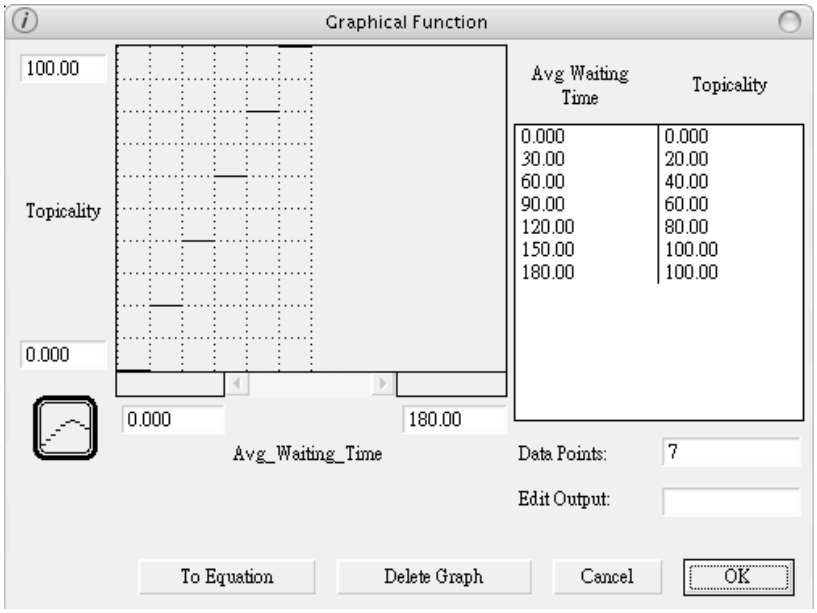

Figure 4. The table function of Ave_Waiting_Time and Topicality

As Figure 4 shows, the more people stand long queues the more topicality it has. We suppose that the level of topicality is from 0 to 100, the more waiting time that people had the more topicality for medium. And the medium would be more interesting to report this kind of news.

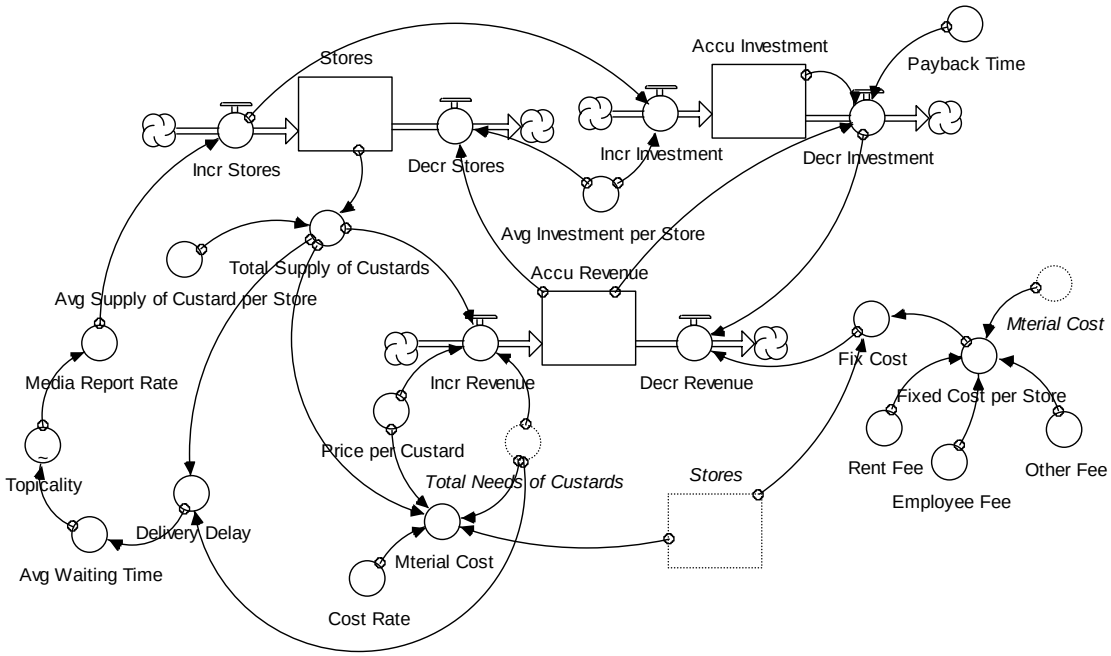

Figure 5. To micro-level of herd behavior in Supply

Customer, in addition to store belongs to micro-level behavior in this case. Store owners inspired long queues at shops in order to create topicality. They limited the production capacity and caused customer had to spend three to four hours to buy custard-tart (see Figure 7). A long queue is topical news for the most medium. In this case, medium reported this news substantially while this event became to be the focus of attention. Then somebody forestall others to invest bakery for selling custard-tart and some bakeries turn to product Portuguese custard-tart. So, every role tried to do the best decision for him.

Imagine what would be happen. The speed of adoption rate was not nearly enough increasing stores and the speed of return was not faster than investment.

There are three levels in WOM loop. The adopter increasing rate is caused by potential adopters. The adopters increased for the period under consideration (see Figure 6). People would know the product and service so fast. After 100 days, all of Taiwan people heard Portuguese custard-tarts and someone began to be first pilots.

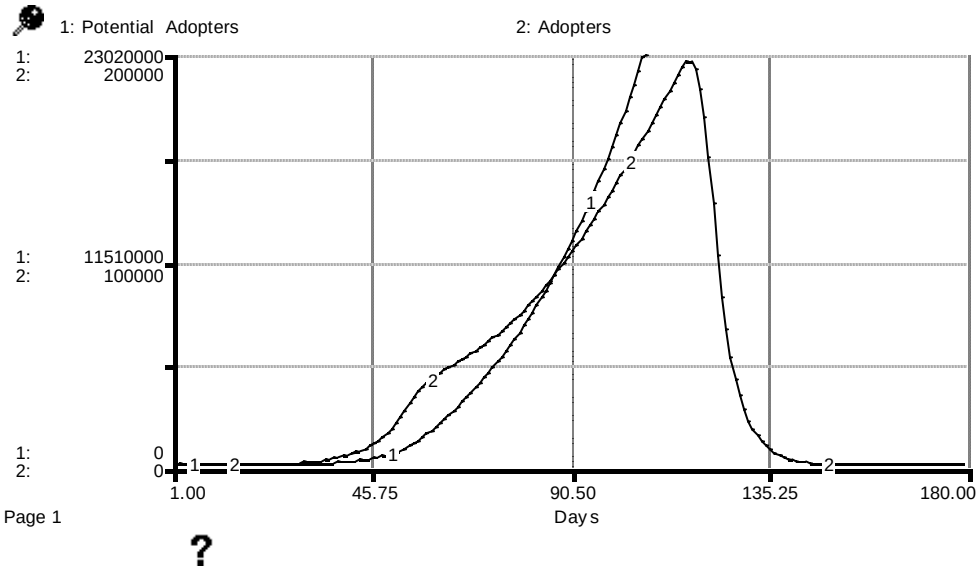

Figure 6. The reinforcing behavior

In this research, we hope to explain the phenomena of herd behavior. But no explanation of this mystifying condition was apparent until we added another players like some enterprisers. Enterprisers who saw a profitable, they would create bakery store as fast as they can.

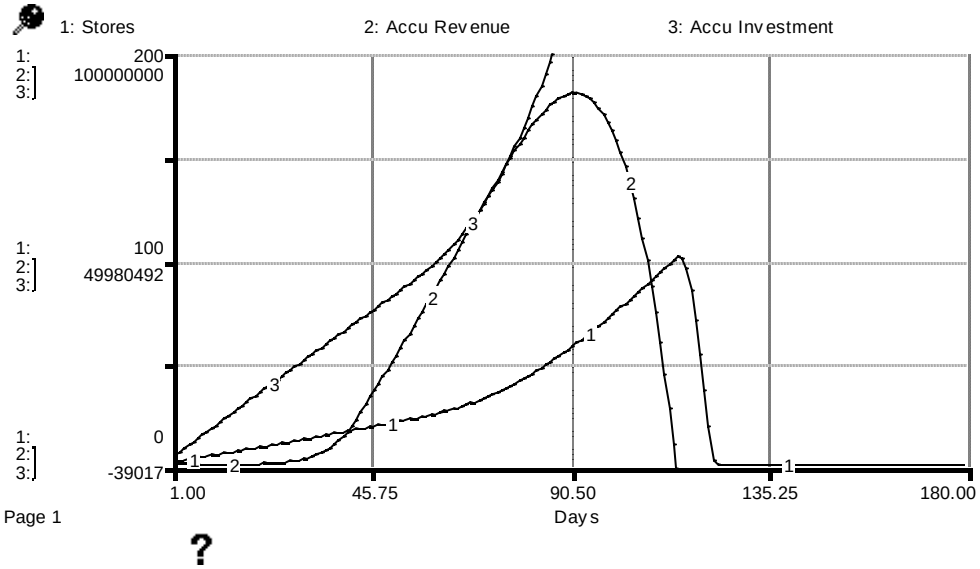

Figure 7. The results of all models

The results of the simulation of this case, the market was crash about 90 days. It is because that the ability of debt-paying was on the wane. People did haphazard investment and cutthroat competition due to the strong herd instinct. This case came suddenly, nobody could aware at this time. As you can see, accumulative investment was increase continually, but the market had crashed (see Figure 7).

Conclusions

This event of Portuguese custard-tart is very popular since this time. It is inconceivable for Taiwan people. This study contributes to extend the diffusion model through this event. Herd instinct is a social tendency in humans to identify with and model many behaviors and beliefs after a larger group of individuals with whom they identify. We can find a lot of similar cases in the world. If we don't know about that, we would make the wrong decisions again and again. That is why we want to build a herd behavior model to helping people make their way through a complex and uncertain world. Herd behavior is a very familiar phenomenon in China area. In this paper, we select a very popular case, Portuguese custard-tarts, to simulate. The phenomenon of herd behavior was among the first topics studied in social psychology (Van Ginneken 1992). Early economists like Thorstein Veblen (1899) and sociologists like Georg Simmel ([1904] 1957) applied it to sudden shifts in consumer behavior such as fashions and fads. Even so, no one can explain completely. The most fundamental tenets of system dynamics can clear up significant muddles in public thinking. According our assumptions, individuals' decision is affected by what other people are doing. And herding behaviors would appear on everyone does what everyone else is doing. It is also appear not only customers, but the store founders. The herding instinct in humans can have both positive and negative effects. The only thing what we can do is to simulate our assumptions about herd behavior. Though we would make the same mistakes and increase social costs.

This paper addresses the boom and bust of the market for Portuguese

custard-tarts in Taiwan using a new product diffusion model coupled with new start-up firm entry. This is an interesting application of boom and bust and has the potential to contribute to our understanding of this phenomenon.

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